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The Use of Leasing in Financially Constrained Firms: An Analysis for European SMEs

Ana Mol-Gómez-Vázquez - Department of Financial Economics and Accounting, University of Alicante, Spain (ana.mol@ua.es) *corresponding author*

Ginés Hernández-Cánovas - Department of Financial Economics and Accounting, Universidad Politécnica de Cartagena, Spain (gines.hernandez@upct.es)

Johanna Köeter-Kant - Department of Finance and Financial Sector Management, Vrije Universiteit Amsterdam, the Netherlands (j.koeter-kant@vu.nl)

Abstract

Severe informational asymmetries, small size, unreliable financial statements and lack of collateral hamper the access of SMEs to traditional sources of debt financing. We use a survey data set of 4,583 SMEs from 25 European countries to analyse whether the use of leasing as a form of financing could fill the financing gap of constrained SMEs. We do so analysing whether the use of leasing by SMEs is triggered by the existence of financial constraints. Our findings indicate that after controlling for firm, bank and country-specific characteristics the likelihood of using leasing increases for financially constrained SMEs, which confirms our hypothesis. This paper contributes to the debate about differences in the use of lease financing between constrained and unconstrained SMEs, providing to the best of our knowledge, the first international evidence using a survey assessment of self-declared financial constraints for SMEs.

1. Introduction

The aim of this study is to investigate whether leasing can act as alternative funding to complement the financing needs of small and medium-sized enterprises (SMEs) whose access to traditional sources of financing is restricted. Conditioned by informational asymmetries and high screening and monitoring costs (Ang, 1992; Martínez-Sola, et al., 2018), financial literature perceives small and medium-sized enterprises as risky firms that end up having problems obtaining the financing they need (Beck and Demirgüç-Kunt, 2006; Psillaki and Daskalakis, 2009). Policy makers around Europe have become increasingly concerned about the financial problems of SMEs because their success is necessary in order to sustain innovation, job creation, and economic growth (ECB, 2013). However, the financial situation of the European SMEs is likely to deteriorate along with the ongoing process of concentration of the European banking system (Han et al., 2017; Mol-Gómez-Vázquez et al., 2019). This process is likely to continue in the future because the ECB recognizes that it will bring benefits at the sector level (Praet, 2016; Constâncio, 2017).

Leasing is a form of asset-based lending where the lessor (lender) is the owner of the leased asset and gives the lessee (borrower) the right to use it in return for specified payments during a specified period. Under lease financing, the lessor does not provide direct capital to the lessee and keeps ownership of the leased asset, which

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facilitates its repossession in the event of bankruptcy of the lessee. This reduces the risk born by the lessor and places the lending decision on the value of the asset rather than the creditworthiness of the lessee. These characteristics seem to suggest that leasing could overcome some of the disadvantages of traditional lending for SMEs. The European leasing industry continues to grow, with the portfolio of leased assets reaching 755.3 billion Euros in 2015 after an annual growth of 3.2%. In 2015, the firms represented through the members of Leaseurope granted total new leasing volumes worth 314.9 billion Euros, which represents an increase of 9.4% compared to 2014. As for the use of leasing by SMEs, Leaseurope estimates that 21.2% of their total investment has been financed via leasing in 2014, highlighting the great importance leasing has for European SMEs.¹ We analyse the association between the use of leasing and the existence of financial constraints for an international sample of 4,583 SMEs from 25 European countries.

Our paper contributes to the literature in several ways. Firstly, we add to the general debate about financing restrictions in SMEs showing how an alternative lending technology such as leasing can help to overcome their financing gap. More specifically, we contribute to the debate about differences in the use of lease financing between constrained and unconstrained SMEs, providing to the best of our knowledge, the first international evidence for SMEs. The only related evidence provided by Beck et al. (2008) combines small and large companies with a number of employees ranging from five to more than 500 and, therefore, fail to perform an analysis for SMEs. Our study improves their work by using a sample that, according to the EU recommendation 2003/361, only includes SMEs with less than 250 employees. Our analyses indicate that the SMEs that are subject to financial constraints, which are measured using five different variables, are 15.25% more likely to use lease financing. These results show a different picture than the one provided by Beck et al. (2008) where the existence of financing obstacles does not influence the use of leasing for firms with less than 500 employees.

Secondly, we do intend to analyse what country-specific characteristics influence lease financing, while we also use the international dimension of our sample to control for country fixed effects in our analyses. This is important because there are differences in asymmetric information problems in SMEs across developed and developing countries (Mol-Gómez-Vázquez et al., 2019), which are likely to influence the association between lease financing and the existence of financial constraints. Our results indicate that country specific variables are important in determining the use of lease financing for SMEs across European countries.

Finally, we also contribute to a better understanding of the leasing industry in Europe including the top 10 countries in terms of leasing penetration measured as a percentage of GDP (Gleeson, 2019). Europe accounts for 33.4% of total leasing world volume consolidating its position as the second largest market in the world whereas some European countries report the highest growth over the world such as Greece (65.32%), Lithuania (23.66%) or Hungary (18.35%). This data shows the importance of the European leasing market and calls for an analysis of European SMEs.

¹ Leaseurope, the European Federation of Leasing Company Associations, is integrated by 47 Member Associations from 34 European countries, representing around 93% of the European leasing market in 2015. Information available at: http://www.leaseurope.org/uploads/documents/LeaseuropeFF_15.pdf

We organise the paper with the following structure. In Section 2, we analyse existing literature and provide the hypothesis. Section 3 describes the sample and the methodology, followed by the results in Section 4. Finally, Section 5 presents the summary and conclusions.

2. Theory and Hypothesis Development

SMEs are usually young firms, highly dependent on bank financing, with poor financial statements and short track records, which do not have enough collateral to pledge as guarantee to overcome asymmetric information problems (Levenson and Willard, 2000; Psillaki and Daskalakis, 2009; Berger et al., 2011). In addition, risk arising from weak legal and institutional environments might also have an influence on the financing decisions of SMEs (Hall et al., 2004; Jøeveer, 2013). For example, Hanedar et al. (2014) find that the likelihood of pledging collateral increases for SMEs operating in less developed countries due to the additional risk arising in such environments. As a consequence, SMEs end up having limited access to debt financing and experience severe credit constraints (Beck and Demirgüç-Kunt, 2006; Beck et al., 2006; Psillaki and Daskalakis, 2009). In this situation we suggest that leasing, a type of asset-based lending, could facilitate the access to debt financing to opaque firms (Sharpe and Nguyen, 1995; Lasfer and Levis, 1998; De la Torre et al., 2010). The lessor keeps the ownership of the leased asset, which in addition constitutes itself the sole collateral of the financing (Sultanov et al., 2009) and the main source of repayment in case of borrower bankruptcy. Therefore, the value of the leased asset is more important for the lessor than the overall risk of the lessee (Berger and Udell, 2006).

The above characteristics imply clear advantages for SMEs. First, according to Kraemer-Eis and Lang (2012), leasing might also overcome the adverse selection problem because the leased asset might be too important for the lessor's business operations to incur in default payments. Second, the misallocation of funds (moral hazard problem) under leasing is not possible because the lessor directly buys the asset and only allows the lessee to use it (Barger and Kuczynski, 1996; Gallardo, 1997). In addition, recent empirical evidence shows that leasing helps preserving the leased asset by ensuring its maintenance (Hendel and Lizzeri, 2002; Gilligan, 2004; Johnson and Waldman, 2010).

Third, leasing, compared to other sources of debt financing, is less dependent on strong and efficient legal systems because the ownership of the underlying asset is not transmitted under lease financing, making repossession easier in the event of default or bankruptcy of the borrower (Berger and Udell, 2006). According to Sultanov et al. (2009), many jurisdictions show that the legal ownership of the lessor makes leasing less risky than other secured financing. Barclay and Smith (1995) and Sharpe and Nguyen (1995) argue that capital leasing has, compared with other forms of secured financing, the highest priority in the case of bankruptcy. In some cases, the lessor will receive the lease payments even if the lessee is in bankruptcy, placing the payments at the same level as other administrative costs. Moreover, as has been discussed above, under lease financing, there is no other collateral to recover, making the process easier and cheaper because firms do not have to go through long bankruptcy procedures. Typically, in the case of bank loans, a court has to execute the guarantees

associated to the loan, increasing repossession costs. In contrast, bankruptcy costs are lower in lease financing (Krishnan and Moyer, 1994).

The higher debt capacity of leasing may be a particularly important reason to lease for SMEs, which are likely more financially constrained. According to Eisfeldt and Rampini (2009), there is a very strong relationship between lease financing and size, concluding that leased capital may be the most important source of external financing for small firms. Sharpe and Nguyen (1995) argue that leasing is the first external financing option according to the Pecking Order Theory when informational asymmetries are important, such as in firms of reduced dimension. Empirical results in the existing literature do show a clear evidence about the association between lease financing and firm size (Beattie et al., 2000; Chavis et al., 2011; Cosci et al., 2013; Neuberger and R athke-D oppner, 2013). However, existing studies fall to provide evidence on the use of lease financing in constrained SMEs. There are works that use samples that combine firms of all sizes, but without performing specific tests for SMEs, in Italy (Cosci et al., 2013), Germany (Neuberger and R athke-D oppner, 2013), North America (Eisfeldt and Rampini, 2009, Lin et al., 2013), as well as with a cross country sample (Beck et al., 2008). We deal with this gap in the literature by testing the following hypothesis:

Hypothesis: The use of leasing increases for SMEs which are financially constrained.

3. Methodology: Data, Method and Variables

This section describes the variables used in our empirical study. Table 1 provides detailed definitions of all the variables, while Table 2 reports the correlations.

3.1 Data and Method

Our sample is based on the Flash Eurobarometer Survey on SME Access to Finance carried out by the European Central Bank and the European Commission between 2005 and 2006.² From these datasets, we obtain the data regarding the use of lease financing and the remaining firm-specific variables for 4,583 SMEs in the EU 25. 3,047 firms (66%) belong to the 15 old Member States of the European Union and the remaining 1,536 firms (34%) belong to the 10 newer Member States (Bulgaria, Romania and Croatia are not represented because they joined the European Union after 2006). After dropping 125 firms operating in the financial sector, we select 4,425 observations which contain information about the use of leasing. Because of missing values in one or several of our explanatory variables, we arrive to a final sample for our regressions that ranges between 3,286 and 3,616. The period used in this paper is limited by data availability. Therefore, we cannot take into consideration a longer period or attempt to implement the analysis with more current data. However, our empirical contribution, previous to the financial crisis, will allow future contributions

² There are two years in the implementation of the survey because the information about the 15 Old Member States was collected in September 2005, while the information about the 10 New Member States was collected between April and May 2006. We recognize that the existence of two years in the definition of the survey can lead to confusion, and one might wonder whether survey data for the same firms are available for 2005 and 2006, or we are just dealing with a cross-section. However, we have to point out that each firm appears only one time in our sample, and therefore our data-set does not allow to form a panel or a repeated cross-section. Therefore, we estimate a cross-section.

to compare the impact of financial constraints on lease financing for SMEs across different economic and financial scenarios.

Table 1 Variables, Descriptions, and Data Sources

<i>Variable name</i>	<i>Description and source</i>
<i>Dependent variable:</i>	
Leasing ^a	Variable that equals one when the firm uses leasing and zero otherwise.
<i>Country and industry dummies:</i>	
Country dummies ^a	Twenty-five country dummies.
Industry dummies ^a	Seven industry dummies, each one being equal to one if the firm operates in one of the seven sectors considered in the survey, and zero otherwise.
<i>Financial constraint variables:</i>	
Assure ^a	Variable that equals one when the firm states that difficult access to means of financing is the element that would hamper the development of the company and zero otherwise.
Allow ^a	Variable that equals one if the current financing situation of the company is not sufficient to see its projects through and zero otherwise.
Access ^a	Variable that reflects the opinion of manager regarding the firm's access to bank loan. This variable ranges from 1 (very easy access) to 4 (very difficult access).
Conclude ^a	Variable that reflects the opinion of firms as to whether the projects cannot be successfully concluded without a loan from the bank. The variable ranges from 1 (totally disagree) to 4 (totally agree).
Internally ^a	Variable that takes into account whether the financial needs of the company are met internally or not. This variable ranges from 1 (yes, absolutely) to 4 (no, not at all).
Debt worsening ^a	Dummy variable that takes the value one if the firm has stated that its level of debt has deteriorated since last year and zero otherwise.
<i>Country-specific variables:</i>	
GDP per capita ^b	GDP per capita is the natural logarithm of GDP per capita in current prices in U.S. dollars divided by the population in 2003.
GDP growth ^b	Ratio of GDP growth expressed in current prices in U.S. dollars in the period 2002-2003.
Inflation ^c	Inflation as measured by the annual growth rate of the GDP implicit deflator shows the rate of price change in the economy as a whole in 2003. The GDP implicit deflator is the ratio of GDP in current local currency to GDP in constant local currency.
Stock traded ^c	A measure of stock market development, calculated as the value of the stock traded as percentage of GDP in 2003.
Credit info ^d	Credit info variable is computed as an index ranging from 0 to 6, that measures the scope, access and quality of credit information available through either public or private bureaus in 2003.
<i>Firm-specific variables:</i>	
Size dummies ^a	Dummy variables micro, small and medium, each one being equal to one if the number of employees of the firm is less than 10 (micro), between 10 and 49 (small), and between 50 and 249 (medium) respectively, and zero otherwise.
Age ^a	Categorical variable that ranges from 1 for those firms that have been in operation less than 2 years to 6 for those firms that have been in operation more than 30 years.
Growth ^a	Variable that equals one when the firm has increased the number of its employees since the last year and zero otherwise.
Foreign ^a	Variable that equals one when the ownership of the company is exclusively own by international companies and zero otherwise.
Subsides ^a	Variable that equals one when the firm has already made use of public subsidies for its activities and zero otherwise.

Source:

^a Survey on SMEs Access to Finance carried out by the European Commission between 2005 and 2006.

^b United Nations Statistics Division.

^c The World Bank (<http://data.worldbank.org/indicator>).

^d The Financial Development and Structure dataset, the World Bank.

^e Doing Business Indicators 2005, the World Bank.

^f Heritage Foundation

Table 2 Correlations

	Leasing	Assure	Allow	Access	Conclude	Internally	Debt worsening	Age	Micro
Assure	0.0695***								
Allow	0.0463***	0.2168***							
Access	0.0402**	0.1671***	0.2643***						
Conclude	0.0909***	0.1212***	0.1894***	0.0865***					
Internally	0.0714***	0.1646***	0.3011***	0.2271***	0.1413***				
Debt worsening	0.0504***	0.0681***	0.1459***	0.0786***	0.1317***	0.0914***			
Age	-0.0198	-0.0863***	-0.1314***	-0.0851***	-0.0636***	-0.0407***	-0.0034		
Micro	-0.2145***	0.0385**	0.0421***	0.0741***	-0.0389**	0.0414***	0.0052	-0.1178***	
Small	0.1140***	-0.0221	0.0137	-0.0164	0.0389**	-0.0146	0.0052	0.0217	-0.7067***
Medium	0.1498***	-0.0246	-0.0740***	-0.0798***	0.0380**	0.0380**	0.0243	0.0217	-0.4831***
Growth	0.1008***	-0.0082	-0.0386**	-0.0450***	0.0188	-0.0307**	0.0109	-0.1310***	-0.2038***
Subsides	0.0942***	0.0299*	0.0096	0.0187	0.0619***	0.0181	0.0104	0.0437***	-0.1542***
Foreign	0.0679***	-0.0419**	-0.0693**	-0.0386**	-0.0628***	-0.0459**	-0.0000	0.0005	-0.1195***
GDP per capita	-0.0353**	-0.1031***	-0.1942***	-0.0248	-0.0028	-0.0304**	-0.0170	0.2757***	0.0945***
GDP growth	0.0015	-0.0401***	-0.0011	-0.0808***	0.0013	-0.1040***	-0.0178	-0.1019***	0.0221
Inflation	-0.0291*	0.0434***	-0.0024	-0.0653***	0.0267*	-0.0955***	0.0569***	-0.1345***	-0.0040
Credit info	0.0263*	-0.0061	-0.0206	0.1323***	0.0283*	0.0828**	0.0211	0.0937***	0.0165
Stock traded	0.0001	-0.0728***	-0.1251***	0.0058	-0.0279*	0.0863***	-0.0242	0.1471***	0.0706***
						GDP per capita	GDP growth	Inflation	Credit info
Medium	-0.2780***								
Growth	0.1342***	0.1106***							
Subsides	0.0449***	0.1539***	0.0794***						
Foreign	0.0085	0.1519***	0.0348**	0.0027					
GDP per capita	-0.0651***	-0.0478***	-0.0619***	0.0019	-0.0408***				
GDP growth	-0.0141	-0.0125	-0.0009	-0.0354**	0.0153	0.1041***			
Inflation	0.0102	-0.0072	0.0202	-0.0196	-0.0013	-0.1815***	0.4625***		
Credit info	-0.0115	-0.0082	-0.0489***	0.0280*	-0.0161	0.2483***	-0.2876***	-0.1353***	
Stock traded	-0.0515***	-0.0322**	-0.0667***	-0.0047	-0.0345**	0.5156***	-0.0532***	-0.1196***	0.3457***

Notes: Definitions and sources of all the variables are reported in Table 1. ***, **, * denote significance at the levels of 1%, 5%, and 10%, respectively and the standard errors are in brackets.

Table 3 shows a summary of the statistics for the variables used in our regressions. The first thing we notice is the existence of variations in the level of financial constraints across firms. On average, three out of five of our financial constraint indicators show that firms in our sample present a moderate perception about the existence of credit constraints. The sample is made up of 55.11% of micro firms which is important since most empirical research in the financial literature neglects this group of firms due to the lack of data. The average firm in our sample has been in operation more than 10 years and more than 23% of the firms grew in the last year. We should also highlight that only 3.67% of the firms are foreign-owned and 18.37% have received public subsidies for its operations. Regarding country-specific characteristics, the statistics show that, on average, the countries in our sample grow at a high rate (23.17%). However, in spite of their economic growth, European countries in our sample still have considerable room for further improvements of their information, financial and economic structures.

Table 3 Summary Statist

	<i>Mean</i>	<i>Std. Dev.</i>	<i>Min.</i>	<i>Max.</i>	<i>N</i>
Leasing	0.5638	0.4960	0	1	4425
Assure	0.1543	0.3613	0	1	4134
Allow	0.2124	0.4091	0	1	4345
Access	2.3769	0.8544	1	4	4041
Conclude	2.4710	1.1748	1	4	4304
Internally	1.7107	0.8006	1	4	4338
Debt worsening	0.1540	0.3610	0	1	4085
Age	4.1054	1.5438	1	6	4442
Micro	0.5511	0.4974	0	1	4458
Small	0.2891	0.4534	0	1	4458
Medium	0.1597	0.3664	0	1	4458
Growth	0.2332	0.4229	0	1	4442
Subsides	0.1837	0.3873	0	1	4404
Foreign	0.0367	0.1881	0	1	4412
GDP per capita	9.8559	0.6950	8.4711	11.0871	4458
GDP growth	0.2317	0.0575	0.0940	0.3600	4458
Inflation	0.0260	0.0156	-0.0081	0.0565	4458
Credit info	4.7047	1.1700	3	6	4169
Stock traded	0.3243	0.3005	0.0099	0.9463	3930

Notes: Definitions and sources of the variables are reported in Table 1.

Related to the method, to assess how financial constraints affect the use of leasing by firms, we estimate the following model using logistic regressions:

$$L_i = \alpha_0 + \beta_1 FC_i + \beta_2 CSC_i + \beta_3 FSC_i + \varepsilon_i \quad (1)$$

Where i represents the i^{th} observation; L_i is a dummy variable that represents the use of leasing for each firm; FC_i represents the group of variables that measure the existence of financial constraints; CSC_i represents the set of variables that control for country-specific characteristics; FSC_i represents the group of variables that measure the characteristics of each firm, and ε_i is the residual.

3.2 Dependent Variable

We create our *leasing* dummy dependent variable using the answers of the surveyed firm's managers. When they state that leasing has been used as a source of financing, the variable *leasing* equals one and zero otherwise.

Next, in Table 4, we look at the use of leasing in terms of size and age of the firm. Panel A shows that 73.38% of medium-sized firms use leasing as a source of financing, while this percentage falls to 65.26% for small firms and 46.78% for micro firms. Therefore, there seems to be a positive association between firm size and the leasing as a source of financing. Regarding the use of leasing by groups created according to the age of the firm, panel B shows that the percentage of firms using leasing remains around 56% for all groups.

Table 4 Overview of the Use of Leasing by Firm Size and Age

Panel A. Use of leasing by firm size		
<i>Number of employees</i>	<i>Observations</i>	<i>Leasing (%)</i>
0-9	2437 (55.07%)	46.78
10-49	1278 (28.88%)	65.26
50-249	710 (16.05%)	73.38
Total	4425 (100%)	56.38
Panel B. Use of leasing by firm age		
<i>Age</i>	<i>Observations</i>	<i>Leasing (%)</i>
Less than 2	307 (6.96%)	55.37
From 2 to 10	1208 (27.40%)	56.87
More than 10	2894 (65.64%)	56.43
Total	4409 (100%)	56.48

3.3 Independent Variables

Financial constraint variables. According to our hypothesis, the use of leasing should be more likely in firms which are more credit constrained. Therefore, this section explains the measures that we create, using the answers from the survey, in order to assess differences in the level of financial constraints across our firms.

First, we create the dummy variable *assure*, which takes the value one when the manager of the firm states that difficult access to means of financing is the element that would hamper the development of the company, and zero otherwise. Second, we define the dummy variable *allow*, which takes the value one when the current financing situation of the company is not healthy enough to see its projects through, and zero otherwise. Third, we add the variable *access*, which ranges from one (very easy) to four (very difficult), to reflect the accessibility of a firm to reach a bank loan. Forth, we build the variable *conclude* to reflect the opinion of the firm as to whether its projects cannot be successfully concluded without a loan from the bank. This variable ranges from one (totally disagree) to four (totally agree). Finally, we include the variable *internally* that ranges from one (yes, absolutely) if the management of the firm can meet their financial needs internally to four (no, not at all) if they are not able to do so. Therefore, higher values in all these variables denote more financial constraints and, according to our first hypothesis, we should expect a positive sign.

Country-specific variables. Next, we take into account the existence of cross-country heterogeneity in the use of leasing by including several variables which define the institutional environment of the country where the firms operate. We control for

the economic, financial, and institutional environment of the country using the variables *GDP per capita*, *GDP growth*, *inflation*, *stock traded*, and *credit info*.

To proxy for the economic environment, we create the variables *GDP per capita*, *GDP growth* and *inflation*. *GDP per capita* equals the natural logarithm of GDP in current prices in U.S. dollars divided by the population in 2003. *GDP growth* is a variable that represents the growth of the economy and it is computed as the increase in GDP in current prices in U.S. dollars between 2002 and 2003. Evidence provided by Beck et al. (2008) shows a positive association between the use of leasing and economic development. Countries with economies which present higher levels of development or higher rates of growth might offer more investment opportunities to their firms. These firms might be more in need of financing in order to take advantage of these possibilities and as a consequence, the use of leasing as a source of financing might help to fill these needs. Therefore, we expect greater use of leasing by firms located in developed and growing countries.

We build the variable *inflation*, measured by the annual growth rate of the GDP implicit deflator which shows the rate of price changes in the economy as a whole in 2003. The GDP implicit deflator is the ratio of GDP in current local currency to GDP in constant local currency. Beck et al. (2008) show that in general, firms operating in environments with a higher ratio of inflation rely less on external financing. However, when analysing each source of external financing in detail, their results point to greater use of leasing as inflation increases. Therefore, we could expect either a positive or a negative association between the use of leasing and the level of inflation.

To proxy for the development of the financial system in a country, we create the variable *stock traded*. This variable is built using the value of stock traded as a percentage of GDP in 2003. Evidence provided by Beck et al. (2008) show a positive association between the use of leasing and higher levels of stock market development. They suggest that lessors might have better access to adequate funding for their loans in countries with a larger stock market. Therefore, we can expect that SMEs operating in countries with higher levels of stock traded are more likely to use leasing.

Finally, to shed additional light on the use of leasing, we include the variable *credit info* to control for the institutional environment of a country. This variable measures the rules and practices affecting the coverage, scope and accessibility of credit information available through either a public credit registry or a private credit bureau in 2003. The *credit info* variable is computed as an index which ranges from zero to six, with higher values indicating higher development of the information structure of a country. Existing empirical evidence shows that greater information sharing mechanisms alleviate the moral hazard and adverse selection problems which are especially important for young firms and SMEs (Jappelli and Pagano, 2002; Love and Mylenko, 2003; Chavis et al., 2011). Therefore, we expect that the likelihood of using leasing by firms is higher in countries with sound credit information structures.

Table 5 reports the scores for the use of leasing and country-specific variables by country. The use of leasing shows a considerable heterogeneity across the countries in our sample. Czech Republic, Germany and Slovak Republic show the highest use of leasing, whereas Belgium, Greece and Luxembourg show the lowest scores. At first sight, it is not possible to establish a pattern on how country variables influence the use of leasing. This imply that deeper analyses are necessary in order to evaluate what country-specific characteristics might play an important role in the decision to lease.

We can also appreciate the existence of important variations in the level of development across countries. For example, the highest GDP per capita (in Luxembourg 65,325) is more than thirteen times bigger than the smallest one (in Latvia 4,775). The GDP per capita of the Slovak Republic is growing (0.36) more than two times faster than the economy of the United Kingdom (0.1587), and Slovenia scores the highest inflation rate (0.0565) whereas Lithuania shows a deflation rate (-0.0081). Regarding financial system development, Table 5 shows that the largest stock market as a percentage of the GDP corresponds to the Netherlands (0.9463), whereas the least developed stock market corresponds to Malta, which shows the lowest ratio (0.0099). Finally, we can observe that most of the EU 10 countries in our sample show the lowest scores in the variable *credit info*, indicating a modest development of their information structures.

Table 5 Overview of the Use of Leasing and Country-Specific Variables

Country	Leasing (%)	GDP per capita	GDP growth	Inflation	Stock traded	Credit info
Austria	68.21	31218	0.2235	0.0131	0.0474	5
Belgium	37.50	30251	0.2329	0.0196	0.1335	6
Cyprus	53.49	18256	0.2601	0.0517		
Czech Republic	75.73	9343	0.2151	0.0109		5
Denmark	52.24	39488	0.2228	0.0148	0.2040	3
Estonia	68.93	7282	0.3442	0.0429	0.0574	5
Finland	43.04	31522	0.2150	0.0021	0.8416	4
France	56.42	28917	0.2342	0.0187	0.5991	3
Germany	76.21	29384	0.2078	0.0121	0.4193	6
Greece	36.73	17356	0.3203	0.0345	0.1682	4
Hungary	49.32	8243	0.2584	0.0546	0.1046	3
Ireland	59.60	39631	0.2904	0.0327	0.0375	5
Italy	53.54	26172	0.2360	0.0318	0.5456	6
Latvia	46.96	4775	0.2083	0.0490	0.0124	4
Lithuania	41.84	5424	0.3133	-0.0081	0.0105	3
Luxembourg	26.80	65325	0.2913	0.0304	0.0101	
Malta	63.73	12648	0.1917	0.0353	0.0099	
The Netherlands	50.26	33356	0.2295	0.0217	0.9463	5
Poland	56.70	5676	0.0940	0.0077	0.0361	5
Portugal	47.96	15472	0.2240	0.0344	0.1454	5
Slovak Republic	80.37	6151	0.3600	0.0535	0.0142	3
Slovenia	51.72	14617	0.2600	0.0565	0.0168	3
Spain	59.86	21023	0.2877	0.0392	0.6876	6
Sweden	65.65	35221	0.2540	0.0176		4
United Kingdom	48.98	31134	0.1587	0.0273	0.6593	6

Notes: Definitions and sources of the variables are provided in Table 1

Firm-specific variables. Next in this section, we describe those variables aimed at controlling for firm heterogeneity.

Following the EU recommendation 2003/361, we create three dummy variables to classify firms in our sample into *micro*, *small* and *medium* sized if their number of employees is less than 10, between 10 and 49, and between 50 and 249 respectively. Empirical results in the existing literature do not show clear evidence about the use of leasing across firms of different sizes. On the one hand, Chavis et al. (2011) show that micro and small firms are less likely to use leasing than medium-sized and large firms, and Beattie et al. (2000) show that medium-sized firms are the most common users of leasing because they need more financing in order to grow³. On the other hand, several

³ Beattie et al. (2000) analyse a sample of 300 listed companies.

studies show the contrary association. Results provided by Cosci et al. (2013) and Neuberger and R athke-D oppner (2013) show that small firms are, compared to larger companies, more likely to experience credit rationing and use leasing. Sharpe and Nguyen (1995) and Lasfer and Levis (1998) find that small firms use more leasing than large firms.⁴ Sharpe and Nguyen (1995) argue that leasing is the first external financing option according to the Pecking Order Theory when informational asymmetries are important, which existing literature suggests is usually the case of most SMEs. Therefore, we could expect that the use of leasing either increases or decreases with the size of the firm.

We use the categorical variable *age*, which ranges from one to six, to allow for differences in the use of leasing among firms that have been in operation less than two years and more than 30 years, respectively. According to Cosci et al. (2013) and Neuberger and R athke-D oppner (2013), we could expect that younger firms are more in need of obtaining financing and therefore, more likely to use leasing.

Existing literature suggests that firms operating in sectors that require an investment in specialized assets make a lower use of lease financing than firms with assets which are more easily redeployable by the lessor (Krishnan and Moyer, 1994; Lasfer and Levis, 1998; Beattie et al., 2000). We control for these industry differences creating seven industry dummies which, for sake of conciseness, will not be displayed and discussed in the results section.⁵

To proxy for differences in firm growth, we include a dummy variable, *growth*, that equals one if the firm has increased the number of employees since the last year and zero otherwise. Cosci et al. (2013) find that Italian SMEs with a higher growth rate use more leasing, because they do not have a solid position in the market and they are perceived as riskier. Barclay and Smith (1995) and Lin et al. (2013) find that overall use fixed-claim obligations, both borrowing and lease financing, decreases in response to the existence of growth opportunities in order to mitigate conflicts of interest between debtholders and stockholder. However, while firms with more growth options use less debt, they also show that a higher fraction of fixed-claim obligations is allocated to leasing and less to borrowing. This argument is at the core of the positive association between growth opportunities and the likelihood of using leasing reported by Krishnan and Moyer (1994) in Belgian, and Deloof et al. (2007) in the US. Therefore, we could expect a positive sign on the coefficient for the variable *growth*.

We define the dummy variable *foreign*, which equals one if the ownership of the company exclusively belongs to international investors, and zero otherwise. According to Beck et al. (2006), firms with foreign ownership should have fewer problems accessing lease financing. In contrast, Beck et al. (2008) show that the share of assets funded with lease capital decreases for foreign-owned firms and Chavis et al. (2011) find a negative association in the use of leasing in firms with foreign ownership. Therefore, the variable *foreign* could appear with both signs in our regressions.

In addition, we build a dummy variable, *subsidies*, that equals one for those SMEs that have already made use of public subsidies for its activities, and zero

⁴ Lasfer and Levis (1998) use a sample of quoted and unquoted companies.

⁵ The seven industry classifications made in the survey are: extraction or production of raw materials, construction or civil engineering, production and manufacturing of goods, trade and distribution, transport, business services and, other services to consumers.

otherwise. Demirgüç-Kunt and Maksimovic (1998) provide the only piece of related evidence and show that the share of companies using external financing does not increase after receiving government subsidies. As a consequence, there is not a clear sign that could be expected for the variable *subsidies* in our regressions.

We understand that there could be alternative ways of measuring our firm-specific variables, or even that could have included more firm-specific characteristics. Unfortunately, we are limited by the data provided by the survey, and we cannot define another variable for any other firm characteristic or add additional firm-specific factors.

4. Results

In Table 6, first column, we analyse the effect of firm-specific characteristics and country-specific characteristics on the use of leasing, while controlling for country and industry effects.⁶ The negative coefficients on the variables *micro* and *small* show that the smallest firms in our sample have a lower likelihood of using leasing than medium-sized firms. This confirms previous results provided by Beattie et al. (2000) and Chavis et al. (2011). According to Beattie et al. (2000), medium-sized firms use leasing more commonly because they are growing and therefore, they are more in need of financing. We also find a negative coefficient on the variable *age*. This indicates that the likelihood of using leasing is lower for older firms which confirms the results provided by Cosci et al. (2013). This might be because firms with an extended credit history prefer to rely more on alternative sources of financing (Chavis et al., 2011).

Consistent with previous evidence (Krishnan and Moyer, 1994; Lasfer and Levis, 1998; Deloof et al., 2007; Cosci et al., 2013) and our prediction, the results indicate that firms with positive growth have a higher likelihood of using leasing.⁷ We also report a positive and statistically significant association between the foreign ownership of firms and the likelihood of using leasing, supporting previous evidence in Beck et al. (2008) and Chavis et al. (2011). We also find that firms receiving subsidies are more likely to use leasing, as indicated by the positive and statistically significant (at the 1% level) coefficient for the variable *subsidies*. Finally, we observe that the country fixed effects are statistically significant, confirming the role that institutional differences play in the deployment and use of lease financing in European SMEs.

Regarding country-specific variables, we find positive and statistically significant coefficients for the variables *GDP per capita*, *GDP growth* and *stock traded*. As we predict, and in line with previous evidence (Beck et al., 2008), firms in wealthy, faster-growing economies and with a developed stock market have more probabilities to fill their financial needs with leasing.⁸ The results also show a positive

⁶ Country and industry effects are included in all regressions, but not reported to save space and for ease of exposition. These variables are available upon request.

⁷ As a robustness check, we use the firm's turnover to measure the growth with a dummy variable that takes the value one when the firm's turnover has increased since last year and zero otherwise. The coefficient for this variable is positive and statistically significant at 1% level in all regressions. The remaining results remain qualitatively the same confirming our conclusions.

⁸ As a robustness check, we include the variable *private credit*, measured as the ratio of bank credit to the private sector as percentage of GDP, as an additional measure to control for financial sector development.

and statistically significant coefficient (at 1% level) for the variable *credit info*, showing that firms in countries with higher levels of information infrastructures are more likely to use leasing than firms in countries with weaker systems.

In addition, Table 6 includes five regressions adding each one of the financial restrictions variables, while controlling for firm and country-specific characteristics. These models allow us to assess whether financially constrained SMEs are more likely to use leasing. We remember that higher values for the variables *assure*, *allow*, *access*, *conclude*, and *internally* indicate the existence of higher levels of financial constraints in the firm. We show how all the financial constraint variables display a positive, and statistically significant, association with the variable leasing. This indicates that those SMEs having more problems to fund their activity are more likely to use leasing. Regarding the effect of firm and country-specific characteristics on the use of leasing, results remain qualitatively the same after controlling for the existence of financial constraints in the firm. In order to shed additional light on how financial restrictions affect the use of leasing, we analyse the economic impact of our results in Table 7. We do so by comparing the effect on the dependent variable of changes in the financial constraint variables when each one goes from its lowest value (column “Low financial obstacles”) to its highest value (column “High financial obstacles”). This comparison (included in column “Economic impact”) shows changes in the likelihood of using lease financing following changes from zero to one in the variables *assure* and *allow*, and changes from one to four in the variables *access*, *internally* and *conclude*. Therefore, the economic impact reflects the difference in the likelihood of using leasing between highly constrained firms and those with a healthier financial situation. Inspection of Table 7 reveals that, for example, the variable *internally* causes the highest increase in the likelihood of using leasing. The probability of using leasing is 51.68% for firms whose financial needs can be met internally, whereas this likelihood rises to 68.27% for those firms with a less healthy financial situation. However, looking at the variable *allow*, we observe that the likelihood of using leasing only increases by 4.32% for firms with a financing situation which is not sufficient to see its projects through, compared to those firms with a less restricted financial situation. These results suggest that having five different measures is important in order to obtain a better picture of the association between the existence of financial obstacles and the use of leasing. This large variation in economic impact could explain the lack of statistically significant results in previous studies.

We have to notice that the inclusion of the variable *private credit* in our regressions forces us to drop the variable *GDP per capita* because both variables are highly correlated (0.77). The new results (available upon request) show a positive and statistically significant coefficient for the variable *private credit*. This indicates that firms in countries with a larger banking system are more likely to use leasing. However, we also observe that our main results remain qualitatively the same in these new regressions. Therefore, we choose to keep our original results, because we strongly believe that it is more appropriate to control for the level of country’s economic development while at the same time controlling for supply characteristics with the variable *stock trade*, than omitting the variable *GDP per capita* in order to include the variable *private credit*.

Table 6 Logistic Regressions of the Use of Leasing on Financial Constraint and Firm and Country-Specific Variables

	Logit (1)	Logit (2)	Logit (3)	Logit (4)	Logit (5)	Logit (6)
Constant	-32.1136*** (6.6333)	-31.3074*** (6.6840)	-31.6549*** (6.7218)	-31.4774*** (6.9893)	-33.1949*** (6.8322)	-33.2412*** (6.6973)
<i>Financial constraints variables:</i>						
Assure		0.5591*** (0.1080)				
Allow			0.1976** (0.0945)			
Access				0.0923* (0.0486)		
Conclude					0.1805*** (0.0326)	
Internally						0.2601*** (0.0487)
<i>Country-specific variables:</i>						
GDP per capita	1.6915*** (0.4194)	1.6548*** (0.4236)	1.6993*** (0.4256)	1.6736*** (0.4422)	1.6982*** (0.4284)	1.7484*** (0.4241)
GDP growth	27.6137*** (5.1323)	26.7061*** (5.1634)	26.8491*** (5.1826)	26.5645*** (5.4042)	28.6490*** (5.3260)	28.1111*** (5.1699)
Inflation	3.1552 (3.9155)	2.2731 (3.9709)	2.1374 (4.0102)	2.4778 (4.1089)	2.7308 (3.9921)	3.6086 (3.9644)
Credit info	3.0910*** (0.5691)	2.9669*** (0.5757)	2.9824*** (0.5757)	2.9694*** (0.5994)	3.1776*** (0.5900)	3.0864*** (0.5734)
Stock traded	9.1753*** (3.1823)	8.6366*** (3.2184)	9.3385*** (3.2184)	8.4733** (3.4009)	11.2597*** (3.2672)	10.2182*** (3.2239)
<i>Firm-specific variables:</i>						
Micro	-1.0870*** (0.1150)	-1.0759*** (0.1191)	-1.0951*** (0.1168)	-1.0867*** (0.1211)	-1.1069*** (0.1181)	-1.1035*** (0.1165)
Small	-0.2959** (0.1192)	-0.2953** (0.1231)	-0.3148*** (0.1206)	-0.3347*** (0.1255)	-0.3368*** (0.1221)	-0.3138*** (0.1203)
Age	-0.0687** (0.0297)	-0.0571* (0.0312)	-0.0609* (0.0303)	-0.0359 (0.0312)	-0.0577* (0.0304)	-0.0630** (0.0301)
Growth	0.3295*** (0.0885)	0.3450*** (0.0919)	0.3369*** (0.0906)	0.3169*** (0.0936)	0.3192*** (0.0910)	0.3301*** (0.0904)
Foreign	0.4932** (0.2123)	0.4397** (0.2178)	0.5175** (0.2128)	0.4575** (0.2271)	0.5171** (0.2146)	0.5486*** (0.2141)
Subsides	0.3616*** (0.0987)	0.2935*** (0.1019)	0.3461*** (0.0995)	0.3229*** (0.1030)	0.3192*** (0.1007)	0.3488*** (0.0998)
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes
Country effects	Yes***	Yes***	Yes***	Yes***	Yes***	Yes***
Observations	3616	3346	3535	3286	3505	3539
Pseudo-R-square	0.0843	0.0860	0.0836	0.0814	0.0913	0.0883

Notes: The dependent variable is *leasing*. All specifications include industry and country fixed effects. Definitions and sources of the variables are reported in Table 1. ***, ** * denote significance at the levels of 1%, 5%, and 10%, respectively and the standard errors are in brackets. Cyprus, Czech Republic, Luxembourg, Malta and Sweden are excluded from the regressions because of missing values of the variables *credit info* and *stock trade*.

Table 7 Economic Impact of Financial Constraint Variables

<i>Variables</i>	<i>Leasing (%)</i>		<i>Economic impact (%)</i>
	<i>Low financial obstacles</i>	<i>High financial obstacles</i>	
Assure	54.62	66.54	11.92
Allow	55.13	59.45	4.32
Access	54.27	60.33	6.06
Conclude	50.27	62.10	11.83
Internally	51.68	68.27	16.59

Notes: Definitions and sources of the variables are reported in Table 1

4.1 Additional Analyses

We recognize that we do not have ideal measures to analyse firms' financial restrictions because of data limitations. However, in order to make a richer analysis, in this subsection, we include one more variable to measure firm's financial restrictions using the best approximation to an objective measure that the survey can offer. This new variable, named *debt worsening*, is a dummy variable that takes the value one if the firm has stated that its level of debt has deteriorated since last year and zero otherwise. In Table 8, column 1, we find that the coefficient on the variable *debt worsening* is positive and statistically significant at the 1% level, confirming previous results and the hypothesis of our study. The remaining results remain qualitatively the same. Therefore, our results strongly support that leasing can act as alternative funding to complement the financing needs of SMEs whose access to traditional sources of financing is restricted.

We extend our analyses including two additional models to assess whether the effect of financial constraints on the use of leasing varies with firm size or with the level of economic development where the firm operates. Previous literature has shown that smaller firms are more opaque and have financial behaviour and constraints which are different from larger firms (Berger and Udell, 2006), while countries with higher levels of economic development are more financially developed and they usually have better institutions, which translate in reduced risk and increased access to financing for SMEs (Levine et al., 2000; Claessens and Laeven, 2004). Therefore, we have carried out additional analyses to assess the effect of financial constraints on the use of leasing for micro firms and for firms operating in developed countries.⁹

Firstly, we have introduced interaction terms of our financial restriction variables with the dummy variable *micro* and run all regressions in Table 6 again. Table 8, column 2, shows a positive coefficient on the variable *internally*, whereas its interaction term shows a negative coefficient (both results are statistically significant), while our main results remain qualitatively the same. This means that micro firms are less likely than small and medium-sized firms to use leasing when their financing needs are not met internally. Therefore, the smaller firms are, the less likely they are to complement internal financing with leasing. Lack of internally generated resources can reduce the willingness and feasibility with which lease financing can be offered to micro firms.

Secondly, we have introduced interaction terms of our financial restriction variables with a dummy variable, named *GDPcap_dummy*, that takes the value one if

⁹ For sake of conciseness and simplicity, Table 8 only includes those new results which are statistically significant. The remaining results are available upon request.

the firm operates in a country with a GDP per capita above the sample mean and zero otherwise. Table 8, column 3, shows a positive and statistically significant coefficient on the interaction term *assure***GDPcap_dummy*. Therefore, SMEs stating that difficult access to means of financing would hamper the development of the company are more likely to resort to leasing when they operate in richer than in poorer countries. This probably suggests that SMEs operating in more developed economies find easier to access lease financing to develop their business when the access to financing is rather difficult.

Table 8 Logistic Regressions of the Use of Leasing on Financial Constraint and Firm and Country-Specific Variables

	<i>Logit (1)</i>	<i>Logit (2)</i>	<i>Logit (3)</i>
Constant	-26.3298*** (7.0601)	-33.7291*** (6.7144)	-51.6475*** (11.5064)
<i>Financial constraints variables:</i>			
Assure			0.2618* (0.1539)
Assure*GDPcap_dummy			0.5680*** (0.2147)
Internally		0.3714*** (0.0782)	
Internally*Micro		-0.1787* (0.0967)	
Debt worsening	0.3750*** (0.1059)		
<i>Country-specific variables:</i>			
GDP per capita	1.3595*** (0.4490)	1.7686*** (0.4252)	
GDPcap_dummy			44.4891*** (10.8287)
GDP growth	23.2173*** (5.4524)	28.2899*** (5.1736)	14.1388*** (3.3639)
Inflation	4.5047 (4.1860)	3.7233 (3.9793)	11.2895*** (3.8713)
Credit info	2.5968*** (0.6039)	3.1079*** (0.5741)	0.7958** (0.3585)
Stock traded	6.0232* (3.3992)	10.3608*** (3.2289)	68.7129*** (17.2592)
<i>Firm-specific variables:</i>			
Micro	-1.0856*** (0.1199)	-0.8065*** (0.1979)	-1.0786*** (0.1193)
Small	-0.2917** (0.1240)	-0.3199*** (0.1208)	-0.2927** (0.1233)
Age	-0.0715** (0.0311)	-0.0637** (0.0302)	-0.0581* (0.0312)
Growth	0.2752*** (0.0934)	0.3410*** (0.0906)	0.3431*** (0.0921)
Foreign	0.6675*** (0.2282)	0.5583*** (0.2142)	0.4466** (0.2181)
Subsides	0.3482*** (0.1019)	0.3489*** (0.1000)	0.2907*** (0.1020)
Industry effects	Yes	Yes	Yes
Country effects	Yes***	Yes***	Yes***
Observations	3342	3539	3348
Pseudo-R-square	0.0854	0.0891	0.0875

Notes: The dependent variable is *leasing*. All specifications include industry and country fixed effects. Definitions and sources of the variables are reported in Table 1. ***, **, * denote significance at the levels of 1%, 5%, and 10%, respectively and the standard errors are in brackets. Cyprus, Czech Republic, Luxembourg, Malta and Sweden are excluded from the regressions because of missing values of the variables *credit info* and *stock trade*.

5. Conclusions

The aim of this paper is to evaluate whether the use of leasing increases for constrained SMEs while controlling for firm, bank and country-specific characteristics using a sample of 4,583 firms operating in 25 European countries. Traditional wisdom states that SMEs are financially constrained because they are perceived as riskier than large companies due to their opaqueness and the lower quality of their financial statements, the lack of an extended credit history or the absence of collateral. However, leasing might be an alternative for constrained SMEs because it does not have additional collateral requirements. Moreover, leasing reduces the risk for the lender because facilitates the repossession of the asset and places the leased asset, rather than the quality of the borrower, as a primary source of repayment.

The evidence we provide in this paper, confirming our hypothesis, indicates that constrained SMEs use leasing as an alternative source of financing. The likelihood of using leasing increases when the development of the company is being hampered by a lack of capital financing, when the financing situation prevents the company from carrying out their projects, when the access to bank loans is difficult, when the projects cannot be successfully concluded without a loan from the bank, or when the financing needs of the firm are not met internally. Due to the international dimension of this paper, our results also show that country-specific characteristics are important in explaining differences in the use of lease financing in SMEs. The evidence shows that, on the whole, SMEs operating in countries with sound and growing economics and with developed stock markets and information structures are more likely to use leasing.

The above results are important in light of the accounting changes introduced by the IFRS 16 Leases (IFRS 16) that becomes effective beginning on or after January 2019. In a qualitative survey-based study, the European Financial Reporting Advisory Group (EFRAG, 2017) finds two main potential negative effects of IFRS 16 on SMEs. Firstly, 19 out of 22 respondents recognize that SMEs experience greater challenges than larger entities in implementing any significant accounting change. Secondly, three respondents think that the application of the IFRS 16 would be disproportionately complex and costly for limited benefits and may result in some European SMEs being at a competitive disadvantage.

Our study makes several important contributions to academics, managers, and policy makers. First, this paper contributes to the existing financial literature by conducting an empirical study on the relation between the use of leasing and the existence of financial constraints for European SMEs. Second, our paper can help firm managers to better understand the advantages of lease financing that make it a good alternative source financing, and it shows managers how the existence of financial constraints triggers the use of leasing in SMEs. From a policy perspective, policy makers might recognize the significant role that leasing plays in the financing of constrained SMEs, specially, taking into account the proposals included in the finalization of Basel III regulations. As Leaseurope recognizes, Basel III overestimates the real risks of leasing exposures which implies that leasing is penalized by the current regulatory framework increasing the capital requirements for this form of financing. This could disincentive banks from offering leasing which would damage even more

the financing of SMEs.¹⁰ An appropriate regulation on leasing would most likely result in financially healthier SMEs that could pursue their growing ambitions and positively contribute to job and GDP creation.

¹⁰ Information available at: <https://nvl-lease.nl/wp-content/uploads/2018/11/Leaseurope-Leaflet-Prudential-Treatment-of-Leasing-Proposal.pdf>

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