Financing patterns of European SMEs – an empirical taxonomy

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1. Introduction

SMEs’ access to finance has received an increasing interest of academics and policy-makers over the last years, in particular since the start of the financial market crisis in 2008. However, prior empirical studies mainly focused on a single financing instrument and its determinants (Berger and Udell 1998; Cosh, Cumming, and Hughes 2009). But this is unsatisfactory, as the different financing instruments and their determinants cannot be investigated in isolation from each other. Various substitutive and complementary effects exist between them. We tap into this research gap using an explorative research design and develop an empirical taxonomy of SME financing patterns in Europe.

It is widely accepted that SMEs are not ‘scaled-down versions’ of large firms (Cressy and Olofsson 1997). SMEs are different in many respects. Especially their ownership structure affects their business strategy, and also their business financing (Ang 1992; Chittenden, Hall, and Hutchinson 1996; Michaelas, Chittenden, and Poutziouris 1999). To understand the financing of SMEs, demand and supply factors have to be considered. To determine SMEs’ financing decisions, cost arguments have to be put in the context of the entrepreneurial

ABSTRACT
This paper develops an empirical taxonomy of SME financing patterns in Europe by performing a cluster analysis including 12,726 SMEs in 28 European countries. The results reveal that SME financing in Europe is not homogenous but that different financing patterns exist. The cluster analysis identifies six distinct SME financing types: mixed-financed SMEs, state-subsidised SMEs, debt-financed SMEs, flexible-debt-financed SMEs, trade-financed SMEs and internally financed SMEs. These SME financing types differ according to the number of financing instruments used and the combinations thereof. Furthermore, the SME financing types can be profiled according to their firm-, product-, industry- and country-specific characteristics. Our findings support policy-makers in assessing the impact of policy changes on SME financing and in designing financing programmes tailored to the specific needs of SMEs.

KEYWORDS
SME financing in Europe; financing patterns; empirical taxonomy; cluster analysis

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interest of self-determination and the desire to maintain control of their firm (Cressy 1995; Achleitner, Braun, and Kohn 2011). Hence, financing decisions of SMEs are highly complex, as they are based on an array of social, behavioural and financial factors (Romano, Tanewski, and Smyrnios 2001). Furthermore, access to finance for SMEs is restricted by high information asymmetries, agency risks, insufficient collateral and small transaction volumes. In this context, prior research has shown that the utilisation of financing instruments by SMEs depends on different firm- and product-specific characteristics such as firm size, firm age, ownership and the innovativeness of firms (Berger and Udell 1998; Huyghebaert, Van de Gucht, and Van Hulle 2007; Artola and Genre 2011; Ferrando and Griesshaber 2011), the industry in which they operate (Hall, Hutchinson, and Michaelas 2000; Degryse, de Goeij, and Kappert 2012) and their macroeconomic and legal environments (La Porta et al. 1997; Agarwal and Mohtadi 2004; Beck, Demirgüç-Kunt, and Maksimovic 2008). However, to the best of our knowledge, no study exists providing an integrative perspective of SME financing patterns taking into account the complementary and substitutive effects between the different financing instruments.

This study addresses this research gap using firm-level data of the ‘Survey on the access to finance of enterprises (SAFE survey)’, which is compiled on behalf of the European Central Bank (ECB) and the European Commission (EC). The survey is well-suited for the research objective, as it has information on 14,859 companies in 37 countries in Europe (wave 2013H1) and most of the firms questioned in the survey are SMEs (around 90%). Furthermore, the SAFE contains information on a large number of financing instruments such as retained earnings or sales of assets, grants and subsidised bank loans, bank overdrafts, credit lines or credit card overdrafts, bank loans, trade credit, other loans (from related companies or family and friends), leasing, hire-purchase or factoring, equity, debt securities issued and subordinated/participating loans or preferred stock. To identify financing patterns of European SMEs, we conduct a cluster analysis using these financing instruments as active cluster variables. Our sample includes 28 European countries and 12,726 SMEs (see Section 4.1). In the next step, the financing patterns are analysed using various passive cluster variables, including firm-, product-, industry- and country-specific variables.

The results of our study provide three main contributions to the literature. First, it contributes to prior research on SME financing by focusing on the substitutive and complementary effects of different financing instruments (Beck, Demirgüç-Kunt, and Maksimovic 2008; Casey and O’Toole 2014). Second, the results extend the research on firm-, product- and industry-specific characteristics of SME financing (Hall, Hutchinson, and Michaelas 2004; Jõeveer 2012). And third, our study contributes to cross-country research of SME financing as our sample includes a large number of European countries (Hall, Hutchinson, and Michaelas 2004; Beck, Demirgüç-Kunt, and Maksimovic 2008; Jõeveer 2012). The understanding of SME financing patterns and their determinants is of great practical relevance as it supports policy-makers in assessing the impact of policy changes on SME financing and in designing financing programmes tailored to the specific needs of SMEs.

The study is structured as follows: Section 2 reviews prior research on the determinants of SME financing. Section 3 describes the SAFE survey, the statistical methods and the variables. Section 4 presents the sample and the results of the cluster analysis. It also investigates the characteristics of the financing patterns. In Section 5, we summarise the results, discuss the theoretical implications, outline our limitations and discuss further research directions. Section 6 concludes.
2. Review of the relevant literature

2.1. Firm-, industry- and owner-level determinants of SME financing

Prior research on SME financing confirms that SMEs’ demand for and access to finance is influenced by a number of different firm-, product- and industry-specific factors (Chittenden, Hall, and Hutchinson 1996; Michaelas, Chittenden, and Poutziouris 1999; Ferrando and Griesshaber 2011). Especially firm-specific characteristics such as firm size, firm age and ownership have been found to significantly affect SME financing (Romanov, Tanewski, and Smyrnios 2001; Sogorb-Mira 2005; Beck, Demirgüç-Kunt, and Maksimovic 2008; Mac an Bhaird and Lucey 2010; Chavis, Klapper, and Love 2011; Ferrando and Griesshaber 2011). Several researchers discovered that small and young firms face more obstacles in accessing external finance in comparison to larger and more established firms (Artola and Genre 2011; Canton et al. 2012; Ferrando and Mulier 2013; Holton, Lawless, and McCann 2014). Especially in times of financial crisis, small and young firms seem to suffer disproportionately by deteriorating external financing conditions (Artola and Genre 2011; Ferrando and Mulier 2013). Furthermore, it has been shown that more innovative SMEs are more financially constrained. This is explained by the high failure risk of innovations, the informational opaqueness of the projects for external capital providers and the low diversification possibilities of SMEs (Fazzari, Hubbard, and Petersen 1988; Ang 1992; Carpenter and Petersen 2002a; Magri 2009; Hall 2010; Mina, Lahr, and Hughes 2013). A number of prior studies investigated industry effects on the capital structure of firms (Harris and Raviv 1991; Hall, Hutchinson, and Michaelas 2000; La Rocca, La Rocca, and Cariola 2009; Degryse, de Goeij, and Kappert 2012). It has been shown that firms in different industries vary in asset types, asset risks, requirement for external capital and debt ratios directly affecting the financing structure of companies (Harris and Raviv 1991; van der Wijst and Thurik 1993; Hall, Hutchinson, and Michaelas 2000; Coleman and Robb 2012).

However, prior research on SME financing only distinguishes between equity and debt, and does not take into account that firms can substitute and complement different forms of financing. Berger and Udell (1998) consider these effects and found that SMEs in the USA use various sources of debt and equity capital. The financing instruments used also vary over the business life cycle of firms. They found that small and young firms depend in particular on three funding sources: the principal owner, commercial banks and suppliers. Berger and Udell (1998) and Robb (2002) discovered that these sources accounted for over 70% of the total financing of small and young firms. Cosh, Cumming and Hughes (2009) discovered that in the UK, the availability of different financing sources depends on a number of different firm characteristics. Banks are more likely to provide loans to larger firms with more assets, leasing and factoring firms and suppliers are more likely to provide capital to firms with higher profit margins and private equity investors are more likely to finance smaller, younger and more innovative firms (Cosh, Cumming, and Hughes 2009). While studying the financing patterns of Belgian SMEs, it has been found that young firms with less access to bank finance turn to leasing companies and their suppliers and hence substitute different sources of capital (Deloof, Lagaert, and Verschueren 2007; Huyghebaert, Van de Gucht, and Van Hulle 2007). In addition, access to and the demand for different financing instruments were found to be influenced by personal characteristics of the entrepreneur such as gender, ethnicity, education, experience and character traits (Ang, Cole, and Lawson 2010; Irwin and Scott 2010; Achleitner, Braun, and Kohn 2011; Coleman and Robb 2012, 2015; Cole and Sokolyk 2013;
Robb and Seaman (2014; Cheng 2015). Furthermore, specific problems a firm is faced with (which were categorised as problems related to sales and marketing, organisational systems and external relations) seem to have an influence on its financing decisions and the specific financing instruments used (Fuller and Parker 2008).

2.2. Cross-country research on SME financing

Prior research has shown that the macroeconomic environment and a country’s legal and financial system affect the financing and capital structure of companies (Rajan and Zingales 1995; La Porta et al. 1997; Demirgüç-Kunt and Levine 1999; Booth et al. 2001; Levine 2002; Cull et al. 2006; De Jong, Kabir, and Nyuyen 2008; Ayadi 2009; Fan, Titman, and Twite 2012). However, most cross-country studies in the past concentrated on large and listed companies and only recently, cross-country studies on SME financing emerged (Beck and Demirgüç-Kunt 2006; Ayyagari, Beck, and Demirgüç-Kunt 2007; Psillaki and Daskalakis 2008; Chavis, Klapper, and Love 2011; Hernandez-Canovas and Koeter-Kant 2011; Jõeveer 2012). It has been shown that SMEs in countries with a higher degree of institutional development and a better protection of property rights experience less financial constraints. Especially, bank financing and the related conditions (e.g. interest rates and collateral requirements) depend significantly on the macroeconomic environment (Hernandez-Canovas and Koeter-Kant 2011; Drakos 2012; Holton, Lawless, and McCann 2013).

Beck, Demirgüç-Kunt and Maksimovic (2008) studied the utilisation of various financing instruments by SMEs at a cross-country level, using the World Business Environment Survey (WBES). They found that access to different sources of external financing depends in particular on firm size and financial market development of countries. Similar to this approach, Allen et al. (2012) have shown that alternative financing instruments defined as non-bank, non-market external sources of capital such as trade credit, leasing and loans from family and friends play an important role, both in developed and in developing countries. Chavis, Klapper and Love (2011) found that around the world, younger firms use more informal finance rather than formal (bank) finance. They identified a substitution effect between different external financing sources: as firms age, formal finance replaces informal finance. And this effect is robust across different firm sizes, countries and economic branches (Chavis, Klapper, and Love 2011). Furthermore, it has been shown that in times of financial crisis, SMEs suffering bank financing constraints are more likely to use alternative external financing instruments such as trade credit, factoring and leasing (Taketa and Udell 2007; Carbó-Valverde and Rodríguez-Fernández 2008; Casey and O’Toole 2014; Psillaki and Eleftheriou 2014).

In sum, although the literature on SME financing has grown over the last years, research on the substitutive and complementary use of a larger number of financing instruments in different countries is still scarce. We tap into this research gap by developing an empirical taxonomy of SME financing patterns and analyse how these patterns can be characterised according to their firm-, product-, industry- and country-specific factors.

3. Data, method and variables

3.1. The SAFE survey

To pursue our research objectives, we use the ‘Survey on the access to finance of enterprises (SAFE survey)’ conducted on behalf of the ECB and the EC. As the SAFE covers both the needs
of the EC for structural purposes and the ECB for its monetary policy, the survey is carried out on a bi-annual basis on behalf of the ECB and every two years (and since 2013 on an annual basis) as a joined survey (ECB 2013, 2014c; European Commission 2013). The two waves differentiate by the number of questions included in the survey and the number of participating countries. The companies are randomly selected from the Dun and Bradstreet database and the survey is carried out by professional research companies using Computer Assisted Telephone Interviews.

The survey contains firm-specific information such as firm size (number of employees and turnover), firm autonomy, firm age and ownership. Furthermore, it contains information about the firms’ main activity, their innovation activity and growth (joined waves), their recent financing sources used, their short-term development regarding the firms’ financing needs and their assessment of the access to finance conditions. The firm size categories include micro (1–9 employees), small (10–49 employees), medium-sized (50–249 employees) and large firms (250+ employees). The sample is stratified by these firm size classes (based on the number of employees), economic activity and country. In order to restore the artificially distorted proportions from the sampling process relating to company size and economic activity, post-stratification weights¹ are used. The specific wave we used for this study was conducted between April and September 2013 (2013H1).² It includes 14,859 firms in 37 European countries. Of those firms, 92% have less than 250 employees. The reduced sample, which we used for the cluster analysis, is described in Section 4.1.

3.2. Method

To develop an empirical taxonomy of SME financing patterns in Europe, we perform a hierarchical cluster analysis. Cluster analysis is a group of multivariate methods with the purpose to classify objects into groups according to their occurrences (Hair et al. 2010). This method has the advantage that it is an explorative statistical method, which does not require predefined assumptions (Sørensen and Gutiérrez 2006). It is used for data reduction to develop a more understandable description of observations with minimal losses of information (Hair et al. 2010). Thus, cluster analysis is an appropriate method for our research objectives,³ as it organises the observed data about the utilisation of financing instruments by European SMEs into taxonomies and facilitates a comparison of the different groups (Sørensen and Gutiérrez 2006; Hair et al. 2010; Özari, Köse, and Ulusoy 2013).

Several hierarchical cluster analysis algorithms were tested (single linkage, complete linkage and Ward’s method), using appropriate similarity measures to be able to identify groups of SMEs with similar financing patterns. Finally, we chose the Ward’s method as the results were homogenous and the cluster sizes were balanced (Bortz 2005). The other clustering techniques produced very unbalanced results, with sometimes only one or a few observations in a cluster and a very large number of observations with high within cluster heterogeneity in another. Hence, they were not appropriate for our research objective (Bortz 2005). The Ward’s method has the advantage that it combines objects which increase the within group variation as little as possible and therefore optimises the homogeneity of the clusters (Backhaus et al. 2013). As a similarity measure, we used the squared Euclidean distance (Hair et al. 2010). Squared Euclidean distance is the most commonly used measure of proximity and optimal in combination with the Ward’s algorithm.⁴ We calculated, compared and analysed different cluster solutions of SME financing patterns according to the number
of objects in each cluster as well as the objects’ characteristics. Finally, we decided for a six-cluster solution based on face validity and fits with theory (Hair et al. 2010). Test statistics are provided in the form of Pearson’s $\chi^2$ and Cramer’s V. The Pearson’s $\chi^2$ test evaluates how likely it is that the observed differences arose by chance or, in other words, whether the distribution across the clusters differs significantly from its distribution in the total sample, while Cramer’s V measures the strength of association between the passive cluster variables and the cluster affiliation (between 0 and 1) (Backhaus et al. 2013).

3.3. Variables

3.3.1. Variables used in the cluster analysis (active cluster variables)
For our research purpose, the question about the financing structure of the firm is of key interest, as it comprises the different financing instruments. Participants of the survey were asked whether they used different financing instruments during the past six months, did not use them during the past six months but have experience with them or never used this form of financing. The financing instruments included are (a) retained earnings or sale of assets, (b) grants or subsidised bank loans, (c) bank overdrafts, credit line or credit card overdrafts, (d) bank loans (new or renewal), (e) trade credit, (f) other loans (for instance from a related company or shareholders or from family and friends), (g) leasing, hire-purchase or factoring, (h) debt securities issued, (i) subordinated loans, participating loans, preferred stocks or similar financing instruments and (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). In addition, respondents could indicate that they did not use any external financing in the past six months (l). Using these financing instruments as active cluster variables, we conducted a cluster analysis to develop an empirical taxonomy of SME financing patterns. Due to the low relevance of (h) debt securities issued and (i) subordinated loans, participating loans, preferred stocks or similar financing instruments in the data-set, we decided to merge these groups into one category. Furthermore, we only considered the financing instruments used over the past six months in the cluster analysis, which is clearly a limitation.

3.3.2. Passive cluster variables
To analyse the characteristics of the resulting clusters, we include a number of firm-, product-, industry- and country-specific variables as passive cluster variables (see Table 1). Previous research has revealed considerable differences in SME financing, based on characteristics such as size, age, profitability, innovativeness, industry and country (Berger and Udell 1998; Michaelas, Chittenden, and Poutziouris 1999; Hall, Hutchinson, and Michaelas 2000; Beck, Demirgüç-Kunt, and Maksimovic 2008; Cosh, Cumming, and Hughes 2009).

3.3.2.1. Firm-specific variables
3.3.2.1.1. Firm size. We measure the size of the firm by the number of employees and by annual turnover (both reported in categories). Previous research has shown that firm size is an important determinant for the firm’s financial structure (Ang 1992; Berger and Udell 1998). It has been argued that smaller firms are more opaque because the quality and quantity of information available about the firm are typically very low (Berger and Udell 1998; Artola and Genre 2011). Empirical results show that the size of a firm is an important determinant
Table 1. Passive cluster variables used (SAFE).

| Passive cluster variables                  | Coding                                      | Comments                                      |
|--------------------------------------------|---------------------------------------------|-----------------------------------------------|
| **Firm size 1: Number of employees**       | 1 = from 1 employee to 9 employees          | Category 4 was excluded from the analysis     |
| How many people does your company currently employ either full- or part-time in [country] at all its locations? | 2 = 10–49 employees                        |                                              |
|                                            | 3 = 50–249 employees                        |                                              |
|                                            | 4 = 250 employees or more                   |                                              |
| **Firm size 2: Turnover**                  | 1 = up to € 2 m                             |                                              |
| What was the annual turnover of your company in 2012? | 2 = more than € 2 m and up to € 10 m        |                                              |
|                                            | 3 = more than € 10 m and up to € 50 m       |                                              |
|                                            | 4 = more than € 50 m                        |                                              |
| **Firm age**                               | 1 = 10 years or more                        | Recoded in the data-set                      |
| In which year was your firm registered?    | 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                       |                                              |
| **Ownership**                              | 1 = public shareholders                     |                                              |
| Who are the owners of your firm?           | 2 = family or entrepreneurs                 |                                              |
| Please select the most appropriate category in terms of majority holders if more than one category applies. | 3 = other firms or business associates      |                                              |
|                                            | 4 = venture capital firms or business angels|                                              |
|                                            | 5 = a natural person, one owner only        |                                              |
|                                            | 7 = other                                   |                                              |
| **Growth in past 1: Employee growth**      | 1 = over 20% per year                       |                                              |
| Over the last three years (2010–2012), 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? | 2 = less than 20% per year                 |                                              |
|                                            | 3 = no growth                               |                                              |
|                                            | 4 = got smaller                             |                                              |
| **Growth in past 2: Turnover growth**      | 1 = over 20% per year                       |                                              |
| Over the last three years (2010–2012), how much did your firm grow on average per year in terms of turnover? | 2 = less than 20% per year                 |                                              |
|                                            | 3 = no growth                               |                                              |
|                                            | 4 = got smaller                             |                                              |
| **Growth expectation**                     | 1 = grow substantially – over 20% per year  |                                              |
| Considering the turnover over the next two to three years (2014–2016), how much does your company expect to grow per year? | 2 = grow moderately – below 20% per year   |                                              |
|                                            | 3 = stay the same size                      |                                              |
|                                            | 4 = become smaller                          |                                              |
| **Profitability**                          | 1 = increased                              |                                              |
| Please tell me whether your company’s profit margin has decreased, remained unchanged or increased over the past six months? | 2 = remained unchanged                     |                                              |
|                                            | 3 = decreased                               |                                              |
| **Product-related innovativeness**         | 1 = yes                                     | Recoded in the data-set                      |
| During the past 12 months have you introduced a new or significantly improved product or service to the market? | 2 = no                                     |                                              |
| **Sector of main activity**                | 1 = industry                               |                                              |
| What is the main activity of your company? | 2 = construction                           |                                              |
|                                            | 3 = trade                                   |                                              |
|                                            | 4 = services                                |                                              |
| **Country**                                | 37 European countries                       | 27 EU countries (excl. Malta) plus Norway as member of the European Economic Area (EEA) included in the analysis* |

*Table A1 (Appendix 1) provides a complete list of countries included in the analysis.
Note: For all variables 9 = DK/NA (excluded).
Source: SAFE 2013H1.
of accessing external sources of financing, especially bank financing (Artola and Genre 2011; Canton et al. 2012; Coluzzi, Ferrando, and Martinez-Carrascal 2015; Holton, Lawless, and McCann 2014; Öztürk and Mrkaic 2014). Furthermore, empirical research reveals that smaller firms hold significantly more short-term debt than larger firms (Holmes and Kent 1991; Hutchinson 1995). However, prior studies show that these effects are often not only due to firm size, but are also related to firm age and ownership (Artola and Genre 2011; Ferrando and Griesshaber 2011).

3.3.3.2. Firm age. In the survey, firm age is reported in categories. Prior research shows that the firm’s financing instruments vary over the business life cycle. Informal financing is more important early in the companies’ life and will be replaced with more formal financing when companies mature (Berger and Udell 1998; Huyghebaert and Van de Gucht 2007; Cosh, Cumming, and Hughes 2009; Chavis, Klapper, and Love 2011). This is explained by the growing reputation of borrowing firms, existing track records and established relationships with capital providers, which reduce information asymmetries and agency risks (Walker 1989; Petersen and Rajan 1994; Chavis, Klapper, and Love 2011; Canton et al. 2012). Furthermore, financial institutions have been found to prefer the provision of short-term debt instead of long-term debt in the early stages of a company, as it provides more flexibility to terminate the contract (Huyghebaert and Van de Gucht 2007).

3.3.3.3. Ownership. The SAFE survey includes a number of different ownership structures of SMEs. We included all ownership types in the analysis, as prior research has revealed that the ownership structure of a firm influences which types of financing sources are used (McMahon and Stanger 1995; Romano, Tanewski, and Smyrnios 2001; Bathala, Bowlin, and Dukes 2004; Ferrando and Griesshaber 2011). Families, teams and single-owner firms are more likely to avoid external finance and especially financing instruments, where others gain control rights in the firm (Cressy 1995; Chittenden, Hall, and Hutchinson 1996; Romano, Tanewski, and Smyrnios 2001; Bathala, Bowlin, and Dukes 2004).

3.3.3.4. Growth. This variable captures the past growth rates as well as future growth expectations of SMEs. Past growth is measured in terms of employment and turnover. Future growth expectations are measured in terms of turnover with the same categories on an annual basis over the next two to three years. Previous research indicates that firms with high growth rates are more likely to require external financing, as internal financing capabilities are not sufficient to finance their growth ambitions (Carpenter and Petersen 2002b; Cassar 2004; Coleman and Robb 2012; Rogers 2014).

3.3.3.5. Profitability. The development of profitability can also be obtained from the survey. Respondents were asked to indicate whether their profit margins increased, remained unchanged or decreased over the past six months. Previous research found that an increase in profitability results in higher retained profits, enhancing the self-financing capabilities of the firm. In addition, firms with a higher profitability are more likely than other firms to substitute long-term debt with internal financing, short-term debt and trade financing to reduce leverage and increase flexibility (Demirgüç-Kunt and Maksimovic 2001; Cosh, Cumming, and Hughes 2009). Banks have been found to be resistant to provide credit to unprofitable companies (Walker 1989; Ferrando and Mulier 2013). Empirical research shows
that profitability and debt are negatively related (Michaelas, Chittenden, and Poutziouris 1999; Romano, Tanewski, and Smyrnios 2001; Cole 2008).

3.3.2.2. Product-specific variables. The SAFE survey contains a variable about the product-related innovativeness of the firm by asking if the firm has introduced a new or significantly improved product or service to the market within the past 12 months. Previous research has shown that firms with more innovation activity are more risky and hence experience more financial constraints than other firms do. This is explained by the high failure risk of innovations, the informational opaqueness of the projects for external capital providers and the low diversification possibilities of SMEs (Fazzari, Hubbard, and Petersen 1988; Ang 1992; Carpenter and Petersen 2002a; Magri 2009; Hall 2010; Mina, Lahr, and Hughes 2013). High-risk projects increase the probability of bankruptcy of the firm and unlike for equity providers, the higher risks are not offset by potentially higher returns (Jensen and Meckling 1976; Carpenter and Petersen 2002a; Mason and Harrison 2003; Magri 2009; Brown and Degryse 2012). Equity investors, in turn, participate in the success of the firm and are compensated for the higher risks with potentially higher returns in case of success (Carpenter and Petersen 2002a; Hall 2010; Robb and Seamans 2014). Particularly VC investors have been found to be better equipped to deal with the higher risks due to their comprehensive due diligence procedures, personal contacts with the entrepreneurs, investor networks and active involvement in the firm (Van Osnabrugge 2000; Carpenter and Petersen 2002a; Mason and Stark 2004; Block and Sandner 2009; Cosh, Cumming, and Hughes 2009; Hall 2010; Alexy et al. 2012).

3.3.2.3. Industry-specific variables. The SAFE data-set contains information about the firms’ main activities: industry, construction, trade and services. Even though the survey obtains information about a larger number of different industries, this information is merged into these four categories to ensure representativeness and anonymity (ECB 2014c). A number of studies in the past were concerned with the industry effect on the capital structure of firms (Harris and Raviv 1991; Hall, Hutchinson, and Michaelas 2000; La Rocca, La Rocca, and Cariola 2009; Degryse, de Goeij, and Kappert 2012). It has been shown that different industries vary in asset types, asset risks, requirement for external capital and debt ratios (Harris and Raviv 1991; van der Wijst and Thurik 1993; Hall, Hutchinson, and Michaelas 2000; Coleman and Robb 2012). Furthermore, firms tend to follow the golden rule of capital structure, which means that long-term assets are more likely to be financed with long-term capital and short-term assets with short-term capital (van der Wijst and Thurik 1993; Hall, Hutchinson, and Michaelas 2000).

3.3.2.4. Country-specific variables. The SAFE survey used for this study comprises 37 European countries. We consider all countries, where the original weights could be restored (see Section 3.1). Hence, 28 European countries are included, where 27 countries are members of the EU (excluding Malta) and Norway, which is a member of the European Economic Area (EEA) and therefore closely linked to the EU. The importance of the macroeconomic, legal and institutional environments and their impact on firm financing have been shown in a number of studies (Rajan and Zingales 1995; La Porta et al. 1997; Demirgüç-Kunt and Levine 1999; Levine 2002; Cull et al. 2006). Previous research found that countries with more developed financial markets and better protection of property rights provide a broader range of financing instruments (Beck, Demirgüç-Kunt, and Maksimovic 2008; Chavis, Klapper, and
Love 2011; Jõeveer 2012). Even though financial markets in Europe have converged, there are still a number of country-specific differences (Guiso et al. 2004; Mullineux and Murinde 2010). To investigate these differences and their impact on SME financing, we classify the countries based on several distinguishing factors such as geography, prevailing financial market systems, the effects of the financial market crisis and financial market integration in Europe.

4. Empirical findings and discussion

4.1. Description of the sample

The aim of this study is to investigate financing patterns of European SMEs. Hence, using the employee threshold provided by the EC to define SMEs, all firms with more than 250 employees are excluded from the analysis (European Commission 2005). The final sample consists of 12,726 SMEs in 28 European countries (27 countries in the EU excluding Malta and including Norway). The largest numbers of SMEs are from Italy (17.3%), France (11.3%), Spain (11.1%), Germany (9.2%) and the UK (7.4%). Nearly 93% of the companies are micro firms with less than 10 employees and about 90% generate an annual turnover of less than EUR 2 m (see Table 4). Around 64% of the companies are mature with an age of 10 years or more and only 3.3% are very young firms. Regarding ownership, very few firms are listed (1.3%) and the majority of firms belong to families or groups of entrepreneurs (46.6%) or are single-owner companies (45.1%). Only around 25% of the firms hired additional employees, but over 40% had a positive turnover development. Future growth expectations are also positive with more than half of the firms expecting a turnover growth over the next two to three years (around 51%). Within the past 12 months, around one-third (31.1%) brought a new or significantly improved product or service to the market. The service sector is the category with the largest number of firms (44.6%), whereas industry is the category with the smallest number of firms (10.3%).

Regarding financing instruments, a large number of firms in the sample used short-term financing in form of bank overdrafts, credit card overdrafts and credit lines (34.8%) and trade credit (29.8%). Bank loans were used by 25.3% of the SMEs, 20.4% used leasing, hire-purchase or factoring and 20% used retained earnings. The least used financing instruments in the past six months were government subsidies (10.2%), equity (4.4%), debt securities issued (1.6%) and subordinated loans, participating loans, preferred stocks or similar financing instruments (1.4%). A detailed overview of the financing instruments used by SMEs is provided Table 2.

4.2. Cluster analysis and description of clusters

To identify groups of SMEs with similar financing patterns, we perform a cluster analysis using the different financing instruments as active cluster variables (see Section 3.3). The final sample for the cluster analysis comprises 12,312 SMEs, as 414 SMEs (around 3.3%) did not provide information on at least one financing instrument. The cluster analysis results in six different clusters, which are statistically significant ($p < 0.01$) from each other regarding the use of the different financing instruments (see Table 3).

**Cluster 1 (Mixed-financed SMEs):** Firms in this cluster use a broad range of financing instruments. It is the second largest cluster including 2,060 SMEs (16.7%). A large number
of SMEs in this group (72.5%) used other loans such as loans from related companies or family and friends. Furthermore, this cluster has the highest percentage of SMEs using retained earnings and sale of assets (27.9%). Bank overdrafts, credit lines or credit card overdrafts (45.0%) as well as bank loans (36.3%) play an important role in this group. In addition, trade-related forms of financing such as trade credit (41.3%), leasing, hire-purchase or factoring (27.9%) were used. The mixed-financed SME cluster is the only group where equity (24.1%) and other financing instruments (i.e. debt securities, subordinated and participating loans and preferred stocks) (17.1%) are of importance. Grants and subsidised bank loans were the least important financing instruments in this cluster (14.9%).

Cluster 2 (State-subsidised SMEs): The firms in this cluster are characterised by their utilisation of government-supported forms of financing. All of the SMEs in this cluster used this type of financing over the previous six months. It is the smallest cluster with only 887 SMEs (7.2%). SMEs in this cluster combined state-subsidised forms of financing in particular with short-term (54.0%) and long-term bank financing (55.2%). Trade credit (32.1%) and leasing, hire-purchase and factoring (24.4%) were also important sources of financing. Other loans (1.2%) as well as equity (3.6%) were of low importance.

Cluster 3 (Debt-financed SMEs): SMEs in this group (1,981 firms, 16.1%) used all forms of debt financing but with little importance of grants and subsidised bank loans (1.6%). This cluster is characterised by the very large number of SMEs using bank loans (95.2%). SMEs in this cluster further relied on short-term bank financing (56.2%), trade credit (41.4%) and leasing, hire-purchase or factoring (30.4%). Retained earnings as a financing instrument were of lower importance (20.6%).

Cluster 4 (Flexible-debt-financed SMEs): This cluster is characterised by SMEs focusing on short-term debt financing, in particular institutional short-term debt. It is the second smallest
Table 3. Cluster results.

| Financing instruments | Mixed-financed SMEs | State-subsidised SMEs | Debt-financed SMEs | Flexible-debt-financed SMEs | Trade-financed SMEs | Internally financed SMEs | Pearson $\chi^2$ (by line) |
|-----------------------|---------------------|-----------------------|--------------------|-----------------------------|----------------------|--------------------------|---------------------------|
| Retained earnings or sale of assets | 27.9% | 22.7% | 20.6% | 14.7% | 25.5% | 14.0% | 236.9*** |
| Grants or subsidised bank loans | 14.9% | 100% | 1.6% | 0.0% | 1.9% | 0.0% | 8750.7*** |
| Bank overdrafts, credit lines or credit card overdrafts | 45.0% | 54.0% | 56.2% | 100% | 6.3% | 0.0% | 6443.2*** |
| Bank loans (new or renewal) | 36.3% | 55.2% | 95.2% | 0.0% | 0.0% | 0.0% | 8160.2*** |
| Trade credit | 41.3% | 32.1% | 41.4% | 20.8% | 70.7% | 0.0% | 3498.2*** |
| Other loans | 72.5% | 1.2% | 0.0% | 0.0% | 0.0% | 0.0% | 8391.2*** |
| Leasing, hire-purchase or factoring | 27.9% | 24.4% | 30.4% | 20.4% | 41.2% | 0.0% | 1702.8*** |
| Equity | 24.1% | 3.6% | 0.0% | 0.0% | 0.0% | 0.0% | 2387.2*** |
| Other | 17.1% | 0.0% | 0.0% | 0.0% | 0.0% | 100% | 1803.4*** |
| No external finance | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 100% | 12312.0*** |
| $N$ | 2,060 | 887 | 1,981 | 1,627 | 1,888 | 3,869 | 3,869 |
| Percentage of firms | 16.7% | 7.2% | 16.1% | 13.2% | 15.3% | 31.4% | 31.4% |
| Description | Firms that use a large variety of financing instruments. | Firms that use grants/subsidised loans and other debt. | Firms that use all types of debt with a strong focus on bank loans. | Firms that use only flexible, short-term debt. | Firms that use mainly trade-related types of financing. | Firms without external financing |

*Other financing instruments = debt securities issued, subordinated/participating loans, preferred stocks or similar instruments.

Notes: $N = 12,312$; Pearson’s $\chi^2$ test: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Cluster with 1,627 SMEs (13.2%). Most important financing instruments were bank overdrafts, credit lines and credit card overdrafts (100%). SMEs in this cluster used to a lesser extent than other SMEs trade credit (20.8%) and leasing, hire-purchase or factoring (20.4%). Also retained earnings were used only by 14.7% of SMEs.

**Cluster 5 (Trade-financed SMEs):** SMEs in this group relied in particular on trade credit (70.7%) to finance their operations and 41.2% used leasing, hire-purchase or factoring. Alongside these sources of financing, retained earnings (25.5%) were important for SMEs in this cluster. 1,888 SMEs (15.3%) belong to this group.
Cluster 6 (Internally financed SMEs): This cluster constitutes the largest group in our sample: 3,869 SMEs or 31.4% of our sample. SMEs in this cluster did not use any sources of external financing in the past six month. Furthermore, only a small number of firms in this group used retained earnings or sale of assets (14.0%) as sources of financing.

4.3. Comparison of clusters regarding passive cluster variables

4.3.1. Firm-, product- and industry-specific characteristics
Statistical tests show that SMEs are not equally distributed across clusters according to their firm-, product- and industry-specific characteristics ($p < 0.01$) (see Table 4).

4.3.1.1. Firm- and product-specific characteristics of the clusters. Whereas larger and more mature SMEs are more likely to use a larger number of financing instruments including bank loans, state-subsidised financing and equity, smaller SMEs are more likely to use internal financing and flexible short-term debt. This result is in line with prior research, which found that larger and more mature firms have lower information asymmetries and can therefore access a broader range of financing sources, whereas smaller and younger firms are more likely to use less external capital or – if external capital is required – tend to use more flexible short-term debt (Holmes and Kent 1991; Hutchinson 1995; Berger and Udell 1998; Huyghebaert and Van de Gucht 2007; Artola and Genre 2011).

The cluster analysis further reveals that the financing patterns of SMEs significantly differ depending on the firm’s ownership structure. It has been found in the past that owner-managed firms try to avoid heteronomy through external parties (Cressy 1995). They prefer debt over equity and in particular short-term debt after internal financing capabilities are depleted (Holmes and Kent 1991; Hutchinson 1995; Huyghebaert, Van de Gucht, and Van Hulle 2007). Short-term financing is typically more flexible, requires less collateral and covenants and is hence, more attractive for smaller, owner-managed firms (Hutchinson 1995). Our cluster analysis supports these findings for single-owner companies. Family-owned firms and firms with more than one owner, however, seem to use a broader range of financing instruments.

Furthermore, we find that past growth rates, innovation activity and future growth expectations seem to be closely related to the financing of SMEs. The cluster analysis reveals that firms with higher growth rates and higher levels of innovation activity are more likely to use a broader range of financing instruments and in particular alternative and short-term financing. Hence, they tend to be more often in the mixed-financed, flexible-debt-financed and trade-financed SME clusters. This result is likely to be related to the higher risks of high growth, innovative firms and the reluctance of banks to finance these companies (Myers 1977; Michaelas, Chittenden, and Poutziouris 1999; Vanacker and Manigart 2010; Degryse, de Goeij, and Kappert 2012). However, the number of firms with high and moderate past growth rates and a higher level of innovation activity are comparatively high in the state-subsidised SME cluster using government subsidies and also bank debt. SMEs in this cluster seem to have a distinctive decrease in profitability but are very positive about their future growth. Even though the specific characteristics of SMEs in this cluster would suggest that access to bank debt for these firms is difficult, they use comparatively more often bank financing. This could be due to the involvement of government agencies providing a positive signal for other capital providers, especially financial institutions.
Table 4. Cluster comparison: firm-, product- and industry-specific characteristics.

| Variable                  | Categories                                      | Total sample (%) | N          | Mixed-financed SMEs (%) | State-subsidised SMEs (%) | Debt-financed SMEs (%) | Flexible-debt-financed SMEs (%) | Trade-financed SMEs (%) | Internally financed SMEs (%) | Test statistic |
|---------------------------|-------------------------------------------------|------------------|------------|-------------------------|--------------------------|------------------------|-------------------------------|-------------------------|--------------------------|-------------------|
| SMEs per cluster          |                                                 |                  |            |                         |                          |                        |                               |                         |                          |                   |
| **Firm characteristics**  |                                                 |                  |            |                         |                          |                        |                               |                         |                          |                   |
| Size                      |                                                 |                  |            |                         |                          |                        |                               |                         |                          |                   |
| Number of employees       | 1–9 employees                                   | 92.8             | 12,312     | 16.3                    | 6.9                      | 15.7                   | 13.3                         | 15.2                    | 32.5                     | 120.8***          |
|                           | 10–49 employees                                 | 6.2              |            | 20.7                    | 10.4                     | 21.4                   | 12.1                         | 17.2                    | 18.1                     | 0.070             |
|                           | 50–249 employees                                | 1.0              |            | 28.8                    | 12.8                     | 21.6                   | 8.0                          | 16.0                    | 12.8                     |                   |
| Turnover                  | ≤€2m                                            | 89.5             | 11,920     | 15.6                    | 6.6                      | 16.0                   | 13.6                         | 15.4                    | 32.7                     | 208.4***          |
|                           | >€2m–€10m                                       | 8.4              |            | 24.4                    | 11.6                     | 19.6                   | 9.9                          | 13.9                    | 20.6                     | 0.076             |
|                           | >€10m–€50m                                      | 1.8              |            | 25.8                    | 13.4                     | 17.7                   | 4.8                          | 21.1                    | 17.2                     |                   |
|                           | >€50m                                           | 0.3              |            | 37.1                    | 2.9                      | 31.4                   | 5.7                          | 8.6                      | 14.3                     |                   |
| Firm age                  | ≥10 years                                       | 64.5             | 11,813     | 15.4                    | 7.2                      | 17.3                   | 13.5                         | 14.9                    | 31.8                     | 149.7***          |
|                           | 5 to less than 10 years                         | 20.1             |            | 17.8                    | 7.4                      | 15.4                   | 15.5                         | 15.1                    | 28.9                     | 33.0              |
|                           | 2 to less than 5 years                          | 12.0             |            | 19.5                    | 6.9                      | 13.7                   | 9.2                          | 17.8                    | 30.0                     |                   |
|                           | <2 years                                        | 3.3              |            | 26.1                    | 9.1                      | 6.8                    | 5.8                          | 10.4                    | 41.8                     |                   |
| Ownership                 | Public shareholders                             | 1.2              | 12,305     | 47.0                    | 2.6                      | 11.3                   | 4.0                          | 16.6                    | 18.5                     | 431.6***          |
|                           | Family or entrepreneurs                         | 46.6             |            | 18.0                    | 8.1                      | 17.5                   | 12.9                         | 17.3                    | 26.2                     | 0.084             |
|                           | Other firms or business associates              | 5.3              |            | 23.4                    | 5.9                      | 14.4                   | 10.3                         | 18.7                    | 27.2                     |                   |
|                           | Venture capital firms or business angels        | 0.3              |            | 59.0                    | 15.4                     | 12.8                   | 0.0                          | 5.1                      | 7.7                      |                   |
|                           | One owner only                                  | 45.2             |            | 13.5                    | 6.4                      | 15.3                   | 14.2                         | 13.1                    | 37.5                     |                   |
|                           | Other                                           | 1.3              |            | 17.1                    | 9.8                      | 6.1                    | 13.4                         | 12.2                    | 41.5                     |                   |
| Growth rate p.a. (average p.a. over past 3 years) | Employment                                     |                  |            |                         |                          |                        |                               |                         |                          |                   |
|                           | High growth >20% p.a.                           | 9.2              | 11,885     | 16.9                    | 10.3                     | 12.2                   | 15.5                         | 17.9                    | 27.2                     | 365.6***          |
|                           | Moderate growth <20% p.a.                       | 15.2             |            | 16.0                    | 8.6                      | 19.1                   | 12.9                         | 15.3                    | 27.9                     | 0.101             |
|                           | No growth                                       | 50.5             |            | 12.1                    | 6.8                      | 16.7                   | 13.3                         | 15.1                    | 35.9                     |                   |
|                           | Got smaller                                     | 25.1             |            | 25.4                    | 6.1                      | 15.4                   | 13.5                         | 15.0                    | 24.5                     |                   |
|                           | Turnover                                        |                  |            |                         |                          |                        |                               |                         |                          |                   |
|                           | High growth >20% p.a.                           | 13.1             | 11,904     | 18.6                    | 8.2                      | 15.1                   | 13.6                         | 15.7                    | 28.8                     | 237.4***          |
|                           | Moderate growth <20% p.a.                       | 31.4             |            | 12.2                    | 7.9                      | 17.5                   | 12.8                         | 18.5                    | 31.1                     | 0.141             |
|                           | No growth                                       | 24.6             |            | 14.1                    | 6.1                      | 14.7                   | 14.6                         | 13.5                    | 37.1                     |                   |
|                           | Got smaller                                     | 30.9             |            | 21.6                    | 7.3                      | 17.5                   | 13.3                         | 13.4                    | 26.9                     |                   |

(Continued).
| Variable                        | Categories                   | Total sample (%) | Mixed-financed SMEs (%) | State-subsidised SMEs (%) | Debt-financed SMEs (%) | Flexible-debt-financed SMEs (%) | Trade-financed SMEs (%) | Internally financed SMEs (%) | Pearson χ² (by line) | Cramer’s V |
|--------------------------------|------------------------------|------------------|-------------------------|--------------------------|------------------------|-------------------------------|--------------------------|---------------------------|------------------------|-------------|
| Growth rate p.a. – Expectation (next 2–3 years) | High growth > 20% p.a.     | 10.6             | 24.6                    | 9.8                      | 11.0                   | 13.0                          | 14.7                     | 26.9                      | 300.7***   | 0.092      |
|                                | Moderate growth < 20% p.a.  | 40.2             | 18.9                    | 8.7                      | 15.8                   | 13.4                          | 16.0                     | 16.0                      | 27.2       |             |
|                                | No growth                   | 34.7             | 11.3                    | 5.7                      | 16.8                   | 13.2                          | 16.6                     | 36.4                      | 75.7       |             |
|                                | Get smaller                 | 14.5             | 19.4                    | 5.8                      | 17.2                   | 14.8                          | 11.0                     | 31.8                      | 22.4       |             |
| Profitability                  | Profit margin               |                  |                         |                          |                        |                               |                          |                           |            |             |
|                                | Increased                   | 13.6             | 21.0                    | 5.3                      | 16.9                   | 13.9                          | 18.0                     | 24.9                      | 160.5***   | 0.082      |
|                                | Remained unchanged          | 36.5             | 14.3                    | 6.5                      | 15.4                   | 12.0                          | 15.1                     | 36.7                      |            |             |
|                                | Decreased                   | 49.9             | 17.7                    | 8.4                      | 16.9                   | 13.9                          | 15.1                     | 28.1                      |            |             |
| Product characteristics        | Product or service innovation | 31.0            | 19.2                    | 9.0                      | 14.1                   | 13.4                          | 15.2                     | 29.0                      | 67.3***    | 0.074      |
| Industry characteristics       | Industry                    | 10.3             | 17.3                    | 8.6                      | 18.1                   | 14.8                          | 16.0                     | 25.2                      | 90.9***    | 0.050      |
|                                | Construction                | 16.6             | 19.5                    | 6.5                      | 18.6                   | 12.2                          | 13.5                     | 29.8                      |            |             |
|                                | Trade                       | 28.5             | 17.1                    | 7.0                      | 16.2                   | 13.7                          | 16.4                     | 29.7                      |            |             |
|                                | Services                    | 44.6             | 15.3                    | 7.3                      | 14.6                   | 13.0                          | 15.2                     | 34.6                      |            |             |

Notes: Pearson’s χ² test and Cramer’s V for categorical variables. ***p < 0.01, **p < 0.05, *p < 0.1.
The table should be read by comparing the share of SMEs per cluster and the share of SMEs in each category of passive cluster variables.
4.3.1.2. **Industry-specific characteristics of the clusters.** The cluster analysis further reveals that service firms seem to rely strongly on internal financing and are less likely to use external financing instruments. As tangible assets and hence capital requirements in the service sector are typically comparatively low, financing from turnover and bootstrapping (Bhide 1992; Freear, Sohl, and Wetzel 1995; Harrison, Mason, and Girling 2004), they have been found to be a suitable way to finance service firms (Klapper, Sarria-Allende, and Sulla 2002; Ebben and Johnson 2006; Chavis, Klapper, and Love 2011). The cluster analysis also demonstrates that trade finances and flexible debt financing are more common for SMEs in the trade sector compared to SMEs in other sectors. This is in line with previous research, which found that firms with a lower maturity structure of assets and a higher requirement for working capital financing are more likely to be short-term financed (Myers 1977; Hutchinson 1995; Petersen and Rajan 1997; Michaelas, Chittenden, and Poutziouris 1999; Klapper, Sarria-Allende, and Sulla 2002; Chavis, Klapper, and Love 2011). SMEs from the industry sector are more likely to be financed by debt and state subsidies. This result can be explained by the fact that firms from capital-intensive industries require longer term financing and – at the same time – can provide more collateral, thereby reducing information asymmetries and agency risks for capital providers, as collateral secures their interests in the case of repayment problems (Michaelas, Chittenden, and Poutziouris 1999; Hall, Hutchinson, and Michaelas 2000; Degryse, de Goeij, and Kappert 2012).

4.3.2. **Country-specific characteristics of the clusters**

To investigate differences in SME financing across countries, we build country classifications based on several distinguishing factors, which are expected to have an impact on SME financing such as geography, prevailing financial market systems, the effects of the financial market crisis and financial market integration in Europe. We find that the financing patterns of SMEs differ significantly between different country groups. Furthermore, we find that the differences by country group are more pronounced (reflected in the size of Cramer’s V) than the differences by firm-, product- and industry-specific characteristics (see Table 5).

4.3.2.1. **Regional differentiation of European countries.** To differentiate country groups by region, we use the classification by the United Nations Statistics Division (UNSD). Accordingly, Europe is divided in Eastern Europe, Northern Europe, Southern Europe and Western Europe. Internally financed SMEs are the largest group within each geographical region. However, Eastern European countries stand out, showing a much higher percentage of firms using internal financing (45.8%). An explanation for this result is likely to be the countries’ history as former socialist countries with their historically underdeveloped financial markets and the importance of internal financing sources (Klapper, Sarria-Allende, and Sulla 2002; Aidis 2005). However, the cluster analysis also indicates that Eastern European SMEs (11.4% of SMEs belong to the debt-financed SMEs cluster) do not differ from Northern European SMEs (11.2%); the percentage of SMEs in the debt-financed cluster is much higher among Southern (17.3%) and Western European SMEs (20.2%). Northern European SMEs are to a large degree mixed-financed SMEs (23.7%). This result is likely due to the fact that Northern European countries tend to have comparably well-organised and efficient financial markets, including stock markets (Guiso et al. 2004). The other three country groups show significantly lower percentages of SMEs in this cluster but with relatively similar proportions (between 14 and 16%). Compared to the other country groups, Southern European SMEs more often tend
Table 5. Cluster comparison: country-specific characteristics.

| Groups of countries by region (UNSD) | Mixed-financed SMEs (%) | State-subsidised SMEs (%) | Debt-financed SMEs (%) | Flexible-debt-financed SMEs (%) | Trade-financed SMEs (%) | Internally financed SMEs (%) | Test statistic |
|-------------------------------------|-------------------------|---------------------------|------------------------|--------------------------------|-------------------------|-----------------------------|---------------|
| Eastern Europe<sup>a</sup>          | 14.4                    | 6.3                       | 11.4                   | 9.8                            | 12.3                    | 45.8                        |               |
| Northern Europe<sup>b</sup>         | 23.7                    | 3.5                       | 11.2                   | 11.6                           | 22.6                    | 27.4                        |               |
| Southern Europe<sup>c</sup>         | 16.1                    | 9.8                       | 17.3                   | 12.4                           | 17.5                    | 26.8                        |               |
| Western Europe<sup>d</sup>          | 15.6                    | 6.2                       | 20.2                   | 17.4                           | 10.8                    | 29.8                        |               |
| Total sample                         | 16.7                    | 7.2                       | 16.1                   | 13.2                           | 15.3                    | 31.4                        |               |
| **Notes:** N = 12,310; Pearson’s χ² test and Cramer’s V for categorical variables. ***p < 0.01, **p < 0.05, *p < 0.1. | | | | | | | |
|<sup>a</sup>BG, CZ, HU, PL, RO, SK;<sup>b</sup>DK, EE, FI, IE, LT, LV, NO, SE, UK;<sup>c</sup>CY, ES, GR, HR, IT, PT, SI;<sup>d</sup>AT, BE, DE, FR, LU, NL. | | | | | | | |

| Groups of bank-based, market-based and former socialist countries | Mixed-financed SMEs (%) | State-subsidised SMEs (%) | Debt-financed SMEs (%) | Flexible-debt-financed SMEs (%) | Trade-financed SMEs (%) | Internally financed SMEs (%) | Test statistic |
|------------------------------------------------------------------|-------------------------|---------------------------|------------------------|--------------------------------|-------------------------|-----------------------------|---------------|
| Bank-based countries<sup>a</sup>                                 | 15.8                    | 8.5                       | 18.6                   | 14.8                           | 15.1                    | 27.1                        |               |
| Market-based countries<sup>b</sup>                               | 23.7                    | 2.9                       | 12.1                   | 11.4                           | 21.2                    | 28.6                        |               |
| Former socialist countries<sup>c</sup>                           | 15.0                    | 6.0                       | 11.2                   | 9.6                            | 12.1                    | 45.9                        |               |
| Total sample                                                      | 16.7                    | 7.2                       | 16.1                   | 13.2                           | 15.3                    | 31.4                        |               |
| **Notes:** N = 12,312; Pearson’s χ² test and Cramer’s V for categorical variables. ***p < 0.01, **p < 0.05, *p < 0.1. | | | | | | | |
|<sup>a</sup>AT, BE, CY, DE, ES, FI, FR, GR, IE, IT, LU, NO, PT;<sup>b</sup>NL, SE, UK, FI;<sup>c</sup>BG, CZ, EE, HR, HU, LT, LV, PL, RO, SI, SK. | | | | | | | |

| Groups of non-distressed vs. distressed countries | Mixed-financed SMEs (%) | State-subsidised SMEs (%) | Debt-financed SMEs (%) | Flexible-debt-financed SMEs (%) | Trade-financed SMEs (%) | Internally financed SMEs (%) | Test statistic |
|--------------------------------------------------|-------------------------|---------------------------|------------------------|--------------------------------|-------------------------|-----------------------------|---------------|
| Non-distressed countries                          | 17.0                    | 5.6                       | 15.4                   | 13.6                           | 13.8                    | 34.6                        |               |
| Distressed countries<sup>a</sup>                  | 16.3                    | 9.8                       | 17.3                   | 12.6                           | 17.8                    | 26.2                        |               |
| Total sample                                      | 16.7                    | 7.2                       | 16.1                   | 13.2                           | 15.3                    | 31.4                        |               |
| **Notes:** N = 12,312; Pearson’s χ² test and Cramer’s V for categorical variables. ***p < 0.01, **p < 0.05, *p < 0.1. | | | | | | | |
|<sup>a</sup>CY, ES, GR, IE, IT, PT, SI (ECB 2014b, 2014c). | | | | | | | |
Table 5. (Continued).

| Groups of countries by region (UNSD) | Mixed-financed SMEs (%) | State-subsidised SMEs (%) | Debt-financed SMEs (%) | Flexible-debt-financed SMEs (%) | Trade-financed SMEs (%) | Internally financed SMEs (%) | Test statistic |
|-------------------------------------|-------------------------|---------------------------|------------------------|-------------------------------|-------------------------|-----------------------------|---------------|
| **EU members before 2004 ('old' members)b** | 16.9                    | 7.6                       | 17.6                   | 14.4                          | 16.3                    | 27.3                        |               |
| **Accession countries since 2004 ('new' members)c** | 15.0                    | 6.1                       | 11.2                   | 9.6                           | 12.3                    | 45.8                        |               |
| **Total sample**                     | 16.5                    | 7.2                       | 16.2                   | 13.3                          | 15.4                    | 31.4                        | **354.5*** 0.171 |

Notes: N=12,165; Pearson’s $\chi^2$ test and Cramer’s V for categorical variables. ***p < 0.01, **p < 0.05, *p < 0.1.

*a* excl. Norway (NO); 
*b* AT, BE, DE, DK, ES, FI, FR, GR, IE, IT, LU, NL, PT, SE, UK; 
*c* BG, CY, CZ, EE, HR, HU, LT, LV, PL, RO, SI, SK.

| Groups of euro vs. non-euro countriesa | Mixed-financed SMEs (%) | State-subsidised SMEs (%) | Debt-financed SMEs (%) | Flexible-debt-financed SMEs (%) | Trade-financed SMEs (%) | Internally financed SMEs (%) | Test statistic |
|--------------------------------------|-------------------------|---------------------------|------------------------|-------------------------------|-------------------------|-----------------------------|---------------|
| **Euro countriesb**                  | 16.4                    | 8.2                       | 18.1                   | 14.5                          | 14.8                    | 28.0                        |               |
| **Non-euro countriesc**              | 16.8                    | 4.9                       | 11.5                   | 10.5                          | 16.8                    | 39.5                        |               |
| **Total sample**                     | 16.5                    | 7.2                       | 16.2                   | 13.3                          | 15.4                    | 31.4                        | **250.3*** 0.142 |

Notes: N=12,163; Pearson’s $\chi^2$ test and Cramer’s V for categorical variables. ***p < 0.01, **p < 0.05, *p < 0.1.

*a* excl. Norway (NO); 
*b* AT, BE, CY, DE, EE, ES, FI, FR, GR, IE, IT, LT, LU, LV, NL, PT, SI, SK; 
*c* BG, CZ, DK, HR, HU, PL, RO, SE, UK.
to be state-subsidised (9.8%). This result might be explained by the fact that a number of countries in this region were strongly affected by the financial market crisis (e.g. Greece, Italy, Portugal and Spain) and financing for SMEs from banks in these countries tended to be more difficult (Belke 2013; Ferrando and Mulier 2013).

The strong banking system in Continental Europe is likely to be an important explanation for the strong debt orientation of SMEs in Western and Southern Europe (Demirgüç-Kunt and Maksimovic 1999; Allard and Blavy 2011; Bijlsma and Zwart 2013). For Western Europe, this finding is supported by the comparatively large number of SMEs in the flexible-debt-financed SME cluster (17.4%). In Southern Europe, SMEs tend to be disproportionally often in the trade-financed SME cluster (17.5%). This result can be explained by the generally longer payment periods in these countries (Marotta 2005; Garcia-Teruel and Martinez-Solano 2010; EPI 2014; Psillaki and Eleftheriou 2014). The finding that 22.6% of SMEs in Northern Europe are trade-financed SMEs is in line with the results of Demirgüç-Kunt and Maksimovic (2001). They have shown that firms in countries with well-developed financial market systems use trade credit comparatively more often than firms in other countries (e.g. in Canada, the UK and Ireland). Furthermore, although initial payment periods might be shorter in Northern European countries (Garcia-Teruel and Martinez-Solano 2010), as long as late payment penalties are not enforced, trade credit might be an attractive option in comparison to other forms of short-term debt financing (Marotta 2005). In addition, leasing as a financing instrument is used to a large degree in some Northern European countries (Oxford Economics 2011).

4.3.2.2. Bank-based, market-based and former socialist countries. Looking deeper at the differences of SME financing in market-based, bank-based and former socialist countries, we find significant differences between these three country groups. While in bank-based financial systems, banks play the dominant role in mobilising and allocating capital, monitoring firms and facilitating risk management systems, market-based financial systems rely on the securities markets to allocate capital and exert corporate control (Demirgüç-Kunt and Levine 1999; Levine 2002). The financial markets in former socialist countries are strongly influenced by their history. State-owned firms and banks, corruption and low levels of investor protection characterised many former socialist countries until the 1990s (Nivorozhkin 2005). As a consequence, financial markets were underdeveloped, the banking system was inefficient and mostly state-owned (Klapper, Sarria-Allende, and Sulla 2002; Aidis 2005; Haas and Peeters 2006). For firms, it was difficult to attract external finance and they often relied on internal financing and loans from related parties like family and friends (Aidis 2005; Haas and Peeters 2006; Hutchinson and Xavier 2006). In line with these results from prior research, our cluster analysis reveals that SMEs in former socialist countries more often tend to be internally financed. In contrast to prior findings, our cluster analysis indicates that SMEs in these transition economies less often belong to the group of flexible-debt-financed and trade-financed SMEs (Klapper, Sarria-Allende, and Sulla 2002; Delcoure 2007).

Market-based countries (Finland, the Netherlands, Sweden and the UK) (Demirgüç-Kunt and Levine 1999; Allard and Blavy 2011; Saillard and Url 2011; Bijlsma and Zwart 2013) significantly more often have mixed-financed SMEs. This result indicates that SMEs in market-based economies are more likely to use a broader range of financing sources, including equity funding and the securities market, to finance their businesses. In addition, SMEs in market-based countries more often tend to be trade-financed SMEs. This result indicates that SMEs in market-based countries seem to prefer covering their financing needs with trade
credit, leasing or factoring instead of using institutional sources of financing (Demirgüç-Kunt and Maksimovic 2001; Oxford Economics 2011). SMEs in bank-based countries more often tend to be debt-financed and flexible-debt-financed. This is not surprising, as these economies are characterised by a strong banking sector. Furthermore, SMEs in bank-based economies are more likely to use state-subsidised financing. This finding might be the result of the European financial market crisis, where banks reduced their credit engagement, especially in regard to smaller and riskier creditors (Ferrando and Griesshaber 2011; Ferrando and Mulier 2013; Casey and O’Toole 2014) and government support was required to overcome problems regarding access to finance.

4.3.2.3. Distressed versus non-distressed economies in Europe. The recent economic, financial and debt crisis has affected countries in Europe to varying degrees. Over the last years, especially Cyprus, Greece, Ireland, Italy, Portugal, Slovenia and Spain (ECB 2014a, 2014b) faced many difficulties not only on the sovereign level but also in the banking sector. Banks in Europe and in particular in distressed countries reacted with a reduction of their credit risk exposure, which resulted in a decrease of supply and an increase of costs for bank loans (Drakos 2012). Previous research found that SMEs suffered the most due to their informational opacity and their inherent higher risks (Ferrando and Griesshaber 2011; Öztürk and Mrkaic 2014). Furthermore, it has been discovered that firms which are more bank-lending constrained are more likely to use alternative sources of financing such as trade credit (Casey and O’Toole 2014). Our cluster analysis supports these findings by revealing that SMEs in distressed economies are more likely to belong to the clusters of state-subsidised and trade-financed SMEs. As expected, deteriorations in financial markets seem to increase the utilisation of alternative financing instruments such as trade credit, leasing and factoring (Casey and O’Toole 2014). Furthermore, it is not surprising that SMEs in distressed countries are more likely to be in need of and receive government support. State-subsidised SMEs are characterised by the utilisation of grants and state-subsidised loans, and also by a high degree of institutional debt financing. The cluster comparison supports the argument that government support is likely to have a positive effect on firms’ access to finance (Murray and Lott 1995; Freel 2006; Mina, Lahr, and Hughes 2013). SMEs that received government subsidies seem to be more likely to obtain other forms of institutional debt, even under difficult financing conditions (Demirgüç-Kunt and Maksimovic 1999; Beck, Demirgüç-Kunt, and Maksimovic 2008).

4.3.2.4. European financial market integration. To shed more light on the financial integration in the European Union (excluding Norway) and its impact on SME financing, we choose two different country classifications: ‘Old’ versus ‘new’ member states and euro versus non-euro countries. The European enlargement since 2004 so far comprises the former socialist countries Bulgaria, the Czech Republic, Croatia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia as well as Cyprus and Malta12 (‘new’ member states or ‘accession’ countries). With respect to the second differentiation, not all European countries introduced the euro as their common currency. Starting with 11 EU member states in 1999, the Eurozone comprises today 19 of the currently 28 EU countries. The non-euro EU member states are Bulgaria, the Czech Republic, Croatia, Denmark, Hungary, Poland, Romania, Sweden and the UK. The results of our cluster analysis show that there exist significant differences in SME financing between these country groups (see Table 5).
Our cluster analysis reveals that compared to SMEs in the ‘old’ EU member states, SMEs in the ‘new’ member states are more likely to be internally financed SMEs and have a much lower utilisation of institutional debt financing (short- and long-term debt). In addition, they tend to use to a lower degree trade financing. Government subsidies also seem to be less common (or less available). Even though the EU accession countries (mainly former socialist countries) typically still have underdeveloped financial markets (Guiso et al. 2004; Murinde, Agung, and Mullineux 2004; Nivorozhkin 2005; Delcoure 2007; Mullineux and Murinde 2010), a considerable number of SMEs in these countries are mixed-financed firms. This highlights the fact that financing from related parties such as family and friends seems to be an important financing alternative in these countries (Aidis 2005).

In the Eurozone, the ECB acts as the leading financial authority with the main mission ‘to safeguard the financial stability and promote European financial integration.’ As a result, economic parties within the Eurozone should face identical rules and equal access to financing instruments or services. In line with this expectation, our cluster analysis indicates that significant differences in SME financing in euro and non-euro countries exist. The results of our cluster analysis show that SMEs in non-euro countries more often tend to be internally financed and less often seem to be financed by government subsidies, bank loans and flexible debt financing. These differences support the argument that the launch of the euro increased the degree of financial integration among the member states (Baele et al. 2004). However, looking at the non-euro countries and the specific differences between both country groups, it is unclear whether these differences can be (solely) explained by the Eurozone membership or whether they are the result of the financial systems in the respective countries, already discussed in the previous classifications.

5. Summary and implications

5.1. Summary and contributions

The aim of this study was to develop an empirical taxonomy of SME financing patterns in Europe. Our results show that SME financing is not homogeneous, but that different SME financing patterns exist. Our cluster analysis identified six distinct SME financing types in Europe differing significantly \((p < 0.01)\) in the utilisation of the different financing instruments: mixed-financed SMEs, state-subsidised SMEs, debt-financed SMEs, flexible-debt-financed SMEs, trade-financed SMEs and internally financed SMEs. These groups of SMEs differ according to the number of different financing instruments used and the combinations of these instruments. Furthermore, it was analysed how these SME financing clusters differ according to their firm-, product-, industry- and country-specific characteristics. We find that mixed-financed SMEs use all types of financing instruments – including equity and market-based financing instruments – but with a strong focus on loans provided by related parties such as family and friends or related companies. In comparison, mixed-financed SMEs are more often younger, small- and medium-sized innovative SMEs with high future growth expectations. The ownership structure is mixed, but with comparatively few single-owner firms. SMEs in this cluster are more likely to be in market-based economies and in Northern Europe. State-subsidised SMEs rely in particular on government subsidies and bank financing. SMEs in this group are more often small- and in particular medium-sized companies with high to moderate past growth rates and high future growth expectations.
SMEs in this cluster show a high level of innovation activities but decreased profit margins. They are more likely to be in bank-based and distressed countries. *Debt-financed SMEs* use bank loans, short-term bank financing and trade credit to a large extent. More often, they tend to be older firms in family hands or owned by entrepreneurial teams. These firms show comparatively low growth rates and growth expectations and a low level of innovation activities. SMEs in this cluster are more often in bank-based economies and in the ‘old’ EU member countries. *Flexible-debt financed SMEs* use more flexible forms of debt financing, in particular provided by financial institutions, and tend to be more mature micro firms. These companies are also more often single-owner firms in bank-based economies and in the ‘old’ EU member states. *Trade-financed SMEs* rely in particular on their suppliers to finance their operations, and also use leasing and factoring comparatively more often. They tend to be younger and smaller firms with increased profit margins, owned by families or entrepreneurial teams. Trade-financed SMEs are more likely to be Northern and Southern European companies. Finally, *internally financed SMEs* are in particular young micro firms. These SMEs tend to be single-owner companies from the service industry with comparatively low growth expectations. SMEs in this group are more likely to be in Eastern Europe and former socialist countries. Table 6 summarises our main results.

The results of this study provide three main contributions to the SME finance literature. First, it contributes to the literature focusing on substitutive and complementary effects of different financing sources for SME financing. Prior research on the interaction between firms and their sources of capital is either focused on the general decision between equity and debt or focuses on a single source of financing. Separate streams of literature have emerged on specific financing instruments (Harris and Raviv 1991; Hutchinson 1995; Michaelas, Chittenden, and Poutziouris 1999; Hall, Hutchinson, and Michaelas 2004; Cosh, Cumming, and Hughes 2009; Vanacker and Manigart 2010). Empirical research considering a larger number of financing instruments and their substitutive and complementary effects is still scarce (exceptions are e.g. Berger and Udell 1998, 2006; Robb 2002; Huyghebaert and Van de Gucht 2007; Cosh, Cumming, and Hughes 2009; Casey and O’Toole 2014; Beck, Demirgüç-Kunt, and Singer 2011). We contribute to this literature by proposing an empirical taxonomy of SME financing patterns with different combinations of various financing instruments.

Second, we contribute to research on firm-, product- and industry-specific characteristics of SMEs and their importance for financing (Howorth 2001; Hall, Hutchinson, and Michaelas 2004; Beck, Demirgüç-Kunt, and Maksimovic 2008; Jöeever 2012). Empirical studies found that factors such as firm size, firm age, ownership structure, profitability, asset structure and industry are important determinants of the demand for and availability of financing instruments (Chittenden, Hall, and Hutchinson 1996; Michaelas, Chittenden, and Poutziouris 1999; Howorth 2001; Romano, Tanewski, and Smyrnios 2001; Frank and Goyal 2007; López-Gracia and Sogorb-Mira 2008). In addition, a number of studies focused on the financing determinants of specific types of firms like innovative and high-growth companies (Freel 2006; Hall 2010; Vanacker and Manigart 2010; Mazzucato 2013; Mina, Lahr, and Hughes 2013). The results of our cluster analysis contribute to this literature by disclosing that SME financing types are characterised by specific combinations of firm-, product- and industry-specific factors. Furthermore, our results contribute to the life cycle theory of firm financing (Berger and Udell 1998). We find that firms use different combinations of financing instruments over the business life cycle. Younger firms seem to be more likely to use informal sources of capital, whereas more mature firms tend to substitute informal sources with more formal financial instruments.
### Table 6. Cluster comparison: summary.

| Cluster                  | Financing in cluster                                                                 | Characteristics                                                                 | Product-specific     | Industry-specific          | Country-specific                                      |
|--------------------------|---------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|----------------------|---------------------------|-------------------------------------------------------|
| Mixed-financed SMEs      | SMEs that used a large variety of instruments with a focus on other loans (72%); only cluster with a noteworthy amount of equity financing (24%) | More often younger, small- and medium-sized firms with different ownership structures; moderate past growth but with high future growth expectations and more often increased profit margins | More innovation     | Most likely for construction sector                     | Esp. in Northern European and market-based countries |
| State-subsidised SMEs    | 100% of SMEs used subsidised bank loans or grants; large amount of other debt       | More often small- and in particular medium-sized firms; especially family firms or entrepreneurial teams; high to moderate past growth and future growth expectations with decreased profit margins | More innovation     | Most likely for industry sector                          | Esp. in Southern European, bank-based and distressed countries |
| Debt-financed SMEs       | 95% of SMEs used bank loans; all types of debt used                                   | More mature small- and medium-sized firms; especially family firms or entrepreneurial teams; low growth in the past and low growth expectations | Low innovation      | More likely for industry and construction sectors        | Esp. in Western European, bank-based and ‘old’ EU member countries |
| Flexible-debt-financed SMEs | 100% of group used short-term bank debt; some trade credit and leasing/factoring | More mature microfirms with lower turnover; especially single-owner firms; more often high employee growth; average growth expectations | Average innovation  | More likely for industry and trade sectors               | Esp. in Western European, bank-based and ‘old’ EU member countries |
| Trade-financed SMEs      | 70% of group used trade credit and 40% leasing/factoring                             | More often younger (2–5 years), small firms in family hands or entrepreneurial teams; moderate turnover growth; moderate to no growth expectations | Average innovation  | Most likely for trade sector                             | Esp. in Northern and Southern European countries; more often in market-based countries |
| Internally financed SMEs | 100% of group used no external debt; 14% retained earnings                           | More often very young, micro, single-owner firms with high and moderate employee growth in the past; no turnover growth and expectation to stay the same size | Low innovation      | Most likely for service sector                            | Esp. in Eastern European, former socialist countries  |
sources of capital. However, our cluster analysis indicates that informal sources are still used as complements to other financing instruments in later stages of a company’s life.

Third, we contribute to cross-country research on SME financing by comparing SME financing patterns across 28 European countries. Prior empirical research found evidence for the importance of country-specific factors determining the financing of SMEs (Hall, Hutchinson, and Michaelas 2004; Beck, Demirgüç-Kunt, and Maksimovic 2008; Jõeveer 2012). It has been shown that corporate market structure, macroeconomic conditions, legal and tax systems, history and culture, relationships with banks and availability of different financing sources influence the financing of firms (Demirgüç-Kunt and Levine 1999; Hall, Hutchinson, and Michaelas 2004; Kiehlborn and Mietzner 2005). The analysis in this study adds to these findings by illustrating differences in the financing patterns of SMEs in different groups of European countries.

5.2. Limitations and further research

5.2.1. Limitations

Our empirical analysis has some limitations. First, the results are limited by the specific formulations of the questions in the SAFE survey. For example, the questions about the utilisation of the different financing instruments only relate to the application but not the significance of the financing instruments for the firm. Hence, our taxonomy does not account for the importance of the respective financing instruments (e.g. the amounts financed by each instrument). Furthermore, in some cases, the financing instruments are broad categories (e.g. ‘leasing, hire-purchase or factoring’ or ‘equity’), which makes the exact interpretation difficult. An additional limitation is that firms without employees are excluded from the survey. This restriction excludes many start-ups in their early phases, as companies typically start without having paid employees. Socio-economic owner characteristics, which have been found to be relevant for the financing decision of firms, are – with the exception of gender – not included in the survey.

Second, the approach used to identify SMEs has some limitations. We defined SMEs according to the threshold provided by the EC but – due to a lack of data – only used the number of employees (less than 250 employees). Other ways to identify SMEs such as the amount of sales were not used. Furthermore, the financing of SMEs in our analysis was restricted to the six months preceding the survey. Six months as a time frame is rather short and may not provide a complete picture of the firms’ financing patterns. On a positive side, this restriction avoids distortions resulting from the business life cycle of firms and changes in macroeconomic conditions. In addition, cause-and-effect relationships between the utilisation of financing instruments and a company’s characteristics cannot always be clearly determined.

Finally, some limitations regarding our statistical analysis have to be considered. We used cluster analysis to develop an empirical taxonomy of SME financing patterns. However, cluster analysis has some limitations such as the sensibility in changes to the data-set, the applied clustering algorithm and the number of clusters chosen (Hair et al. 2010; Moritz 2015).

5.2.2. Further research

Our study provides first insights into the financing patterns of European SMEs. The limitations of our analysis provide interesting research directions for further research.
(1) How did the financing patterns of SMEs and their profiles change over time?
The results of our study are based on the SAFE survey in 2013. To shed more light on the stability of the identified clusters, a comparison of the taxonomy over time could be performed. The identified financing patterns could be analysed according to their firm-, product-, industry- and country-specific characteristics. This analysis could give some indication on how the financing of SMEs changes in the presence of changing economic conditions such as a financial crisis (Block and Sandner 2009).

(2) What influences have additional country-, firm- and owner-level data on SME financing patterns?
To enable a further in-depth analysis of the determinants of SME financing, the SAFE data could be combined with additional firm-level data such as the firms’ balance sheet information (Ferrando and Mulier 2013) and additional macro-level data such as GDP, inflation rates, private credit allocation and stock market liquidity. Furthermore, it has been found that the availability and utilisation of different financing instruments does not only vary on a country-level, but also on a sub-national or regional level (Degryse and Ongena 2005; DeYoung, Glennon, and Nigro 2008; Alessandrini, Presbitero, and Zazzaro 2009; Avdeitchikova 2009; Mason 2010; Harrison, Mason, and Robson 2015). It would be very interesting to further differentiate between SMEs in core and peripheral regions and to investigate if the financing patterns of SMEs differ according to geographical variations. Finally, it has been shown in prior research that owner characteristics such as gender, age, ethnicity and education have an influence on SME financing (Ang, Cole, and Lawson 2010; Irwin and Scott 2010; Coleman and Robb 2015). The consideration of such socio-economic owner-related information could further improve the understanding of SME financing patterns in Europe.

(3) Are alternative financing instruments a solution for SMEs experiencing financial constraints?
A further interesting research direction could be to analyse if financially constrained SMEs switch to alternative financing sources. The comparison of financing clusters could be one step to shed more light on this question. However, the SAFE survey used for this research project does not go deep enough into some financing instruments (such as the exact type of equity used). An even greater distinction between different financing instruments and the inclusion of new financing alternatives could further improve the understanding of SME financing patterns.

6. Conclusion
The results of our empirical study reveal that SME financing in Europe is not homogenous, but that different financing patterns with different profiles exist. Or to put it differently: various financing instruments are considered as substitutes and complements in SME financing and the different financing patterns are characterised by specific firm-, product-, industry- and country-specific factors. This result is of high political relevance as government support programmes can only be effective if they support access to financing instruments that consider both, the specific characteristics of SMEs and their demand for finance as well as the supply conditions in specific countries.

One important finding of our analysis is that government support programmes seem to have a positive influence on firms’ access to finance. SMEs in the state-subsidised SME
cluster seem to complement government subsidies with the use of a large variety of financing instruments, but with a strong focus on institutional debt. The specific characteristics of SMEs in this cluster, especially their high level of innovation activities, high growth rates and decreased profitability would suggest that access to bank debt for these firms is difficult. Thus, it is very likely that the involvement of government agencies provides a positive signal for other capital providers, especially financial institutions. The cluster comparison also shows that the state-subsidised SME cluster is the smallest group of SMEs, more often comprising small- and in particular medium-sized companies and less often micro firms. Micro firms are more likely to use internal resources and short-term debt, especially from financial institutions. This financing behaviour of SMEs can have various reasons such as their particular financing requirements, ownership structure, owner characteristics and macroeconomic conditions. Our study should be understood as explorative and descriptive. It does not provide a full picture of the reasons responsible for the financing of SMEs nor does it analyse the suitability of the financing instruments or whether the financing of these SMEs is an active choice or the result of financial constraints (Moritz 2015).

Despite these and other limitations (see above), our study can help policy-makers adapt and tailor government support programmes to the particular needs of the SME financing types and to different European countries (European Investment Fund 2015). In this context, our cluster analysis provides information about possible effects of policy changes (e.g. changes in banking regulations) in Europe on SME financing and which groups of SMEs will be particularly affected by these changes.

Notes

1. To calculate the appropriate weights, the data on company size, economic activities and countries reported by Eurostat are used: http://appsso.eurostat.ec.europa.eu/nui/show.do?wai=true&data-set=sbs_sc_sca_r2 (accessed 15 December 2014).
2. The questionnaire is available at https://www.ecb.europa.eu/stats/money/surveys/sme/html/index.en.html (accessed 2 January 2016).
3. Basically, two statistical methods are appropriate to develop an empirical taxonomy: cluster analysis and correspondence analysis. As the result of a correspondence analysis would be rather complex and difficult to read as it would depict all 12,726 SMEs of our sub-sample in a two-dimensional space, we decided for the more appropriate cluster analysis (Backhaus et al. 2013).
4. However, we also applied other proximity measures to test for the stability of the clusters. The Rogers and Tanimoto as well as the Russel and Rao similarity measures produced a relatively high matching in the cluster solutions of 77.1 and 76.2%.
5. We validated the cluster results using the Test of Mojena and the Elbow Criterion (Mojena 1977; Backhaus et al. 2013). As both measures did not provide an unambiguous result, different cluster results were analysed and compared. This approach supported the six-cluster solution (Hair et al. 2010).
6. For more details about country distribution, please compare Table A1 (Appendix 1).
7. Due to the low relevance of debt securities issued and subordinated loans, participating loans, preferred stocks or similar financing instruments in the data-set, these groups were merged in the analysis into the category ‘Other’ (debt securities, subordinated/participating loans and preferred stock).
8. Table 4 should be read by comparing the share of SMEs per cluster and the share of SMEs in each category of passive cluster variables. For example, 32.5% of all SMEs with 1–9 employees are internally financed SMEs, even though only 31.4% of all SMEs belong to this cluster. This result suggests that smaller firms are more likely to be internally financed SMEs. Due to the
large sample size, even small differences are noteworthy. The Pearson $\chi^2$ test statistic of 120.8 for the variable ‘number of employees’ is statistically significant ($p < 0.01$). This result suggests that the differences in the number of employees are not due to chance.

9. Based on the SAFE survey, alternative instruments include trade credit, leasing, factoring and hire-purchase.

10. SMEs in the trade-financed SME cluster show more often than the average high to moderate past growth rates. Regarding innovation activity, they are in the average compared to the other clusters.

11. For a more detailed analysis, please compare Moritz (2015).

12. Due to a lack of data, Malta is not included in the analysis (see Section 3.1).

13. See https://www.ecb.europa.eu/ecb/orga/escb/html/mission_eurosys.en.html (accessed 2 January 2016).

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## Appendix 1

### Table A1. Country distribution

| Country             | Number of SMEs | In percent |
|---------------------|----------------|------------|
| Austria             | AT 171         | 1.3        |
| Belgium             | BE 311         | 2.4        |
| Bulgaria            | BG 278         | 2.2        |
| Cyprus              | CY 26          | 0.2        |
| Czech Republic      | CZ 549         | 4.3        |
| Germany             | DE 1,176       | 9.2        |
| Denmark             | DK 118         | 0.9        |
| Estonia             | EE 30          | 0.2        |
| Spain               | ES 1,419       | 11.1       |
| Finland             | FI 127         | 1.0        |
| France              | FR 1,436       | 11.3       |
| Greece              | GR 511         | 4.0        |
| Croatia             | HR 93          | 0.7        |
| Hungary             | HU 313         | 2.5        |
| Ireland             | IE 86          | 0.7        |
| Italy               | IT 2,196       | 17.3       |
| Lithuania           | LT 64          | 0.5        |
| Luxembourg          | LU 16          | 0.1        |
| Latvia              | LV 46          | 0.4        |
| Netherlands         | NL 445         | 3.5        |
| Norway              | NO 152         | 1.2        |
| Poland              | PL 834         | 6.6        |
| Portugal            | PT 489         | 3.8        |
| Romania             | RO 253         | 2.0        |
| Sweden              | SE 353         | 2.8        |
| Slovenia            | SI 65          | 0.5        |
| Slovakia            | SK 230         | 1.8        |
| United Kingdom      | UK 937         | 7.4        |
| Total               | 12,726         | 100        |

Source: SAFE 2013H1