Late payments to SMEs - A factor that affects their access to finance

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Abstract

Late payments pose a significant threat to European SMEs' financial resilience with significant consequences for the European economy. Using unique firm-level survey data on SME financing conditions, this paper focuses on the negative impacts of late payments to SMEs on their access to finance. We show that SMEs that face late payments regularly or occasionally are around 7% more likely to face access to finance problems. The effect is more prominent among core euro area countries. Furthermore, our results show that late payments to SMEs also give rise to credit rationing. Banks tighten price terms and conditions of loans to those SMEs that face late payments, too. Overall, our results have important policy implications for designing suitable policy measures to mitigate SME liquidity shortages due to late payments.

Jel Codes: G32, G33, G2, M1
Keywords: Late payments, SMEs, Access to Finance

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I. Introduction

Many of the businesses suffer from delays in receiving their payments. Although late payment to firms is a common problem across all firm sizes, it is much more prevalent among small and medium-sized enterprises (SMEs) in Europe (EC (2011)). Each year, thousands of SMEs struggle with late payments from large firms, the public sector, and nonprofit organizations, leaving the backbone of the EU's economy saddled with unpaid invoices. Late payments exacerbate the liquidity needs of SMEs, especially during challenging business conditions, lead to over-indebtedness and translate into SME failures (ECB (2020)). Considering that SMEs in Europe employs around 100 million people and account for more than half of Europe's GDP, late payments to SMEs lead to job losses or bankruptcies with impacts well beyond the boundaries of single SMEs. Against this background, late payments to SMEs is of central importance for policymakers and market participants alike.

Various negative spillovers have been identified, from late payments to SMEs to their financial positions to date. Late payments have been shown to have a detrimental impact on SMEs' cash flow in the literature (Peel, Wilson, and Howorth (2000); Tauringana and Afrifa (2013)). They have often resulted in SMEs experiencing liquidity shortages (ECRI (2010)) or incurring additional interest expenses (Intrum (2019)). SMEs have been demonstrated to experience more late payments (Paul and Boden (2011)) and to depend on short-term finance sources more often (Walker and Petty (1978)), too. However, there is a paucity of literature on the effect of late payments on SMEs' access to financing. Indeed, the combined impact of liquidity shortages and overreliance on short-term funding often make it difficult for SMEs to pay debtors or suppliers on time anyways. In addition to this, SMEs experiencing late payments hinder their ability to timely pay their debts due to a lack of cash. Meanwhile, SMEs' creditworthiness suffers the consequences of their poor liquidity positions. When combined with SMEs' lack of administrative resources to provide adequate documentation regarding their creditworthiness and their inability to come up with high-quality collateral (Gvetadze, Kraemer-Eis, Lang, Prencipe, Signore, and Torfs (2018)), late payments to SMEs cause access to financing issues.

Using micro-level survey data on European SMEs, we study the detrimental drawbacks from late payments to SMEs' to their access to funding in this paper.[1] To be specific, we utilize a large EU-wide Survey on Access to Finances (SAFE) data provided by the European Central Bank (ECB) and focus on SMEs from eleven euro area countries. The standardized questionnaire responses allow us to evaluate the SMEs' perceptions regarding their various characteristics, including late payments and address a lack of harmonization in balance sheet definitions across European countries. To be specific, in addition to general information on the type and situation of the SMEs, their financing, availability of finance, and market conditions, the SAFE questionnaire has included a question concerning SMEs experiencing late payments since 2019. Using this variable, we test three hypotheses. First, we examine whether late payments cause SMEs to have access to finance problems. Second, we test if banks limit lending to SMEs due to late payments to them. Third, we investigate whether late payments to SMEs affect the terms and conditions of bank loans.

Our results indicate that late payments cause a surge in SMEs, citing access to finance as the most significant problem. Specifically, SMEs experiencing regular late payments from private or public entities are 7% more likely to report access to funding problems. This result is robust to the inclusion of a rich set of firm-specific controls, balance sheet indicators, macro indicators as well as country-specific fixed effects. We focus on the impact of late payments to SMEs in country sub-samples. The results show significant cross-country variation on this front, with the most significant drawbacks from late payments observed in the larger euro area countries. We next look at access to bank lending issues in connection with late payments as a further step. Our results reveal that late payments to SMEs are associated with a 3 % higher risk of credit constraint for SMEs. Finally, we show that late payments to SMEs harm bank loan terms. For example, SMEs that have late payments are 7% percent and 10% more likely to have higher interest rates and other charges, respectively. In addition, late payments to SMEs result in a reduction in the size of loans available to them and, in general, a shorter maturity horizon.

[1]For a meta-analysis of the literature based on the SAFE survey and its use in various papers, see Martinez, Guercio, and Bariviera (2020).

Our results have important policy implications. First and foremost, payment delays to SMEs create a liquidity squeeze and threaten their survival. Taken together with SMEs' smaller reserves and higher reliance on steady cash, late payments place even greater pressure on European SMEs' liquidity positions. The Covid crisis and associated lockdowns that restricted European SMEs' cash flows probably intensified the problem further. These might lead to a wave of insolvencies, stymie European SMEs' growth, and result in job losses. Moreover, severe spillover effects to other parts of the economies are inevitable in the future. For example, SMEs might default on loans weighing on banks' balance sheets and thus negative transmissions into the banking sector. Employee layoffs might curb consumption, and the cancellation of projects might drag growth further down. During these episodes of economic turmoils, sustained access to finance and, most importantly, to bank lending is of pivotal importance for SMEs. To guarantee so, policymakers might revisit the "Late Payment Directive" of the EU to develop even more targeted policy measures.

The remainder of the paper proceeds as follows. Section 2 provides a literature review and hypothesis development. Section 3 introduces the data and methodology. In Section 4, we present the empirical results of our analysis and section 5 concludes the paper.

II. Literature review and hypothesis development

SMEs account for most businesses worldwide and play a central role in value-added, employment, job creation, and recovery from crisis periods. Therefore, policymakers and market participants devote particular attention to SMEs' viability and financial resilience. In the eyes of observers, SMEs' financial flexibility and their cash flow are strongly interlinked (Grablowsky (1984), and Banos-Caballero, Garcia-Teruel, and Martinez-Solano (2012)). Indeed, SMEs can reduce their dependence on external funding by efficiently managing their potential lack of cash flows. Against this background, impact of working capital on individual SMEs' profitability (Deloof (2003); Garcia-Teruel and Martinez-Solano (2007)), investment decisions (Ding, Guariglia, and Knight (2013) and Guariglia,

Liu, and Song (2011)), or company value (Almeida and Eid (2014)) etc. have been examined intensively to date.

Among different elements of SMEs cash flows, trade receivables are central in cash conversion cycles. For example, Giannetti (2003) documents that a quarter of the total assets of European companies is invested in trade receivables. Moreover, the amount is even higher if European SMEs are considered (Garcia-Teruel and Martinez-Solano (2010)). Therefore, late payments to SMEs might lead to cash flow holes and force SMEs to draw on their reserves by reducing cash and bank balances or lead to delay in their trade payables.

The negative spillovers from late payments to SMEs' cash flows have been broadly documented in the literature (Peel et al. (2000); Tauringana and Afrifa (2013)). Notwithstanding, the literature on the potential impact of late payments on SME financing is limited. Connell (2014) study the economic effects of late payments and show that late payments have a detrimental impact on the business environment and exacerbate the burden of financially constrained firms. Nicolas (2021) documents that late payments increase SMEs' working capital needs. He argues that in order to deal with short-term financial frictions, strengthening the protection of SMEs against late payments is necessary. EC (2015) meanwhile states that SMEs are disproportionately affected by late payments as they usually do not have access to finance to cover temporary shortfalls. Moreover, even if short-term funding is available to SMEs - it is generally offered at unfavorable rates. Taken together, late payments to SMEs and their financing require a closer look.

A. Access to finance

The SAFE survey lists external financing alternatives for SMEs as bank loans, trade credit, equity, debt securities, or other potential external financing options. In general, SMEs' access to funding alternatives suffers from market imperfections that stem from information asymmetries, SMEs' insufficient collateral, and their small funding needs at cases. Nevertheless, the literature documents that the sustained availability of exter-

nal financing alternatives is of pivotal importance with repercussions well beyond the boundaries of single SMEs (Casey and O'Toole (2014), and Bongini, Ferrando, Rossi, and Rossolini (2021)). Even more, access to finance problems usually intensifies during crisis periods which makes the external financing of SMEs particularly important during these periods (Ozturk and Mrkaic (2014)).

SMEs however are not scaled-down versions of large firms, and their access to finance trends are usually unique (Cressy and Christer (1997); Moritz, Block, and Heinz (2016)). For example, an overwhelmingly large share of SMEs are micro firms, and the ownership structure of these firms affects their financing (Chittenden, Hall, and Hutchinson (1996); Michaelas, Chittenden, and Poutziouris (1999)). Unlike large firms, micro-firm funding typically relies on owners' cash, bank deposits, or collateral. Late payments to micro firms cutting down these sources might thereby disproportionately impact micro firms. Indeed, SMEs are, by virtue of their size, generally exposed to greater risk of late payments. For example, smaller firms are reported to experience the longest payment delays (Pike and Cheng (2001)) with significant cross country differences in terms of receivables and payment delays (Garcia-Teruel and Martinez-Solano (2010)). All these might translate into constraints in access to finance of SMEs that face late payments. Against this background, we test the following hypothesis:

H1: Late Payments negatively impact SMEs access to finance

B. Credit rationing

SMEs' access to alternative financing sources is often more constrained than large firms (Beck and Demirguc-Kunt (2006)). For example, European SMEs' access to external equity financing, such as private equity, is almost negligible, and European SMEs rely by and large on bank lending. Specifically, only 1% of European SMEs report to receive venture capital or business angel financing in 2020 in the SAFE survey. This makes SMEs more dependent on bank lending and access to bank loans particularly relevant (Berger and Udell (1998), and Berger and Udell (1995)). Yet, Duygan-Bump, Levkov, and

Montoriol-Garriga (2015) show that banks tend to reduce lending to small and opaque companies first in response to balance sheet constraints. Even more, among different challenges that the SMEs face, access to bank lending is named by SMEs as the most significant one (Carbo-Valverde, Rodriguez-Fernandez, and Udell (2016), and Duygan-Bump et al. (2015)).

Banks usually find it cumbersome to evaluate the payment capabilities of SMEs (Bernini and Montagnoli (2017), and Gregory, Rutherford, Oswald, and Gardiner (2005)). In connection, late payments and the associated decline in cash reserves or available collateral might negatively impact SMEs' creditworthiness and their access to bank loans. For example, Howorth and Wilson (1998) presents that SMEs suffering from late payments typically are undercapitalized and have poor credit management practices. Moreover, late payments are standard in SMEs that usually lack the cash to finance themselves (Howorth and Reber (2003)). These aspects being considered, SMEs that frequently face late payments might be credit rationed. Therefore, our second hypothesis to test is:

H2: Late Payments result in credit rationing for SMEs

C. Price and Nonprice Terms and Conditions of Bank Financing

While banks provide the supply of loans, the cost of bank lending determines the demand for bank loans partly (Moritz et al. (2016)). SMEs perceived as riskier by banks, find it more costly to obtain bank financing, especially in periods of financial stress. It is indeed documented that loans to SMEs with less cash holdings or rated riskier by the banks carry higher interest rates (Berger and Udell (1990), and Strahan (1999)). Put differently, in assessing loan applications, banks are concerned about the SMEs' ability to generate enough cash flow to pay the debt and the serviceability of loans (Rostamkalaei and Freel (2016), and Cowling (2010)). Drakos (2013) for example revealed that firms' net interest expenses and profitability explain the terms and conditions of bank loans in the euro area. As already stated above, the literature points to the role of cash flows in profitability and sufficient cash holdings. If late payments to SMEs negatively impact

cash reserves, this may result in unfavorable terms and conditions of bank financing. All in all, to understand the impact of late payments on bank lending demand, the conditions of bank loans have to be considered, too. Therefore the third hypothesis we test is:

H3: Late Payments result in subdued bank loan terms and conditions for SMEs

D. Other factors

Several other factors might impact financing constraints of SMEs. The most frequently cited determinants by the literature are firm size and firm age. Beck and Demirguc-Kunt (2006) and Beck, Demirgüç-Kunt, and Maksimovic (2008) study the financing constraints with respect to firm size and present that larger firms more easily expand their external financing compared to SMEs. Ferrando, Popov, and Udell (2017) show that SMEs with low turnover are more likely to be denied credit as they are more opaque or posses less collateral. Beck, Demirguc-Kunt, Laeven, and Maksimovic (2006) and North, Robert, and Ignatius (2010) meanwhile argue that younger firms have a limited credit history and thereby they have more access to finance difficulties. The changes in balance sheet–related indicators such as turnover or profit are documented to impact constraints, too (Duchin, Ozbas, and Sensoy (2010), Campello, Graham, and Harvey (2010) and Ferrando, Popov, and Udell (2019)). Maes, Dewaelheyns, Fuss, and Van-Hulle (2019) and Fauceglia (2015) study the impact of exporting and show that exporting SMEs have different debt choices and access to finance preferences. Finally, prior research has shown that the utilisation of financing instruments by SMEs depends also on the macroeconomic environments (Beck et al. (2008)) they operate in.

III. Data and methodology

A. Research Sample

This study uses the *SAFE* survey data provided by the ECB and the EC. The survey aims to monitor euro area firms' financial conditions and access to finance trends. It

includes detailed categorical questions on firm demographics, balance sheet position, most pressing problems, availability of finance and market conditions, as well as current and expected access to finance. *SAFE* is conducted bi-annually since 2009 and published in May and November to cover the six months prior to the publishing months. In this paper, we select SMEs following the EC definition. Specifically, our sample consists of firms with less than 250 employees and a turnover of at most EUR 50 million. We include eleven euro area countries in our analysis: Austria, Belgium, Germany, Spain, Finland, France, Greece, Ireland, Italy, the Netherlands, and Portugal.

Since 2019, the SAFE survey has included a backward-looking question to shed some light on late payments being a problem for SMEs. Late payments question is asked in the first half of the year.[2] Therefore, our final sample covers three SAFE survey waves: H1-2019, H1-2020, and H1-2021. To be specific, SAFE incorporates the following question:

We will turn now to the subject of late payments. Has your company experienced problems due to late payments from any private or public entities in the past six months?

Responses to this question are given on a scale of three where 1) stands for *Yes, regularly*; 2) *Yes, occasionally* and 3) *No*. We recode the late payments variable into a binary variable for ease of interpretation based on these response categories. Our binary indicator takes the value of one if SMEs respond either -yes, regularly-, or -yes, occasionally- to this question and zero otherwise. Table I shows the responses to late payments questions as a binary variable. Presented values are the shares of SMEs facing late payments. Around 43% of SMEs report late payments on average. Among different euro are countries, SMEs located in the Netherlands report the lowest late payments with 28% on average. At the other extreme is Greece, where 60% seem to suffer from late payments. Late payments are a larger problem for SMEs in southern euro area countries like Italy, Portugal, Spain, and even France. In the eyes of observers, the SMEs

[2]SAFE defines late payments as "*a payment not made within the contractual or statutory period of payment, unless the debtor is not responsible for the delay, and when the creditor has fulfilled all its legal and contractual obligations*".

in southern Europe are hit much harder by the sovereign crisis and have faced persistent problems since. Meanwhile, late payments seem to come down across the board over the last three years. This is an interesting observation, considering the negative impact of the Corona crisis on the cash flows of companies of all sizes and the subdued payment capacity of all economic agents.

Table I: Late Payments

Country	2019-H1	2020-H1	2021-H1	Total
AT	0.390	0.298	0.305	0.332
BE	0.442	0.427	0.451	0.440
DE	0.358	0.344	0.348	0.350
ES	0.414	0.413	0.343	0.390
FI	0.505	0.448	0.448	0.466
FR	0.530	0.463	0.458	0.484
GR	0.623	0.637	0.541	0.601
IE	0.439	0.400	0.355	0.397
IT	0.571	0.585	0.469	0.542
NL	0.334	0.254	0.247	0.278
PT	0.421	0.416	0.391	0.410
Total	0.460	0.435	0.400	0.432

This table presents the percentage responses to recoded binary late payments question. In columns are the waves, and in rows are the countries. AT stands for Austria, BE for Belgium, DE for Germany, ES for Spain, FI for Finland, FR for France, GR for Greece, IE for Ireland, IT for Italy, NL for the Netherlands, and PT for Portugal.

B. Variables

Table II presents the dependent and explanatory variables utilized in this paper. Two groups of explanatory variables are microdata from the SAFE survey and macro controls from the Eurostat and the ECB. All survey data used in this paper are backward-looking and refer to the six months before the survey.

The first dependent variable is access to finance, being the most pressing problem for firms. The responses to this question have a scale from one to ten, one representing access to finance being not a problem at all. For ease of interpretation, we convert this variable into a dichotomous variable such that responses up to and including scale five refer to zero and one otherwise (see Asiedu, Kalonda-Kanyama, Ndikumana, and Nti-Addae (2013) for a similar approach). The second dependent variable is if firms are credit-constrained or not. Following Casey and O'Toole (2014) and Kaya and Masetti (2019) we consider a firm as being credit-constrained if it applied for a bank loan but was rejected or received less than 75% or discouraged from applying or refused the loan due to high costs. Finally, the third dependent variable is related to the terms and conditions of bank financing. Specifically, we employ the SAFE survey question ten on how the price and non-price terms and conditions of a bank loan received changed last six months before the survey. The question includes several subcategories: (i) level of interest rates, (ii) level of the cost of financing other than interest rates, such as charges, fees, commissions, (iii) available size of loan, (iv) available maturity of the loan, and (v) the collateral requirements. Possible responses are: was increased by the bank, remained unchanged, was decreased by the bank. We recode each category separately as a dichotomous variable if categories (i), (ii), or v) are increased by the bank and zero otherwise or if categories (iii) or (iv) are decreased by the bank and zero otherwise.

Smaller firms are more likely to report access to finance problems, among others. Therefore, we include two sets of indicators to control the company size effects. The first set of indicators, *micro, small* and *medium sized* are the dummy variables concerning the number of employees and take the value of one if the respective condition is satisfied. For example, micro takes the value of one if the company has two to nine employees and zero

otherwise (Bremus and Neugebauer (2018)). The second set of size indicators *Turnover up to EUR 2 mio*, *Turnover EUR 2 to 10 mio* and *Turnover EUR 10 to 50 mio* refers to yearly firm turnover dummies (Martin and Santomero (1997)). Similarly, younger firms face more access to finance issues (Ferrando and Griesshaber (2011)). Therefore, to address firm age, we include dummy variables in our analysis that take the value of one for the respective firm age.

Issues around the balance sheet are central to firms' credibility and access to finance, too. To capture the balance sheet difficulties, we include two indicators *Decreasing turnover* and *Profit down* which takes the value of one if the companies face decreasing turnover or profit during the last six months before the survey date. Encountering these issues on a continuous basis might further intensify impact on access to finance. To address this, ECB defines a control dummy in the SAFE survey as "vulnerable firms" which takes the value of one if firms report, simultaneously, lower turnover, decreasing profits, higher interest expense. In addition, exporting firms' liquidity constraints and external finance requirements might differ from others. To control this aspect, we include a dummy variable that takes the value of one if the company exports goods and services. Subsidiary companies might finance themselves through parent companies and have fewer external financing needs. This structural difference is controlled in our analysis by a control if the firm is a subsidiary of another enterprise.

We include three macro controls in our analysis, too. First, seasonality-adjusted GDP growth captures the impact of changes in the general economic conditions. To control for the banking sector's health and profitability, we include the ROE of the domestic banking sector. Last, growth rate of general payment activity that includes the entire non-financial sector controls the payment activity beyond single firms.

C. Estimation Method

Similar to Puri, Rocholl, and Steffen (2011), we employ a linear probability model throughout the paper where the outcome variable is binary. Even though non-linear models such as probit or logit could be used in our setting, these suffer from incidental

parameters problem, especially for applications where the time dimension is small, and the number of firms is large. Unlike non-linear models, the linear probability model consistently estimates the coefficients that are directly interpretable and economically meaningful. These being said, all results presented in this paper are robust to model specification, and the sign and magnitude of the estimates for non-linear probability models deliver very similar results.

Our estimation approach takes the following form

$$Y_{itj} = \alpha + \rho LatePayments_{itj} + \beta X_{itj} + \theta Z_{tj} + \delta_j + \epsilon_{itj} \quad (1)$$

where Y_{itj} stands for the different binary dependent variables (i.e. access to finance problems) for firm i in year t at country j. $LatePayments_{itj}$ stands for if the firm i in year t at country j faced late payments six months prior to survey. X_{itj} represents firm-specific characteristics for firm i in year t at country j, Z_{tj} for macro factors in year t at country j, and δ_j country fixed effects. ϵ_{itj} is the error term. In our specifications, we begin with a smaller set of covariates and increase them step by step.

Table II: Explanatory variables

Variables	**Measurement**	**Source**
Dependent variables		
Access to finance	Access to finance as the most pressing problem	SAFE Q0b
Credit constraints	Lack of access to bank lending	SAFE Q7a
Loan conditions	Terms and conditions of bank financing	SAFE Q10
Independent variables		
Micro	Firms 2 to 9 employees	SAFE D1
Small	Firms 10 to 49 employees	SAFE D1
Medium Sized	Firms 50 to 249 employees	SAFE D1
Turnover up to EUR 2 mio	Firm turnover less than EUR 2 million	SAFE D4
Turnover EUR 2 to 10 mio	Firm turnover from EUR 2 to EUR 10 million	SAFE D4
Turnover EUR 10 to 50 mio	Firm turnover from EUR 10 to EUR 50 million	SAFE D4
Age ≤ 2	Firm age less than 2 years	SAFE D5
$2 <$ Age ≤ 10	Firm age from 2 years to 10 years	SAFE D5
Age > 10	Firm age larger than 10 years	SAFE D5
Decreasing turnover	Firm faces decreasing turnover	SAFE Q2
Decreasing profit	Firm faces decreasing profit	SAFE Q2
Vulnerable firm	Firms reporting, simultaneously, lower turnover, decreasing profits, higher interest expenses	SAFE Q2
Exporting firm	The company exports goods and services	SAFE D7
Subsidiary	Firm is a subsidiary of another enterprise	SAFE D2
Δ GDP	Calendar and seasonally adjusted GDP growth	Eurostat
ROE	Return on equity of domestic banking groups and stand-alone banks	ECB
Δ Payments	Real growth rate of payment services	ECB

This table presents the independent variables used in the paper. Presented values are the variables names, their respective explanations and sources.

IV. Results

A. Descriptive statistics

Table III presents the dependent and independent variables from the SAFE survey utilized in this paper. Presented values are the averages for different countries for comparison.

The first panel of Table III presents the averages for the dependent variables. Starting with the first row, access to finance as the most pressing problem, SMEs in Greece report the highest numbers, with around 60% of SMEs citing this as the single most crucial problem they face. SMEs in Portugal, Italy, and Spain present a high number of SMEs having access to finance problems, too. The SMEs in Finland, the Netherlands, and Germany are at the other extreme, where less than one-third of SMEs report access to finance problems. Turning to credit constraints in the second row, SMEs in Greece similarly are the most credit constraints SMEs, followed by Portuguese and Spanish SMEs. On the other hand, Austrian and German SMEs have the lowest credit constraints. SMEs in southern Europe have faced access to finance problems since the sovereign crisis, and their convergence to their core euro are counterparts has been stubbornly slow. On the other hand, differences in conditions are less visible across southern and core euro area countries for those firms that get bank credit. To be specific, while SMEs in Spain face the highest interest rates and costs, SMEs in the Netherlands also face unfavorable conditions. SMEs in Ireland suffer the most in terms of loan size and maturity. Interestingly, Greek, Italian, and German SMEs have reported similar heightened collateral requirements in recent years. This might point to the effectiveness of supporting measures implemented by EU institutions to support the crisis-hit SMEs eligible for a credit.

Turning to explanatory variables, the micro-enterprises with two to nine employees or firms with a turnover of up to EUR 2 Mio make the largest share of SMEs in Greece, Italy, and Spain. On the contrary, in Germany and Ireland, the percentage of medium-sized firms is much larger. This points to the particular importance of the financial conditions of micro firms and their access to finance for value-added and employment in southern

Table III: Summary statistics

Dependent variables	AT	BE	DE	ES	FI	FR	GR	IE	IT	NL	PT	Total
Access to finance	0.303	0.339	0.290	0.431	0.219	0.311	0.585	0.368	0.466	0.280	0.513	0.375
Credit constraints	0.027	0.047	0.028	0.059	0.033	0.044	0.164	0.046	0.049	0.039	0.061	0.051
Higher interest rate	0.154	0.256	0.148	0.279	0.202	0.109	0.125	0.158	0.177	0.211	0.172	0.182
Higher other cost	0.361	0.342	0.316	0.393	0.212	0.312	0.424	0.341	0.313	0.319	0.413	0.341
Smaller loan size	0.059	0.108	0.046	0.103	0.058	0.073	0.141	0.159	0.087	0.142	0.091	0.089
Shorter maturity	0.037	0.071	0.026	0.053	0.072	0.042	0.072	0.086	0.052	0.107	0.052	0.053
Increased collateral	0.051	0.028	0.075	0.046	0.029	0.052	0.077	0.058	0.070	0.036	0.057	0.056
Explanatory variables	AT	BE	DE	ES	FI	FR	GR	IE	IT	NL	PT	Total
Micro	0.342	0.470	0.263	0.476	0.382	0.396	0.633	0.359	0.547	0.395	0.486	0.431
Small	0.375	0.319	0.372	0.311	0.355	0.335	0.230	0.344	0.294	0.331	0.285	0.323
Medium	0.283	0.21	0.366	0.213	0.263	0.269	0.137	0.297	0.158	0.274	0.228	0.245
Turnover up to EUR 2 mio	0.473	0.492	0.449	0.641	0.467	0.514	0.783	0.513	0.648	0.482	0.687	0.563
Turnover EUR 2 to 10 mio	0.286	0.29	0.313	0.21	0.307	0.275	0.156	0.311	0.219	0.277	0.223	0.257
Turnover EUR 10 to 50 mio	0.241	0.218	0.238	0.148	0.226	0.211	0.061	0.176	0.133	0.241	0.09	0.18
Age ≤ 2	0.014	0.007	0.011	0.009	0.004	0.016	0.01	0.008	0.008	0.011	0.006	0.01
$2 <$ Age ≤ 10	0.102	0.093	0.108	0.103	0.107	0.110	0.137	0.132	0.088	0.107	0.098	0.106
Age > 10	0.884	0.900	0.881	0.888	0.889	0.874	0.853	0.860	0.903	0.882	0.896	0.884
Decreasing turnover	0.304	0.373	0.310	0.385	0.31	0.374	0.408	0.412	0.387	0.318	0.390	0.362
Decreasing profit	0.379	0.398	0.388	0.467	0.339	0.425	0.533	0.430	0.452	0.362	0.419	0.423
Vulnerable firm	0.032	0.046	0.041	0.102	0.027	0.056	0.043	0.047	0.068	0.024	0.066	0.056
Exporting firm	0.536	0.502	0.413	0.346	0.409	0.307	0.442	0.396	0.399	0.440	0.553	0.406
Subsidiary	0.150	0.201	0.124	0.091	0.163	0.169	0.04	0.121	0.087	0.288	0.045	0.131

The summary statistics for the company-specific variables utilized in this paper are presented in this table. The figures shown are the percentage averages of the explanatory variables for different countries. In columns are countries. Micro refers to firms with fewer than ten employees, small to ten to fifty employees, and medium to those fifty to two hundred fifty employees. Turnover up to EUR 2 Mio refers to firms that have an annual turnover of fewer than two million euros, turnover EUR 2 to 10 Mio relates to firms that have a yearly turnover of more than EUR two million, but less than EUR ten million, and turnover EUR 10 to 50 Mio refers to firms with an annual turnover of more than EUR ten million but less than EUR fifty million. Age ≤ 2 stands for firms younger than two years old, $2 <$ Age ≤ 10 for firms two to ten years old, and Age > 10 for firms older than ten years old. Decreasing turnover and decreasing profit refer to the share of firms reporting declines for these balance sheet items six months before the survey. Vulnerable firms are those that report, simultaneously, lower turnover, decreasing profits, higher interest expenses. The exporting firm refers to those firms that comprise sales of goods or services to non-residents. Finally, subsidiaries are separate, distinct legal entities part of other firms.

Europe. For startups that are younger than two years, Austria and the Netherlands spearhead. Indeed, the startup ecosystem in the Netherlands has been thriving for many years and is one of the most established ones in western Europe. Across the board, though almost 90% of all SMEs are ten years or older. Around 30% to 40% of SMEs see their turnover and profits decline in our sampling period. Moreover, around 6% of SMEs face persistent low turnover, decreasing profits, and high-interest expenses. SMEs in southern Europe report the most significant balance sheet problems. These indicate that the impact of the sovereign crisis started in 2013 and hit the southern euro area SMEs hardest, had a lasting effect on SMEs balance sheets. Lastly, around 60% of firms on average are local firms in our sample, and some 15% are subsidiaries.

B. Late payments and access to finance

Model 1 of Table IV presents the impact of late payments on access to finance of SMEs. To do so, it includes the dummy late payments indicator. We begin with a smaller set of covariates in our specifications and increase them step by step. Our specification (1) includes only the late payments dummy variable as the explanatory variable. It enters the regression with a positively significant coefficient, which is large in magnitude. SMEs that face late payments are around 10% more likely to have access to finance problems. This shows that late payments indeed have adverse spillover effects on SMEs' access to external finance. In specification (2) of IV, we include individual SME characteristics. The late payments dummy variable became slightly smaller in magnitude but remained positively significant. SMEs that face late payments are 7% more likely to face access to finance problems.

Other indicators of access to finance are also worth mentioning. Micro and small firms are 6% and 3% less likely to report access to finance problems respectively compared to reference medium-sized firms category. Due to their smaller number of employees, they probably have lower fixed costs. On the other hand, both turnover coefficients enter the regression with a positively significant coefficient. SMEs in the smallest turnover group are 7% more likely to face access to finance problems. Firms with a larger turnover

usually suffer less from information asymmetries and access to finance. SMEs two to ten years old are 6% more likely to face access to finance issues. Due to limited information about the creditworthiness of young, growing SMEs, they often have difficulty accessing finance. Taken together, SMEs that are less established, having a relatively large number of employees but still smaller turnover, are more likely to face access to finance problems.

In specification (2), we also include indicators related to the balance sheet and business features. Our results indicate that decreasing turnover and declining profits increase the likelihood of access to finance problems around 2% each. Most importantly, though, as defined in the SAFE survey, vulnerable SMEs are 22% more likely to have difficulties in receiving finance. Exporting firms report around 2% more access to finance problems whereas subsidiaries report 5% less. While balance sheet problems negatively impact the availability of financing, facing these continuously creates the most significant impediment in SMEs' access to finance.

In specification (3) of table IV, we add macro controls controls. The significance and sign of the late payments variable are also robust to the inclusion of these controls. Both seasonality-adjusted GDP and general payment activity growth have negatively entered the regression with negatively significant coefficients. However, their magnitude is relatively small, indicating almost economic insignificance. Increasing ROE equity of the banking sector while having a statistically significant positive coefficient is also very small in magnitude.

SMEs have access to finance problems even at normal times. Our results indicate that late payment to SMEs might exacerbate these problems with potential knock-on effects. Indeed, SMEs waiting for their invoices to be paid while having access to finance problems probably themselves result in not paying their suppliers before their customers pay them. They might thereby scale down their activities and postpone or cancel planned investments, and probably be less creditworthy as a result.

Differences in business cultures lead to cross-country differences in late payments. For example, average payment delay is around ten days in Germany and forty days in Portugal and Greece. If late payments are standard in conducting businesses anyways

in a country, SMEs in these countries might not suffer from access to finance problems. To shed some light on these, we run our model including the explanatory variables in specification (3) for each country in our sample separately. Figure 1 present the results for this analysis. Our results reveal a significant cross-country heterogeneity. The most considerable spillover effects from late payments to access to finance are observed in larger euro area countries such as Germany, France, the Netherlands, Italy, and Spain. In smaller countries such as Portugal and Ireland the negative externality to access to finance is somewhat smaller.

C. Late payments and credit rationing

Banks' credit rationing provides a good basis to distinguish between the availability of external financing to SMEs and their demand for external funding. Indeed, bank lending is the single most important external financing alternative for SMEs, and their bank loan requirements, especially during crisis periods, might be a function of several factors. For example, unpaid invoices to SMEs hamper SMEs' viability and increase bankruptcy risk and thereby the cost of bank lending to SMEs. As a result, SMEs might refrain from loan applications due to potentially high costs or rejections. They might even try to reduce their indebtedness as a result of late payments that negatively impact their cash flow and liquidity situation.

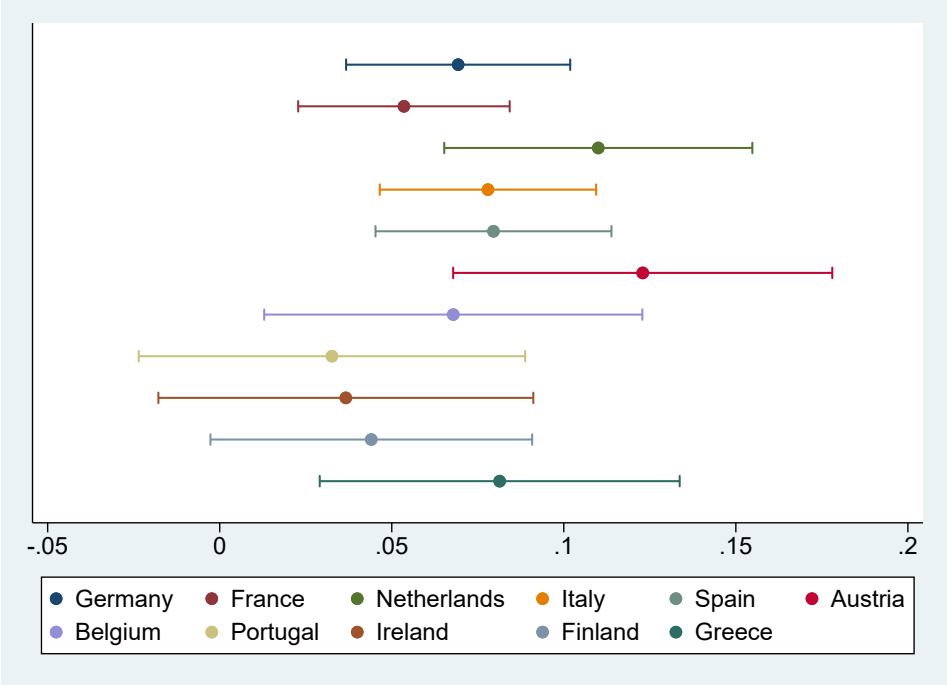
In Table V, we study the impact of late payments on SMEs' access to bank lending. In model 1, we include only the late payments dummy variable, which enters the regression with a positively significant coefficient. In model 2, we include other explanatory variables. The coefficient of late payments dummy remains positively significant and large in magnitude. SMEs that receive their payments late are 3% more likely to be credit rationed. Deterioration in SMEs' liquidity position due to late payments result in credit rationing such as a smaller credit amount than SMEs demand, a higher interest rate, or even rejections at a point when these SMEs have higher funding needs. Due to late payments, banks are most likely unable to identify ex-ante SMEs' long-term creditworthiness, which leads to demand-supply imbalances in credit markets.

Table IV: Access to finance as the most pressing problem

	(1)	(2)	(3)
Late Payments	0.099***	0.071***	0.070***
	(0.006)	(0.006)	(0.006)
Micro		-0.061***	-0.062***
		(0.012)	(0.012)
Small		-0.029***	-0.029***
		(0.010)	(0.010)
Turnover up to EUR 2 mio		0.071***	0.074***
		(0.013)	(0.013)
Turnover EUR 2 to 10 mio		0.045***	0.046***
		(0.011)	(0.011)
Age ≤ 2		0.051	0.050
		(0.032)	(0.032)
$2 <$ Age ≤ 10		0.064***	0.063***
		(0.010)	(0.010)
Decreasing turnover		0.019***	0.012***
		(0.004)	(0.004)
Profit down		0.015***	0.015***
		(0.003)	(0.003)
Vulnerable firm		0.219***	0.217***
		(0.014)	(0.014)
Exporting firm		0.021***	0.022***
		(0.007)	(0.007)
Subsidiary		-0.048***	-0.047***
		(0.009)	(0.009)
Δ GDP			-0.002***
			(0.000)
ROE			0.003***
			(0.001)
Δ payments			-0.001*
			(0.001)
Constant	0.332***	0.155***	0.160***
	(0.004)	(0.014)	(0.014)
R^2	1%	7%	7.2%
Sample size	23231	23223	23223
Country fixed effects		✓	✓

This table presents the OLS estimates for the determinants of SMEs' access to finance. The dependent variable is the dummy variable that takes the value of one for access to finance as most problem responses are larger than five and zero otherwise. All specifications include country-fixed effects. Standard errors robust to heteroskedasticity are in parentheses. Three stars denote significance at 1%; two stars denote significance at 5%; one star denotes significance at 10%.

Figure 1. Impact of late payments on access to finance with respect to different countries



This chart presents the impact of late payments on SMEs' access to finance in different countries. Presented results are the coefficients of late payments dummy variable in respective countries.

Continuing with the other factor affecting credit rationing, while the number of employees is not significant for being credit rationed, firms with a turnover of less than EUR 2 Mio are 2% more likely to be credit rationed than otherwise. While early startups are not necessarily being credit rationed, SMEs two to ten years old also suffer from access to bank lending problems. Being a vulnerable firm is strongly associated with being credit rationed by banks, too, i.e. vulnerable firms are 8% more likely to face access to bank lending problems. Finally, while exporting firms are slightly more likely, subsidiaries are less likely to face access to bank lending issues.

The sovereign crisis hit the banking systems among euro area countries and their ability to provide credit to SMEs dis-proportionally. Bank lending to euro area SMEs located in southern euro area countries has decreased considerably, while bank loans to SMEs in core countries have remained stable or even increased. This divergence might lead to differences in the impact of late payments on SMEs' access to bank lending. In line with the previous section, we run our model, including the explanatory variables for each country in our sample separately to shed some light on these and in line with the

Table V: Late payments and credit rationing

	(1)	(2)
Late Payments	0.037***	0.029***
	(0.003)	(0.003)
Micro		-0.008
		(0.005)
Small		-0.001
		(0.004)
Turnover up to EUR 2 mio		0.023***
		(0.006)
Turnover EUR 2 to 10 mio		0.007
		(0.005)
Age ≤ 2		0.027
		(0.017)
$2 <$ Age ≤ 10		0.015***
		(0.005)
Vulnerable firm		0.080***
		(0.010)
Exporting firm		0.013***
		(0.003)
Subsidiary		-0.009**
		(0.004)
Decreasing turnover		0.003
		(0.002)
Profit down		0.002
		(0.001)
GDP		-0.000
		(0.000)
ROE		0.001
		(0.001)
Growing payments		-0.000
		(0.000)
Constant	0.035***	-0.012*
	(0.002)	(0.006)
R^2	1%	3.5%
Sample size	23231	23223
Country fixed effects		✓

This table presents the OLS estimates for the determinants of SMEs' being credit rationed. The dependent variable is the dummy variable that takes the value of one for SMEs' that are credit rationed and zero otherwise. All specifications include country-fixed effects. Standard errors robust to heteroskedasticity are in parentheses. Three stars denote significance at 1%; two stars denote significance at 5%; one star denotes significance at 10%.

previous section. Figure 2 present the results for this analysis. Our results indicate that late payments lead to credit rationing across the board apart from Ireland. The highest impact is observed in Greece. Yet, in other countries, the magnitude is by and large the same, indicating relatively homogenous spillover from late payments to credit rationing.

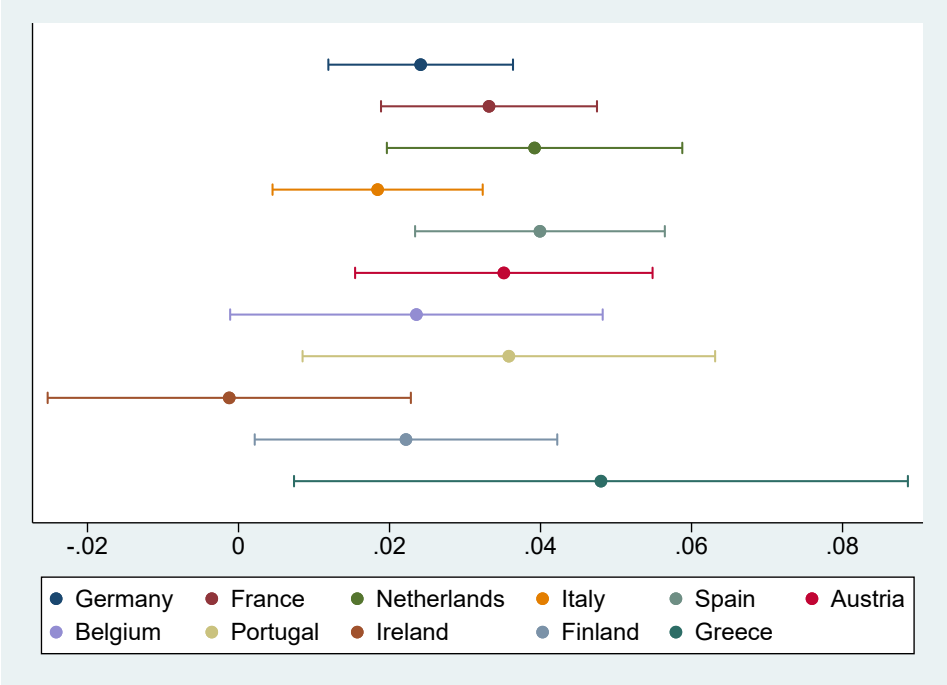
D. Late payments and Terms and conditions of bank loans

Aside from examining SMEs' access to bank credit, we examine if late payments to SMEs affect the price and nonprice terms and conditions of bank financing. To do so, we consult question 10 of the SAFE survey, which asks SMEs about the terms and conditions of bank financing they have received in the past six months. This question refers to a subsample of SMEs that have already been granted a loan by a bank. The explanatory variables for this analysis are the same as in the benchmark regression in the third column of Table IV.

In Table VI we report the results of this analysis. The first column shows whether late payments result in higher interest rates for bank loans. The coefficient of late payments are positively significant and large in magnitude, indicating a 7% increased likelihood of paying higher interest rates. The other costs of bank loans as the dependent variable is in column 2. If SMEs experience late payments, they are 10% more likely to incur additional fees and commissions. In relation to the size and maturity of loans as presented in columns 3 and 4 of Table VI, respectively, late payments lead to a smaller size of loans available to SMEs and a shorter maturity period in general. SMEs already granted a bank loan have a 3% greater likelihood of receiving a smaller loan as their payments aren't timely. Collateral requirements, meanwhile, are not necessarily affected by late payments to SMEs.

Turning to other factors that affect the terms and conditions of loans granted to SMEs, being a vulnerable SME spearhead as a critical indicator. It leads to higher interest rates, and other costs, with a considerable 17% higher likelihood of facing these problems. Vulnerable SMEs are also 5% and 4% more likely to have smaller loan sizes and shorter maturities. Smaller turnover in cases also leads to higher costs and smaller

Figure 2. Impact of late payments on credit rationing with respect to different countries



This chart presents the impact of late payments on SMEs' access to bank lending in different countries. Presented results are the coefficients of late payments dummy variable in respective countries.

loan sizes. Among macro indicators, GDP growth is statistically significant across the board, yet the economic impact is relatively small.

V. Conclusion

The SMEs suffer the most from late payments because of their limited financial resources to mitigate the impact of late payment when it occurs. This paper uses unique firm-level survey data on European SMEs' to determine the impact of late payments on SMEs' access to finance. We find that SMEs that face regular or occasional late payments are on average around 7% more likely to face access to finance problems. The effect is more prominent among core euro area countries. Our results show that late payments to SMEs also give rise to credit rationing. The effect is by and large visible in all countries with the same magnitude. Banks meanwhile tighten price terms and conditions of loans to those SMEs that face regular or occasional late payments. Moreover, these SMEs suffer from smaller loan sizes than needed and shorter maturities. Collateral requirements

Table VI: Terms and conditions

	Higher interest rate	Higher other costs	Smaller loan size	Shorter maturity	Increased collateral
Late Payments	0.066***	0.103***	0.025***	0.013**	-0.010
	(0.010)	(0.012)	(0.008)	(0.006)	(0.006)
Micro	-0.020	0.037	-0.007	0.003	0.004
	(0.019)	(0.023)	(0.014)	(0.011)	(0.011)
Small	-0.024	-0.002	-0.018	-0.000	0.013
	(0.015)	(0.018)	(0.011)	(0.008)	(0.009)
Turnover up to EUR 2 mio	0.031	0.049**	0.039***	0.013	-0.003
	(0.019)	(0.023)	(0.014)	(0.010)	(0.012)
Turnover EUR 2 to 10 mio	0.008	0.036*	0.020*	0.003	-0.011
	(0.015)	(0.019)	(0.011)	(0.008)	(0.009)
Age ≤ 2	-0.032	-0.071	0.068	0.028	0.002
	(0.045)	(0.061)	(0.050)	(0.038)	(0.032)
$2 <$ Age ≤ 10	0.003	0.006	0.007	0.013	0.013
	(0.017)	(0.021)	(0.013)	(0.011)	(0.011)
Vulnerable firm	0.173***	0.173***	0.044***	0.034**	-0.024**
	(0.021)	(0.022)	(0.016)	(0.013)	(0.010)
Exporting firm	0.018*	0.008	0.008	0.008	0.009
	(0.011)	(0.013)	(0.008)	(0.006)	(0.007)
Subsidiary	-0.001	-0.025	0.009	-0.005	-0.009
	(0.017)	(0.020)	(0.013)	(0.009)	(0.010)
Decreasing turnover	-0.004	-0.015*	0.019***	0.012***	0.001
	(0.007)	(0.008)	(0.005)	(0.004)	(0.004)
Profit down	0.007	0.009	0.005	-0.000	-0.006**
	(0.004)	(0.006)	(0.003)	(0.003)	(0.003)
GDP	0.001**	0.003***	0.001**	-0.001***	-0.001***
	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
ROE	0.002	0.001	-0.003	0.003**	0.000
	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)
Growing payments	0.000	0.000	-0.000	-0.001	0.000
	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)
Constant	0.083***	0.238***	-0.029*	-0.024**	0.082***
	(0.023)	(0.030)	(0.016)	(0.012)	(0.016)
R^2	5.3%	4.9%	2.5%	1.6%	1.2%
Sample size	5767	5805	5809	5748	5724
Country fixed effects	✓	✓	✓	✓	✓

This table presents the OLS estimates for the determinants of terms and conditions of bank loans. The dependent variables are respective loan conditions. All specifications include country-fixed effects. Standard errors robust to heteroskedasticity are in parentheses. Three stars denote significance at 1%; two stars denote significance at 5%; one star denotes significance at 10%.

are not affected by late payments, though. These results are robust to the inclusion of a rich set of firm-specific controls, macroeconomic factors, and country-specific controls.

In the aftermath of the pandemic crisis, the availability of external funding is crucial to SME investment decisions and sustained recovery. Late payments hindering these will cause significant negative real economy spillovers. Therefore, policymakers should consider and prioritize measures that address the liquidity shortages arising from late payments to SMEs. In addition, the improvement of contractual measures such as enhanced enforcement or stricter payment terms would be an essential step forward. In addition, bridge funding alternatives that address short-term liquidity problems might also provide a significant contribution.

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