Do crises impact capital structure? A study of French micro-enterprises

Thi van Hoang, Călin Gurău, Amine Lahiani, Thuy-Luu Seran

HAL Id: hal-03608784
https://hal.science/hal-03608784v1

Submitted on 21 Mar 2022 (v1), last revised 17 Apr 2024 (v2)

Do Crises Impact Capital Structure?
A Study of French Micro-Enterprises

Thi Hong Van HOANG

Montpellier Business School

Montpellier Research in Management

2300 Avenue des Moulins

34185 Montpellier, France

Tel.: +33 (0)467102802

Email: thv.hoang@Montpellier-BS.com

Călin GURĂU

Montpellier Business School

Montpellier Research in Management

2300 Avenue des Moulins

34185 Montpellier, France

Tel.: +33 (0)467102846

Email: c.gurau@montpellier-bs.com

Amine LAHIANI

University of Orléans, France

Email: amine.lahiani@univ-orleans.fr

Thuy-Luu SERAN

MOMA, University of Montpellier

Montpellier Research in Management

Espace Richter, Rue Vendémiaire

34960 Montpellier, France

Do Crises Impact Capital Structure?
A Study of French Micro-Enterprises

Abstract

This article analyses the impact of the global crisis on the relationship between firm-related factors (size, tangible and intangible assets, growth and profitability) and the capital structure of French micro-enterprises. A panel of 4,945 firms are studied comparatively over two periods: before (2003-2007) and during (2008-2013) the global crisis. During the global crisis, micro-enterprises survive by relying mostly on internal sources of financing. External leverage is reduced, as the increased information asymmetry and default risk raise the cost of debt. When necessary, micro-enterprises sell the underused or unnecessary tangible assets, as they focus on their main competence and develop their intangible assets: human skills, advertising, networking, brand name and awareness. In addition, we show that the pecking order is the most relevant theory for predicting the financial decisions and situation of French MEs. These results provide interesting insights into the financial strategy of French micro-enterprises, facilitating understanding and action at academic and policy levels.

1. Introduction

The 2008-2013 period was characterized by a dramatic financial crisis, followed by a severe economic recession[1] (Berkowitz et al. 2015). Considered the largest economic recession since the Second World War, this global crisis had devastating effects on firms of all sizes (Alviarez et al. 2017; Bricogne et al. 2012; Kudlyak and Sanchez 2017; Vandenberg 2009). Micro-enterprises (MEs) were particularly vulnerable because "it is more difficult for them to downsize as they are already small; they are individually less diversified in their economic activities; they have a weaker financial structure (i.e., lower capitalization); they have a lower or no credit rating; they are heavily dependent on credit, and they have fewer financing options" (OECD 2009, p. 6). Facing the joint challenges of weak market demand and tight credit conditions (Vandenberg 2009), their capital structure came under significant stress during the global crisis.

In the European Union (EU), MEs are defined as enterprises that employ fewer than 10 persons and whose annual turnover or annual balance sheet total does not exceed two million euros (European Commission 2016). Their overwhelming proportion in the EU organizational landscape (i.e., 92.7% of the total number of business organisations, according to Eurostat, 2015) is counter-balanced by their high mortality and inability to achieve sustainable economic growth. At the core of these issues, greatly exacerbated by the global crisis, stands MEs' capital structure (Balios et al. 2016). Despite the importance of these firms for national and EU economies[2], their capital structure is much less studied than that of larger firms (Ramalho and Da Silva 2009; Van de Wijst and Thurik 1993; Zingales 2000). MEs are often aggregated with other Small and Medium-Sized Enterprises (SMEs), or when considered independently, the interpretation of results is rather shallow, as it is limited to a comparison with larger firms (Bellettre 2010; Calvo 2014; Ramalho and Da Silva 2009). This superficial approach neglects that similar results may express different causes and processes for various categories of firms, as the differences between MEs and small firms may be larger than expected (Bellettre 2010; Scherr and Hulburt 2001).

---

[1] Following Benkraiem (2016), we refer to these crises as the global crisis hereafter. Furthermore, for simplicity reasons, "crisis" and "global crisis" are used interchangeably.

[2] "Micro-enterprises […] are considered as a driver of the economy of the European Union (EU), creating jobs and contributing to economic growth. In 2012, of the 22.3 million enterprises in the EU's non-financial business economy, an overwhelming majority (92.7%) were microenterprises […], accounting for 29.2% of employment" (Eurostat 2015, p.1).

Although the survival and support of MEs is a major concern for national governments and international institutions (Bazard 2015; *Observatoire du financement des entreprises* [3] 2012 and 2014; Vandenberg 2009), little is known about the effect of the global crisis on MEs' capital structure. We address this knowledge gap by investigating the effect of firm-related variables (i.e., size, asset structure, profitability and growth) on the capital structure (i.e., short-term, long-term and total debt over total assets) of 4,945 French MEs between 2003 and 2013, with 2003-2007 as the pre-crisis and 2008-2013 as the global crisis period (e.g., Benkraiem et al. 2016; Zeitun et al. 2017). Applying the least square dummy variable (LSDV) estimation of fixed-effect regressions, we attempt to answer two inter-related research questions:

(1) What is the relationship between firm-related variables and the capital structure of French MEs?

(2) How is this relationship affected by the global crisis?

In investigating these questions, we provide a threefold contribution to the capital structure literature. First, we analyze the specific case of micro-enterprises, which, to the best of our knowledge, have not been exclusively studied in previous research. Second, we seek to analyze the impact of the global crisis on the relationship between firm-related factors and the capital structure of MEs. This question is important because MEs' survival during crisis essentially depends on their choice of financing sources. Third, we apply a methodology based on rational econometrics – least square dummy variable (LSDV) estimation, which allows us to take into account the potential existence of endogeneity in our panel data of 4,945 firms over the 2003-2013 period. In addition, we use Principal Component Analysis (PCA) to better understand the interaction between firm-related factors and their capital structure.

Overall, our results show that all investigated firm-related factors (size, tangible and intangible assets, growth, and profitability) significantly affect the capital structure of French micro-enterprises. Furthermore, long-term debt is used to finance tangible assets, while short-term debt is mainly used by firms with low profitability and growth. During the crisis, MEs focus on operational growth, financed mainly through short-term debt to maintain strategic flexibility. In addition, during the crisis, the relationship between firm growth and long-term debt becomes non-significant, demonstrating the challenges raised by this type of financing.

---

[3] In English, "*The Observatory of Enterprise Financing*", an organization created and managed by the French Ministry of Economy and Finance in order to study the financing of firms in France. More information can be found on the following website: https://www.tresor.economie.gouv.fr/Observatoire-du-financement-des-entreprises.

Finally, we show that pecking order is the most relevant theory for predicting the financial decisions and situation of French MEs.

The rest of the article is structured as follows. In Section 2, we present the specific characteristics of MEs. In Section 3, we discuss the relevance of various capital structure theories for MEs, and we formulate the research hypotheses. Section 4 provides information about the applied methodology. The results are presented and discussed in Section 5. We conclude the paper in Section 6, highlighting our original contributions, the main limitations, and propositions for future research.

2. The structure and management of micro-enterprises

In the last 20 years, the interest in MEs has continued to grow both in the economic and in the finance literature (Muske et al. 2007). The reasons for this interest are twofold. First, the majority of entrepreneurial firms are very small organizations that have an important role in the economic, social and market development, either by reducing unemployment or by designing and introducing product, service, and market innovations (Boyer and Blazy 2013). Second, if MEs survive the perils of the starting phase and succeed to achieve sustainable growth, they will become medium and large companies in the future (Young 2013). MEs are thus an important basis for the development of larger firms.

In France, MEs play a very important role at national and local levels. According to Eurostat (2015), 94.8% of French companies are micro-enterprises, representing one of the largest percentages among EU countries. In economic terms, they employ 2.93 million people, are responsible for an annual turnover of 552 billion euros, and produce 220 billion euros of value-added before taxes (*INSEE*[4] 2014). Their contribution to total sales reaches 40% in the hospitality-restoration sector and nearly 30% in the construction and personal services sector (*Observatoire du financement des entreprises* 2014). Moreover, MEs play an important role in the local economy and in specific activities, such as retailing, car repairs or personal services (*INSEE* 2014). On the other hand, high-technology MEs are an important source of major innovations (Baumann and Kritikos 2016; Kraemer-Eis et al. 2016).

MEs have specific characteristics in comparison with larger firms. Their small size drastically limits their competitive power. They rely mostly on generalist knowledge and have limited human, financial and relational resources. Some researchers (Belletre 2010; Carson et al. 1995) question their capacity to develop a strategy, knowing that very small firms are

---

[4] In English, the French Institute of Statistics and Economic Studies [*Institut National de la Statistique et des Etudes Economiques*]. More information can be found on the following website: https://www.insee.fr/fr/accueil.

mainly acting at a tactical level, by adopting a short-term reactive approach to market changes. They are particularly vulnerable to market crises, either of an economic or financial nature, as their access to internal and external funding is extremely limited (*OECD[5]* 2009).

At managerial level, the activity of MEs is often determined by the personality, knowledge, and decisions of the owner-entrepreneur. The owner's identification with the enterprise exacerbates the need for centralized control and decision making. In the start-up phase, the firm survives and develops mainly thanks to the human, financial and relational resources of the owner (Belletre 2010). Growth can be perceived as problematic, as it requires decentralization and a dilution of the direct decisional power of the entrepreneur. In terms of capital structure, this highly centralized perspective affects the financial choices made by the entrepreneur and determines a specific order of preference (Hutchinson 1995), described by pecking order theory (Myers and Majluf 1984).

The external factors preventing MEs from obtaining external financing are mostly the requirements of financing bodies for "careful market research, well thought-out business plans, top-notch founding teams, sagacious boards, quarterly performance review, and devilishly complex financial structures" (Bhide 1992, p.109). Although sometimes excessive, these requirements are justified by the high level of information asymmetry and risk characteristic of MEs (Huyghebaert and Van de Gucht 2007). Banks are reluctant to loan money to MEs because transaction and control costs are higher than in the case of larger organisations. On the other hand, most MEs have little collateral value to guarantee leverage due to their assets' specificity or scarcity (Carpenter and Petersen 2002), and many of them have no formalized business plan (*Observatoire du financement des entreprises* 2014).

Dealing with the specific nature of these organisations, in the following section, we discuss the relevance of the classical theoretical frameworks for their financing decisions, and the hypothesized impact of relevant firm-related factors (i.e., size, tangible and intangible assets, profitability and growth) on their capital structure.

3. The capital structure of micro-enterprises: theories and hypotheses

In this section, we discuss how classical capital structure theories can be applied to MEs, with the objective of formulating research hypotheses. We first present the general theoretical framework, follow by a review of extant studies. The hypotheses to be tested are formulated in the last subsection.

---

[5] OECD: The Organisation for Economic Co-operation and Development. More information can be found on the following website: http://www.oecd.org/about/.

3.1. Trade-off or pecking order for micro-enterprises?

Firms finance their assets using equity, debt, or a combination of these. Debt can be divided into short- and long-term debt, with their sum representing the total leverage. Short-term debt is usually associated with working capital requirements (WCR) or the acquisition of small equipment. On the other hand, long-term leverage is normally used for larger investments, such as the purchase of expensive machinery or equipment (Esperança and Matias 2005). The distinction between short- and long-term debt is important because the main source of long-term debt is bank loans, which are more difficult to access by MEs, compared with larger firms. In this context, micro-enterprises are more dependent on short-term debt (mostly composed of payables to providers) than larger organisations. This categorization is also relevant when studying the impact of the global crisis, as the availability and conditions of banks loans are different before and during the crisis (Levieuge 2017).

The way in which a firm combines equity and debt represents its capital structure. Contingency theory indicates that the choice between equity and debt is specific to each firm, and it is determined by a series of factors, such as the size of the firm, its asset structure, its level of profitability, the opportunities for growth, the availability and cost of leverage, and the level of uncertainty (Proença et al. 2014). Because of this situation, "there is no universal theory of the debt-equity choice, and no reason to expect one" (Myers 2001, p. 81). However, researchers have developed a series of capital structure theories (i.e., trade-off, pecking order, and market timing) that analyze the inter-relations between various factors and their role in determining firms' financing choice. In this study, we focus on two theories (trade-off and pecking order) to explain the capital structure of MEs because the market-timing theory is applied only for listed firms (Baker and Wurgler 2002), which is not the case of our sample.

The trade-off theory (Modigliani and Miller 1963) posits that the capital structure of a firm results from rational decisions that attempt to balance the costs and advantages of leverage. Managers try to maximize firm value by reaching an optimal debt ratio in which the marginal value of debt benefits (e.g., tax shields) exactly compensates for the costs of issuing more debts (e.g., bankruptcy and agency costs). The relevance of the trade-off theory for MEs has been questioned in several studies (Ang 1992; Bellettre 2010; Daskalakis and Thanou 2010; Pettit and Singer 1985), as the fiscal advantages for these firms are very low, or independent of the contracted debt, while bankruptcy risks, information asymmetry and agency costs are very high. On the other hand, the financial activity and annual performance of MEs are often difficult to predict, even for the owner-manager, because of various economic and market

uncertainties. In these conditions, targeting an optimal level of debt, as suggested by the trade-off theory, is highly problematic.

The pecking order theory (Myers 1984; Myers and Majluf 1984) is particularly suited to predict the financing preferences and capital structure of smaller firms (Bellettre 2010; Daskalakis and Thanou 2010). The theory explains that the combination of high information asymmetry, with a strong desire of the owner-manager to maintain organizational control and operational independence, will determine a specific order of preferences in the choice of financing sources, with internally generated funds representing the first choice, followed by debt and then equity (Daskalakis and Thanou 2010).

Empirical studies suggest that the agency costs theory (Jensen and Meckling 1976) has a partial relevance for the capital structure of MEs. In most cases, the manager of the ME is also its owner, eliminating the agency problems of equity between shareholders and managers (Daskalakis and Thanou 2010; Poza et al. 2004; Proença et al. 2014). On the other hand, the agency costs of debt can represent an important issue (Ang 1992; Van de Wijst 1989) as high information asymmetry may induce lenders to require collateral guarantees (Daskalakis and Thanou 2010; Harris and Raviv 1991; Myers 1977). Considering the specific situation of MEs, the agency costs associated with debt represent the common point of the trade-off and the pecking order theories, providing complementary explanations regarding MEs' capital structure (Adair and Adaskou 2015; Frank and Goyal 2008). To reinforce this idea, Agca and Mozumdar (2004) argue that these theories should be considered not conflicting but complementary: the trade-off perspective helps firms determine their debt capacity, while pecking order theory describes firms' preferences between different methods of financing.

Because MEs are not obliged to publish their accounts and because there is no auditor control (*Observatoire du financement des entreprises* 2014), their level of information asymmetry is significantly higher than that for larger firms (Jõeveer 2013). In this context, most MEs have no accountant and very limited accounting notions. As debt providers know that MEs are riskier (default risk), they increase the interest rates to reward the incurred risks. On the other hand, high interest rates scare away the good payers, who search other alternative sources of funding. Consequently, the firms remaining in the debt market are mostly the ones that have no other financing alternative, or the potential defaulters, which are forced to accept an interest rate that is higher than it should be. In this situation, we consider that the pecking order theory better explains the financing behavior of MEs, although the trade-off theory remains relevant and applicable.

3.2. Firm-level determinants of the capital structure

There are few academic papers fully dedicated to micro-enterprises (e.g., Belletre 2010; Prohorovs and Beizitere 2015). The extant literature includes studies in which MEs are just one category among others (Akyüz et al. 2006; Daskalakis and Thanou 2010; Daskalakis et al. 2014; Heshmati 2001; Krasauskaite 2011; Mateev et al. 2013; Ramalho and Da Silva 2009), or papers in which they are included in the category of small firms (Degryse et al. 2012; Jõeveer 2013; Michaelas et al. 1999; Van der Wijst and Thurik 2003). Some of these studies conclude that firm-level determinants have similar effects on the capital structure of firms of all sizes (Daskalakis and Thanou 2010), while other researchers find specific results concerning MEs (Belletre 2010; Krasauskaite 2011; Ramalho and Da Silva 2009).

Considering the firm-related determinants of capital structure investigated in various studies, we note a high level of consistency in the commonly selected regressors (Hall et al. 2000; Krasauskaite 2011). In line with this literature, we consider the following factors to be the main determinants of MEs' capital structure: firm size, tangible and intangible assets, profitability, and growth. The reasons for choosing these variables are threefold: first, they are the commonly selected regressors in extant studies investigating the capital structure of small and micro-firms, thus permitting a comparison of methodologies and results; second, they represent a good combination of indicators for characterizing the profile and financial situation of an organization; third, they are context sensitive, changing in a crisis situation.

To investigate the impact of the global crisis, we divide the total period of analysis (2003-2013) into two periods: before (2003-2007) and during (2008-2013) the crisis. This distinction follows the approach of Alves and Francisco (2015) and Benkraiem et al. (2016), among others, who consider the joint effects of both the financial and economic crisis. Furthermore, the GDP of France dropped in 2008, and the pre-crisis level was reached again only at the end of 2013, which indicates that the recession period lasted between 2008 and 2013 (Eveno and Roger 2014). The same sub-period distinction is used by Levieuge (2017), who differentiates between a before-crisis (1997-2007) and a crisis period (2008-2013) regarding the situation of bank loans in France. For these reasons, we decide to study the impact of the global crisis based on the two mentioned sub-periods. Formulating the research hypotheses, we consider the before-crisis period to be the default situation explained by classical capital structure theories, while the crisis period is different in terms of credit availability and MEs' specific needs. The research hypotheses are formulated in the following sub-section.

3.3. Hypotheses

3.3.1. The before-crisis period (2003-2007)

Size: Existing studies associate larger firms with more diversification, less risk of financial distress, and lower information asymmetries. This leads to a higher debt capacity for larger firms in comparison with smaller ones (Rajan and Zingales 1995). On the other hand, as firms grow in size, they switch their use of leverage from short- to long-term debt. This is due to two main reasons: first, according to the pecking order theory, smaller firms are inclined to primarily use short-term debt in order to avoid liabilities and control associated with long-term debt; second, for MEs, short-term debt is mainly used to finance working capital, since these firms can have difficulties to immediately pay their providers (Seidman 2005). As a firm grows, its capacity to finance working capital from internal funds improves, and the lower perceived risk facilitates access to long-term debt. In the SME literature, there is a strong consensus regarding the positive relationship between size and long-term debt and a negative one between size and short-term debt (Esperança et al. 2005; Hall et al. 2000; Michaelas et al. 1999; Vieira and Novo 2010). ME studies (Bellettre 2010; Daskalakis and Thanou 2010; Ramalho and Da Silva 2009) indicate a positive association between firm size and total debt, but Bellettre (2010) finds no significant relation between size and long-term debt. Taking these elements into account, we formulate the following research hypotheses:

H1: Firm size is positively correlated with total debt.

H1': Firm size is negatively correlated with short-term debt

H1'': Firm size is positively correlated with long-term debt.

Tangible assets: Previous studies demonstrate a positive relation between asset tangibility and leverage (Chittenden et al. 1996; Jordan et al. 1998; Michaelas et al. 1999; Van der Wijst and Thurik 1993). Both the pecking order and the trade-off theories predict that asset tangibility is positively correlated with long-term debt but negatively correlated with short-term leverage (Bas et al. 2009; Degryse et al. 2012; Hall et al. 2000; Klapper et al. 2002; Sogorb-Mira 2005), since tangible assets can be used as collateral, which mitigates the default risk. Firms use their collateral to attract long-term debt, which has lower costs than short-term debt. Large holdings of tangible assets may also indicate a stable source of revenues, providing internal funds that reduce the demand for short-term leverage (Daskalakis and Psillaki 2008; Harc 2015). In line with these studies, we hypothesize that:

H2: The proportion of a firm's tangible assets is positively correlated with total debt.

H2': The proportion of a firm's tangible assets is negatively correlated with short-term debt.

H2'': The proportion of a firm's tangible assets is positively correlated with long-term debt.

Intangible assets: Compared to tangible assets, intangible assets are more difficult to identify and measure, as their value is more sensitive to who owns and employs them. These characteristics reduce the capacity of many intangible assets to be used as collateral, leading to a negative relation between intangible assets and leverage (Lim et al. 2014). On the other hand, Loumioti (2012) reports that some lenders may accept liquid and redeployable intangible assets as collateral. In support of these statements, Ellis and Jarboe (2010) provide examples of such intangible asset-backed loans. In addition to their possible role as collateral, intangible assets can support debt through their capacity to generate cash, frequently to a greater extent than tangible assets (Lim et al. 2014). Finally, the proportion of intangible assets in the total assets of the firm is used as a proxy for growth opportunity, suggesting that firms with higher proportions of intangible assets may obtain long-term debt to finance their future growth (Degryse et al. 2012; Krasauskaite 2011; Michaelas et al. 1999; Sogorb-Mira 2005). Taking into account the results reported by Lim et al. (2014) and Cerisola et al. (2013), we posit that intangible assets may have the same general effect on total and long-term leverage as tangible assets:

H3: The proportion of a firm's intangible assets is positively correlated with total debt.

H3': The proportion of a firm's intangible assets is positively correlated with short-term debt.

H3'': The proportion of a firm's intangible assets is positively correlated with long-term debt.

Growth: This variable is often positively related to total and long-term leverage and negatively related to short-term debt. As firms grow, their diversification reduces default risk, making them more eligible for long-term debt, which is needed to exploit further growth opportunities (Michaelas at al. 1999; Ramalho and da Silva 2009). On the other hand, growing firms usually have a stable cash-flow cycle, reducing their dependency on short-term debt, which is more costly than long-term debt. Faster growing firms will thus use their internal funds to finance short-term needs but will require higher levels of long-term debt to pursue growth opportunities (Acs and Isberg 1996). Existing studies on micro-enterprises provide conflicting results, possibly indicating the need of a contextual interpretation in relation to the financial system of various countries. Previous research demonstrates a significant positive relationship between growth and total debt (Daskalakis and Thanou 2010),

growth and long-term debt (Krasauskaite 2011), growth and all categories of leverage (Bellettre 2010) or a non-significant association of growth with total and long-term leverage (Krasauskaite 2011; Ramalho and da Silva 2009). Considering these arguments, we formulate the following hypotheses:

H4: Growth is positively correlated with total debt.

H4': Growth is negatively correlated with short-term debt.

H4'': Growth is positively correlated with long-term debt.

Profitability: A key prediction of the pecking order theory is the negative relation between profitability and leverage (Myers 1984; Myers and Majluf 1984). Profitability is expected to be negatively related to short-term debt, as retained profits provide more freedom and have a much lower cost that short-term debt when it is used to finance working capital (Fama and French 2002). The relationship between profitability and long-term debt is usually negative, as retained profits can also be used to finance long-term investments. Furthermore, in very small firms, if internal profits do not permit a full coverage of working capital or investment opportunities, managers prefer short-term over long-term debt. This negative association between profitability and debt is confirmed by previous studies analyzing MEs (Bellettre 2010; Daskalakis and Thanou 2010; Krasauskaite 2011; Ramalho and da Silva 2009). Thus, we formulate the following hypotheses:

H5: Profitability is negatively correlated with total debt.

H5': Profitability is negatively correlated with short-term debt.

H5'': Profitability is negatively correlated with long-term debt.

The five sets of hypotheses for the pre-crisis period are presented in Table 1.

Table 1. Hypotheses regarding the impact of firm factors on leverage ratios in the before-crisis period (2003-2007)

Variables	Total debt	Short-term debt	Long-term debt
Size *(H1, H1', H1'')*	+	-	+
Tangible assets *(H2, H2', H2'')*	+	-	+
Intangible assets *(H3, H3', H3'')*	+	+	+
Growth *(H4, H4', H4'')*	+	-	+
Profitability *(H5, H5', H5'')*	-	-	-

3.3.2. The crisis period (2008-2013)

The 2008-2013 period is characterized by a sharp financial crisis, followed by a long economic recession. In Europe, the financial problems related to the level of national indebtedness of several European countries (Greece, Portugal, Spain, and Ireland) created additional shocks, worsening and prolonging the economic recession of the EU zone (Muijs 2015). Existing studies indicate that financial and economic crises increase the turbulence and unpredictability of the market, affecting firms' capital structure (Balios et al. 2016; Proença et al. 2014; Truong and Nguyen 2016). As uncertainty and risk rise and as expected returns decline, both lenders and borrowers become reluctant to lock-in capital in long-term investments (Demirguc-Kunt et al. 2015). Credit conditions become more stringent, as banks require more collateral and as the cost of debt is higher, especially for MEs with higher information asymmetries than larger firms. As a result, many MEs restrain their access to bank debit, as they are unwilling to pay higher debt premiums (*Fiducial* 2013). In addition, MEs may also be affected by market stagnation or recession, which reduces their revenues and profits (*Fiducial* 2013), limiting the internal financing sources. Considering this situation, we expect that during the global crisis, the relationship between firm-related factors (i.e., size, asset structure, growth and profitability) and capital structure will change, in size, level of significance, or sign.

Size: Previous studies suggest that crises have a strong impact on smaller firms, while large companies can escape almost untouched (Demirguc-Kunt et al. 2015). The outcome is determined by three main factors: first, larger firms are more diversified, which helps them mitigate market turbulence; second, they have more internal resources, where a reduction in revenues or profitability is not so dramatic as in the case of smaller organisations; and third, they have more collateral and lower information asymmetry, which gives them better access to credit. The smaller the size of a firm, the worse its situation in a crisis situation (Proença et al. 2014). In addition, as MEs often lack internal financing, they access short-term debt to cover their working capital needs (Belletre 2010). Existing studies investigating SMEs' capital structure during the crisis indicate a positive association between firm size and long-term debt (Proença et al. 2014; Muijs 2015), a negative (Proença et al. 2014) or a non-significant (Muijs 2015) relationship between size and short-term debt, and a positive one with total debt (Balios et al. 2016; Proença et al. 2014). In line with these studies, we hypothesize that:

H6: During the crisis, the size of MEs is positively correlated with total debt.
H6': During the crisis, the size of MEs is negatively correlated with short-term debt
H6'': During the crisis, the size of MEs is positively correlated with long-term debt.

Tangible assets: During the crisis, the level of information asymmetry between borrowers and lenders is considerably high, owing to market unpredictability (Ang 1992; Van der Wijst 1989). Tangible assets become important, as firms with more collateral enjoy easier access to debt (Frank and Goyal 2008). On the other hand, short-term debt is usually guaranteed with regular profits, which suggests a negative relationship between tangible assets and short-term debt (Hall et al. 2000; Sogorb-Mira 2005). Studies investigating SMEs' capital structure during crises indicate that firms with more tangible assets issue more long-term debt (Muijs 2015; Proença et al. 2014). The relationship between tangible assets and short-term debt is less clear, as Proença et al. (2014) indicate a negative and Muijs (2015), a non-significant one. On the other hand, somehow unexpectedly, the proportion of tangible assets seems to have a negative influence on total debt (Balios et al. 2016; Proença et al. 2014). In line with these studies, we hypothesize that:

H7: During the crisis, the proportion of a firm's tangible assets is negatively correlated with total debt.

H7': During the crisis, the proportion of a firm's tangible assets is negatively correlated with short-term debt.

H7'': During the crisis, the proportion of a firm's tangible assets is positively correlated with long-term debt.

Intangible assets: The global crisis significantly increased market turbulence and uncertainty. This situation erodes the stability and value of intangible assets, inducing lenders to ask for tangible collateral. Taking into account that short-term debt is dedicated mainly for investing in, or developing, intangible assets (Proença et al. 2014), we hypothesize a positive relationship with short-term debt but a negative one with long-term and total debt. On the other hand, the negative relationship between the assets' structure and total debt (Balios et al. 2016; Proença et al. 2014) indicates that during the crisis, the level of intangible assets may have a positive relationship with total debt:

H8: During the crisis, the proportion of a firm's intangible assets is positively correlated with total debt.

H8': During the crisis, the proportion of a firm's intangible assets is positively correlated with short-term debt.

H8'': During the crisis, the proportion of a firm's intangible assets is negatively correlated with long-term debt.

Growth: Because of market recession and turbulence, growth is usually problematic during a crisis. A firm experiencing growth may send a positive signal to lenders (Ross 1977) and thus obtain easier access to debt, or according to Myers (1977), they may take unreasonable risks, which results in a negative evaluation by creditors. On the other hand, a growing firm may be forced to access external finance to aliment organizational development, although smaller firms prefer to use only retained profits. Extant studies on SMEs' capital structure during crises are equally controversial: Proença et al. (2014) find a positive relationship between growth and all three debt ratios, Balios et al. (2016) indicate a positive association between growth and total debt, while Muijs (2015) finds a non-significant relationship between growth and long-term debt but a significant positive one with short-term debt. In line with previous studies (Cabaço 2010; Esperança et al. 2005; Hall et al 2000; Michaelas et al. 1999; Mira and Garcia 2003; Proença et al. 2014), we hypothesize that:

H9: During the crisis, growth is positively correlated with total debt.

H9': During the crisis, growth is positively correlated with short-term debt.

H9'': During the crisis, growth is positively correlated with long-term debt.

Profitability: The pecking order theory predicts that profitable firms will use retained profits to finance both long-term investments and working capital needs (Myers 1984). This assumption is supported by the increased cost of leverage resulting from higher information asymmetries during crises. In this context, MEs' profitability is threatened by market recession and reduced demand. Most empirical studies on SMEs' capital structure during crises find a negative association between profitability and various forms of leverage (Balios et al. 2016; Proença et al. 2014), although Muijs (2015) obtains non-significant relationships with both short- and long-term debt. Taking into account these theoretical predictions and studies, we hypothesize that:

H10: During the crisis, a firm's profitability is negatively correlated with total debt.

H10': During the crisis, a firm's profitability is negatively correlated with short-term debt.

H10'': During the crisis, a firm's profitability is negatively correlated with long-term debt.

A summary of the hypotheses formulated for the crisis period is displayed in Table 2.

Table 2. Hypotheses regarding the impact of firm factors on leverage ratios during the global crisis (2008-2013)

Variables	Total debt	Short-term debt	Long-term debt
Size *(H6, H6', H6'')*	+	-	+
Tangible assets *(H7, H7', H7'')*	-	-	+
Intangible assets *(H8, H8', H8'')*	+	+	-
Growth *(H9, H9', H9'')*	+	+	+
Profitability *(H10, H10', H10'')*	-	-	-

The following section presents the methodology applied to collect and analyze primary data.

4. Methodology

4.1. Data collection

Following the definition of the French Ministry of Finance and Public Accounts published in a 2014 report[6], a micro-enterprise (ME) is defined by two criteria: first, the number of employees is lower than ten, and second, its annual turnover (or total assets)[7] is lower than or equal to two million euros. In the first phase of data collection, we selected from Diane, the French part of the Bureau van Dijk database[8], the firms in which these two criteria are validated for all available years. We excluded from the analysis both Finance and Administration organizations and listed companies, as their specific capital structure could bias our results. Applying these criteria, our original database comprises 6,054 companies included into an unbalanced panel, meaning that the number of firms can be different from one year to another (to get the maximum number of firms available in our database). In the second step, we cleaned the original database by applying the following criteria:

---

[6] http://www.economie.gouv.fr/files/files/directions_services/mediateurducredit/pdf/Rapport_-OFE_financement_des_TPE_juin_2014.pdf

[7] We choose the turnover criterion in our study. However, when the total assets criterion is used for selection, the number of companies that we obtained is similar.

[8] Diane is the French database of the Bureau van Dijk, which provides company data and business intelligence for individual countries, regions, and the world. More details can be found on the website: http://www.bvdinfo.com/en-gb/home.

- We select only firms with at least two-year available balance sheets to obtain panel data;

- We eliminate all the firms with unusable or missing data;

- We also eliminate firms for which the dependent variables (long-term debt, short-term debt and total debt ratio) are higher than one (due to negative equity), as well as firms for which the dependent variables are over the 1% and 99% quartiles – in order to eliminate extreme values.

After applying this filtering procedure, our database contains 4,945 companies.

4.2. Variables

To study the relationship between firm-related factors and the capital structure of French MEs, we choose three dependent variables: long-term (LTD), short-term (STD), and total (TD) debt ratios. The first one is the ratio between long-term debt (or financial debt) and total assets, the second one represents the ratio between short-term debt and total assets, and the third one is the sum of previous two debt ratios. For French MEs, long-term debt is essentially constituted by bank debt, while short-term debt is mainly based on payable accounts. The firm-related factors used in our study are summarized in Table 3.

Table 3. Firm-related factors considered in this study

Variables	Abbreviation	Definition
Total debt	**TD**	Total debt / Total asset
Short-term debt	**STD**	Short-term debt / Total asset
Long-term debt	**LTD**	Long-term debt / Total asset
Size	**Size**	Ln(Total asset)
Tangible assets	**Tangible**	Tangible assets / Total asset
Intangible assets	**Inta**	Intangible assets / Total asset
Growth	**Growth**	Total asset t / Total asset t-1
Profitability	**Pfit**	EBIT / Total assets

As displayed in Table 4, French MEs use predominantly short-term leverage, as STD is more than three times larger than LTD. This confirms our previous analysis about the difficulty of MEs to obtain long-term debt, which explains their high demand for short-term debt. All three debt ratios decreased during the crisis: STD decreased from 43% to 39%, LTD decreased from 13% to 12%, and TD decreased from 57.46 % to 51.9 %. The same situation is found for fixed assets and growth, although the decrease is very small. Surprisingly, the

average size of the investigated MEs increased slightly during the crisis, as is also the case of intangible assets. On the other hand, it is important to note that the profitability of investigated MEs decreases significantly, from an average of 15.79% before the crisis to 11.1 % during the crisis. These results confirm the financial situation of MEs described in previous studies (Belletre 2010; *OECD* 2009), characterized by lack of internal funds owing to an important decrease in profitability and reduced access to short- and long-term debt.

Table 4. Descriptive statistics

	Whole period (2003-2013)	**Before crisis (2003-2007)**	**During crisis (2008-2013)**
Total debt			
Average	54.15%	57.46%	51.9%
Median	52.33%	56.57%	49.21%
Standard-deviation	17.25%	18.52%	18.6%
Short-term debt			
Average	41.16%	43.51%	39.56%
Median	40.48%	42.80%	38.41%
Standard deviation	15.45%	16.52%	16.50%
Long-term debt			
Average	12.99%	13.95%	12.34%
Median	9.83%	9.87%	8.34%
Standard deviation	11.94%	14.02%	12.69%
Size			
Average	12.15	12.07	12.20
Median	12.13	12.06	12.19
Standard deviation	0.84	0.83	0.87
Tangible assets			
Average	27.13%	27.56%	26.83%
Median	21.27%	21.72%	20.41%
Standard deviation	21.38%	22.00%	22.09%
Intangible assets			
Average	10.00%	9.62%	10.26%
Median	0.42%	0.19%	0.34%
Standard deviation	18.03%	18.03%	18.53%
Growth			
Average	1.06	1.10	1.04
Median	1.04	1.06	1.02
Standard deviation	0.12	0.19	0.16
Profitability			
Average	13.01%	15.79%	11.10%
Median	11.55%	14.07%	9.74%
Standard deviation	11.49%	12.62%	12.63%

4.3. Empirical analysis

To investigate our research hypotheses, we first use panel data regressions performed on two sub-periods (2003-2007 and 2008-2013). We then apply Principal Component Analysis (PCA) to better investigate the use of short-term and long-term debt in French MEs. The principles of these two methods are detailed below.

4.3.1. Panel data regressions

As mentioned in section 3, we investigate the relationship between firm-related factors and MEs' leverage during two sub-periods − before and during the global crisis − in order to elucidate the impact of the global crisis on MEs' financing decisions and capital structure. Based on this logic, we estimate the following models:

- Before the crisis period (2003-2007):

- $TD_{it} = \alpha + \beta_1 Size_{it} + \beta_2 Tangible_{it} + \beta_3 Inta_{it} + \beta_4 Growth_{it} + \beta_5 Pfit_{it} + u_{it}$ (1')

- $STD_{it} = \alpha + \beta_1 Size_{it} + \beta_2 Tangible_{it} + \beta_3 Inta_{it} + \beta_4 Growth_{it} + \beta_5 Pfit_{it} + u_{it}$ (2')

- $LTD_{it} = \alpha + \beta_1 Size_{it} + \beta_2 Tangible_{it} + \beta_3 Inta_{it} + \beta_4 Growth_{it} + \beta_5 Pfit_{it} + u_{it}$ (3')

- During the crisis period (2008-2013):

- $TD_{it} = \alpha + \beta_1 Size_{it} + \beta_2 Tangible_{it} + \beta_3 Inta_{it} + \beta_4 Growth_{it} + \beta_5 Pfit_{it} + u_{it}$ (1")

- $STD_{it} = \alpha + \beta_1 Size_{it} + \beta_2 Tangible_{it} + \beta_3 Inta_{it} + \beta_4 Growth_{it} + \beta_5 Pfit_{it} + u_{it}$ (2")

- $LTD_{it} = \alpha + \beta_1 Size_{it} + \beta_2 Tangible_{it} + \beta_3 Inta_{it} + \beta_4 Growth_{it} + \beta_5 Pfit_{it} + u_{it}$ (3")

Where:

- TD_{it}, LTD_{it} and STD_{it} are the dependent variables representing, respectively, total, long-term, and short-term debt (i is the firm and t is the period);

- α is a constant;

- $Size_{i,t}$, $Tangible_{i,t}$, $Inta_{i,t}$, $Growth_{i,t}$, $Pfit_{i,t}$ are independent variables defined in Table 3 for size, tangible assets, intangible assets, growth and profitability, respectively;

- $\beta_1 ... \beta_5$ are the estimated coefficients for the five independent variables, respectively;

- u_{it} is the error term.

The estimation of models (1'), (2') and (3') allows us to test the hypotheses from H1, H1', H1" to H5, H5' and H5", while the estimation of models (1"), (2") and (3") allows us to test

the hypotheses from H6, H6', H6" to H10, H10' and H10". To validate these hypotheses, the signs of coefficients $\beta_1...\beta_5$ have to correspond to those indicated in Tables 1 and 2 above.

The estimation procedure is performed by following two steps. First, we consider the results of the Hausman test to determine whether the fixed-effect or random-effect regressions are best suited to our panel data set. Second, we estimate the regressions by using the Least Square Dummy Variable (LSDV) method, which allows us to take into account the potential endogeneity issue by using dummies as instrumental variables in the estimation procedure.

4.3.2. Principal Component Analysis (PCA)

Although the previous models provide an answer to our research questions, we also apply the principal component analysis (PCA) method to obtain a general overview of the relations between all the considered variables. The PCA approach transforms the observed variables into a smaller number of principal components that account for most of the variance in the dependent variables. A principal component is defined as a linear combination of optimally-weighted observed variables. The number of principal components is fewer than, or equal to, the number of the considered variables. In our study, we present only the first two principal components (F1 and F2) that represent the highest variance of the dependent variables. This method allows a graphic presentation of the nexus between variables: the closer they are on the graph, the higher their correlation is.

5. Results and discussions

To decide between fixed and random effects, the Hausman test verifies the null hypothesis enouncing that the best model to be chosen is the random-effect one. This method tests whether the errors are correlated with regressors (alternative hypothesis), when the null hypothesis says they are not. Table 5 presents the results of this test for the two sub-periods.

Table 5. Hausman tests

	2003-2007	2008-2013
Dependent variable	**TD (Total debt)**	
Hausman	144.28[***]	302.19[***]
Dependent variable	**STD (Short-term debt)**	
Hausman	56.78[***]	54.97[***]
Dependent variable	**LTD (Long-term debt)**	
Hausman	165.52[***]	313.65[***]

Notes: [***] means the significance of the test statistic at 1%. It shows the rejection of the null hypothesis and thus the rejection of the random-effect model.

We note that in all cases, the null hypothesis of the random-effect model is rejected. Thus, we select the alternative model, which is the fixed-effect one. According to this model, if the unobserved variables do not change over time, then any changes in the dependent variable are due to the influence of factors other than these fixed characteristics.

5.1. Fixed-effect regressions results

Table 6 presents the results of fixed-effect regressions, estimated by the Least Square Dummy Variable (LSDV).

In all cases, the comparison between the two sub-periods shows that the sign of the coefficients remains the same during the two sub-periods, with two exceptions:

- The impact of size on short-term debt changes from positive to negative from the first to the second sub-period, possibly indicating that smaller organisations had more difficulties to pay short-term debt than larger ones during the crisis;

- The relationship between growth and long-term debt changes from a positive to a non-significant coefficient, suggesting that during the crisis, banks were more concerned with the structure of a firm's assets than with its growth (Benkraiem et al. 2016)

Table 6. Fixed-effect regressions estimated by the Least Square Dummy Variable (LSDM) method

Dependent variable	Before the global crisis: 2003-2007			During the global crisis: 2008-2013		
	Total debt	Short-term debt	Long-term debt	Total debt	Short-term debt	Long-term debt
Intercept	0.12[*]	0.76[***]	-0.61[***]	-0.03	0.75[***]	-0.78[***]
	(1.66)	(9.96)	(-10.11)	(-0.49)	(14.18)	(-17.75)
Size	0.03[***]	*0.03[***]*	0.05[***]	0.03[***]	*-0.04[***]*	0.07[***]
	(6.65)	*(-6.49)*	(15.58)	(10.11)	*(-12.42)*	(27.73)
Tangible assets	0.20[***]	-0.36[***]	0.06[***]	0.26[***]	-0.26[***]	0.52[***]
	(16.73)	(-28.26)	(53.62)	(31.17)	(-32.50)	(78.52)
Intangible assets	-0.14[***]	0.11[***]	-0.25[***]	-0.19[***]	0.15[***]	-0.35[***]
	(-6.19)	(4.60)	(-12.760)	(-12.16)	(9.60)	(-26.91)
Growth	0.05[***]	0.04[***]	*0.01[***]*	0.02[***]	0.02[***]	*-0.001*
	(22.28)	(18.16)	*(3.96)*	(13.62)	(14.67)	*(-0.59)*
Profitability	-0.30[***]	-0.22[***]	-0.09[***]	-0.23[***]	-0.01[***]	-0.08[***]
	(-44.35)	(-30.41)	(-14.82)	(-47.93)	(-31.47)	(-22.29)
R^2	0.88	0.84	0.85	0.83	0.79	0.78

Note: "[***], [**], [*] indicate that the coefficient is significant at the 1%, 5% and 10% level, respectively. No asterisk means that the coefficient is not significant. The figure between parentheses is the value of t-statistic. The values in italics indicate a significant change between the two sub-periods.

Five of six hypotheses regarding the effect of firm's size are validated (i.e., H1, H1'', H6, H6', H6''). The only hypothesis that is not validated is H1', concerning the negative

relationship between size and short-term debt, before the crisis. Our results are different from those of previous studies (Esperança et al. 2005; Hall et al. 2000; Michaelas et al. 1999; Vieira and Novo 2010). This contradiction can be explained by the specific characteristics of MEs and implies that larger MEs are more dependent on short-term debt, as they do not reach yet the critical mass to switch their financing sources to long-term debt. However, this situation changes during the crisis (the coefficient becomes negative, validating hypothesis H6') when the high cost of short-term debt prevents larger MEs from using this source of financing.

All the hypothesized effects of tangible assets on MEs' capital structure are validated, both before and during the crisis, (i.e., H2, H2', H2'', H7, H7', H7''). Our results confirm the counter-intuitive negative relationship between tangible assets and total debt during the crisis period (Balios et al. 2016; Proença et al. 2014), indicating that French MEs with a high proportion of tangible assets use less leverage. This controversial result requires further investigation to better understand the financing logic of MEs in difficult economic circumstances.

The results regarding intangible assets contradict half of the hypothesized relationships (i.e., H3', H8', H8'' are validated and H3, H3'', H8 are not validated). This indicates a symmetrically opposite effect in comparison with tangible assets. In addition, these results reinforce the idea that intangible assets – because of their specific characteristics (Lim et al. 2014) – are not appropriate as collateral for bank debt in the case of French MEs. However, the results clearly indicate a constant positive relationship between intangible assets and short-term debt, which may highlight a distinctive characteristic of French MEs. This result can also be explained by the small value of intangible assets (see Table 4).

Growth presents some counter-intuitive results for the crisis period. Four of the six formulated hypotheses are validated (i.e., H4, H4'', H9 and H9'), while H4' and H4'' are not. Before the crisis, MEs' growth is mainly financed through long-term debt, which is cheaper and less restrictive than short-term leverage. However, during the crisis, growing MEs seem to switch their financing sources toward short-term debt. This happens either because access to long-term debt becomes more difficult or because short-term debt provides more flexibility in a turbulent environment, in which further growth is difficult to predict. In fact, during the crisis, firm growth becomes completely disconnected from long-term debt and their relationship becoming non-significant.

Finally, the results confirm the predictions of the pecking order theory that, for French MEs, retained profits represent the main financing source, as they are preferred to all types of bank debt. Hypotheses H5, H5', H5'', H10, H10', H10'' are thus validated.

5.2. Principal component analysis: PCA results

Figure 1 presents the results of the principal component analysis (PCA): the graphs in the first line focus on the relationship between short-term debt (STD) and the considered firm determinants, while the graphs from the second line focus on the long-term debt (LTD) and those from the third line concern total debt (Debt).

Overall, the PCA results show that the first two axes display almost 50% of the variation of the investigated variables. The relationship between the variables can be explained by their distance on the graphs: the closer they are, the stronger their relationship. The graphs from the second line show that firms with high long-term debt have also high levels of fixed and intangible assets (variable LTD is close to Tan and Inta variables). This suggests that long-term debt is used to finance both tangible and intangible assets in French MEs. Short-term debt (first line) is mainly used by smaller firms (as indicated by the opposite places of STD and SIZE on the graph). Furthermore, the higher the value of short-term debt, the lower the profit and growth of the company. We notice that the financial crisis did not significantly change these relationships since the graphs for the two sub-periods are similar. These results confirm the coefficients obtained from the fixed-effect regressions presented above.

The graphs from the third line show that total debt (Debt) is close to intangible and tangible assets and far from growth, size and profit, for the whole period. This observation indicates that debt is used to finance tangible and intangible assets in French MEs. On the other hand, the higher the value of growth, size and profit, the lower the value of debt, both before and during the crisis. The PCA results suggest that long-term debt is used to finance tangible and intangible assets and is less used by firms with high growth and profit or with a larger size. Low-growth, low-profit and low-size firms use more short-term than long-term debt.
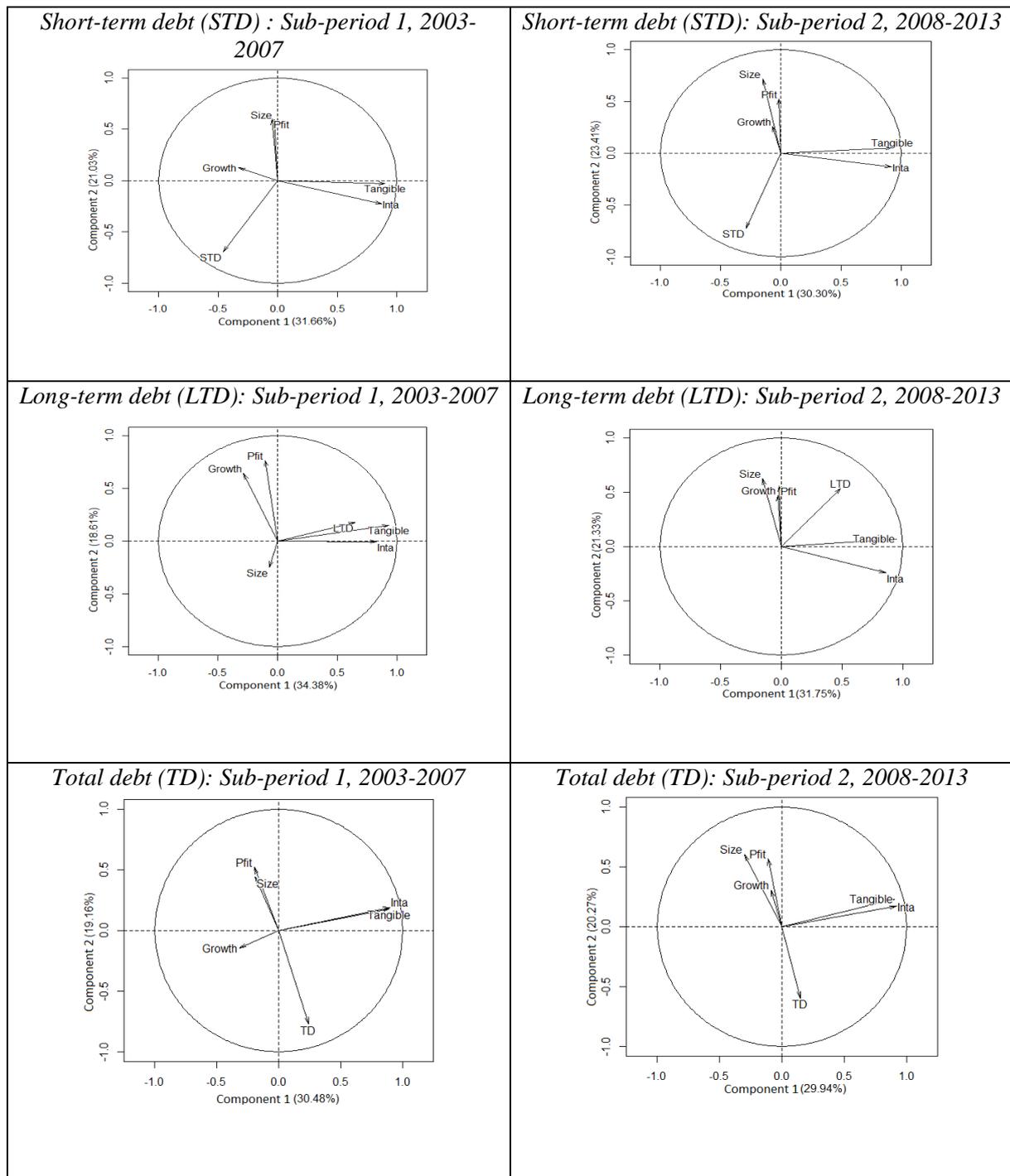
Figure 1. The PCA results

Note: F1 and F2 represent the two first artificial components (explained in Section 4). The percentage for each axis represents the part of the variation that is explained by the axis. The closer the variables on the graphs, the stronger the relationship between them. TD = Total debt, STD = Short-term debt, LTD = Long-term debt, Size = Total asset, Tangible = tangible assets, Inta = Intangible assets, Growth = total asset t / total asset t-1, Pfit = Profitability.

5.3. Discussion

Overall, the findings of this study depict a paradoxical situation. Although their level of profitability, growth and indebtedness drops during the crisis period, the relative size of the investigated firms remains stable. On the other hand, we observe a reduction in the proportion of tangible assets and an increase in the proportion of intangible assets during the crisis.

Our analysis (see Section 5) takes into account the circumstantial situation in France before and during the crisis, as well as the organizational and functional specificity of MEs. Acknowledging the difficult situation of many MEs during the crisis, the French government implemented special financing programs (Bazard 2015; *Observatoire du financement des entreprises* 2012 and 2014) to help the entrepreneurial micro-ventures, many of them owned and run by local artisans and based on strong family ties. The program had limited success, as many owner-managers still perceived significant barriers in accessing bank debt, either because of a poor communication with banks or because of their own reluctance to become indebted during a turbulent period (*Observatoire du financement des entreprises* 2012 and 2014).

Results (Table 6 and Figure 1) show that during the difficult period of the financial crisis followed by economic recession, many MEs switched their functioning to a survival mode. They stopped growing, and in many cases, they even reduced their activity, relying mainly on internal sources of financing. The level of leverage was reduced, as the increased information asymmetry and the default risk raised the cost of debt. Working mostly with family members, these entrepreneurs approached the day-to-day market situation in a flexible way, adapting their strategy to demand and price fluctuations. When necessary, they sold the underused or unnecessary tangible assets, focusing their activities on their main competence. They avoided long-term debt commitments, preferring to finance their operational growth through short-term debt. On the other hand, they competed mainly by developing the intangible assets of the firm, in terms of human skills, advertising, networking, brand name and customer awareness. Often, the business was supported by a hard core of loyal customers from the local community or by their family network. Using these survival techniques, many MEs traversed this difficult economic period without too much harm, preserving their core competence and market positioning.

However, as indicated by the official documents published in France (Bazard 2015; *Observatoire du financement des entreprises* 2012 and 2014), the diversity of MEs in terms of activity, sector, and survival strategy prevents absolute generalizations (Bacheré 2015). On the other hand, this diversity invites further research, either by diversifying the analysis at the

level of various economic sectors or by differentiating between the capital structure and the financing strategy of family and non-family MEs.

6. Concluding remarks

Given the importance of micro-enterprises for all European countries (Kraemer-Eis et al. 2016), the lack of studies investigating their financial behavior and capital structure during the recent financial and economic crisis is surprising. Addressing this knowledge gap, our study concerns the impact of firm-related factors (size, tangible and intangible assets, growth and profitability) on the capital structure of micro-enterprises in France, covering an eleven-year period, from 2003 to 2013.

In this context, our study provides a fourfold original contribution to the capital structure literature: first, we provide a clear overview of the financial situation of French MEs, in terms of bank financing, size, asset structure, growth and profitability. In this way, we avoid aggregating these firms with SMEs; second, we formulate and validate a series of hypotheses regarding the default situation of capital structure, as we identify the pecking order as the most relevant theory for predicting the financial decisions and situation of French MEs; third, we compare the impact of firm-related factors on the capital structure of French MEs before and during the 2008-2013 financial and economic crises; and fourth, using both our results and the existing governmental reports, we provide an interpretation of MEs' financial behavior and decisions during the crisis.

Our panel data regression results show that all investigated firm factors (size, tangible and intangible assets, growth, and profitability) affect the capital structure of French micro-enterprises. The PCA results show that long-term debt is used to finance tangible assets, while short-term debt is mainly used by firms with low profitability and growth. During the crisis, MEs focus on operational growth, financed mainly through short-term debt to maintain strategic flexibility. On the other hand, the relationship between firm growth and long-term debt disappears, demonstrating the challenges raised by this type of financing. This situation explains the somehow paradoxical image depicted by governmental reports, which, on the one hand, outline the favorable credit conditions provided for French micro-enterprises but indicate the increased difficulty of these organizations in accessing bank debt because of credit refusals and requesting more collateral (*Fiducial* 2013; *Observatoire du financement des entreprises* 2012 and 2014). Our interpretation suggests that during the crisis, the majority of investigated micro-enterprises enter in a 'survival mode', stopping long-term investments in tangible assets and focusing primarily on intangible assets developed through internal

resources that go beyond finance, including support from family members, friends and fellow entrepreneurs (Poussielgues 2015; Unizo 2015).

These findings deepen our understanding of French MEs' financial needs and behavior during the financial and economic crisis, providing a sound basis for political initiative and targeted action. However, the number of investigated micro-enterprises and the exclusive source of data limits the generalisability of our findings. Future studies should increase the number of analyzed micro-enterprises attempting inter-sectorial or inter-country comparisons regarding the relationship between firm-related factors and their capital structure before, during, and after the crisis.

References

Acs, Z. J., & Isberg, S. C. (1996) Capital structure, asset specificity and firm size: A transaction cost analysis. In E. Helmstädter and M. Perlman (Eds.), *Behavior Norms, Technological Progress, and Economic Dynamics: Studies in Schumpeterian Economics* (pp. 285-300). Ann Arbor, MI: University of Michigan Press.

Adair, P., & Adaskou, M. (2015). Trade-off-theory vs. pecking order theory and the determinants of corporate leverage: Evidence from a panel data analysis upon French SMEs (2002–2010). *Cogent Economics & Finance, 3*(1). http://www.tandfonline.com/doi/citedby/10.1080/23322039.2015.1006477?scroll=top&needAccess=true (Accessed 28 September 2016). DOI: http://dx.doi.org/10.1080/23322039.2015.1006477.

Agca, S., & Mozumdar, A. (2004). Firm size, debt capacity, and corporate financing choices. https://ssrn.com/abstract=687369 Accessed 28 September 2016). DOI: http://dx.doi.org/10.2139/ssrn.687369.

Akyüz, K. C., Akyüz, I., Serin, H., & Cindik, H. (2006). The financing preferences and capital structure of micro, small and medium sized firm owners in forest products industry in Turkey. *Forest Policy and Economics, 8*(3), 301-311. DOI: http://dx.doi.org/10.1016/j.forpol.2004.09.003.

Alves, P., & Francisco, P. (2015). The impact of institutional environment on the capital structure of firms during recent financial crises. *The Quarterly Review of Economics and Finance, 57*, 129-146. DOI: http://dx.doi.org/10.1016/j.qref.2014.12.001.

Alviarez, V., Cravino, J., & Levchenko, A.A. (2017). The growth of multinational firms in the Great Recession. *Journal of Monetary Economics, 85*, 50-64. DOI: http://doi.org/10.1016/j.jmoneco.2016.11.006.

Ang, J. (1992). On the theory of finance for privately held firms. *The Journal of Small Business Finance, 1*(3), 185-203.

Bacheré, H. (2015). Les très petites entreprises, 2 millions d'unités très diverses [The very small enterprises, 2 million of very diverse units]. *INSEE Focus* 24, March 1. http://www.insee.fr/fr/themes/document.asp?ref_id=if24 (Accessed 25 June 2015).

Baker, M., & Wurgler, J. (2002). Market timing and capital structure. *The Journal of Finance, 57*(1), 1-32. DOI: 10.1111/1540-6261.00414.

Balios, D., Daskalakis, N., Eriotis, N., & Vasiliou, D. (2016). SMEs capital structure determinants during severe economic crisis: The case of Greece. *Cogent Economics & Finance, 4*(1), 1-11. DOI: http://dx.doi.org/10.1080/23322039.2016.1145535.

Bas, T., Muradoglu, G., & Phylaktis, K. (2009). *Determinants of capital structure in developing countries*. Working Paper.
http://www.efmaefm.org/0EFMSYMPOSIUM/2010-China/papers/determinants%20of%20capital%20structure%20in%20developing%20countries.pdf (Accessed 20 September 2014).

Baumann, J., & Kritikos, A. S. (2016). The link between R&D, innovation and productivity: Are micro firms different? *Research Policy, 45*(6), 1263-1274.
DOI: http://dx.doi.org/10.1016/j.respol.2016.03.008.

Bazard, C. (2015). Les TPE françaises et leur accès au financement. [The French MEs and their access to financing] *Trésor-Eco*, 159.
http://www.tresor.economie.gouv.fr/File/419641 (Accessed 28 September 2016).

Bellettre, I. (2010). *Les choix de financement des très petites entreprises [The financing choice of very small enterprises]*. PhD Thesis. Lille, France: Université du Droit et de la Santé - Lille II.
https://tel.archives-ouvertes.fr/tel-00579822/ (Accessed 20 May 2015).

Benkraiem, R. (2016). Small business access to bank leverage under crisis circumstances. *International Journal of Entrepreneurship and Small Business, 29*(3), 390-397. DOI: 10.1504/IJESB.2016.079419.

Benkraiem, R., Bouattour, M., Miloudi, A., & Vigneron, L. (2016). Corporate leverage and the terms of employment: Evidence from French small businesses before and during the global crisis. *Applied Economics*, 1-12. DOI:10.1080/00036846.2016.1237755.

Berkowitz P., Von Breska, E., Pieńkowski, J., & Rubianes, A. C. (2015). *The impact of the economic and financial crisis on the reform of Cohesion Policy 2008-2013*. European Commission Directorate-General for Regional and Urban Policy (DG REGIO). http://ec.europa.eu/regional_policy/sources/docgener/work/2015_03_impact_crisis.pdf (Accessed 20 June 2015).

Bhide, A. V. (1992). Bootstrap finance: The art of start-ups. *Harvard Business Review, 70*(66), 109-117. DOI: 10.1225/92601.

Boyer, T., & Blazy, R. (2014). Born to be alive? The survival of innovative and non-innovative French micro-start-ups. *Small Business Economics, 42*(4), 669-683. DOI: 10.1007/s11187-013-9522-8.

Bricogne, J.C., Fontagné, L., Gaulier, G., Taglioni, D., & Vicard, V. (2012). Firms and the global crisis: French exports in the turmoil. *Journal of International Economics, 87*, 134-146. DOI: 10.1016/j.jinteco.2011.07.002.

Calvo, S. G. (2014). *Financial Crises, Social Impact, and Risk Management: Lessons and Challenges.* World Development Report. http://siteresources.worldbank.org/EXTNWDR2013/Resources/8258024-1352909193861/8936935-1356011448215/8986901-1380568255405/WDR14_bp_Financial_Crisis_Social_Impact_Calvo.pdf (Accessed 20 June 2016).

Carpenter, R. E., & Petersen B. C. (2002). Capital market imperfections, high-tech investment, and new equity financing. *The Economic Journal, 112*(477), 54-72. DOI: 10.1111/1468-0297.00683.

Carson, D., Cromie, S., McGowan, P., & Hill, J. (1995). *Marketing and entrepreneurship in SMEs: An innovative approach*. Harlow, UK: Pearson Education.

Cerisola, S., D'Alfonso, E., Felice, G., Giannangeli, S., & Maggioni, D. (2013). *Investment in Intangible Assets and Level of Sophistication: The Role of Italian Firms' Financial Structure*. EFIGE Country Report: Italy.

Chittenden, F., Hall, G., & Hutchinson, P. (1996). Small firm growth, access to capital markets and financial structure: Review of issues and an empirical investigation. *Small Business Economics, 8*(1), 59-67. DOI: 10.1007/BF00391976.

Daskalakis, N., Eriotis, N., Thanou, E., & Vasiliou, D. (2014). Capital structure and size: New evidence across the broad spectrum of SMEs. *Managerial Finance, 40*(12), 1207-1222. DOI: http://dx.doi.org/10.1108/MF-11-2013-0325.

Daskalakis, N., & Thanou, E. (2010). Capital structure of SMEs: To what extent does size matter? http://ssrn.com/abstract=1683161 (Accessed 20 March 2014). DOI: http://dx.doi.org/10.2139/ssrn.

Daskalakis, N., & Psillaki, M. (2008). Do country or firm factors explain capital structure? Evidence from SMEs in France and Greece. Applied Financial Economics, 18(2), 87-97. DOI: https://doi.org/10.1080/09603100601018864.

Degryse, H., de Goeij, P., & Kappert, P. (2012). The impact of firm and industry characteristics on small firms' capital structure. *Small Business Economics, 38*(4), 431-447. DOI: 10.1007/s11187-010-9281-8.

Esperança, J. P., & Matias, F. (2005). *Finanças empresariais [Business Finance]*. Lisboa: Publicações Dom Quixote.

European Commission (2016). *User Guide to the SME definition*. Luxembourg: European Commission. http://ec.europa.eu/DocsRoom/documents/10109/attachments/1/translations/en/renditions/pdf (Accessed 20 June 2016).

Eurostat (2015). *Eurostat news release 201/2015*. November 17. http://ec.europa.eu/eurostat/documents/2995521/7076793/4-17112015-AP EN.pdf/1db58867-0264-45c0-94bf-ab079e62d63f (Accessed 20 June 2016).

Eveno, A., & Roger, P. (2014). Croissance: Comment la France a effacé des années de crise [Growth: How did France erase the crisis years]. *Le Monde*, February 14. http://www.lemonde.fr/economie/article/2014/02/14/en-2013-la-france-a-enfin-efface-les-annees-de-crise_4366515_3234.html#TG60DvUO3dW2Ucd7.99 (Accessed 25 June 2016).

Fama, E. F., & French, K. R. (2002). Testing tradeoff and pecking order predictions about dividends and debt. *Review of Financial Studies, 15*(1), 1-33. DOI: 10.1093/rfs/15.1.1.

Fiducial (2013). *Baromètre des TPE. [The Barometer of MEs]*. March 13. http://www.ifop.com/?option=com_publication&type=poll&id=2187 (Accessed 20 July 2015).

Frank, M., & Goyal, V. K. (2008). Tradeoff and pecking order theories of debt. In B. Espen Eckbo (Ed.), *Handbook of Empirical Corporate Finance*: *Volume 2* (pp. 135-202). Amsterdam: Elsevier/North Holland.

Hall, G., Hutchinson, P., & Michaelas, N. (2000). Industry effects on the determinants of unquoted SMEs' capital structure. *International Journal of the Economics of Business, 7*(3), 297-312. DOI: http://dx.doi.org/10.1080/13571510050197203.

Harc, M. (2015). The relationship between tangible assets and capital structure of small and medium-sized companies in Croatia. *Econviews, 28*(1), 213-224. DOI: http://dx.doi.org/10.2139/ssrn.1721455.

Harris, M., & Raviv, A. (1991). The theory of capital structure. *The Journal of Finance, 46*(1), 297-355. DOI: 10.1111/j.1540-6261.1991.tb03753.x.

Hausman, J.A. (1978). Specification tests in econometrics. *Econometrica, 46*(6), 1251-1271.DOI: 10.2307/1913827.

Heshmati A. (2001). On the growth of micro and small firms: Evidence from Sweden. *Small Business Economics, 17*(3), 213-228. DOI: 10.1023/A:1011886128912.

Hutchinson, R. W. (1995). The capital structure and investment decision of the small owner-managed firm: Some exploratory issues. *Small Business Economics, 7*(3), 231-239. DOI: 10.1007/BF01135368.

Huyghebaert, N., & Van de Gucht, L. M. (2007). The determinants of financial structure: New insights from business start-ups. *European Financial Management, 13*(1), 101-133. DOI: 10.2139/ssrn.296841.

INSEE (2014). *Les entreprises en France [The enterprises in France, National Institute of Statistics and Economic Studies].*
http://www.insee.fr/fr/ffc/docs_ffc/ENTFRA14g_FTLo1_prod.pdf (Accessed 20 June 2016).

Jarboe, K. P., & Ellis, I. (2010). Intangible assets: Innovative financing for innovation. *Issues in Science and Technology*, *26*(2), 75-80.

Jensen, M., & Meckling, W. (1976). Theory of the firm: Managerial behaviour, agency costs and ownership structure. *Journal of Financial Economics, 3*(4), 305-360. DOI: 10.1016/0304-405X(76)90026-X.

Jõeveer, K. (2013). What do we know about the capital structure of small firms? *Small Business Economics, 41*(2), 479-501. DOI: 10.1007/s11187-012-9440-1.

Jordan, J., Lowe, J., & Taylor, P. (1998). Strategy and financial policy in UK small firms. *Journal of Business Finance & Accounting, 25*(1-2), 1-27. DOI: 10.1111/1468-5957.00176.

Klapper, L. F., Sarria-Allende, V., & Sulla, V. (2002). Small- and medium-size enterprise financing in Eastern Europe. *World Bank Policy Research Paper*, No. 2933, Washington D.C.

Kraemer-Eis, H., Lang, F., Torfs, W., & Gvetadze, S. (2016). *European Small Business Finance Outlook.* Working Paper 2016/35, Luxembourg: European Investment Fund.

Krasauskaite, E. (2011). *Capital structure of SMEs: Does firm size matter? Empirical investigation of the Baltic countries*. Master Thesis, Aarhus University Business and Social Sciences, Aarhus, Denmark.

http://pure.au.dk/portal-asb-student/files/40429737/Capital_Structure_of_SMEs_Does_Firm_Size_Matter.pdf (Accessed 20 June 2016).

Kudlyak, M., & Sanchez, J.M. (2017). Revisiting the behavior of small and large firms during the 2008 financial crisis. *Journal of Economic Dynamics & Control, 77*, 48-69. DOI: http://dx.doi.org/10.1016/j.jedc.2017.01.017.

Levieuge, G. (2017). Explaining and forecasting bank loans. Good times and crisis. *Applied Economics, 49*(8), 823-843. DOI: 10.1080/00036846.2016.1208350.

Lim, S. C. Macias, A. J., & Moeller, T. (2014). Intangible assets and capital structure. http://www.baylor.edu/business/finance/doc.php/231371.pdf (Accessed 20 June 2016).

Loumioti, M. (2012). The use of intangible assets as loan collateral. Working paper, Los Angeles, CA: University of Southern California.

https://msbfile03.usc.edu/digitalmeasures/loumioti/intellcont/theuseofintangiblesasloancollateral_final-1.pdf (Accessed 20 June 2016).

Mateev, M., Poutziouris, P., & Ivanov, K. (2013). On the determinants of SME capital structure in Central and Eastern Europe: A dynamic panel analysis. *Research in International Business and Finance, 27*(1), 28-51. DOI: 10.1016/j.ribaf.2012.05.002.

Michaelas, N., Chittenden F., & Poutziousris, P. (1999). Financial policy and capital structure choice in UK SMEs: Empirical evidence from company panel data. *Small Business Economics, 12*(2), 113-130. DOI: 10.1023/A:1008010724051.

Modigliani, F., & Miller, M. H. (1963). Corporate income taxes and the cost of equity: A correction. *American Economic Review, 53*(3), 433-443.

Muijs, W. K. (2015). The Impact of the financial crisis on the determinants of capital structure: Evidence from Dutch listed firms. http://purl.utwente.nl/essays/67498 (Accessed 22 July 2016).

Muske, G., Woods, M., Swinney, J., & Chia-Ling, K. (2007). Small businesses and the community: Their role and importance within a states' economy. *Journal of Extension, 45*(1). http://www.joe.org/joe/2007february/rb4.shtml (Accessed 20 April 2014).

Myers, S. C. (2001). Capital structure. *Journal of Economic Perspectives, 15*(2), 81-102. DOI: 10.1257/jep.15.2.81.

Myers, S. C. (1984). The capital structure puzzle. *The Journal of Finance, 39*(3), 575-592. DOI: 10.3386/w1393.

Myers, S. (1977). Determinants of corporate borrowing. *Journal of Financial Economics, 5*(2), 147-175. DOI: 10.1016/0304-405X(77)90015-0.

Myers S. C., & Majluf, N. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics, 13*(2), 187-221. DOI: 10.3386/w1396.

Observatoire du financement des entreprises [The Observatory of Enterprise Financing] (2014). Rapport sur le financement des TPE en France [Report regarding MEs' financing in France].

http://www.economie.gouv.fr/files/files/directions_services/mediateurducredit/pdf/RAPPORT -OFE-_financement_des_TPE_en_France__juin_2014.pdf (Accessed 28 June 2016).

Observatoire du financement des entreprises [The Observatory of Enterprise Financing] (2012). Rapport sur le financement des PME-ETI en France [Report regarding SMEs' financing in France].

http://www.financement-tpe-pme.com/wp-content/uploads/2012/09/Rapport_OFE_2012.pdf (Accessed 20 April 2014).

OECD (2009). *The impact of the global crisis on SME and entrepreneurship. Financing and policy responses*. Centre for Entrepreneurship, SMEs and Local Development.

https://www.oecd.org/cfe/smes/43183090.pdf. (Accessed 21 June 2016)

Pettit, R. R., & Singer, R. F. (1985). Small business finance: A research agenda. *Financial Management, 14*(3), 47-60. DOI: 10.2307/3665059.

Poussielgues, N. (2015). Le système bancaire alternatif: Solution face à la raréfaction du crédit pour les jeunes entrepreneurs ? [The alternative banking system: A solution to the credit reduction for young entrepreneurs?] *Journal du Net*, Janvier 19,

http://www.journaldunet.com/management/expert/59648/le-systeme-bancaire-alternatif----solution-face-a-la-rarefaction-du-credit-pour-les-jeunes-entrepreneurs.shtml (Accessed 24 June 2016).

Poza, E. J., Hanlon, S., & Kishida, R. (2004). Does the family business interaction factor represent a resource or a cost? *Family Business Review, 17*(2), 99-118. DOI: 10.1111/j.1741-6248.2004.00007.x.

Proença, P., Laureano, R. M. S., & Laureano, L. M. S. (2014). Determinants of capital structure and the 2008 financial crisis: Evidence from Portuguese SMEs. *Procedia - Social and Behavioral Sciences*, 150, 182-191. DOI: 10.1016/j.sbspro.2014.09.027.

Prohorovs, A., & Beizitere, I. (2015). Trends, sources and amounts of financing for micro-enterprises in Latvia. *Procedia - Social and Behavioral Sciences, 213*, 404-410. DOI: 10.1016/j.sbspro.2015.11.558.

Rajan, R., & Zingales, L. (1995). What do we know about capital structure? Some evidence from international data. *The Journal of Finance, 50*(5), 1421-1460. DOI: 10.1111/j.1540-6261.1995.tb05184.x.

Ramalho, J. J. S., & Da Silva, J. V. (2009). A two-part fractional regression model for the financial leverage decisions of micro, small, medium and large firms. *Quantitative Finance, 9*(5), 621-636. DOI: 10.1080/14697680802448777.

Scherr, F. C., & Hulburt, H. M. (2001). The debt maturity structure of small firms. *Financial Management, 30*(1), 85-111. DOI: 10.2307/3666392.

Seidman, K. F. (2005). *Economic development finance*. Thousand Oaks, CA: Sage.

Sogorb-Mira, F. (2005). How SME uniqueness affects capital structure: Evidence from a 1994–1998 Spanish data panel. *Small Business Economics, 25*(5), 447–457.

Truong, H. T., & Nguyen, T. P. (2016). Effects of financial crisis on capital structure of listed firms in Vietnam. *International Journal of Financial Research, 7*(1), 66-74. DOI: 10.1007/s11187-004-6486-8.

Unizo, V. (2015). *Financement des PME 2014 [The financing of SMEs 2014]*. Brussels: SPF Economie.

Van der Wijst, D. (1989). *Financial structure in small business, theory, tests and applications*. Berlin: Springer-Verlag.

Van der Wijst, N., & Thurik, R. (1993). Determinants of small firm debt ratios: An analysis of retail panel data. *Small Business Economics, 5*(1), 55-65. DOI: 10.1007/BF01539318.

Vandenberg, P. (2009). *Micro, small and medium-sized enterprises and the global economic crisis: impacts and policy responses*. International Labour Office, Sustainable Enterprise Programme. Geneva: International Labour Office. http://www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_ent/documents/publication/wcms_108413.pdf (Accessed 20 June 2016).

Vieira, E. F. S., & Novo, A. J. (2010). A estrutura de capital das PME: Evidência no mercado português [The capital structure of SMEs: Evidence from the Portuguese market]. *Revista Estudos do ISCA, 4*(2), 1-9. DOI: http://dx.doi.org/10.1234/ei.v0i2.578.

Young, L. (2013). Growing your business. A report on growing micro business.

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/197726/bis-13-729-growing-your-business-a-report-on-growing-micro-businesses.pdf (Accessed 28 June 2015).

Zeitun, R., Temimi, A., & Mimouni, K. (2017). Do financial crises alter the dynamics of corporate capital structure? Evidence from GCC countries. *The Quarterly Review of Economics and Finance, 63*, 21-33. DOI: 10.1016/j.qref.2016.05.004.

Zingales, L. (2000). In search of new foundations. *The Journal of Finance, 55*(4), 1623-1653. DOI: 10.1111/0022-1082.00262.