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Financing Micro Firms in Europe: An Empirical Analysis

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Working Paper **2017/44**

Financing Micro Firms in Europe:

An Empirical Analysis

Christian Masiak
Joern H. Block
Alexandra Moritz
Frank Lang
Helmut Kraemer-Eis

Christian Masiak *is a PhD student and research assistant at the Chair of Management at the University of Trier.*

Contact: masiak@uni-trier.de
Tel.: +49 651 201 4489

Joern H. Block *is Professor of Management at the University of Trier and the Erasmus University Rotterdam.*

Contact: block@uni-trier.de
Tel.: +49 651 201 3030

Corresponding author (Univ. Trier): Alexandra Moritz *is a research associate at the Chair of Management and a managing director at the research institute "Forschungsstelle Mittelstand" at the University of Trier.*

Contact: moritz@uni-trier.de
Tel.: +49 651 201 4489.

Corresponding author (EIF): Frank Lang *is Senior Manager in EIF's Research & Market Analysis division.*

Contact: f.lang@eif.org
Tel.: +352 248581 278

Helmut Kraemer-Eis *is Head of EIF's Research & Market Analysis division and Chief Economist of the EIF.*

Contact: h.kraemer-eis@eif.org
Tel.: +352 2485 81 394

Editor
Helmut Kraemer-Eis,
Head of EIF's Research & Market Analysis, Chief Economist

Contact:
European Investment Fund
37B, avenue J.F. Kennedy, L-2968 Luxembourg
Tel.: +352 248581 394
http://www.eif.org/news_centre/research/index.htm

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Preface

Micro-enterprises represent 93% of all companies in the European non-financial business sector, and they contribute important shares of total economic activity and employment. In contrast, often, the smaller a company the more difficult its access to finance tends to be. However, there is relatively little empirical evidence about the financing *patterns* of micro-enterprises, and to what extent they differ from those of other small and medium-sized enterprises (SMEs).

Enhancing the access to finance of SMEs, including micro-enterprises, through a wide range of financial intermediaries is the central mission of the European Investment Fund (EIF). To this end, the EIF primarily designs, promotes and implements equity and debt financial instruments which specifically target micro, small and medium-sized companies. In this role, the EIF fosters European Union (EU) objectives in support of entrepreneurship, growth, innovation, research and development, and employment.

EIF's Research & Market Analysis (RMA) supports EIF's strategic decision-making, product development and mandate management processes through applied research, market analyses, and impact assessments. RMA works as internal advisor, participates in international fora and maintains liaison with many organisations, institutions, universities and think tanks.

EIF's RMA division and the Chair of Management at the University of Trier have established a research cooperation, which has already generated many outputs. The most preeminent part of our cooperation is the joint research project "Financing of European SMEs: Patterns, Determinants and Dynamics over Time", which benefitted from a research grant of the STAREBEI research support programme of the EIB Institute. STAREBEI forms part of the EIB Institute's Knowledge Programme, which aims at providing support to higher education and research activities. More information can be found on the EIB Institute's website: https://institute.eib.org/.

Following the EIF Working Paper 2017/40, "Financing Patterns of European SMEs Revisited : An Updated Empirical Taxonomy and Determinants of SME Financing Clusters", which was published in March 2017, the present paper is the second publication that resulted from our joint STAREBEI research project. It focusses on the financing patterns of micro-enterprises in Europe and their differences from those of other SMEs. More information about the STAREBEI project can be found here: https://www.uni-trier.de/index.php?id=58427.

Prof. Dr. Jörn Block
Professor of Management at the University of Trier
and the Erasmus University Rotterdam;
University Tutor of this project

Dr. Helmut Kraemer-Eis
Head of Research & Market Analysis,
Chief Economist, EIF
Editor of the EIF Working Paper Series

Abstract*

The vast majority of firms in Europe are micro firms. Still, we know little about their financing patterns. Our paper aims to close this gap. Based on a large European firm-level data set, we find that micro firms differ in their financing patterns from small and medium-sized companies. Our empirical results show that micro firms are more likely to use internal financing instruments, whereas they are less likely to use state subsidies, trade credit or asset-based financing instruments. Furthermore, micro firms differ from medium-sized firms by using more short-term debt (credit card overdrafts, credit lines and bank overdrafts). The implications of these findings for micro firms and policy makers are discussed.

Keywords: Micro firms; SMEs; enterprise financing in Europe; financing patterns

JEL codes: C30; G20; G30

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Non-technical Summary

Micro firms make up around 93% of all non-financial companies in Europe and employ around 30% of the workforce (European Commission, 2016; Kraemer-Eis et al., 2017). To be able to survive and grow, these firms need access to capital (Beck and Demirgüç-Kunt, 2006; Carpenter and Petersen, 2002; Lee et al., 2015). Therefore, it is important to understand which financing tools are used by these firms, and in which combinations. Although prior research has investigated the financing patterns of SMEs and large firms (Chavis et al., 2011; Masiak et al., 2017; Moritz et al., 2016; Moritz et al., 2015; Lawless et al., 2015), little is known about the financing patterns of micro firms. This lack of research is remarkable, as micro firms differ from other firms in a number of ways, particularly in their ownership structure, resource availability and cost structure. These characteristics directly influence the costs for obtaining external capital and, hence, the financing structure of these companies (Baas and Schrooten, 2006; Binks et al., 1992; Freeman et al., 1983; Nooteboom, 1993; Rao et al., 2008).

We investigate the financing patterns of micro firms in Europe to improve the understanding of how they differ from other SMEs. To this end, we use an EU-wide dataset created from the "Survey on the access to finance of enterprises" (SAFE survey), which is conducted on behalf of the European Commission and the European Central Bank. The survey contains detailed information about a large set of financing instruments as well as firm, product, industry and country information about the 12,144 companies included.

Our results provide evidence for some of our main predictions. Micro firms are less likely to use state subsidies, trade credit or asset-based financing instruments, whereas they are more likely to use internal financing instruments. Also, micro firms differ from medium-sized firms by relying more on short-term bank debt (credit card overdrafts, credit lines and bank overdrafts).

The contributions of our study are threefold. First, we contribute to the SME financing literature (Casey and O'Toole, 2014; Lawless et al., 2015; Moritz et al., 2016), which, so far, has not analysed the differences between micro firm financing patterns and those of other SMEs. Second, we contribute to prior research on micro firm financing (Beck et al. 2015; Daskalakis et al., 2013). We find that micro firms use, in particular, internal rather than external financing instruments. Third, we contribute to the trade financing literature (McGuinness and Hogan, 2016; Ogawa et al., 2013) by showing that micro firms use fewer trade financing instruments than other SMEs.

Improving the understanding of micro firms' financing patterns can help policy makers to provide tailor-made support for these types of firms. Our results will enable better assessments of the consequences of policy changes, particularly as regards micro firms. Our results indicate that, in addition to facing difficulties accessing external financing in general, micro firms also encounter challenges when it comes to receiving government grants or subsidised bank loans. Given micro firms' importance in the economy, these issues can be seen as signals of market weakness and highlight the need for further public support for these types of companies. Moreover, as their financing patterns differ from other SMEs, support for micro firms should be designed in a way that meets their specific needs while costs to use such support should not be prohibitive (e.g. via products that incentivise financial intermediaries and use existing transmission channels).

Table of contents

Preface iii
Abstract iv
Non-technical Summary v
Table of contents vi
List of Tables vii
1 Introduction 1
2 Prior literature on micro firm financing 2
2.1. Definition and characteristics of micro firms 2
2.2. Financing of micro firms 2
3 Theory and hypotheses 3
3.1. Financing patterns of SMEs 3
3.2. Hypotheses 3
4 Data, methods and variables 6
4.1. Data 6
4.2. Method 7
4.3. Variables 8
5 Results 10
5.1. Cluster analysis 10
5.2. Regression analysis 11
6 Discussion and conclusion 14
6.1. Summary of main findings 14
6.2. Implications for theory and practice 14
6.3. Limitations and future research 15
References 17
Annex 23
Annex 1: Seemingly unrelated logistic regression estimation on financing patterns 23
Annex 2: Multinomial logistic regression on financing patterns 24
Annex 3: List of abbreviations 25
About … 26
… the European Investment Fund 26
… EIF's Research & Market Analysis 26
… this Working Paper series 26
EIF Working Papers 27

List of Tables

Table 1: Variable description 9

Table 2: Cluster results 10

Table 3: Multivariate probit regression model on financing patterns 12

1 Introduction

Micro firms are an important part of the European economy (European Commission, 2016). They make up the largest share (around 93%) of non-financial companies in Europe and are important for economic development and growth; they employ around 30% of the workforce (Kraemer-Eis et al., 2017). To be able to survive and grow, these firms need access to capital (Beck and Demirgüç-Kunt, 2006; Carpenter and Petersen, 2002; Lee et al., 2015). Therefore, it is important to understand the financing instruments used and required by these firms. Although prior research has investigated the financing patterns of small, medium-sized and large firms (Chavis et al., 2011; Masiak et al., 2017; Moritz et al., 2016; Moritz et al., 2015; Lawless et al., 2015), little is known about the financing patterns of micro firms. This is an important oversight, as micro firms differ from other firms in a number of ways, particularly in their ownership structure, resource availability and cost structure. These characteristics directly influence the costs for obtaining external capital and, hence, the financing structure of these companies (Baas and Schrooten, 2006; Binks et al., 1992; Freeman et al., 1983; Nooteboom, 1993; Rao et al., 2008).

We tap into this research gap by investigating the financing patterns of micro firms in Europe to improve our understanding about how they differ from small and medium-sized companies. To this end, we use an EU-wide dataset created from the "Survey on the access to finance of enterprises" (SAFE survey), which is conducted on behalf of the European Commission and the European Central Bank. The survey contains detailed information about a large set of financing instruments as well as firm, product, industry and country information about the 12,144 companies included.

Our results provide evidence for some of our main predictions. Micro firms are less likely to use state subsidies, trade credit or asset-based financing instruments, whereas they are more likely to use internal financing instruments. Also, micro firms differ from medium-sized firms by relying more on short-term bank debt (credit card overdrafts, credit lines and bank overdrafts).

The contributions of our study are threefold. First, we contribute to the SME financing literature (Casey and O'Toole, 2014; Lawless et al., 2015; Moritz et al., 2016), which, so far, has not analysed the differences between micro firm financing patterns and those of other small and medium-sized companies. Second, we contribute to prior research on micro firm financing (Beck et al. 2015; Daskalakis et al., 2013). We find that micro firms use, in particular, internal rather than external financing instruments. Third, we contribute to the trade financing literature (McGuinness and Hogan, 2016; Ogawa et al., 2013) by showing that micro firms use fewer trade financing instruments than small or medium-sized firms.

Improving our understanding of micro firms' financing patterns can help policy makers to provide tailor-made support for these types of firms. Our results will enable better prediction and assessment of the consequences of policy changes, particularly for the financing of micro firms. Our results indicate that, in addition to facing difficulties accessing external financing in general, micro firms also encounter challenges when it comes to receiving government grants or subsidised bank loans. Given micro firms' importance to the overall economy, these issues can be seen as signals of market weakness and highlight the need for further public support for these types of companies. Moreover, as their financing patterns differ from small- and medium-sized firms, support for micro firms should be designed in a way that meets their specific needs.

The article proceeds as follows: The next section provides a short description of micro firms and a summary of prior research on micro firm financing. Section 3 presents our conceptual framework and derives hypotheses. Section 4 introduces the dataset, empirical methods and variables used in the dataset. In Section 5, we show the results of the regression analyses, while Section 6 discusses our results and highlights their implications for theory and practice.

2 Prior literature on micro firm financing

2.1. Definition and characteristics of micro firms

Although there is no universally accepted definition of micro firms, the vast majority of definitions focus either on the number of employees and/or the turnover of the firm. The European Commission defines micro firms according to the number of employees, annual turnover or the balance sheet total. According to this definition, micro firms have less than 10 employees and have an annual turnover or a balance sheet total of no more than EUR 2m (European Commission, 2003).

Micro firms differ from larger firms in various ways. First, micro firms typically operate as single owner-managed firms (Ang, 1992; Marwa, 2014). According to previous research, the interests of single-owners of micro firms, such as their growth ambitions, the risk level they are willing to take or their desire for independence, differ from larger companies (Berger and Udell, 1998; Chittenden et al., 1996; Howorth, 2001). Moreover, micro firms are opaque, as they usually do not publish annual statements, and contracts with stakeholders are not publically available (Abdulsaleh and Worthington, 2013; Berger and Udell, 1998). Hence, information asymmetries and moral hazard problems, which are always prevalent in borrower-lender relationships, are particularly pronounced when it comes to very small firms, and agency costs are typically much higher (Ang, 1992; Bruhn-Leon et al., 2012; Daskalakis et al., 2013; Heshmati, 2001; Kraemer-Eis et al., 2016). Micro firms therefore need to signal their quality to gain legitimacy and credibility (Berger and Udell, 1998; Khaire, 2010).

2.2. Financing of micro firms

Research on SME financing has increased substantially over the last years (e.g., Ang et al., 2010; Daskalakis and Psillaki, 2008; Hall et al., 2004; López-Gracia and Sogorb-Mira, 2008). It has been shown that access to finance can be a significant growth constraint for smaller companies (e.g., Ayyagari et al., 2008; Beck and Demirgüç-Kunt, 2006; Wright et al., 2015). However, most studies do not explicitly distinguish between micro, small and medium-sized firms, or do not take into account the complementary and substitutive effects of different financing instruments (exceptions are for example Beck et al., 2008; Chavis et al. 2011; Romano et al., 2001). Despite the economic importance of micro businesses, only a very small number of researchers have investigated the financing of micro firms: Daskalakis et al. (2013) used data from Greek small and micro firms and found that these companies rely more on their own funds instead of using equity from venture capitalists (VCs) or business angels (BAs). Furthermore, Greek firms of this type appear to face a funding gap, especially with respect to long-term bank debt (Daskalakis et al.

2013). In line with these results, Lawless et al. (2015) found that European micro firms rely more heavily on internal financing rather than external financing instruments (e.g., debt, government grants or equity finance) in comparison to small or medium-sized firms. By using cluster analysis, Moritz et al. (2016) investigated the financing patterns of a large sample of European SMEs and confirmed these results. They found that micro firms are more likely to be internally-financed and less likely to be debt-financed or state-subsidised. In addition, Chavis et al. (2011) found that this trend can be seen worldwide: being a micro firm is positively related to the use of informal finance and negatively related to the use of credit lines, bank finance, leasing and trade credit.

In addition, it has been found that European micro firms are more often rejected in the loan application process (Holton et al., 2014; Kraemer-Eis et al., 2017). These findings become even stronger during a financial crisis (Casey and O'Toole, 2014). However, micro firms are still less likely to apply for alternative financing (e.g., trade credit) in comparison to small and medium-sized companies (Casey and O'Toole, 2014).

Prior research has also connected microfinance and microcredits with micro firm financing (Chan and Lin, 2013; Sonnekalb, 2014). According to the definition of the European Commission, microcredits include amounts less than EUR 25,000 and are tailored to micro firms or self-employed people (Kraemer-Eis et al., 2017). Even though this form of financing started in developing countries (Khandelwal, 2007), today, microcredits are used to support small businesses in both developing and developed countries in order to reduce access to finance constraints (e.g., Chan and Lin, 2013; Forcella and Hudon, 2016; Sonnekalb, 2014).

3 Theory and hypotheses

3.1. Financing patterns of SMEs

To date, only a few studies have considered the substitutive and complementary use of different financing instruments (Chavis et al., 2011; Lawless et al., 2015; Masiak et al., 2017; Moritz et al., 2016). They found that smaller firms use a small number of different financing instruments (Chavis et al., 2011; Lawless et al., 2015), whereas larger firms have more diversified financing structures (Lawless et al., 2015; Moritz et al., 2016). Moritz et al. (2016) investigated the complementary and substitutive use of different financing instruments by developing an empirical taxonomy of SME financing patterns. They found that, although financing in Europe is heterogeneous, several homogeneous financing patterns exist (Moritz et al., 2016). These financing patterns are used as a basis in the following hypotheses.

3.2. Hypotheses

Previous research identified a strong correlation of age ("liability of newness") with the survival rate of firms (Freeman et al., 1983, Zimmermann and Zeitz, 2002). However, Aldrich and Auster (1986) found that, independent of age, the size of a firm directly affects its survival rate. Responsible for this relationship, according to their study, is the firms' liability of smallness, which determines smaller firms' competitive disadvantages, such as a lack of resources (e.g., due to

difficulties competing for labor) and cost disadvantages, particularly due to a lack of economies of scale and scope (Aldrich and Auster, 1986; Freeman et al., 1983; Halliday et al., 1987; Kale and Arditi, 1998; Nooteboom, 1993). Division of labour and specialization can help larger firms reduce their average costs per unit, thereby realizing economies of scale (Argyris and Liebeskind, 1999; Nooteboom, 1993). Smaller firms lack the resources to implement the same level of specialization. Financing of these firms is often one task among many for employees or the company's owner. They must use their limited resources to reconcile the search and application for external financing with a range of other tasks. Hence, the knowledge about and the incentives to use external financing are lower for smaller firms due to higher costs. Another cost disadvantage with respect to external financing arises from larger transaction costs for external capital providers (e.g. due to high fixed cost elements). External capital providers can achieve economies of scale as the volume of funds increases (Anderson and Khambata, 1985; Saito and Villanueva, 1981). Micro firms, however, often require micro loans (Van der Graaf et al., 2016). To summarize, smaller companies, especially micro firms (demand-side), as well as capital providers (supply-side) face higher costs when applying for and providing capital to smaller firms.

Moreover, high information asymmetries exist between SMEs and, in particular, between micro firms and external capital providers. Small firms are not required to publish annual reports or to provide any other form of information to the public. Therefore, they possess superior information about their business model, performance, collateral and future potential compared to external stakeholders. As a consequence, external capital providers experience high uncertainty and risks when evaluating small firms (Brealey et al., 1977; Daskalakis et al., 2013; Winborg and Landström, 2001). To reduce information asymmetries, smaller firms can send signals of quality to capital providers (Connelly et al., 2011; Block et al., 2014; Rao et al., 2008). However, signals must be costly for the sender to be perceived as credible (Connelly et al., 2011), which makes them a less attractive instrument for smaller firms.

External capital providers can either use cost intensive monitoring tools (Baas and Schrooten, 2006; Bergemann and Hege, 1998; Binks et al., 1992; Gompers, 1995) or demand collateral to reduce uncertainty and risks (Degryse et al., 2012; Hall et al., 2000; Michaelas et al., 1999). For debt providers, especially banks, intensive monitoring is typically not feasible or cost efficient, and they prefer collateral provided by the firm (Manove et al., 2001; Ono and Uesugi, 2009). However, smaller companies usually do not possess the assets required for use as collateral. As a result, both the monitoring and reduction of default risk increases costs for external capital providers, particularly debt providers.

To summarize, higher transaction costs arise for both debt providers (due to information asymmetries, administrative and default expenses) and micro firms (due to signalling, application and information costs) to obtain external capital, in particular bank debt financing (European Central Bank, 2016; Lawless et al., 2015). Thus, we propose the following:

Hypothesis 1: Micro firms are less likely than small and medium-sized firms to use debt-financing instruments.

Moreover, prior research has found that owner-managers try to avoid the influence of external parties. Equity investors typically try to reduce their risks and costs by using voting and participation rights, thereby reducing the self-determination rights of the owner(s) (Bathala al., 2004; Chittenden

et al., 1996). Even though external debt providers such as banks do not hold participation rights in the company, they still try to reduce information asymmetries through collateral and by using controlling instruments (e.g., financial ratios which must be met by the firm, particularly in the case of long-term debt) (Barnes, 1987; Berger and Udell, 1998). This preference is in line with the pecking-order theory and appears to hold for small firms: owner-managed firms seem to prefer internal over external financing, and debt over equity (López-Gracia and Sogorb-Mira, 2008). In particular, these firms use short-term debt after internal financing is depleted (Holmes and Kent, 1991; Hutchinson, 1995). A specific short-term financing instrument that has been found to be frequently used by SMEs is trade credit (Huyghebaert et al., 2007). Suppliers of goods and services often do not expect direct payment, instead granting payment extensions. Moreover, suppliers have been found to be less likely to engage in monitoring and controlling efforts compared to banks (Wilson and Summers, 2002). However, previous research has shown that suppliers are reluctant to provide trade credit to very young and small firms due to high information asymmetries and bankruptcy risks associated with smaller firms (Andrieu et al., 2015). Furthermore, even though trade-credit is a flexible form of short-term debt, smaller firms might be reluctant to use it (at least as long as there is an alternative), as this form of financing can be rather expensive and they are typically highly cost sensitive (Marotta, 2005; Robb, 2002; Taketa and Udell, 2007).

Altogether, we propose the following:

Hypothesis 2: Micro firms are less likely than small and medium-sized firms to use trade-financing instruments.

Prior research found that smaller firms have a lack of awareness of public funding programs (Aldrich and Auster, 1986; Daskalakis et al., 2013; Öztürk and Mrkaic, 2014). Furthermore, the application process is often very complex and time consuming. This overburdens the limited resources of smaller firms and, hence, they are less likely to apply for subsidised bank loans and grants (Daskalakis et al., 2013).

Therefore, we propose the following:

Hypothesis 3: Micro firms are less likely than small and medium-sized firms to use state-subsidised financing instruments.

Leasing and factoring are two financing instruments that have been found to be attractive financing sources for SMEs (Beck, 2013; Deloof et al., 2007). However, leasing as an asset-based financing instrument is often used for specific asset-types, such as machinery, vehicles and industrial equipment, which are predominantly used by larger firms (Oxford Economics, 2015). In addition, risks for the lessor are priced into the leasing fees. Fees for smaller firms are typically higher due to higher information asymmetries and transaction costs and can thus make leasing unattractive (Eisfeldt and Rampini, 2009).

Factoring, especially without recourse, has also been found to be an interesting financing alternative for SMEs, as firms can sell their outstanding invoices to a factor at a discount (Klapper, 2006; Summers and Wilson, 2000). Hence, factoring is not a form of lending and does not rely on the creditworthiness of the invoice seller. Instead, it is an asset-based type of financing that relies on the debtor's creditworthiness. However, the discount charged by the invoice buyer

negatively influences the return on sales, which can make factoring unattractive, particularly for smaller firms (Beck, 2013; Berger and Udell, 2006; Klapper, 2006).

Hence, we propose that very small firms use less asset-based financing instruments (leasing and factoring) due to higher costs (Lawless et al., 2015; Oxford Economics, 2015):

Hypothesis 4: Micro firms are less likely than small and medium-sized firms to use asset-based financing instruments.

Overall, and in line with our previous argumentation, we expect that micro firms are altogether less likely to obtain external financing and that they are more likely to rely on internal financing instruments. As a result, we propose:

Hypothesis 5: Micro firms are more likely than small and medium-sized firms to use internal financing instruments.

4 Data, methods and variables

4.1. Data

For our empirical analyses, we use survey data from the 'Survey on the access to finance of enterprises (SAFE survey)', which has been conducted since 2009 on behalf of the European Central Bank (ECB) and the European Commission (EC). The SAFE survey is run on a semi-annual basis by the ECB; it is carried out every two years and, since 2013, every year in cooperation with the EC (European Commission, 2015; European Central Bank, 2016). The semi-annual and the annual waves differ both by the number of questions in the survey and the number of participating countries. We use data from the EC/ECB annual wave conducted between April and September 2015.

The aim of the SAFE survey is to provide data on the financing conditions faced by SMEs in Europe on a regular basis. Besides questions about the firms' financing situation, the SAFE survey gathers 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 evaluation of access to finance. In line with the EU's employee threshold definition of SMEs, the SAFE survey differentiates between micro (1-9 employees), small (10-49 employees), medium-sized (50-249 employees) and large firms (≥ 250 employees). We follow this definition in our study, which was also applied by Lawless et al. (2015) and Moritz et al. (2016). In total, our sample consists of 12,144 SMEs in 27 European countries.[2]

[2] Malta was excluded due to a large number of missing data in the survey. All other European Union countries are covered by the data set.

4.2. Method

Cluster analysis

To construct our dependent variable, we perform a hierarchical cluster analysis to identify SME financing patterns using the SAFE survey (wave 2015HY1). Participants of the SAFE survey were asked whether they used specific financing instruments during the past six months. In total, eleven different financing instruments are included as active cluster variables in the cluster analysis[3].

We test several hierarchical cluster analysis algorithms, such as single linkage, average linkage, complete linkage, k-means and Ward's method. In line with Moritz et al. (2016) and Masiak et al. (2017), we use Ward's method and squared Euclidean distance as a measure of proximity to perform the cluster analysis, as they provide relatively homogeneous results with a low intra-cluster heterogeneity (Moritz et al., 2016, Masiak et al., 2017). Furthermore, we use the Test of Mojena and Elbow Criterion as validation tests for the number of clusters.

Regression analyses

Based on these results, we perform regression analyses using the financing patterns as dependent variables; the aim is to analyse the differences between micro and small or medium-sized firms. However, the error terms of the different equations could be correlated with each other. We address this concern by using a multivariate probit model which is similar to the approach of Zellner's method of a joint seemingly unrelated regression (Cappellari and Jenkins, 2003; Zellner, 1962). Since our dependent variables are dichotomously coded, we run a multivariate probit model that allows for binary dependent variables and involves a simultaneous estimation of equations for the firm's decision to use specific financing patterns. The reference group for the analysis are medium-sized firms. To check for differences between micro and small firms, we calculate a p-value test to determine whether the coefficient of micro firms equals the coefficient of small firms.

Based on separate individual logistic regression analyses for each financing pattern, we estimate a seemingly unrelated estimation, which is used to further check the robustness of our results. As an additional robustness check, we perform a multinomial logistic regression with the internally-financed cluster as the base category.

[3] The following financing instruments are included in the cluster analysis: (a) retained earnings or sale of assets, (b) grants or subsidised bank loans, (c) credit lines, bank overdrafts or credit card overdrafts, (d) bank loans (both short and long-term), (e) trade credit, (f) other loans (for example from family and friends, a related enterprise or shareholders), (g) leasing, hire purchase or factoring (h) debt-securities issued, (i) 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), (j) other sources of financing (subordinated debt instruments, participating loans, crowdfunding). In addition, we included a variable that indicated whether a company did not use any external financing in the past six months.

4.3. Variables

Dependent variables

We use five financing patterns, focusing on debt-financing, trade-financing, state-subsidised, asset-based financing and internal financing instruments as dependent variables. All dependent variables are binary coded (1=firm belongs to the financing pattern; 0=otherwise).

Independent and control variables

To test our hypotheses, our main independent variable is firm size, which we measure according to the number of employees. Following the definition recommended by the EU (Kraemer-Eis et al., 2017; European Commission, 2013), we distinguish between micro (1–9 employees), small (10–49 employees) and medium-sized firms (50–249 employees).

Further control variables are included in our analysis based on the findings of prior research on financing patterns (e.g., Lawless et al., 2015; Moritz et al., 2016; Masiak et al., 2017). We include several dummies describing the main owner in the firm, as previous studies have found that the ownership structure significantly affects business financing (e.g., Chittenden et al., 1996; Ferrando and Griesshaber, 2011). We include: *family or entrepreneurs*, *one owner only*, *public shareholders*, *other enterprises or business associates*, and *venture capital enterprises or business angels*. Furthermore, we include a variable for firm age (*age <2*, *age 2–4*, *age 5–9*, *age >9*), since previous research has shown that firm age affects the capital structure of companies (e.g., Chavis et al., 2011; Chittenden et al., 1996). Whereas younger firms rely more on informal financing, older firms appear to use more formal financing such as bank loans (Chavis et al., 2011).

In addition, the dummy variables *past turnover growth* (over 20% per year, less than 20% per year, no growth, got smaller) and *growth expectations* (grow substantially, grow moderately, stay the same, become smaller) are included in the analysis. It has been shown that smaller firms with high growth rates typically require more external financing in order to finance their growth objectives (Cassar, 2004). The dummy variable *innovativeness* refers to a value of '1', indicating that the firm introduced a new or significantly improved product or service to the market, and a value of '0', indicating otherwise. Innovative small firms often face problems obtaining external financing, since the development of new products and services is often cost intensive and their success is highly uncertain. A lack of diversification options increases small firms' dependency on their innovation success and consequently increases their default probability, which makes them very risky for capital providers (Block, 2012).

Prior research has also investigated the impact of the industry on the firm's capital structure (e.g., Bradley et al., 1984; Coleman and Robb, 2012; Degryse et al., 2012). It has been found that firms in the service sector typically require less external financing than firms in other sectors, since capital requirements are often lower (Harrison et al., 2004). Firms in the industry sector typically have a large share of long-term assets (i.e., machines) and therefore require long-term financing instruments (Hall et al., 2000; Michaelas et al., 1999). To examine the effect of industry sectors,

we use the four categories applied in the SAFE survey: *industry*, *construction*, *trade* and *services* (European Central Bank, 2016).

In addition, the variable *access to finance problems* measures whether access to finance was indicated as an important problem for companies in the past six months on a scale from 1 to 10 (categorized as low = 1–3, medium = 4–6 and high importance = 7–10). Furthermore, we include dummy variables for the *capital positon* and *changes in turnover* (Lawless et al., 2015). We include country dummy variables in our data set to control for country differences. Previous research highlighted the importance of institutional characteristics, particularly the system of law and the protection of property rights, on the capital structure of firms (Beck et al., 2008; Fan et al., 2012; Masiak et al., 2017). A detailed overview of all variables is provided in Table 1.

Table 1: Variable description

Variable	Description
Dependent variables	
Financing patterns	Dichotomous variables (1=firm uses the specific financing instruments; 0=otherwise)
Independent variables	
Micro firms	Dichotomous variable (1=firm is a micro firm; 0=otherwise)
Small firms	Dichotomous variable (1=firm is a small firm; 0=otherwise)
Medium-sized firms	Dichotomous variable (1=firm is a medium-sized firm; 0=otherwise)
Control variables	
Age <2	Dichotomous variable (1=firm is younger than 2 years; 0=otherwise)
Age 2–4	Dichotomous variable (1=firm is 2–4 years old; 0=otherwise)
Age 5–9	Dichotomous variable (1=firm is 5–9 years old; 0=otherwise)
Age >9	Dichotomous variable (1=firm is older than 9 years; 0=otherwise)
Family or entrepreneurs	Dichotomous variable (1=family or entrepreneur owns the largest stake in the firm; 0=otherwise)
One owner	Dichotomous variable (1=one owner owns the largest stake in the firm; 0=otherwise)
Public shareholder	Dichotomous variable (1=public shareholder owns the largest stake in the firm; 0=otherwise)
Other enterprises or business associates	Dichotomous variable (1=other enterprises or business associates own the largest stake in the firm; 0=otherwise)
VC/BA	Dichotomous variable (1=venture capitalist or business angel owns the largest stake in the firm; 0=otherwise)
Other	Dichotomous variable (1=other owns the largest stake in the firm; 0=otherwise)
Innovativeness	Dichotomous variable (1= firm has introduced a new or significantly improved product or service to the market during the past 12 months; 0=otherwise)
Profit unchanged	Dichotomous variable (1=profit over previous 6 months remains unchanged; 0=otherwise)
Profit increased	Dichotomous variable (1=profit over previous 6 months increased; 0=otherwise)
Profit decreased	Dichotomous variable (1=profit over previous 6 months remains decreased; 0=otherwise)
Capital position unchanged	Dichotomous variable (1=capital over previous 6 months remains unchanged; 0=otherwise)
Capital position increased	Dichotomous variable (1=capital over previous 6 months increased; 0=otherwise)
Capital position decreased	Dichotomous variable (1=capital over previous 6 months remains decreased; 0=otherwise)
Turnover expectation >20%	Dichotomous variable (1=expected turnover of the firm over the next two to three years will grow >20%; 0=otherwise)
Turnover expectation <20%	Dichotomous variable (1=expected turnover of the firm over the next two to three years will grow <20%; 0=otherwise)
Turnover expectation unchanged	Dichotomous variable (1=expected turnover of the firm over the next two to three years will stay the same size; 0=otherwise)
Turnover expectation become smaller	Dichotomous variable (1=expected turnover of the firm over the next two to three years will become smaller; 0=otherwise)
Access to finance problems	Dichotomous variable for each category: low (1-3), medium (4-6), and high importance (7-10) (access to finance has been an important problem in the past six months on a scale of 1–10, where 1 means it is not at all important)
Industry dummies	Dichotomous variable for the relevant industry (industry, trade, construction, service)

5 Results

5.1. Cluster analysis

The results of the cluster analysis are presented in Table 2. We found seven distinct financing patterns: *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*[4].

Table 2: Cluster results

Financing instruments	Clusters							Pearson Chi²
	Mixed-financed (other loans)	Mixed-financed (retained earnings /sale of assets)	State-subsidised	Debt-financed	Trade-financed	Asset-based financed	Internally-financed	
Retained earnings or sale of assets	20.6%	**100%**	17.4%	0.0%	4.6%	0.0%	0.0%	9354.2 ***
Grants or subsidised bank loans	1.3%	3.6%	**100%**	0.0%	1.5%	0.0%	0.0%	10949.5 ***
Credit line, bank overdraft or credit cards overdraft	48.6%	46.8%	57.5%	**82.2%**	51.7%	40.9%	0.0%	4183.2 ***
Bank loans	24.3%	26.5%	43.9%	45.2%	24.8%	0.0%	0.0%	2398.9 ***
Trade credit	30.6%	33.8%	32.0%	0.0%	**85.4%**	0.0%	0.0%	6454.8 ***
Other loans	**100%**	1.7%	0.0%	0.0%	4.4%	0.0%	0.0%	10061.7 ***
Debt securities issued	0.6%	0.6%	0.2%	0.0%	8.3%	0.0%	0.0%	750.1 ***
Equity	0.8%	1.2%	0.3%	0.0%	10.7%	0.0%	0.0%	934.6 ***
Leasing, hire-purchase or factoring	30.9%	38.6%	39.2%	15.6%	35.1%	**100%**	0.0%	4739.4 ***
Other[(a)]	1.2%	0.5%	8.5%	0.0%	5.3%	0.0%	0.0%	415.6 ***
No external finance	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	**100%**	12144.0 ***
N	972	1,531	956	2,062	1,886	1,174	3,563	
Percentage of firms	8.0%	12.6%	7.9%	17.0%	15.5%	9.7%	29.3%	

Note: N = 12,144; Pearson's chi-square test: ***p < 0.01, **p < 0.05, *p < 0.1.
[(a)] Other financing instruments = subordinated debt instruments, participating loans, crowdfunding

[4] The results are in line with Masiak et al. (2017).

The first cluster (*mixed-financed firms with focus on other loans*) includes firms that use a large number of different financing instruments. However, the focus is on other loans such as loans from family and friends or related companies and short-term debt. It is the second smallest cluster with only 972 firms. In the second cluster (*mixed-financed firms with focus on retained earnings or sale of assets*), firms use a great variety of financing instruments, but mainly rely on retained earnings or sale of assets. The cluster contains 1,531 firms (12.6%). All firms in cluster 3 (*state-subsidised firms*) use government grants or subsidised bank loans. It is the smallest cluster with 956 firms (7.9%). Furthermore, institutional debt (e.g., bank loans) is an important external financing instrument in this group. Firms in the fourth cluster (*debt-financed firms*) focus on both short-term and long-term bank debt. It is the second largest cluster, including 2,062 firms (17.0%). Cluster 5 (*trade-financed firms*) contains firms that use primarily trade credit or other short-term debt (e.g., bank overdrafts, credit lines or credit card overdrafts). 1,886 firms (15.5%) are included in this cluster. All firms in cluster 6 (*asset-based financed firms*) use leasing, hire-purchase or factoring as an external source of financing. 1,174 firms belong to this cluster (9.7%). The majority of firms, however, do not use any external financing. As a result, the seventh cluster is labelled *internally-financed*; it is the largest cluster with 3,563 firms (29.3%).

5.2. Regression analysis

Main results

The results of our main model, in which we perform a multivariate probit model, are shown in Table 3. We report the coefficients and the standard errors in brackets. In addition, we check whether the coefficients of micro and small firms are statistically equal. Our results are unlikely to suffer from multicollinearity due to the large sample size and the variation inflation factors.

Table 3: Multivariate probit regression model on financing patterns

Dependent variables	Debt-financed (H1)	Trade-financed (H2)	State-subsidised (H3)	Asset-based financed (H4)	Internally-financed (H5)
Independent variables					
Firm size variables, *reference group: medium-sized firms*					
Micro firms	0.088**	-0.200***	-0.475***	-0.258***	0.617***
	(0.039)	(0.040)	(0.050)	(0.043)	(0.035)
Small firms	0.047	-0.048	-0.130***	-0.020	0.271***
	(0.037)	(0.038)	(0.044)	(0.039)	(0.034)
p-value of test (coefficients size micro = size small)	p>0.1	p<0.01	p<0.01	p<0.01	p<0.01
Control variables					
Age variables					
Age <2	-0.219	0.226	0.037	0.107	-0.117
	(0.180)	(0.167)	(0.203)	(0.189)	(0.153)
Age 2–4	-0.276***	0.075	-0.217**	-0.010	0.166***
	(0.070)	(0.067)	(0.094)	(0.072)	(0.055)
Age 5–9	-0.044	0.107***	-0.085**	0.012	-0.014
	(0.032)	(0.035)	(0.043)	(0.035)	(0.028)
Age >9 (reference group)					
Ownership variables					
VC/BA	0.266	0.530***	-0.038	-0.013	-0.384*
	(0.196)	(0.174)	(0.254)	(0.181)	(0.204)
Family or entrepreneur	0.221**	-0.058	0.239*	-0.195**	-0.104
	(0.103)	(0.091)	(0.130)	(0.093)	(0.082)
Other	0.125	-0.036	0.063	-0.187*	-0.065
	(0.107)	(0.096)	(0.135)	(0.097)	(0.085)
One owner	0.241**	-0.053	0.216*	-0.186**	-0.024
	(0.103)	(0.092)	(0.131)	(0.093)	(0.082)
Other enterprises or business associates	0.044	0.040	0.438***	-0.372***	0.062
	(0.128)	(0.115)	(0.151)	(0.122)	(0.102)
Public shareholder (reference group)					
Innovativeness	-0.041	0.055*	0.159***	-0.027	-0.129***
	(0.030)	(0.031)	(0.037)	(0.034)	(0.027)
Capital position					
Improved	Yes	Yes	Yes	Yes	Yes
Unchanged	Yes	Yes	Yes	Yes	Yes***
Deteriorated (reference group)					
Profit					
Increased	Yes	Yes	Yes	Yes	Yes
Unchanged	Yes	Yes	Yes	Yes	Yes***
Decreased (reference group)					
Turnover expectation					
>20%	Yes	Yes	Yes***	Yes	Yes*
<20%	Yes	Yes	Yes**	Yes*	Yes**
Same size	Yes	Yes	Yes	Yes	Yes
Become smaller (reference group)					
Access to finance problems, *reference group: high 7–10*					
Low (1–3)	Yes***	Yes***	Yes***	Yes	Yes***
Medium (4–6)	Yes	Yes	Yes**	Yes	Yes***
High 7–10 (reference group)					
Industry dummies	Yes	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes	Yes
	Rho1	Rho2	Rho3	Rho4	
Rho/2	-0.211***				
	(0.019)				
Rho/3	-0.170***	-0.165***			
	(0.023)	(0.024)			
Rho/4	-0.418***	-0.311***	-0.115***		
	(0.016)	(0.018)	(0.021)		
Rho/5	-0.195***	-0.158***	-0.105***	-0.272***	
	(0.021)	(0.021)	(0.024)	(0.020)	
Number of observations	12,144				
Log-likelihood	-21,709.10				
Wald χ^2 (255)	3,067.34				

Note: Multivariate probit model, SEs are in parentheses. ***p<0.01, **p<0.05, *p<0.1.

We find that, against our expectation, the variable *micro firms* increases the probability of being *debt-financed*. The regression analysis indicates that micro firms are more likely than medium-sized firms to use *debt-financing instruments* (coeff.=0.088; $p<0.05$). Hence, we do not find support for H1. However, we do find support for H2. The regression shows that *micro firms* decreases the probability of being *trade-financed* (coeff.=–0.200; $p<0.01$). In addition, micro firms are less likely than small ($p<0.01$) and medium-sized firms (coeff.=–0.475; $p<0.01$) to be *state-subsidised*. These findings support our hypothesis H3. Furthermore, we find that micro firms are less likely than small or medium-sized firms to be *asset-based financed*. Both the regression analysis (coeff.=–0.258; $p<0.01$) and the p-value test ($p<0.01$) support Hypothesis H4. The results also reveal that micro firms are more likely than small and medium-sized firms to be *internally-financed* (coeff.=0.617; $p<0.01$), which supports Hypothesis H5.

Other results

Beside our main results, several control variables also show significant effects. Regarding the age of firms, we find that less mature firms (ages 2–4), are less likely to use debt-financing instruments (coeff.=–0.276; $p<0.01$) and are more likely to be internally-financed (coeff.=0.166; $p<0.01$). In addition, we find that firms with an age of 5–9 years are more likely to use trade-financing instruments (coeff.=0.107; $p<0.01$) and less likely to use state-subsidised financing instruments (coeff.=–0.085; $p<0.05$).

Regarding the ownership structure of firms, we find strong significant effects. Family firms or entrepreneurs are more likely to use *debt-financing instruments* (coeff.=0.221; $p<0.05$). Single-owner firms tend to use *debt-financing instruments* (coeff.=0.241; $p<0.05$) and *state-subsidised financing instruments* (coeff.=0.216; $p<0.1$) more frequently, but are less likely to use *asset-based financing instruments* (coeff.=–0.186; $p<0.05$). Moreover, we find that innovative firms are more likely to use *trade-financing instruments* (coeff.=0.055; $p<0.1$) and *state-subsidised financing instruments* (coeff.=0.159; $p<0.01$), but are less likely to use *internal financing instruments* (coeff.=–0.129; $p<0.01$).

Robustness checks

As a robustness check, we calculate separate logistic regressions for each of the different financing patterns and run a seemingly unrelated estimation. The results are very similar to the findings of the multivariate probit model on financing patterns (see Appendix 1). As a further robustness check, we calculate a multinomial logistic regression (see Appendix 2). The *internally-financed cluster* is the base category of the regression analysis. The results show that micro firms are more likely than small or medium-sized firms to be in the *internally-financed cluster* than in the remaining clusters (state-subsidised, debt-financed, trade-financed, or asset-based financed cluster).

6 Discussion and conclusion

6.1. Summary of main findings

The aim of our study was to investigate how the financing patterns of micro firms in Europe differ compared to small and medium-sized firms. Even though prior research has shown that SMEs use different financing instruments as complements or substitutes to each other (e.g., Berger and Udell, 1998; Chavis et al., 2011), and that firm size has an effect on firms' financing patterns (e.g., Hall et al., 2000; Moritz et al., 2016), no prior study has separated SMEs into groups according to firm size and then conducted a detailed analysis of each group's financing patterns. Due to the high economic importance of micro firms, this is, however, an important research question. In line with prior research (e.g., Lawless et al., 2015), we find that there is a statistically significant effect of firm size on firm financing but that this effect is independent of firm age. Furthermore, our results reveal that the financing patterns of micro firms differ significantly from small and medium-sized firms. In other words, micro firms use different financing instruments as substitutes and complements to those used by larger SMEs. Most of our expectations about these differences are supported by our results. However, against our expectation, we find that micro firms are more likely than medium-sized firms to use debt-financing instruments. But, it needs to be considered that the debt-financed cluster is characterized by a high proportion of short-term debt (credit lines, bank overdrafts or credit card overdrafts). Prior research has shown that flexible short term-debt is especially important for micro firms, since long-term debt has been found to be either less attractive due to high costs or less favourable other financing conditions or more difficult to obtain for these firms (Hall et al., 2000; Hutchinson, 1995). Bank loans in the SAFE survey are not differentiated according to their duration. Hence, we do not know if micro firms more often used short-term bank loans, which are typically easier to obtain.

6.2. Implications for theory and practice

Our results provide three main theoretical contributions. First, we contribute to the literature on SME financing that investigates the complementary and substitutive use of different financing instruments (Casey and O'Toole, 2014; Chavis et al., 2011; Lawless et al., 2015; Masiak et al., 2017; Moritz et al., 2016). We add to this literature by distinguishing between different firm sizes (micro, small and medium-sized firms) and show significant differences in micro firm financing patterns in comparison to small and medium-sized firms. In other words, the utilization of financing instruments differs by SME size class, which implies that SME segments need to be differentiated with regard to financing. Second, we contribute to the micro firm financing literature (Beck et al. 2015; Daskalakis et al., 2013). We find that micro firms use primarily internal financing instruments or short-term debt, such as credit lines, bank overdrafts or credit card overdrafts. Moreover, micro firms use state-subsidised bank loans or grants, trade credits and asset-based financing to a lesser extent than larger SMEs. Third, we contribute to the research investigating trade financing (McGuinness and Hogan, 2016; Ogawa et al., 2013; Tsuruta, 2008). Whereas previous research has found that trade credit is an important financing source for informationally opaque firms (e.g., Berger and Udell, 1998; Ogawa et al., 2013, Huyghebaert et al., 2007), our study reveals that trade-financing instruments appear to be particularly relevant for small and medium-sized firms, but not for micro firms.

Our findings have practical implications, particularly for policy-makers. Our results reveal that micro firms appear less likely to be financed by subsidised loans or grants, even though they are often targeted by specific support programs. However, it is unclear whether this is due to a lack of awareness of public funding programs (Daskalakis et al., 2013; Öztürk and Mrkaic, 2014) or whether the programs are simply not feasible for the requirements of micro firms – e.g. due to administrative burdens. Hence, we recommend further investigation into this result, and suggest to either increase awareness of public funding programs or adapt support programs to the specific requirements of micro firms. This is particularly important, as our results indicate that the financing patterns of micro firms differ from small and medium-sized firms. Hence, support programs focusing on micro firms should be tailored specifically to small businesses' needs in order to optimize the policy intervention's impact and should be separated from more general SME support.

However, even though some programs designed specifically for micro firms do exist, the implied costs to apply for public support programs can be high. Hence, indirect public support programs (e.g., through portfolio guarantees for financial intermediaries) that use standard financing channels - in particular, banks, microfinance institutions and other providers of finance for micro-enterprises - are likely to be more efficient, as these mechanisms mitigate the collateral requirements for micro firms to obtain bank loans and do not require additional application processes.

Important steps in this direction were taken in the European Progress Microfinance Facility (Bruhn-Leon et al., 2012) and subsequent programs, e.g. the EU Programme for Employment and Social Innovation (EaSI Financial Instruments[5]). The microfinance instruments of these initiatives were successfully absorbed in the market, which is an indication of micro-enterprises' large need of external funding in general and of debt financing in particular.

6.3. Limitations and future research

Our study has some limitations, particularly regarding the data set and the questions asked in the SAFE survey. In our analysis, we only included financing instruments that were used by firms in the past six months. This reduces distortions, for example, by macroeconomic changes. Nevertheless a longer time period or a panel data set would help to see if our results were stable over time. Furthermore, we cannot distinguish between the relevance of financing instruments for specific types of firms and their frequency of use. In addition, the survey does not cover solo self-employed companies, which significantly limits the scope of micro firms included in our data set. Furthermore, our study only includes firm-level data such as firm age, size and industry, and does not account for macroeconomic data or country-specific differences.

These limitations point towards interesting research areas that should be further investigated in the future. First, it has been shown that country-specific differences impact the capital structure of firms (e.g., Daskalakis and Psillaki, 2008; La Porta et al., 1997). Future research could therefore add

[5] See EIF (2017): Inclusive finance. Available at: http://www.eif.org/what_we_do/microfinance/index.htm (accessed 15 March 2017).

macroeconomic variables (e.g., tax rates, interest rates, protection of property rights) to the dataset, in a way that is similar to the approach chosen by Masiak et al. (2017), for instance, and run a multi-level regression to control for these variables and further investigate how these differences affect the financing patterns of micro firms. As cross-border financing is typically very difficult with low funding volumes (Wagner, 2012), micro firms are likely to be affected strongly by these country-specific differences, including the countries' macroeconomic and legal environment.

Second, prior research has linked micro financing to micro firms (e.g., Chan and Lin, 2013; Sonnekalb, 2014). An in-depth analysis of the loan sizes used in micro firms would provide further insights into the financing patterns of these companies. This could produce additional information about how micro loans can help these firms achieve access to finance and allow for policy recommendations regarding how to structure micro loan programs.

Third, as mentioned above, a deeper analysis of the differentiation of various loan durations and, in particular, the importance of short term debt and working capital could provide a substantial amount of relevant information that would enable a better understanding of micro firms' financing patterns and the need for policy intervention.

Fourth, high fixed costs (in absolute and relative terms in comparison to loan amounts) in providing financing for small businesses are often an important constraint. Particularly, costs to reduce asymmetric information (e.g., screening activities) are typically higher when it comes to smaller companies. Against this background, it remains to be seen whether technological developments (e.g., better data availability, internet platforms, fintechs, etc.) can reduce or even eliminate this issue in small business lending (Kraemer-Eis et al., 2017; Block et al., 2017). This is an area that we cannot cover in this paper, but that certainly merits further research.

Fifth, the lack of collateral is a key factor limiting the access to finance of smaller companies in general and micro-enterprises in particular (Bruhn-Leon et al., 2012; Kraemer-Eis et al., 2017). This aspect is used, inter alia, as a background for deriving our hypothesis 1 further above. A deeper investigation of this issue, focusing on the lack of collateral of micro-enterprises and looking into ways to mitigate its consequences, could bring useful information for policy makers and the potential design of financial instruments.

We started this paper by stressing the importance of micro firms for the European economy. Our research generates significant new insights into small firm financing patterns, as our results reveal that different components of the SME group differ significantly with respect to their financing behavior. More research is needed to fully understand these patterns and to better support policy makers in designing appropriate interventions that deliver optimal impacts.

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Annex

Annex 1: Seemingly unrelated logistic regression estimation on financing patterns

Dependent variables	Debt-financed	Trade-financed	State-subsidised	Asset-based financed	Internally-financed
Hypotheses	H1	H2	H3	H4	H5
Independent variables					
Firm size variables, *reference group: medium-sized firms*					
Micro firms	0.179***	-0.387***	-0.969***	-0.478***	1.124***
	(0.068)	(0.074)	(0.010)	(0.088)	(0.061)
Small firms	0.082	-0.088	-0.254***	-0.005	0.522***
	(0.066)	(0.067)	(0.083)	(0.077)	(0.059)
p-value of test (coefficients micro firms = small firms)	p>0.1	p<0.01	p<0.01	p<0.01	p<0.01
Control variables					
Age variables, *reference group: Age >9*					
Age <2	-0.457	0.443	0.148	0.272	-0.173
	(0.332)	(0.281)	(0.390)	(0.351)	(0.286)
Age 2–4	-0.533***	0.164	-0.476**	0.052	0.279***
	(0.132)	(0.116)	(0.195)	(0.142)	(0.093)
Age 5–9	-0.086	0.200***	-0.161*	-0.008	-0.035
	(0.057)	(0.067)	(0.085)	(0.065)	(0.050)
Ownership variables	Yes	Yes	Yes	Yes	Yes
Innovativeness	Yes	Yes	Yes	Yes	Yes
Capital position	Yes	Yes	Yes	Yes	Yes
Profit	Yes	Yes	Yes	Yes	Yes
Turnover expectation	Yes	Yes	Yes	Yes	Yes
Access to finance problems	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes	Yes
Number of observations	12,144	12,144	12,144	12,144	12,144
Log-likelihood	-5,331.51	-4,788.80	-3,037.67	-3,676.07	-6,587.03
Pseudo-R^2	0.036	0.087	0.093	0.047	0.104

Note: Seemingly unrelated logit regression estimation, robust SEs are in parentheses. ***p<0.01, **p<0.05, *p<0.1.

Annex 2: Multinomial logistic regression on financing patterns

Dependent variables	Debt-financed	Trade-financed	State-subsidised	Asset-based financed	Internally-financed
Hypotheses	H1	H2	H3	H4	H5
Independent variables					
Firm size variables, *reference group: medium-sized firms*					
Micro firms	-0.668***	-1.172***	-1.743***	-1.216***	Base category
	(0.081)	(0.086)	(0.111)	(0.098)	
Small firms	-0.338***	-0.498***	-0.653***	-0.403***	
	(0.080)	(0.815)	(0.096)	(0.088)	
Control variables					
Age variables, *reference group: Age >2*					
Age <2	-0.266	0.489	0.251	0.345	
	(0.386)	(0.348)	(0.444)	(0.417)	
Age 2–4	-0.640***	-0.049	-0.648***	-0.148	
	(0.143)	(0.133)	(0.208)	(0.153)	
Age 5–9	-0.052	0.197***	-0.124	0.012	
	(0.066)	(0.074)	(0.093)	(0.076)	
Ownership variables	Yes	Yes	Yes	Yes	
Innovativeness	Yes	Yes	Yes	Yes	
Capital position	Yes	Yes	Yes	Yes	
Profit	Yes	Yes	Yes	Yes	
Turnover expectation	Yes	Yes	Yes	Yes	
Access to finance problems	Yes	Yes	Yes	Yes	
Industry dummies	Yes	Yes	Yes	Yes	
Country dummies	Yes	Yes	Yes	Yes	
Number of observations	12,144				
Log-likelihood	-20,412.98				
Pseudo-R^2	0.086				

Note: Multinomial logistic regression, SEs are in parentheses. ***p<0.01, **p<0.05, *p<0.1.

Annex 3: List of abbreviations

- BA: Business Angel
- coeff.: coefficient
- doi: digital object identifier
- DSGV: Deutscher Sparkassen- und Giroverband
- EaSI: EU Programme for Employment and Social Innovation
- EC: European Commission
- ECB: European Central Bank
- EIB: European Investment Bank
- EIF: European Investment Fund
- EU: European Union
- EUR: Euro
- FGF: Förderkreis Gründungs-Forschung
- H: Hypothesis
- HY1: first half-year
- JEL: Journal of Economic Literature
- m: million
- RMA: Research & Market Analysis
- SAFE: Survey on the access to finance of enterprises
- SME: Small and medium-sized enterprise
- STAREBEI: Stages de Recherche BEI - EIB research internships
- VC: Venture capital; Venture capitalist

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