



Article

Bank Credit and Trade Credit: The Case of Portuguese SMEs from 2010 to 2019

António Pedro Soares Pinto ^{1,2} , Carla Manuela Ribeiro Henriques ^{1,3},
Carolina Esteves Oliveira da Silva Cardoso ¹ and Maria Elisabete Duarte Neves ^{4,5,*} 

¹ School of Technology and Management of Viseu, Polytechnic Institute of Viseu, 3500-510 Viseu, Portugal

² CISED—Research Center in Digital Services, 3500-510 Viseu, Portugal

³ CMUC—Centre for Mathematics of the University of Coimbra, 3000-143 Coimbra, Portugal

⁴ Coimbra Business School | ISCAC, Polytechnic of Coimbra, 3045-601 Coimbra, Portugal

⁵ UTAD | CETRAD, Centre for Transdisciplinary Development Studies, 5000-801 Vila Real, Portugal

* Correspondence: mneves@iscac.pt

Abstract: Small companies face significant difficulties in accessing finance, and the use of bank credit and trade credit are the primary sources of financing, specifically in small countries, with little market liquidity, and focused on the banking system, as is the case of Portugal. The main objective of this article is to identify significant drivers of bank and trade credit, as well as investigate the complementary or substitutive relationship between them, considering that both constitute an essential source of financing for small and medium-sized enterprises (SMEs). The sample comprises 5860 companies, and the analysis was performed using panel data methodology (2010–2019). The results suggest that, during the period in which the financial crisis was most felt in the country (2010–2013), companies intensified their demand for trade credit, and in the following years for bank credit. Our evidence does support the substitution hypothesis between trade and bank credit.

Keywords: SMEs; bank credit; trade credit; financial crisis; credit constraints



Citation: Pinto, António Pedro Soares, Carla Manuela Ribeiro Henriques, Carolina Esteves Oliveira da Silva Cardoso, and Maria Elisabete Duarte Neves. 2023. Bank Credit and Trade Credit: The Case of Portuguese SMEs from 2010 to 2019. *Journal of Risk and Financial Management* 16: 170. <https://doi.org/10.3390/jrfm16030170>

Academic Editor: Ştefan Cristian Gherghina

Received: 20 December 2022

Revised: 20 February 2023

Accepted: 27 February 2023

Published: 3 March 2023



Copyright: © 2023 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

1. Introduction

Scarcity of resources conditions the development of Small and Medium Enterprises (SMEs). In the absence of equity capital, access to credit is the primary source of financing. The difficulties experienced by SMEs in accessing financial resources stem from the particular characteristics they present, namely in terms of information asymmetry, transaction costs, and agency costs (Degryse et al. 2005; Zarrouk et al. 2020; Mueller and Sensini 2021).

The 2008 financial crisis made access to credit difficult for smaller companies, given the substantial funding restrictions and stricter capital requirements to which the banking system was subject (Farinha and Félix 2015). Access to credit has become more difficult for companies, particularly those accessing the banking system for the first time. Given the strong constraints to which they were subjected, many companies resorted to alternative sources, namely trade credit, characterized by speed and operability, albeit with a high opportunity cost (Su and Sun 2011). In times of crisis, SMEs have been the object of different empirical studies due to the increased difficulties they face in resorting to sources of financing. The results are not consensual regarding the substitution or complementarity relationship between commercial credit and bank credit (Palacín-Sánchez et al. 2019). The substitution hypothesis, which is supported by the existing literature, asserts that SMEs rely on trade credit as a last resort as a result of financial restrictions (Huang et al. 2011; Love et al. 2007). The substitution effect is mentioned by Casey and O’Toole (2014) and McGuinness et al. (2018), while Illueca-Muñoz et al. (2016) and Andrieu et al. (2018) identify a complementary effect. These results suggest the need to deepen the relationship between bank credit and trade credit.

The global financial crisis, which started at the end of 2007, drastically reduced the amount of credit available to SMEs in the Eurozone, which includes Portugal (Vermoesen et al. 2013). Portuguese SMEs represent 99.9% of all companies, are responsible for 79% of all employment, and generate 66% of added value, making a considerable contribution to economic expansion, job creation, and innovation (European Commission 2014). Portugal is one of the EU countries most affected by the crisis resulting from the 2008–2013 global recession (Serrasqueiro et al. 2021). The recent global economic crisis has highlighted the limitations of a business financing model based on resorting to credit and with little use of the capital market.

This work aims to evaluate the influence of company-specific variables (including the risk of bankruptcy, as a distinctive variable) on access to bank credit and trade credit in Portuguese SMEs, for a time horizon of 10 years (2010–2019), using panel data methodology.

This study is important for Portuguese SMEs and banking, as it allows the impact of the financial crisis (2010–2013) on the use of credit (banking and trade) to be assessed. It identifies the main business drivers that condition credit and evaluates the substitution or complementarity relationship between bank credit and trade credit. A total of 5860 businesses were polled regarding the effects of the crisis, their access to different sources of financing both before and after the crisis, and their chances of recovering. It provides guidance on financing decisions to managers and current and potential shareholders.

In addition to this introduction section, Section 2 addresses the literature review on the subject, Section 3 deals with research design including data and estimation method, then Section 4 presents and discusses the main results, and finally, Section 5 presents the conclusions, limitations, and theoretical and practical contributions, as well as providing lines of future research.

2. Literature Review

2.1. Theoretical Framework

The issue of SME financing is complex but unavoidable due to the implications that arise in terms of the growth and development of a significant number of companies that play an essential role in the economies of many countries. In the context of the world economy, small and medium-sized companies are one of the main drivers of economic growth, job creation, and excellent investment opportunities, financed mainly by bank credit. However, the evolution of the markets, technological acceleration, the development of new information and communication systems, the reduced capacity of knowledge, and the difficulties in acquiring capital constitute obstacles to its growth (Halling et al. 2005; Banerjee and Duflo 2014; Brei et al. 2020).

Before the 2008 crisis, companies accumulated high levels of indebtedness given favorable financing conditions and optimistic expectations of productivity growth. Financial difficulties and the subsequent sovereign debt crisis led to a significant contraction in economic activity and, consequently, to the deterioration of economic agents' perspectives. Portuguese banks were subject to international financing restrictions and stricter capital requirements. The results show that, after 2009, access to credit became particularly difficult for Portuguese companies, namely for those that were resorting to the banking system for the first time (Farinha and Félix 2015). Farinha and Félix (2015) also conclude that credit supply is positively related to the warranties provided (available assets), and negatively related to the level of corporate indebtedness. On the other hand, the demand for credit increases with the scarcity of domestic resources and capital needs. The authors also mention that approximately 15% of Portuguese SMEs with bank loans are subject to financial restrictions.

Financial constraints significantly hamper the growth of SMEs (Moscalu et al. 2020). To face these constraints, SMEs essentially resort to bank financing. SMEs and large companies have direct access to bank financing; however, smaller ones face increased difficulties, which stem from the fact that they provide little information and are not very credible, inducing information asymmetries (Nilsen 2002; Su and Sun 2011). Given the constraints

to which they are subject, many companies resort to alternative means of financing, namely trade credit, which is more expeditious, albeit at a higher cost in many circumstances. SMEs mostly resort to trade and bank credit, since access to the capital market is limited to large companies in many circumstances (Wang et al. 2021; Yang et al. 2021).

The asymmetry of information, the absence of warranties provided, the reduced negotiating power, and the absence of an extensive credit history pose constraints to bank financing at affordable interest rates (De la Torre et al. 2008). Financing restrictions are felt with greater intensity in SMEs compared to larger companies. In addition, these companies have more difficulty accessing capital markets, making them more vulnerable to bank credit and trade credit (Beck and De La Torre 2007). SMEs present high volatility of results, resulting in a high level of risk. When banks cannot quantify (evaluate) risk, they ration credit and impose credit minimums and maximums, preferring to finance large companies (Hernández-Cánovas and Martínez-Solano 2007). SMEs face fewer financial constraints in countries with developed capital markets (Ullah 2020).

In addition to the issues mentioned in the previous paragraphs, the characteristics of corporate governance models (Anglo-Saxon model and continental model) under which companies carry out their activity constitute another condition affecting how companies finance themselves (Moutinho et al. 2022). Banks play a crucial role in the continental system as creditors and shareholders. The generated financial income allows banking entities to establish a stable relationship with companies, which results in mutual advantages, in many circumstances, placing the bank in a situation of privilege (dominion). Companies develop more stable and lasting relationships with banking entities with fewer owners and creditors due to the lower relevance and development of capital markets (Ahmad and Omar 2016; Outa and Kutubi 2021).

In the Anglo-Saxon model, as a result of the dispersion of capital, small and medium-sized companies do not bear supervision costs, translating into a benefit of a priori control. In turn, in the continental system, due to a greater concentration of ownership, the holders of capital have greater internal control, ensuring more excellent supervision and control (González and González 2008; Grosman et al. 2019).

2.2. Bank Credit and Trade Credit

Bank credit can be expressed as the ratio of bank liabilities and bond loans to total liabilities (Love et al. 2007; McGuinness and Hogan 2014). For García-Teruel and Martínez-Solano (2010) and Yang (2011), trade credit can be measured as the ratio between supplier credit plus other credits to total liabilities. The literature review (e.g., Carbó-Valverde et al. 2006; Degryse et al. 2017; D'Ignazio and Menon 2020) refers to bank credit as an important source of financing for SMEs.

Trade credit is generally granted to a customer by a supplier of goods and/or services, where payment is made later (Catalin 2020). Credit is granted on a short-term basis, usually with maturities between 30 and 90 days. The author also concludes that the lack of positive results, liquidity, and the degree of indebtedness determine the extent of trade credit. Companies prefer trade credit when they have difficulty accessing bank credit, thus revealing a degree of complementarity between trade credit and bank credit in short-term financing (Cassia and Vismara 2009). Trade credit arises from the interaction between a supplier and a customer (company) in a specific context of limited liability for uncollateralized debt (Cuñat 2007). There is a generally agreed-upon conclusion in the trade credit literature that supplier financing has a negative relationship with size (Kestens et al. 2012), inventory (Taketa and Udell 2007), liquidity (Love et al. 2007), and profitability (García-Teruel and Martínez-Solano 2010; Canto-Cuevas et al. 2016).

The limitations, to which SMEs are subject, particularly in periods of the financial crisis, lead a significant number of companies to resort to trade credit (Carbó-Valverde et al. 2006; Degryse et al. 2017; D'Ignazio and Menon 2020). In the 2008 financial crisis, trade credit emerged as a substitute for bank credit, given the negative impact on the availability of bank credit (García-Appendini and Montriol-Garriga 2013; Cassia and Vismara 2009).

Although trade credit is a substitute for bank credit, the former becomes a substitute in periods of a financial crisis (Yazdanfar and Öhman 2017). In times of crisis, suppliers are valuable agents to make up for companies' difficulties accessing bank credit (Bastos and Pindado 2013).

When bank financing is difficult, companies rely more heavily on trade credit (Garcia-Appendini and Montriol-Garriga 2013). This has become known as the substitution theory between bank credit and trade credit in the financial literature.

A different theory may also explain this connection. According to Biais and Gollier (1997), commercial credit and bank credit should move in the same direction, as they either increase or decrease together. Contrary to the previous assumption, trade credit is not seen merely as a safety net in case of default on bank loans. This implies that bank credit and commercial credit are complementary forms of credit. Since Biais and Gollier published their paper, numerous investigations have supported this concept of complementarity (e.g., Kohler et al. 2000; Kling et al. 2014).

In times of crisis, the study of this relationship has been particularly investigated in empirical studies with SMEs as they face additional challenges in the demand for capital (Palacín-Sánchez et al. 2019). Assessing whether commercial credit and bank credit are complementary or substitutes for each other is an open debate. Therefore, the following hypotheses are formulated:

Hypothesis 1a (H1a). *Less short-term bank credit is associated with more trade credit.*

Hypothesis 1b (H1b). *Less short-term bank credit is associated with less trade credit.*

2.3. Company Variables

Besides the theoretical framework developed in the previous paragraphs, a literature review also makes it possible to identify internal drivers of bank credit and trade credit: profitability, warranties provided, liquidity, turnover growth, and risk.

2.3.1. Profitability

Profitability is a strong ally of bank credit insofar as, when it increases, financing conditions improve (Erdogan 2018). Profitability negatively influences the use of bank credit, but does not affect trade credit (Kirch and Terra 2012). However, Yazdanfar and Öhman (2017) show that profitability is negatively correlated with trade credit. The results indicate that SMEs with higher profitability use less trade credit as a financing instrument.

The negative relationship between profitability and indebtedness is justified by the fact that companies with higher profitability generate a greater volume of internal resources so that external financing decreases (Esperança et al. 2003). Similarly, older companies resort less to external financing due to internally generated funds (Agyei et al. 2020).

To address information asymmetries, companies must consolidate a long-term banking relationship with a limited number of institutions as financing conditions improve (Erdogan 2018). Older and more profitable companies rely more heavily on bank credit than young companies, which face high banking restrictions (Gama et al. 2010).

Companies with high profitability and liquidity use a smaller number of banking entities; however, in the long term, exclusive relationships may lead to a loss of income (Farinha 1999; Pinto et al. 2011). Consequently, we formulated the following hypotheses:

Hypothesis 2a (H2a). *Profitability affects bank credit.*

Hypothesis 2b (H2b). *Profitability affects trade credit.*

2.3.2. Warranties

The supply of bank credit depends positively on the number of assets the company offers as collateral (Farinha and Félix 2015). In underdeveloped markets and with many

financial intermediaries, the ability of small companies to resort to bank credit depends heavily on the warranties provided (Esperança et al. 2003). The volume of available assets is one of the most relevant factors for the capital structure insofar, as the provision of warranties ensures companies the possibility of negotiating longer debt terms (Vieira and Novo 2010).

In an empirical study with European SMEs, Hernández-Cánovas and Martínez-Solano (2010) show that trust between the company and the bank promotes access to finance, reduces borrowing costs, and increases the probability of providing warranties. In the same vein, Serrasqueiro and Nunes (2012) argue that companies with a high volume of tangible assets preferentially resort to long-term debt, continuing to finance themselves through trade credit. Large companies with high tangible assets rely more on bank credit (Kirch and Terra 2012). Kirch and Terra (2012) also conclude that the warranties provided play a significant role (risk reduction) in long-term loans. However, the number of warranties has positive marginal effects on the concentration of banking entities (González and González 2008). This result indicates that banking concentration and asset tangibility facilitate access to bank credit. In line with previous results, Agyei et al. (2020) report a positive relationship between the tangibility of assets and the level of indebtedness. Collateral appears as a necessary condition for obtaining bank credit. In companies with a significant volume of assets, agency conflicts between managers and creditors are mitigated, thus increasing the volume of credit (Ayed and Zouari 2014). Accordingly, we propose the following hypotheses:

Hypothesis 3a (H3a). *Warranties influence bank credit.*

Hypothesis 3b (H3b). *Warranties influence trade credit.*

2.3.3. Liquidity

During the 2008 financial crisis, companies with a high level of liquidity resorted to trade credit more often (García-Appendini and Montriol-Garriga 2013). Conversely, Ayed and Zouari (2014), Costa et al. (2014), and Legesse and Guo (2020) refer to a positive relationship between liquidity and short-term bank financing, and a negative relationship with long-term bank financing. Companies with higher liquidity have lower borrowing ratios (Antão and Bonfim 2008). SMEs with high levels of liquidity preferentially use internal resources to finance investment rather than debt (Agyei et al. 2020). In turn, for Gama et al. (2010), companies with excellent liquidity more often resort to trade credit.

In periods of the financial crisis, banks reduce credit, companies' liquidity decreases, and the probability of insolvency increases, which leads companies to resort more to trade credit (Bussoli and Marino 2018; Love et al. 2007). The authors conclude that strengthening trade credit through injections of liquidity into companies can reduce the impact of the financial crisis on SMEs. Suppliers are willing to forgive debts and extend the maturity period of credits when customers experience temporary liquidity shocks, which could threaten their survival (Cuñat 2007). In this sense, companies in financial difficulties delay the payment of debts to suppliers, usually without penalties or cuts in the flow of goods.

Companies with high cash flows use less trade credit (Niskanen and Niskanen 2006). The tremendous financial difficulties lead companies to adjust internal resources (cash) more quickly, mitigating agency costs, which were heightened after the 2008 financial crisis, and leading companies to increase their internal financing capacity in response to the rationing of credit originated (García-Teruel and Martínez-Solano 2010). In periods of the financial crisis, companies with more significant restrictions reduce the offer of credit to customers and increase the use of credit from suppliers (Yang 2011). As per the literature review, we established the following hypotheses:

Hypothesis 4a (H4a). *Liquidity affects bank credit.*

Hypothesis 4b (H4b). *Liquidity affects trade credit.*

2.3.4. Turnover Growth

Companies with high growth rates resort more to trade credit (Niskanen and Niskanen 2006). SMEs with high growth opportunities adjust more quickly to internally generated resources, particularly in times of crisis, in response to credit restrictions (Martínez-Sola et al. 2018). In turn, Fernandes et al. (2011) identify a positive relationship between business growth and medium and long-term financing sources. However, micro and small companies, subject to more significant financial constraints, have growth limited to the availability of resources and cannot take advantage of all growth opportunities (Moscalu et al. 2020). The authors also mention that the development of banking markets in the euro area promotes the growth of SMEs. The supply of credit establishes a significant relationship with the behaviour of SMEs, particularly with respect to their ability to grow. Adverse shocks, such as the 2008 financial crisis, directly affect the ability of companies to secure financing from the banking system (Vermoesen et al. 2013). Borrowing capacity increases as the company grows, and the probability of the company incurring financial insolvency costs decreases, given the greater diversification of its portfolio of activities (Vieira and Novo 2010). From the discussion above, we established the following hypotheses:

Hypothesis 5a (H5a). *Turnover growth affects bank credit.*

Hypothesis 5b (H5b). *Turnover growth affects trade credit.*

2.3.5. Risk of Bankruptcy

Risk inherent to business activity is an additional element in accessing credit. Despite its relevance, this has not been considered within the scope of the work around this theme. The pioneering model developed by Eduard Altman (1968) intends to predict the risk of bankruptcy in a time horizon of two years. Starting from a set of economic-financial indicators, it intends to estimate a bankruptcy indicator (Z-score) that allows for predicting the probability of future bankruptcy (Altman 1968). Altman (1983) has readjusted the model, replacing the market value of equity with the book value, as well as the cut-off points, allowing it to be applied to unlisted companies. The model is expressed as follows:

$$Z\text{-score} = 0.717X_1 + 0.0847X_2 + 3.107X_3 + 0.420X_4 + 0.998X_5$$

where X_1 = Working Capital/Total Assets; X_2 = Retained Earnings/Total Assets; X_3 = Earnings Before Interest and Taxes/Total Assets; X_4 = Book Value of Equity/Total Liabilities; X_5 = Sales Total Assets.

According to the overall index, if the Z-score value is greater than 2.90, the companies are classified as non-bankrupt firms (safe zone). If their index value ranges from 1.23 to 2.90, they are classified as in the grey area, and index values less than 1.23, suggesting that companies are in a difficult situation and these are classified as at a high risk of bankruptcy—distress zone (Altman and Hotchkiss 2006).

One of the main concerns associated with using this type of model stems from the interpretation of financial statements and the information generated that must comply with international financial accounting standards (Popov 2018). Consequently, we formulated the following hypotheses:

Hypothesis 6a (H6a). *Risk of bankruptcy affects bank credit.*

Hypothesis 6b (H6b). *Risk of bankruptcy affects trade credit.*

3. Sample and Data Analysis Methodologies

This is an empirical study based on a sample of 5860 SMEs. SMEs are defined according to the standard European Commission criteria (European Commission 2023), which includes firms that employ fewer than 250 workers in a given year and have either an annual turnover of less than EUR 50 m or a balance sheet total of less than EUR 43 m. Data

from these SMEs were obtained from the Iberian Balance Sheet Analysis System (SABI) and referred to a period of 10 years (2010 to 2019). Firms with missing values in the accounting information were excluded from the analysis. The sample also excludes all companies of the following sectors of activity, as they have specific characteristics, and it is understood that they should be studied separately: construction, real estate, insurance, finance, agriculture, fisheries, and public administration. The final sample includes 5860 firms and has 58,600 observations.

To study the determinants of bank and trade credit, regression models with panel data were used. The panel data methodology has been increasingly used in corporate finance research. In particular, it has been used by several authors in the scope of this theme—analysis of credit determinants (Bastos and Pindado 2013; Costa et al. 2014; Matias and Serrasqueiro 2017).

Analysis from panel data has advantages over cross-sectional data. In particular, it allows the regression model to consider individual heterogeneity due to intrinsic company characteristics. Therefore, it is possible to estimate the effect of the independent variables, taking into account that the companies are different, that is, controlling for factors invariant in time and that differentiate the companies (Gujarati and Bernier 2004). As observed by Bastos and Pindado (2013), controlling this heterogeneity is very important in the study of the use of credit, as this may depend on certain characteristics of firms and thus, the problem of not observing all relevant variables is reduced.

The dependent variable Bank Credit (Bcredit) is the ratio of short and long-term bank debt to total liabilities (Love et al. 2007; McGuinness and Hogan 2014). Trade Credit (Tcredit) is the ratio of (short- and long-term) trade debt to total liabilities (García-Teruel and Martínez-Solano 2010; Yang 2011).

As independent variables, the models consider: return on assets (ROA), defined by the ratio between operating profits and total assets (Serrasqueiro and Nunes 2012); collateral (Col), the ratio between tangible fixed assets and total assets (Yang 2011; Serrasqueiro and Nunes 2012); current ratio (CR), measured by current assets divided by current liabilities (Farinha 1999; Agyei et al. 2020); growth (GR), which, for year t , is measured by $(Turnover_t - Turnover_{t-1}) / Turnover_{t-1}$ (Petersen and Rajan 1994; García-Teruel and Martínez-Solano 2010), and risk Z-score (Zscore), which is considered as a qualitative variable with three categories (Altman and Hotchkiss 2006), the safe zone ($Z > 2.9$), the grey zone ($1.23 < Z < 2.9$), and the distress zone ($Z < 1.23$). The dummy for the distress zone was kept out of the model as the reference category. Age is also included as an independent variable. Age and firm size are often considered control variables in the study of commercial and bank credit (Palacín-Sánchez et al. 2019). In this study, firm size is assessed by collateral (Col). Models were also estimated with the time dummies for all years except 2013, which was used as the reference year.

Fixed effects and random effects models were estimated, as they are frequently used in estimating panel data regression models. In the fixed effects model, individual heterogeneity is allowed through the coefficient β_{0i} , which varies with the firms and captures all unobserved, time-invariant, individual characteristics that affect the dependent variable. In this study, the model is expressed by:

$$Y_{it} = \beta_{0i} + \beta_1 ROA_{it} + \beta_2 Col_{it} + \beta_3 CR_{it} + \beta_4 GR_{it} + \beta_5 Zscore_grey_{it} + \beta_6 Zscore_safe_{it} + \beta_7 Age_{it} + \varepsilon_{it} \quad i = 1 \dots N; \quad t = 1 \dots T$$

where Y_{it} is one of the dependent variables (bank credit or trade credit) of firm i at time t , β_{0i} is the non-observed individual-specific effect, and ε_{it} the error term.

In the random effects model, β_{0i} is considered a random variable, $\beta_{0i} = \beta_0 + u_i$:

$$Y_{it} = \beta_0 + \beta_1 ROA_{it} + \beta_2 Col_{it} + \beta_3 CR_{it} + \beta_4 GR_{it} + \beta_5 Zscore_grey_{it} + \beta_6 Zscore_safe_{it} + \beta_7 Age_{it} + u_i + \varepsilon_{it} \quad i = 1 \dots N; \quad t = 1 \dots T$$

where u_i is the individual-specific error component, representing the random individual effect.

Significant differences between firms are tested using the F test in the fixed effects model and using the Breusch-Pagan Lagrange Multiplier (LM) test in the random effects model. In all estimated models, these tests rejected the null hypothesis that there is no individual heterogeneity, which supports the use of fixed/random effects models.

Cluster robust standard errors are used in all estimated models to correct for serial correlation and heteroscedasticity.

The Hausman test is usually used to decide between the fixed and random effects model. This test compares the estimates of both models, which are expected to be similar if both estimators are consistent. However, if the assumption of non-correlation between the independent variables and the error term u_i is not satisfied, the random effects estimator will no longer be consistent, but the fixed effects estimator is unaffected. Thus, the rejection of the null hypothesis makes the choice of the fixed effects model more plausible. Additionally, the Arellano–Bond linear dynamic estimator was used to assess the lagged effect of the dependent variable, trade and bank credit. According to [Huang et al. \(2011\)](#), credit moves dynamically in a “flow in-stock-flow out” pattern, which was described by [Benishay \(1968\)](#). To put it another way, the quantity of credit “in stock”, or in the present period, is primarily based on what was available in the preceding period. Therefore, controlling for lagged credit effects is necessary to obtain a more realistic picture of the interaction effect between consecutive time points.

4. Results and Discussion

In [Figure 1](#), 95% of confidence intervals (CI) are presented for the averages of bank and trade credit in each year under study. Until 2013, there was a trend of growth in the use of trade credit, followed by a decrease, and the reverse is observed for bank credit. Since 2013 was a turning point, this year was considered the reference year in the estimated models. During the financial crisis, which began in 2008 and lasted until 2013, companies resorted more intensively to trade credit, given the difficulties encountered in the banking system. However, after 2013, this increased with the resumption of economic activity and the reduction in bank credit restrictions.

[Table 1](#) presents the descriptive statistics for the independent variables. The results indicate that, on average, companies increased profitability (ROA) from 2010 to 2019, namely from 2013 onwards, with the recovery of economic activity. Regarding warranties (Col) for the years under study, approximately 0.28% of the assets are tangible fixed assets, and, on average, current ratio (CR) values are greater than one, with an increasing trend, so companies have sufficient liquidity to meet their responsibilities. Concerning growth in turnover (GR), the mean values range from 0.06 in 2012 to 0.32 in 2010.

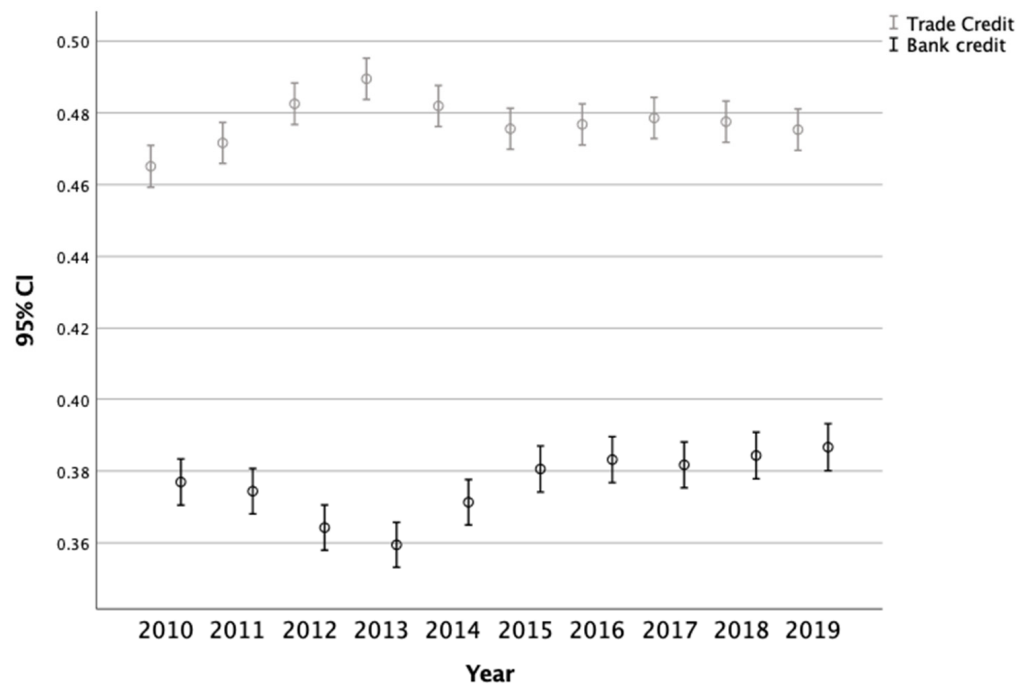


Figure 1. 95% confidence intervals for mean values of trade and bank credit by year.

Table 1. Descriptive statistics.

Year	Statistics	ROA	Col	CR	GR	Age
2010	Mean (SD)	0.0545 (0.0704)	0.2930 (0.1944)	1.7527 (1.1037)	0.3236 (3.1279)	19.5107 (14.8167)
	Median	0.0397	0.2619	1.4415	0.0832	17
2011	Mean (SD)	0.0493 (0.0679)	0.2895 (0.1950)	1.7890 (1.1320)	0.2414 (4.0096)	20.5085 (14.8162)
	Median	0.0366	0.2574	1.4585	0.0393	18
2012	Mean (SD)	0.0461 (0.0703)	0.2822 (0.1949)	1.8306 (1.1613)	0.0551 (0.4887)	21.5088 (14.8169)
	Median	0.0355	0.2503	1.5000	0.0000	19
2013	Mean (SD)	0.0564 (0.0708)	0.2793 (0.1924)	1.8524 (1.1450)	0.1284 (0.5550)	22.5092 (14.8166)
	Median	0.0417	0.2475	1.5280	0.0675	20
2014	Mean (SD)	0.0671 (0.0770)	0.2797 (0.1935)	1.9388 (1.2084)	0.1284 (0.5690)	23.5088 (14.8169)
	Median	0.0486	0.2448	1.6000	0.0706	21
2015	Mean (SD)	0.0695 (0.0741)	0.2838 (0.1933)	1.9980 (1.2517)	0.1121 (0.7668)	24.5088 (14.8169)
	Median	0.0494	0.2511	1.6400	0.0551	22
2016	Mean (SD)	0.0684 (0.0730)	0.2910 (0.1944)	2.0281 (1.2875)	0.0802 (0.2878)	25.5061 (14.8159)
	Median	0.0496	0.2599	1.6590	0.0484	23
2017	Mean (SD)	0.0689 (0.0738)	0.2952 (0.1921)	2.0526 (1.3188)	0.1287 (0.4087)	26.5088 (14.8169)
	Median	0.0500	0.2659	1.6660	0.0830	24
2018	Mean (SD)	0.0665 (0.0751)	0.2995 (0.1931)	2.0687 (1.3346)	0.0861 (0.2570)	27.5088 (14.8169)
	Median	0.0490	0.2711	1.6650	0.0542	25
2019	Mean (SD)	0.0646 (0.0781)	0.3011 (0.1923)	2.1728 (1.4943)	0.0686 (0.4671)	28.5088 (14.8169)
	Median	0.0472	0.2748	1.6975	0.0335	26

SD—Standard Deviation.

Pearson correlations are shown in Table 2. The correlations are relatively low, suggesting that multicollinearity should not be a problem. This is substantiated by the values below five of the variance inflation factor (VIF), calculated for the quantitative variables included in the models ROA (1.054), Col (1.1045), CR (1.1), GR (1.005), and Age (1.004).

Table 2. Correlation between quantitative independent variables.

	ROA	Col	CR	GR
ROA	1			
Col	−0.1374	1		
CR	0.1680	−0.2901	1	
GR	0.0385	0.0046	−0.0256	1
Age	−0.0935	0.0065	0.1552	−0.0525

Tables 3 and 4 present the regression results for bank credit and trade credit, respectively. The Hausman test rejects the null hypothesis, raising suspicion about the random effects model. However, the results of the two models, fixed effects and random effects, are identical in terms of significance and signs of the coefficients, both for trade and bank credit. Furthermore, with the introduction of the time dummy variables, the interpretation of the estimated models also does not change.

For bank credit, the fixed effects model proposes a negative relationship between profitability and bank credit—an increase in ROA is accompanied by a decrease in the use of bank credit, supporting hypothesis H2a. The results obtained agree with [Serrasqueiro and Caetano \(2015\)](#), who realize that there is a negative relationship between profitability and indebtedness. However, they differ from [Erdogan \(2018\)](#), who identifies a positive relationship between profitability and indebtedness since, when profitability increases, financing conditions improve.

Table 3. Estimated models for bank credit.

Bank Credit	Without the Dummies for the Year		With the Dummies for the Year	
	Fixed Effects Model	Random Effects Model	Fixed Effects Model	Random Effects Model
ROA	−0.1316995 *** (0.0163612)	−0.1262685 *** (0.0157488)	−0.1394959 *** (0.0164699)	−0.1380626 *** (0.0158961)
Col	0.4298704 *** (0.0142808)	0.4290318 *** (0.0120539)	0.4281331 *** (0.0143163)	0.4255743 *** (0.0120449)
CR	0.0331677 *** (0.0016323)	0.0315011 *** (0.0015345)	0.0330255 *** (0.00634)	0.0310835 ** (0.0015396)
GR	−0.0022985 *** (0.0006117)	−0.0023351 *** (0.0006285)	−0.0023532 *** (0.0006272)	−0.0023548 *** (0.0006375)
Zscore—Grey zone	−0.0420213 *** (0.0032853)	−0.4447552 *** (0.0031061)	−0.0419049 *** (0.0032804)	−0.0448042 *** (0.0030964)
Zscore—Safe zone	−0.1624452 *** (0.0055837)	−0.1768439 *** (0.0051734)	−0.1620986 *** (0.0055799)	−0.1769761 *** (0.0051642)
Age	0.0016097 *** (0.0003775)	0.0011495 *** (0.0001812)	−0.0058568 (0.0078799)	0.0006997 *** (0.0001697)

Robust standard errors are in parentheses. Coefficients of time dummies not reported; *** indicates significance at 1% level.

Table 4. Estimated models for trade credit.

Trade Credit	Without the Dummies for the Year		With the Dummies for the Year	
	Fixed Effects Model	Random Effects Model	Fixed Effects Model	Random Effects Model
ROA	−0.0730007 *** (0.0159637)	−0.085256 *** (0.0153893)	−0.0690659 *** (0.0160334)	−0.088319 *** (0.0154248)
Col	−0.3641811 *** (0.0122565)	−0.3662555 *** (0.00100133)	−0.3619666 *** (0.0122918)	−0.3678833 *** (0.0100743)
CR	−0.0435346 *** (0.0015685)	−0.0425367 *** (0.0014318)	0.0433945 *** (0.0015693)	−0.042878 ** (0.0014349)
GR	−0.0003518 (0.0007137)	0.002236 (0.0006683)	0.0004068 (0.0007312)	0.0003316 (0.0006978)
Zscore—Grey zone	0.0522939 *** (0.0028638)	0.0607472 *** (0.0026814)	0.0520897 *** (0.0028637)	0.060329 *** (0.0026867)
Zscore—Safe zone	0.15775635 *** (0.0028638)	0.1814645 *** (0.0046156)	0.1572341 *** (0.0050623)	0.1803989 *** (0.0046253)
Age	0.0016209 *** (0.0003312)	0.0003039 *** (0.0001528)	0.0014964 (0.0076249)	−0.0002977 (0.0001469)

Robust standard errors are in parentheses. Coefficients of time dummies not reported; ** indicates significance at 5% level and *** at 1% level.

Regarding the impact of warranties (Col), the results suggest a positive and significant relationship with bank credit, confirming hypothesis H3a. The smaller the warranties provided, the greater the restrictions on companies’ access to bank credit (Stiglitz and Weiss 1981). The warranties establish a direct relationship with the use of bank credit, as the increase in warranties facilitates access to credit (Farinha and Félix 2015). Companies that hold a significant volume of assets improve their conditions for accessing finance (Ayed and Zouari 2014). This positive effect of warranties on bank credit stems from the fact that the warranties play a significant role (risk reduction) in long-term loans (Kirch and Terra 2012). The results obtained are in line with the work carried out by González and González (2008) and Agyei et al. (2020).

The model also suggests a direct relationship of liquidity (CR) with bank financing, as an increase in general liquidity provides an increase in bank credit (H4a). The results are consistent with Legesse and Guo (2020) and Ayed and Zouari (2014), who state that liquidity is directly related to bank credit. Conversely, Garcia-Appendini and Montriol-Garriga (2013) and Gama et al. (2010) conclude that companies with high levels of liquidity depend more on trade credit, particularly in times of financial crisis.

Concerning the growth in turnover (GR), the results suggest a significant and negative relationship with bank credit (H5a), as companies, by expanding their commercial activity, manage to generate internal resources (self-financing), decreasing the need for bank credit. The results do not support the conclusions of Agyei et al. (2020), Yazdanfar and Öhman (2017), and Serrasqueiro and Caetano (2015) when they suggest that, as companies gain size, they have more negotiating power, increasing the use of bank credit. The authors also maintain that, when the size of the company increases, the problems of information asymmetry and agency costs are lower, facilitating access to bank credit.

Finally, regarding bankruptcy risk (z-score), the negative coefficients of the binary variables Zscore-Grey zone and Zscore-Safe zone indicate that companies in these categories use less bank credit than companies in the distress zone. In this sense, the model indicates that companies that are at risk of bankruptcy (distress zone) resort to bank credit more than others. Thus, hypothesis H6a is supported by the estimated models.

Estimation results for the dependent variable trade credit (Table 4) indicate that the effect of ROA on trade credit is also negative, supporting hypothesis H2b. In other words, companies with higher profitability tend to resort less to trade credit, as they generate

sufficient resources (Agyei et al. 2020). The results are in line with Yazdanfar and Öhman (2017) when they conclude that companies with higher profitability use less trade credit as a financing instrument. On the other hand, Kirch and Terra (2012) show that the fact that companies are able to secure bank credit has no impact on the use of trade credit.

The model suggests that warranties (Col) have a negative relationship with trade credit (H3b), which is in line with García-Teruel and Martínez-Solano (2010), since large companies have fewer financial constraints.

Concerning liquidity (CR), it is negatively associated with trade credit (H4b), suggesting that the lower the liquidity, the more companies resort to trade credit with suppliers. The results are in line with Love et al. (2007) and Bussoli and Marino (2018), when they conclude that, in periods of the financial crisis, banks reduce credit lines, liquidity decreases, and companies resort more to trade credit as a support instrument.

Regarding growth in turnover (GR), the results indicate that this variable does not have a significant effect on trade credit, so hypothesis H5b cannot be supported. However, Niskanen and Niskanen (2006) report that companies with high growth rates use trade credit more.

Finally, the models suggest that companies classified in the grey zone or in the safe zone use more trade credit than those in the distress zone, which supports H6b.

Table 5 shows the results of the fixed-effects estimation replacing the independent variables by their lagged values. For bank credit, the lagged effect of the independent variables, in terms of sign and significance, is equal to that predicted by the models given in Table 3. For trade credit, a positive effect of the lagged ROA was observed, as opposed to the negative effect of ROA predicted in the models in Table 4. This means that high profitability in one year is associated with greater access to trade credit in the following year (Box et al. 2018). The credibility of a company with high returns with its suppliers may be one of the possible explanations for this positive effect. However, in the same year, high profitability is associated with less use of trade credit. A possible explanation offered by Rodriguez-Rodriguez (2006) is that the less profitable a firm is, the more likely it is to resort to trade credit because otherwise, it may face a higher risk of going bankrupt. Additionally, the lagged growth in turnover (GR) is significantly and positively associated with trade credit.

Table 5. Fixed-effects models with lagged independent variables.

	Bank Credit	Trade Credit
L1.ROA	−0.0404757 *** (0.0154928)	0.048813 *** (0.0147905)
L1.Col	0.2738606 *** (0.0137742)	−0.2339244 *** (0.0119224)
L1.CR	0.0101701 *** (0.0013746)	−0.0115544 *** (0.0013625)
L1.GR	−0.0013968 ** (0.0005469)	0.0008811 ** (0.0003485)
Zscore—Grey zone	−0.0500314 *** (0.0033238)	0.0401698 *** (0.0029667)
Zscore—Safe zone	−0.1569917 *** (0.005282)	0.1095161 *** (0.004979)
Age	0.0034835 *** (0.0004188)	−0.000768 ** (0.0003692)

Robust standard errors in parentheses. ** indicates significance at 5% level and *** at 1% level.

To analyse if the determinants of bank and trade credit were the same during and after the financial crises, the models were estimated separately for the periods from 2010 to 2013 and after 2013 (2014 to 2019) (Table 6). Except for growth in turnover (GR), which loses

significance in the post-crisis period, the significant determinants of bank credit in the two periods under analysis are those established in earlier models. Furthermore, no differences were found in the significant determinants for trade credit.

Table 6. Estimated models for the period during and after the financial crisis.

	Bank Credit		Trade Credit	
	≤2013	>2013	≤2013	>2013
ROA	−0.1028687 *** (0.0206406)	−0.1601295 *** (0.0175573)	−0.0453536 *** (0.0239082)	−0.0676285 *** (0.0180393)
Col	0.3455245 *** (0.0222821)	0.4219209 *** (0.0170763)	−0.317908 *** (0.0217409)	−0.3546202 *** (0.0148063)
CR	0.0401843 *** (0.00224483)	0.0293925 *** (0.0018535)	−0.0508033 *** (0.0022623)	−0.0395303 *** (0.0018224)
GR	−0.0010253 *** (0.0003295)	−0.0029731 (0.0022544)	−0.0000443 (0.0006877)	0.0027032 (0.0021187)
Zscore—Grey zone	−0.0159538 *** (0.0037243)	−0.0405382 *** (0.0036482)	0.0277735 *** (0.00377)	0.0440993 *** (0.0033379)
Zscore—Safe zone	−0.0789757 *** (0.0064491)	−0.1386827 *** (0.0061565)	0.0776654 *** (0.0066993)	0.132846 *** (0.0057963)
Age	−0.0051731 *** (0.0007996)	−0.0001084 (0.0005349)	0.007697 *** (0.0007877)	0.0018799 *** (0.0005056)

Robust standard errors in parentheses. *** indicates significance at 1% level.

To analyse hypotheses H1, the fixed effects models presented in Table 7 were obtained, where bank credit was considered an independent predictor for trade credit and vice-versa. The models support the substitution hypothesis H1a, but not the complementary hypothesis H1b.

Table 7. Estimated models for analysis of the substitution or complementarity effect.

	Bank Credit	Trade Credit
Bank Credit		−0.615192 *** (0.0077165)
Trade Credit	−0.6789673 *** (0.0088336)	
ROA	−0.1812646 *** (0.014019)	−0.1540212 *** (0.0136794)
Col	0.1826034 *** (0.0121659)	−0.0997282 *** (0.0101943)
CR	0.0036078 *** (0.0014187)	−0.023132 *** (0.0013255)
GR	−0.0020596 ** (0.000444)	−0.0010622 ** (0.0005281)
Zscore—Grey zone	−0.0065155 *** (0.0025148)	0.0264427 *** (0.0022726)
Zscore—Safe zone	−0.0554647 ** (0.0041305)	0.0576285 *** (0.0040386)
Age	0.0027102 *** (0.0002776)	0.0026122 *** (0.000241)

Robust standard errors are in parentheses. ** indicates significance at 5% level and *** at 1% level.

Finally, to analyse the possible lagged effect of the dependent variable, the Arellano–Bond linear dynamic estimator was used (Table 8). As expected, the lagged effect of the dependent variable is positive, both for bank and trade credit, indicating that the increased use of a credit type in one year tends to continue in the following year. The dynamic models corroborate the conclusions suggested by the models in Table 7, with the only exception that the growth in turnover (GR) has lost its significant effect on bank credit.

Table 8. Arellano–Bond linear dynamic model.

	Bank Credit	Trade Credit
L1.Bank Credit	0.3565241 *** (0.0113299)	
L1.Trade Credit		0.1994232 *** (0.0105107)
Bank Credit		−0.6563467 *** (0.0094307)
Trade Credit	−0.5955426 *** (0.0101064)	
ROA	−0.1041775 *** (0.0146004)	−0.233731 *** (0.0181127)
Col	0.1965496 *** (0.0126653)	−0.0890334 *** (0.0120726)
CR	0.0165701 *** (0.0016668)	−0.0309341 *** (0.0020016)
GR	−0.000757 (0.0007134)	−0.0004512 (0.0012386)
Zscore	−0.000757 *** (0.0007134)	0.0201721 *** (0.0041228)
Age	0.001215 *** (0.000229)	0.0020677 *** (0.0002548)

Robust standard errors in parentheses. Zscore is not categorized; *** indicates significance at 1% level.

In summary, companies with higher profitability use less bank and trade credit. As for the warranties provided (collateral) and liquidity (CR), they positively condition access to bank credit and negatively affect trade credit. Turnover growth has a significant negative impact on the use of bank credit, but its effect on trade credit is not significant. Finally, the companies at risk of bankruptcy tend to use bank credit more and trade credit less than other companies. In terms of lagged effects, a positive lagged effect of profitability (ROA) and turnover growth (GR) was observed for trade credit. Separate analyses for the financial crisis period (2010–2013) and the post–crisis period (>2013) did not uncover changes in credit determinants, except for turnover growth (GR), which loses significance for bank credit. Finally, this study supports the substitutive relationship between bank and trade credit.

5. Conclusions

Given the small size and low liquidity of the Portuguese capital market, and because it is a country with markedly civil law characteristics, companies, namely SMEs, depend heavily on bank credit and commercial credit for the development of their activity.

This article aims to assess whether commercial credit and bank credit in SMEs have a complementary or substitutive relationship, and what are the determinants of these two sources of financing.

Using the panel data methodology for 5860 SMEs in the period between 2010 and 2019, the results show that the determinants of the two credit variables differ in sign and significance, corroborating the substitutive effect of the variables.

Operating profitability negatively affects bank credit, suggesting that companies with greater profitability finance their activity with internal resources. The guarantees provided and the amounts of liquidity are also relevant to bank credit, given the lower financial risk of these companies. Our results also show that companies at risk of bankruptcy resort more to bank credit, probably taking advantage of better knowledge of the company. This result may suggest the existence of asymmetric information problems in these companies.

On the contrary, there was a negative relationship between the guarantees provided and commercial credit. The liquidity index also has a negative sign, suggesting that companies with difficulties in generating cash flows prefer to resort to commercial credit. Finally, there was less use of commercial credit by companies at risk of bankruptcy, suggesting that companies with more significant difficulties resort less to commercial credit. This result suggests that it is more difficult to disseminate asymmetric information problems between trading partners than between companies and banks.

Finally, the results show that, in the crisis period, companies intensified the demand for commercial credit, probably due to the impossibility of banking, given regulatory impositions. At this point, in principle, SMEs would be more fragile and the credit risk much greater.

These findings should help clarify the importance of the substitutive link between a short-term bank loan and a commercial credit for SME survival.

5.1. Theoretical Implications

This study contributes in different ways to the literature. Namely, our research has the following theoretical implications:

1. First, we use a set of company characteristics and introduce a variable to assess how bankruptcy risk conditions credit.
2. Second, these findings should contribute to a better understanding of the significance of the substitutive link between bank credit and trade credit in ensuring the survival of SMEs.
3. Finally, we identify how the financial crisis (2010–2013) conditioned the use of credit by Portuguese companies.

5.2. Practical Implications

This study contributes in different ways to different stakeholders:

1. First, this study is relevant for Portuguese Small and Medium Enterprises, and banking, as the main drivers influencing the use of bank credit and trade credit, are analysed. Managers are responsible for making daily decisions in the company; therefore, they must identify the main drivers of debt. This work can also be necessary for current and potential shareholders, since credit restrictions strongly condition business value creation. Finally, the difficulties that companies face are conditioned by the decisions advocated by policymakers, business partners and suppliers, customers, and public authorities. More thorough/in-depth knowledge of the current context can help improve future circumstances.
2. Second, to the best of our knowledge, this study is the first to consider an indicator of risk of bankruptcy as an inducer of bank credit and trade credit in Portuguese companies.
3. Finally, with this work, academics, researchers, and professionals can understand the state of the art of this issue in the context of a small economy, proposing new approaches to a topic that is increasingly relevant in corporate finance.

5.3. Limitations and Lines for Future Research

The main limitation of this study stems from the fact that it did not include information that allows the relationship between companies and banking entities to be characterized, namely: proximity relationship, duration of the relationship, number of banks, and corporate governance. At the level of trade credit, it was also impossible to reflect elements that characterize the relationship between companies and suppliers. In addition, other control

variables could be considered in the model. For future research, additional studies should be developed that lead to a comparative analysis with other institutional and business realities similar to ours.

Author Contributions: Conceptualization, C.E.O.d.S.C., A.P.S.P. and C.M.R.H.; methodology, C.E.O.d.S.C., A.P.S.P. and C.M.R.H.; formal analysis, C.E.O.d.S.C., A.P.S.P. and C.M.R.H.; investigation, C.E.O.d.S.C., A.P.S.P., C.M.R.H. and M.E.D.N.; data curation, C.E.O.d.S.C., A.P.S.P. and C.M.R.H.; writing—original draft preparation, C.E.O.d.S.C., A.P.S.P., C.M.R.H. and M.E.D.N.; writing—review and editing, C.E.O.d.S.C., A.P.S.P., C.M.R.H. and M.E.D.N.; visualization, C.E.O.d.S.C., A.P.S.P., C.M.R.H. and M.E.D.N.; supervision, A.P.S.P., C.M.R.H. and M.E.D.N.; project administration, A.P.S.P., C.M.R.H. and M.E.D.N. All authors have read and agreed to the published version of the manuscript.

Funding: António Pedro Pinto: This work is funded by National Funds through the FCT—Foundation for Science and Technology, I.P., within the scope of the project Ref. UIDB/05583/2020. Furthermore, we would like to thank the Research Center in Digital Services (CISeD) and the Instituto Politécnico de Viseu for their support. Carla Henriques: This work was partially supported by the Center for Mathematics of the University of Coimbra—UIDB/00324/2020, funded by the Portuguese Government through FCT/MCTES. Maria Elisabete Neves: This work is supported by national funds, through the FCT—Portuguese Foundation for Science and Technology under the project UIDB/04011/2020.

Data Availability Statement: Not applicable.

Acknowledgments: António Pedro Pinto: This work is funded by National Funds through the FCT—Foundation for Science and Technology, I.P., within the scope of the project Ref. UIDB/05583/2020. Furthermore, we would like to thank the Research Center in Digital Services (CISeD) and the Instituto Politécnico de Viseu for their support. Carla Henriques: This work was partially supported by the Center for Mathematics of the University of Coimbra - UIDB/00324/2020, funded by the Portuguese Government through FCT/MCTES. Maria Elisabete Neves: This work is supported by national funds, through the FCT—Portuguese Foundation for Science and Technology under the project UIDB/04011/2020.

Conflicts of Interest: The authors declare no conflict of interest.

References

- Agyei, James, Shaorong Sun, and Eugene Abrokwah. 2020. Trade-Off Theory versus Pecking Order Theory: Ghanaian Evidence. *SAGE Open* 10: 1–13. [CrossRef]
- Ahmad, Shabir, and Rosmini Omar. 2016. Basic corporate governance models: A systematic review. *International Journal of Law and Management* 58: 73–107. [CrossRef]
- Altman, Edward. 1968. Financial Ratios, Discriminant analysis and the prediction of corporate bankruptcy. *Journal of Finance* 23: 589–609. [CrossRef]
- Altman, Edward. 1983. *Corporate Financial Distress: A Complete Guide to Predicting, Avoiding, and Dealing with Bankruptcy*. Frontiers in Finance Series; New York: John Wiley and Sons.
- Altman, Edward, and Edith Hotchkiss. 2006. *Corporate Financial Distress and Bankruptcy. Predict and Avoid Bankruptcy, Analyze and Invest in Distressed Debt*. New Jersey: John Wiley and Sons.
- Andrieu, Guillaume, Raffaele Staglianò, and Peter Van Der Zwan. 2018. Bank debt and trade credit for SMEs in Europe: Firm-, industry-, and country-level determinants. *Small Business Economics* 51: 245–64. [CrossRef]
- Antão, Paula, and Diana Bonfim. 2008. Capital Structure Decisions in the Portuguese Corporate Sector. *Economic Bulletin and Financial Stability Report Articles and Banco de Portugal Economic Studies*. Available online: <https://ideas.repec.org/a/ptu/bdpart/r200802.html> (accessed on 1 September 2022).
- Ayed, Wafa Hadriche Ben, and Sonia Ghorbel Zouari. 2014. Contractors financières et innovation dans les PME: Une etude econometric dans le context tunisien. *Revue Internationale PME* 27: 63–94. [CrossRef]
- European Commission. 2023. The European Commission Provides a Comparable Reference Group for Defining SMEs across the European Union. Available online: https://single-market-economy.ec.europa.eu/smes/sme-definition_en (accessed on 1 September 2022).
- Banerjee, Abhijit, and Esther Duflo. 2014. Do firms want to borrow more? Testing credit constraints using a directed lending program. *Review of Economic Studies* 81: 572–607. [CrossRef]
- Bastos, Rafael, and Julio Pindado. 2013. Trade credit during a financial crisis: A panel data analysis. *Journal of Business Research* 66: 614–20. [CrossRef]
- Beck, Thorsten, and Augusto De La Torre. 2007. The Basic Analytics of Access to Financial Services. *Financial Markets, Institutions and Instruments* 16: 79–117. [CrossRef]

- Benishay, Haskel. 1968. Parameters and relations of stochastically lagged and disaggregative time series. *Econometrica: Journal of the Econometric Society* 36: 155–71. [CrossRef]
- Biais, Bruno, and Christian Gollier. 1997. Trade credit and credit rationing. *Review of Financial Studies* 10: 903–57. [CrossRef]
- Box, Travis, Ryan Davis, Matthew Hill, and Chris Lawrey. 2018. Operating performance and aggressive trade credit policies. *Journal of Banking & Finance* 89: 192–208.
- Brei, Michael, Blaise Gadanecz, and Aaron Mehrotra. 2020. SME lending and banking system stability: Some mechanisms at work. *Emerging Markets Review* 43: 100676. [CrossRef]
- Bussoli, Candida, and Francesca Marino. 2018. Trade credit in times of crisis: Evidence from European SMEs. *Journal of Small Business and Enterprise Development* 25: 277–93. [CrossRef]
- Canto-Cuevas, Francisco-Javier, María-José Palacín-Sánchez, and Filippo di Pietro. 2016. Efectos del ciclo económico en el crédito comercial: El caso de la pyme española. *European Research on Management and Business Economics* 22: 55–62. [CrossRef]
- Carbó-Valverde, Santiago, Francisco Rodríguez-Fernández, and Gregory Udell. 2006. Bank market power and SME financing constraints. *Review of Finance* 13: 309–40. [CrossRef]
- Casey, Eddie, and Connor O’Toole. 2014. Bank lending constraints, trade credit and alternative financing during the financial crisis: Evidence from European SMEs. *Journal of Corporate Finance* 27: 173–93. [CrossRef]
- Cassia, Lucio, and Silvio Vismara. 2009. Firms’ trade credit and the local level of development of the banking system in Europe. *Investment Management and Financial Innovations* 6: 46–58.
- Catalin, Gherorghe. 2020. Evolution of Trade Credit in Romania—Trends and Challenges. *International Journal of Economics and Management Systems* 5: 14–20.
- Costa, Sérgio, Luís Laureano, and Raul Laureano. 2014. The debt maturity of Portuguese SMEs: The aftermath of the 2008 financial crisis. *Procedia-Social and Behavioral Sciences* 150: 172–81. [CrossRef]
- Cuñat, Vicente. 2007. Trade credit: Suppliers as debt collectors and insurance providers. *The Review of Financial Studies* 20: 491–527. [CrossRef]
- D’Ignazio, Alessio, and Carlo Menon. 2020. Causal Effect of Credit Guarantees for Small- and Medium-Sized Enterprises: Evidence from Italy. *The Scandinavian Journal of Economics* 122: 191–218. [CrossRef]
- De la Torre, Augusto, María Soledad Martínez Peria, and Sergio Schumkler. 2008. Bank Involvement with SMEs: Beyond Relationship Lending. *Policy Research Working Paper*, 1–50. [CrossRef]
- Degryse, Hans, Steven Ongena, and Günseli Tümer-Alkan. 2005. *Corporate Governance: A Review of the Role of Banks*. Working Paper. Tilburg: Center-Tilburg University.
- Degryse, Hans, Kent Matthews, and Tianshu Zhao. 2017. Relationship banking and regional SME financing: The case of Wales. *International Journal of Banking, Accounting and Finance* 8: 93–118.
- Erdogan, Aysa Ipek. 2018. Factors affecting SME access to bank financing: An interview study with Turkish bankers. *Small Enterprise Research* 25: 23–35. [CrossRef]
- Esperança, José Paulo, Ana Paula Matias Gama, and Mohamed Aazzim Gulamhussen. 2003. Corporate debt policy of small firms: An empirical (re)examination. *Journal of Small Business and Enterprise Development* 10: 62–80. [CrossRef]
- European Commission. 2014. *Helping Firms Grow, European Competitiveness Report 2014*. Brussels: European Commission.
- Farinha, Luísa. 1999. As Relações entre as Empresas e os Bancos: A Escolha entre uma Relação Exclusiva e o Relacionamento com Vários Bancos. *Boletim Económico, Banco de Portugal*, 91–99. Available online: <https://www.bportugal.pt/paper/relacoes-entre-empresas-e-os-bancos-escolha-entre-uma-relacao-exclusiva-e-o-relacionamento-com> (accessed on 1 September 2022).
- Farinha, Luísa, and Sónia Félix. 2015. Credit rationing for Portuguese SMEs. *Finance Research Letters* 14: 167–77. [CrossRef]
- Fernandes, António, Fernando Lobo Marques, and Zélia Maria Da Silva Serrasqueiro. 2011. Financing decisions of Portuguese micro-enterprises. *6th Annual International Symposium on Economic Theory, Policy and Applications*; Institute for Education and Research. Available online: <http://hdl.handle.net/10198/6248> (accessed on 1 September 2022).
- Gama, Ana Paula, Cesário Mateus, and Teixeira Andreia. 2010. Does Trade Credit Facilitate Access to Bank Finance? An Empirical from Portuguese and Spanish Small Medium size Enterprises. *International Research Journal of Finance and Economics* 45: 26–45.
- Garcia-Appendini, Emilia, and Judit Montriol-Garriga. 2013. Firms as liquidity providers: Evidence from the 2007–2008 financial crisis. *Journal of Financial Economics* 109: 272–91. [CrossRef]
- García-Teruel, Pedro Julian, and Pedro Martínez-Solano. 2010. Determinants of trade credit: A comparative study of European SMEs. *International Small Business Journal* 28: 215–33. [CrossRef]
- González, Vitor, and Francisco González. 2008. Influence of bank concentration and institutions on capital structure: New international evidence. *Journal of Corporate Finance* 14: 363–75. [CrossRef]
- Grosman, Anna, Ruth Aguilera, and Mike Wright. 2019. Lost in translation? Corporate governance, independent boards and blockholder appropriation. *Journal of World Business* 54: 258–72. [CrossRef]
- Gujarati, Damodar, and Bernard Bernier. 2004. *Econometrics*. Brussels: De Boeck, pp. 17–25.
- Halling, Michael, Alex Stomper, and Josef Zechner. 2005. Capital Market-Oriented Financing Prospects for Austrian SMEs. *Financial Stability Report* 10: 83–94.
- Hernández-Cánovas, Gienes, and Pedro Martínez-Solano. 2007. Effect of the Number of Banking Relationships on Credit Availability: Evidence from Panel Data of Spanish Small Firms. *Small Business Economics* 28: 37–53. Available online: <https://www.jstor.org/stable/40229517> (accessed on 1 October 2022).

- Hernández-Cánovas, Gines, and Pedro Martínez-Solano. 2010. Relationship lending and SME financing in the continental European bank-based system. *Small Business Economics* 34: 465–82. [CrossRef]
- Huang, Hui, Xiaojun Shi, and Shunming Zhang. 2011. Counter-cyclical substitution between trade credit and bank credit. *Journal of Banking & Finance* 35: 1859–78. [CrossRef]
- Illueca-Muñoz, Manuel, Lars Norden, and Stefan van Kampen. 2016. *Substitution Effects in Private Debt: Evidence from SMEs*. SSRN Working Paper. FGV Digital Repository. Available online: <https://bibliotecadigital.fgv.br/dspace/handle/10438/17568> (accessed on 1 October 2022). [CrossRef]
- Kestens, Katrien, Philippe Van Cauwenberge, and Heidi Vander Bauwhede. 2012. Trade credit and company performance during the 2008 financial crisis. *Accounting and Finance* 52: 1125–51. [CrossRef]
- Kirch, Guilherme, and Paulo Renato Soares Terra. 2012. Determinants of corporate debt maturity in South America: Do institutional quality and financial development matter? *Journal of Corporate Finance* 18: 980–93. [CrossRef]
- Kling, Gerhard, Salima Paul, and Eleimon Gonis. 2014. Cash holding, trade credit and access to short-term bank finance. *International Review of Financial Analysis* 32: 123–31. [CrossRef]
- Kohler, Marion, Erik Britton, and Anthony Yates. 2000. *Trade Credit and the Monetary Transmission Mechanism*. The Bank of England Working Paper, No. 115. Available online: <https://www.bankofengland.co.uk/working-paper/2000/trade-credit-and-the-monetary-transmission-mechanism> (accessed on 1 October 2022). [CrossRef]
- Legesse, Tenkir Seifu, and Haifeng Guo. 2020. Does firm efficiency matter for debt financing decisions? Evidence from the biggest manufacturing countries. *Journal of Applied Economics* 23: 106–28. [CrossRef]
- Love, Inessa, Lorenzo Preve, and Virginia Sarria-Allende. 2007. Trade credit and bank credit: Evidence from recent financial crises. *Journal of Financial Economics* 83: 453–69. [CrossRef]
- Martínez-Sola, Cristina, Pedro García-Teruel, and Ppedro Martínez-Solano. 2018. Cash holdings in SMEs: Speed of adjustment, growth and financing. *Small Business Economics* 51: 823–42. [CrossRef]
- Matias, Fernanda, and Zélia Serrasqueiro. 2017. Are there reliable determinant factors of capital structure decisions? Empirical study of SMEs in different regions of Portugal. *Research in International Business and Finance* 40: 19–33. [CrossRef]
- McGuinness, Gerard, and Teresa Hogan. 2014. Bank credit and trade credit: Evidence from SMEs over the financial crisis. *International Small Business Journal*. [CrossRef]
- McGuinness, Gerard, Teresa Hogan, and Ronan Powell. 2018. European trade credit use and SME survival. *Journal of Corporate Finance* 49: 81–103. [CrossRef]
- Moscalu, Maricica, Claudia Girardone, and Raffaella Calabrese. 2020. SMEs' growth under financing constraints and banking markets integration in the euro area. *Journal of Small Business Management* 58: 707–46. [CrossRef]
- Moutinho, Nuno, Carlos Francisco Alves, and Francisco Martins. 2022. The effect of borrower country financial system and corporate governance system types on the spread of syndicated loans. *Corporate Governance* 22: 846–69. [CrossRef]
- Mueller, Andreas, and Luca Sensini. 2021. Determinants of financing decisions of SMEs: Evidence from the hotel industry. *International Journal of Business and Management* 16: 117–27. [CrossRef]
- Nilsen, Jeffrey. 2002. Trade credit and bank lending channel. *Journal of Money, Credit, and Banking* 34: 226–53. [CrossRef]
- Niskanen, Jyrki, and Mervi Niskanen. 2006. The Determinants of Corporate Trade Credit Policies in a Bank-dominated Financial Environment: The Case of Finnish Small Firms. *European Financial Management* 12: 81–102. [CrossRef]
- Outa, Erick Randing, and Shawgat Kutubi. 2021. Bank corporate governance in Australia: Is there a conflict between the existing corporate culture and the Anglo-Saxon model of corporate governance? *Journal of Corporate Accounting and Finance* 32: 145–50. [CrossRef]
- Palacín-Sánchez, María José, Francisco Javier Canto-Cuevas, and Filippo Di-Pietro. 2019. Trade credit versus bank credit: A simultaneous analysis in European SMEs. *Small Business Economics* 53: 1079–96. [CrossRef]
- Petersen, Mitchell A., and Raghuram G. Rajan. 1994. The benefits of lending relationship: Evidence from small business data. *The Journal of Finance* 49: 3–37. [CrossRef]
- Pinto, António, Mário Augusto, and Paulo Gama. 2011. Determinants of the banking relationship and credit restrictions in Portuguese SMEs. *Repository of the Polytechnic Institute of Viseu*, 1–17. Available online: <http://hdl.handle.net/10400.19/2371> (accessed on 1 October 2022).
- Popov, Dimitar. 2018. Application of Altman Z-score for viability of small and medium enterprises. *Бизнес Посоки* 24: 5–17.
- Rodriguez-Rodriguez, Olga Maria. 2006. Trade Credit in Small and Medium Size Firms: An Application of the System Estimator with Panel Data. *Small Business Economics* 27: 103–26. [CrossRef]
- Serrasqueiro, Zélia, and Ana Caetano. 2015. Trade-off theory versus pecking order theory: Capital structure decisions in a peripheral region of Portugal. *Journal of Business Economics and Management* 16: 445–66. [CrossRef]
- Serrasqueiro, Zélia, and Paulo Maças Nunes. 2012. Is Age a Determinant of SMEs Financing Decisions? Empirical Evidence Using Panel Data Models. *Entrepreneurship Theory and Practice* 36: 627–54. [CrossRef]
- Serrasqueiro, Zélia, João Leitão, and David Smallbone. 2021. Small-and medium-sized enterprises (SME) growth and financing sources: Before and after the financial crisis. *Journal of Management & Organization* 27: 6–21.
- Stiglitz, Joseph E., and Andrew Weiss. 1981. Credit rationing in markets with imperfect information. *The American Economic Review* 71: 393–410. Available online: <https://www.jstor.org/stable/1802787> (accessed on 1 October 2022).

- Su, Jun, and Yuefan Sun. 2011. Informal finance, trade credit and private firm performance. *Nankai Business Review International* 2: 383–400. [[CrossRef](#)]
- Taketa, Kenshi, and Gregory F. Udell. 2007. Lending channels and financial shocks: The case of small and medium-sized enterprise trade credit and the Japanese banking crisis. *Monetary and Economic Studies* 25: 1–44.
- Ullah, Barkat. 2020. Financial constraints, corruption, and SME growth in transition economies. *The Quarterly Review of Economics and Finance* 75: 120–32. [[CrossRef](#)]
- Vermoesen, Veronique, Marc Deloof, and Eddy Laveren. 2013. Long-term debt maturity and financing constraints of SME during the global financial crisis. *Small Business Economics* 41: 433–48. [[CrossRef](#)]
- Vieira, Elisabete S., and António João Novo. 2010. The capital structure of SMEs: Evidence in the Portuguese market. *ISCA Studies*. [[CrossRef](#)]
- Wang, Xiadong, Liang Han, Xing Huang, and Biao Mi. 2021. The financial and operational impacts of European SMEs' use of trade credit as a substitute for bank credit. *The European Journal of Finance* 27: 796–825. [[CrossRef](#)]
- Yang, Xiaolou. 2011. The role of trade credit in the recent subprime financial crisis. *Journal of Economics and Business* 63: 517–29. [[CrossRef](#)]
- Yang, Wei, Haiyang Li, Gaowen Kong, and Dongmin Kong. 2021. Access to finance and SMEs' trade credit: Evidence from a regression discontinuity design. *Accounting and Finance* 61: 2997–3029. [[CrossRef](#)]
- Yazdanfar, Darush, and Peter Öhman. 2017. Substitute or complement? The use of trade credit as a financing source among SMEs. *Management Research Review* 40: 10–27. [[CrossRef](#)]
- Zarrouk, Hajer, Mohamed Sherif, Laura Galloway, and Teheni El Ghak. 2020. Entrepreneurial orientation, access to financial resources and SMEs' business performance: The case of the United Arab Emirates. *The Journal of Asian Finance, Economics and Business* 7: 465–74. [[CrossRef](#)]

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.