

FGF Studies in Small Business and Entrepreneurship

Alexandra Moritz  
Joern H. Block  
Stephan Golla  
Arndt Werner *Editors*

# Contemporary Developments in Entrepreneurial Finance

An Academic and Policy Lens on the  
Status-Quo, Challenges and Trends

 Springer

# **FGF Studies in Small Business and Entrepreneurship**

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# About the FGF Studies in Small Business and Entrepreneurship

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# Preface

Increased regulations, new technologies, and new methods of communication have significantly changed the financing landscape for entrepreneurial ventures and small- to medium-sized companies (SMEs) in recent years. In the past, fast-growing innovative start-ups were heavily dependent on a limited number of finance sources: family and friends, bootstrapping, or investments by an angel followed by venture capital. For many entrepreneurs, acquiring external finance was the major challenge in the development and growth of their ventures—even though they had good future business prospects. If they were lucky, they were able to obtain support from government funding. SMEs could address their local banks or their suppliers, trying to secure the financing required. Other sources of financing were not available—not like today. However, the entrepreneurial finance landscape has changed dramatically in the past decades. Nowadays, the capital can be acquired from many new sources reflecting the different needs in different financial situations of modern SMEs. Large corporations and even some smaller ones, for example, have created their own accelerator funds to provide equity financing for innovative start-ups. Corporate venture capital is going through its sixth cycle, creating an unprecedented boom. A number of different fund types have emerged, such as venture debt funds or social venture funds, which not only try to reduce the financing gap of small innovative firms but also follow nonfinancial goals and support good causes, and, ultimately, the Internet, with its platforms and crowd-based investment opportunities providing debt financing, equity, or just rewards which have created a totally new environment of entrepreneurial finance. In fact, not only have the financing opportunities of start-ups and small businesses changed in a way that multiple sources of external finance are available both on national and international levels. The whole industries are facing disruption by aggressive young fintechs. The editors of this edited volume believe that it is time to issue a series of articles addressing these latest trends and provide an overview of the current and future developments. This book tries to provide a comprehensive understanding of these new trends in financial decision-making and supply of capital by new players. This book is therefore a starting point comprising studies with focus on SMEs as well as young and growing firms.

In the first part, this book focusses on the status quo of SME financing, trends in market regulation, and governmental initiatives and their consequences for SME financing. First, Masiak, Moritz, and Lang investigate SME financing by using cluster analysis. They develop a useful empirical taxonomy of SME financing patterns in Europe. Werner, Menk, and Neitzert are focussing on the context of SME financing. They contribute to another long-term discussion and analyze the access to capital markets for SMEs in the European Union. While politicians try to open the path to international capital markets, the authors highlight the importance of local banks and their contribution to money supply. In the next chapter, Zimmermann discusses the use of funds for either innovation activities or investments. Interestingly, the author shows that all innovations are heavily dependent on internal sources of finance, while investments are backed by bank loans plus internal funding. Finally, Raimi and Uzodinma investigate SME financing in Nigeria and provide a comprehensive overview of the trends in Nigerian financing programs.

In a contemporary book about entrepreneurial finance, investigations of trends in venture capital and business angel financing are indispensable. Hence, the second part of our book focusses on these financing sources. First, Granz, Henn, and Lutz show that venture capitalists and business angels differ in regard to their investment criteria. A central problem in starting a new firm is the availability of financial resources because of the high degree of uncertainty due to the newness and/or innovativeness of entrepreneurial ventures. In this context, the authors develop a conceptual framework grounded on agency theory for the investment criteria that VCs and BAs use for their funding decisions. Following this, Diegel et al. introduce a venture capital sentiment index in Europe to better understand the current and future investment climate of VC investors. The next two chapters by Signore, Masiak, Fisch, and Block discuss activities in the venture capital market. First, Signore investigates the relationship between innovations and their related value using a large venture capital database. Afterward, Masiak, Fisch, and Block analyze the distribution of the different types of venture capital investments in 402 German regions and provide implications for high-tech firms and regional policy initiatives.

In addition to classical VC funds, corporate venture capital is currently reaching the pinnacle of start-up investments. Roehm and Kuckertz apply rigid scientific methodology to assess typical corporate venture capital-related circumstances. In particular, they focus on their dependency on the corporate world while doing business with start-ups, which are embedded in a different ecosystem.

In the third part, this book focusses on the current trends in entrepreneurial finance. First, Hirschmann and Moritz investigate social ventures and their funding opportunities. Finding funding for start-ups is always challenging—but these difficulties are even more pronounced for social ventures where financial returns are often subordinated to social returns. Grants have been considered as an important financing source for these types of start-ups. The authors investigate the requirements for social ventures to receive grants and highlight that grants also increase the likelihood to receive follow-up financing.

Afterwards, this book looks at the financing opportunities enabled by the Internet and the participation of the crowd. For quite a while, crowdfunding was considered

the silver bullet of start-up financing. In the context of this new trend, a new instrument based on cryptocurrencies and the block chain has emerged—initial coin offerings (ICOs). This new and highly innovative financing source completes the portfolio of disruptive innovations in the financial sector. Ackermann, Bock, and Bürger compare the main characteristics of crowdfunding and ICOs and provide insights both on motivational factors of investors and success factors for their campaigns. Finally, Daldrup, Krahl, and Bürger investigate the suitability of crowdfunding to support public research. Their article provides different approaches how Public Research Organizations (PROs) and universities can successfully acquire financing through the crowd.

In sum, we expect that this book provides an excellent contemporary overview of the current trends in entrepreneurial finance and outlines expected future developments. With their thematic diversity and different methodologies, the chapters included offer a multifaceted picture of the current and future entrepreneurial finance landscape. We strongly believe that this book can be considered as a timely reference and essential reading material for students, academics, practitioners and political decision makers.

The editors and authors are grateful and acknowledge the long-standing and ongoing support of our Arbeitskreis “Gründungs- und Mittelstandsfinanzierung” by “Wissenschaftsförderung der Sparkassen-Finanzgruppe e.V.”.

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**Part I**  
**Status Quo in SME Financing**  
**and Financial Market Regulation**

# European SME Financing: An Empirical Taxonomy



Christian Masiak, Alexandra Moritz, and Frank Lang

**Abstract** This study investigates financing patterns of European SMEs by looking at a large number of different financing instruments and their complementary and substitutive effects, using the SAFE dataset collected in 2015. We develop an empirical taxonomy of SME financing patterns in Europe to analyse SME financing, applying cluster analyses. Our cluster analysis identifies seven distinct SME financing types based on the financing instruments used: mixed-financed SMEs with focus on other loans, mixed-financed SMEs with focus on retained earnings or sale of assets, state-subsidised SMEs, debt-financed SMEs, trade-financed SMEs, asset-based financed SMEs and internally financed SMEs. Moreover, the SME financing types can not only be profiled according to their firm-, product-, industry- and country-specific characteristics but also to macroeconomic variables. Our findings can support policy makers in assessing the impact of changes in policy measures for SME financing.

**Keywords** European SME financing · Financing patterns · Empirical taxonomy · Cluster analysis

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A prior version of this chapter has been part of the EIF Working Paper series: Masiak, C., Moritz, A. and Lang, F. (2017): Financing Patterns of European SMEs Revisited: An Updated Empirical Taxonomy and Determinants of SME Financing Clusters, EIF Working Paper 2017/40 and the doctoral dissertation of Christian Masiak “Financing SMEs and Entrepreneurial Opportunities: Firm- and Regional-Level Investigations from Europe” awarded by Trier University (Germany) in 2018. In contrast to the working paper and dissertation, this version is shortened significantly and focusses on macroeconomic differences.

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# 1 Introduction

Small- and medium-sized enterprises (SMEs) are a significant driver of the European economy, as approximately 99.8% of all European nonfinancial enterprises are SMEs, generating around EUR 3.9 trillion value added per year (European Commission 2016). Nevertheless, SMEs are often confronted with financing constraints due to high information asymmetries, insufficient collateral, agency risks and high transaction costs for capital providers (e.g. Artola and Genre 2011; Berger and Udell 1998; Chong et al. 2013; Ryan et al. 2014).

Although research in SME financing has increased over the last years (e.g. Casey and O'Toole 2014; Lawless et al. 2015; Moritz et al. 2016), little is known about the substitutive or complementary usage of several financing instruments and cross-country differences in Europe. Moritz et al. (2016) found that country differences seem to have the strongest impact on differences in SME financing patterns. However, the authors did not further investigate the reasons for these differences. In our study, we complement this research by including macroeconomic variables (e.g. Beck et al. 2008; Camara 2012; Demirgüç-Kunt and Maksimovic 1999; Hernández-Cánovas and Koëter-Kant 2011). Furthermore, we analyse the status quo of the financing patterns of European SMEs and consequently check for the stability of the clusters identified by Moritz et al. (2016).

We use the “Survey on the access to finance of enterprises (SAFE survey)”, which is conducted on behalf of the European Central Bank (ECB) and the European Commission (EC). The SAFE survey contains information on about 17,950 firms in 39 countries (wave 2015H1). Since the majority of firms in the SAFE survey are SMEs (approximately 90%), the survey is ideally suited for our research question. Moreover, the SAFE survey contains information about a large number of different financing instruments, as well as firm-, product-, industry- and country-specific information. We use the different financing instruments as active variables in our cluster analysis to identify financing patterns of SMEs in Europe. To profile the different financing patterns, we use the firm-, product-, industry- and country-specific characteristics provided in the SAFE survey.<sup>1</sup> In this article, however, we focus solely on country-specific and in particular macroeconomic variables. To complement these profiles, we added a number of relevant macroeconomic variables to our dataset such as GDP per capita, inflation rate and volatility, unemployment rate or property rights.

Our findings contribute to the literature on SME financing in different ways (e.g. Beck et al. 2008; Casey and O'Toole 2014; Lawless et al. 2015; Moritz et al. 2016). To date, little is known about the complementary and substitutive use of

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<sup>1</sup>For an entire analysis of all passive variables, such as firm-, product- and industry-specific characteristics, please refer to the following EIF Working Paper: Masiak, C., Moritz, A., and Lang, F. (2017): Financing Patterns of European SMEs Revisited: An Updated Empirical Taxonomy and Determinants of SME Financing Clusters, EIF Working Paper. Available at: [http://www.eif.org/news\\_centre/publications/EIF\\_Working\\_Paper\\_2017\\_40.htm](http://www.eif.org/news_centre/publications/EIF_Working_Paper_2017_40.htm). Accessed 01 October 2018.

different financing instruments (Beck et al. 2008; Casey and O’Toole 2014). Our findings suggest that the identified financing patterns by Moritz et al. (2016) are relatively stable over time and various financing instruments are used as complements and substitutes by European SMEs. Furthermore, we contribute to the literature by investigating the influence of country characteristics on small firms’ financing (e.g. Beck et al. 2008; Camara 2012; Mokhova and Zinecker 2014).

The remainder of the study proceeds as follows: Section 2 provides a literature review focused on macroeconomic variables influencing SME financing. Section 3 explains the dataset (SAFE survey), the method applied and the description of the variables used in the empirical analysis. In Sect. 4 we provide the results of the cluster analysis and the determinants of the financing patterns. Section 5 summarises the results, discusses limitations and suggests further research areas.

## 2 Literature Review

Prior research identified a significant effect of country-, firm- and industry-specific factors on SMEs’ usage of different financing sources (Chittenden et al. 1996; Ferrando and Griesshaber 2011; Hall et al. 2000; Mac an Bhaird and Lucey 2010). However, many previous studies focused on a single financing instrument and did not investigate the complementary and substitutive use of different debt and equity instruments (exceptions are, e.g. Beck et al. 2008; Casey and O’Toole 2014; Lawless et al. 2015; Moritz et al. 2016).<sup>2</sup>

Furthermore, several previous studies have analysed the effect of country-specific and macroeconomic variables on SME financing. For instance, the gross domestic product (GDP) is an indicator for a country’s economic development, and its influence on the capital structure of firms has been widely investigated (e.g. Bopkin 2009; Mokhova and Zinecker 2014). Prior research found that there is a negative relation between both GDP and GDP growth and the firm’s capital structure choices (Bopkin 2009; Gajurel 2006). Also, the unemployment rate is used as an indicator of economic development. However, prior findings on the influence of a country’s unemployment rate on the capital structure of firms have been mixed (Camara 2012; Mokhova and Zinecker 2014). Moreover, empirical studies investigated the effect of the inflation rate on the financing of firms but also with mixed findings. Camara (2012), Hanousek and Shamshur (2011) Sett and Sarkhel (2010) identified a positive effect on the firm’s leverage, but Gajurel (2006) reported a negative influence of the inflation rate on total leverage. Beside these factors, prior research investigated the effect of macroeconomic indices, such as the legal system index or the property rights index (e.g. Duan et al. 2012). It has been found that companies in countries with better protection of property rights use to a larger extent

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<sup>2</sup>Refer to Moritz (2015) who provides a comprehensive and detailed literature review on SME financing and its influencing factors.

external financing, especially bank and equity finance, as better protection of property rights increases the security for capital providers (Beck et al. 2008; Psillaki and Daskalakis 2009).

However, most prior studies are either focused on larger firms or did not investigate the complementary and substitutive use of different financing instruments (e.g. Beck and Demirgüç-Kunt 2006; Bopkin 2009; Chavis et al. 2011). We tap into this research gap by developing an empirical taxonomy of SME financing patterns and characterise the patterns according to the macroeconomic variables.

### **3 Data, Method and Variables**

#### ***3.1 The SAFE Survey***

The main dataset used for our analysis is obtained from the “Survey on the access to finance of enterprises (SAFE survey)”, which is conducted on behalf of the European Central Bank (ECB) and the European Commission (EC). The SAFE survey is run on a biannual basis by the ECB, while it is carried out once a year (since 2013) through cooperation between EC and ECB (European Central Bank 2016; European Commission 2015). The difference between the biannual and annual questionnaire is the number of questions asked and the participating countries. The firms in the sample are selected randomly from the Dun & Bradstreet database by a specialist research institute, to underline the fact that it is anonymous and professional.

The SAFE survey contains various firm-specific information, such as firm size (turnover, number of employees), firm age, ownership structure, main activity (industry, trade, construction, service), growth, innovation activity and financing information (e.g. current financing sources, evaluation of the access to finance). According to the size categories, the SAFE differentiates between micro (1–9 employees), small (10–49 employees), medium-sized (50–249 employees) and large firms (>250 employees). The sample of the SAFE survey is artificially distorted due to the sampling process. Therefore, we used post-stratification weights (calculated on the basis of Eurostat data) in order to restore the non-distorted proportions based on the approach applied by Moritz et al. (2016). For our analysis, we used the joint EC/ECB wave number 13 that was conducted between April and September 2015. In total, the sample includes 17,950 firms in 39 European countries.

#### ***3.2 Method***

In order to identify an empirical taxonomy of SME financing patterns, we conduct a hierarchical cluster analysis. Cluster analysis is an appropriate method to identify

groups of firms that use similar financing instruments. The goal is to identify clusters which are relatively homogeneous within the clusters but are distinctively different from each other (e.g. Hair et al. 2010; Özari et al. 2013).

Different hierarchical cluster analysis algorithms were tested (single linkage, average linkage, complete linkage and Ward's method) in order to identify an empirical taxonomy of SMEs in Europe. We decided to use Ward's method because this algorithm generated relatively homogeneous clusters with balanced cluster sizes, whereas the other methods provided unbalanced cluster sizes or clusters with high intra-cluster heterogeneity (Backhaus et al. 2013). Furthermore, this approach allows us to directly compare our results with the analysis by Moritz et al. (2016), without causing differences due to the application of a variety of methods. Consistent with Ward's algorithm, we used the squared Euclidean distance as a measure of proximity. Based on the validation tests (test of Mojena and elbow criterion), as well as face validity and theoretical foundation (Backhaus et al. 2013; Mojena 1977), we identified seven distinct SME financing clusters.

### 3.3 Variables

#### 3.3.1 Active Cluster Variables

In the SAFE survey, the participating SMEs are asked about the financing of their company and, in particular, the financing instruments used. The question consists of two parts: First, the enterprise was asked whether it had used the specific financing instrument in the past or would consider using it in the future (i.e. whether the financing instrument was relevant to the firm). Second, the company was asked whether it had used the financing instrument during the past 6 months. The following financing instruments were queried: (a) retained earnings or sale of assets; (b) grants or subsidised bank loans; (c) credit line, bank overdraft or credit card overdrafts; (d) bank loans (both short and long term); (e) trade credit; (f) other loans (e.g. from family and friends, a related enterprise or shareholders); (g) leasing or hire purchase; (h) factoring; (i) debt securities issued; (j) equity (quoted shares, unquoted shares or other forms of equity provided by the owners or external investors, such as venture capital companies or business angels); and (k) other sources of financing (subordinated debt instruments, participating loans, peer-to-peer lending, crowdfunding).

#### 3.3.2 Passive Cluster Variables

To characterise the different financing patterns, several firm-, product-, industry- and country-specific determinants are included as passive cluster variables based on prior research (e.g. Ferrando and Griesshaber 2011; Mac an Bhaird and Lucey 2010). The majority of the variables is retrieved from the SAFE survey (see Table 1). To analyse

**Table 1** Passive cluster variables

Passive cluster variables	Coding	Comments
<b>Firm size (1): number of employees</b> How many people does your company currently employ either full- or part-time in [country] at all its locations?	1 = from 1 employee to 9 employees 2 = 10–49 employees 3 = 50–249 employees 4 = 250 employees or more	Category 4 was excluded from the analysis
<b>Firm size (2): turnover</b> What was the annual turnover of your enterprise in 2014?	5 = up to EUR 500,000 6 = more than EUR 500,000 and up to EUR 1m 7 = more than EUR 1m and up to EUR 2m 2 = more than EUR 2m and up to EUR 10m 3 = more than EUR 10m and up to EUR 50m 4 = more than EUR 50m	Category 5, 6 and 7 are recoded to “up to EUR 2m”
<b>Firm age</b> In which year was your enterprise first registered?	1 = 10 years or more 2 = 5 years or more but less than 10 years 3 = 2 years or more but less than 5 years 4 = less than 2 years	Recoded in the dataset
<b>Ownership</b> Who owns the largest stake in your enterprise?	1 = public shareholders 2 = family or entrepreneurs 3 = other enterprises or business associates 4 = venture capital enterprises or business angels 5 = one owner only 7 = other	
<b>Growth in the past (1): employee growth</b> Over the last 3 years (2012–2014), how much did your firm grow on average per year in terms of employment regarding the number of full-time or full-time equivalent employees?	1 = over 20% per year 2 = less than 20% per year 3 = no growth 4 = got smaller	
<b>Growth in the past (2): turnover growth</b> Over the last 3 years (2012–2014), how much did your firm grow on average per year in terms of turnover?	1 = over 20% per year 2 = less than 20% per year 3 = no growth 4 = got smaller	

(continued)

**Table 1** (continued)

Passive cluster variables	Coding	Comments
<b>Growth expectation</b> Considering the turnover over the next 2–3 years (2015–2017), how much does your company expect to grow per year?	1 = grow substantially—over 20% per year 2 = grow moderately—below 20% per year 3 = stay the same size 4 = become smaller	
<b>Profit</b> Has profit decreased, remained unchanged or increased over the past 6 months?	1 = increased 2 = remained unchanged 3 = decreased	
<b>Access to finance problems</b> How important have the following problems been for your enterprise in the past 6 months? (scale 1–10)	1 = it is not at all important 10 = extremely important	Recoded in the dataset: 1 = low (1–3) 2 = medium (4–6) 3 = high (7–10)

the country-specific differences, we add macroeconomic variables provided by the OECD, the European Commission, the Heritage Foundation and the World Bank.<sup>3</sup>

### 3.4 Descriptive Statistics

For our research goal to identify financing patterns of SMEs in Europe, we include all firms from the SAFE survey with less than 250 employees according to the definition of the European Commission (European Commission 2005). Hence, our study includes 13,098 firms (see Tables 2 and 5). We reweighted the sample using data on firm size, economic activities and countries by Eurostat in order to make valid statements for the overall population of SMEs in Europe. The final reweighted sample mainly consists of micro firms with less than ten employees (93%). Moreover, 6% of the firms employ 10–49 people, whereas only 1% of the firms have 50–249 employees. Furthermore, approximately 90% of the companies have an annual turnover of less than EUR 2m. Regarding to firm age, most of the firms (71.8%) are mature companies ( $\geq 10$  years old). The majority of SMEs is from Italy (16.8%), France (13.3%), Spain (10.4%), Germany (9.7%) and the United Kingdom (7.9%). With regard to the active cluster variables, credit lines, bank overdrafts or credit card overdrafts were the external financing source that the largest share (33.9%) of firms in the sample used over the past 6 months. Many firms (40.6%)

<sup>3</sup>Please refer to the EIF Working Paper for a detailed explanation of the variables included: Masiak, C., Block, J., Moritz, A., Lang, F., und Kraemer-Eis, H. (2017): Financing Micro Firms in Europe: An Empirical Analysis, EIF Working Paper 2017/44, available at: [http://www.eif.org/news\\_centre/publications/eif\\_wp\\_44.pdf](http://www.eif.org/news_centre/publications/eif_wp_44.pdf).

**Table 2** Sample description (active cluster variables)

Source of financing	Used in the past 6 months
Retained earnings or sale of assets	10.7%
Grants or subsidised bank loans	5.3%
Bank overdraft, credit card overdrafts, credit lines	33.9%
Bank loans	14.3%
Trade credit	15.7%
Other loans	9.6%
Debt securities issued	1.2%
Leasing, hire purchase or factoring	12.5%
Equity	1.2%
Other sources of financing	1.0%
Factoring	2.9%
No external financing used	40.6%

in the sample, however, did not use any external financing in the last 6 months. Table 3 provides a detailed overview of the utilisation of the different sources of financing.

## 4 Empirical Analysis

### 4.1 Identifying an Empirical Taxonomy of SMEs in 2015

To identify an empirical taxonomy of SMEs based on different financing instruments, we perform a cluster analysis. In total, 13,098 SMEs are included in the analysis, providing a 7-cluster solution ( $p < 0.01$ ). The results of the cluster analysis are shown in Table 3.

**Cluster 1 (mixed-financed SMEs with focus on other loans)** This cluster is characterised by the utilisation of a large number of different financing instruments. However, the main focus is on “other loans”, such as loans from family and friends or related companies, which were used by 93.9% of SMEs in the cluster. 1129 SMEs (8.6% of the number of firms in the whole sample) belong to this cluster.

**Cluster 2 (mixed-financed SMEs with focus on retained earnings or sale of assets)** Firms in this group also use a great variety of financing instruments. However, the most important financing sources are retained earnings or sale of assets (92.8%). 1324 SMEs (10.1%) belong to this cluster.

**Cluster 3 (state-subsidised SMEs)** The state-subsidised SME cluster contains the smallest number of firms (602 SMEs, 4.6%). All firms in this cluster use government grants or subsidised bank loans over the previous 6 months. In addition, short-term debt in terms of credit lines, bank overdrafts or credit card overdrafts (56.5%) and bank loans (49.7%) are important financing sources.

**Table 3** Cluster results

Financing instruments	Mixed-financed (other loans)	Mixed-financed (retained earnings or sale of assets)	State-subsidised SMEs	Debt-financed SMEs	Trade-financed SMEs	Asset-based financed SMEs	Internally financed SMEs	Pearson Chi <sup>2</sup>
Retained earnings or sale of assets	7.5%	<b>92.8%</b>	12.7%	0.0%	1.0%	0.0%	0.0%	10,511.2***
Grants or subsidised bank loans	6.2%	1.1%	<b>100%</b>	0.0%	0.3%	0.0%	0.0%	11,406.4***
Credit line, bank overdraft or credit card overdrafts	48.5%	35.5%	56.5%	<b>85.7%</b>	45.8%	37.2%	0.0%	6038.7***
Bank loans	21.8%	14.6%	49.7%	35.6%	18.4%	0.0%	0.0%	2632.5***
Trade credit	23.7%	22.1%	29.2%	0.0%	<b>95.6%</b>	0.0%	0.0%	8453.6***
Other loans	<b>93.9%</b>	14.2%	0.0%	0.0%	0.5%	0.0%	0.0%	10,405.3***
Debt securities issued	0.5%	0.4%	1.0%	0.0%	9.8%	0.0%	0.0%	1021.7***
Equity	0.9%	10.4%	0.0%	0.0%	0.5%	0.0%	0.0%	1074.9***
Leasing, hire purchase or factoring	16.8%	20.3%	23.0%	6.9%	23.6%	<b>100%</b>	0.0%	6106.6***
Other <sup>a</sup>	11.7%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	1413.5***

(continued)

Table 3 (continued)

Financing instruments	Mixed-financed (other loans)	Mixed-financed (retained earnings or sale of assets)	State-subsidised SMEs	Debt-financed SMEs	Trade-financed SMEs	Asset-based financed SMEs	Internally financed SMEs	Pearson Chi <sup>2</sup>
No external finance	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100%	13,098.0***
N	1129	1324	602	2481	1382	859	5321	
Percentage of firms	8.6%	10.1%	4.6%	18.9%	10.6%	6.6%	40.6%	
Description	Firms that use a large variety of financing instruments with focus on other loans	Firms that use a large variety of financing instruments with focus on retained earnings or sale of assets and equity	Firms that use grants/subsidised bank loans but also other types of debt	Firms that use different types of debt, in particular short-term debt	Firms that use mainly trade-related types of financing	Firms that mainly use asset-based related types of financing (leasing, hire purchase or factoring)	Firms without external financing	

Notes: N = 13,098

Pearson's chi-square test: \*\*\*p &lt; 0.01, \*\*p &lt; 0.05, \*p &lt; 0.1

\*Other financing instruments = subordinated debt instruments, participating loans, crowdfunding

**Cluster 4 (debt-financed SMEs)** The debt-financed SME cluster is the second largest group in the sample with 2481 SMEs (18.9%). This cluster focuses on short-term debt (85.7%) and long-term debt (35.6%). Firms included in this group use leasing, hire purchase or factoring to a lesser extent (6.9%).

**Cluster 5 (trade-financed SMEs)** SMEs in this cluster (1382 firms, 10.6%) focus on trade credit. 95.6% of the SMEs in this cluster use this source of financing. In addition, short-term debt is used by 45.8% of SMEs in this cluster. The trade-financed SME cluster is the only group where the issuance of debt securities plays a considerable role (9.8%).

**Cluster 6 (asset-based-financed SMEs)** The asset-based financed SME cluster is the second smallest group with 859 firms (6.6%). All SMEs in this group use leasing, hire purchase or factoring as an external source of financing.

**Cluster 7 (internally financed SMEs)** The majority of firms belong to the internally financed SME cluster (5321 firms, 40.6%). All firms rely on internal financing and do not use any external financing instruments over the past 6 months.

## 4.2 *Profiling and Describing the Taxonomy*

Since we focus in this article on macroeconomic and country-specific differences, we briefly summarise the main results of the remaining passive cluster variables in Table 4.<sup>4</sup>

According to our cluster analysis, country-specific characteristics are the most important variables ( $p < 0.01$ ) that affect the distribution of SMEs across clusters. We highlight and discuss the main results of the cluster characteristics regarding macroeconomic variables and country differences in the following.

### 4.2.1 **Macroeconomic Variables**

The cluster analysis reveals that a country's inflation rate (Cramer's  $V = 0.085$ ) and inflation volatility (Cramer's  $V = 0.107$ ) appear to be important factors, in determining the financing patterns of SMEs (see Table 5). SMEs in countries with a higher inflation rate tend to use less trade financing and state subsidies, but are comparatively more often in the debt-financed cluster. Previous research found that higher inflation is negatively associated with the utilisation of external financing

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<sup>4</sup>For a detailed analysis of the taxonomy concerning firm-, product- and industry-specific variables, please refer to EIF Working Paper: Masiak, C., Moritz, A., and Lang, F. (2017): Financing Patterns of European SMEs Revisited: An Updated Empirical Taxonomy and Determinants of SME Financing Clusters, EIF Working Paper. Available at: [http://www.eif.org/news\\_centre/publications/EIF\\_Working\\_Paper\\_2017\\_40.htm](http://www.eif.org/news_centre/publications/EIF_Working_Paper_2017_40.htm). Accessed 01 October 2018.

**Table 4** Cluster summary concerning firm-, product- and industry-specific variables

Cluster	Financing in cluster	Firm-specific	Product-specific	Industry-specific
Mixed-financed SMEs (with focus on other loans)	SMEs that used a large variety of instruments with a focus on other loans (94%)	More often younger micro- and medium-sized firms with larger turnover; esp. single-owner firms, public shareholder, VC-financed firms or other firms/business associate as owner; more often negative past growth but high growth expectations	More innovation	More likely for service and trade sector
Mixed-financed SMEs (focus on retained earnings or sale of assets)	SMEs that used a large variety of instruments with a focus on retained earnings or sale of assets (93%); only cluster with a noteworthy amount of equity financing (10%)	More often older, small- and medium-sized firms with ownership by VCs and BAs relatively high represented; moderate to high past growth and high future growth expectations	More innovation	Most likely for industry sector
State-subsidised SMEs	100% of SMEs used grants or subsidised bank loans; large use of other bank loans	More often very young and small- or medium-sized firms; esp. family firms/entrepreneurial teams and public shareholders; with moderate and high employee growth in the past; high growth expectations	More innovation	Most likely for industry sector
Debt-financed SMEs	86% of SMEs used credit line/bank overdraft/credit card overdrafts and 36% bank loans; some used leasing/factoring	More mature micro and small firms; esp. family firms/entrepreneurial teams or single-owner firms; no growth in the past and relatively low growth expectations	Average innovation	More likely for construction and trade sector
Trade-financed SMEs	96% of group used trade credit and 46% credit line/bank overdraft/credit card; some used leasing/factoring, bank loans; only cluster with	More often younger (2–5 years) and small-/medium-sized firms; esp. family firms/entrepreneurial teams or other firms/business associates;	Average innovation	Most likely for trade sector

(continued)

**Table 4** (continued)

Cluster	Financing in cluster	Firm-specific	Product-specific	Industry-specific
	considerable use of debt securities	high employment and turnover growth in the past; no high growth expectations		
Asset-based financed SMEs	100% of group used leasing/factoring and 37% credit line/bank overdraft/credit card overdrafts	Low innovation	Most likely for service sector	Esp. in Western European, non-distressed countries
Internally financed SMEs	100% of group did not use any external debt	Low innovation	Most likely for service sector	Esp. in Eastern European, former socialist countries

(Beck et al. 2008), but, at the same time, higher inflation rates and higher expected inflation rates seem to increase the leverage ratio of SMEs (Frank and Goyal 2009; Öztekin 2015). However, we find a contrary result: firms in countries with low inflation volatility more often tend to be in the debt-financed SME cluster. Regarding inflation volatility, we find that SMEs in countries with very high inflation volatility tend to be comparatively more often in the internally financed or mixed-financed cluster (with a focus on other loans). This can be explained by the fact that high inflation volatility decreases the predictability of a country's future development, which in turn increases the business risk of firms. As a consequence, firms are more likely to avoid long-term debt in this uncertain environment (Ball 1992; Fan et al. 2012; Frank and Goyal 2009).

Furthermore, we find that GDP per capita (Cramer's  $V = 0.100$ ) and GDP growth rates (Cramer's  $V = 0.125$ ) are related to the financing of firms. Both variables provide information about the economic condition of a country (Bas et al. 2009; De Jong et al. 2008). Our cluster analysis reveals that SMEs in countries with high GDP per capita are comparatively more often in the mixed-financed (with a focus on retained earnings or sale of assets), asset-based and debt-financed clusters. Hence, SMEs in more developed and economically sound countries seem to be able to obtain financing from a larger variety of financing sources (Bas et al. 2009). In line with this finding, firms in countries with relatively high GDP growth rates appear to use a broader range of financing instruments (18.0% of SMEs in countries with an average GDP growth rate of  $\geq 3\%$  from 2011 to 2015 belong to the mixed-financed SME cluster with a focus on retained earnings or sale of assets), whereas SMEs in countries with lower GDP growth rates are more likely to use state subsidies. This result implies that SMEs in less well developing countries obtain more government support than SMEs in countries with high GDP growth rates.

SMEs in countries with higher tax rates are more likely to be in the debt-financed cluster (22.1% of SMEs in countries with a total tax rate of  $>50\%$  belong to the debt-financed cluster) and in the state-subsidised cluster, in which the use of bank loans is

Table 5 Cluster comparison: country-specific characteristics

Variable	Categories	Total sample	N	Mixed-financed SMEs (with focus on other loans)	Mixed-financed SMEs (with focus on retained earnings/sale of assets)	State-subsidised SMEs	Debt-financed SMEs	Trade-financed SMEs	Asset-based-financed SMEs	Internally financed SMEs	Test statistic	
											Pearson Chi <sup>2</sup>	Cramer's V
<i>Country level</i>	<b>SMEs per cluster</b>											
<b>Inflation rate</b>	Deflation (<0%)	28.3%		9.8%	9.1%	4.3%	14.4%	14.9%	6.8%	40.6%		
	0 to <0.5%	61.4%		8.2%	11.0%	4.8%	20.7%	9.0%	6.3%	39.9%		
	≥0.5%	10.3%	13,098	7.8%	7.4%	3.8%	20.8%	8.1%	7.2%	44.8%	190.0***	0.085
	<b>Inflation volatility (standard deviation over the preceding 4 years)</b>											
	0 to <0.5	2.9%		4.7%	13.7%	3.1%	16.6%	8.5%	13.5%	39.9%		
	0.5 to <1	30.6%		7.5%	11.9%	2.7%	22.4%	5.3%	9.1%	41.1%		
	1 to <1.5	50.7%		9.1%	9.0%	6.3%	18.6%	13.4%	4.2%	39.3%		
	1.5 to <2	11.3%		7.9%	8.4%	3.7%	13.7%	15.7%	9.0%	41.6%		
	≥2	4.4%	13,098	14.7%	12.1%	1.4%	13.8%	2.9%	4.9%	50.2%	597.6***	0.107

