

# Investment in trade credit in small business start-ups: Evidence from Spain during a financial crisis

Sonia Baños-Caballero<sup>a</sup>, Pedro J. García-Teruel<sup>b</sup>

<sup>a</sup> University of Murcia, Faculty of Economics and Business, Dpt. Management and Finance, Campus Universitario de Espinardo, 30100-Murcia (SPAIN), tel: +34 868 883798, fax: +34 868 887537, email: sbanos@um.es. ORCID: 0000-0002-7988-6419

<sup>b</sup> University of Murcia, Faculty of Economics and Business, Dpt. Management and Finance, Campus Universitario de Espinardo, 30100-Murcia (SPAIN), tel: +34 868 887828, fax: +34 868 887537, email: pjteruel@um.es. ORCID: 0000-0001-7399-0111

## Abstract

This study analyses start-up firms' investment in trade credit during the period 2011-2014. We find that new or recently created firms had greater investments in trade credit than established firms. Moreover, the results indicate that start-up firms' investment in trade credit did not depend on their bargaining power or access to external finance. These findings suggest that the reason start-ups invested more in accounts receivable than established firms could be due to late payments or their granting credit to low-quality customers who cannot obtain credit from established firms.

**Keywords:** start-ups, trade credit, financial crisis, bargaining power, access to finance.

**JEL classification:** G30, G39

**Funding:** Grant PID2020-113741GB-I00 funded by MCIN/AEI/10.13039/501100011033. The authors also acknowledge financial support from Fundación CajaMurcia.

---

*Post-print version*

*Baños-Caballero, S., and García-Teruel, P. J., Investment in trade credit in small business start-ups: Evidence from Spain during a financial crisis, **Applied Economics**, 55(3), pp 273-282.*

(<https://doi.org/10.1080/00036846.2022.2086685>)

---

## **1. Introduction**

In recent years, the financial literature has reflected an interest in the financial structure of start-ups and their survival (see, for example, Cassar, 2004; Huyghebaert, et al., 2000; Huyghebaert and Van de Gucht, 2007; Cole and Sokolyk, 2018; Deloof and Vanacker, 2018). However, until now, very little attention has been paid to the investment decisions made by new or recently created firms. Since few firms survive their first years of life, we think that it is also necessary to study the investment decisions these firms make in depth and not only their financing decisions.

The trade credit granted to a customer, which is usually measured by accounts receivable, is a short-term investment that normally represents a significant part of the total assets of a firm and affects its profitability and liquidity, and consequently, its value. Specifically, investments in accounts receivable represent 28.37% of the total assets of the sample of Spanish firms considered in this study, on average. In the case of start-up firms, this investment represents 31.38% of their total assets. This raises the following questions. Do start-up firms invest in trade credit in a different way than established firms? If so, why?

Thus, our aim in this paper is to analyse start-up firms' investments in trade credit. In particular, we examine whether these firms invest in trade credit more or less than older firms, and we also analyse whether start-ups' investment in trade credit is influenced by their bargaining power or access to financing. There are several reasons why the trade credit provided by start-ups may be different from that offered by other established firms. As Huyghebaert (2006) indicates, start-ups have no established relationships with banks and suppliers, and they have no prior history or reputation, so they face important financial constraints in their first years of life (Huyghebaert and Van de Gucht, 2007).

Moreover, newly created firms do not know their customers or have established relationships with them; they face reputation problems and are in an asymmetric bargaining position with respect to their customers (Wilson and Summers, 2002).

We use a sample of small, non-financial Spanish firms during the period 2011-2014 to analyse start-ups' investments in trade credit for two reasons. First, according to the Bank of Spain in its 2017 report, this was a period characterised by a significant drop in credit granted to firms, especially to new firms, due to their higher credit risks and the lack of information banks had about them. Second, Spain provides an excellent setting for this study because capital markets are less developed than in Anglo-Saxon countries and firms receive most of their financing from financial institutions (Schmidt and Tyrell, 1997). In addition to the fewer financing alternatives available to Spanish firms, small firms also have greater financial restrictions (Whited 1992; Fazzari and Petersen 1993; Audretsch and Elston 1997). The Bank of Spain indicates in its 2015 Annual Report that external financing for smaller Spanish firms comes mainly from bank loans. In the case of start-ups, Astebro and Bernhardt (2003) and Deloof and Vanacker (2018) also demonstrate the importance of bank loans for the survival of these firms.

This paper contributes to the literature on start-up firms and the granting of trade credit. To our knowledge, this is the first work that studies start-ups' investments in trade credit, providing evidence about the differences between these firms and older firms in terms of investment in accounts receivable. The results indicate that start-up firms had greater investment in trade credit than established firms. Moreover, we find that start-up firms' investments in accounts receivable did not depend on their bargaining power or their access to external finance, so these firms' greater investment in trade credit could be due to late payments or their granting credit to low-quality customers who cannot obtain credit

from established firms. For start-up firms, it is more difficult to be aware of a buyer's credit worthiness, and these firms may also be forced to allow delayed payments from influential buyers.

The remainder of the paper is structured as follows: In Section 2, we review the literature related to trade credit and show why start-up firms may invest differently in trade credit than established firms. Section 3 specifies the financial conditions in Spain during the period 2011-2014. In Section 4, we present the model. Section 5 describes the data. Section 6 presents the results. Finally, Section 7 contains the conclusions.

## **2. Investment in trade credit during a financial crisis**

As Wilner (2000) and Cuñat (2007) indicate, suppliers can provide liquidity to their customers by granting trade credit. In this way, when liquidity in financial markets is scarce, as is the case during financial crises, firms in good financial positions can increase the amount of trade credit they provide to their financially constrained customers since suppliers have an implicit stake in the survival of their customers. Indeed, as Ng et al. (1999) indicate, firms can use trade credit to maintain long-term relationships with their customers. Garcia-Appendini and Montoriol-Garriga (2013) find that firms with high pre-crisis liquidity increased the trade credit they offered to their customers during the crisis. However, firms in worse financial positions may offer less trade credit when bank credit is scarce.

Some works analyse the use of trade credit during periods of credit rationing (Petersen and Rajan, 1997; Nilsen, 2002; Danielson and Scott, 2004; Wilner, 2000; Love et al. 2007; Tsuruta, 2013; Bastos and Pindado, 2013; Lin and Zhang, 2020; Lin and Qiao, 2021). Petersen and Rajan (1997) show that firms use more trade credit when bank credit

is unavailable. Nilsen (2002) also finds that small firms use more trade credit during periods of monetary contractions. Other works, such as those by Danielson and Scott (2004) and Wilner (2000), also find results along this line. Love et al. (2007), who studied how two financial crises affected trade credit in emerging economies, find that suppliers increase trade credit immediately after a crisis and then tighten the terms of credit in the following months and years due to decreases in bank credit. Tsuruta (2013) finds that small suppliers, even those with weak bargaining power, offer less trade credit during a recession. Bastos and Pindado (2013) observe that credit constraints during a financial crisis cause firms to postpone payments to suppliers and, in turn, these suppliers act accordingly with their suppliers. That is, there is a contagion effect. Thus, an increase in trade credit investment might not be a firm's investment strategy but rather involuntary investment due to delayed payments.

There are two reasons why start-up firms may have less investment in trade credit than established firms. Firstly, as Huyghebaert (2006) indicates, start-ups have no established relationships with banks and suppliers; they do not have prior histories or reputations, and they therefore face important financial constraints in their first years of life. Moreover, during a crisis period, financial conditions are tightened. This is especially relevant for newly created firms due to their higher credit risk and the reduced quantity and quality of information that banks have about them (2015 Annual report from the Bank of Spain). This limited access to finance for start-ups can lead to less investment in trade credit<sup>1</sup>. Secondly, start-ups do not know their customers and have no prior information about them, so they may ask for cash payments or offer stricter credit terms than older firms to avoid the risks of late payment or non-payment.

---

<sup>1</sup> Offering personal collateral could remediate this situation.

On the other hand, start-ups could invest more in trade credit than older firms for several reasons. First, as newly created firms do not have established relationships with customers or track records, they could use trade credit to guarantee the quality of their products before customers have to pay. This is a way to reduce information asymmetries. Smith (1987) suggests that when sellers do not have established reputations, more extended credit periods are expected because granting trade credit allows buyers to ascertain the quality of products and services before paying for them. Second, as Wilson and Summers (2002) indicate, start-ups could offer better credit terms than the standard terms in the industry to attract new customers. Young firms often have weaker bargaining positions, so customers could pressure these firms to receive better credit terms (Wilson and Summers, 2002). Huyghebaert, et al. (2000) find that start-ups with liquidity constraints do not grant less trade credit to their customers because they cannot impose stricter credit terms than the standard industry terms due to their lack of reputation. Fabbri and Kappler (2016) also indicate that bargaining power might explain why small credit-constrained firms offer trade credit. In addition to offering better credit terms, start-ups can also extend more credit to customers or extend credit to a greater number of customers than established firms to attract new customers and increase sales. Third, as start-ups do not know their customers, they could grant trade credit to low-quality customers who delay payments, so the increase in trade credit investment might not be an investment strategy to increase sales but an involuntary investment due to collection delays.

According to these arguments, start-ups could have more or less investment in trade credit than established firms.

### 3. Financial conditions in Spain during the period 2011-2014

According to the Bank of Spain in its 2017 report, Spanish banks and savings banks have been undergoing a profound restructuring process since 2008, making a great effort to clean up credit investment and improve their solvency. This process is reflected in the significant reduction in the number of credit institutions in this country, especially savings banks. During 2012 and 2013, the financial sector was notably unstable, with a significant increase in non-performing loans, a drop in credit granted and growing uncertainty about the solvency of the banking sector as a whole. Loans granted to firms fell from a reduction of 6% in 2011 to a reduction of 13.5% in 2013, and higher credit rates accompanied these reductions. Although the solvency and profitability of credit institutions improved in 2014, the volume of credit granted by Spanish banks continued to decline. These tightening financial conditions were especially relevant for new firms due to their higher credit risks and the lack of information banks had about them.

### 4. Model

To study whether start-up firms' trade credit investments differ from those of older firms, we estimate the following model by using the panel data methodology:

$$AR_{i,t} = \beta_0 + \beta_1 StartupDummy_{i,t} + \beta_2 Growth_{i,t} + \beta_3 Size_{i,t} + \beta_4 Stlev_{i,t} + \beta_5 Fcost_{i,t} + \beta_6 Internal\ funds_{i,t} + \eta_i + \lambda_t + \varphi_s + \varepsilon_{i,t} \quad (1)$$

Where  $AR_{i,t}$  is investment in trade credit, measured as accounts receivable over total assets.  $StartupDummy$  is a dummy variable that takes the value of 1 for recently created firms and 0 otherwise. The rest of the independent variables used are: growth opportunities (Growth), measured by sales growth  $(Sales_t - Sales_{t-1}) / Sales_t$ ; size (Size), defined by the natural logarithm of assets; short-term financing (Stlev), calculated as the

ratio of current liabilities to sales; the cost of outside financing (*Fcost*), defined as the ratio between financial cost and external financing minus trade credit; and capacity to generate internal resources (*Internal funds*), defined as the ratio of net profits plus depreciation to sales.  $\eta_i$  is the unobservable heterogeneity or the firm's unobservable individual effects;  $\lambda_t$  and  $\varphi_s$  are time and industry dummy variables; and  $\varepsilon_{i,t}$  is random disturbance.

Since previous literature has shown that the trade credit granted to customers depends on a firm's bargaining power and access to external finance (Petersen and Rajan, 1997; Wilner, 2000; Wilson and Summers, 2002; Cuñat, 2007; García-Teruel and Martínez-Solano, 2010; Giannetti et al., 2011; Yang, 2011; Abdulla et al., 2020), we also analyse whether start-up firms' investments in accounts receivable during the period 2011-2014 depended on their bargaining power and access to finance. To do this, we estimate the following models:

$$AR_{i,t} = \beta_0 + \beta_1 StartupDummy_{i,t} + \beta_2 StartupDummy_{i,t} \times BPDummy_{i,t} + \beta_3 BPDummy_{i,t} + \beta_4 Growth_{i,t} + \beta_5 Size_{i,t} + \beta_6 Stlev_{i,t} + \beta_7 Fcost_{i,t} + \beta_8 Internal\ funds_{i,t} + \eta_i + \lambda_t + \varphi_s + \varepsilon_{i,t} \quad (2)$$

$$AR_{i,t} = \beta_0 + \beta_1 StartupDummy_{i,t} + \beta_2 StartupDummy_{i,t} \times AFDummy_{i,t} + \beta_3 AFDummy_{i,t} + \beta_4 Growth_{i,t} + \beta_5 Size_{i,t} + \beta_6 Stlev_{i,t} + \beta_7 Fcost_{i,t} + \beta_8 Internal\ funds_{i,t} + \eta_i + \lambda_t + \varphi_s + \varepsilon_{i,t} \quad (3)$$

where  $BPDummy_{i,t}$  is a dummy variable that takes the value of 1 for firm-year observations with strong bargaining power and 0 otherwise. Bargaining power is measured as the ratio between a firm's annual sales and the total annual sum of sales in a given industry. A firm is considered to have strong bargaining power when it is above the 75th percentile.  $AFDummy_{i,t}$  is a dummy variable that takes the value of 1 for firm-year observations with better access to external finance and 0 otherwise. We use three different



variables to measure a firm's access to external finance (*Z score*, cash flow and size). *Z score* captures the probability of a firm's financial distress, which could affect its access to finance. We use the re-estimation of Altman's (1968) model by Begley, Mings and Watts (1996), and we consider that a firm has better access to external finance when it is above the 75th percentile. The cash flow variable is defined as the ratio of earnings before interest and tax plus depreciation to total assets, and we assume that firms with a cash flow above the 75th percentile have better access to finance. Finally, firms with a size above the 75th percentile are considered to have better access to finance. The rest of the variables are defined as previously explained.

## **5. Data**

The data used in this study were obtained from the SABI database, which contains accounting and financial information for Spanish and Portuguese firms and is developed by Bureau Van Dijk. We use a sample of small, non-financial Spanish firms during the period 2011-2014. This period was characterised by a significant drop in credit granted to firms, especially new firms, due to their greater risk of bankruptcy and the difficulty financial institutions had in assessing the quality of these firms without historical information, according to the 2017 Bank of Spain report. We only use small firms because the initial size of newly created companies in Spain is, in general, small, with an average of 4.6 workers<sup>2</sup>. This characteristic was accentuated during the crisis period, given that the average size of the firms created in Spain has decreased since 2008. We carried out the selection of small firms according to the requirements established by European Commission Recommendation 2003/361 / EC.

---

<sup>2</sup> Each firm must have at least 10 employees for the last year available.

We consider start-ups to be firms that were established during the period studied (2011-2014), so our sample is made up of start-ups between 1 and 4 years old. This definition is in line with that proposed by Berger and Udell (1998), who distinguish four groups of companies: infants (0 to 2 years), adolescents (3 to 4 years), middle-aged (5 to 24 years) and old (more than 25 years). Thus, we have considered the first two categories as newly created firms. We consider already established firms to be those that have been in business for five years or more.

The data obtained was refined. Specifically, we eliminated observations with errors in the accounting data and those with values below the 1st percentile and above the 99th percentile for all the variables. Consequently, the sample comprises 38,376 firms, of which 1,154 are considered start-ups.

The sample has been divided into five sectors of activity. Table 1 presents the number of firms by sector, distinguishing between start-up firms and established firms.

INSERT TABLE 1

Table 2 shows the descriptive statistics for all the observations of the sample, and Table 3 presents the correlation matrix.

INSERT TABLE 2

INSERT TABLE 3

Table 4 presents the mean values of investments in accounts receivable for both groups of firms and the difference of means. As can be seen, newly created firms had more investment in trade credit, on average, than established firms, and the difference is significant. Figure 1 presents investments in accounts receivable by year, distinguishing

between start-ups and non-start-ups. We can observe that investment in trade credit was greater in newly created firms throughout the analysed period.

INSERT TABLE 4

INSERT FIGURE 1

We also find this mean difference when we use a matching procedure to compare the sample of start-ups with a sample of established firms with similar characteristics. The matching estimator we used was replacement, with all the matching firms within the predefined propensity score distance (caliper)  $\delta=0.001$ . We created five matched samples based on the following firm characteristics: size and sector; sales growth and sector; short-term financing and sector; cost of outside financing and sector; and the capacity to generate internal resources and sector. Table 5 shows the investment in accounts receivables for start-ups and established firms for each matched sample. The results indicate that, regardless of the criteria used to match the firms, start-ups had more investment in trade credit than established firms.

INSERT TABLE 5

In Table 6, we present investments in accounts receivable by sector. We can see that in all the sectors except the service sector, newly created firms also invested more in trade credit, on average. We can observe that firms generally had more investment in accounts receivable in the construction sector.

INSERT TABLE 6

## 6. Empirical evidence

Our first aim is to analyse whether the investment newly created firms have in trade credit differs from that of older firms. To do this, we estimate Model (1) described in Section 3. Following Hausman's (1978) test, the regression is estimated using a fixed effects model (p-value is 0.00). The results are presented in column (1) of Table 7 and indicate that start-up firms had more investment in trade credit than established firms during the financial crisis period 2011-2014. As we previously commented, this could be due to several reasons. First, newly created firms could use trade credit to reduce information asymmetries, as this is a way to guarantee product quality before customers have to pay. Second, these firms face reputation problems when entering new markets (Wilson and Summers, 2002), so they may decide to grant more trade credit as a sign of commitment. They can offer better credit terms, extend more credit to customers or extend credit to a greater number of customers to attract new customers and increase sales. It is difficult for these firms to be successful if they do not offer competitive terms of sales, so providing more trade credit than the industry average could be a way to attract new customers (Wilson and Summers, 2002). As Wilson and Summers (2002) indicate, young firms tend to be in an asymmetric bargaining position in relation to their customers, so the greater investment in trade credit may be due to customer pressure. Third, this larger investment by newly created firms in accounts receivable could be due to late payments since these firms do not know their customers well and could extend credit to customers who do not want to or cannot pay. As start-ups do not have established relationships with their customers, it is more difficult for these firms to be aware of a buyer's credit worthiness. Moreover, start-up firms could be forced to allow delayed payments from influential buyers.

After observing that start-up firms had more investment in trade credit than established firms, we delve into the reason newly created firms invested more in accounts receivable. To do this, we study whether start-up firms' investments in accounts receivable were influenced by their bargaining power or access to finance. One reason these firms had more investment in trade credit than established firms during the financial crisis period 2011-2014 could be their weaker bargaining positions. Fabbri and Klapper (2016) find that firms with weak bargaining power grant more trade credit. Thus, we analyse whether start-up firms with more bargaining power imposed stricter credit terms than start-ups with less bargaining power. To do this, we estimate Model (2), described in Section 3, and present the results in column (2) of Table 7. The results indicate that bargaining power did not affect start-ups' investment in trade credit. Therefore, start-ups could have had greater investment in trade credit than established firms for reputational reasons, as an investment strategy to increase their sales, or due to credit granted to low-quality customers, but not because of their weaker bargaining power. Taking this result into account, we also study whether start-up firms' investments in accounts receivable depended on their access to finance. If start-up firms granted more trade credit as an investment strategy or for reputational reasons, it is to be expected that those start-ups with greater access to external financing would grant more trade credit than start-ups with more limited access to financing. Indeed, start-up firms had significant difficulties obtaining financing during the crisis period and, therefore, in financing investments in accounts receivable. Columns (3) to (5) of Table 7 show the results of estimating Model (3) by using the different proxies for external financing access specified in Section 3. We find that access to financing did not affect start-up firms' investments in trade credit either. Thus, this finding suggests that start-ups could have had more investment in accounts receivable than established firms due to overdue payments or because they

granted credit to customers established firms were not willing to give credit to. Start-ups do not know their customers well and could grant credit to low-quality customers, or they could be forced to allow delayed payments from influential buyers.

INSERT TABLE 7

## **7. Conclusions**

This paper studies start-up firms' investments in trade credit during the period 2011-2014. Specifically, it analyses whether start-up firms had more or less investment in trade credit than established firms and whether this investment was influenced by their bargaining power or access to finance. To our knowledge, this paper is the first to analyse investments in accounts receivable in recently created firms. Moreover, unlike the rest of the studies on start-up firms, this study uses a sample of firms that includes both start-ups and already established firms, which allows us to make comparisons between both groups. The results show that start-up firms had greater investments in trade credit than established firms. The greater investment in trade credit by newly created firms could be due to their weak bargaining power, an investment strategy to increase sales, the granting of credit to low-quality customers, or late payments. However, we find that the bargaining power of start-up firms and their access to external financing did not affect their investment in accounts receivable, so the greater investment in trade credit of newly created firms could have been due to late payments or their granting credit to low-quality customers who cannot obtain credit from established firms.

These results are of interest to managers and shareholders because investment in trade credit has an impact on firms' operating performance and value (e.g., Martínez-Sola, et al., 2012; Box et al., 2018). According to our findings, we could infer that start-up firms

could be granting credit to low-quality customers. If so, these results suggest that managers of these firms should check whether their current trade credit policy may be affecting profitability.

## References

Abdulla, Y., Dang, V. A., & Khurshed, A. (2020). Suppliers' listing status and trade credit provision. *Journal of Corporate Finance*, 60, 101535. <https://doi.org/10.1016/j.jcorpfin.2019.101535>

Altman, E. (1968). Financial ratios, discriminant analysis and the prediction of the corporate bankruptcy. *Journal of Finance*, 23, 589–609. <https://doi.org/10.1111/j.1540-6261.1968.tb00843.x>

Astebro, T., & Bernhardt, I. (2003). Start-up financing, owner characteristics, y survival. *Journal of Economics and Business*, 55, 303-319. [https://doi.org/10.1016/S0148-6195\(03\)00029-8](https://doi.org/10.1016/S0148-6195(03)00029-8)

Audretsch, D. B., & Elston, J. A. (1997). Financing the German mittelstand. *Small Business Economics*, 9, 97–110. <https://doi.org/10.1023/A:1007963621438>

Bank of Spain (2015). Informe anual. Available at: [https://www.bde.es/bde/es/secciones/informes/Publicaciones\\_an/Informe\\_anual/index2015.html](https://www.bde.es/bde/es/secciones/informes/Publicaciones_an/Informe_anual/index2015.html)

Bank of Spain (2017). Informe anual. Available at: [https://www.bde.es/bde/es/secciones/informes/Publicaciones\\_an/Informe\\_anual/index2017.html](https://www.bde.es/bde/es/secciones/informes/Publicaciones_an/Informe_anual/index2017.html)

Bastos, R., Pindado, J. (2013). Trade credit during a financial crisis: A panel data analysis. *Journal of Business Research*, 66, 614-620. <https://doi.org/10.1016/j.jbusres.2012.03.015>

Begley, J., Mings, J., & Watts, S. (1996). Bankruptcy classification errors in the 1980s: An empirical analysis of Altman's and Ohlson's models. *Review of Accounting Studies*, 1, 267–284. <https://doi.org/10.1007/BF00570833>

Berger, A.N., & Udell, G.F. (1998). The economics of Small Business Finance: The Roles of Private Equity and Debt Markets in the Financial Growth Cycle. *Journal of Banking and Finance*, 22, 613-673. [https://doi.org/10.1016/S0378-4266\(98\)00038-7](https://doi.org/10.1016/S0378-4266(98)00038-7)

Box, T., Davis, R., Hill, M., & Lawrey, C. (2018). Operating performance and aggressive trade credit policies. *Journal of Banking and Finance*, 89, 192-208. <https://doi.org/10.1016/j.jbankfin.2018.02.011>

Cassar, G. (2004). The financing of business start-ups. *Journal of Business Venturing*, 19, 261–283. [https://doi.org/10.1016/S0883-9026\(03\)00029-6](https://doi.org/10.1016/S0883-9026(03)00029-6)

Cole, R. A., & Sokolyk, T. (2018). Debt financing, survival, and growth of start-up firms. *Journal of Corporate Finance*, 50, 609–625. <https://doi.org/10.1016/j.jcorpfin.2017.10.013>

Cuñat, V., (2007). Trade credit: suppliers as debtcollectors and insurance providers. *Review of Financial Studies*, 20(2), 491–527.



- Danielson, M. G., & Scott, J. A. (2004). Bank loan availability and trade credit demand. *Financial Review*, 39, 579–600. <https://doi.org/10.1111/j.0732-8516.2004.00089.x>
- Deloof, M., & Vanacker, T. (2018). The recent financial crisis, start-up financing and survival. *Journal of Business Finance and Accounting*, 45, 928-951. <https://doi.org/10.1111/jbfa.12319>
- Fabbri, D., & Klapper, L. F. (2016). Bargaining power and trade credit. *Journal of Corporate Finance*, 41, 66-80. <https://doi.org/10.1016/j.jcorpfin.2016.07.001>
- Fazzari, S. M., & Petersen, B. (1993). Working capital and fixed investment: New evidence on financing constraints, *Rand Journal of Economics*, 24, 328–342. <https://doi.org/10.2307/2555961>
- Garcia-Appendini, E., & Montoriol-Garriga, J. (2013). Firms as liquidity providers: Evidence from the 2007-2008 financial crisis. *Journal of Financial Economics*, 109, 272-291. <https://doi.org/10.1016/j.jfineco.2013.02.010>
- García-Teruel, P. J., & Martínez-Solano, P. (2010). A dynamic approach to accounts receivable: a study of Spanish SMEs. *European Financial Management*, 16, 400-421. <https://doi.org/10.1111/j.1468-036X.2008.00461.x>
- Giannetti, M., Burkart, M., & Ellingsen, T. (2011). What you sell is what you lend? Explaining trade credit contracts. *Review of Financial Studies*, 24 (4), 1261-1298. <https://doi.org/10.1093/rfs/hhn096>
- Hausman, J. A. (1978). Specification tests in Econometrics. *Econometrica*, 46, 1251-1271. <https://doi.org/10.2307/1913827>

Huyghebaert, N., Gaeremynck, A., Roodhooft, F., & Van de Gucht, L. M. (2000). New Firm Survival: The Effects of Start-up Characteristics. *Journal of Business Finance and Accounting*, 27, 627-651. <https://doi.org/10.1111/1468-5957.00328>

Huyghebaert, N. (2006). On the determinants and dynamics of trade credit use: Empirical evidence from business start-ups. *Journal of Business Finance and Accounting*, 33, 305-328. <https://doi.org/10.1111/j.1468-5957.2006.001364.x>

Huyghebaert, N., & Van de Gucht, L. M. (2007). The determinants of financial structure: New insights from business start-ups. *European Financial Management*, 13(1), 101–133. <https://doi.org/10.1111/j.1468-036X.2006.00287.x>

Lin, Q., & Zhang, T. (2020). Trade credit in economic fluctuations and its impact on corporate performance: a panel data analysis from China. *Applied Economics*, 52 (1), 1-18. <https://doi.org/10.1080/00036846.2019.1621982>

Lin, Q., & Qiao, B. (2021). The relationship between trade credit and bank loans under economic fluctuations - based on the perspective of the supply chain. *Applied Economics*, 53 (6), 688-702. <https://doi.org/10.1080/00036846.2020.1809632>

Love, I., Preve, A. P., & Sarria-Allende, V. (2007). Trade credit and bank credit: Evidence from recent financial crises. *Journal of Financial Economics*, 83, 453–469. <https://doi.org/10.1016/j.jfineco.2005.11.002>

Martínez-Sola, C., García-Teruel, P. J., & Martínez-Solano, P. (2012). Trade credit policy and firm value. *Accounting & Finance*, 53, 791-808. <https://doi.org/10.1111/j.1467-629X.2012.00488.x>

- Nilsen, J. (2002). Trade credit and the bank lending channel. *Journal of Money, Credit, and Banking*, 34, 226–253.
- Ng, C.K., Smith, J.K., & Smith, R.L. (1999). Evidence on the determinants of credit terms used in interfirm trade. *Journal of Finance*, 54, 1109–1129. <https://doi.org/10.1111/0022-1082.00138>
- Petersen, M. A., & Rajan, R. G. (1997). Trade credit: theories and evidence. *Review of Financial Studies*, 10, 661–692. <https://doi.org/10.1093/rfs/10.3.661>
- Schmidt, R., & Tyrell, M. (1997). Financial systems, corporate finance and corporate governance. *European Financial Management*, 3, 333–361. <https://doi.org/10.1111/1468-036X.00047>
- Smith, J. K. (1987). Trade credit and informational asymmetry. *Journal of Finance*, 62, 863-872. <https://doi.org/10.1111/j.1540-6261.1987.tb03916.x>
- Tsuruta, D. (2013). Customer relationships and the provision of trade credit during a recession. *Applied Financial Economics*, 23, 1017-1031. <https://doi.org/10.1080/09603107.2013.791016>
- Whited, T. M. (1992). Debt, liquidity constraints, and corporate investment: Evidence from panel data. *Journal of Finance*, 47, 1425–1460. <https://doi.org/10.1111/j.1540-6261.1992.tb04664.x>
- Wilner, B. S. (2000). The exploitation of relationships in financial distress: the case of trade credit. *Journal of Finance*, 55 (1), 153–178. <https://doi.org/10.1111/0022-1082.00203>

Wilson, N., & Summers, B. (2002). Trade credit terms offered by small firms: survey evidence and empirical analysis. *Journal of Business, Finance and Accounting*, 29, 317-351. <https://doi.org/10.1111/1468-5957.00434>

Yang, X. (2011). The role of trade credit in the recent subprime financial crisis. *Journal of Economics and Business*, 63, 517-529. <https://doi.org/10.1016/j.jeconbus.2011.05.001>

**Table 1**

Number of firms by sector

Industry	Description	Established firms	Start-ups	Total sample
1	Agriculture, livestock and fishing	1,049	55	1,104
2	Manufacturing	10,909	255	11,164
3	Construction	4,267	145	4,412
4	Wholesale and retail trade	10,876	280	11,156
5	Services	10,121	419	10,540
	Total	37,222	1,154	38,376

**Table 2**

Descriptive statistics

Variable	Obs.	Mean	Std.Dev.	10th percentile	90th percentile
AR	94,721	0.2837	0.1921	0.0415	0.5593
Growth	80,161	0.0446	0.3294	-0.2083	0.2904
Size	94,721	7.4509	0.8900	6.2237	8.5789
Stlev	94,721	0.3688	0.2672	0.1488	0.6437
Fcost	94,721	0.0960	0.1566	0.0218	0.1719
Internal funds	91,719	0.0445	0.0676	-0.0057	0.1180

AR is investment in trade credit, measured as accounts receivable over total assets. Growth is growth opportunities, measured by sales growth  $(Sales_t - Sales_{t-1}) / Sales_t$ . Size is size, defined by the natural logarithm of assets. Stlev is short-term financing, calculated as the ratio of current liabilities to sales. Fcost is the cost of outside financing, defined as the ratio between finance cost and external financing minus trade creditors. Internal funds is the capacity to generate internal resources, defined as the ratio of net profits plus depreciation to sales.

**Table 3**

Correlation matrix

	AR	Growth	Size	Stlev	Fcost	Cash flow
AR	1,0000					
Growth	0.0747***	1,0000				
Size	-0.0762***	-0.0345***	1,0000			
Stlev	-0.0747***	-0.0661***	0.2364***	1,0000		
Fcost	0.1156***	0.0136***	-0.1027***	-0.0353***	1,0000	
Internal funds	-0.1346***	0.1130***	0.1514***	-0.0471***	-0.0755***	1,0000

AR is investment in trade credit, measured as accounts receivable over total assets. Growth is growth opportunities, measured by the sales growth  $(Sales_t - Sales_{t-1}) / Sales_t$ . Size is size, defined by the natural logarithm of assets. Stlev is short-term financing, calculated as the ratio of current liabilities to sales. Fcost is the cost of outside financing, defined as the ratio between finance cost and external financing minus trade creditors. Internal funds is the capacity to generate internal resources, defined as the ratio of net profits plus depreciation to sales.

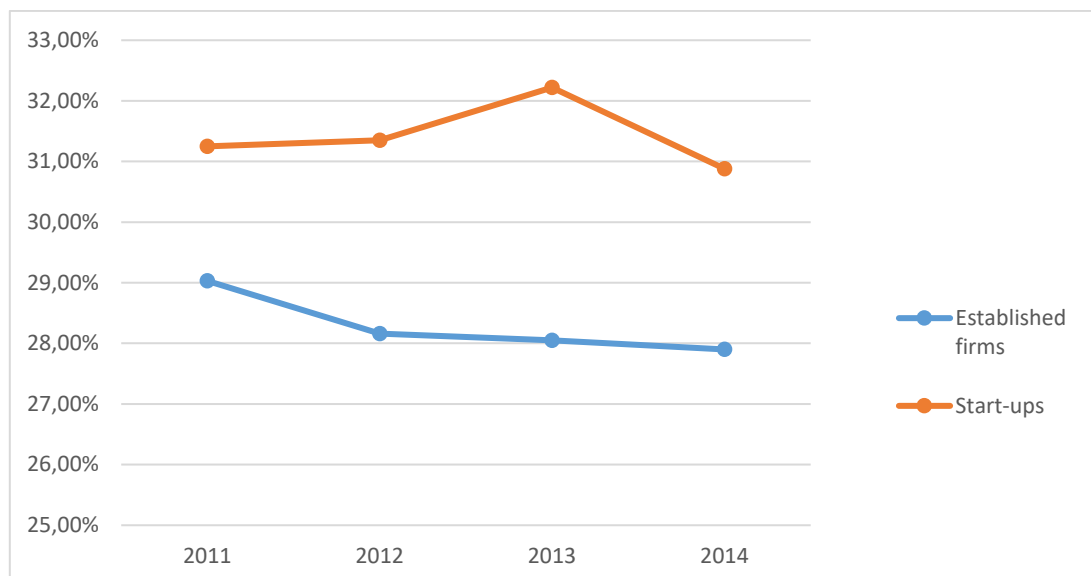
**Table 4**

Investment in accounts receivable in start-up and non-start up firms

	<i>Start-ups</i>	Established firms	Difference of means	t-test
Investment in AR	0.3138	0.2831	0.0307	6.5725***

**Figure 1**

Investment in accounts receivable by year



**Table 5**

Investment in accounts receivable for start-ups and established firms with similar characteristics					
<b>Matching method: Caliper, d=0.001</b>	<b>Control group</b>	<b>Treatment group</b>	<b>Difference</b>	<b>SE</b>	<b>t</b>
Sales growth and sector	0.2870	0.3113	0.0244	0.0111	2.19**
Size and sector	0.2842	0.3138	0.0296	0.0075	3.96***
Short-term financing and sector	0.2775	0.3138	0.0363	0.0072	5.01***
Cost of outside financing and sector	0.2727	0.3138	0.0411	0.0073	5.65***
Capacity to generate internal resources and sector	0.2822	0.3101	0.0279	0.0075	3.73***

**Table 6**

Investment in accounts receivable by sector					
Investment in AR	Agriculture, livestock and fishing	Manufacturing	Construction	Wholesale and retail trade	Services
Total sample	0.2031	0.2926	0.3736	0.2689	0.2608
Start-ups	0.2688	0.3756	0.4602	0.2839	0.2471
Established firms	0.2014	0.2914	0.3718	0.2686	0.2611

**Table 7**

Investment in accounts receivable

	(1)	(2)	(3)	(4)	(5)
<i>Startup dummy</i>	0.0130** (2.44)	0.0133** (2.30)	0.0132** (2.32)	0.0134** (2.45)	0.0194*** (3.43)
<i>Startup dummy x BPDummy</i>		-0.0030 (-0.61)			
<i>BPDummy</i>		0.0182*** (12.07)			
<i>Startup dummy x Zscore dummy</i>			-0.0034 (-0.74)		
<i>Zscore dummy</i>			0.0152*** (10.75)		
<i>Startup dummy x Cash flow dummy</i>				0.0010 (0.31)	
<i>Cash flow dummy</i>				0.0049*** (5.18)	
<i>Startup dummy x Size dummy</i>					-0.0008 (-0.13)
<i>Size dummy</i>					0.0090*** (5.12)
Growth	0.0317*** (28.29)	0.0303*** (27.02)	0.0301*** (26.79)	0.0315*** (28.74)	0.0345*** (31.13)
Size	0.0375*** (16.79)	0.0322*** (14.17)	0.0419*** (18.49)	0.0415*** (19.03)	
Stlev	0.0116*** (4.55)	0.0157*** (6.12)	0.0142*** (5.58)	0.0073*** (2.98)	0.0229*** (9.37)
Fcost	0.0115*** (3.98)	0.0108*** (3.75)	0.0100*** (3.47)	0.0093*** (3.29)	0.0075*** (2.60)
Internal funds	0.0520*** (6.55)	0.0521*** (6.57)	0.0521*** (6.57)		0.0675*** (8.55)
Time dummies	YES	YES	YES	YES	YES
Industry Dummies	YES	YES	YES	YES	YES
P-Hausman	0.0000	0.0000	0.0000	0.0000	0.0000
Observations	77,912	77,912	77,912	77,912	77,912

Regressions have been estimated using fixed effects models. The dependent variable is investment in accounts receivable. *Startup dummy* is a dummy variable that takes the value of 1 for recently created firms and 0 otherwise. *BPDummy* is a dummy variable that takes the value of 1 for firm-year observations with strong bargaining power and 0 otherwise. *Zscore dummy*, *Cash flow dummy* and *Size dummy* are dummy variables that take the value of 1 for firm-year observations that have better access to external finance and 0 otherwise. Growth is growth opportunities; Size is size; Stlev is short-term financing; Fcost is the cost of outside financing; and Internal funds is the capacity to generate internal resources. Regressions include time and industry dummies. \*\*\*, \*\* and \* indicate significance at 1%, 5% and 10%, respectively. t Statistic in brackets. P-Hausman is the p-value in Hausman's (1978) test. This indicates that the fixed effects model is the most appropriate model.