Trade-Off-Theory vs. Pecking Order Theory and the determinants of corporate leverage: evidence from a panel data analysis upon French SMEs (2002-2010)

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Trade-off theory vs. pecking order theory and the determinants of corporate leverage: Evidence from a panel data analysis upon French SMEs (2002–2010)

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Abstract: We test the assumptions of trade-off theory (TOT) and pecking order theory (POT) regarding corporate leverage. The dependent variable being the debt ratio, we apply a linear model upon a balanced panel data-set of 2,370 French SMEs over the period 2002–2010. In accordance to TOT, trade credit acts as a signal to creditors who have no private information about the firm and access to credit relies on guarantees. The relationship between corporate leverage and the profitability of SMEs as well as growth opportunities support POT. However, the relationship between corporate leverage and the age of SMEs, as well as their size, remains inconclusive with respect to both theories.

Subjects: Economics; Finance; Business, Management and Accounting

Keywords: capital structure; corporate leverage; panel data; pecking order theory; SMEs; trade-off theory

JEL classifications: C23; G32

ABOUT THE AUTHORS

Philippe Adair research in Financial Economics developed within the ERUDITE laboratory alongside his former PhD students. Since 2011, he published five articles in academic journals on the following topics. With M. Adaskou, he analyses the determinants of corporate leverage from a balanced panel of 1,520 French SMEs over the period 2000–2004; he tests the main theories of capital structure—trade-off and pecking order. With F. Fhima, he estimates a disequilibrium model of credit rationing applied to a balanced panel of 1,274 Tunisian SMEs from 2001 to 2006. With I. Berguiga, he studies the relationship between social and financial performance of 50 microfinance institutions (MFIs) in the Middle East and North Africa (MENA) region over the period 1998–2008. He extends the study to a larger panel of MENA MFIs from 1998 to 2011; it is published in a forthcoming special issue of *Savings & Development*, for which he is guest editor.

PUBLIC INTEREST STATEMENT

Over 95% of all firms are SMEs that create most jobs and the value added. They usually face an ongoing need for funding, and they may access either external (loans) or internal (equity) funds, albeit these resources do not compare as regards their cost and impact upon ownership and control of the firm. Standard corporate finance theory was first applied to large firms, which do not necessarily match the characteristics of SMEs. It has developed into trade-off theory (TOT), whereas pecking order theory (POT) is its main challenger. Hence, the theory that fits best the SMEs corporate leverage strategy is a controversial issue. We test 2,370 French SMEs over the period 2002–2010 and compare our results with that of other French studies. Neither TOT nor POT validates all the variables explaining capital structure and there is no general theory thereof.

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1. Introduction

Despite the fact that Brealey, Myers and Allen (2010) point out that *"how financial decisions are made"* is a question that still remains unanswered, standard corporate finance theory holds that the main concepts are applicable to the financing of all kinds of firms. Management is supposed to identify the capital structure that maximise the firm value and may resort to various means of external funding. Debt financing requires payback with cash flow commitments that are independent of the successful use of the money borrowed. Equity financing is less risky as regards cash flow commitments, albeit it dilutes share ownership, control and earnings. The cost of equity is higher than the cost of debt that is a deductible expense. Hence, trade-off theory (TOT) assumes that firms choose how to allocate their resources comparing the tax benefits of debt with the bankruptcy costs thereof, thus targeting an optimal debt ratio. Pecking order theory (POT) challenges the former theory, contending that firms prefer a sequential choice over funding sources: they avoid external financing if they have internal financing available and avoid new equity financing whenever they can engage in new debt financing. Tests of POT have proved controversial. According to Shyam-Sunder and Myers (1999), the test over a small sample (157 US firms) over the period 1971–1989 is positive, whereas Frank and Goyal (2003) find that it fails for US small firms size whereof information asymmetry is important.

Little attention has been paid to the fact that small firms, especially SMEs, may not fit standard corporate finance theory, which deserves to be tested in this respect.

López-Gracia and Sogorb-Mira (2008) point out that SMEs aim to achieve an optimal debt ratio, which may provide the best explanation for the capital structure of French SMEs (Dufour & Molay, 2010). In contrast, Brounen, De Jong, and Koedijk (2004) hold that SMEs lack concern for such a ratio: their financial behaviour being distinct from that of large companies, one should look for a more relevant alternative theory.

We address the following controversial issue: which of the two major theories of capital structure—Trade-Off Theory (TOT) or Pecking Order Theory (POT)—provides the best predictions as regards the borrowing behaviour of unlisted SMEs? We examine the main determinants of corporate leverage strategy (both short-term as well as medium and long-term debt) upon a sample of 2,370 French SMEs selected from the DIANE database over a nine-years period (2002–2010). It enables us to compare our outcomes with those of other French studies devoted to this issue since the 1990s, which used panel data analysis upon smaller samples. Thus, our article provides an update and enlarges the prospect.

Our paper is organised as follows: Section 2 designs the assumptions related to TOT and POT. Section 3 describes the key variables selected in order to test these assumptions. Section 4 presents the sample and descriptive statistics; it sketches the theoretical model and econometric techniques, and discusses the outcomes. Section 5 concludes.

2. Theories of the financial structure of SMEs

2.1. Trade-off Theory (TOT): taxation, bankruptcy and agency costs

This theory fits in the literature initiated by Modigliani and Miller (1958) upon strong assumptions—capital markets are perfect and there are neither tax or agency costs nor transaction costs—and demonstrate that financial structure is neutral vis-à-vis the value of the company.

Later on, Modigliani and Miller (1963) relax the neutrality axiom and include taxation: the value of an indebted company is equal to that of a non-corporate debt, plus the present value of the tax savings from debt and less the present value of costs related to potential financial difficulties. Hence, because interest are deductible from taxable profits, firms have an incentive to use debt rather than equity. The value of a leveraged firm is higher in as much as the tax rebate benefits only the business itself, save personal income (Miller, 1977).

SMEs already enjoy a low tax rate that limits at some point any leverage policy conditional to a rebate on interest charges (Ang, 1991).

The existence of bankruptcy costs (Stiglitz, 1969) involves a balance between the value of the firm and tax benefit; it theoretically drives to an optimal debt level when the marginal benefits associated with tax rebate are equal to the marginal costs associated with bankruptcy due to leverage.

Similarly, forsaking the hypothesis of no agency costs allows for the theoretical existence of an optimal capital structure. Agency theory (Jensen & Meckling, 1976) assumes that there are conflicts of interest between the principal (shareholders) and the agent (business managers); hence, triggering agency costs that affect financing. Conflicts of interest between shareholders and creditors arise because the latter have priority over the former in case of bankruptcy. An optimal debt ratio is achieved when agency costs are minimum.

SMEs face no or little agency costs between managers and shareholders, because they are often confused, unless the firm belongs to a group. However, agency conflicts between owners and lenders arise. The lender (principal) experiences difficulties in monitoring the decision of a small firm owner-manager (agent); mostly due to a lack of transparency in information systems that generates agency costs (Cieply, 1997).

2.2. Pecking Order Theory (POT) and asymmetry of information

Myers and Majluf (1984) developed Pecking Order Theory (POT) upon the asymmetry of information between internal stakeholders (owners and managers) and external providers of the firm. Business leaders adopt a financial policy, which aims at minimising the costs associated with asymmetric information, especially adverse selection, and prefer internal financing to external financing. This theory assumes that a business leader complies with the following hierarchy: self-financing, non-risky debt issuance, risky debt issuance and equity issuance as a last resort. Such behaviour eschews a fall in the prices of shares of the firm; it restricts the distribution of dividends in order to increase cash flow and reduces the cost of capital by limiting as much as possible access to loans. Thus, profitable firms enjoy more internal funds available.

Asymmetric information should drive the issue of debt over equity. Debt issuance signals the confidence of the board that an investment is profitable and that the current stock price is undervalued. Equity issuance signals a lack of confidence in the board that may feel the share price is overvalued. An issue of equity would therefore lead to a drop in share price. However, this may not apply to intangible assets.

Ang (1991) and Holmes and Kent (1991) point out that POT applies to SMEs, save subcontracting SMEs or those belonging to a group (Kremp & Phillippon, 2008). SMEs do not aim to achieve an optimal financial structure; they rank their preferences for internal financing over external financing, as well as debt relative to equity. They may wish to borrow when investment funding exceeds their internal cash flow, albeit they will face transaction costs in their credit relationship. These costs may be zero for internal funds (cash flow), albeit higher for new shares issuance, whereas that of debt stand in between. The objective of SMEs managers is to maximise their own wealth, while securing control over decision-making vis-à-vis external actors. Hence, they will first choose internal funds for financing and if such funds prove unavailable, they prefer using debt rather than increasing their capital.

POT is also supported with respect to assumptions regarding the age and profitability of SMEs: they use less debt as time goes by and when their life cycle leads youth to maturity (Berger & Udell, 1998).

Transaction Costs Economics (TCE), alongside with behavioural finance (Barberis & Thaler, 2003) may also explain the financial behaviour of SMEs. Williamson (1988) assumes opportunism and bounded rationality of agents, finding a close relationship between the determinants of financing choices and nature of the asset to be financed. In the case of a specific (intangible) asset, the sequence

alleged by Myers and Majluf (1984) is reversed as follows: cash flow, equity and debt. Leary and Roberts (2010) point out that firms routinely issue equity when they should not do so, whereas mimicry could explain as much as 70% of the financing behaviour of firms (Leary & Roberts, 2012).

SMEs specificities match at some point to the teachings of TCE and behavioural finance. On one hand, the rationality of owner-managers is bounded and the risk of error is higher for SMEs, due to the decision that is into the hands of the owner-manager. On the other hand, SMEs strategies aim to satisfy primarily the interests of the owner-manager and former shareholders. SMEs experience a lack of equity and have little access to the financial market.

3. Characteristics of French SMEs, key variables and assumptions

3.1. Characteristics of French SMEs
We focus upon SMEs, which are considered as the cutting edge of economic issues; it is worth noting that French SMEs have been studied using various panel data analysis that prove fruitful to discover or check stylised facts (See Table 3). As in the case of other European countries (Daskalakis & Psillaki, 2007), SMEs in France are the main source of employment (60% of jobs) and contribute to 55% of value added. SMEs constitute an unbalanced set of three categories: by January 2010, micro-enterprises (0–9 employees) account for 94.25% of all SMEs, whereas small enterprises (10–49 employees) and medium-sized enterprises (50–249 employees) account in respect for 4.80% and only 0.79% (OSEO, 2011).

According to an investigation upon French SMEs in 2010 (KPMG, 2012), trade credit remains the main source of financing corporate cash flow in France. Self-financing remains the main source of investment funding (40–45% of cases), followed by bank loans (34–38% of cases). The average corporate debt ratio is high for SMEs (88.6%): the debt ratio is below 52% for half of SMEs, whereas it is above 158% for a quarter of them. In 2009, the median weight of equity in the balance sheet of SMEs was 42%. Three-quarters of SME managers declare being reluctant to open their capital to outside investors, in fear of losing their independence. Very few SMEs access the financial market: out of 135,823 French SMEs, only 574 are listed in 2010.

3.2. Key variables and assumptions
We identify capital structure by the debt ratio of the company (*DR*), which is our dependent variable we gauge with the ratio of financial debt (short-term and medium-long-term) upon total assets, in line with Ziane (2004) or Dufour and Molay (2010). The explanatory variables are size, age, industry, profitability, growth opportunities, trade credit and guarantees (see Table 1). These key variables test the assumptions related to the debt ratio addressing the predictions of TOT vs. POT.

Size (*WF*) is a dummy. The size effect plays a role in the choice between share and debt. Large firms are less at risk of bankruptcy than small-sized firms, because the former diversify their investments and may experience lower transaction costs associated with debt as well as lower information costs, due to the quality of financial reporting. Hence, according to TOT, size should be positively related to leverage. However, the size effect is ambiguous (Rajan & Zingales, 1995): it can also send a signal to external prospective investors. Whenever they enlarge their staff, SMEs should look promising firms with growth opportunities and less exposure to the risk of bankruptcy; according to POT, they should increase their equity rather than leverage. Our first hypothesis (*H1*) states that the size of the firm is related to the level of debt ratio, either positively (TOT) or negatively (POT).

Age (*AGE*) is the difference between the first year of observation (2002) and the registration date of the firm: the older the firm is, the larger its information record. TOT assumes the existence of a positive relationship between age and debt ratio; the fact that mature firms have better reputation and more experience can reduce agency costs through a positive signal on the quality of potential investments. Conversely, assuming that the cash flow of SMEs is a positive function of age, and according to POT, mature firms have less recourse to leverage. Our second hypothesis (*H2*) states that mature firms do experience a higher debt ratio (TOT) vs. a lower debt ratio (POT).

Table 1. Testing TOT vs. POT and the related set of assumptions					
Financial theory	**Hypothesis**	**Variables regarding**	**Definition**	**Code**	**DR**
TOT vs. POT	H1	The choice between share and debt	Workforce: average number of employees (according to sales turnover and balance sheet) *dummy* variable	WF	+ −
TOT vs. POT	H2	The existence of an optimal financial structure in a dynamic perspective	2002—date of registration: quantitative variable	AGE	+ −
TOT vs. POT	H3	The risk to the main activity of the firm (industry)	Included in the NAF classification, level 60: *dummy* variable	SEC	+ −
TOT vs. POT	H4	Profitability	Operating income/total assets: quantitative variable	PROF	+ −
TOT vs. POT	H5	Growth opportunities	Intangible assets/total assets: quantitative variable	GO	− +
TOT vs. POT	H6	The confidence of suppliers as a good signal	Credit to customers—accounts payable/total liabilities: quantitative variable	TC	+ −
TOT vs. POT	H7	The presence of guarantees as a good signal	Tangible fixed assets + inventories/total assets: quantitative variable	GAR	+ −

Source: Our design.

The industry (*SEC*) has an impact on the financial structure of the firm. Each industry is characterised with specific modes of operation, and it may stand as an overall proxy of risk to the main activity of the firm according to Psillaki, Tsolas and Margaritis (2010). We use the French classification of activities (NAF) to select four dummies: manufacturing, trade, construction and services. Our third hypothesis (*H3*) states that industry influences the debt ratio of the firm, either positively (TOT) or negatively (POT).

We measure profitability (*PROF*) by the ratio of operating income upon total assets. TOT assumes a positive relationship between profitability and the debt ratio. On the one hand, a profitable business may prefer debt because it maximises its value thanks to tax advantage. On the other hand, profitability sends the lender a signal as regards the financial health of the company and reduces information asymmetries that constitute a major obstacle to financing SMEs. Conversely, according to POT, profitability exert a negative impact upon the debt ratio. Profitable companies will give priority to cash flow funding in order to secure their independence and to eschew exposure to information asymmetry. SMEs borrow, as the only source of significant external liquidity, once they exhaust their ability to generate internal funds. Since the amount of profit determines cash flow, profitable firms are less leveraged. Our fourth hypothesis (*H4*) states that profitability affects the debt ratio, either positively (TOT) or negatively (POT).

We measure growth opportunities (*GO*) by the ratio of intangible assets to total assets (Dufour & Molay, 2010). Agency theory holds that the relationship should be negative: growth opportunities may induce moral hazard; firms are considered as more risky and fail convincing lenders to grant them credit; those with growth potential tend to have a low debt ratio (Myers, 1977). Conversely, according to POT, the relationship should be positive: the combination of growth potential and very limited access to financial markets drives SMEs to look for bank financing (Chittenden, Hall, & Hutchinson, 1996). Our fifth hypothesis (*H5*) states that the relationship between growth opportunities and the debt ratio should be negative TOT vs. positive POT.

Trade credit (*TC*) results from the difference between the gross amount of customer credit and debt supplier. We express it as a percentage of the balance sheet, by dividing the balance of trade credit with total assets. The firm becomes a lender or borrower depending on the sign of the balance of trade receivables and debts. TOT holds that the ability of the firm to borrow from its trading partners may send to lenders a signal of its good payback capacity (Kremp & Dietsch, 1998): trade credit exerts a positive effect as it eases granting bank credit thereof. In contrast, Petersen and

Rajan (1994) argue that commercial debt is a substitute for financial debt when firms face credit rationing. For a large number of firms in the development stage of their lifecycle (including start-ups), trade credit is the main source of working capital as compared to bank loans (Commission Européenne, 2001). According to POT, trade credit is less risky for SMEs: hence, the relationship with debt should be negative. Our sixth hypothesis (*H6*) states that trade credit affects the debt ratio, positively TOT vs. negatively POT.

We gauge guarantees (*GAR*) from the share of fixed assets and inventories in the balance sheet (Bourdieu & Colin-Sédillot, 1993; Titman & Wessels, 1988). Collateral is a major requirement from donors in the credit relationship (López-Gracia & Sogorb-Mira, 2008); it reduces agency costs and drives commitment to longer term loans (Harris & Raviv, 1990; Jensen & Meckling, 1976). This requirement may also reduce the risk of moral hazard, as it is a means for self-selection of borrowers; it is a deterrent for managers to under-invest and make discretionary levies (Berger & Udell, 1990; Besanko & Thakor, 1987; Jensen & Meckling, 1976; Myers, 1977). Titman and Wessels (1988) argue that firms holding assets that may constitute a collateral are more leveraged. Our seventh hypothesis (*H7*) states that firms wherein total fixed assets and inventories are more important in their balance sheet experience a higher debt ratio (TOT) or not (POT).

4. Sample design, balanced panel model and outcomes

4.1. Sample design and descriptive statistics
Data come from the widely used DIANE database, collected from 1,085,000 French firms, which are available over ten years (at the maximum). We assume that biases remain roughly constant overtime; hence, the database enables to make relevant comparisons with other comparable French studies in order to highlight some stylised facts. The selection of the sample complies with the definition of SMEs[1]: according to the European Commission in 2005, an SME is any business that employs less than 250 people, with total assets from €2 million (minimum) up to €43 million (maximum), and sales turnover from €2 million (minimum) up to €50 million (maximum). We selected firms according to the French classification of business activity (NAF level 60 of INSEE). All financial data are updated and available for the observation period of nine consecutive years [2002, 2010]. Our balanced panel of 2,370 SMEs comprises 21,330 observations over almost a decade.

The distribution of our panel by size and categories of SMEs shows that small enterprises (10–49 employees) are predominant and account for nearly two-thirds (64.60%), whereas micro-enterprises (17.34%) and medium-sized enterprises (18.06%) represent an almost equivalent share. Unsurprisingly, it does not match the distribution of OSEO (2011).

As for industries, construction, manufacturing, trade and services account for, respectively, 19.87, 24.81, 36.37 and 18.95%. Trade and manufacturing comprise the largest number of firms. Almost three out of four micro-enterprises operate in the trade and services industries. Small businesses are more concentrated in the trade and manufacturing industries. The medium-sized enterprises display a rather balanced distribution wherein the manufacturing and construction industries are slightly dominant.

The overall debt ratio for all selected SMEs is 57%. Medium-sized companies are more leveraged (60.94%) than micro-enterprises (56.78%) and small firms (55.78%).

Equity is the primary source of funding for SMEs: 40.38% of total liabilities for micro-enterprises, 41.53% for small firms and 35.17% for medium-sized enterprises. The relationship between the share of equity in total assets and the size of the firm is ambiguous, as noticed previously (Commission Européenne, 2001).

Trade credit is the second largest source of funding and account for over one quarter of the SMEs liabilities: 24% for micro-enterprises, 24.75% for small firms and 25.53% for medium enterprises.

Debt is the third largest source of financing for SMEs: 16.21% of liabilities for micro-enterprises, 14.78% for small firms and 15.14% for medium enterprises. There is a strong dispersion as regards debt (including short-term), reflecting the heterogeneity of SMEs. The relationship between average financial debt and the size of business displays a non-linear U-shaped curve.

A first glance to these patterns suggests that the sequence reversal between equity and debt runs against POT, whereas it matches rather well TCE. If one adds trade credit with debt (overall debt): equity ranks first over overall debt for both the micro and the small businesses and runs against POT; whereas, it ranks second only for medium-sized firms in accordance with POT.

4.2. Econometric balanced panel model and outcomes
We tested the following linear model:

$$Y_{it} = \alpha_0 + \alpha_1 dummymicro_{it} + \alpha_2 dummymedium_{it} + \alpha_3 dummytrade_{it}$$
$$+ \alpha_4 dummymanufacturing_{it} + \alpha_5 dummyservices_{it} + \alpha_6 AGE_{it} + \alpha_7 PROF_{it}$$
$$+ \alpha_8 GO_{it} + \alpha_9 TC_{it} + \alpha_{10} GAR_{it} + \mu_i + \varepsilon_{it}$$

Y_{it}: dependent variable that is the debt ratio (*DR*).

α_0: constant.

With the number of firms [i = 1; (…); 2,370] and the number of years [t = 1; (…); 9].

The model attempts to explain the dependent variable with the explanatory variables. The presence of a disturbance in the model is due to other indicators considered as less relevant and which are not explicitly considered. This unobserved heterogeneity poses econometric problems that the ordinary least squares (OLS) method does not overcome. Other methods of estimation have developed in order to monitor the effects of estimated parameters: *Within* (intra-individual) estimator, *Between* (inter-individual) estimator and the QGLS (quasi-generalised least squares) estimator.

Unlike the OLS method, models with fixed effects (*Within*) and random effects (QGLS) account for the heterogeneity of data, but assumptions regarding the nature of specific effects differ from one model to another. In the *Within* model, specific effects are correlated with the explanatory variables, whereas in the QGLS model no correlation is assumed. To choose between these two models, a specification test (Hausman, 1978) uses differences in the properties of two estimators as regards the following alternative: if H_0, both estimators are convergent but only the QGLS estimator is asymptotically efficient; if H_1, only the *Within* estimator is consistent but not asymptotically efficient.

Outcomes from the estimation of fixed effects (*Within*) and random effects (QGLS) models are typical of panel data analysis: R^2 are acceptable. Fisher's test and Wald test for fixed effects and random effects are significant at 1% threshold, respectively; hence, our model is significant. The probability of Breusch–Pagan test shows that the random effects are significant at 1% threshold. The Hausman probability test *Within* vs. QGLS is significant at 1% threshold: specific effects are correlated with the explanatory variables and the fixed effects model is preferable to the random effects model.

However, the estimation of specific effects model does not allow us to estimate the impact of time invariant variables (age and industry), because data are transformed into difference with respect to the individual average. It would be advisable to use the *Between* estimator, the results of which are close to that of OLS. In the remaining, we restrict our comment to the QGLS estimation (see Table 2) and compare our findings with those from other studies devoted to French SMEs (see Table 3).

The size effect (*WF*) does not show up. The coefficient on dummy micro-enterprises is positive albeit not significant, whereas that on dummy medium is negative but not significant. Contrary to our expectations, non-significance of the size variable does not enable to confirm or reject *H1* hypothesis regarding the predictions of either TOT or POT.

Table 2. Four estimations testing the debt ratio

Explanatory variables	Coefficients			
	OLS	*Within*	*Between*	**QGLS**
Dummy micro	0.010*** (4.860)	0.000 (0.310)	0.020*** (2.710)	0.001 (0.890)
Dummy medium	0.002 (0.930)	−0.002 (−0.860)	0.007 (0.870)	−0.002 (−0.790)
Dummy trade	0.012*** (4.260)	–	0.006 (0.770)	0.037*** (5.590)
Dummy manufacturing	0.003 (1.130)	–	0.003 (0.370)	0.009 (1.250)
Dummy services	0.063*** (21.640)	–	0.062*** (8.360)	0.070*** (9.600)
Age (*AGE*)	−0.001*** (−10.640)	–	−0.001*** (−3.630)	−0.001*** (−5.580)
Profitability (*PROF*)	−0.174*** (−18.030)	−0.242*** (−28.030)	−0.135*** (−4.260)	−0.231*** (−27.700)
Growth opportunities (*GO*)	0.331*** (37.610)	0.134*** (7.650)	0.338*** (14.550)	0.222*** (15.870)
Trade credit (*TC*)	0.093*** (16.640)	0.206*** (32.840)	0.055*** (3.370)	0.184*** (31.440)
Guarantees (*GAR*)	0.340*** (68.100)	0.341*** (47.150)	0.329*** (23.690)	0.347*** (54.650)
Constant	0.025*** (7.570)	0.043*** (13.750)	0.023*** (2.490)	0.025*** (3.850)
Observations	21,330	21,330	21,330	21,330
R^2	0.266	0.174	0.309	
Fisher test	774.800	667.420	105.700	
Prob > F	0.000	0.000	0.000	
Wald χ^2				4860.82
Prob> χ^2				0.0000
Breusch–Pagan test				37758.79
Hausman test *Within* vs. QGLS		171.38		
Prob Hausman		0.0000		

***Significant at 1%.

**Significant at 5%.

*Significant at 10%.

Robust T-statistics are within parentheses.

Source: Our design.

Table 3. An overview of studies upon the capital structure of French SMEs

Authors	Sample, country, period and techniques	Outcomes
Bédué (1997)	Balanced panel of 1,387 firms (DIANE); France, 1989–1993; OLS estimators and *Between*	POT is validated. Agency theory is verified. Emphasis is upon the role of collateral in the credit relationship`
Boussaa (2000)	Balanced panel of 1,712 SMEs (DIANE); France, 1991–1995; multivariate analysis and econometric analysis (OLS, *Within* and *Between*)	POT and signal theory explain the financial structure of SMEs. Trade credit reduces information asymmetry
Ziane (2004)	Balanced panel of 2,551 SMEs (DIANE); France, 1994–2001; estimate the moments (GMM)	POT is most common but not exclusive from TOT
Trabelsi (2006)	Balanced panel of 1,898 SMEs (DIANE); France, 1995–2002; OLS	POT and TOT are compatible
Daskalakis and Psillaki (2007)	Balanced panel: 320 SMEs (Italy); 52 firms (Portugal); 1,252 firms (Greece) and 2,006 SMEs (France); 1997–2002	POT is validated
Bellelettre (2010)	Unbalanced panel of 56,605 micro-enterprises (DIANE); France, 1998–2006; panel model with fixed effects and instrumental variables	POT does not explain the preference of micro-enterprises for debt, as compared to current accounts
Dufour and Molay (2010)	Balanced panel of 1,535 SMEs (DIANE), France, 2000–2007; OLS, generalised least squares with fixed effects or random effects; results associated with the best specification	TOT is validated, but POT (semi-strong version) cannot be rejected. Change in debt depends on the funding gap
Adair and Adaskou (2011)	Balanced panel of 1,520 SMEs (DIANE), France, 2000–2004; OLS, *Within*, QGLS and instrumental variables	POT and TOT are validated according to variables, albeit some variables remain unexplained

Source: Our design.

Age (*AGE*) is significant at 1% threshold and negatively correlated with the debt ratio. The test for *H2* hypothesis refutes the prediction of both TOT and the agency theory holding that older firms have a better reputation and more experience, enjoying reduced agency costs thanks to a positive signal. Conversely, it sustains the prediction of POT: the older the firm is, the more its cash flow increases and the less it resorts to debt financing. This negative relationship between age and the debt ratio is consistent with the study of Boussaa (2000) as well as Adair and Adaskou (2011), whereas Ziane (2004) observed an ambiguous effect.

Industry (*SEC*): The coefficients associated with dummy trade and dummy services are positive and significant. These two industries are more indebted than the reference construction industry: 7% for services and 3.7% for trade. Contrary to our expectations, the coefficient on dummy manufacturing is positive but not significant. These results are not consistent with those of Adair and Adaskou (2011) highlighting all three industries are less indebted than the construction industry. The test for *H3* hypothesis makes sure that industry has an influence on the debt ratio, albeit it is unclear whether it supports the prediction of either theory.

Profitability (*PROF*): The coefficient is negative and significant at 10% threshold. Hence, profitability has a negative effect on the debt ratio. This outcome rejects the prediction of TOT, according to which profitable businesses save on tax thanks to leverage and/or reduce agency costs and signal the financial health of the company. Conversely, it supports the prediction of POT: profitability has a negative impact upon the debt ratio. The test for *H4* hypothesis is consistent with the studies of Ziane (2004) as well as Dufour and Molay (2010).

Growth opportunities (*GO*): Its coefficient is positive and significant at 10% threshold. This refutes the prediction of TOT that there is a negative relationship between growth potential and the debt ratio, due to the existence of agency costs and risk. Conversely, this positive relationship confirms the prediction of POT: growth of the firm drives the need for external financing, and debt seems the most appropriate funding source (Ziane, 2004). The test for *H5* hypothesis is in line with the studies of Dufour and Molay (2010), Ziane (2004) as well as Adair and Adaskou (2011).

Trade credit (*TC*): Its coefficient is positive and significant at 10% threshold. Firms using more trade credit have a higher debt ratio, which is in line with the prediction of TOT. The positive relationship between these two complementary funding sources emphasises the role of reputation effects of SMEs with trading partners in accessing bank credit. The test for *H6* hypothesis is consistent with the study of Trabelsi (2006). Conversely, it refutes the prediction of POT and the thesis arguing that trade credit is a substitute for bank credit (Petersen & Rajan, 1994), thereby rejecting the result of Adair and Adaskou (2011).

Guarantees (*GAR*): Its coefficient is significant and positively related with the debt ratio; firms with larger fixed assets and inventories in their balance sheet are more leveraged. The test of *H7* hypothesis confirms the prediction of TOT and rejects that of POT, in accordance with Ziane (2004) and Trabelsi (2006) as well as Adair and Adaskou (2011).

5. Conclusion

We focused on the determinants of debt ratio upon a large sample of 2,370 French SMEs over a nine-years period. We tested seven hypotheses related to the theories (TOT vs. POT) that explain the financial structure of small- and medium-size businesses. We conclude that both theories explain to a limited extent the behaviour of SMEs as regards debt. We recall that we restricted our discussion to outcomes of the QGLS estimator dealing with random effects, because the *Within* estimation does not gauge the impact of time-invariant variables (age and industry).

First, we did not identify the size effect, which is insignificant and therefore cannot confirm or reverse the predictions of either TOT or POT. Second, the negative relationship between age and the debt ratio rejects the prediction of TOT and agency theory; conversely, it supports the prediction of POT: the older

is the firm, the more its cash flow increases and the less it resorts to debt financing. Third, the impact of industry that encapsulates risk remains unfortunately inconclusive as regards one or the other theory. Fourth, profitability influences negatively the debt ratio; it rejects the prediction of TOT and sustains that of POT: the larger is internal financing and the less the firm needs external resources and therefore debt. Fifth, growth opportunities have a positive influence on the debt ratio, contrary to the prediction of TOT and in accordance with that of POT: growth potential of the firm drives its need for external financing and debt seems to be the best source of funding. Sixth, trade credit correlates positively with the debt ratio as a complement to bank financing. It supports the prediction of TOT while rejecting that of POT. Seven, guarantees are a prerequisite to access funding; they reduce agency costs and encourage more creditors to enter into a funding relationship. The fact that firms offering guarantees are more indebted than others is in accordance with the prediction of TOT and rejects that of POT.

POT passes the test slightly better than TOT, albeit both theories fit some facts. In line with Harris and Raviv (1991) as well as Myers (2001), we share the conclusion of Frank and Goyal (2008) that no currently available theory determining the capital structure seems able to account simultaneously for all the stylised facts, with respect to SMEs.

Our study contains limitations inherent to the nature of book accounting data (Welch, 2002), the approximate measurement of some variables as well as heterogeneity of SMEs. Our balanced panel cannot display a representative picture of French SMEs, due to selection criteria. Eventually, the absence of a fixed-effects estimation is frustrating and we did not use a generalised method of moments. However, it sustains some conclusions of the studies devoted to the capital structure of SMEs in France, in relation to prior shorter periods and smaller samples. Thus, it contributes to the development of more robust stylised facts.

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Note
1. Unfortunately, ownership is not studied. DIANE database does not allow for the separation between independent SMEs from those belonging to a group. The latter expanded from 20% in 1997 up to 50% in 2006 and 52% in 2011 (KPMG, 2012; Kremp & Phillipon, 2008). This may be due to chain store outlets. As for SMEs that belong to a group and can access internal funds thereof, there is a potential underpinning for POT.

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