Does the location of European companies still matter for their access to finance?

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Keywords:
geography of finance,
access to finance,
financial centers,
peripheries,
regional development,
capital structure

This paper investigates the role of European firms´ location in their access to capital from 2014 to 2018. Spatial variation in a firm´s access to finance triggers differences between the development of rural and urban areas. The study draw on the geography of finance, which explores the phenomenon of the spatial distribution of financial markets, and aim to answer the question of to what extent the location of a firm affects its access to capital. The authors focus on both credit and equity markets and pursue an econometric approach. The paper explore the drivers of the capital structures of European firms with the main control variables connected to the spatial distribution of economic actors. The authors adds to the regional finance literature by examining hard data on the real capital structure patterns of firms. The findings lead to different conclusions: While for the credit market, the location of a firm still matters, financial center bias regarding the primary equity market is fading due to the growing computerization of communication.

Highlights:

- Companies from financial centers have better access to bank credit.
- The concentration of the banking system increases the disparities between the core and periphery.
- There is financial center bias in the equity markets in most European countries.
- Financial center bias is negatively linked to the computerization of financial markets.

Online first publication date: 12 June 2024

Introduction

Regional development in Europe is driven by factors of geographical inequality (Bachtler 2014, Nemes Nagy–Tagai 2011), which creates national and international disparities. All regions face issues relating to agglomeration effects, with problems typically being most acute in the least accessible areas driven by different endowments of human knowledge, public, social, and financial capital (Bachtler 2014). The role of the last-mentioned driver of geographical inequality – financial capital – is, however, ambiguous. Scholars (Garretsen et al. 2009) have argued that if geography had once been relevant for understanding capital movements, it would rapidly become irrelevant. O'Brien (1992) argued that technological advances in information and communication technologies (ICT) accelerated financial integration globally, while location and geography are losing their significance for financial firms and products. O'Brien (1992) called this statement the end of the geography of finance, but this study was followed by several other empirical and theoretical studies that confirmed that location and place remain of crucial importance in the world of finance (inert alia: Leyshon 1998, Martin 1999, Wójcik 2009, Alessandrini et al. 2009, Bečicová–Blažek 2015). In contrast, other scholars (McKillop–Hutchinson 1990) do not find any evidence of variation in access to finance among some regions in Northern Ireland.

This paper aims to fill this research gap using data on the capital structures of European companies and to lay an empirical foundation for regional policy recommendations about regional access to financial capital. Government policies significantly influence regional socioeconomic disparities via frameworks shaping capital endowments (Harger et al. 2019). Lee–Luca (2019) or Chmelíková–Somerlíková (2018) state that access to finance is vital for economic growth, and if it varies spatially, it is likely to be a factor in continued uneven regional development. This issue calls for empirical evidence on the relationship between firm location and access to finance.

According to Lee–Luca (2019), evidence in developed economies suggests geographical variation in access to finance. Their study, covering data from 97 countries, confirmed that firms in large cities perceive lower obstacles to obtaining credit than firms in less-developed regions. Zhao–Jones-Evans (2017) found evidence suggesting that the operational proximity between banks and borrowers appears to be important in access to bank finance. This article thus aims to contribute to the growing literature on the geography of finance. Previous studies are mainly based on qualitative research conducted on soft data revealed from interviewed credit applicants (inter alia: Lee–Luca 2019, Chmelíková–Redlichová 2020). Our contribution adds to the regional finance literature by examining complex data on European firms' real capital structure patterns.

The paper proceeds as follows. While the second part reviews extant theoretical and empirical studies that focus on the regional variation in access to finance, the third and fourth parts propose hypotheses to be tested, describe data and methods, and present the empirical study. We divide our empirical study on the role of distance in financial decision-making into two main parts. First, we empirically verify whether the location of a firm or the structure of the banking system influences the level of capital from banks in the capital structures. Second, we empirically verify whether firms' location within countries still matters in public equity markets. The concluding section discusses our main results.

Regional variation in access to finance

As the introductory section indicates, research on the geography of finance is of major relevance from a practical and scientific point of view. Access to finance is an effective channel for job creation in an economy (Kraemer-Eis–Conforti 2009). Regional variation in access to capital sources may cause regional disparities, as it is a driver of geographical and socioeconomic inequality (Bachtler 2014 or Gomes Lages et al. 2015). The regional variation in Europe is moreover driven by distinct approaches to the financial system. While the continental models place greater emphasis on bank loan financing, the Anglo-Saxon model, commonly found in the United Kingdom, favors equity and bond financing. However, the empirical evidence on the relationship between the spatial distribution of financial markets and their impact on firms' capital structures is limited.

Research in corporate finance, theories of capital structure and their relationship to the company's value mostly anticipated the assumption of perfect capital mobility at the level of all regions. A company's geographical location was not considered a decisive factor in determining capital structure patterns. The situation was similar in the field of economic geography. The spatial distribution of financial markets became a more frequently explored topic in the 1990s. This interest was triggered by financial globalization, financial integration, and the rise of financial centers, which sparked an increase in the scientific community's interest in research into the phenomenon of the spatial distribution of financial markets. The research was motivated by the growing integration of international capital markets, which was connected with the liberalization of cross-border capital flows. O'Brien (1992) argued that we are moving toward a global financial marketplace no longer bounded by national frontiers. The key driver of this development is introducing new information technology that destroys geographical barriers around markets (Dicken 2011). Despite this information technology development, which probably surpassed the notions of possible development from the perspective of the early 1990s when O'Brien declared the end of geography concerning finance, there is still high geographical variation in access to finance. This was shown in several empirical studies that emerged in reaction

to the claim of O'Brien (1992) that geography had become irrelevant in modern financial systems (e.g., Degryse–Ongena 2005 or Agarwal–Hauswald 2010). Economists and geographers began to address this issue in bank systems and public capital markets.

The first stream concerns the role of proximity regarding the supply and demand for bank loans. Since the 1990s, the development of the banking sector has accepted global banking principles, which have led to many mergers and acquisitions with uniform organizational and product structures. This was accompanied by the growing size of banks and the geographical widening of their markets. The authors warned that globalization and consolidation of banking systems would generate high transactional costs for firms in the periphery and exclude them from bank services (Dow 1992, Martin 1994). On the other hand, others argued that bank competition is played out in the field of geographical proximity and changes the structure of local branches. Berger–De Young (2001) found that while banks moved their headquarters from smaller cities to larger cities, branches moved substantially farther away from their headquarters. Their evidence that banking institutions have become less geographically centralized was later supported by Alessandrini et al. (2009), who, however, showed that smaller operational distance did not enhance credit availability for small firms due to worsened functional distance. The growing concentration in the banking sector increased the distance between banks and borrowers, which did not necessarily mean banks' reluctance to lend to remote and lesser-known clients.

In contrast, larger banks with a more robust capital background have better options in technological equipment for digitizing soft client data and processing sophisticated ratings (Udell 2009). Zhao–Jones-Evans (2017) found evidence suggesting the presence of a region-specific influence on small firms' access to bank finance. Their findings suggest that the operational proximity between banks and borrowers appears to be important in access to bank finance. Similar to Zhao–Jones-Evans (2017), Bečicová–Blažek (2015) showed that there is a credit gap in the peripheral Czech regions. Their studies indicate that the problems that entrepreneurs face in periphery areas regarding the value of their premises when setting them as collateral are significantly underestimated.

The second main direction of the research in financial geography concerns the place role in the public capital markets. Factors affecting the behavior of firms in capital markets and their decision to go public have become the subject of several empirical studies. While Gajewski–Gresse (2006) and Ritter (2003) searched for the differences between European countries, Brau–Fawcett (2004) looked at the differences between sectors. Wójcik (2009) and Chemmanur et al. (2010) examined the dependence of the probability of going public on corporate location within a country. Wójcik (2009) analyzed financial center bias in developed economies.

The results show that firms in cities with concentrated financial services are more likely to go public than firms in peripheral areas. The less developed the country's

stock market is, the stronger the financial bias is. Chemmanur et al. (2010) confirmed Wójcik´s findings and showed that firms' behavior depends on the behavior of their neighboring institutions more than those of distant ones, leading to the creation of clusters in the financial centers. Scholars (Bathelt et al. 2004, Storper–Venables 2004, Chmelíková et al. 2019) have argued that the most significant driver of firms' concentration with equity from the initial public offering (IPO) is a relationship among issuers, investors, and investment banks, which cannot be created through the exchange of information at a distance but requires regular face-to-face contact. However, the role of distance in human communication has recently developed rapidly. The pandemic situation during the coronavirus crisis has shown that distance is no longer as important as it used to be. It turned out that new technologies made it possible to communicate, work, and meet without the physical presence of individual participants. The question remains as to what extent these new technical possibilities have affected the customs of the financial market and thus affected the optimum capital structures of respective companies.

Effects of spatial attributes on access to bank capital

Research objective

The topic of optimal capital structure and its influence on shareholder value has received tremendous attention in the financial sector in recent decades. This scientific discussion led to the evolution of capital structure theories, which have passed through many variations and requirements. There are several milestones in the development of this scientific topic. First, scholars identified the optimum capital structure in terms of dependence on the cost of capital (Durand 1952); later, they came up with the irrelevance propositions (Modigliani–Miller 1958), which were later modified to trade-off theory (Miller 1988). The latest approach, pecking order theory (Myers–Majluf 1984), shows a preference for internal sources, followed by long-term loans, and the last preference is the issue of shares. These milestones of capital structure theory work with firm- or sector-specific factors to explain the behavior of capital structures. However, the role of space is not included, which motivates our research question as to what extent the locations of firms influence their capital structures.

The last decades brought a phenomenon of globalization and intensified international competition, which led to a concentration of financial systems on both levels – institutional and geographical. This motivated academic interest in conducting empirical studies on the access of small and medium firms from the periphery to capital structure. Agarwal–Hauswald (2010) showed that credit is more accessible to nearby firms, as soft information about borrowers can be easily obtained in financial centers. Alessandrini et al. (2010) found that small and medium firms in remote areas

with lower banking service density have fewer sources to introduce process and product innovations. Bellucci et al. (2013) explored the dependence of term credits on bank-borrower physical proximity and confirmed that interest rates and binding credit limits increase with the distance between borrowers and banks. Most of these empirical studies were conducted on a sample of small- and medium-sized enterprises. However, the empirical evidence for large firms is missing.

Moreover, previous studies build mainly upon qualitative research conducted on soft data from interviewed credit applicants. Our contribution adds to the regional finance literature by examining hard data on the real capital structure patterns observed in firms in the European area. Scholars (Bathelt et al. 2004, Storper–Venables 2004) have argued that the social relationships between borrowers and banks are of great importance and cannot be created through the exchange of information at a distance but require face-to-face contact. Accordingly, to answer our research question, we propose our first hypothesis as follows:

H_1: The share of bank loans in the capital structure of listed firms depends on the firm's location within a country.

Data

We build a dataset to investigate our hypothesis by drawing on several sources. We combine a worldwide database of firms Orbis (Bureau van Dijk – Moody´s analytics company) with the country-level data obtained from various existing databases [1–3].

Our research sample comprises publicly traded firms in the European Union (EU) and the United Kingdom, and the territorial extension of this part of the study covers all 27 EU countries + The United Kingdom. The number of firms in our data changed during the observation period, which led to the creation of unbalanced panel data. We have 10,543 firms across 28 countries, each with 2–5 years of data from 2014 to 2018. The variations in the analyzed dataset do not decrease its information content.

Our country-level data come from several sources. Data on gross domestic product (GDP) per capita, interest rates and concentration and centralization of the banking sector were obtained from the Statistical Data Warehouse of the European Central Bank. Indicators of Financial Institution Depth, Financial institutions Access, Financial institutions Efficiency, financial market depth, Financial Market Access, and financial market efficiency are published annually by the International Monetary Fund 2–3].

All variables, including a description of the measures used and their descriptive statistics, are summarized in Table 1.

Table 1

Description of variables and summary statistics for the BLTA (Outstanding balance on bank loans/total assets) model

Variables	Abbreviation	Description	Source	Mean	SD	Min	Max	N
Firm-specific level								
Share of bank loans	BLTA	Outstanding balance on bank loans/ total assets	[4]	0.152	0.0981	–0.040	14.492	12,370
Age	AGE	Number of years since creation	**[4]**	36.535	24.000	3.0000	342.00	52,717
Size	TOVR	Overall turnover	**[4]**	$1.3e^{+009}$	$1.7e^{+007}$	$–10e^{+008}$	$3.4e^{+011}$	33,475
Profitability	ROE	Net income/ shareholder's equity	**[4]**	–2.908	4.539	–999.5	939.77	37,874
Location	FC	Location of a firm in financial center	**[4]**	0.515	1.000	0.000	1.000	52,712
Country-specific level								
Economic power	GDPpC	Gross domestic product per capita	[5]	103.93	100.10	22.300	335.70	52,627
Financial market efficiency	FME	Stock market turnover ratio (stocks traded to capitalization)	[3]	1.000	0.047	0.461	835	51,882
Market concentration of bank system	HERB	Herfindal index for credit institutions	[4]	0.210	0.028	0.048	90	52,627
Level of bank system centralization	CENTR	Number of all bank branches/ number of banks	[4]	0.012	0.000	0.002	18,291	34,426

Source: Own processing based on data from [3–5].

Methodology

We aim to investigate to what extent the location of a firm is linked to a different level of bank loans in its capital structure. Our empirical strategy to evaluate our hypotheses is based on an estimation of a multivariate regression model with random effects. We evaluate our hypotheses based on the value of the estimated parameters and their statistical significance (De Jong et al. 2012). To test our hypothesis, we use our cross-sectional data with the dependent variable *BLTA*, which represents the share of bank loans in the capital structure of analyzed firms. Controls on the firm represent our independent variable- and country-specific level according to recent literature on capital structure, attributed to changes in capital sources of the firms. Our main control variable *(FC)* represents the influence of the firm's location. It takes 1 if the firm is located in the financial center and zero if it lies outside. We define a financial center as an urban area or agglomeration where the financial market institutions are concentrated headquarters. For all EU countries, we use their capitals as a financial center. There is an exception of five countries without an obvious single financial center, where we take two, three or even four cities combined: Germany – Berlin, Düsseldorf, Frankfurt am Main, and Munich; Italy – Milan, Rome and Turin; Netherlands – Amsterdam and Rotterdam; Portugal – Lisbon and Porto; and Spain – Barcelona and Madrid. We also deploy variables controlling for the quality of the financial market (*FME*) and banking system (*HERB*) and (*CENTR*). *HERB* indicates the concentration of market power in the banking sector in individual countries. To measure market concentration, we use the most common indicator, the Herfindahl index, which is calculated by squaring the market share of each bank competing in a market and then summing the resulting numbers. The growing concentration in the banking sector is believed to increase the distance between banks and borrowers (Udell 2009) and firms' preferences in financial centers. With growing concentration, the overall usage of bank credit in the economy might be increased, as the concentration allows banks to pool their resources and build a larger capital base. With more capital, banks have greater capacity to lend money and extend credit to borrowers from various regions. We expect a similar dependence from *CENTR*, which represents the rate of centralization of banking systems in particular countries. This indicator is calculated as the ratio between the number of bank branches in the country to the number of all banks in the country. Centralization in the banking sector can result in economies of scale and increase the overall usage of bank credit in the country. The increased efficiency can translate into reduced costs of lending and offer a wider range of financial products and services to various sectors and regions. By diversifying their offerings, banks can attract a larger customer base and serve different segments of the market. This diversification allows them to allocate resources more effectively.

To test the influence of the location of a firm on the capital structure of large firms, the following regression model is estimated:

$$\boldsymbol{BLTA_{ijt}} = \alpha + \beta_0 X0_{ijt} + \beta_1 Y1_{jt} + \varepsilon_{ijt},$$

where $BLTA_{ijt}$ is a year-*t* share of bank loans of firm *i* located in country *j*. $X0_{ijt}$ is a set of firm-specific variables that are believed to be drivers of capital structure for firm *i* located in country *j* in year *t*. $Y1_{jt}$ is a set of country-specific drivers of capital structure describing country *j* in year *t*, and ε_i, is the residual (random) part of the model.

Model estimation and results

Panel data, including 7,197 observations, were used to estimate the panel model with random effects to investigate the impact of selected explanatory variables on the dependent variable. The results are estimated with robust standard errors to overcome a potential problem with autocorrelation and heteroskedasticity in panel data. The explanatory variables included in the model were selected from a more extensive set of possible variables concerning strong collinearity between variables. Table 2 offers an interpretation of the results after econometric verification of the estimated model.

Table 2

Model table – Dependent variable BLTA

Independent variables	Coefficient β	Standard errors
FC	0.0153***	(0.0051)
TOVR	–1.073e-012***	(9.58e–225)
ROE	−9.561e-05**	3.120e–05**
AGE	−0.0002***	5.291e–05**
GDPpC	0.0002***	5.053e–05**
FME	0.0462***	0.00931***
HERB	0.1133***	0.03800**
CENTR	4.0115**	0.8565**
Const	0.0668***	0.0091***
AIC	−8,456.923	
Hausman test p value	0.17	
Observations	7.197	

Note: *** and ** denote statistical significance at the 0.001% and 0.01% levels, respectively.

Table 2 shows the results of estimating the impact of the different locations of the firms on the level of bank loans in their capital structures. A positive prefix for the estimated coefficients indicates a positive relationship between the independent variables and the level of bank loans in the capital structure; similarly, a negative prefix suggests a negative relationship. Specifically, we find a significant positive influence

for the main control variable: the location of a firm in the financial center (*FC*), economic level of the country (*GDPpC*), efficiency of the financial market (*FEM),* market concentration of the banking system (*HERB*), and level of its centralization (*CENTR).* We find significant negative evidence for the age of the firm (*AGE*), financial performance (*ROE*) and size in terms of total turnover (*TOVR*).

The location of a firm in a financial center (*FC*) is significantly positively associated with our dependent variable (*BLTA*), which means that firms with higher physical proximity to the headquarters of financial institutions have a higher share of bank credit in their capital structures. This result is consistent with Zhao–Jones-Evans (2017), who found evidence suggesting the presence of a region-specific influence on small firms' access to bank finance, as well as with the study of Bečicová–Blažek (2015), who showed that there is a credit gap in the peripheral Czech regions. Therefore, the results of our analysis support our Hypothesis H1 that the share of bank loans in the capital structure of listed firms depends on the firm's location within a country. Our findings clearly show that physical proximity is still important in access to capital and contributes to regional disparities.

Other control variables on the country-specific level describe the qualities of the national economy and financial market – the economic level of the country (*GDPpC*), efficiency of the financial market (*FEM),* market concentration of the banking system (*HERB*), and level of its centralization (*CENTR)* are significantly positively associated with a higher share of bank loans in the capital structures of analyzed firms. The findings on centralization are in contrast to Alessandrini et al. (2009), who showed that banking organizations have become less geographically centralized and that smaller operational distance did not enhance credit availability for firms due to worsened functional distance. Our findings show that higher centralization of the banking sector leads to the higher usage of bank capital, which can be driven by the higher efficiency of banks. This efficiency can translate into reduced costs of lending, making credit more affordable and accessible to borrowers. Lower costs may also incentivize banks to extend credit to a broader range of customers, including those in underserved or less profitable markets. The results of Udell (2009) indicate that growing concentration in the banking sector brought an increase in the distance between banks and borrowers, which, however, did not necessarily lead to a reluctance of banks to lend to remote and lesser-known clients. This finding is in agreement with our results.

Control variables on the firm-specific level *(AGE),* (*ROE*), and (*TOVR*) are negatively and significantly associated with the share of bank loans (*BLTA*). This finding is consistent with pecking order theory (Myers–Majluf 1984), which shows a preference for internal sources, followed by long-term loans, with the least-preferred being the issue of shares. Profitable firms (high *ROE*) and those with a long-term history (high *AGE*) generally have better access to internal funds generated from their operations (e.g., Zdráhal 2019). They can rely on retained earnings, which are

considered a less costly and more readily available source of financing. Since these firms have a trac7k record of profitability, they are in a better position to assess and utilize their internal funds without the need to disclose sensitive information to external lenders. The statistically significantly negative relationship between the share of bank loans and profitability with the combination of long-term history offers empirical evidence to support pecking order theory.

Public equity markets and location of a firm

Research objective

The geography of public equity offerings is outside the interest of mainstream research in this area and is usually assumed to be irrelevant. However, several empirical studies confirmed that place matters when deciding on primary equity markets because a piece of information is not easily transferable across space. Wójcik (2009), Ioannou–Wójcik (2021) and Chemmanur et al. (2010) examined the dependence of the probability of going public on corporate location within a country. Wójcik (2009) analyzed financial center bias all over developed economies and found that firms from cities with concentrated financial services are more likely to go public than firms from peripheral areas. Wójcik (2009) argues that issuers from financial centers may use better communication channels of bank syndicates with potential investors than those in remote regions. He also mentions an aspect of pooled liquidity when an area has only a limited number of potential investors and hence little capital to be invested. Local issuers may struggle to access public equity markets.

To describe the differences in the probability of participating in public stock markets between provincial and urban companies, he created a measure called the financial center bias index (FCBI). The FCBI is calculated as a share of large, listed companies in the financial centers to all large companies in the financial centers related to the share of large, listed companies in provinces to all large companies in provinces in the underlying economy. An index higher than 1 shows that the ratio of issuers to potential issuers is more prominent in the financial centers than in the rest of the country and points to the fact that there is a financial center bias. He defines a financial center as an urban area or agglomeration where the financial market institutions are concentrated headquarters (similar to Csomós 2015). He found five countries in the EU without an obvious single financial center. Here, the FCBI was calculated for two, three or even four cities combined (Germany – Berlin, Düsseldorf, Frankfurt am Main and Munich; Italy – Milan, Rome and Turin; Netherlands – Amsterdam and Rotterdam; Portugal – Lisbon and Porto; and Spain – Barcelona and Madrid). For the remaining EU countries, he used their capital as financial centers. Wójcik (2009) showed that in 2006, financial center bias prevailed in 21 EU countries, meaning that large companies in these countries are more likely to be listed if they come from the financial center. Wójcik (2009) found that the probability of getting

public depends on the firm's size, sector, and country-specific factors, including stock market development and corporate governance indicators. However, the influence of changing communication platforms remained beyond this comprehensive research. Therefore, we aim to answer the research question, to what extent the computerization of communication has affected the customs of the primary equity market, and accordingly propose our second hypothesis as follows:

H_2: Financial center bias is negatively linked to internet use in financial markets.

Data

We need to divide our analysis into two steps to investigate our hypothesis. First, it is necessary to actualize the FCBI for our observation period of 2014–2018. Data for FCBI are obtained from two different sources – We combine a worldwide database of Orbis firms (Bureau van Dijk – Moody´s analytics company) with the data from Eurostat. While the data on the numbers of publicly traded companies are obtained from Orbis, the data on some companies operating in the underlying economies are collected from the Eurostat – Regional Business Demography section. The data from Orbis are obtained for all 27 EU members. However, Eurostat lacks several observations on the number of operating companies for regions in Belgium, Croatia, Cyprus, Germany, Greece, Ireland, Luxembourg, Malta and Slovenia. This enables calculation of FCBI results in this study covering only 18 EU countries, which are listed in Table 3. To obtain results comparable to those of the previous study, we study only firms with more than ten employees.

Second, when investigating the influence of financial markets on the FCBI, we build a dataset based on several sources. We combine the worldwide database of Orbis firms with the country-level data obtained from various existing databases (Eurostat, Statistical Data Warehouse of the European Central Bank, and Databases of International Monetary Fund). The number of FBCIs in our data changed during observation, leading to unbalanced panel data creation.

Methodology

We start this section with the calculation of FCBI, defined as a share of large, listed companies in the financial centers to all large companies in the financial centers related to the share of large, listed companies in provinces to all large companies in provinces in the underlying economy. We calculate FCBI according to the following equation:

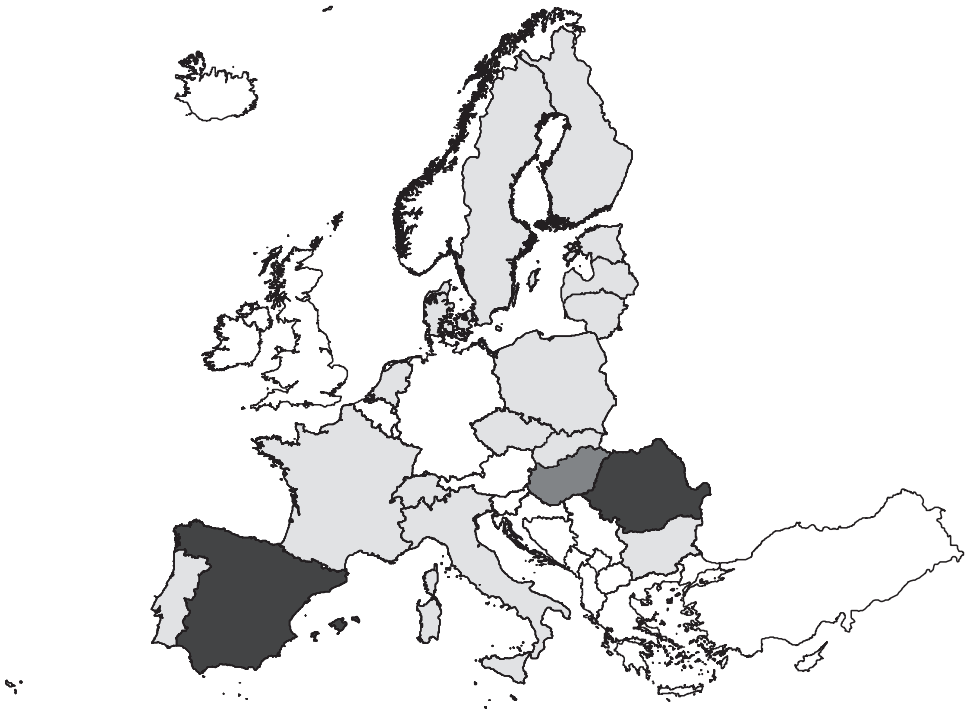
$$FCBI_{i,t} = \frac{\frac{Number\ of\ Listed\ Companies\ in\ Financial\ Centre\ _{i,t}}{Number\ of\ All\ Companies\ in\ Financial\ Centre\ _{i,t}}}{\frac{Number\ of\ Listed\ Companies\ out\ of\ Financial\ Centre\ _{i,t}}{Number\ of\ All\ Companies\ out\ of\ Financial\ Centre\ _{i,t}}}$$

where: *FCBI* stands for financial center bias index, *i* represents the country, *t* represents the year (2014–2018).

An index higher than 1 shows that the ratio of issuers to potential issuers is larger in the financial centers than in the rest of the country and points to the fact that there is a financial center bias. Figure 1 shows that the FCBI is greater than 1 in 15 out of 18 countries. This confirms the findings of Wójcik (2009), who states that most EU countries face a financial center bias.

Figure 1

Financial center bias index in EU countries in 2018



Source: Own processing based on [4].

The results in Table 3 show that FCBI is decreasing on average, which supports our prediction that the role of the place in the primary equity markets lost its importance during the observation period due to the computerization of communication. We aim to investigate this assumption and determine to what extent financial center bias is linked to different levels of computerization of financial markets. The empirical strategy to evaluate our Hypothesis H2 is based on an estimation of a multivariate regression model with fixed effects. Variables were tested for stationarity and were found to be stationary. The presented model is estimated with robust standard errors to overcome the potential threats of heteroskedasticity and autocorrelation. For the estimation of the econometric model, we use Gretl software.

Table 3

Financial Center Bias in EU countries in 2014–2018 (share of large, listed companies in the financial centers to all large companies in the financial centers related to the share of large, listed companies in provinces to all large companies in provinces in the underlying economy)

Country	2014	2015	2016	2017	2018
Austria	3.19	3.18	3.08	3.07	3.05
Bulgaria	2.43	2.44	2.40	2.38	2.37
Czech Republic	1.53	1.37	1.36	1.36	1.35
Denmark	0.20	0.14	0.16	0.10	0.10
Estonia		1.43	2.17	2.17	2.09
Finland	1.26	1.25	1.24	1.21	1.17
France	1.58	1.58	1.61	1.62	1.62
Hungary	11.00	9.27	9.18	9.08	9.18
Italy	1.86	1.88	1.91	1.97	2.08
Latvia			1.10	1.12	1.12
Lithuania	0.35	0.49	0.47	0.47	0.47
Netherlands	4.19	4.25	4.15	4.26	4.20
Poland			3.80	3.82	3.84
Portugal	1.64	1.64	1.65	1.66	1.67
Romania	12.36	11.89	11.66	11.61	11.48
Slovakia	0.88	0.84	0.87	0.91	0.91
Spain	21.04	21.16	21.31	21.46	21.87
Sweden					1.30
Average	4.54	4.19	4.01	4.02	3.88

Source: Own processing based on [4].

We use our cross-sectional data with the dependent variable (FCBI) to test our second hypothesis, representing financial center bias. Controls on the country-specific level define our independent variables according to recent literature on capital structure attributed to changes in capital sources of the firms. Our main control variable (*EFI*N) represents the level of computerization of financial markets. We take this variable from Eurostat, which offers information on internet usage in financial services on an annual basis.

We also deploy variables controlling for the financial market development that are annually published by the International Monetary Fund and are represented by the set of following indices: *FMD* stands for financial market depth and compiles data on stock market capitalization to GDP, stock traded to GDP, international debt securities of government to GDP, and total debt securities of financial and nonfinancial corporations to GDP; *FMA* denotes financial market access and is defined as percent of market capitalization outside of top 10 most prominent companies and total number of issuers of debt per 100,000 adults; (*FME*) stands for financial market efficiency and is defined as stock market turnover ratio (stock traded to capitalization); *FIA* stands for financial institutions access and compiles data on bank branches per 100,000 adults and ATMs per 100,000 adults; and *FIE* is financial

institutions efficiency, which collects data on financial indicators of banking sector (net interest margin, return on assets, return on equity, overhead costs to total assets). Furthermore, we control for the banking systems' concentration (*HERB*) and centralization (*CENTR*). *HERB* indicates the concentration of market power in the banking sector in individual countries. To measure market concentration, we use the most common indicator, the Herfindahl index (e.g., Blažková–Chmelíková 2015), which is calculated by squaring the market share of each bank competing in a market and then summing the numbers. CENTR represents the rate of centralization of banking systems in particular countries. This indicator is calculated as the ratio between the number of bank branches in the country to the number of banks.

To test the influence of the location of a firm on the capital structure of large firms, the following regression model is estimated:

$$\boldsymbol{FCBI_{it}} = \alpha + \beta_0 EFIN_{it} + \beta_1 FMD_{it} + \beta_2 FMA_{it} + \beta_3 FME_{it} + \beta_4 FIA_{it} + \beta_5 FIE_{it} + \beta_6 HERB_{it} + \beta_7 CENTR_{it} + \varepsilon_{ijt},$$

where: *FCBI* stands for financial center bias index, *EFIN* is the level of computerization of financial markets, *FMD* is financial market depth, *FMA* is financial institutions access, *FME* is financial market efficiency, *FIA* is financial institutions access, *FIE* is financial institutions efficiency, *HERB* is the market concentration of the banking system, *CENTR* is the level of its centralization, *i* represents country, *t* represents year (2014–2018).

Model estimation and results

Panel data, including 28 observations, were used to estimate the model with fixed effects to investigate the impact of selected explanatory variables on the dependent variable. The results are estimated with robust standard errors to overcome a potential problem with autocorrelation and heteroskedasticity in panel data. The explanatory variables included in the model were selected from a more extensive set of possible variables concerning strong collinearity between variables. All variables, including a description of the measures used and descriptive statistics, are summarized in Table 4.

Table 4

Description of variables and summary statistics for the FCBI model

Vari-ables	Abbre-viation	Mean	SD	Min	Max	N
Financial center bias index	FCBI	1.859	4.106	0.104	21.866	81
Financial institutions access	FIA	0.7215	0.708	0.501	0.838	80
Financial institutions efficiency	FIE	0.722	0.708	0.501	0.838	80
Financial market depth	FMD	0.535	0.480	0.018	0.949	80
Financial market access	FMA	0.408	0.373	0.005	0.980	80
Financial market efficiency	FME	0.697	0.659	0.047	1.000	70
Market concentration of the bank system	HERB	0.094	0.114	0.036	0.636	80
Level of bank system centralization	CENTR	24.984	47.573	3.654	167.52	64
Level of computerization of financial markets	EFIN	56.250	53.983	4.500	94.500	90

Source: Own processing based on [1–4]

After econometric verification of the estimated model, we interpret the results in Table 5.

Table 5

Model table – Dependent variable FCBI

Independent variables	Coefficient β	Standard errors
EFIN	– 0.045**	0.015
FMD	– 4.075***	0.849
FMA	0.750*	0.374
FME	–2.146	1.300
FIA	–2.482*	1.180
FIE	0.930	0.584
HERB	1.156	07.784
CENTR	–0.024***	0.007
Const	15.145***	3.047
AIC	–60.452	
Observations	28	

Note: *** and ** denote statistical significance at 0.001% and 0.01%, respectively.

Table 5 shows the results of changing the computerization of financial markets on the financial center bias index. A positive and negative coefficient indicates a positive and negative relationship between the independent variables and the financial center bias in the particular country, respectively. Specifically, we find a significant negative influence for our main control variable – computerization of financial markets (*EFIN*), which points out that electronic transfer of information helps overcome the distance and leads to decreased financial center bias. This finding contrasts with

studies by Bathelt et al. (2004) and Storper–Venables (2004). They argue that the most significant driver of firms' concentration with equity from the IPO is a relationship among issuers, investors, and investment banks, which cannot be created through the exchange of information at a distance but requires regular face-to-face contact. However, the role of distance in human communication has recently developed rapidly, and our findings show that financial center bias is decreasing on average. This finding supports our prediction that the role of the place in the primary equity markets is losing its importance due to the computerization of communication. Therefore, the results support Hypothesis H2 that financial center bias is negatively linked to internet use in financial markets. Our findings clearly show that the location of a firm loses its importance in the primary equity markets.

Furthermore, we find a negative statistically significant relationship between the ability of individuals and companies to access financial institutions (*FIA*) and financial market depth, defined as a combination of size and liquidity of markets (*FMD*). A negative relationship was identified between the level of centralization of the banking systems (*CENTR*) and financial center bias indices.

Discussion and conclusion

Social inequalities between core and peripheral regions are driven by different human, knowledge, and social and financial capital endowments. Access to financial capital is often considered a crucial factor for economic growth (Chmelíková–Redlichová 2013), enabling economic agents to make long-term consumption and investment decisions. If access to finance varies spatially, it may cause uneven regional development. There is a tendency to concentrate on bank headquarters and other key financial institutions, such as city stock exchanges (Dicken 2011). However, the advancement of ICT is believed to accelerate financial integration and mitigate the importance of location and financial geography. However, the empirical evidence appears ambiguous or contradictory. The findings from testing our empirical models bring different conclusions for primary equity markets and bank capital. While a firm's location still matters for the market of bank capital, financial center bias on the primary equity market is fading due to the growing computerization of communication and thanks to the EU initiative Capital Market Union, which influenced the regional variation of the primary equity market by promoting equal access to capital, diversifying investment opportunities, harmonizing regulations, and fostering the development of local capital markets.

The results indicate that the company's location matters when using bank loans in capital structures. It turns out that companies in financial centers have a higher share of bank loans in their capital structures than their counterparts outside the financial centers. Moreover, the higher the market concentration of the banking system is, the more firms from financial centers use bank capital. Additionally, the higher the bank

system's centralization is, the higher the level of bank loans in the capital structures is. Pecking order theory (Myers–Majluf 1984) shows a preference for internal sources, followed by long-term loans, and the last preference is the issue of shares. Among firm-specific indicators, such as age, size, and financial performance (*AGE, TOVR* and *ROE*), we find a strong negative significant association with the usage of bank capital. This finding is consistent with the pecking order theory (Myers–Majluf 1984), which claims that internal sources are preferred over external sources. Those big and profitable firms generate enough internal sources to finance their operation and prefer their usage to bank loans. Generally, our empirical results support our first hypothesis that the share of bank loans in the capital structure of listed firms depends on the firm's location within a country.

The second part of our research aims to examine the role of place in firms' decision-making process when going public. We follow the research on financial center bias started by Wójcik (2009) and find that there still exists a significant financial center bias in most European countries. The benefit of issuers´ proximity to specialized IPO intermediaries still matters, albeit its relevance has slightly declined. Next, financial segment characteristics believed to count for capital structures are examined. In total, we find a statistically significant association between financial center bias and the level of internet usage in the financial sector. This enables us to support our second hypothesis that financial center bias is negatively linked to the computerization of financial markets. Among the financial market characteristics, we find a significant negative association between financial center bias and access to financial institutions and depth of the financial market, which is consistent with general economic theory. The negative association between the level of centralization of the banking sector and financial center bias can be explained by a higher rate of state intervention in these countries and taking companies public by the state.

Declaration of interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgments

We thank Mendel University for partial financial support via internal grant (IGA) number FRRMS – IGA – 2023/014.

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