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REVIEW PAPER

Trade credit and family control

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Abstract
This paper analyses whether trade credit strategies depend on the family identity of the controlling shareholder. We use a sample of 4,022 private Spanish firms for the years 2004 and 2013 and examine family firm heterogeneity by analysing different thresholds of control, involvement in management and firm identification with the family name. The results reveal that family firms have more restrictive trade credit strategies than non-family firms. Moreover, among family-controlled firms, those with the strongest identification between the family shareholders and their firms are the most restrictive. However, family-controlled firms reduced trade credit less after the financial crisis of 2008. These firms supported their customers by limiting the impact of liquidity shocks during the crisis.

Keywords Family firms · Heterogeneity · Customers · Trade credit granted · Controlling shareholders

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1 Introduction

Firms usually offer payment deferments to their customers to purchase goods and services, known in inter-firm commercial relationships as trade credit. According to the traditional trade credit literature, this reduces the cost of commercial transactions (Emery 1984; Ferris 1981), and it stimulates firms' sales by providing liquidity and financial support to their customers (e.g. Cuñat 2007; Meltzer 1960; Schwartz 1974). It also reduces information asymmetries about product quality and the supplier during the evaluation period (e.g. Lee and Stowe 1993; Long, et al. 1993; Smith 1987). The financial literature has demonstrated the importance of trade credit for business sales and growth and, therefore, performance (Hill et al. 2012).

Based on prior research, trade credit plays an important role in reducing information asymmetries between buyers and sellers (Smith 1987; Bastos and Pindado 2007) because it permits buyers to check that the product and services received comply with the previously agreed-upon terms and conditions. Thus, suppliers reduce asymmetric information about the quality of their products since delaying payment for the merchandise allows customers to verify the quality of the goods. Some studies have shown that firms grant longer payment periods for products whose quality is more difficult to evaluate, and firms that are relatively unknown in the market tend to grant more trade credit to signal the quality of their products to their customers (Deloof and Jegers 1996; Kappler et al. 2012; Lee and Stowe 1993; Long et al. 1993; Pike et al. 2005). Accordingly, reducing asymmetric information and improving firms' reputations might reduce accounts receivable carrying costs and increase firms' returns. In this situation, family firms have incentive structures that reduce information asymmetry for their customers. Specifically, family firms present a long-term investment horizon (since they are interested in the survival of the firm) and are concerned about the firm's reputation and its effect on the principal stakeholders (Anderson et al. 2003; Beck and Prügl 2018; Burkart et al. 2003; Croci et al. 2011; Faccio et al. 2011). Families as controlling shareholders also make decisions that permit them to protect nonfinancial goals such as maintaining control and family influence over corporate decisions and enhancing the family image and reputation, which is known as "socio-emotional wealth" (Souder et al. 2017; Zellweger et al. 2013). Prior studies about family firm financing practices have shown the impact of family firm characteristics on financial decisions, such as the cost of debt financing (Anderson et al. 2003; Croci et al. 2011; Steijvers et al. 2010), leverage (Romano et al. 2001; Schmid 2013; Crespí and Martín-Oliver 2015) and cash holdings (Steijvers and Niskanen 2013), among other issues. However, the impact of family firm characteristics on trade credit policy remains unexplored despite its importance for firm value.

The aim of this research is to study the role of family firms in the trade credit granted to customers. Specifically, we analyse the impact of family firms' inherent characteristics on trade credit compared to non-family firms. Moreover, since family firms are not a homogeneous group with similar goals (Daspit et al. 2021; Deephouse and Jaskiewicz 2013; Isakov and Weisskopf 2014; Mauri 2006; Michiels and Molly 2017), we examine the heterogeneity of family firms by analysing the differences among them considering a number of thresholds of ownership and control, family involvement in management and concern about reputation. Finally, we study the

greater resilience of family firms (Chrisman et al. 2011; Le Breton-Miller and Miller 2011; Levine et al. 2018) in the aggregate economy during the 2008 financial crisis. These firms acted as buffers to default (Boissay and Gropp 2013; Levine et al. 2018) since they were able to provide liquidity to their clients (Crespí and Martín-Oliver 2015; D'Aurizio et al. 2015; Garcia-Appendini and Montoriol-Garriga 2013).

We selected a sample of private Spanish firms as they fit the purpose of this study for several reasons. First, Spain is a continental European country with a large proportion of family-controlled firms (Faccio and Lang 2002; La Porta et al. 1998, 1999). Second, Spanish firms allow one of Europe's longest trade payment periods (Baños et al. 2023; Giannetti 2003). Third, Spain has a banking-oriented financial system with weak creditor protection (La Porta et al. 1998), and trade credit is one of the main sources of financing for SMEs (Burkart and Ellingsen 2004). We focus on the period 2004–2013 to test the impact of the 2008 financial crisis on trade credit granted. During financial crises and the subsequent economic downturns, firms face significant rationing due to the reduction of credit supplied by banks (Santos 2011), and the trade credit granted by firms declines in the years following the initial impact of a financial crisis (e.g. Bastos and Pindado 2013; Kestens et al. 2012; Love Preve and Sarria-Allende 2007; McGuinness and Hogan 2016). This was the case in the Spanish market during the years after the Great Recession, when SMEs faced rationing (Bentolilla et al. 2018), and the trade credit granted declined from 50% of the GDP in 2007 to 30% in 2013 (García-Vaquero and Mulino-Rios 2015).

Our results show a negative association between firms controlled by families and trade credit granted. These results indicate the importance of family firms in credit-granting decisions as they improve the efficiency of their short-term financial decisions. Moreover, there was less reduction in the trade credit granted by suppliers to their customers in the crisis period in the case of family-controlled firms, revealing that family firms are willing to support their customers by limiting the impact of the liquidity shocks that were a consequence of the financial crisis. Considering the heterogeneity of family firms, the results highlight that those with greater family involvement grant less credit to their customers, but they are also more concerned about their customers in periods of crisis.

Our paper contributes to the literature in several ways. First, we provide empirical evidence about the restrictive trade credit strategies followed by family firms, and we highlight the importance of family control in shortening the credit terms granted to customers to pay for goods and services. Second, we delve deeper into the diversity among family firms by analysing several types of family firm control, considering different thresholds, involvement in management and firm identification with the family name. This could shed light on the debate about family firm heterogeneity in the pursuit of non-economic goals. Third, our study analyses the changes in trade credit strategies followed by family firms as a consequence of the 2008 financial crisis. These results could be useful in future financial crises characterised by restricted bank credit supply.[1] There was less reduction in trade credit granted by suppliers to customers during the crisis in the case of family-controlled firms. This shows that

[1] We do not focus on the more recent COVID-19 pandemic because during this crisis, due to its exceptional nature, companies had access to bank financing through guarantee schemes set up by governments. This,

family firms are willing to support their customers by limiting the impact of the liquidity shocks caused by financial crises, demonstrating the resilience of family firms. Finally, we contribute to the debate regarding the significance of family firms in financial decisions.

The rest of the paper is organized as follows. In Sect. 2, we review the related literature and present our hypotheses. In Sect. 3, we describe the data and estimation method, and in Sect. 4, we report on the results of the research. The paper ends by discussing the study's contributions, limitations and implications.

2 Theoretical foundations

2.1 Trade credit granted by family firms

Trade credit is a business-to-business agreement where sellers offer customers a payment deferment for the purchase of goods and services. The financial literature has established that trade credit granted is affected by information asymmetries, which cause agency problems in the relationship between a firm and its clients (e.g. Bastos and Pindado 2007). Ex-ante asymmetries result in adverse selection problems for customers since they do not know suppliers' characteristics or the quality of the products bought. Sellers can reduce this problem by delaying payment for the merchandise, which allows customers to see whether the goods or services match the agreed-upon terms (quantity, quality, etc.). If the products or services do not meet expectations, the buyers can refuse to pay and return the merchandise. However, when credit is not offered or customers pay promptly, returning the products and the payment is more complicated. Smith (1987) points out that suppliers can transmit information about the quality of their products by agreeing on credit terms that allow their customers an evaluation period. Empirical studies have showed that firms receive longer payment terms when it is difficult to evaluate the quality of the merchandise bought (Deloof and Jegers 1996; Klapper et al. 2012; Lee and Stowe 1993; Long et al. 1993; Pike et al. 2005). Building on this, family firms have incentive structures that could reduce trade credit-related agency conflicts in their business-to-business relationships with customers. Particularly, family firms have long-term investment horizons, owners are actively involved in management, and they are concerned about their firm's reputation and its effect on major stakeholders (Anderson et al. 2003; Beck and Prügl 2018).

Family firms are usually characterised by non-diversified investment and high equity concentration, hence their interest in their firms' long-term survival (Ang 1992; Andres 2008). This permits family firms to develop longer-term relationships with customers, generating valuable exchanges for both parties beyond what would be possible if their interactions were focused on market transactions (Hillman and Keim 2001). Reputation is a relevant issue for family firms since they are closely connected with their company's location (Beck and Prügl 2018; Bopaiah 1998). This is particularly true when the family's shareholders are linked to their firm, which often bears

therefore, does not correspond to a traditional financial crisis in which there is a drastic reduction in bank credit.

the family name (Rousseau et al. 2018). Internal and external stakeholders' perceptions of the firm directly affect the image and reputation of family owners (Gomez-Mejia et al. 2011; Zellweger et al. 2013). These characteristics give family firms an advantage because customers see them as more reliable and trustworthy (Beck and Prügl 2018). Zellweger et al. (2013) state that the importance of reputation for family firms motivates these firms to satisfy the goals of their primary stakeholders.

The literature has pointed out that family firms have better reputations than non-family firms and that this has positive effects on their relationships with customers (Sageder et al. 2018). Customers prefer products and services from reputable companies (Binz et al. 2013), trust family firms more (Botero et al. 2018), are more loyal to them (Orth and Green 2009; Sageder, et al. 2015) and are willing to pay higher prices for their goods (Fombrun and Shanley 1990). These effects could result in more restrictive trade credit policies in family-owned firms since, according to the trade credit literature (Deloof and Jegers 1996; Lee and Stowe 1993; Long, et al. 1993; Pike et al. 2005), firms with more consolidated reputations grant less trade credit as they have less need to signal the quality of their products and their capacity to fulfill their commitments. These shorter periods of credit equal higher prices, given that trade credit acts as a price discrimination mechanism (Brennan et al. 1988; Mian and Smith 1992), reducing accounts receivable carrying costs. In short, suppliers with better reputations imply less information asymmetry and less adverse selection (Diamond 1991) for their customers, allowing suppliers to reduce their trade credit (Van den Bogaerd and Aerts 2014). Regarding investments in trade credit, family firms may use their reputation with customers to establish a more restrictive trade credit policy by granting shorter trade credit terms, whereas non-family, less trusted firms grant more trade credit.

Consequently, the first hypothesis is:

Hypothesis 1 Family-controlled firms grant shorter trade credit periods to their customers than non-family firms.

2.2 The heterogeneity of family firms

Previous literature on family firms has highlighted that it would be wrong to judge family firms without further differentiation (Deephouse and Jaskiewicz 2013; Isakov and Weisskopf 2014; Mauri 2006). According to the socioemotional wealth theory, family firms have non-economic goals they pursue by maintaining control and influence over management and governance, improving the family reputation and ensuring succession (Gomez-Mejia et al. 2011; Souder et al. 2017; Zellweger et al. 2013). Thus, the performance of family firms might differ depending on a variety of family characteristics, such as the number of family shareholders, whether the family controlling shareholder is actively involved in the firm's management and whether the firm bears the family name.

Among firms controlled by a family, if ownership is shared among several family members (e.g. siblings or cousins), these family shareholders are likely to have conflicting interests because they might wish to pursue personal goals and business

priorities that could hamper the firm's performance. Moreover, when the controlling shareholder is a group of several family members, none of them may have enough authority over the other family shareholders to impose his/her decisions. Thus, intra-family agency conflicts could arise. This affects the firm's decision-making because it does not favour making the best choices for the firm. Principal-principal conflicts could occur among family shareholders in a family firm. Principal-principal conflicts take place when there is more than one shareholder with diverging interests (Calabró et al. 2017; Miller et al. 2022). However, if ownership is concentrated in the hands of a single shareholder, this owner has a strong incentive to make decisions that maximise his/her goals and the firm's goals (De Massis et al. 2013). Thus, agency problems in the case of multiple family shareholders could be reflected in the relationship between the firm and its customers. As a result, customers may need to grant more trade credit to secure the relationship.

According to Daspit et al. (2018), family involvement in management and ownership are important aspects of firm heterogeneity, but what is particularly relevant is the degree of involvement in management as it facilitates the principal agent alignment (Sacristan-Navarro et al. 2011). The direct involvement of family members in management can benefit the quality of decision-making processes because the interests of family owners' and managers' goals are aligned, which is consistent with the agency theory (De Massis et al. 2013). Le Breton-Miller et al. (2011) note that family shareholders involved in firm management are likely to develop a deep sense of commitment to the well-being of the firm. In this type of family firm, clients can trust the family's reputation. These family firms could offer less trade credit to their clients than other family firms, in which the controlling shareholder is not acting as manager. Focusing on trade credit, when the manager is either from the family or is effectively monitored by the owning family, granting trade credit has a direct effect on the manager's family, so being strict with trade credit may be a disciplining force. In contrast, when the manager does not belong to the family, she/he may have an incentive to boost sales by giving trade credit to the firm's customers since credit extension increases sales by acting as promotion for the company (e.g. Meltzer 1960; Lee and Stowe 1993; Long et al. 1993; Schwartz 1974).

Family firms are also concerned about their reputation to avoid damaging their socioemotional goals. This is especially relevant when the family name and family image are identified with the firm's activity in the area where the firm is established. Some family shareholders are closely identified with their firms, and they consider them extensions of themselves. The family name is reflected in the firm's name. In this case, the family and the firm have overlapping interests, and any difficulties will damage not only the firm's financial performance but also the reputation of the firm and the family (Sageder et al. 2016). Schellong et al. (2019) add that a family firm's image acts as a signal to clients, reflecting that family firms are making good decisions to preserve their socioemotional goals. Family firms make decisions to improve their financial performance and achieve their socioemotional goals, among which are projecting a positive image to society and preserving the firm's and the family's reputation (Deephouse and Jaskiewicz 2013). These goals motivate family firms to make decisions that favour stakeholders (Zellweger et al. 2013). Authors such as Craig et al. (2008) find that family firms build long-lasting, trusting relationships with

their customers, whereas Kashmiri and Mahajan (2014) note that when family shareholders are visibly linked to their firms through the family name, concerns regarding product quality increase. Similarly, Lude and Prügl (2019) find that clients trust a brand more when they are aware of the firm's family nature, resulting in stronger purchasing intentions. Clients are willing to purchase products, even paying higher prices, from firms with good reputations (Fombrun and Shanley 1990). Therefore, family firms with better reputations that are well-known by their customers may have less need to grant longer payment periods.

Consequently, the second hypothesis is:

Hypothesis 2 Family firms with the involvement of family-controlling shareholders reduce trade credit levels more than other family firms.

2.3 Financial crisis, trade credit and family firms

Trade credit levels may also be affected by a country's economic situation (Smith 1987). Firms may increase the length of accounts receivable under deteriorated macroeconomic conditions. They may also reduce trade credit to their customers when they have more difficulties obtaining funds. Financial literature models of trade credit have established that firms with better access to finance and lower costs act as financial intermediaries by extending commercial credit to customers with worse credit quality; i.e. firms with difficulties accessing credit markets need more trade credit (Biais and Gollier 1997; Burkart and Ellingsen 2004; Meltzer 1960; Schwartz 1974, among others). This substitution effect is confirmed by empirical studies analysing constrained firms (Danielson and Scott 2004; Petersen and Rajan 1997) and less-constrained firms in contractionary monetary periods (Huang et al. 2011; Mateut et al. 2006; Nilsen 2002).

The empirical evidence on financial crises in emerging markets in the 1990s (Love et al. 2007) shows that although trade credit extension increased at the beginning of the crisis and acted as a substitute for bank credit, it later declined due to reduced bank credit for both financially weak and strong firms. This affected the trade credit conditions offered by suppliers to their customers. Increased default risk for trade credit may make unconstrained firms less willing to finance their customers. Indeed, firms become more risk-averse and reduce trade credit during periods of economic uncertainty (D'Mello and Toscano 2020; Jory et al. 2020). Similar results were found for private European firms during the 2008 financial crisis and the subsequent recession, where the systematic nature of the crisis and an increase in sovereign risk reduced access to financing for suppliers and customers (Cantero Sáiz et al. 2017; Kestens et al. 2012; McGuinness and Hogan 2016). Thus, widespread financial restrictions affect all firms, preventing financial intermediation from unconstrained firms to constrained firms through the trade credit channel.

The reduction in trade credit granted by firms to their customers in the 2008 financial crisis may have been much lower for family firms. Although there are no conclusive results about how family firms face financial crisis periods (Michiels and Molly 2017), the long-term orientation of this type of shareholder, their interest in non-

economic goals and their desire to protect their socioemotional wealth could make family firms more resilient, placing them in a better position to face external economic shocks (Chrisman et al. 2011; Le Breton-Miller and Miller 2011; Levine et al. 2018; Van Essen et al. 2015). Family firms financially outperformed non-family firms during the 2008 financial crisis (Van Essen et al. 2015), and they faced less rationing (Crespí and Martín-Oliver 2015; D'Aurizio et al. 2015). Thus, the resilience of family firms could play an important role in the aggregate economy during financial crises, acting as a buffer against default (Boissay and Group 2013) since family firms are in a better position to provide liquidity to their clients (Garcia-Appendini and Montoriol-Garriga 2013). Family-controlled firms are more concerned about their main stakeholders, and they are willing to become actively involved with them to preserve their socioemotional wealth (Cennamo et al. 2012; Van Essen et al. 2015). D'Aurizio et al. (2015) and Van Essen et al. (2015) find differences between the employment policies of family and non-family firms. Concretely, family firms reduce employee numbers and wages less than non-family firms during financial crises.

Consequently, the orientation toward stakeholders and the lesser impact of liquidity shocks may affect the trade credit granted by family firms. We analyse the effect of the financial crisis on the trade credit policies applied by family and non-family firms. We expect family firms to support their customers with lower reductions in trade credit during the liquidity shocks of financial crises. Therefore, our second hypothesis is:

Hypothesis 3 Family-controlled firms reduce trade credit less than non-family firms during a financial crisis (credit supply shock).

3 Data and methodology

3.1 Data collection and sample

To analyse the impact of family characteristics on trade credit strategies, the design of the empirical study is based on non-financial private Spanish firms with information available for the years 2004 to 2013 in the SABI database (Iberian Balance Sheets Analysis System). This period allows us to analyse the effect of one of the greatest financial crises on firms' trade credit decisions, considering the relevance of owners' family identity. Because we wanted to classify private firms according to their family character, we believed information about the ownership structure and identity of shareholders and managers to be central aspects when selecting the sample, and we discarded firms with incomplete information about these aspects. Listed firms were also dropped since we restricted the sample to private firms. After that, we eliminated micro-firms, following the European Commission's Standards (firms with fewer than ten employees and a turnover under two million euros), because these firms have other legal criteria for their annual financial reports. We kept only the firms that had no missing or inconsistent data. For this reason, firms had to have positive values for sales and assets. Finally, we removed firms that presented extreme values; spe-

cifically, we dropped observations below the 1st and above the 99th percentile to decrease the influence of outliers. The observations from 2004 were considered to determine some variables. After exclusions, the final sample comprised 35,428 firm-year observations from an unbalanced panel of 4,022 non-listed firms. The period of study covers the five years before the financial crisis and five years after it began.

3.2 Variables

Dependent variable. The dependent variable represents *Trade credit granted*. Following the previous literature (e.g. Deloof and Jegers 1999; Cuñat 2007; Petersen and Rajan 1997), we consider two different measures. The first is the firm's investment in trade credit (REC), calculated as the ratio of accounts receivable to assets. Second, we use days of sales outstanding (DSO) as a proxy for the period of trade credit offered by a supplier to their customers. This variable is measured as the ratio of accounts receivable over daily sales.

Independent variables. In this research, we need to differentiate between family and non-family firms. Different definitions of a *family firm* have been proposed in the literature, generally considering three dimensions: ownership, control and management (Villalonga and Amit 2006). We define family firms as those that at least meet the requirement of having a family as the controlling owner. Thus, for each firm in our sample, we need to identify the ultimate shareholder who controlled the firm by tracing the control chains, in line with the method used by Claessens et al. (2000), Faccio and Lang (2002) and La Porta et al. (1999). An owner is defined as "controlling" if he/she directly or indirectly holds a percentage of voting rights equal to or above a specified threshold, i.e. 10% and 20% for La Porta et al. (1999). In the case of private firms, the defined threshold is 25% (Franks et al. 2012; Minichilli et al. 2016). Using this threshold, we traced the ownership chain back for each firm by hand to determine the nature of the ultimate controlling shareholder. From this unique, manually constructed database, we classified a firm as a family firm if, at the end of the ownership chain, the largest shareholder is a single person or several members of the same family with at least 25% of the voting rights. A firm ultimately controlled by another type of shareholder at the 25% threshold is classified as a non-family firm. Similarly, if no ultimate shareholder holds more than 25% of the voting rights, it is considered non-family. Hence, after tracing the control chain of each firm, we defined *Family* as a dummy variable equal to 1 if the ultimate controlling owner of the firm is a single person or several members of the same family and 0 otherwise. Different dummy variables have been defined that take the value of 1 if the firm is controlled by a non-family owner (*State*, *Financial institution* and *Miscellaneous*) and 0 otherwise (Mauri 2006; Isakov and Weisskopf 2014). Other authors required families to control at least 50% of the voting rights to be considered controlling shareholders in private firms (Ang et al. 2000; Steijvers et al. 2010). Therefore, we again mapped out the complete ownership chain for each firm and created a dummy variable (*Family [50]*) that is equal to 1 if a single person or several members of the same family directly or indirectly hold a percentage of voting rights greater than or equal to 50%.

Second, previous literature has highlighted that family firms are not a homogeneous group with similar goals. To consider this, we analysed the family firm features

that could affect the asymmetric information between firms and their customers. Previous studies have proposed that characteristics inherent to family firms, such as the active participation of a family member in management or a firm's strong symbolic family-to-firm identification through the family name, could influence company decisions (Deephouse and Jaskiewicz 2013; Isakov and Weisskopf 2014; Mauri 2006). Therefore, in this study, we have used different dummy variables that equal 1 if a firm fulfills a specific characteristic. We considered the active participation of families in firm management, and we created a variable *(Family management*) that takes the value of 1 for family firms with members of the family managing the firm (Deephouse and Jaskiewicz 2013; Isakov and Weisskopf 2014; Mauri 2006). Furthermore, as family name recognition is a relevant aspect of family firms and is closely linked to reputation, we used a variable (*Family reputation*) that codes 1 if the firm's name is the same as the family controlling shareholder's name (Anderson et al. 2003; Deephouse and Jaskiewicz 2013; Rousseau et al. 2018). Family involvement is considered a distinctive element of family firms, and companies have different levels of family involvement. The closest is when family members act as managers, and the family name is tied to the firm. We created a dummy variable (*Family all involvement*) that takes the value of 1 for family firms with these two characteristics.

Third, to delve deeper into the effect of family firms on trade credit policies, we considered other dummy variables. Thus, *Lone family* takes the value of 1 for firms with one person as the controlling owner (Anderson et al. 2012; Isakov and Weisskopf 2014; Miller et al. 2007), and *Family Independent* is a variable that takes the value of 1 when a family is directly the controlling owner of a firm.

Following previous papers that analysed the effects of the crisis, we used 2009 as the year the crisis started, and we created a dummy variable (*Crisis Dummy*) that takes the value of 1 if the year is 2009 to 2013[2] (Minichilli et al. 2016).

Control variables. Following previous studies, we controlled for other factors that affect trade credit policy (e.g. García-Teruel and Martínez-Solano 2010; Petersen and Rajan 1997). We included the following firm characteristics: Growth opportunities (*Growth*) to proxy sales growth; *Size*, measured by the natural logarithm of total assets, and *Age*, calculated as the number of years since the firm was established, to proxy for the firm's creditworthiness. We also used *Short-Term Debt* as a proxy for short-term finance, calculated as the ratio of current liabilities to total assets, to measure the availability of financial resources. We created a variable that analyses whether the cost of external finance influences the trade credit extended by a firm. This variable, *Financial Cost*, is measured as the ratio of financial expenses over total debt (minus trade creditors). We also included a proxy for the firm's ability to generate internal resources, *Cash Flow*, calculated as the ratio of net profits plus depreciation to sales. Product quality was measured using the variable *Turn*, calculated as sales to total assets minus accounts receivable, given that firms producing better-quality products have lower turnover, and the profit margin (*Profit margin*) was computed by the ratio of gross profit to sales. Dummy variables for sectors are included in the models.

[2] The Spanish annual GDP grew during the years 2004 to 2008 and declined from 2009 to 2013.

Finally, the trade credit strategy followed by a firm may be influenced by suppliers' and customers' bargaining power (Dass et al. 2015; Fabbri and Klapper 2016; Giannetti et al. 2011). To capture the degree of competition in a firm's market, as well as its market power, we consider the *Market Share* of the firms in their industry, measured as a firm's annual sales divided by aggregate annual industry sales, where the industry is defined by the four-digit SIC code. A high market share is related to more market power for firms, and it puts them in a better position to negotiate credit terms.

3.3 Empirical model

We studied the effects of family identity on a firm's trade credit strategy by using the following panel data model:

$$\begin{aligned} Trade\,Credit\,Granted_{it} = {} & Intercept + \beta_1 Family\,Dummy \\ & + \beta_2 Market\,share_{it} + \beta_3 Growth_{it} + \beta_4 Size_{it} + \beta_5 Age \\ & + \beta_6 Short - Term\,Debt_{it} + \beta_7 Financial\,Cost_{it} \\ & + \beta_8 Cash\,Flow_{it} + \beta_9 Turn_{it} + \beta_{10} Profit\,margin_{it} \\ & + \mathrm{B}_{11} Profit\,margin_{it}^2 + I_s + \eta_i + \upsilon_{it} \end{aligned} \tag{1}$$

In this model: *Trade Credit Granted* represents the credit provided to customers, and it is measured by the investment in accounts receivable (*REC*) and the days of sales outstanding (*DSO*) in the robustness analysis; *Family dummy* represents the family character of a company; *Market Share* is a firm's market share; *Growth* represents growth opportunities; *Size* measures firm size; *Age* measures the years the firm has been operating; *Short-Term Debt* measures the availability of short-term debt; *Financial Cost* is the cost of external finance; *Cash Flow* measures the cash flows generated by the firm; *Turn* is a proxy for product quality; *Profit margin* is the firm's profit margin; I_s controls the industry in which the firm operates; η_i represents the individual unobservable effects of each particular firm; and υ_{it} represents random disturbances. The estimations of this panel data model were performed using fixed effects.

3.4 Descriptive statistics

Table 1 shows the descriptive statistics of the data set. The investment in accounts receivable (REC) of private Spanish firms is 34.4% in mean terms, whereas the number of days private firms finance their customers is, on average, 97.186 days. Trade credit granted in the selected sample is similar to other studies that analysed Spanish firms (96.141 days in García-Teruel and Martínez-Solano 2010 and 103 days in Ferrando and Mulier 2013). According to previous literature, trade credit is more prevalent in countries with weaker legal protection (e.g. Demirgüc-Kunt and Maksimovic 2001; Palacín et al. 2019), as is the case of Spain (La Porta et al. 1998). Trade credit is more important than bank credit when creditor protection is weak because cash is more easily diverted than goods (Burkart and Ellingsen 2004).

Of the private firms, 82.1% are classified as family-controlled based on a 25% ownership threshold, whereas 7.1% are classified as non-family-controlled share-

Table 1 Descriptive statistics

	Mean	SD	Min	p25	p50	p75	Max
REC	0.344	0.200	0.006	0.190	0.323	0.477	0.889
DSO	97.186	60.917	1.789	54.366	90.412	127.642	395.018
Family	0.821	0.383	0.000	1.000	1.000	1.000	1.000
Family [50]	0.787	0.409	0.000	1.000	1.000	1.000	1.000
Family management	0.723	0.447	0.000	0.000	1.000	1.000	1.000
Family reputation	0.232	0.422	0.000	0.000	0.000	0.000	1.000
Family all involvement	0.225	0.417	0.000	0.000	0.000	0.000	1.000
Lone family	0.191	0.393	0.000	0.000	0.000	0.000	1.000
Family independent	0.538	0.499	0.000	0.000	1.000	1.000	1.000
State	0.028	0.165	0.000	0.000	0.000	0.000	1.000
Financial institution	0.030	0.170	0.000	0.000	0.000	0.000	1.000
Miscellaneous	0.013	0.111	0.000	0.000	0.000	0.000	1.000
Market share	0.007	0.024	0.000	0.001	0.002	0.005	0.713
Growth	0.030	0.192	−0.513	−0.079	0.023	0.123	0.994
Size (million €)	22.48	66.08	0.56	4.82	8.56	18.40	2,438.82
Age (years)	24.709	12.761	2.030	16.180	22.580	30.135	121.490
Short-Term Debt	0.442	0.206	0.000	0.280	0.432	0.593	0.998
Financial Cost	0.038	0.039	0.000	0.015	0.030	0.049	0.347
Cash Flow	0.062	0.063	−0.132	0.021	0.046	0.088	0.400
Turn	2.927	2.763	0.150	1.285	2.126	3.536	23.534
Profit margin	0.045	0.062	−0.199	0.012	0.034	0.069	0.345

REC is the ratio of accounts receivable to assets; DSO (Day of Sales Outstanding) is the ratio of accounts receivable over daily sales; *Family* (*Family [50]*) takes the value of 1 if the controlling shareholder holding more than 25% (at least 50%) of the voting rights is a family, zero otherwise; *Family management* takes the value of 1 if the family controlling shareholder holding more than 25% is active as a manager, zero otherwise; *Family reputation* takes the value of 1 if the family controlling shareholder's name is included in the firm's name holding more than 25% of the voting rights, zero otherwise; *Family all involvement* takes the value of 1 if the controlling shareholder (holding more than 25%) is a family which has members as managers and the name of the family is included in the firm's name; *Lone family* takes the value of 1 if only one member of a family is the controlling shareholder holding more than 25% of the voting rights, zero otherwise; *Family independent* takes the value of 1 for firms without a parent company when the controlling shareholder is a family (holding more than 25%); *State*, *Financial institution* and *Miscellaneous* take the value of 1 when the controlling shareholder is the State, a financial institution or others, respectively, zero otherwise; *Market share* is the firm's market share of the industry sales, including with a lag; *Growth* is the ratio $(Sales_1 - Sales_0)/Sales_0$; *Size* is the total assets in thousands of euros; *Age* is calculated as the difference between the sample year and the year the firm was established; *Short-Term Debt* is the ratio of current liabilities to total assets; *Financial Cost* is measured as the ratio of finance costs over outside financing minus trade creditors; *Cash Flow* is calculated as the ratio of net profits plus depreciation to total sales; *Turn* is the ratio of sales over assets minus accounts receivable; *Profit margin* is the ratio of gross profit to sales

holders (state, financial institutions and miscellaneous). The remaining 10.8% are widely held. When we consider a threshold of 50%, the percentage of firms whose ultimate controlling owner is a family decreases to 78.7%. Following our basic categories of family firms, family members are involved in company management in 72.3% of private firms. Finally, if we take into account the relevance of family identification with its firm's name (*Family Reputation*), 23.2% of the firms are named after the family. The figures are similar when closer family involvement is considered because about 22.5% of the sample are family firms whose members are active as

managers, and the name of the family is also the name of the company (*Family all involvement*). The data reveals that 19.1% of the firms are controlled by only one family member (*Lone family*). Finally, about 53.8% of the firms are directly controlled by a family (*Family independent*); that is, they are independent firms that do not belong to a parent company.

Regarding the control variables, the data shown in Table 1 also reveal that the mean firm size (average total assets) is 22.48 million euros. The average sales growth rate is 3%, the average short-term debt is 44.2%, and the average cost of external finance is 3.8%. Moreover, the sample of firms has a mean asset turnover ratio (*Turn*) of 2.927 times, a mean profit margin rate of 4.5% and a mean value of cash flow to sales of 6.2%.

Table 2 provides the Pearson correlation coefficients for the variables of trade credit granted to customers and the main explanatory variables. The data show low levels of correlation among the variables. In addition, an analysis of the variance inflation factor (VIF) was conducted to test for multicollinearity. The VIF values are less than five in all the cases, indicating that our regression model specification is unlikely to suffer from collinearity. The significant and negative correlations between all the family firm types and both trade credit variables seem to indicate that the family nature of a firm negatively affects trade credit granted to customers. Concerning the control variables, investment in accounts receivable (REC) is positively correlated with *Growth*, *Short-Term Debt* and *Turn* and negatively correlated with *Size*, *Cash Flow* and *Profit Margin*.

4 Results

4.1 Univariate analysis

Table 3 shows the mean values of the trade credit variables for family and nonfamily firms. The data show that private firms invest less in trade credit when control is maintained by a family (34.1% versus 35.8%). The difference in this variable is greater when both control and management are exercised by a family (33.9% versus 35.8%). The mean value of accounts receivable to assets decreases to 33.4% for family firms bearing the name of the family (*Family reputation*). The data also reflect that family firms with closer involvement (*Family all involvement*) provide the least financing to customers via trade credit, where the amount decreases to 33.2%. In Table 3, the figures indicate that family firms where only one person is the controlling owner have lower mean values of accounts receivable to assets than non-family firms (33.5% versus 35.8%). This is similar to family firms directly controlled by the family (33.9% versus 35.8%). Therefore, all the categories of family private firms provide less trade credit to their customers than non-family firms.

Similarly, the data shown in Table 3 provide evidence that private family firms, on average, extend shorter credit periods than firms controlled by other types of shareholders or companies without a controlling shareholder. Concretely, family firms offered credit to customers for 95.949 days during the period 2005–2013, whereas non-family firms offered 102.864 days of credit. If we consider family firms with

Table 2 Correlation matrix

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. REC	1.00															
2. DSO	0.58***	1.00														
3. Family	−0.03***	−0.04***	1.00													
4. Family management	−0.04***	−0.04***	0.76***	1.00												
5. Family reputation	−0.03***	−0.02***	0.26***	0.30***	1.00											
6. Family all involvement	−0.03***	−0.02***	0.25***	0.33***	0.98***	1.00										
7. Lone Family	−0.02***	−0.02***	0.23***	0.26***	0.07***	0.07***	1.00									
8. Family independent	−0.03***	−0.04***	0.50***	0.65***	0.31***	0.32***	0.25***	1.00								
9. Market share	−0.07***	−0.03***	−0.14***	−0.17***	−0.07***	−0.07***	−0.07***	−0.17***	1.00							
10. Growth	0.123***	−0.00	−0.02***	−0.03***	−0.02***	−0.02***	−0.01	−0.02***	−0.01	1.00						
11. Size	−0.17***	0.12***	−0.25***	−0.32***	−0.11***	−0.12***	−0.13***	−0.40***	0.38***	0.05***	1.00					
12. Age	−0.09***	−0.00	0.04***	0.03***	0.06***	0.06***	−0.04***	0.04***	0.02***	−0.11***	0.12***	1.00				
13. Short-Term Debt	0.46***	0.11***	−0.05***	−0.06***	−0.04***	−0.04***	−0.04***	−0.06***	−0.03***	0.15***	−0.05***	−0.17***	1.00			
14. Financial Cost	−0.01*	−0.04***	0.13***	0.15***	0.07***	0.08***	0.03***	0.16***	−0.03***	−0.03***	−0.04***	0.02***	0.02***	1.00		
15. Cash Flow	−0.25***	0.08***	−0.09***	−0.11***	−0.07***	−0.06***	−0.01	−0.12***	0.10***	0.11***	0.24***	−0.03***	−0.39***	−0.10***	1.00	
16. Turn	0.67***	−0.02***	−0.04***	−0.06***	−0.03***	−0.04***	−0.03***	−0.05***	−0.04***	0.12***	−0.22***	−0.13***	0.44***	−0.00	−0.31***	1.00
17. Profit margin	−0.04***	0.08***	−0.02***	−0.03***	−0.04***	−0.04***	0.02***	−0.03***	0.05***	0.18***	0.14***	−0.06***	−0.22***	0.00	0.73***	-0.12***

Note. REC is the ratio of accounts receivable to assets; DSO (Day of Sales Outstanding) is the ratio of accounts receivable over daily sales. ***p<0.01; **p<0.05; *p<0.1

family members serving as managers, we obtain the same results since the mean value for this type of family-controlled firm is 95.673 days. When we focus on the impact of family reputation, this type of firm extends shorter credit periods to their customers (94.607 days). Family firms with closer family involvement because they are managers and the family name is that of the firm offer shorter credit periods than non-family firms (94.847 days versus 102.864 days). Therefore, we find that credit periods vary considerably between family and non-family firms. These differences are significant when all the sub-types of family firms are considered. These preliminary results support our main hypothesis that family firms provide or extend less trade credit to their customers than non-family firms.

Next, Table 4 shows the descriptive statistics for trade credit policies during the pre-crisis and crisis periods and the differences between family and non-family firms. In Spain, trade credit represented 50% of the GDP in 2007; in 2013, that percentage decreased to 30% (García-Vaquero and Mulino-Rios 2015). Accordingly, the data show that all the firms reduced their investment in trade credit when the crisis broke out (37.7% for the pre-crisis period versus 31.8% during the financial crisis). The days of sales outstanding exhibit the same pattern, and the trade credit period offered to customers decreased once the crisis appeared (100.309 days for the pre-crisis period versus 94.680 in the crisis period).

Over the entire study period, the average trade credit granted by family firms is persistently lower than that provided by non-family firms (see Table 3). However, the difference in trade credit policies is particularly pronounced in the early years (pre-crisis) because during the crisis, the days of sales outstanding decreased more in non-family than in family firms. The difference in trade credit policies between family and non-family firms, summarised in Tables 3 and 4, is also maintained if we split the sample using firm features, such as age or positive and negative growth opportunities. Next, we present a multivariate analysis to control for other determinants of trade credit policies.

4.2 Multivariate analysis

4.2.1 Family firms and trade credit policy

The literature has established that firms may decrease the trade credit granted to their customers by reducing asymmetric information and improving their reputation with customers (Lee and Stowe 1993; Long et al. 1993; Deloof and Jegers 1996). Family firm characteristics, such as non-diversified investments, long-term orientation, and concerns about reputation, may mitigate conflicts with stakeholders, thereby reducing information asymmetry and increasing trust in the firm. Family firms could maintain less investment in accounts receivable compared to non-family firms. In Table 5, we show the results of the estimation, allowing us to analyse the impact of family firms on trade credit as a dependent variable. In Column 1, we regressed model 1 for the dummy variable *Family* (equal to 1 if a family is the controlling shareholder, holding more than 25% of the voting rights). The results reveal that private firms with a family as the ultimate controlling shareholder provide less trade credit to their customers than non-family firms since the variable *Family* is negative and statistically

Table 3 Family firms and trade credit granted

	All	Non-Family	Family	Family management	Family reputation	Family all involvement	Lone Family	Family Independent
N observations (%)	35,428 (100%)	6,336 (17.9%)	29,092 (82.1%)	25,628 (88.1%)	8,211 (28.2%)	7,961 (27.4%)	6,750 (23.2%)	19,063 (65.5%)
REC								
2005	0.385	0.390	0.384	0.382	0.376	0.374	0.382	0.380
2006	0.389	0.400	0.388	0.385	0.383	0.381	0.383	0.385
2007	0.384	0.396	0.381	0.377	0.375	0.372	0.372	0.375
2008	0.349	0.356	0.347	0.345	0.342	0.339	0.343	0.347
2009	0.331	0.341	0.329	0.326	0.318	0.316	0.326	0.329
2010	0.330	0.341	0.328	0.325	0.316	0.314	0.323	0.326
2011	0.319	0.339	0.314	0.313	0.310	0.308	0.301	0.315
2012	0.307	0.327	0.303	0.301	0.296	0.294	0.294	0.301
2013	0.304	0.327	0.299	0.296	0.290	0.288	0.289	0.294
2005–2013	0.344	0.358	0.341	0.339	0.334	0.332	0.335	0.339
Difference from non-family			−0.016	−0.019	−0.024	−0.026	−0.023	−0.019
t-test			5.905***	6.745***	7.117***	7.726***	6.476***	6.585***
DSO								
2005	102.409	112.283	100.242	99.145	97.020	96.568	97.434	95.237
2006	103.807	111.639	102.085	101.023	100.375	100.041	100.146	97.929
2007	102.086	112.531	99.795	98.941	97.484	97.394	97.595	95.957
2008	92.952	98.113	91.820	91.230	90.463	90.232	90.701	90.266
2009	98.067	102.910	97.014	96.791	95.197	94.877	97.984	97.016
2010	98.627	102.424	97.790	97.759	95.242	95.320	98.318	97.844
2011	93.776	99.483	92.530	92.836	92.964	92.913	89.358	93.083
2012	91.743	93.828	91.300	91.709	91.534	91.491	89.336	92.306
2013	91.096	91.869	90.932	91.597	91.111	91.460	89.695	92.517
2005–2013	97.186	102.864	95.949	95.673	94.607	94.487	94.500	94.685
Difference from non-family			−6.915	−7.191	−8.257	−8.378	−8.364	−8.179
t-test			8.195***	8.481***	7.839***	7.894***	7.600***	9.389***

Note. REC is the ratio of accounts receivable to assets; DSO (Day of Sales Outstanding) is the ratio of accounts receivable over daily sales. t-statistic for the difference between non-family firms and the corresponding subgroup of family firms. ***p<0.01; **p<0.05; *p<0.1

significant at the 1% level. This is consistent with the fewer information asymmetry problems and better reputation of family firms.

We also tested for an additional threshold to identify family firms since some studies analysing private firms required stakes of at least 50 percent (Ang et al. 2000; Steijvers et al. 2010). Therefore, as a robustness test, Column 2 in Table 5 presents the re-estimated model using this threshold. We created *Family [50]*, a dummy variable equal to 1 if the family holds at least 50% of the voting rights. The results also show a negative and significant coefficient at the 1% level for the variable *Family [50]*. This finding is consistent with the previous analysis and confirms that regard-

Table 4 Financial crisis, family firms and trade credit granted

All firms	Pre-crisis period	Crisis period	Pre-crisis period	Crisis period
	REC	REC	DSO	DSO
Mean	0.377	0.318	100.309	94.680
St. Dev	0.205	0.192	61.110	60.648
p25	0.221	0.171	57.201	52.203
p50	0.361	0.295	94.934	86.838
p75	0.518	0.439	132.215	123.821
t-test		27.623***		8.653***
Subsamples	Mean	Mean	Mean	Mean
Non-Family	0.386	0.335	108.638	98.180
Family	0.375	0.315	98.482	93.923
Family management	0.372	0.312	97.578	94.149
Family reputation	0.369	0.306	96.352	93.215
Family all involvement	0.367	0.304	96.073	93.219
Lone family	0.370	0.307	96.453	92.933
Family Independent	0.372	0.313	94.846	94.557

Note. ***p<0.01; **p<0.05; *p<0.1

less of the threshold used to define family firms, these types of companies provide less financing to their customers via trade credit than non-family firms.

We present an additional robustness test in Column 3 of Table 5 to control for other types of controlling shareholders that could affect firm trade credit policies. We included dummy variables to consider the possibility that the controlling shareholder was the State, financial institutions or others (*State*, *Financial institution* and *Miscellaneous*, respectively). Once again, the coefficient for the family firm variable remains significant and with the same sign.

The result indicates that family-controlled firms grant about 0.45% less trade credit (accounts receivable as percentage of total assets) in means than to non-family-controlled firms (Column 3 in Table 5). For comparison, a one standard deviation increase in the growth opportunities ratio increases trade credit granted by about 0.39%. This finding implies that the economic magnitude of the impact of family control of the firm is comparable to that of other important determinants of trade credit granted.

We provide further insight into our first hypothesis by refining our family firm measures. Our variables for family firms meet two criteria: ownership and control. However, a stricter definition requires a third condition to be met: management. Thus, we re-estimated the model considering family firms to be those where the controlling shareholder is a family and members of this family manage the company. The presence of family members managing the firm may also help to reduce asymmetric information problems between the firms and their customers, reinforcing their reputation and, in turn, allowing them to offer less trade credit. Thus, in Columns 4 and 5 of Table 5, we inserted the variables *Family Management* and *Family Management [50]* that take the value of 1 when members of the family-controlling shareholder

Table 5 Effect of family control on trade credit granted

	REC 1	REC 2	REC 3	REC 4	REC 5	REC 6	REC 7	REC 8	REC 9	REC 10
Family	−0.003***		−0.004***							
	(−5.82)		(−6.29)							
Family [50]		−0.003***								
		(−5.94)								
Family management				−0.001***						
				(−5.14)						
Family management [50]					−0.001***					
					(−5.33)					
Family reputation						−0.002***				
						(−2.75)				
Family reputation [50]							−0.002***			
							(−2.75)			
Family all involvement								−0.001**		
								(−2.47)		
Lone Family									−0.001**	
									(−2.19)	
Family Independent										−0.000
										(−0.80)
State			0.002							
			(1.32)							
Financial institutions			−0.007***							
			(−3.62)							
Miscellaneous			−0.004*							
			(−1.80)							
Market share	0.051	0.051	0.059	0.053	0.053	0.044	0.044	0.044	0.047	0.046
	(0.60)	(0.59)	(0.73)	(0.62)	(0.62)	(0.51)	(0.51)	(0.51)	(0.76)	(0.53)

Table 5 (continued)

	REC 1	REC 2	REC 3	REC 4	REC 5	REC 6	REC 7	REC 8	REC 9	REC 10
Growth	0.007***	0.007***	0.007***	0.009***	0.009***	0.007***	0.007***	0.007***	0.007***	0.007**
	(2.70)	(2.69)	(2.73)	(3.24)	(3.25)	(2.52)	(2.52)	(2.51)	(3.13)	(2.49)
Size	0.017***	0.017***	0.017***	0.016***	0.016***	0.016***	0.016***	0.016***	0.016***	0.016***
	(5.12)	(5.11)	(5.18)	(4.94)	(4.94)	(4.90)	(4.90)	(4.90)	(9.78)	(4.88)
Age	−0.048***	−0.050***	−0.040***	−0.066***	−0.065***	−0.073***	−0.073***	−0.073***	−0.073***	−0.073***
	(−5.40)	(−5.71)	(−4.21)	(−8.58)	(−8.58)	(−9.80)	(−9.81)	(−9.86)	(−18.18)	(−9.46)
Short-Term Debt	0.158***	0.158***	0.159***	0.162***	0.162***	0.163***	0.163***	0.163***	0.164***	0.163***
	(19.43)	(19.47)	(19.75)	(20.07)	(20.07)	(20.21)	(20.20)	(20.21)	(37.62)	(20.06)
Financial Cost	−0.096***	−0.096***	−0.097***	−0.092***	−0.092***	−0.094***	−0.094***	−0.094***	−0.094***	−0.094***
	(−4.49)	(−4.49)	(−4.48)	(−4.36)	(−4.36)	(−4.48)	(−4.48)	(−4.48)	(−7.64)	(−4.48)
Cash Flow	−0.096***	−0.096***	−0.099***	−0.092***	−0.092***	−0.091***	−0.091***	−0.091***	−0.089***	−0.089***
	(−3.77)	(−3.78)	(−3.89)	(−3.63)	(−3.63)	(−3.57)	(−3.57)	(−3.56)	(−5.17)	(−3.49)
Turn	0.038***	0.038***	0.038***	0.039***	0.039***	0.039***	0.039***	0.039***	0.039***	0.039***
	(39.65)	(39.67)	(39.69)	(39.78)	(39.79)	(39.77)	(39.77)	(39.78)	(128.65)	(39.75)
Profit margin	0.207***	0.207***	0.206***	0.211***	0.210***	0.213***	0.213***	0.212***	0.212***	0.212***
	(8.90)	(8.92)	(8.86)	(9.03)	(9.02)	(9.09)	(9.10)	(9.09)	(13.70)	(9.06)
Profit margin^2	−0.135*	−0.137*	−0.123	−0.141*	−0.140*	−0.142*	−0.142*	−0.142*	−0.144**	−0.143*
	(−1.63)	(−1.65)	(−1.50)	(−1.70)	(−1.69)	(−1.70)	(−1.70)	(−1.70)	(−2.39)	(−1.71)
Intercept	0.163***	0.168***	0.139***	0.215***	0.214***	0.236***	0.236***	0.237***	0.239***	0.239***
	(4.27)	(4.46)	(3.59)	(6.08)	(6.08)	(6.76)	(6.76)	(6.78)	(13.43)	(6.68)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.444	0.444	0.447	0.435	0.436	0.431	0.431	0.431	0.431	0.430
Observations	35,428	35,428	35,428	35,428	35,428	35,428	35,428	35,428	35,428	35,428

The estimations have been carried out using fixed-effects

Note. Robust standard errors are shown in parentheses. ***p<0.01; **p<0.05; *p<0.1

are managers in the firm with stakes of 25% and 50%, respectively. The results show that the coefficients for both variables are also negative and significant. Family firms where the controlling shareholder is involved in the firm's management provide significantly less credit to their customers.

Family firms' concern about reputation could be especially important when the firm bears the family name. So, in Column 6 of Table 5, we included the dummy variable *Family reputation*, which takes the value of 1 for firms with the same name as the controlling shareholder with a voting right of at least 25%. In Column 7 (Table 5), we included the variable *Family reputation [50]*, which is equal to 1 for a family controlling shareholder with a threshold of 50%. The results show that both variables are significant and negatively related to the trade credit provided to customers. These results support the idea that including the family's name in the name of the firm as an indication of reputation reduces asymmetric information and increases customers' trust in the family firm.

Next, we studied firms with increased family involvement because family members are managers and the name of the family is included in the firm name. We included the dummy variable *Family all involvement*, which is equal to 1 when a family is the ultimate largest shareholder, members of that family are managers and the name of the family is also the firm's name. In Column 8 of Table 5, we observe that this type of family firm offers less trade credit to their customers. Therefore, the results of the different models presented in Table 5 confirm our first hypothesis. Finally, in Columns 9 and 10, we studied the results for family firms controlled by only one person (*Lone family*) and those directly controlled (*Family independent*), respectively. In these cases, we expected greater identification between family and firm. The results show that both variables are negatively related to trade credit but only statistically significant for *Lone family*.[3]

The results of the control variables are, in general, in line with previous studies. The variable *Size* is significant and positive, which means that large firms provide more trade credit to their customers than small ones. We also find that firms with better access to finance and finance at a lower cost offer more trade credit. Indeed, the coefficient of the variable *Short-Term Debt* is positive and significant in all the regressions, the cost of external finance (*Financial Cost*) has a negative and significant impact on the trade credit granted by firms, and the proxy variable for the internal generation of resources (*Cash Flow*) is negative and significant. The coefficient of the variable *Turn* is positive and significant, and the results show a non-linear relationship between the profit margin and trade credit granted variables.

4.2.2 Inside family firms and trade credit policy

Literature has highlighted that family firms are not a homogeneous group with similar goals (e.g. Michiels and Molly 2017). Thus, to provide insight into our second hypothesis, the model is re-estimated for the subsample of only family firms to examine the effects of family firm heterogeneity on trade credit policy.

[3] In this study we do not have information on intra-group trade credit granted.

The results presented in Column 1 of Table 6 show that family firms directly controlled by a family (*Family independent*) do not grant less trade credit than firms belonging to a family business group. Similarly, in column 2 of Table 6, when we compare family firms where only one person is the controlling owner (*Lone Family*) to family firms where several members of a family are the controlling owner, this characteristic does not affect the trade credit granted to their customers.

Table 6 Trade credit granted among family firms

	REC 1	REC 2	REC 3	REC 4	REC 5
Family Independent	−0.001				
	(−1.05)				
Lone family		−0.001			
		(−1.44)			
Family management			−0.001***		
			(−6.39)		
Family reputation				−0.002***	
				(−2.98)	
Family all involvement					−0.002***
					(−2.68)
Market share	−0.028	−0.026	−0.014	−0.032	−0.032
	(−0.32)	(−0.29)	(−0.15)	(−0.35)	(−0.35)
Growth	0.007**	0.007**	0.010***	0.007**	0.007**
	(2.47)	(2.47)	(3.47)	(2.50)	(2.49)
Size	0.015***	0.015***	0.015***	0.015***	0.015***
	(4.08)	(4.02)	(4.05)	(4.06)	(4.07)
Age	−0.070***	−0.070***	−0.060***	−0.069***	−0.070***
	(−7.67)	(−8.16)	(−6.92)	(−8.19)	(−8.26)
Short-Term Debt	0.181***	0.182***	0.180***	0.181***	0.181***
	(19.59)	(19.89)	(19.78)	(19.86)	(19.86)
Financial Cost	−0.121***	−0.121***	−0.119***	−0.121***	−0.121***
	(−6.35)	(−6.36)	(−6.26)	(−6.37)	(−6.37)
Cash Flow	−0.105***	−0.104***	−0.110***	−0.108***	−0.107***
	(−3.37)	(−3.35)	(−3.53)	(−3.47)	(−3.45)
Turn	0.037***	0.037***	0.037***	0.037***	0.037***
	(34.18)	(34.15)	(34.23)	(34.20)	(34.20)
Profit margin	0.233***	0.233***	0.232***	0.234***	0.234***
	(8.43)	(8.45)	(8.43)	(8.49)	(8.48)
Profit margin^2	−0.112	−0.114	−0.109	−0.110	−0.111
	(−1.19)	(−1.22)	(−1.17)	(−1.18)	(−1.19)
Intercept	0.241***	0.244***	0.215***	0.240***	0.241***
	(6.10)	(6.36)	(5.59)	(6.29)	(6.30)
Industry dummies	Yes	Yes	Yes	Yes	Yes
R-squared	0.438	0.438	0.445	0.438	0.438
Observations	29,092	29,092	29,092	29,092	29,092

The estimations have been carried out using fixed-effects

Note. *t*-statistics in parentheses. ***p<0.01; **p<0.05; *p<0.1

The results in Column 3 of Table 6 highlight that family firms with family members acting as managers (*Family management*) provide less trade credit to their customers than other types of family firms. We can assume that clients of family firms with family shareholders acting as managers are more committed to the firm's well-being and have a greater interest in the seller's survival, which could be reflected in the higher quality of their products and services. Similarly, the results reveal that family firms whose name is the same as the controlling shareholder (*Family reputation* in Column 4) have a more restrictive trade credit policy than other types of family firms. For this type of family shareholder, their firms are an extension of themselves, and they need to protect the firm's reputation by, for example, offering better quality products.

The findings in Table 6 also reveal that family firms with the closest family involvement in the firm (*Family all involvement* in Column 5) provide less trade credit to their customers than other family firms. These findings support the idea that the joint management of the firm by family members and the visibility of the family's reputation, represented by the firm's name, may help to reduce asymmetric information problems between family firms and their customers and, in turn, allow them to offer less trade credit.

4.2.3 Financial crisis, family firms and trade credit granted

The financial crisis started in 2008, and the recession in subsequent years provoked a reduction in the ratio of trade credit offered by firms to their customers (Cantero Sáiz et al. 2017; Kestens et al. 2012; McGuinness and Hogan 2016). In this context and in accordance with our third hypothesis, we are interested in whether family firms' concern for their customers resulted in less credit reduction than in non-family firms. In Table 7, we include the interaction between the variable *Crisis* and the different family firm variables used in this study.

The results presented in Table 7 support the argument that in periods of financial crisis, firms reduce their investment in accounts receivable since the coefficient of the *Crisis* variable is negative and significant in all the cases (Columns 1 to 10). Moreover, the findings in Table 7 highlight that family firms grant less trade credit than non-family firms since all the family firm dummy variables are significantly negative. During the crisis period, private family firms reduced financing to their customers less than companies with a non-family controller since the interactions between *Crisis* and the different family firm variables are positive and significant in Columns 1 to 10. This implies that family firms alleviate the negative impact of crises on trade credit granted, and they limit the trade credit provided to their customers less than non-family firms. We can infer that family firms have a close relationship with their customers and are concerned about them during periods of crisis.

The findings presented in Columns 1 to 10 (Table 7) highlight that family firms grant less trade credit than non-family firms but also that during the crisis, private family firms reduced financing to customers less than companies with a non-family controlling shareholder. These results are observed when we compare different categories of family firms with non-family firms. Therefore, family control seems to be beneficial for customers during financial crises. This supports that the trade credit policies implemented by family firms contemplate broad criteria that go beyond eco-

nomic goals, whereas non-family firms focus mainly on economic objectives (Souder et al. 2017).

After analysing the trade credit policies of family versus non-family firms during a financial crisis, in Table 8, we examine this issue for a subsample of only family firms to examine family firm heterogeneity in terms of the trade credit policies implemented after the Great Recession. The findings displayed in Column 1 of Table 8 show that family firms directly controlled by a family (*Family independent*) grant less trade credit than those indirectly controlled by an ownership chain, that is, firms that belong to a family business group. However, during the crisis period, independent family firms reduced financing to customers less than family companies with the controlling shareholder at the end of an ownership chain. Similarly, in Column 2 of Table 8, we consider firms where only one person is the controlling owner (*Lone Family*) compared to family firms where several members of the same family hold voting rights. We find that family firms controlled by only one person provide less trade credit than family firms controlled by various family members. However, this type of family firm cares more for its customers since, in crisis periods, they reduce the trade credit granted less than family firms with several family members as owners. These results are consistent with a closer identification between family and firm in companies controlled by one person or when they directly control the business without intermediaries hiding the true identity of the owners. The results presented in Table 8 reveal that family firms with family member managers (*Family management* in Column 3), those whose name is the same as the controlling shareholder (*Family reputation* in Column 4) and those with the closest family involvement in the firm (*Family all involvement* in Column 5) provide less trade credit to their customers. However, the results also highlight that this type of family firm alleviates the negative impact of crises on trade credit by limiting the trade credit provided to customers less than other types of family firms.

4.2.4 Robustness

Trade credit granted is also calculated as the days of sales outstanding. Therefore, for robustness, we re-estimated the final model by using this alternative dependent variable. Table 9 presents the results for these models, and the findings are consistent with those reported in Table 7.

In summary, family firms foster trust among their customers. Therefore, they can provide shorter credit periods and adopt more restrictive trade credit policies than non-family firms. However, during a crisis, family firms reduce trade credit less than non-family firms. Therefore, family control is also beneficial for this stakeholder during crisis periods. This confirms that the trade credit policies adopted by family firms contemplate broad criteria that go beyond economic goals, whereas non-family firms focus mainly on economic objectives (Souder et al. 2017).

Table 10 shows the findings with the days of sales outstanding as the dependent variable and comparing trade credit policies among family firms. The results are similar to those previously presented. That is, the direct control of family firms, the presence of family members managing these firms or family reputation represented

Table 7 Family firms, trade credit granted and financial crisis

	REC 1	REC 2	REC 3	REC 4	REC 5	REC 6	REC 7	REC 8	REC 9	REC 10
Crisis	−0.025***	−0.022***	−0.024***	−0.019***	−0.018***	−0.011***	−0.011***	−0.011***	−0.012***	−0.025***
	(−6.83)	(−6.75)	(−6.37)	(−6.83)	(−6.60)	(−6.44)	(−6.42)	(−6.31)	(−7.14)	(−8.94)
Family	−0.006***		−0.006***							
	(−10.18)		(−9.83)							
Family*Crisis	0.029***		0.027***							
	(7.40)		(6.93)							
Family [50]		−0.006***								
		(−10.22)								
Family [50]*Crisis		0.026***								
		(7.33)								
Family management				−0.002***						
				(−8.66)						
Family management*Crisis				0.010***						
				(3.68)						
Family management [50]					−0.002***					
					(−8.67)					
Family management [50]*Crisis					0.009***					
					(3.23)					
Family reputation						−0.003***				
						(−5.37)				
Family reputation*Crisis						0.013***				
						(4.37)				
Family reputation [50]							−0.003***			
							(−5.32)			
Family reputation [50]*Crisis							0.013***			
							(4.29)			

Table 7 (continued)

	REC 1	REC 2	REC 3	REC 4	REC 5	REC 6	REC 7	REC 8	REC 9	REC 10
Family all involvement								−0.003***		
								(−4.66)		
Family all involvement*Crisis								0.011***		
								(3.81)		
Lone Family									−0.004***	
									(−5.07)	
Lone Family*Crisis									0.019***	
									(5.64)	
Family Independent										−0.004***
										(−7.31)
Family Independent*Crisis										0.0267***
										(9.74)
State			0.004***							
			(2.60)							
Financial institution			−0.005**							
			(−2.41)							
Miscellaneous			−0.002							
			(−0.68)							
Market share	0.049	0.049	0.053	0.053	0.052	0.040	0.040	0.040	0.042	0.045
	(0.57)	(0.58)	(0.67)	(0.61)	(0.61)	(0.47)	(0.46)	(0.47)	(0.49)	(0.53)
Growth	0.007***	0.007***	0.007***	0.009***	0.009***	0.006**	0.006**	0.006**	0.006**	0.006**
	(2.74)	(2.72)	(2.78)	(3.26)	(3.23)	(2.24)	(2.24)	(2.22)	(2.22)	(2.39)
Size	0.017***	0.017***	0.017***	0.016***	0.016***	0.016***	0.016***	0.016***	0.016***	0.016***
	(5.26)	(5.25)	(5.27)	(4.88)	(4.90)	(4.94)	(4.94)	(4.94)	(4.90)	(4.90)
Age	−0.019**	−0.022**	−0.018*	−0.036***	−0.037***	−0.052***	−0.052***	−0.052***	−0.051***	−0.038***
	(−2.02)	(−2.30)	(−1.83)	(−4.15)	(−4.26)	(−6.31)	(−6.32)	(−6.40)	(−6.17)	(−4.44)

Table 7 (continued)

	REC 1	REC 2	REC 3	REC 4	REC 5	REC 6	REC 7	REC 8	REC 9	REC 10
Short-Term Debt	0.154***	0.154***	0.157***	0.156***	0.156***	0.158***	0.158***	0.158***	0.158***	0.158***
	(18.96)	(18.97)	(19.52)	(19.25)	(19.24)	(19.55)	(19.54)	(19.55)	(19.54)	(19.42)
Financial Cost	−0.103***	−0.103***	−0.102***	−0.109***	−0.109***	−0.106***	−0.106***	−0.107***	−0.107***	−0.106***
	(−4.79)	(−4.77)	(−4.75)	(−5.10)	(−5.07)	(−4.95)	(−4.95)	(−4.96)	(−5.00)	(−4.99)
Cash Flow	−0.106***	−0.105***	−0.106***	−0.098***	−0.098***	−0.095***	−0.095***	−0.095***	−0.093***	−0.097***
	(−4.17)	(−4.14)	(−4.19)	(−3.89)	(−3.88)	(−3.74)	(−3.74)	(−3.72)	(−3.66)	(−3.82)
Turn	0.038***	0.038***	0.038***	0.038***	0.038***	0.038***	0.038***	0.038***	0.038***	0.038***
	(39.66)	(39.65)	(39.69)	(39.70)	(39.70)	(39.71)	(39.71)	(39.71)	(39.70)	(39.68)
Profit margin	0.206***	0.206***	0.204***	0.205***	0.205***	0.208***	0.208***	0.208***	0.207***	0.206***
	(8.82)	(8.82)	(8.77)	(8.77)	(8.77)	(8.90)	(8.90)	(8.89)	(8.86)	(8.83)
Profit margin^2	−0.122	−0.124	−0.115	−0.128	−0.128	−0.133	−0.133	−0.133	−0.134	−0.124
	(−1.47)	(−1.50)	(−1.40)	(−1.55)	(−1.55)	(−1.61)	(−1.61)	(−1.61)	(−1.62)	(−1.50)
Intercept	0.080**	0.087**	0.075*	0.136***	0.138***	0.177***	0.177***	0.179***	0.175***	0.143***
	(2.07)	(2.27)	(1.94)	(3.74)	(3.80)	(5.00)	(5.01)	(5.06)	(4.98)	(3.94)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.456	0.456	0.455	0.453	0.452	0.444	0.444	0.444	0.446	0.450
Observations	35,428	35,428	35,428	35,428	35,428	35,428	35,428	35,428	35,428	35,428

The estimations have been carried out using fixed-effects

Note. *t*-statistics in parentheses. ***p<0.01; **p<0.05; *p<0.1

by a firm's name may help diminish asymmetric information problems with customers and allow them to provide less trade credit.

In Table 11, we also consider additional econometric concerns. First, in model 1, we re-estimated the final model with lagged control variables to address the endogeneity issue. As we can see, the results are like those previously discussed. Second, since family firms might differ from non-family firms in several respects, and these differences might affect trade credit policies, we have also compared family firms with an equal subsample of non-family firms with similar characteristics. To do this, we have applied a propensity score-matching analysis using size, age, growth opportunities, industry and year as control characteristics in the first year of our study to compare the trade credit granted by family firms to that granted by similar non-family firms. Our matched sample comprises 12,326 observations equally divided into family and non-family firms. The propensity score-matching estimator applied is the standard one-to-one nearest neighbour. We re-estimated the effect of family firms and crisis on the trade credit granted using the final specification. As shown in model 2 of Table 11, the results are consistent with the previous findings. We also re-estimated the model for the matched sample considering lagged control variables, and we found strong and consistent results (see model 3 in Table 11). Table 11 also presents the results for these three models (lagged independent variables, matched sample and matched sample with lagged independent variables) considering the days of sales outstanding as the dependent variable (columns 4 to 6, respectively, in Table 11), and the findings are consistent with those previously discussed. In this respect, family firms provide less trade to their customers than non-family firms. However, the results also reveal that firms with a family as the controlling shareholder are beneficial for their customers in crisis periods because family firms reduce trade credit less than non-family firms.

Finally, to validate the results and confirm that they were not biased, we re-estimated the models with alternative definitions of the control variables. For example, following Petersen and Rajan (1997), we replaced the variable *Growth* with *Positive growth* and *Negative growth* to consider the effects of positive and negative sales growth, respectively. After considering these alternative measures, the results remain qualitatively the same.

5 Discussion and conclusions

This paper analyses the influence of family firm on trade credit granted to customers, focusing on the distinctions between family and non-family firms, the heterogeneity among family firms and the effects of the 2008 financial crisis on trade credit policies for the different types of firms studied. To do this, we used a sample of non-financial private Spanish firms to conduct a panel data study (period 2004–2013) of trade credit strategies in family firms. The sample and timeframe selected are useful to analyse the role played by family firms in reducing information asymmetries that cause agency problems between a firm and its customers and preserving their socioemotional wealth and their influence in the redistribution channel of trade credit during the financial crisis.

Table 8 Trade credit granted and financial crisis among family firms

	REC 1	REC 2	REC 3	REC 4	REC 5
Crisis	−0.024***	−0.023***	−0.023***	−0.011***	−0.011***
	(−8.54)	(−6.47)	(−5.16)	(−5.63)	(−5.50)
Family Independent	−0.004***				
	(−7.22)				
Family Independent*Crisis	0.030***				
	(9.35)				
Lone family		−0.003***			
		(−5.05)			
Lone family*Crisis		0.019***			
		(5.40)			
Family management			−0.002***		
			(−8.57)		
Family management*Crisis			0.011***		
			(2.60)		
Family reputation				−0.003***	
				(−5.31)	
Family reputation*Crisis				0.012***	
				(3.99)	
Family all involvement					−0.003***
					(−4.61)
Family all involvement*Crisis					0.011***
					(3.46)
Market share	−0.026	−0.034	−0.014	−0.039	−0.039
	(−0.29)	(−0.39)	(−0.15)	(−0.44)	(−0.44)
Growth	0.007**	0.007**	0.011***	0.007**	0.007**
	(2.49)	(2.25)	(3.59)	(2.27)	(2.25)
Size	0.015***	0.015***	0.014***	0.015***	0.015***
	(4.10)	(4.08)	(4.03)	(4.13)	(4.12)
Age	−0.030***	−0.047***	−0.029***	−0.048***	−0.049***
	(−2.97)	(−5.05)	(−2.83)	(−5.22)	(−5.32)
Short-Term Debt	0.175***	0.176***	0.173***	0.176***	0.176***
	(18.94)	(19.15)	(18.78)	(19.18)	(19.17)
Financial Cost	−0.133***	−0.134***	−0.138***	−0.132***	−0.133***
	(−6.93)	(−6.94)	(−7.15)	(−6.88)	(−6.90)
Cash Flow	−0.113***	−0.109***	−0.116***	−0.112***	−0.111***
	(−3.68)	(−3.51)	(−3.74)	(−3.61)	(−3.59)
Turn	0.037***	0.037***	0.037***	0.037***	0.037***
	(34.12)	(34.15)	(34.17)	(34.17)	(34.17)
Profit margin	0.225***	0.228***	0.225***	0.229***	0.229***
	(8.23)	(8.28)	(8.16)	(8.33)	(8.32)
Profit margin^2	−0.088	−0.103	−0.095	−0.101	−0.101
	(−0.95)	(−1.10)	(−1.03)	(−1.09)	(−1.09)
Intercept	0.133***	0.179***	0.130***	0.182***	0.183***
	(3.25)	(4.59)	(3.21)	(4.64)	(4.67)
Industry dummies	Yes	Yes	Yes	Yes	Yes

Table 8 (continued)

	REC 1	REC 2	REC 3	REC 4	REC 5
R-squared	0.459	0.453	0.461	0.450	0.451
Observations	29,092	29,092	29,092	29,092	29,092

The estimations have been carried out using fixed-effects

Note. *t*-statistics in parentheses. ***p<0.01; **p<0.05; *p<0.1

Our results show a negative association between firms controlled by families and trade credit extension. These results demonstrate the vital role played by family firms in granting credit, thus improving the efficiency of their short-term financial decisions. Family firms' inherent characteristics reduce information asymmetries with their customers, which permits them to establish a more restrictive trade credit strategy and grant less trade credit to their customers than non-family firms. The findings also show that the reduction in the trade credit granted by firms to their customers in the crisis period was lower when the controlling shareholder was a family. In terms of the heterogeneity among family firms and trade credit policy, we find that those with more active family involvement tend to be stricter in extending credit to their customers. However, they also demonstrate a heightened level of empathy and support for their customers during financial crises.

Our results provide new insights that are consistent with previous research. According to seminal studies (e.g. Smith 1987), trade credit is an effective tool to mitigate ex-ante information asymmetries that lead to adverse selection for customers due to the unknown nature of the seller or product quality. The empirical literature has shown that this problem can be solved by increasing trade credit (Deloof and Jegers 1996; Klapper et al. 2012; Lee and Stowe 1993; Long et al. 1993; Pike et al. 2005). Our results are consistent with these studies, as family firms' incentive structures are associated with reduced information asymmetries, allowing them to offer less trade credit to their customers. Furthermore, clients may be willing to demand less trade credit since family firms' interest in preserving non-financial goals, such as their reputation (Gómez-Mejia et al. 2011; Souder et al. 2017; Zellweger et al. 2013), make them more reliable (Binz et al. 2013; Botero et al. 2018; Sageder et al. 2018). These outcomes might be affected by the bargaining power in the supply chain since several studies have found that firms with greater market power provide less trade credit (e.g. Cosci et al. 2020; Dass et al. 2015; Fabbri and Klapper et al. 2012), but this factor has been controlled in our analysis.

We also shed light on the heterogeneity of family firms. Regarding the differences in trade credit granted among family firms, reputation is the most differentiating factor among family businesses, highlighting their concern for socioemotional wealth and non-economic goals, especially when the company's image is associated with the family (Deephouse and Jaskiewicz 2013; Isakov and Weisskopf 2014; Mauri 2006), which enhances customer confidence (Lude and Pügl 2019; Schellong et al. 2019). Thus, the importance placed on socioemotional wealth by family firms drives the variation in their financing decisions (Michiels and Molly 2017). Consistent with the agency theory, the data also highlight the relevance of management's involvement since it facilitates the alignment of family owners' interests and managers' goals (De

Table 9 Family firms, trade credit granted and financial crisis. Robustness analysis

	DSO 1	DSO 2	DSO 3	DSO 4	DSO 5	DSO 6	DSO 7	DSO 8	DSO 9	DSO 10
Crisis	−7.896***	−6.929***	−6.795***	−5.037***	−4.455***	−0.584	−0.598	−0.539	−0.942	-8.076***
	(−5.23)	(−4.99)	(−4.52)	(−4.27)	(−3.90)	(−0.75)	(−0.77)	(−0.70)	(−1.25)	(−5.37)
Family	−1.730***		−1.784***							
	(−7.01)		(−7.02)							
Family*Crisis	12.855***		11.768***							
	(8.01)		(7.34)							
Family [50]		−1.704***								
		(−7.02)								
Family [50]*Crisis		12.007***								
		(8.02)								
Family management				−0.220**						
				(−2.15)						
Family management*Crisis				6.748***						
				(5.99)						
Family management [50]					−0.233**					
					(−2.27)					
Family management [50]*Crisis					6.109***					
					(5.58)					
Family reputation						−0.627**				
						(−2.33)				
Family reputation*Crisis						4.186***				
						(3.23)				
Family reputation [50]							−0.643**			
							(−2.38)			
Family reputation [50]*Crisis							4.302***			
							(3.30)			
Family all involvement								−0.545*		
								(−1.98)		
Family all involvement*Crisis								3.897***		
								(2.94)		

Table 9 (continued)

	DSO 1	DSO 2	DSO 3	DSO 4	DSO 5	DSO 6	DSO 7	DSO 8	DSO 9	DSO 10
Lone Family									−1.257***	
									(−3.91)	
Lone Family*Crisis									7.898***	
									(5.29)	
Family Independent										−0.694***
										(−2.92)
Family Independent*Crisis										11.751***
										(10.00)
State			0.437							
			(0.57)							
Financial institution			−1.878**							
			(−2.66)							
Miscellaneous			−0.814							
			(−0.87)							
Market share	−283.858***	−283.570***	−281.676***	−282.039***	−282.293***	−284.865***	−284.879***	−284.657***	−284.756***	−278.427***
	(−3.88)	(−3.87)	(−3.85)	(−3.94)	(−3.93)	(−3.88)	(−3.88)	(−3.88)	(−3.88)	(−3.87)
Growth	−18.767***	−18.785***	−18.735***	−18.878***	−18.862***	−19.165***	−19.160***	−19.170***	−19.130***	−19.052***
	(−15.04)	(−15.04)	(−15.02)	(−14.83)	(−14.82)	(−15.31)	(−15.30)	(−15.31)	(−15.29)	(−15.28)
Size	25.876***	25.866***	25.904***	25.265***	25.289***	25.564***	25.564***	25.548***	25.554***	25.957***
	(19.96)	(19.95)	(20.05)	(19.56)	(19.57)	(19.72)	(19.72)	(19.7)	(19.71)	(19.33)
Age	−23.823***	−24.528***	−22.884***	−32.402***	−32.454***	−34.340***	−34.318***	−34.455***	−33.616***	−30.034***
	(−5.47)	(−5.72)	(−5.16)	(−8.22)	(−8.25)	(−9.44)	(−9.44)	(−9.47)	(−9.19)	(−7.79)
Short-Term Debt	30.928***	30.934***	31.419***	32.694***	32.563***	31.980***	31.979***	32.010***	31.886***	33.381***
	(9.89)	(9.90)	(10.06)	(10.42)	(10.39)	(10.29)	(10.29)	(10.30)	(10.25)	(10.64)
Financial Cost	−71.446***	−71.354***	−71.141***	−73.781***	−73.547***	−72.257***	−72.230***	−72.325***	−72.274***	−73.647***
	(−9.52)	(−9.49)	(−9.41)	(−9.83)	(−9.79)	(−9.58)	(−9.58)	(−9.59)	(−9.58)	(−9.84)
Cash Flow	37.837***	38.251***	37.365***	41.783***	41.890***	42.220***	42.210***	42.321***	42.179***	42.436***
	(2.74)	(2.77)	(2.72)	(3.03)	(3.04)	(3.06)	(3.06)	(3.06)	(3.06)	(3.10)
Turn	2.079***	2.081***	2.067***	2.056***	2.055***	2.061***	2.061***	2.059***	2.065***	2.057***
	(10.18)	(10.17)	(10.15)	(10.08)	(10.06)	(10.07)	(10.07)	(10.06)	(10.09)	(10.13)

Table 9 (continued)

	DSO 1	DSO 2	DSO 3	DSO 4	DSO 5	DSO 6	DSO 7	DSO 8	DSO 9	DSO 10
Profit margin	−50.916***	−51.006***	−51.136***	−51.005***	−51.055***	−51.020***	−51.037***	−51.055***	−51.138***	−51.550***
	(−4.08)	(−4.08)	(−4.10)	(−4.09)	(−4.09)	(−4.09)	(−4.09)	(−4.09)	(−4.10)	(−4.17)
Profit margin^2	145.481***	144.833***	147.916***	143.128***	142.555***	140.832***	140.965***	140.942***	141.412***	145.459***
	(3.34)	(3.32)	(3.40)	(3.29)	(3.28)	(3.24)	(3.24)	(3.24)	(3.25)	(3.36)
Intercept	−81.024***	−79.004***	−84.038***	−53.051***	−53.059***	−49.728***	−49.786***	−49.290***	−80.714***	−81.467***
	(−4.88)	(−4.82)	(−5.03)	(−3.47)	(−3.47)	(−3.37)	(−3.37)	(−3.33)	(−4.85)	(−4.98)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.026	0.026	0.026	0.024	0.024	0.023	0.023	0.023	0.023	0.025
Observations	35,428	35,428	35,428	35,428	35,428	35,428	35,428	35,428	35,428	35,428

The estimations have been carried out using fixed-effects

Note. *t*-statistics in parentheses. ***p<0.01; **p<0.05; *p<0.1

Massis et al. 2013; Le Breton-Miller et al. 2011; Sacristán-Navarro et al. 2011). In this regard, family managers may not be as lenient with trade credit as non-family managers, who may have incentives to increase sales by facilitating trade credit to customers. However, we find no evidence that either family firms directly controlled by a family rather than a family group or those where only one person is the controlling owner have more restrictive trade credit policies.

Previous financial literature has also analysed the role of trade credit as a redistribution mechanism during financial crises**.** In the aftermath of the 2008 financial crisis, firms faced severe credit constraints stemming from a reduction in bank lending and a subsequent decline in trade credit. (e.g. Bastos and Pindado 2013; Kestens et al. 2012; McGuinness and Hogan 2016). Accordingly, our outcomes support a reduction in the aggregate level of trade credit during the recession years. Moreover, we expand these studies by considering the response of family firms during the lack of bank credit as a consequence of the 2008 financial crisis. The lower reduction in trade credit granted by family-controlled firms during the crisis may indicate that they are willing to support their customers' goals by limiting the impact of liquidity shocks. Family firms are more prone to actively engage with their stakeholders to preserve their socioemotional wealth (Cenmano et al. 2012; Van Essen et al. 2015). Non-family firms make strategic decisions driven by standard performance metrics because they do not consider socioemotional wealth in their decision-making, whereas family firms respond to stakeholders' needs to achieve mutually beneficial outcomes during crises. These results may also be explained by the redistribution effect since family firms financially performed better during the 2008 financial crisis (Van Essen et al. 2015) and faced less rationing (Crespí and Martín-Oliver 2015; D'Aurizio et al. 2015), which places them in a better position to provide liquidity to their clients (Garcia-Appendini and Montoriol-Garriga 2013). An alternative interpretation could be that family firms were already operating close to their optimal trade credit levels, with little margin to make cuts during the crisis. This may be due to the higher efficiency of family firms in managing trade credit (Chen et al. 2023). Their interest in the survival of the firms may prioritise long-term gains over short-term benefits, which can lead to a more efficient allocation of resources (Miller et al. 2008). In addition, family ownership promotes the alignment of interests, which can increase the efficiency of decision-making (Anderson and Reeb 2003). Their established reputation and strong customer relationships can also lead to more favourable credit terms. However, family firms also face conflicts that can negatively affect their efficiency, such as conservatism in decision making, nepotism practices and succession issues (Ghalke et al. 2023).

The findings of this research have valuable implications for family and non-family controlling shareholders and firm managers. The effects of family control on a firm's trade credit strategy demonstrate that the family's inherent characteristics are considered by their critical stakeholders. Therefore, carefully reflecting on these characteristics is necessary to ensure that strategic decisions best fit the firm's shareholders and stakeholders. Implicitly, the results highlight the importance of owners' characteristics in firms' decision-making. Therefore, a firm's owners and managers should keep in mind that their reputations and long-term horizons may be reflected in their

Table 10 Trade credit granted and financial crisis among family firms. Robustness analysis

	DSO 1	DSO 2	DSO 3	DSO 4	DSO 5
Crisis	−6.607***	−0.417	−5.753***	0.144	0.181
	(−5.44)	(−0.49)	(−3.25)	(0.16)	(0.21)
Family Independent	−0.847***				
	(−3.14)				
Family Independent*Crisis	12.647***				
	(9.23)				
Lone family		−1.358***			
		(−4.06)			
Lone family*Crisis		7.254***			
		(4.71)			
Family management			−0.191*		
			(−1.86)		
Family management*Crisis			6.981***		
			(4.08)		
Family reputation				−0.704**	
				(−2.51)	
Family reputation*Crisis				3.354**	
				(2.47)	
Family all involvement					−0.624*
					(−2.17)
Family all involvement*Crisis					3.106**
					(2.24)
Market share	−376.497**	−389.446***	−382.222***	−389.749***	−389.479***
	(−2.83)	(−2.90)	(−2.90)	(−2.90)	(−2.90)
Growth	−18.426***	−18.610***	−18.218***	−18.641***	−18.649***
	(−13.47)	(−13.55)	(−12.90)	(−13.57)	(−13.58)
Size	23.756***	24.439***	24.113***	24.436***	24.427***
	(16.26)	(16.63)	(16.49)	(16.62)	(16.60)
Age	−26.591***	−31.039***	−30.584***	−32.297***	−32.449***
	(−5.75)	(−7.26)	(−6.48)	(−7.63)	(−7.65)
Short-Term Debt	37.009***	35.718***	36.338***	35.882***	35.903***
	(10.53)	(10.26)	(10.33)	(10.31)	(10.31)
Financial Cost	−75.538***	−74.764***	−75.803***	−74.626***	−74.678***
	(−9.66)	(−9.50)	(−9.64)	(−9.48)	(−9.49)
Cash Flow	34.903**	34.012**	34.497**	33.805**	33.959**
	(2.09)	(2.03)	(2.05)	(2.01)	(2.02)
Turn	1.656***	1.666***	1.652***	1.665***	1.663***
	(7.08)	(7.09)	(7.03)	(7.08)	(7.07)
Profit margin	−52.521***	−51.084***	−51.873***	−50.790***	−50.853***
	(−3.60)	(−3.46)	(−3.52)	(−3.44)	(−3.44)
Profit margin^2	181.285***	176.172***	177.506***	175.890***	175.949***
	(3.79)	(3.64)	(3.68)	(3.64)	(3.64)
Intercept	−53.823***	−46.862***	−45.981***	−43.486***	−43.196**
	(−3.01)	(−2.77)	(−2.61)	(−2.59)	(−2.27)
Industry dummies	Yes	Yes	Yes	Yes	Yes

Table 10 (continued)

	DSO 1	DSO 2	DSO 3	DSO 4	DSO 5
R-squared	0.035	0.031	0.031	0.030	0.030
Observations	29,092	29,092	29,092	29,092	29,092

The estimations have been carried out using fixed-effects

Note. *t*-statistics in parentheses. ***p<0.01; **p<0.05; *p<0.1

Table 11 Family firms, trade credit granted,and financial crisis. Robustness analysis

	REC 1	REC 2	REC 3	DSO 4	DSO 5	DSO 6
Crisis	−0.030***	−0.015***	−0.018***	−7.766***	−4.439***	−2.311
	(−7.60)	(−4.16)	(−4.01)	(−7.08)	(−2.71)	(−1.32)
Family	−0.005***	−0.004***	−0.005***	−1.912***	−1.536***	−3.602***
	(−7.04)	(−4.34)	(−2.57)	(−5.16)	(−3.36)	(−3.91)
Family*Crisis	0.024***	0.015***	0.018**	11.400***	5.396**	8.219**
	(5.30)	(2.85)	(2.27)	(7.09)	(2.24)	(2.15)
Market share	0.323**	0.121	0.373*	−69.246*	−203.09***	−34.477
	(2.49)	(1.12)	(1.75)	(−1.69)	(−3.29)	(−0.60)
Growth	−0.000	0.009*	−0.004	−14.940***	−20.789***	−15.549***
	(−0.12)	(1.89)	(−0.50)	(−11.87)	(−8.34)	(−5.30)
Size	−0.015***	0.016***	−0.011	6.223***	27.824***	10.106***
	(3.71)	(2.78)	(−1.19)	(4.59)	(12.34)	(3.57)
Age	−0.027**	−0.045***	−0.072***	−19.911***	−35.493***	−34.860***
	(−2.26)	(−3.35)	(−3.55)	(−4.40)	(−5.67)	(−4.37)
Short-Term Debt	0.131***	0.124***	0.107***	−7.489**	27.491***	7.857
	(13.95)	(9.95)	(6.08)	(−2.38)	(5.09)	(1.27)
Financial Cost	−0.053**	−0.044	0.003	−13.470*−	−75.666***	−11.797
	(−2.41)	(−0.87)	(0.04)	(−1.91)	(−4.99)	(−0.59)
Cash Flow	−0.060**	−0.089***	−0.018	1.448	30.711	25.267
	(−2.22)	(−2.79)	(−0.47)	(0.11)	(1.59)	(1.20)
Turn	0.018***	0.040***	0.021***	0.922***	2.916***	1.399***
	(21.79)	(25.25)	(12.89)	(4.72)	(8.71)	(3.93)
Profit margin	0.136***	0.170***	0.088**	−4.315	−38.468**	−9.145
	(5.38)	(5.21)	(2.05)	(−0.36)	(−2.11)	(−0.41)
Profit margin^2	−0.292***	−0.187	−0.450**	55.433	96.873	10.359
	(−3.07)	(−1.44)	(−2.18)	(1.21)	(1.34)	(0.10)
Intercept	0.476***	0.157**	0.567***	106.447***	−74.873***	102.644***
	(10.23)	(2.48)	(5.53)	(6.26)	(−2.85)	(2.93)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.357	0.465	0.344	0.006	0.008	0.002
Observations	29,643	12,326	6,955	29,643	12,326	6,955

The estimations have been carried out using fixed-effects

Note. *t*-statistics in parentheses. ***$p<0.01$; **$p<0.05$; *$p<0.1$

firm's efficient investment. Particularly, our findings suggest that firms controlled by families can reduce their investments in trade credit.

Our research is not without limitations that provide avenues for future studies. First, the analysis is based on data from Spain. This country is an interesting context due to the dominant role of family controlling shareholders and the great importance of trade credit. Thus, although our results can be generalised to other Continental European countries with similar institutional characteristics, they could be culturally constrained. Therefore, future studies could test whether our results hold up in other institutional settings. Additionally, although we focused on firms' primary stakeholders, there are other primary and secondary stakeholders that have not been included. Future research could analyse whether a firm's trade credit strategy depends on other stakeholders, such as suppliers. It would also be interesting to increase research focused on finding appropriate instruments for different family variables, which would allow estimation with instrumental variables methods with the appropriate theoretical justification. Finally, future research could examine how more effective investment by family firms could improve financial performance.

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Conflict of interest The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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