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SMEs' growth under financing constraints and banking markets integration in the euro area

Maricica Moscalu[a], Claudia Girardone[b], and Raffaella Calabrese ⓘ[c]

[a]Department of Finance, Bucharest University of Economic Studies, Romania; [b]Essex Business School, University of Essex, UK; [c]Business School, University of Edinburgh, UK

ABSTRACT

We explore the impact of financing constraints and the role of banking markets integration on the growth of small and medium enterprises (SMEs). The data are drawn from the European Central Bank/Survey on the Access to Finance of Enterprises (ECB/SAFE) on SMEs' access to finance aggregated at the country level for the largest 11 euro area countries during 2009–2015. Our findings suggest that financing constraints hamper SMEs' growth and that the effect is stronger for *perceived*, rather than *actual*, financing constraints. On the other hand, increased banking markets integration in the euro area appears to foster SMEs' growth. Furthermore, we found that the reduction in financing constraints is crucial in the transmission channel from banking markets integration to growth. This effect appears significantly stronger when integration is measured by the intensity of cross-border lending than through convergence in interest rates to loans to nonfinancial corporations.

Introduction

How does access to finance in the euro area impact on the growth of small and medium enterprises (SMEs)? To what extent does integration in banking markets play a role in reducing financing constraints for small businesses? In this article, we attempt to answer these important questions and adopt a broad definition of access to finance to include demand and supply side factors. The theoretical and empirical literature on the financing behavior of firms is dominated by two capital structure theories[1]; namely, the trade-off (Kraus & Litzenberger, 1973) and pecking order theories (Myers, 1984; Myers & Majluf, 1984). Conversely, financial intermediation theories (Diamond, 1984; Leland & Pyle, 1977) focus on the characteristics and nature of bank relationships and the role of signaling (for example, internal financing and collateral) in reducing credit rationing. According to this view, debt contracts are the optimal methods of financing, and relationship lending can improve information quality. In this

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CONTACT Raffaella Calabrese ✉ Raffaella.Calabrese@ed.ac.uk

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[1]For an extensive literature survey, see Frank and Goyal (2008).

study, we focus on the banking sector as main supplier of small business credit. Although recent years have witnessed a considerable growth in nontraditional finance options (for example, fintech activities such as peer-to-peer lending platforms), in Europe they remain niche products and banks still provide much of the fuel for SMEs' growth. On the demand side for small business credit, financing constraints are viewed from the perspective of the firm seeking external capital to support its growth thus uses firm-level data to measure them. The supply approach considers the impact of the availability and cost of external financing in the European Union (EU) single market and explores whether and to what extent more integrated banking markets reduce loan prices and increase credit availability, thereby benefiting euro area small and medium firms' growth. If a more integrated banking market is found to be conducive to growth, then important policy implications can implicitly be drawn.

The conventional approach to measuring financing constraints relies on financial statement proxies such as cash flow at the firm level. However, the increased availability of survey data for SMEs has allowed researchers to measure constraints more directly especially as far as bank financing is concerned. In this article, we adopted an approach à la Ferrando and Mulier (2015) that allowed us to distinguish between actual and perceived external bank financing constraints (for more details, see the subsection *Financing constraints as a barrier for growth*). The use of both measures not only provided us with a means to check the validity of our main results, but also allowed us to assess the accuracy of firms' perceptions about the impact of their financing difficulties on the realized growth. Survey data is especially adequate for exploring this type of insight. Based on previous literature (Bottazzi, Secchi, & Tamagni, 2014; Beck & Demirguc-Kunt, 2006; Carpenter & Petersen, 2002; and others), we expected a negative association between the share of constrained firms and the SMEs' sector growth.

In this article we sought to test not only whether there are direct effects of banking integration on *firm growth* (defined as growth in sales), but also potential indirect effects through the impact of banking integration on financing constraints. The choice to focus on the banking markets was further motivated by the fact that SMEs are typically more dependent on banks for external finance compared to larger firms that can more easily access market finance (Berger & Udell, 1995; Bremus & Neugebauer, 2018; Gertler & Gilchrist, 1994). SMEs in the euro area can be particularly vulnerable to unfavorable developments in banking markets conditions, as shown in recent years. These markets have experienced an increase in the level of cross-country dispersion in interest rates to loans for nonfinancial corporations (NFCs) (Arnold and van Ewijk, 2014; Rughoo & Sarantis, 2012), together with a pronounced reduction in the level of cross-border lending in the years following the onset of the global financial crisis. Evidence shows that the crisis has indeed had a persistent effect on integration in the euro

area banking markets. With regard to cross-border lending, Bremus and Fratzscher (2015) show that the growth in cross-border claims has not significantly picked up after the crisis. They also found that the home bias has risen sharply leading to more segmented credit markets especially in the euro area, and attribute this to changes in monetary and regulatory policies. Similarly, with regard to convergence in interest rates, Arnold and van Ewijk (2014) argue that heterogeneity in sovereign risk is to a large extent responsible for the increased cross-sectional dispersion in lending and deposit rates.

Since the start of the global financial crisis, there has been a growing literature analyzing various ways in which the crisis might have affected SMEs' access to bank finance (Carbó-Valverde, Rodríguez-Fernández, & Udell, 2016; Ferrando & Mulier, 2015; Casey & O'Toole, 2014; Drakos, 2013; Canton, Grilo, Monteagudo, & van der Zwan, 2013; Vermoesen, Deloof, & Laveren, 2013; Kremp & Sevestre, 2013; Holton, Lawless, & McCann, 2013 and others). Using data from the crisis period, our study investigates whether increased banking market integration can have a beneficial effect on SMEs' access to bank finance. We hypothesize a positive effect as increased markets integration is expected to expand the range of available financing sources while reducing their cost (for example, Lucey & Zhang, 2011). Integration in banking markets can be assessed in different ways. In this study, we employed two measures that proxy for supply and cost of funds in an integrated market. The first measure refers to the intensity of the flow of bank funds to borrowers across borders and assumes that, under full financial integration, the flow of funds across borders is not hampered by financial frictions. It is essentially a quantity-based measure (ECB, 2015), calculated as the country-share of monetary financial institutions' (MFIs) cross-border lending to nonfinancial corporations located in the other euro area countries in total lending to NFCs. The second measure was constructed under the *law of one price* concept according to which, in integrated financial markets, the price of similar-risk assets should converge (for example, Yeyati, Schmukler, & Van Horen, 2009). It is a price-based measure that accounts for the cross-country variability of MFIs' interest rates to (new) loans to NFCs (see, for example, De Nicolò & Juvenal, 2014). Both measures exhibit time variation, and this is important, given that financial integration is a time-varying process as initially noted in Bekaert and Harvey (1995). Indeed, the recent financial crisis has confirmed this, as after decades of increasing financial and banking markets integration, the trend was reversed (ECB, 2014, 2015).

We used secondary data from the Survey on the Access to Finance of Enterprises (SAFE) conducted by the European Central Bank (ECB) alone or jointly with the European Commission (EC) mainly for the euro area countries. The survey seeks to periodically follow the developments in the

financing conditions for SMEs compared to large firms. In this article, we used data aggregated at the country level for the 11 largest euro area countries (Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Netherland, Portugal, Spain)[2] from the first 14 waves of the survey, which allowed us to construct a country panel dataset and thus exploit both the cross-sectional and the time dimensions in our empirical strategy. In addition, the data allowed us to include in our models country-level determinants and to make inferences at the country level.

Our key findings can be summarized as follows. First, financing constraints appear to hamper significantly SMEs' growth and the negative effect is stronger for *perceived* than for *actual* financing constraints. Second, increased banking markets integration fosters SMEs' growth in the euro area. The results were robust to alternative measures of banking market integration. Third, we explained that reducing financing constraints – both perceived and actual – is the channel through which the benefits of banking markets integration transmit to growth, and the effect is particularly strong when integration is captured through the intensity of cross-border lending to NFCs rather than through convergence in interest rates to loans to NFCs. The fact that SMEs' growth was found sensitive to changes in short-term lending rates is not unexpected given that SMEs are typically more indebted in the short term (Daskalakis & Psillaki, 2008; Lopéz-Gracia & Sogorb-Mira, 2008; Titman & Wessels, 1988). Additionally, the interest rate integration measure whose impact was found statistically significant refers to loans of up to and including 1 million euros and these are considered a proxy for loans to SMEs.

This article is structured as follows. First, we review the relevant literature regarding financial constraints and financial integration and the hypothesized impact on growth. Next, we introduce the data, variables, and empirical models. Then, we present the results, followed by a discussion of them. After that, we provide several robustness tests. Finally, we conclude the article and provide useful implications for policy.

Literature review and key hypotheses

Financing constraints as a barrier for growth

Financing constraints and their impact on firm dynamics have been extensively studied in the literature. The traditional approach investigates how sensitive firm investment is to financing constraints, proxied by a measure of internal resources such as cash flow. Firm investment (growth) is typically

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[2]Since 2014, Slovakia has also been included in every round of the survey. Besides these countries, the common ECB–EC rounds also include the other (smallest) euro area countries as well as the UK and the other non-euro area EU countries.

proxied by the change in total or fixed assets (Carpenter & Petersen, 2002; Fazzari, Hubbard, & Petersen, 1988; Guariglia, Liu, & Song, 2011; Hutchinson & Xavier, 2006; Kaplan & Zingales, 1997; Quader, 2017). Carpenter and Petersen (2002) show that SMEs' growth is constrained by the availability of internal finance (a cash flow measure) and that the effect is much larger for SMEs with reduced access to external equity. Based on their model, if capital markets were perfect, internal finance would have no impact on growth as it could be substituted by an equal amount of external capital. Hutchinson and Xavier (2006) reinforce the importance of cash flow for growth and show that the positive effect is much larger for SMEs compared to large firms, and for firms in transition countries compared to firms in developed countries. Honjo and Harada (2006) show that the growth effects of internal cash flow are larger for younger than older SMEs.

Later studies (for example, Bottazzi et al., 2014; Honjo & Harada, 2006; Hutchinson & Xavier, 2006; Rahaman, 2011) depart from the investment–cash flow sensitivity approach by considering growth in alternative size metrics (employment and sales) as opposed to growth in assets (investment). They also use an explicit measure of external rather than internal financing constraints. Bottazzi et al. (2014) proxy external finance constraints through credit ratings which, they argue, influence the probability of receiving credit (positively) and its cost (negatively). They show that financing constraints undermine growth such that constrained firms have a negative average growth rate, and their impact is transmitted through multiple channels, namely: (a) the expansion of the negative gap between large and small firms' growth rates; (b) a reduction in the ability of large firms to benefit from their diversified structure; and (c) impact on the shape of the growth shocks distribution, so that constrained firms exhibit a higher variability of growth episodes and are associated with profound asymmetries in growth shocks. Consistently with previous literature, the study also shows that financial constraints are more relevant for the more vulnerable firms: those that are smaller and younger.

Rahaman (2011) shows that constrained firms are heavily reliant on internal funds to support their growth. However, as their access to external bank credit facilities improves, the impact of internal finance on growth is weakened and external finance becomes the main source. As a result, firms switch between internal and external finance dependent on financial constraints, a behavior that was found to be more frequent among small and unquoted firms. This is in line with previous work by Carpenter and Petersen (2002) and reinforces the idea that improving access to external capital helps relaxing internal finance pressure on growth. In this study, we followed a direct approach to capture firms' financial constraints based on survey data, as for example, in Ferrando and Mulier (2015), Casey and O'Toole (2014), Holton et al. (2013), and Popov and Udell (2012), that allowed us to distinguish between actual and perceived financing constraints.

Given the purpose of our article, we considered the latter as a useful measure in our empirical analysis as: (a) it is based on firms' perception on the severity of their access to finance problems; and (b) it refers to external finance in general, including bank finance.[3] Given the above, the first main hypothesis can be formulated as follows:

Hypothesis 1 (H1): There is a negative relationship between actual and perceived bank financing constraints and the aggregate growth of the SME sector.

Banking markets integration and growth

A related aim of our study was to explore whether banking markets integration helps to alleviate financial constraints so that small firms' growth potential is less bound by their internal funds. The investigation of the relationship between financial integration and growth is traditionally associated with the finance growth literature (De Nicolò & Juvenal, 2014; Owen & Temesvary, 2014; Hoxha, Kalemli-Ozcan, & Vollrath, 2013; Masten, Coricelli, & Masten, 2008, to name a few). Most studies performed country-level analysis and typically provide evidence of significant benefits. Yet there are considerably fewer studies that investigated the banking markets integration–growth nexus at the firm level, and this is where our article intends to contribute. The key questions we attempt to answer are the following: Do the macro benefits of financial integration translate into real gains at the firm level? Are SMEs able to reap the benefits of more integrated financial markets by obtaining more and cheaper financial resources that ultimately will help them expand?

Previous literature has identified direct and indirect channels through which financial integration is expected to (positively) impact growth (for a review see, for example, Masten et al., 2008). One of the most important is related to access to finance. Based on Rajan and Zingales's (1998) concept of external financial dependence at industry level, Friedrich, Schnabel, and Zettelmeyer (2013) argue that financial integration should make access to finance easier and thus stimulate growth-enhancing investments. More broadly, Masten et al. (2008) indicate that financial integration leads to financial development, and thus indirectly to growth, by facilitating access to foreign financial markets either through direct lending from abroad or by listing on foreign stock markets. Hence, from the ECB's perspective (full) banking markets integration is equivalent to an efficient allocation of resources to the most productive investment opportunities across the euro

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[3]The period used in our study overlaps with the financial crisis period and does not allow for a pre- or postcrisis analysis. However, as Ferrando and Mulier (2015) argue, financial constraints are more prevalent in crisis times and this offers a unique opportunity for investigating their impact. Similarly, Campello, Graham, and Harvey (2010) studied the impact of financial constraints on firms' investment plans during the recent crisis and found that, indeed, constrained firms operated cuts in their planned investment and adopted a more conservative cash policy.

area, without financial frictions affecting the cross-border flow of funds (ECB, 2015).

A number of firm-level studies show that financial integration matters for firm-level growth. Bena and Jurajda (2011) demonstrate that financial integration brought about by the Single Market in Europe fostered financial development and thus positively impacted on EU15 firms' growth. They also contend that this positive effect suggests that there is no longer potential for additional beneficial effects. Nonetheless, as noted before, there seems to be some consensus that financial markets integration in the euro area is still incomplete (Guiso, Jappelli, Padula, & Pagano, 2004; Pungulescu, 2013), and that the recent crises have brought about fragmentation in the euro area financial markets and especially in the credit market segment (European Central Bank, 2014). Rughoo and Sarantis (2012) show that lending rates converged slower than deposit rates in Europe before 2007 while both types of rates diverged during 2008–2011. Focusing specifically on lending rates, Wagenvoort, Ebner, and Morgese Borys (2011) document a considerable degree of segmentation among the euro area countries for the period 2003–2008, although it varies with the type and size of the loan. Pungulescu (2013) confirms the fragmentation in the EU credit markets was induced by the financial crisis.

With respect to small firms, Giannetti and Ongena (2009) analyze the impact of financial integration from the perspective of banking markets, which is also the focus of this article, measured by the presence of foreign banks in European transition countries. They show that a higher foreign bank presence is associated with higher levels of sales, investment, and debt and lower levels of cost of debt, but the benefits are lower for smaller firms and highest for young firms. However, a few years earlier, Guiso et al.'s (2004) study provided an opposite result as small firms were found to benefit most as they gain access to more developed financial markets compared to their local market. The more recent findings by Popov and Ongena (2011) support our research purpose as they show that SMEs benefit from more integrated European interbank markets as a result of a reduction in their credit constraints and cost of loans, the integration benefits being transmitted through the bank competition channel.

Overall, it seems that there are not unambiguous results on whether financial integration can benefit SMEs. We help clarify this issue by using recent data (2009–2015) for the SME sector in the most financially developed countries of the euro area. Additionally, we focus on a specific segment of the financial market (that is, the banking market), and to gauge the integration we used quantity- and price-based measures derived from the literature. We decided to use both types of measures due to the debate surrounding the adequacy of each type (see, among others, Masten et al., 2008).

Specifically, the first measure of integration refers to the country share of the cross-border MFIs' loans to NFCs located in the other euro area countries except the reference country. The share was computed relative to the total loans by MFIs; that is, domestic loans to NFCs plus cross-border loans to NFCs in the remaining euro area countries. This is one of the measures that the ECB uses to follow the credit markets integration in the euro area (ECB, 2015), and a higher value can be interpreted as evidence of higher integration on this market segment.

The second measure refers to the cross-country variability in interest rates to new bank loans (other than revolving loans and overdrafts, convenience and extended credit card debt) with an original period/initial rate fixation period of up to one year provided by MFIs to NFCs. This was computed as the quadratic distance between each country's rate and the euro area average, similar to the measure used by De Nicolò and Juvenal (2014) for the stock market integration, with the difference that we initially used the average for the whole euro area instead of the 11 countries sample. We did this to be consistent with the other measure where the cross-border loans refer to loans to all the remaining euro area countries and not the remaining 10 countries in our sample. We used interest rates for two size breakdowns: small amount loans (up to and including 1 million euros) and larger ones (above 1 million euros). We interpreted lower values of these measures as evidence of increased banking integration. Therefore, we expected a negative relationship between interest rate measures and growth. The second hypothesis can therefore be split into two as follows:

Hypothesis 2a (H2a): There is a positive relationship between the share of cross-border loans and SMEs' growth.

Hypothesis 2b (H2b): There is a negative relationship between the interest rate measures of banking markets integration and SMEs' growth.

Regarding H2b, we expected a stronger relation for the measure related to small amount loans as we strongly believe they are more relevant for SMEs and thus more likely to be used (ECB, 2014). The hypothesized positive effects from both channels mean that firms are expected to access loans more easily and at a lower cost in more integrated banking markets and they are consistent with the retail banking market integration definition itself which, according to, for example, Rughoo and Sarantis (2012), implies more unified and open markets and convergence of financial assets prices.

It follows that if SMEs are expected to benefit in terms of availability and cost of bank loans, then increased banking markets integration should exert an additional positive effect on SMEs' growth through a reduction of the

negative impact of financial restrictions on growth. Thus, our third and final hypothesis is:

Hypothesis 3 (H3): Banking market integration has a moderating effect on the relationship between financing restriction and SMEs' growth.

The confirmation of this hypothesis would imply that increased banking market integration in the euro area can contribute to relaxing SMEs' external financing restrictions and, therefore, has potentially strong policy implications. To accept this hypothesis, we expected a more positive (negative) relationship when integration is measured by the share of cross-border loans (interest rates).

The empirical strategy

The ECB/SAFE dataset

The data were drawn from the ECB/SAFE survey that provides firm-level data aggregated at country level.[4] The research reported in this article is based on the results of the first 14 rounds of the survey (2009H1-2015H2) for the 11 largest euro area countries (Austria - AT, Belgium - BE, Germany - DE, France - FR, Finland - FI, Greece - GR, Ireland - IE, Italy - IT, Netherlands - NL, Portugal - PT, and Spain - ES) as they were included in all the rounds of the survey and given our interest in banking markets integration for this group of countries. Therefore, we constructed a balanced panel sample of 154 observations.[5]

The reference period of the survey was the past six-month period preceding each wave. However, there were small variations from one wave to another for the first few waves.[6]

Based on our SAFE survey data, most of SMEs in the largest euro area countries, as averages over the period, were owned by family or entrepreneurs or had only one natural person as owner. Conversely, the shares of SMEs that were listed on the stock exchange were relatively low and ranged from 1.5 percent of SMEs in Italy, 1.6 percent in Germany, and 2 percent in Portugal to 6 percent in Belgium, 6.6 percent in Greece, and 6.9 percent in the Netherlands. This was confirmed when we looked at the intensity of using each type of financing sources. As expected, only a few SMEs in our

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[4]The SAFE survey is conducted every six months by the ECB starting with the first semester (H1) in 2009 (and together with the European Commission every two years until 2013H2 and every year since 2014H1). The survey seeks to highlight the changes in SMEs' access to finance in the past period of six months (SAFE Report, 2014H1).

[5]The original number of panel observations was 154. Tables 5–7 show the results computed on 143 observations as we lost one observation per country due to the lag in the regression models.

[6]Thus, to have the same reference period for each corresponding wave of the survey (H1/H2) we applied a rule based on most of the waves: namely, the first round for each year (H1) corresponds to the period of April–September while the second round for the same year corresponds to the period October–March the following year.

dataset issued debt securities or benefited from new equity investments in the six-month period preceding the survey. Thus, only 0.2 percent of SMEs in Austria, 0.3 percent in Germany, and 0.6 percent in Belgium issued debt securities while the highest shares did not exceed 3 percent (2.6 percent in Ireland), except for Greece where there was an unusually high share of 14.1 percent over the period. This might be explained by the aftermath of the financial crisis, as access to finance for SMEs in countries like Greece was particularly difficult. Based on a firm-level SAFE dataset, Casey and O'Toole (2014), for example, observe that Greek SMEs reported the highest usage of market financing (equity and debt securities) among the same 11 euro area countries included in our sample. However, they did not find any evidence that bank-constrained SMEs relied more on market finance as an alternative to bank lending. The shares were higher for equity investment, but even in this case they did not exceed 9 percent (8.4 percent in Germany). As expected, much higher shares could be seen for internal sources, coming from retained earnings or sale of assets (41.0 percent in Ireland, 39.6 percent in Finland), bank loans (excluding overdrafts) (35.5 percent in Belgium, 34.3 percent in Italy), and for credit lines, bank overdrafts, and credit card overdrafts (59.3 percent in Ireland, 49.4 percent in Italy, 44.3 percent in the Netherlands), as shown in Table 1.

Based on this dataset, we constructed our dependent variable (that is, the growth in sales of the SMEs sector), the external financing restrictions variables, and other firm-specific variables that we included as controls in our model. To construct the banking integration variables, both quantity- and price-based, we used data from ECB (see subsection *Control variables on firms' characteristics*). Other country-level variables were constructed from data collected from various

Table 1. Financial structure of SMEs in the SAFE dataset (percentage).

	Internal funds	Bank loan	Debt securities issued	Equity investment	Credit line, bank overdraft or credit cards overdraft
Austria	33.5	32.7	0.2	6.4	38.3
Belgium	18.4	35.5	0.6	4.7	35.5
Germany	34.1	31.8	0.3	8.4	36.9
Spain	23.2	31.6	1.5	2.2	34.6
Finland	39.6	24.4	1.0	5.7	28.9
France	22.6	33.4	1.1	4.9	38.7
Greece	22.3	25.5	14.6	5.8	12.9
Ireland	41.0	29.4	2.6	6.2	59.3
Italy	23.9	34.3	1.5	2.2	49.4
Netherlands	20.7	26.1	0.6	2.5	44.3
Portugal	9.0	23.6	0.7	1.0	38.4

Note: The percentage of SMEs that reported using each of the respective sources of financing in the past six month, as averages over the period 2009H1-2015H2, computed based on the ECB/SAFE dataset. The SMEs category (small and medium enterprises) includes: micro, small and medium enterprises. ECB/SAFE = European Central Bank/Survey on the Access to Finance of Enterprises.

sources; namely, the ECB, Eurostat, and World Bank (World Governance Indicators and Doing Business).

Variables

The variables used in the empirical analysis are defined in Table 2.

The *dependent variable* in all our estimations was the net percentage change in the SMEs' sector turnover (GROWTH). We used two measures of *financing constraints*. The first represents the *actual financing constraints* with regard to bank loans based on the negative outcome (rejected, got only part of the amount requested, refused the offer because the cost was too high) of firms' applications for bank loans. It was used by Ferrando and Mulier (2015), but similar approaches have been found in other studies. Casey and O'Toole (2014) employs primary data from the SAFE survey to define two classes of credit-constrained firms, credit-rationed firms (were refused a bank loan or received less than 75 percent of the amount requested) and self-rationed firms (declined the offer because the cost was too high). The approach employed in this article covered both classes mentioned above and was grounded on the idea that not only SMEs that are (totally or partially) rejected by banks are likely to suffer from financing constraints, but also those that choose to self-ration themselves when the cost burden is deemed unbearable. We checked the robustness of our initial results with a second measure of financing constraints, that is, *perceived financing constraints* (FINPRESS), also based on Ferrando and Mulier (2015). It was a measure of the perceived difficulty in accessing external finance (relative to other problems). It did not focus on bank financing, yet it provided us with a good opportunity to investigate how perceptions about the difficulty in accessing finance impact on SMEs' growth.

Control variables on firms' characteristics

To capture the impact of internal funding on growth, we followed Rahaman (2011) and used as a measure of *internal funding* the percentage of SMEs that reported the use of internal funds (INTFUND). An additional way to capture the impact of access to finance on growth is through financial structure. Rahaman (2011) shows that leverage significantly and positively impacts on growth in employment and sales, particularly for small and unquoted firms, while Honjo and Harada (2006) document a negative correlation between leverage and SMEs' growth in employment and assets and a positive one for growth in sales. Coricelli, Driffield, Pal, and Roland (2012) argue that there is a nonmonotonic relationship between leverage and growth with a threshold beyond which leverage can harm growth. The leverage-growth relationship is thus significant, albeit not unambiguous. To investigate it, we included a measure of the *debt ratio* (DEBTR).

Table 2. Description of variables.

Variable	Code	Unit of measure	Definition	Source of data	Frequency
Dependent variable					
Change in turnover	GROWTH	%	Net percentage change in turnover, i.e., the difference between the share of SMEs reporting an increase in their turnover and the share of SMEs reporting a decrease, over the past six months, for each wave and country sample. Turnover corresponds to market sales of goods or services supplied to third parties. Turnover also includes all other charges (transport, packaging, etc.) passed on to the customer. Turnover excludes VAT and other taxes on the goods or services invoiced by the SME.[a]	SAFE dataset (question Q2 of the survey, item "turnover").	Half-yearly
External financing constraints					
Actual financing constraints	LOAN_CONSTR	%	The percentage of firms, in each country sample and for each wave of the survey, reporting a negative outcome of their bank loan application (rejected, got only part of the amount requested, refused because the cost was too high).	SAFE dataset (question Q7B of the survey, item "bank loans").	Half-yearly
Perceived financing constraints	FINPRESS	%	The percentage of SMEs, in each country sample and for each wave, that reported access to finance as their most pressing problem.	SAFE dataset (question Q0 of the survey).	Half-yearly
Banking markets integration					
The share of cross-border loans to NFCs in the other euro area countries to total loans to NFCs in the euro area	CBLOANS	%	The beginning of period outstanding amount of cross-border loans provided by MFIs in the reference country to NFCs in the other euro area countries divided by the total outstanding amount of loans granted by MFIs to NFCs located in the euro area, both cross-border and domestic loans. The original data series are at monthly frequency. To obtain semiannual values, the outstanding amount at the end of March, i.e., beginning of April is used as the first semiannual value (H1) while the value at the end of September, i.e., beginning of October, is used as the second semiannual value (H2). This approach was used for similar variables.	ECB – Monetary Statistics – Balance Sheet Items	Half-yearly

(Continued)

Table 2. (Continued).

Variable	Code	Unit of measure	Definition	Source of data	Frequency
Interest rate distance measure for small amount loans	IRDNLS_S	% ^2	The quadratic difference between each country's interest rate and the euro area average. The interest rate refers to up to 1 year and up to and including 1 million euros new loans provided by MFIs to NFCs in the reference country. The half-yearly frequency is obtained by taking the averages for each half-yearly reference period of the survey as follows: March to September for H1 and October to March (next year) for H2.	ECB – MFI Interest Rate Statistics	Half-yearly
Interest rate distance measure for large amount loans	IRDNLL_S	% ^2	The quadratic difference between each country's interest rate and the euro area average. The interest rate refers to up to 1 year and over 1 million euros new loans provided by MFIs to NFCs in the reference country. The half-yearly frequency is obtained by taking the averages for each half-yearly reference period of the survey as follows: March to September for H1 and October to March (next year) for H2.	ECB – MFI Interest Rate Statistics	Half-yearly
Country-level variables					
Concentration in the banking sector	HHI	Index ranging from 0 to 10,000	Herfindahl-Hirschman Index	ECB – Banking Structural financial indicators	Yearly (repeated values for half-yearly frequency).
Financial development	NFCL_GDP	%	Share to GDP of loans to NFCs	Eurostat	Yearly (repeated values for half-yearly frequency).
Economic growth	GDPCG	%	Growth rate in annual GDP per capita (current prices, EUR)	Eurostat	Yearly (repeated values for half-yearly frequency).

(*Continued*)

Table 2. (Continued).

Variable	Code	Unit of measure	Definition	Source of data	Frequency
Control variables					
Internal funding	INTFUND	%	The percentage of SMEs who reported they used internal funds (retained earnings or funds from sales of assets) in the past six months.	SAFE dataset (question Q4 of the survey).	Half-yearly
Change in debt ratio	DEBTR	%	Net percentage change in debt ratio, i.e., the difference between the share of SMEs reporting an increase in their debt ratio and the share of SMEs reporting a decrease, over the past six months, for each wave and country sample.	SAFE dataset (question Q2 of the survey, item "debt to assets ratio," previously Q3).	Half-yearly
Age	AGE1, AGE2, AGE3, AGE4	%	The percentage in each country's sample and for each wave of SMEs falling into each of the following four age brackets: less than 2 years old (AGE1), 2 years or more but less than 5 years old (AGE2), 5 years or more but less than 10 years old (AGE3), and 10 years or older (AGE4). The sum of the four percentages is less than 100% as there are SMEs for which the age was not declared. Age is defined as the year of the survey minus the registration year.	SAFE dataset (question D5)	Half-yearly
Size	TURN1, TURN2, TURN3, TURN4	%	The percentage in each country's sample and for each wave of SMEs falling into each of the following four turnover brackets: up to 2 million euros (TURN1); more than 2 and up to 10 million euros (TURN2); more than 10 and up to 50 million euros (TURN3); and more than 50 million euros (TURN4). The sum of the four percentages is less than 100% as there are SMEs for which the turnover was not declared.	SAFE dataset (question D4)	Half-yearly

(Continued)

Table 2. (Continued).

Variable	Code	Unit of measure	Definition	Source of data	Frequency
Economic sector	CONSTRUCTION INDUSTRY SERVICES TRADE	%	The share of SMEs, for each country's sample and for each wave, belonging to one of the following sectors: construction (CONSTRUCTION), industry (INDUSTRY), services (SERVICES), and trade (TRADE). They sum to 100%.	SAFE dataset (question D3)	Half-yearly
Other variables					
Change in fixed investment	INVEST	%	Net percentage change in fixed investment (property, plant, or equipment), i.e., the difference between the share of SMEs reporting an increase in their fixed investment and the share of SMEs reporting a decrease, over the past six months, for each wave and country sample.	SAFE dataset (question Q2 of the survey, item "fixed investment").	Half-yearly
Difficulty in finding customers	FINDCUSTOMERS	%	The percentage of SMEs, in each country sample and for each wave, that reported finding customers as their most pressing problem.	SAFE dataset (question Q0 of the survey).	Half-yearly
Inflation	INFLATION	%	The average of monthly inflation rate for the six-month period of the survey.	Eurostat	Half-yearly
The share of unconstrained firms	LOAN_UNCONSTR	%	The percentage of firms, in each country sample and for each wave of the survey, that reported that they received the full amount requested in their bank loan application.	SAFE dataset (question Q7B of the survey, item "bank loans").	Half-yearly
Evolution of SMEs credit history	CREDHIST	%	The net percentage change, i.e., the difference between the share of SMEs reporting an improvement in their credit history over the past 6 months and the share of those SMEs reporting a deterioration over the same period, for each wave and country sample.	SAFE dataset (question Q11 of the survey, item "credit history").	Half-yearly

(Continued)

Table 2. (Continued).

Variable	Code	Unit of measure	Definition	Source of data	Frequency
Change in willingness of banks to provide credit	BANKWILL	%	The net percentage change, i.e., the difference between the share of SMEs reporting an improvement over the past 6 months in the willingness of banks to provide credit to their enterprise and the share of those SMEs reporting a deterioration over the same period, for each wave and country sample.	SAFE dataset (question Q11 of the survey, item "willingness of banks to provide credit to your enterprise").	Half-yearly
Recovery rate	RECOV	%	The recovery rate in resolving insolvency procedures (cents on the dollar).	World Bank – Doing Business	Yearly (repeated values for half-yearly frequency).
Regulatory quality	REG	Units of standard normal distribution (−2.5 to 2.5)	Captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. The index estimate gives the country's score on the aggregate indicator.	World Bank – Worldwide Governance Indicators	Yearly (repeated values for half-yearly frequency).

Note: The SMEs category (small and medium enterprises) includes micro, small and medium enterprises. SAFE = Survey on the Access to Finance of Enterprises; ECB = European Central Bank; NFCs = nonfinancial corporations; MFIs = monetary financial institutions; VAT = Value Added Tax; HHI = Herfindhal-Hirschman Index; GDP = gross domestic product.
[a]A detailed definition of turnover is described in Commission Regulation No.1503/2006.

Age and *size* are the traditional determinants of firm's growth (Cooley & Quadrini, 2001). A negative relationship between age and growth is generally predicted as younger firms are expected to grow faster (Honjo & Harada, 2006; Rahaman, 2011). Moreover, previous studies have revealed that the determinants of SMEs' growth as well as the magnitude of their effect differ with the age of the firm (Nunes, Gonçalves, & Serrasqueiro, 2013). We captured the influence of age by a set of variables measuring the proportion of SMEs falling into four nonexhaustive age brackets (AGE1-4). With regard to size, the empirical investigation of its effect on growth is commonly known as testing for the Gibrat's law, which hypothesizes that a firm's current growth is independent of its previous size (Nunes et al., 2013). Most previous studies invalidated it by finding a statistically significant correlation, either negative suggesting that smaller firms grow faster (Honjo & Harada, 2006; Rahaman, 2011), or positive (Bentzen, Madsen, & Smith, 2012). To carry out this test, we proceeded similarly as for age and defined four nonexhaustive size classes (TURN1-4) based on turnover. Finally, we controlled for differences in growth opportunities across economic sectors using the country share of SMEs belonging to four mutually exclusive sectors (CONSTRUCTION, INDUSTRY, SERVICES and TRADE) as, for example, in Nunes et al. (2013) and Giannetti and Ongena (2009).

Descriptive statistics based on the SAFE dataset

Tables 3 and 4 report the averages by country over the period for the variables derived from the SAFE dataset. In terms of size, microenterprises dominated in all countries, with the notable exception of Germany where small firms were more common. Additionally, most SMEs had a turnover of less than 2 million euros (about 50 percent or more) and were at least 10 years old (more than 70 percent).

Regarding the sectorial distribution, in all countries most SMEs operated in the service sector (around 40 percent or more). Based on this and given that the four sector variables added to 100 percent, to avoid multicollinearity we took the services sector as our reference sector.

Turning to external financing constraints, the data showed relatively large differences across countries. A considerable share of SMEs in Greece (32.5 percent) perceived access to finance as being their most pressing problem relative to others (for example, finding customers, regulation) compared to just 7.5 percent of SMEs in Austria. In terms of actual financing constraints, the picture was essentially the same. SMEs in Greece were most restricted from accessing bank loans (54.4 percent), followed by SMEs in other Southern European countries while those in Finland (15.6 percent) were least financially restricted. Thus, there seemed to be quite a clear separation between the so-called GIPSI countries (Greece, Italy, Portugal, Spain, and Ireland) and the remaining ones (Austria, Belgium, Germany, Finland, France, and the Netherlands). These differences

Table 3. Age and size structure of the SAFE dataset.

%	Micro enterprises	Small enterprises	Medium enterprises	TURN 1	TURN 2	TURN 3	TURN 4	AGE 1	AGE 2	AGE 3	AGE 4
Austria	37.7	34.5	27.8	49.7	25.7	16.4	4.5	4.7	6.1	12.4	71.9
Belgium	47.1	30.0	22.9	48.0	24.7	17.2	4.6	1.6	6.6	12.5	77.5
Germany	31.4	36.1	32.5	48.7	28.4	17.2	3.0	1.9	6.5	11.9	74.0
Spain	52.9	28.5	18.7	62.5	22.1	9.8	1.9	1.1	6.8	14.6	75.0
Finland	39.5	32.5	27.9	50.3	27.9	17.3	3.8	1.7	5.7	12.1	79.2
France	43.3	31.6	25.1	55.2	24.9	15.6	2.1	4.5	9.2	16.0	69.0
Greece	66.9	20.2	12.9	69.1	20.4	6.4	1.1	1.2	8.1	15.5	73.7
Ireland	35.0	34.4	30.5	46.6	28.3	17.2	5.1	1.1	3.6	9.9	82.2
Italy	58.5	26.2	15.3	64.1	19.6	10.9	2.5	1.8	8.0	16.2	71.4
Netherlands	41.4	30.8	27.8	49.7	23.7	18.0	4.9	2.4	10.0	15.4	70.7
Portugal	52.8	27.1	20.2	69.1	19.2	6.2	0.7	1.2	5.5	17.0	75.0

Note: The average percentage of small and medium enterprises (SMEs) over the period 2009H–2015H2 computed on the European Central Bank/Survey on the Access to Finance of Enterprises (ECB/SAFE) dataset. See Table 2 for the definition of variables (TURN1-4 and AGE1-4).

were reflected in the distribution of growth rates for the aggregate SMEs sector. Since for SMEs in the GIPSI countries, access to credit in particular and access to external finance in general were especially difficult, they were also those who experienced a reduction in their sales, on average over the period (from −35.5 percent in Greece to −12.3 percent in Portugal). The only exception was Ireland where the average net change in turnover was marginally positive (1.3 percent).

In terms of leverage, while SMEs in all non-GIPSI countries deleveraged by a sensible margin, SMEs in GIPSI countries either increased their leverage (Italy and Greece) or reduced it but by a lower amount compared to the non-GIPSI group (Portugal, Spain, Ireland). In terms of the intensity of using internal funds (retained earnings and sale of assets), the variability was not as high as noticed for the other SAFE variables, although the GIPSI countries were among those exhibiting the lowest use of internal funds. This latter remark could imply that the growth differential noticed above may not be due to differences in their internal funding potential, but possibly to other internal characteristics such as financial constraints. In subsection *Actual versus perceived external financing constraints*, we provide a more in-depth investigation of this intuitive finding.

Measures of banking markets integration

We used the country share of cross-border loans to NFCs in the other euro area countries (CBLOANS) to total loans to NFCs as a quantity-based measure of banking market integration (ECB, 2015). We defined this variable CBLOANS, where CB stands for cross-border. Additionally, we employed two interest rate-based measures computed as the quadratic distance between each country's short-term interest rates compared to the euro area average for new small (up

Table 4. Sector composition, financial constraints, and firm-level variables in the SAFE dataset.

%	CONSTRUCTION	INDUSTRY	SERVICES	TRADE	FINPRESS	LOAN_CONSTR	GROWTH	DEBTR	INTFUND
Austria	9.4	15.4	49.1	26.1	7.5	18.0	22.4	−12.1	33.5
Belgium	12.4	16.2	43.4	28.1	9.6	20.7	8.1	−13.1	18.4
Germany	7.6	20.8	47.7	24.0	10.0	17.4	23.9	−12.5	34.1
Spain	15.4	15.0	44.0	25.6	21.7	42.9	−24.7	−2.4	23.2
Finland	13.1	21.2	46.3	19.4	8.0	15.6	15.5	−17.0	39.6
France	12.3	17.2	46.8	23.7	12.3	19.8	4.7	−6.9	22.6
Greece	10.1	12.9	39.2	37.8	32.5	54.4	−35.5	1.4	22.3
Ireland	6.2	16.1	47.4	30.3	18.0	41.0	1.3	−8.4	41.0
Italy	12.7	23.1	40.8	23.5	16.1	35.0	−16.9	12.1	23.9
Netherlands	8.9	10.6	52.7	27.9	14.1	43.6	8.7	−17.7	20.7
Portugal	14.8	19.3	38.8	27.0	15.9	32.3	−12.3	−3.2	9.0

Note: The average percentage of small and medium enterprises (SMEs) over the period 2009H1–2015H2 computed on the European Central Bank/Survey on the Access to Finance of Enterprises (ECB/SAFE) dataset. See Table 2 for the definition of variables.

to and including 1 million euro) and new large (over 1 million euro) amount loans. We coded the resulting variables IRDNLS_S (which stands for Interest Rate Distance for New Loans with Small amounts and for a Short term) and IRDNLL_S (Interest Rate Distance for New Loans with Large amounts and for a Short term), respectively. By taking the quadratic instead of the simple distance, we focused on the impact of the magnitude of the deviation from the euro zone average and not on the direction of the deviation.

Data in Table 5 reveal that there were relatively large differences among the euro area countries under study with regard to both measures of banking markets integration. The largest values for the interest rate-based measures could be noticed for Greece and Portugal; moreover, the variability seemed to be higher for the interest rates to small amount loans (IRDNLS_S) than to large-volume loans (IRDNLL_S), which is highly relevant for this study given that the former is considered a proxy for loans to SMEs. These insights were confirmed by the trends depicted in Figures 1 and 2, which additionally revealed an increased variability since 2010 that started to recede in more recent years.

The share of cross-border loans in total loans to NFCs was relatively low and a similar country pattern can be noticed (see Table 5 and Figure 3). While Austria, the Netherlands, Ireland, Belgium, and Germany had time-average shares above 10 percent, most of the countries severely affected by the financial crises (Italy, Greece, Portugal, and Spain) had the least intense cross-border lending activity (about 1–2 percent). On an international level, Bremus (2015) shows that, following the global financial crisis, cross-border lending has dropped significantly and remained low. That author attributes this trend to banks' need to deleverage, due to changes in risk perception, and to policy interventions aimed at stabilizing the domestic banking systems. Regarding the distressed euro area countries (Greece, Ireland, Italy, Portugal, and Spain), Ferrando, Popov, and Udell (2017) mention that their tight bank-sovereign links dramatically affected investors' confidence in the domestic banking sectors of those countries and this could account for the change in risk perception.

Other macroeconomic variables

We also controlled for concentration in the banking market, financial development, and economic growth. Concentration in the banking sector was found to significantly affect SMEs' access to bank finance in several studies. Craig and Hardee (2007) found that consolidation in the banking sector negatively impacts on the probability of small firms to obtain credit and force them to substitute it for nonbank financing. In the context of financial integration, Popov and Ongena (2011) show that the benefits of European interbank market integration on SMEs' access to finance are conditioned on the existence of a high degree of competition in the banking markets. To
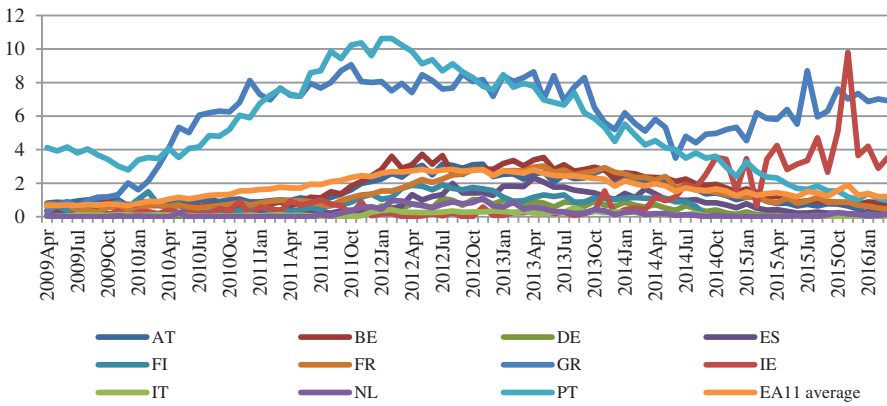
Figure 1. The evolution of monthly interest rate distance measure for small amount loans (IRDNLS_S) over the period April 2009 to March 2016. Source of data: ECB - *MFI Interest Rate Statistics*, Statistical Data Warehouse. *Note:* Values are expressed in squared percentages. EA11 average = the average for the 11 euro area countries.
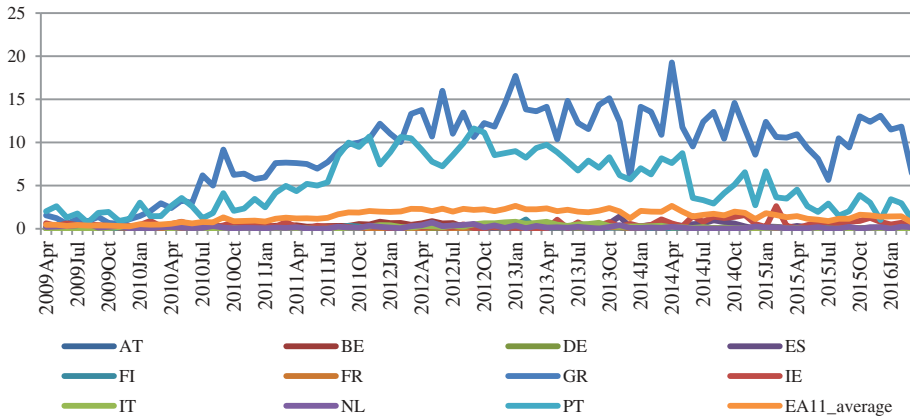

Figure 2. The evolution of monthly interest rate distance measure for large amount loans (IRDNLL_S) over the period April 2009 to March 2016. Source of data: ECB - *MFI Interest Rate Statistics*, Statistical Data Warehouse. *Note:* Values are expressed in squared percentages. EA11 average = the average for the 11 euro area countries.

proxy for concentration in the banking sector, we used the Herfindahl-Hirschman Index (HHI) for which we predicted a negative impact on growth. We noticed that Finland has a highly concentrated banking system while the other countries have either a moderately concentrated (Greece, the Netherlands) or a competitive banking market (Table 5). However, as revealed in Table 4, Finnish SMEs were the least financially restricted.

The literature has shown that *financial development* is disproportionally beneficial for the growth of small firms compared to large firms due to the decrease in the marginal cost of informational asymmetry and tangible collateral

Table 5. Financial integration measures and other country-level variables.

	CBLOANS	IRDNLS_S	IRDNLL_S	HHI	NFCL_GDP	GDPCG
	%	%^2	%^2	Points from 0 to 10,000	%	%
Austria	14.8	1.5	0.1	404.1	65.2	1.7
Belgium	11.1	1.7	0.2	1196.3	105.7	1.5
Germany	11.8	0.3	0.1	281.4	42.0	2.3
Spain	2.4	0.7	0.2	677.0	103.3	−0.6
Finland	2.2	0.7	0.1	3214.3	70.0	0.7
France	6.7	1.4	0.1	585.9	59.7	0.8
Greece	1.2	6.0	9.2	1678.1	63.0	−4.1
Ireland	13.0	1.1	0.5	674.7	174.1	4.7
Italy	1.1	0.1	0.2	398.6	71.1	−0.3
Netherlands	13.3	0.2	0.2	2073.7	98.7	0.4
Portugal	2.3	5.4	5.2	1182.0	93.2	0.4

Note: Average values by country over the period of study (2009H1-2015H2). See Table 2 for the definition of variables. HHI = Herfindhal-Hirschman Index; CBLOANS = Share of cross-border loans by MFIs to NFCs; IRDNLS_S = interest rate distance measure for small amount loans; IRDNLL_S = Interest rate distance measure for large amount loans; NFCL_GDP = Share to GDP of loans to NFCs; GDPCG = GDP per capita growth.
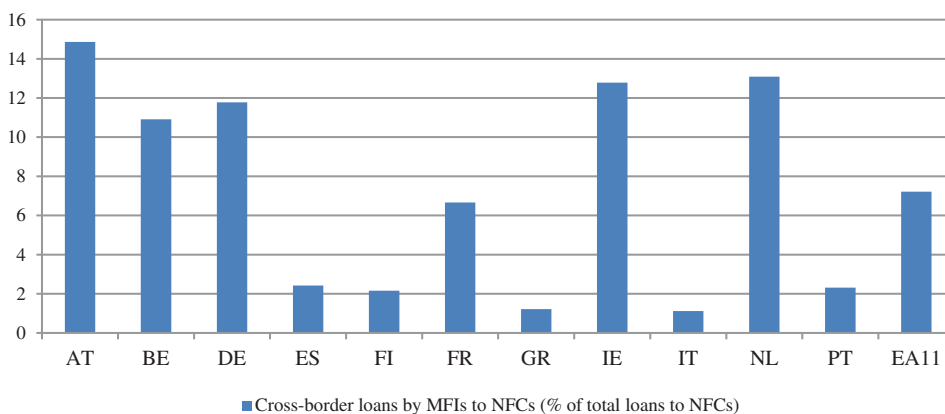

Figure 3. Average monthly shares by country over the period March 2009 to September 2015 of cross-border loans by monetary financial institutions (MFIs) to nonfinancial corporations (NFCs). Source of data: ECB - *Monetary Statistics - Balance Sheet Items*, Statistical Data Warehouse. *Note:* The values are expressed in percentages. EA11 = the average value for the 11 euro area countries in the sample over the period March 2009 to September 2015.

requirements (Beck, Demirgüç-Kunt, & Maksimovic, 2008a, 2008b; Beck, Demirguc-Kunt, & Maksimovic, 2005), and that it alleviates financial constraints at entry especially with regard to access to loans for small firms and subsequently helps them grow faster (Aghion, Fally, & Scarpetta, 2007). We thus expected a positive impact of financial development, measured as the share to the gross domestic product (GDP) of the volume of loans to NFCs (NFCL_GDP), on SMEs' growth. The data in Table 5 show that there are large country differences regarding financial development, as the share of loans to NFCs in GDP ranged from 42.0 percent in Germany to 174.1 percent in Ireland.

To measure *aggregate economic growth*, we employed the growth rate in annual GDP per capita (GDPCG) for which a positive impact on SMEs' growth was predicted. Some of the countries most affected by the financial crisis had negative average growth rates in annual GDP per capita over the period, the lowest being in Greece (−4.1 percent), followed by Spain and Italy; at the other extreme, Germany had an average annual growth rate of 2.3 percent (see Table 5).

The empirical models

The model that we used to test our hypotheses, in its baseline formulation, is specified in Equation (1):

$$Y_{it} = \alpha + X'_{it-1}\beta + Z'_{it-1}\gamma + W'_{it-1}\delta + V'_{it-1}\theta + d_t + \mu_i \tag{1}$$

$$\mu_{it} = v_i + \varepsilon_{it} \tag{2}$$

where Y_{it} is the variable GROWTH of the SME sector for the country i during the semester t. The X_{it-1} is the set of external finance restrictions (LOAN_CONSTR and FINPRESS, for variables definitions see subsection *Variables*) and Z_{it-1} includes the remaining SAFE dataset variables referring to internal funding (INTFUND) and change in debt ratio (DEBTR). W_{it-1} is the set of banking market integration variables (CBLOANS, IRDNLS_S, and IRDNLL_S) and V_{it-1} includes the other country variables (HHI, NFCL_GDP, and GDPCG). We use the symbol ' in Equation (1) to indicate that the vector of variables is transposed. The v_i component in Equation (2) refers to the country time-invariant, unobserved effects included to control for unobserved heterogeneity while ε_{it} is the idiosyncratic error.

The explanatory variables in Equation (1) are lagged one period to avoid simultaneity and deal with the causal relationship between firm and country variables, on one hand, and growth, on the other, as in Honjo and Harada (2006), because it accounts, at least partially, for potential simultaneity issues (Bottazzi et al., 2014). By taking one lag of the independent variables, we alleviated the endogeneity issues in our model (Roberts & Whited, 2012). This is frequently done in firm-level models of growth as, for example, Chen, Tan, and Jean (2016), Lee (2014), Rahaman (2011), and Honjo and Harada (2006).

In all estimations, we include year dummies (d_t). Given that our series were at semiannual frequency, each of our year dummies take the value of 1 twice, for both rounds of the survey corresponding to a given year. Following the main literature (for example, Giannetti & Ongena, 2009; Rahaman, 2011), our basic estimations were obtained via fixed effects (FE) models. Since there are reasons to believe that access to finance (that is, external financing constraints, in our study) could be endogenous (Bottazzi et al., 2014; Rahaman, 2011), we

reestimated the model using an instrumental variable (IV) procedure, where we instrumented for the actual and perceived financing constraints variables.

We also investigated how the beneficial effects of increased banking markets integration in the euro area transmit to and impact on SMEs' growth. Specifically, we hypothesized that increased banking integration could help alleviating SMEs' financial constraints, thus fostering their growth. To test this hypothesis (H3), we reformulated our model specification in Equation (1) by introducing two interaction terms between the measures of financial constraints and measures of the banking markets integration, as follows:

$$Y_{it} = \alpha + X'_{it-1}\beta + Z'_{it-1}\gamma + W'_{it-1}\delta + V'_{it-1}\theta + (X_{it-1} * W_{it-1})'\vartheta + \mu_i \quad (3)$$

All the vectors of variables in Equation (3) are defined in Equation (1). The specification in Equation (3) helped us investigate whether banking markets integration had a moderating effect on the hypothesized negative relationship between financing constraints and growth of SMEs. This potential moderating effect is captured by the ϑ coefficient so that the total effect of banking integration on growth is given by the sum of the coefficients δ and ϑ as in Equation (4):

$$\frac{\partial Y_{it}}{\partial W'_{it-1}} = \delta + X'_{it-1}\vartheta \quad (4)$$

Similarly, the total effect of financing constraints on growth is obtained as in Equation (5):

$$\frac{\partial Y_{it}}{\partial X'_{it-1}} = \beta + W'_{it-1}\vartheta \quad (5)$$

Results

The determinants of growth for SMEs

The results of estimating Equation (1) are provided in Table 6. They show that both firms' characteristics and macroeconomic variables impact significantly on SMEs' growth in sales.

Regarding firm age, all four variables (AGE1-4) were significantly and positively related to change in turnover, the magnitude of the effect being the largest for the youngest SMEs (<2 years) and the smallest for the oldest SMEs (10+ years), even though the youngest SMEs were the least numerous (based on data in Table 3).

The results were less significant when it came to firm size. Nevertheless, the coefficient for TURN4 was negatively and significantly correlated to growth in Models 1 and 2 showing that the largest SMEs negatively impacted on the growth in the overall SMEs sector and this effect was

economically large. In terms of how the sector composition affected growth, our results show that the average growth of SMEs in services was higher than that in the construction sector, despite being the least represented sector (Table 2), while the trade sector had a higher average growth of SMEs than the one in services. Both sectoral effects were economically large. Overall, our results show that younger and smaller SMEs grew faster than their older and, respectively, larger counterparts while the sectoral variation existed.

SMEs with a larger internal potential to finance their growth were systematically able to grow more, although the magnitude of the effect was relatively small, consistent with the finding in Table 1 that internal funds (INTFUND) was an important source of finance for all SMEs in our dataset. With respect to leverage, however, our results show that SMEs reporting an increase in leverage (DEBTR) found their growth hampered.

Whether bank financing constraints harm growth was one of our main research questions. The results in Table 6 provide strong support for H1 given the significant negative relationship between the measure of *actual* financing constraints (LOAN_CONSTR) and growth in sales.

In terms of the impact of macroeconomic variables on SMEs' growth, the results in Table 6 reveal that concentration in the national banking sectors positively impacted on SMEs' growth, although only slightly in magnitude.

We were especially interested to check if our hypothesized effects of the banking markets integration on the growth of the SME sector were validated. First, our evidence indicates that the higher the share of cross-border loans by euro area MFIs to NFCs the higher the SMEs' growth. Moreover, the large magnitude of the positive coefficient of CBLOANS suggests that the effect is economically important as well. Thus, taking steps for advancing financial integration in euro area banking markets has a "growth dividend" as argued by Guiso et al. (2004). There was, therefore, strong support for H2a.

Second, reduced cross-country variability across the euro area with respect to interest rates to loans to NFCs (that is, a lower value of our measure of distance from the euro area average, equivalent to higher interest rates convergence) positively impacted on SMEs' growth, thereby confirming H2b. However, the effect was significant only when variability in interest rates to small amount loans was considered, which is not unexpected, as these are more relevant for SMEs and thus could be considered as a proxy for SMEs loans, according to ECB (2014).

What are the channels through which the above-mentioned benefits of banking markets integration on growth of SMEs are transmitted is an issue we tackled in subsection *Can banking market integration alleviate SMEs' financing constraints?* Specifically, we investigated the potential of increased banking integration to alleviate the adverse effects of bank financing constraints on growth.

Table 6. Firm- and country-level determinants of growth of the small and medium enterprise (SME) sector.

	Model 1	Model 2	Model 3	Model 4
TURN1$_{(-1)}$	0.234	0.357	0.501	0.592
	[0.498]	[0.492]	[0.548]	[0.552]
TURN2$_{(-1)}$	−0.172	0.055	−0.176	0.023
	[0.688]	[0.652]	[0.723]	[0.706]
TURN3$_{(-1)}$	−0.443	−0.161	−0.443	−0.213
	[0.869]	[0.936]	[0.927]	[0.994]
TURN4$_{(-4)}$	−1.951**	−1.835**	−1.23	−1.132
	[0.792]	[0.732]	[0.868]	[0.856]
AGE1$_{(-1)}$	1.498***	1.535***	1.592***	1.628***
	[0.428]	[0.450]	[0.442]	[0.461]
AGE2$_{(-1)}$	1.360***	1.276***	1.384***	1.309***
	[0.426]	[0.430]	[0.450]	[0.454]
AGE3$_{(-1)}$	1.404***	1.547***	1.420***	1.545***
	[0.396]	[0.394]	[0.416]	[0.409]
AGE4$_{(-1)}$	1.057***	1.069***	1.129***	1.138***
	[0.330]	[0.338]	[0.335]	[0.344]
CONSTRUCTION$_{(-1)}$	−1.421**	−1.276*		
	[0.646]	[0.645]		
INDUSTRY$_{(-1)}$	0.078	0.071		
	[0.473]	[0.480]		
TRADE$_{(-1)}$	1.201**	1.234**		
	[0.496]	[0.504]		
SERVICES$_{(-1)}$			−0.024	−0.073
			[0.385]	[0.387]
INTFUND$_{(-1)}$	0.186*	0.227**	0.217*	0.250**
	[0.103]	[0.112]	[0.114]	[0.124]
DEBTR$_{(-1)}$	−0.687***	−0.719***	−1.104***	−1.117***
	[0.223]	[0.243]	[0.238]	[0.253]
LOAN_CONSTR$_{(-1)}$	−0.349**	−0.360**	−0.373**	−0.383**
	[0.150]	[0.148]	[0.168]	[0.166]
HHI$_{(-1)}$	0.019***	0.020**	0.026***	0.026***
	[0.007]	[0.009]	[0.006]	[0.009]
NFCL_GDP$_{(-1)}$	0.091	0.001	0.138	0.062
	[0.182]	[0.188]	[0.190]	[0.190]
GDPCG$_{(-1)}$	0.338	0.553	0.017	0.216
	[0.538]	[0.668]	[0.543]	[0.646]
CBLOANS$_{(-1)}$	2.650***	2.200**	2.203**	1.813*
	[0.917]	[0.963]	[0.942]	[0.958]
IRDNLS_S$_{(-1)}$	−2.303*		−1.972	
	[1.192]		[1.228]	
IRDNLL_S$_{(-1)}$		0		0.037
		[1.365]		[1.444]
C	−190.140**	−203.656***	−205.096***	−210.902***
	[73.839]	[73.036]	[70.142]	[71.191]
Year dummies	Yes	Yes	Yes	Yes
Adj. *R*-squared	0.836	0.829	0.813	0.808
F-statistic	21.745***	20.730***	19.711***	19.118***
Redundant fixed effects test				
(Chi-square)	(36.559)***	(42.078)***	(44.380)***	(48.984)***
No. of observations	143	143	143	143

Note: This table reports the coefficient estimates of the model in Equation (1). The dependent variable is GROWTH. Variables are defined in Table 2. Robust standard errors (White diagonal) are given in brackets []. The explanatory variables are taken with lag to alleviate the endogeneity problems. The null hypothesis tests the joint significance of fixed effects and a zero *p*-value indicates that the effects are significant; they are significant in all our fixed effects models. *, **, *** denote significance at 10%, 5%, and 1%, respectively.

Actual versus perceived external financing constraints

We then employed an alternative measure of financing constraints, that is, the *perceived financing constraints* (FINPRESS), and reestimated Equation (1) by keeping the interest rate–based measure for small amount loans and the sector grouping that excluded the service sector. Overall, previous results with respect to the influence of age, size, economic sector, internal funds, and leverage ratio held.

The new estimations yielded a negative significant coefficient for the variable FINPRESS, which implies that not only actual financial restrictions impede on SMEs' growth but also their perceptions that access to finance is the most pressing problem they face, relative to other problems. In addition, the coefficient is larger for the perceived constraints, which suggests that SMEs' growth is even more adversely affected by their perceived difficulties than it is by the actual constraints. Additional support for H1 was thus provided. Regarding the perceived difficulty of access to bank loans for European SMEs, Canton et al. (2013) show that the youngest and smallest SMEs are the ones that perceive access as being most difficult. The findings regarding the beneficial impact of increased banking markets integration (H2a and H2b) were confirmed.

Can banking market integration alleviate SMEs' financing constraints?

To test whether banking markets integration can alleviate SMEs' financing constraint, we introduced two interaction terms between the measures of banking integration and the measures of financing constraints. The results (Table 7, Models 6–7) show that both measures of financing restrictions remained individually significant, but their adverse effect was intensified given the larger magnitude of the coefficients. Again, the magnitude of the impact of perceived constraints was twice larger than that of actual financing constraints (−2.117 versus −1.010), which confirmed that it is an important finding.

The positive intrinsic effect of cross-border loans to NFCs appears to have vanished in both models, as its coefficient became statistically insignificant. However, the coefficient ϑ of its interaction term with both measures of financing constraints was significant and positive. Taken together, these two results suggest that the positive effect of increased cross-border lending activity to NFCs on SMEs' growth, previously documented, was now entirely captured through the channel of financing constraints. In other words, increasing cross-border lending activity of euro area MFIs to NFCs positively impacted on SMEs' growth by mitigating the negative impact of financing constraints on their growth. Again, the moderating effect was much larger in magnitude when we measured access to finance restrictions in terms of perceived constraints rather than actual constraints (0.175 versus 0.059).

Increased convergence in euro area interest rates to loans for NFCs depicted a different picture. First, its beneficial individual effect was maintained and even deepened in terms of magnitude (compared to the results in Models 1 and 5). Second, it also had an indirect effect given the significant positive coefficient of the interaction term between IRDNLS_S and each of the two measures of financing constraints; however, this effect was significant only when the measure of perceived constraints was considered.

Discussion

Regarding firm size and age as determinants of growth, our results are supported by the extant literature. We found that the youngest SMEs had higher growth rates compared to older ones, consistent with previous literature that younger firms grow faster (Bottazzi et al., 2014; Honjo & Harada, 2006; Rahaman, 2011). The importance of age in predicting (actual) financing constraints has previously been emphasized by, for example, Ferrando and Mulier (2015).

The negative contribution of turnover for the largest SMEs may be due to the lower growth opportunities of already large SMEs. This result rejects the Gibrat's law prediction, consistent with Rahaman (2011) and Honjo and Harada (2006). Our finding that SMEs with greater availability of internal funds are systematically able to grow more confirms previous findings (in Carpenter and Petersen (2002) and others), especially in Rahaman (2011), that used similar measures of internal resources.

While the negative correlation between leverage and SME growth contradicted the findings of some previous studies (Honjo & Harada, 2006; Hutchinson & Xavier, 2006; Rahaman, 2011), it can be supported by others such as Lang, Ofek, and Stulz (1996) and Coricelli et al. (2012). The latter argues that that there is a threshold level for leverage beyond which it can harm firm growth. From this perspective, our results may suggest that SMEs in the euro area countries are already highly leveraged or the cost of debt is burdensome, an intuition that should be explored further in future research.

Our empirical analysis offers new evidence on economically and financially developed countries in crisis, that constraints in accessing external (bank) finance do hamper growth of SMEs. This is in accordance with previous literature (Bottazzi et al., 2014; Rahaman, 2011), and it is also consistent with euro area evidence brought by Ferrando, Köhler-Ulbrich, and Pál (2008) which shows that micro and small firms, as opposed to medium and large firms, are affected by financing constraints as their realized growth is limited by the availability of resources and thus they are less able to take advantage of growth opportunities. Given that financing constraints are more prevalent in times of crisis (Ferrando & Mulier, 2015), the relevance of our finding is augmented.

Table 7. Firm- and country-level determinants of growth of the small and medium enterprise (SME) sector using alternative measures of financing constraints and interaction terms.

	Model 5	Model 6	Model 7	Model 8
TURN1$_{(-1)}$	0.23	0.217	0.27	0.332
	[0.549]	[0.564]	[0.600]	[0.516]
TURN2$_{(-1)}$	−0.244	0.013	0.117	−0.141
	[0.706]	[0.689]	[0.767]	[0.705]
TURN3$_{(-1)}$	−0.4	−0.357	−0.1	−0.362
	[0.833]	[0.850]	[0.821]	[0.891]
TURN4$_{(-4)}$	−2.141**	−1.781**	−1.470*	−1.773**
	[0.851]	[0.831]	[0.856]	[0.825]
AGE1$_{(-1)}$	1.305***	1.181**	0.916**	1.580***
	[0.397]	[0.460]	[0.385]	[0.422]
AGE2$_{(-1)}$	1.367***	1.402***	1.337***	1.311***
	[0.424]	[0.402]	[0.387]	[0.412]
AGE3$_{(-1)}$	1.181***	1.186***	0.883**	1.458***
	[0.397]	[0.396]	[0398]	[0.396]
AGE4$_{(-1)}$	0.963***	0.985***	0.788**	1.068***
	[0.322]	[0.321]	[0.301]	[0.325]
CONSTRUCTION$_{(-1)}$	−1.333**	−1.509**	−1.350**	−1.260*
	[0.639]	[0.620]	[0.594]	[0.654]
INDUSTRY$_{(-1)}$	0.091	−0.105	−0.067	0.123
	[0.477]	[0.470]	[0.463]	[0.486]
TRADE$_{(-1)}$	1.186**	1.089**	0.920*	1.221**
	[0.518]	[0.482]	[0.491]	[0.502]
INTFUND$_{(-1)}$	0.193*	0.201*	0.259**	0.179*
	[0.101]	[0.109]	[0.105]	[0.105]
DEBTR$_{(-1)}$	−0.733***	−0.489*	−0.565**	−0.708***
	[0.218]	[0.251]	[0.223]	[0.227]
LOAN_CONSTR$_{(-1)}$		−1.010***		
		[0.314]		
FINPRESS$_{(-1)}$	−0.737*		−2.117***	
	[0.412]		[0.691]	
LOAN_UNCONSTR$_{(-1)}$				0.338**
				[0.132]
HHI$_{(-1)}$	0.020***	0.019***	0.016**	0.022***
	[0.006]	[0.006]	[0.006]	[0.007]
NFCL_GDP$_{(-1)}$	0.125	0.117	0.234	0.114
	[0.177]	[0.182]	[0.178]	[0.184]
GDPCG$_{(-1)}$	0.347	0.669	0.765	0.307
	[0.565]	[0.601]	[0.627]	[0.549]
CBLOANS$_{(-1)}$	2.637***	0.915	0.503	2.665***
	[0.968]	[1.186]	[1.432]	[0.902]
LOAN_CONSTR$_{(-1)}$ × CBLOANS$_{(-1)}$		0.059**		
		[0.025]		
FINPRESS$_{(-1)}$ × CBLOANS$_{(-1)}$			0.175**	
			[0.074]	
IRDNLS_S$_{(-1)}$	−2.777**	−6.809*	−9.494***	−2.563**
	[1.187]	[3.930]	[3.530]	[1.222]
LOAN_CONSTR$_{(-1)}$ × IRDNLS_S$_{(-1)}$		0.107		
		[0.087]		
FINPRESS$_{(-1)}$ × IRDNLS_S$_{(-1)}$			0.289**	
			[0.134]	
C	−179.665**	−157.818*	−153.973*	−237.357***
	[72.247]	[79.901]	[81.956]	[79.804]
Year dummies	Yes	Yes	Yes	Yes
Adj. R-squared	0.833	0.843	0.847	0.835
F-statistic	21.282***	21.537***	22.328***	21.541***

(*Continued*)

Table 7. (Continued).

	Model 5	Model 6	Model 7	Model 8
Redundant fixed effects test (Chi-square)	(35.094)***	(38.107)***	(44.346)***	(36.1190)***
No. of observations	143	143	143	143

Note: Table reports the coefficient estimates of the model in Equation (1) (Models 5 and 8) and in Equation (3) (Models 6 and 7). The dependent variable is GROWTH. Variables are defined in Table 2. Robust standard errors (White diagonal) are given in brackets []. The explanatory variables are taken with lag to alleviate the endogeneity problems. The null hypothesis tests the joint significance of fixed effects and a zero *p*-value indicates that the effects are significant. *, **, *** denote significance at 10%, 5%, and 1%, respectively.

With regard to competition, as national banking sectors become more concentrated, for instance through mergers, acquisitions, or exit, our study shows that SMEs grow more not less, as Craig and Hardee (2007) suggest, but in line with Canton et al. (2013) who show that European SMEs have an improved perception on the availability of bank loans in countries with more concentrated banking sectors, as proxied by the HHI as well.

The higher significance of cross-country variability in interest rates to small amount loans may also stem from the high cross-country heterogeneity for this interest rate, as Wagenvoort et al. (2011) show that it was the most nonintegrated lending rate before 2008 and, consequently, still affected by country-specific factors. Similar conclusions can be drawn by comparing the trends in Figures 1 and 2. Moreover, the cross-country variations for SMEs' lending rates in the euro area was even higher after the onset of the financial crisis, a development that the ECB has repeatedly warned about (ECB, 2015, 2014). Using the firm-level SAFE dataset, Drakos (2013) report a tightening of the price conditions for euro area SMEs during the period 2009–2011.

Our findings on the potential of increased banking integration to alleviate the negative impact of financing constraints on growth are broadly in line with Canton et al. (2013) who show that increased foreign bank presence, an expression of higher integration, is associated with improved perception of loan accessibility by SMEs in the EU15 countries. It is also consistent with Popov and Ongena (2011) who found that increased interbank integration alleviates credit constraints for firms and lowers their cost of credit. Overall, our findings show that euro area banking integration has both direct and indirect effects on SMEs' growth.

Robustness tests

For robustness, we performed several additional tests. First, if it is true that the higher the share of constrained SMEs the lower the growth of the SME sector (as we have previously shown), the reverse should hold as well (that is, the higher the share of unconstrained SMEs the higher the overall growth).

We tested this by replacing the measure of actual constraints with the opposite measure (LOAN_UNCONSTR), defined as the share of SMEs in each country and survey wave reporting that their loan application was fully satisfied. Our expectation for a positive correlation was also grounded in the previous literature. Bottazzi et al. (2014) show that unconstrained firms exhibited positive growth rates while they lowered or even turned negative as the severity of financing problems increased. The new estimations are reported in Table 7, Model 8. As expected, the coefficient for LOAN_UNCONSTR was positive and statistically significant. Thus, an increasing share of unconstrained SMEs led to an increasing share of SMEs reporting growth in turnover. All the other findings remained unchanged.

Second, we dealt with the endogeneity of financial constraints. Specifically, we suspected that our measures of financial constraints could be affected by reverse causality given that higher growing firms are expected to generate more internal resources and thus be less affected by financial constraints, either actual or perceived. On the other hand, higher-growing firms are riskier as they exhibit increased earnings volatility and increased agency conflicts between managers and lenders, so the latter would be more reluctant to extend credit to them. We used an instrumental variable (IV) procedure to instrument for both measures of financial constraints. This method has previously been used in the literature to address similar endogeneity concerns (for example, Beck, Demirguc-Kunt, Laeven, & Levine, 2008b; Boubakri, El Ghoul, & Saffar, 2015; Popov & Udell, 2012).

We instrumented actual financing constraints with: (a) the perceived evolution of SMEs' credit history (CREDHIST); (b) the recovery rate following bankruptcy procedures, at the country level (RECOV); and (c) the regulatory quality of the government (REG, see Table 2 for the definition of variables). The rationale for these instruments is as follows: (a) firms with better credit history tend to have a better credit rating and thus easier access to bank loans (Bottazzi et al., 2014); (b) firms in countries with higher recovery rates may be perceived as less risky given that bankruptcy costs are expected to be lower; and (c) better perceptions on the ability of governments to formulate and implement more effective regulations and policies aimed at private sector development should help firms access finance more easily. Perceived financing constraints is also instrumented using the measure on the perception of regulations, discussed above. Additionally, we used as instrument a measure on the perceptions of SMEs regarding the willingness of banks to provide credit (BANKWILL, see Table 2). This was because we expected SMEs to be less likely to perceive access to finance as problematic when they have improved their perceptions about the willingness of banks to provide credit.

The results of the IV estimation are reported in Table 8. The previous results generally held, although they became less significant when the

interaction terms were included. With respect to financial constraints, Models 9a and 9b showed that their significant negative effect on SMEs' growth was maintained, and the magnitude of their negative impact was even deepened. Moreover, the perceived access to finance constraints hindered SMEs' growth to a greater extent than actual bank financing constraints did given that the magnitude of its coefficient was twice as large (−1.822 in Model 9a versus −3.877 in Model 9b), thus confirming the previous findings. After the interaction terms were introduced, the individual effect of actual constraints vanished (Model 9a).

Concerning the bank integration measures, our IV estimates confirmed that a more intense cross-border lending activity of MFIs toward NFCs was conducive to growth as the coefficient on CBLOANS remained positive and statistically significant in Models 9a and 9b. Similarly, greater convergence in interest rates to new loans for NFCs, which is equivalent to lower (quadratic) distance of a country's interest rates from the euro area average for short-term small amount loans, favored SMEs' growth, especially when perceived financing constraints were considered (IRDNLS_S was significant at 1 percent in Model 9b). When interaction terms were introduced, results were all insignificant, both with regard to interest rates and cross-border loans measures (Model 10a), whereas we found a significant moderating effect of increased cross-border lending to NFCs on the negative impact of financial constraints on SMEs' growth (Model 10b). The nonsignificance of the statistic of the Sargan-Hansen test for overidentifying restrictions revealed that the set of instruments used was valid in most cases and they reliably predicted our endogenous variables. Overall, the IV estimations provide evidence that the euro area banking market integration also mattered for SMEs and that its effects were favorable, as also shown in Popov and Ongena (2011) for the European interbank market. They also confirmed that there was a significant impact running from financial constraints to growth, consistently with the previous literature (for example, Bottazzi et al., 2014; Rahaman, 2011).

Third, a set of several additional robustness checks were performed by employing alternative measures of our dependent and independent variables.[7] We reestimated Models 6 and 7 using growth in fixed investment as the dependent variable (coded INVEST and defined in Table 2). The results must be interpreted with caution as the SAFE survey reported data on this item only from 2014H1. Overall, they suggest that financial constraints and banking integration impact on growth in fixed investment (that is, a long-run effect) similar to the growth in sales (that is, a short-run effect). However, the results are significant when actual financial constraints are considered, thereby suggesting that long-term SMEs' growth is affected by

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[7]We thank two anonymous referees for suggesting these further tests. The full set of results are not reported in this article for reasons of brevity, but they can be made available on request.

Table 8. Additional tests using the IV procedure.

	Model 9a	Model 9b	Model 10a	Model 10b
TURN1$_{(-1)}$	0.392	0.37	−0.168	0.251
	[0.703]	[0.646]	[1.127]	[0.547]
TURN2$_{(-1)}$	0.624	0.25	1.564	0.615
	[0.948]	[0.834]	[2.018]	[0.723]
TURN3$_{(-1)}$	−0.215	0.012	0.102	0.356
	[1.091]	[1.009]	[1.769]	[0.861]
TURN4$_{(-4)}$	−1.375	−2.365**	−0.686	−0.952
	[1.232]	[1.117]	[2.178]	[0.976]
AGE1$_{(-1)}$	2.526***	1.520**	−0.155	0.541
	[0.787]	[0.621]	[1.649]	0.552
AGE2$_{(-1)}$	2.095***	2.138***	2.148*	1.459***
	[0.670]	[0.595]	[1.181]	[0.488]
AGE3$_{(-1)}$	2.163***	0.999*	0.194	0.352
	[0.712]	[0.595]	[1.382]	[0.552]
AGE4$_{(-1)}$	1.821***	1.333***	1.055	0.646
	[0.565]	[0.450]	[0.774]	[0.386]
CONSTRUCTION$_{(-1)}$	−1.384	−0.921	−2.122	−1.315**
	[0.795]	[0.741]	[1.369]	[0.621]
INDUSTRY$_{(-1)}$	−0.054	0.018	−1.42	−0.279
	[0.727]	[0.668]	[1.659]	[0.567]
TRADE$_{(-1)}$	0.988	0.907	0.188	0.546
	[0.711]	[0.655]	[1.383]	[0.568]
INTFUND$_{(-1)}$	0.097	0.133	0.159	0.272**
	[0.166]	[0.150]	[0.261]	[0.129]
DEBTR$_{(-1)}$	−0.159	−0.398	1.429	−0.212
	[0.0385]	[0.311]	[1.828]	[0.288]
LOAN_CONSTR$_{(-1)}$	−1.822***		−7.248	
	[0.589]		[5.713]	
FINPRESS$_{(-1)}$		−3.877***		−4.926***
		[0.883]		[1.149]
HHI$_{(-1)}$	0.020**	0.020***	0.014	0.014**
	[0.008]	[0.008]	[0.014]	[0.007]
NFCL_GDP$_{(-1)}$	0.339	0.522**	0.557	0.536***
	[0.230]	[0.221]	[0.519]	[0.203]
GDPCG$_{(-1)}$	−0.949	−0.912	1.565	0.581
	[0.793]	[0.658]	[1.315]	[0.522]
CBLOANS$_{(-1)}$	3.825**	3.763***	−11.788	−2.501
	[1.512]	[1.362]	[11.911]	[1.928]
LOAN_CONSTR$_{(-1)}$ × CBLOANS$_{(-1)}$			0.519	
			[0.423]	
FINPRESS$_{(-1)}$ × CBLOANS$_{(-1)}$				0.430***
				[0.120]
IRDNLS_S$_{(-1)}$	−1.921	−4.415***	−31.773	−14.222***
	[1.519]	[1.467]	[23.348]	3.386
LOAN_CONSTR$_{(-1)}$ × IRDNLS_S$_{(-1)}$			0.716	
			[0.565]	
FINPRESS$_{(-1)}$ × IRDNLS_S$_{(-1)}$				0.474***
				[0.130]
C	−277.850***	−223.477**	40.779	−123.838
	[101.964]	[89.056]	[239.412]	[76.926]
Year dummies	Yes	Yes	Yes	Yes
R-squared	0.649	0.561	0.463	0.458

(*Continued*)

Table 8. (Continued).

	Model 9a	Model 9b	Model 10a	Model 10b
F-statistic	6.880***	8.420***	2.510***	10.840***
Sargan-Hansen statistic(Chi-square)	1.948	0.653	3.605	20.214
	p-value (0.378)	*p*-value (0.419)	*p*-value (0.165)	*p*-value (0.000)
No. of observations	143	143	143	143

Note: This table reports the coefficient estimates of the model in Equation (1) (Models 9a and 9b) and Equation (3) (Models 10a and 10b) by instrumental variables (IV) procedure. The dependent variable is GROWTH. Variables are defined in Table 2. Standard errors are given in brackets []. The explanatory variables are taken with lag to alleviate the endogeneity problems. The two variables measuring external financing constraints, actual constraints (LOAN_CONSTR) and perceived constraints (FINPRESS) are instrumented to control the endogeneity of financing constraints. When the the Sargan-Hansen test statistic is nonsignificant, it illustrates that the instruments used are valid. *, **, *** denote significance at 10%, 5%, and 1%, respectively.

their investment plans and their corresponding ability to raise (bank) capital to finance. In contrast, short-term growth (in sales) is sensitive to both actual and perceived constraints with these latter having an even larger effect.

We also tested the robustness of our interest rate measure of integration with three additional measures: (a) the level of interest rates; and (b) the spread over the corresponding interest rates of a virtuous country (Germany). In both cases, we multiplied our measures by (−1) to interpret them in the same way as the measure based on cross-border loans (that is, higher values are equivalent to higher integration). And, finally (c), we employed the interest rate to new small amount loans (up to and including 1 million euros) with maturity *over* one year; however, there were gaps in this series for Greece over the period considered. Our results showed no significant effects for the new interest rate–based measures, either individual or when interacted with financial constraints. In contrast, the positive effect of cross-border lending on alleviating financial constraints was maintained especially when the spread was used. Taken together, these results suggest that the effect of convergence in lending rates on SMEs' access to finance was "less direct" and possibly less crucial compared to the effect of cross-border loans to NFCs. The literature indeed provides evidence that the positive effects of overall banking markets integration in the euro area on the availability of credit for firms are transmitted through the interbank channel. Popov and Ongena (2011) found evidence that increased interbank market integration in the euro area alleviates credit constraints for firms and reduces the cost charged to them. Similarly, Bremus and Neugebauer (2018) found that the reduction in cross-border lending to banks increases the likelihood that SMEs will face higher credit costs.

We carried out some additional tests on the impact on SMEs' age structure. We defined three age groups as follows: startups, up to two years old (AGE1); middle-aged SMEs, defined by combining the shares of SMEs in the second and third age brackets (AGE23); and mature firms, 10 years and older (AGE4). The models were estimated using beta regression models

(Ferrari & Cribari-Neto, 2004) as the dependent variable is a proportion. The results showed that financing constraints, both actual and perceived, had a significant negative impact on young SMEs as their prevalence reduces the share of startups; the effect was reversed for the share of mature SMEs (10 years and older) with no significant effect on middle-aged SMEs. Thus, it is the younger rather than the mature SMEs that are more likely to be affected by financial constraints. With regard to banking integration in terms of cross-border lending, consistent with previous literature (for example, Bottazzi et al., 2014), startups seem to be less likely to benefit from increased cross-border lending activity, but reducing their actual bank loan constraints acts as a moderating factor. Overall, these results indicate that financing constraints are most relevant for young firms, as they are more vulnerable.

Finally, with regard to the impact of macroeconomic controls, we reestimated our baseline models by including a measure of inflation and its effect was negative (as expected), but statistically insignificant. We also added an explanatory variable capturing the SMEs' perception of the difficulty of finding customers as an alternative proxy for the demand addressed to SMEs (drawn from the SAFE dataset and coded FINDCUSTOMERS in Table 2). The variable seems to be a better predictor of SMEs' sales growth than GDP per capita, as it is found to be negative and significant when actual constraints with regard to accessing bank loans were considered.

Conclusions

In this article, we empirically investigated the impact of access to external finance constraints on SMEs' growth in sales. Financial constraints were considered as actual financing constraints as well as perceived financing constraints. Additionally, we explored how banking markets integration in the euro area can foster growth in SMEs and whether it could ease their financing constraints. According to ECB (2015, 2014), the main negative trends in the euro area banking market integration refer to the increase in the cross-country variation in interest rates to loans for NFCs especially for SMEs, together with the reduction of the cross-border lending among the euro area countries. This article builds on the ideas that (a) access to finance is a barrier to firm growth, especially for SMEs (Beck & Demirguc-Kunt, 2006), and that (b) financial integration makes external finance more available and at a lower cost and thus stimulates growth-enhancing investments (Friedrich et al., 2013). Therefore, we sought to shed light on the interconnection of these two factors by using survey data, aggregated at country level, for the 11 largest euro area countries over 2009–2015.

Our main findings support the above expectations. First, our evidence revealed that financing constraints significantly hamper SMEs' growth and that the negative effect is stronger for perceived than for actual financing constraints. Second, we found that increased banking markets integration in

the euro area fosters growth in SMEs. We measured banking markets integration in two ways: (a) as the share of cross-border lending to NFCs in the other euro zone countries in total lending (domestic and cross-border) to NFCs of a country; and (b) as the (quadratic) distance of each country's interest rate to new loans to NFCs against the euro area average. Third, we explained that reducing financing constraints – both perceived and actual – is the channel through which the benefits of increased banking markets integration are transmitted, although the effect is much stronger when integration is captured through the intensity of cross-border lending than through convergence in interest rates to loans to NFCs. The fact that SMEs' growth was found sensitive to changes in short-term lending rates was not unexpected given that SMEs are typically considered to be more indebted in the short term (Daskalakis & Psillaki, 2008; Lopéz-Gracia & Sogorb-Mira, 2008; Titman & Wessels, 1988). Additionally, this interest rate (quadratic) distance whose impact was found significant refers to small amount loans (up to and including 1 million euros), which are considered a proxy for loans to SMEs (ECB, 2015, 2014). Our main findings regarding the impact of financial constraints and of banking integration on SMEs' growth generally held when we used an alternative IV estimation procedure that controlled for endogeneity of financial constraints, both actual and perceived, although the significance of the results was reduced.

The findings in this article have strong implications for policies targeting at alleviating financing constraints for SMEs and promoting their access to external finance, particularly to bank loans as they significantly hamper their growth. One way to do so is by reducing the fragmentation in the euro area banking markets, especially by promoting MFIs' cross-border lending activity and aligning the cost of borrowing for SMEs to stimulate their growth.

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Funding

ORCID

Raffaella Calabrese 🔵 http://orcid.org/0000-0002-0078-3151

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