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Capital structure determinants: an empirical study of French companies in the wine industry

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Abstract

Purpose – The purpose of this paper is to explain the leverage of French wine companies (410 companies) in the wine industry during the period 2000-2004.

Design/methodology/approach – Different classical capital structure theories are reviewed (trade-off theory (TOT), pecking order theory (POT) and dynamic TOT) in order to formulate testable propositions concerning the determinants of debt levels of the French wine companies. A number of regression models (classical and panel techniques) are developed to test the static theory of trade-off against the POT.

Findings – The results suggest that POT seems to better explain leverage of French wine companies. Significant differences in debt ratio were found between cooperatives and other legal structures. Debt ratios are also different between sub-sectors (wholesalers, wine growers, wine makers, etc.).

Practical implications – Cost of capital is one of the pillars of competitive advantage (or disadvantage) of companies. With the objective to minimize the cost of capital, it seems very important to know the potential determinants of an optimal capital structure.

Originality/value – This is a first study of capital structure determinants in the French wine industry which contributes to the current debate between competitive capital structure theories.

Keywords Wines, Capital structure, Gearing, France

Paper type Research paper

Introduction

The access to financing and its cost is a fundamental dimension of international competition in the wine industry. From the supply side of financial resources, the cost of capital reduction is the principal financial lever of value creation by the companies. With regard to their use, the financing of new projects of investment is essential to ensure their long-term survival in a sector which is the subject of an accelerated globalization (innovation, rationalization, etc.). However, the financing of French wine companies meets important obstacles and suffers from many handicaps in comparison with their competitors of the New World. The financial structure of the companies is indeed a distinctive factor between the wines of Old and the New World (Saulpic and Tanguy, 2002). Relatively small family companies of the traditional producer countries face the multinationals of the New World which have access to the various financial resources offered by capital markets and banks. This easier access to the financial resources is a considerable source of competitive advantage for the wine companies of the New World.

In this context, the main objective of the paper is to explain the leverage of French companies in the wine industry. Few empirical studies have been done specifically on the agricultural sector and none (to the best of our knowledge) on the wine industry. So, it seems to us interesting to investigate if traditional explanations of capital structure apply to the wine industry companies and if there is specific determinants of capital structure in this industry. Moreover, empirical studies do not lead to a consensus with

International Journal of Wine Business Research
Vol. 20 No. 2, 2008
pp. 171-194

1751-1062
DOI 10.1108/17511060810883786

regard to the significant determinants of capital structure and there is no agreement on which theory is best supported by empirical data, so our study will feed the debate.

The paper is organized as follow. First section makes a short presentation of the different theories of capital structure and of the associated determinants of capital structure that will be used in the empirical study. Second section presents the sample and methods. Third section is devoted to the results. The final section concludes.

Theoretical discussion and empirical determinants

In this empirical paper, we will only make a brief review of the different theories of capital structure. The objective is to better explain the choice of the various empirical determinants of capital structure and theirs links to the different theories. Then, we will describe in more depth each empirical determinant that will be used in the empirical study.

Theories of capital structure

Since the seminal Modigliani and Miller (1958) paper showing that, subject to some restrictive conditions, the impact of financing on the value of the firm is irrelevant; the literature on capital structure has been expanded by many theoretical and empirical contributions.

Three principal theories aim to explain corporate leverage and its evolution. According to the traditional (or static) trade-off theory (TOT), firms select optimal capital structure by comparing the tax benefits of the debt, the costs of bankruptcy and the costs of agency of debt and equity, that is to say the disciplinary role of debt and the fact that debt suffers less from informational costs than outside equity (Modigliani and Miller, 1963; Stiglitz, 1972; Jensen and Meckling, 1976; Myers, 1977; Titman, 1984). So optimal leverage minimizes cost of capital and maximizes firm value.

In the so-called pecking order theory (POT) (Donaldson, 1961; Myers and Majluf, 1984; Myers, 1984), because of asymmetries of information between insiders and outsiders, the company will prefer to be financed first by internal resources, then by debt and finally by stockholders' equity. The debt ratio depends then on the degree of information asymmetry, on the capacity of self-financing and on the various constraints which the company meets in the access to the various sources of financing. So, in the pecking order world, observed leverage reflects the past profitability and investment opportunities of the companies.

The dynamic trade-off theory (DTOT) tries a compromise between TOT and POT (Fischer *et al.*, 1989; Leland, 1994, 1998[1]). Although, due to information asymmetries, market imperfections and transaction costs, many companies allow their leverage ratios to drift away from their targets for a time, when the distance becomes large enough managers take steps to move their companies back toward the targets. While the POT explains short-run deviation from the target, the traditional TOT holds in the long run. Following this approach, leverage must converge toward a target leverage ratio. That would no be the case following POT because managers make no effort to reverse changes in leverage.

Two additional theories also reject the notion of timely convergence toward a target leverage ratio. According to the theories of market timing and inertia, the capital structure is the result at a given time of an historical process. Supporters of the market timing approach (Jalilvand and Harris, 1984; Korajczyk *et al.*, 1991; Lucas and McDonald, 1990; Jung *et al.*, 1996; Loughran *et al.*, 1994; Baker and Wurgler, 2002) argue that companies will sell overpriced equity shares. Company's share prices will

fluctuate around their true value, and managers tend to issue shares when the market-to-book ratio is high. A small debt ratio must thus follow a long period of high market-to-book ratio. According to the managerial inertia approach (Welch, 2004) companies do not adjust their debt ratio to the fluctuations of the market value of their equity. High market-to-book ratio must thus be accompanied by small debt ratios.

Empirical determinants of capital structure

As in much empirical research, theoretical constructs must be proxied indirectly through the use of firm or environmental characteristics. The links between the theoretical determinants and the variables chosen in the empirical studies are complex. Their justification rests on the mobilization of additional theories and on purely empirical observations. So the selected empirical variables suffer from several weaknesses:

(1) Length of the causal chain which connects the variable chosen to the theoretical determinants and then with the debt ratio itself.

(2) Ambiguity of the variable influence on the capital structure. Indeed, the selected variable can have contradictory effects on the capital structure owing to the fact that several causal chains connect it to the debt ratio or that some purely empirical relations are not generally accepted. For example, according to a first causal chain, firms of big size have relatively less costs of bankruptcy what allows them higher debt ratios. According to another causal chain, information asymmetry is lower for larger firms requiring less debt financing.

In the following, we use classical capital structure determinants: size, asset structure, profitability, risk and growth. Most of these classical variables suffer of the weakness cited above. To mitigate these weaknesses, we take also a more direct route which consists in seeking the type of financing actually chosen by the companies (the so-called financial deficit approach). All the determinants are measured using book values because data come from financial statements only.

Size. There are several theoretical reasons why firm size should be related to capital structure. Smaller firms may find it relatively more costly to resolve informational asymmetries with lenders and financiers, which discourages the use of outside financing (Chung, 1993; Grinblatt and Titman, 1998) and should increase the preference of smaller firms for equity relative to debt (Rajan and Zingales, 1995). However, this problem may be mitigated with the use of short-term debt (Titman and Wessels, 1988). Relative bankruptcy costs and probability of bankruptcy (larger firms are more diversified and fail less often) are an inverse function of firm size (Warner, 1977; Ang *et al.*, 1982; Pettit and Singer, 1985; Titman and Wessels, 1988). A further reason for smaller firms to have lower leverage ratios is that smaller firms are more likely to be liquidated when they are in financial distress (Ozkan, 1996).

Asset structure. The degree to which firms' assets are tangible and generic should result in the firm having a greater liquidation value. By pledging the assets as collateral (Myers, 1977; Scott, 1977; Harris and Raviv, 1991) or arranging so that a fixed charge is directly placed to particular tangible assets of the firm, also reduces adverse selection and moral hazard costs (Long and Malitz, 1992). Bank financing will depend upon whether the lending can be secured by tangible assets (Storey, 1994; Berger and Udell, 1998). Tangible assets could also have a negative impact on financial leverage by augmenting risk through the increase of operating leverage (Hutchinson and Hunter, 1995).

Part of the intangible assets, such as reputation, becomes quasi-tangible and interpreted by debt holders as a guarantee (Balakrishnan and Fox, 1993).

Liquidity ratios may have a mixed impact on the capital structure decision. Companies with higher liquidity ratios might support a relatively higher debt ratio due to greater ability to meet short-term obligations (TOT). On the other hand, firms with greater liquidities may use them to finance their investments (POT). Therefore, the companies' liquidities should exert a negative impact on its leverage ratio (Ozkan, 2001). Moreover, the liquid assets can be used to show to which extend these assets can be manipulated by shareholders at the expense of bondholders (Prowse, 1991).

Profitability. There are conflicting theoretical predictions on the effects of profitability on leverage. Following POT, profitable firms, which have access to retained profits, can use these for firm financing rather than accessing outside sources. Jensen (1986) predicts a positive relationship between profitability and financial leverage if the market for corporate control is effective because debt reduces the free cash flow generated by profitability. From the TOT point of view, more profitable firms are exposed to lower risks of bankruptcy and have greater incentive to employ debt to exploit interest tax shields.

Risk. Since higher variability in earnings indicates that probability of bankruptcy increases, we can expect (TOT) that firms with higher income variability have lower leverage (Bradley *et al.*, 1984; Kester, 1986; Titman and Wessels, 1988). Firms that have high operating risk can lower the volatility of the net profit by reducing the level of debt. A negative relation between operating risk and leverage is also expected from a POT perspective: firms with high volatility of results try to accumulate cash during good years, to avoid under-investment issues in the future.

Growth. Following TOT, for companies with growth opportunities, the use of debt is limited as in the case of bankruptcy, the value of growth opportunities will be close to zero, growth opportunities are particular case of intangible assets (Myers, 1984; Williamson, 1988; Harris and Raviv, 1990). Firms with less growth prospects should use debt because it has a disciplinary role (Jensen, 1986; Stulz, 1990). Firms with growth opportunities may invest sub-optimally, and therefore creditors will be more reluctant to lend for long horizons. This problem can be solved by short-term financing (Titman and Wessels, 1988) or by convertible bonds (Jensen and Meckling, 1976; Smith and Warner, 1979).

Applying pecking order arguments, growing firms place a greater demand on the internally generated funds of the firm. Consequentially, firms with relatively high growth will tend to issue securities less subject to information asymmetries, i.e. short-term debt. This should lead to firms with relatively higher growth having more leverage.

Non-debt tax shield. Non-debt tax shield like tax deduction for depreciation and investment tax credits are substitutes for the tax benefit of debt financing (DeAngelo and Masulis, 1980). Therefore, the tax advantage of leverage decreases when other tax deduction increases.

Age. The longer a company has been servicing its loan, the more likely the business is viable and its owner trustworthy. In consequence, the duration of the relation between a company and the banking system reduces information asymmetries between companies and banks. Following POT, this reduction should facilitate the access to debt financing and have a positive effect on leverage ratio (Petersen and Rajan, 1994). On the other hand, young firms tend to be externally financed[2] while

older tend to accumulate retained earnings so age must be negatively related to leverage (Petersen and Rajan, 1994). So, theoretical effect of age on leverage is ambiguous. Empirical evidences (Petersen and Rajan, 1994, Michaelas *et al.*, 1999) are in favour of the second hypothesis.

Industry effect. Since asset risk, asset type, and requirement for external funds vary by industry we could expect average debt ratios to vary from industry to industry (Myers, 1984; Harris and Raviv, 1991). The sector characteristics (degree of concentration, entry and exit barriers, technological changes) and dynamics (Miao, 2005) have an influence on the debt ratio. Our paper is focused on the wine industry but we are interested by the presence of intra-industry effects. The fact that wine growing, wine making, wholesaling, champagne and spirits are in quite different activities and deal with different constraints and opportunities could explain difference in their debt ratio.

Sample, variables and methods

The sample is first presented then the various leverage ratio followed by the quantitative and qualitative capital determinants variables. The section ends with a description of the methodology.

Sample

All the data used in this study were gathered from the Plimsoll database on the period 2000-2003 (Plimsoll, 2005). The data comprised the annual financial statements of French wines and spirits companies. We have 419 companies with at least one year of complete data, for 410 of them this year is 2003. We have complete data for all the four years only for 303 companies.

Dependent variables

As in many studies in the field, we face the problem of choosing an appropriate leverage measure as the dependent variable. Following previous empirical works, we use five classical capital structure measures discussed in depth by Rajan and Zingales (1995). The broader one is the ratio:

$$\frac{\text{Total liabilities (Total assets} - \text{Book equity)}}{\text{Total assets}}$$

which is likely to overstate the financial leverage. However, for some firms (and wespecially in the wholesale sector), non-debt items are a very important part of the capital structure. This ratio is often used in the most recent studies (Baker and Wurgler, 2002; Fama and French, 2002; Kayhan and Titman, 2007). We also use the more traditional measure of leverage:

$$\frac{\text{Long-term debt} + \text{Short-term debt}}{\text{Total assets}}$$

and in order to shed some light over the difference between long- and short-term debt determinants we also consider the two following measures of leverage:

$$\frac{\text{Long-term debt}}{\text{Total assets}} \quad \frac{\text{Short-term debt}}{\text{Total assets}}$$

.

Finally, we compute the ratio:

$$\frac{\text{Long-term debt}}{\text{Long-term debt} + \text{Equity}}$$

which probably best represents the effects of past financial decision (Rajan and Zingales, 1995).

Quantitative independent variable

The different measures of capital structure used in our empirical study are presented in Table I with references to other empirical studies using them. Measures can be considered as "classical" and so less controversial when a lot of empirical studies use them. It will be also easiest to compare our results to previous studies using the same measures.

Qualitative independent variable

Dummy variables are defined in an attempt to identify reputational assets. The dummy used distinguishes between companies on the basis of whether they declare their market to be "local or regional", "national" and "international" (Hutchinson and Hunter, 1995).

Dummy variables are also used to take into account a potential sub-sector effect (Harris and Raviv, 1991; Michaelas *et al.*, 1999; Akhtar, 2005).

In an attempt to determine if legal structure and the associated differences in governance have an impact on leverage, we use a dummy variable to distinguish between cooperatives and other legal structures.

Methodology

As for methodology, we first have used the ordinary least square method and the stepwise technique because we have different proxies for the same determinant and we want to keep only the most significant independent variables. Stepwise regression is the most conservative method with respect to the criteria for retaining variables in the equation. Dependant variables are the 2003 leverages measures. Second, we use panel econometric techniques to take into account the time series dimension of our data. In this case, the significant dependant variables of the stepwise technique are used as dependent variables. Third, we use the financial deficit approach (Shyam-Sunder and Myers, 1999; Frank and Goyal, 2003; Baker and Wurgler, 2002) to further investigate the explanatory power of the POT.

Results

To profit from the largest sample as possible we conduct two different empirical studies, the first one with only the year 2003 (named "2003 sample") for which we have the largest number of companies (410) with complete data, the second one (named "2000-2003" sample) with all the companies with complete data for all the four years 2000-2003 (303 companies). So in the studies using the first sample we cannot compute the measures of risk and growth. Tables II and III present descriptive statistics of the various leverage ratios and their evolution for the two samples. All ratios are rather stable in time (see last column, F test and the associated probability). Evolutions are not always similar for the two samples. Long-term debt decreases relatively to equities and total liabilities relatively to assets. Short-term debt decreases during three years and then increases. Results are different for long-term debt and financial debt relatively to assets in the two samples: the ratios increase in the first sample but decrease in the

Table I.
Measures of capital structure determinants

Determinants	Measures used	Some references using the same measures
Size	Ln(Total sales) Ln(Total assets)	Homaifar *et al.* (1994), Rajan and Zingales (1995), Michaelas *et al.* (1999), Booth *et al.* (2001), Ozkan (2001), Sogorb-Mira (2002), Cassar and Holmes (2003), Panno (2003), Deesomsak *et al.* (2004), Akhtar (2005), Fattouh *et al.* (2005), Gaud *et al.* (2005), and Song (2005)
Asset structure (tangibility)	$\frac{\text{Fixed assets} + \text{Stock}^{a}}{\text{Total assets}}$	Titman and Wessels (1988) and Gaud *et al.* (2005)
Asset structure (liquidity)	$\frac{\text{Cash}}{\text{Total assets}}$	Panno (2003) and Akhtar (2005)
Asset structure (asset turnover)	$\frac{\text{Total sales}}{\text{Total assets}}$	O'Brien and Vanderheiden (1987) and Hutchinson and Hunter (1995)
Profitability	$\frac{\text{EBITDA}}{\text{Total assets}}$ $\frac{\text{EBIT}}{\text{Total assets}}$	Titman and Wessels (1988), Hutchinson and Hunter (1995), Rajan and Zingales (1995), Michaelas *et al.* (1999), Booth *et al.* (2001), Ozkan (2001), Sogorb-Mira (2002), Cassar and Holmes (2003), Deesomsak *et al.* (2004), Voulgaris *et al.* (2004), Fattouh *et al.* (2005), Gaud *et al.* (2005), and Song (2005)
Risk (volatility)	σ(EBITDA) – mean(EBITDA) $\frac{\sigma(\text{EBITDA})}{\text{Total assets}}$ σ: standard deviation	Bradley *et al.* (1984), Lee and Kwok (1988), Titman and Wessels (1988), Homaifar *et al.* (1994), Michaelas *et al.* (1999), Ghosh *et al.* (2000), Booth *et al.* (2001), Miguel and Pintado (2001), Cassar and Holmes (2003), Deesomsak *et al.* (2004), Gaud *et al.* (2005), and Song (2005)
Growth	Mean (growth of assets), mean (growth total sales)[b] (three years: 2000-2003)	Jensen *et al.* (1992), Mehran (1992), Michaeles *et al.* (1999), Ghosh *et al.* (2000), Cassar and Holmes (2003), Voulgaris *et al.* (2004), Akhtar (2005), Fattouh *et al.* (2005), and Song (2005)
Non-debt tax shield	$\frac{\text{Depreciation}^{c}}{\text{Total assets}}$	DeAngelo and Masulis (1980), Bradley *et al.* (1984), Titman and Wessels (1988), Barton *et al.* (1989), Homaifar *et al.* (1994), Ozkan (2001), Sogorb-Mira (2002), Deesomsak *et al.* (2004), Akhtar (2005), and Fattouh *et al.* (2005)
Age	2003-date of birth	Petersen and Rajan (1994) and Michaelas *et al.* (1999)

Notes: [a]Adding inventories to the tangible assets is motivated by the fact that inventories can be very important in the wine industry and debts are used partly to finance inventories. Moreover, in most case inventories maintain some value when firm is liquidated; [b]It was not possible to measure growth opportunities by the traditional market to book ratio because market data are not available for most of the firms of the sample small medium companies (SMEs) and the RD expenses are not significant for companies in the sample; [c]It should be noted that this may also proxy for other things than non-debt tax shields. For example, tangibility of assets or the fact that firms with higher depreciation ratio are also more likely to have fewer growth options in their investment opportunity sets

second. These very preliminary results are not in favour of TOT because they show that, in spite of a changing general economic environment (crisis of the French wine sector), debt ratios are stable. One possible reason is that companies in the sample are not publicly traded and thus undergo very high transaction cost on equity issue[3]. As in DTOT, target debt ratios are changing but transaction costs are so high that actual debt ratios do not converge to them.

Traditional quantitative determinants

For the simple ordinary least square (OLS) technique and 2003 leverage measures as dependant variables, our findings are the following. We find a negative and significant coefficient for profitability for the two samples and whatever the leverage measure used (see Appendix, Tables AI-AX). These results are consistent with strong empirical evidence from previous studies (Titman and Wessels, 1988; Hutchinson and Hunter, 1995; Michaelas *et al.*, 1999; Ghosh *et al.*, 2000; Booth *et al.*, 2001; Ozkan, 2001; Cassar and Holmes, 2003; Voulgaris *et al.*, 2004; Akhtar, 2005; Fattouh *et al.*, 2005; Gaud *et al.*, 2005; Song, 2005;) and support the POT.

Theoretical and empirical studies do not agree about the impact of cash on leverage (Panno, 2003; supports TOT but Akhtar, 2005; supports POT). The coefficient for cash is also negative and significant for the two samples but only for financial leverage (Tables AI-AIII and AVI-AVIII). This result is also consistent with POT.

Also consistent with POT is the positive significant relationship between past growth and leverage (Tables AVI-AX). We find no significant coefficient between past

Ratios	2000 Mean (SD)	2001 Mean (SD)	2002 Mean (SD)	2003 Mean (SD)	F (p)
$\left(\frac{\text{LTD}}{\text{LTD}+E}\right)$	0.3359	0.3305	0.3306	0.3277	0.062
	(0.2761)	(0.2733)	(0.2682)	(0.2631)	(0.980)
$\left(\frac{\text{LTD}}{\text{Total assets}}\right)$	0.1722	0.1742	0.1851	0.1898	0.806
	(0.1747)	(0.1795)	(0.1900)	(0.1930)	(0.491)
$\left(\frac{\text{LTD+STD}}{\text{Total assets}}\right)$	0.2364	0.2379	0.2405	0.2482	0.269
	(0.1944)	(0.1991)	(0.2009)	(0.2040)	(0.848)
$\left(\frac{\text{Total Liab.}}{\text{Total assets}}\right)$	0.6831	0.6801	0.6657	0.6520	1.709
	(0.2351)	(0.2058)	(0.2050)	(0.2077)	(0.163)
$\left(\frac{\text{STD}}{\text{Total assets}}\right)$	0.0642	0.0637	0.0554	0.0584	0.571
	(0.1087)	(0.1099)	(0.0969)	(0.1044)	(0.634)

Table II.
Descriptive statistics of dependent variables ("2003 sample")

Ratios	2000 Mean (SD)	2001 Mean (SD)	2002 Mean (SD)	2003 Mean (SD)	F (p)
$\left(\frac{\text{LTD}}{\text{LTD}+E}\right)$	0.3365	0.3206	0.3184	0.3061	0.682
	(0.2758)	(0.2688)	(0.2688)	(0.2614)	(0.563)
$\left(\frac{\text{LTD}}{\text{Total assets}}\right)$	0.1717	0.1670	0.1680	0.1638	0.102
	(0.1727)	(0.1725)	(0.1756)	(0.1728)	(0.959)
$\left(\frac{\text{LTD+STD}}{\text{Total assets}}\right)$	0.2362	0.2292	0.2283	0.2296	0.105
	(0.1928)	(0.1934)	(0.1920)	(0.1926)	(0.957)
$\left(\frac{\text{Total Liab.}}{\text{Total assets}}\right)$	0.6805	0.6773	0.6705	0.6557	0.807
	(0.2375)	(0.2033)	(0.2084)	(0.2127)	(0.490)
$\left(\frac{\text{STD}}{\text{Total assets}}\right)$	0.0644	0.0622	0.0603	0.0657	0.154
	(0.1090)	(0.1069)	(0.0999)	(0.1087)	(0.927)

Table III.
Descriptive statistics of dependent variables ("2000-2003 sample")

growth and short-term debt ratio in contrast with Voulgaris *et al.* (2004). Same empirical results are found by some empirical studies (Michaelas *et al.*, 1999; Ghosh *et al.*, 2000; Cassar and Holmes, 2003; Fattouh *et al.*, 2005) for low and medium levels of leverage. Non-significant relationships are reported by Chittenden *et al.* (1996), Jordan *et al.* (1998), and Song (2005).

Tangibility of assets has a positive and significant impact on financial leverage for the "2003 sample" but not for the "2000-2003" sample (Tables AII and AIII). Titman and Wessels (1988) and Gaud *et al.* (2005) obtain the same results. For Gaud *et al.* (2005), the impact is significant only for leverage measured in market values. Other studies (Rajan and Zingales, 1995, for all the countries in their sample; Michaelas *et al.*, 1999; Ghosh *et al.*, 2000; Booth *et al.*, 2001; Voulgaris *et al.*, 2004; Akhtar, 2005; for domestic companies but not for multinational companies) find a significant impact of tangibility measured by the more classical ratio (Fixed Assets/Total Assets). Some studies report a negative effect on short-term debt ratios (Chittenden *et al.*, 1996; Van der Wijst and Thurik, 1993).

A significant positive impact is also found for the short-term debt ratio (Tables AV and AX). Consistent with these findings asset turnover has a significant negative impact on financial leverage (Tables AI-AIII and AVI-AVIII). We find also a positive impact on total liabilities ratio (Table AIV and AIX). These results are compatible with POT (tangible assets are less subject to information asymmetry) and TOT (reduction of bankruptcy costs).

There is a significant negative relationship between non-debt tax shield and short-term debt ratio for the two samples (Tables AV and AX). But we find no clear result for the impact on other leverage ratios (no significant impact for the second sample, different sign for the first one, positive for the long-term debt ratio but negative for the total liabilities ratio). Companies in our sample seem to make an arbitrage only between short-term debt and non-debt tax shield. Non-significant relationships are reported by Chittenden *et al.* (1996), Jordan *et al.* (1998), and Song (2005). This result is in contrast with Jordan *et al.* (1998) for small firms; and Song (2005) who find a totally reversed scheme, non-debt tax shield has a positive effect on short-term debt ratio and negative on long-term debt ratio.

Finally, as in previous works (Petersen and Rajan, 1994; Michaelas *et al.*, 1999), we find a negative significant impact of the age of the company on total liabilities ratios (Tables AIV and AIX). Note that we do not find any significant impact of two traditional determinants: size and risk. The effect of size on leverage is controversial in empirical studies. In our work, this absence of significant impact can be due to the relative size homogeneity of our sample constituted of rather small or medium non-listed companies. For risk, the explanation is probably the weakness of our measure due to the fact we calculate standard deviation with only four years of data.

In short, and consistent with most of the empirical studies using comparable methodology and variables, we find relatively low empirical support for TOT and much stronger support for POT.

Panel least squares with cross-section fixed effect do not give perfectly coherent results with the previous ones. First, we find very little impact of dependant variables on leverage measures (Tables AVI-AX). Profitability and tangibility impacts are significant but not always negative (exceptions are in Table AVIII for profitability and in Table AVI for tangibility). The impact of cash is not significant except in Table AVIII (negative impact). As in our previous results, past growth has a positive impact on leverage (Tables AVI-AIX) and non-debt tax shield a significant negative impact on

short-term debt ratio (Table AX). These results, although not as clear as the previous ones, do not change our general conclusion.

Qualitative determinants

We use each model obtained by stepwise regressions for the quantitative dependant variables and add dummy variables to take into account non-metric variables. As in the previous paragraph, we first implement classical OLS (Tables AXI, AXII, AXIV and AXV) and then panel least squares (Tables AXIII and AXVI). In general, coefficient of panel least squares is of the same sign as classical OLS but more statistically significant.

Cooperatives have no significant difference in their total debt or total liabilities ratios, but their debt structure is different from the other companies in the sample: they have significant more long-term debt and less short-term debt (Table IV).

We find some evidences for a sector and sub-sector effect. Wholesalers tend to have more total liabilities but less financial long-term debt (Tables AXI-AXIII) and more short-term debt (Tables AXI-AXIII). This result can be explained by the fact that commercial activities necessitate fewer tangible assets. Following POT, the leverage of these companies should be lower and the part of short-term debt higher. Champagne companies have a significant higher long-term and total debt ratios (Tables AXI-AXIII) but less short-term debt and a lower total liabilities ratio. Spirits and brandies companies have a lower leverage whatever the measure used (Tables AXI-AXIII). It is just the contrary for wine makers (Tables AXI-AXIII). These results are difficult to interpret from a theoretical point of view and an in depth analysis of the impact of sector characteristics on leverage is out the scope of this paper. Spirits and Champagne companies are in activities with higher growth opportunities (Vinexpo, 2007) but different concentration ratios (Coelho and Rastoin, 2006; Declerck, 2005). Champagne concentration ratio is far lower than spirits[4] so competition intensity is higher. From our empirical results, we can thus conclude that leverage ratio increases with competitive intensity[5].

Finally companies with a "local or regional" market have a significant slightly greater long-term and short-term debt ratios (Tables AXIV-AXVI) and lower total liability ratio (Table AXVI). It is just the contrary for companies which declare to have a "national market" (Tables AXIV-AXVI). Finally, companies with a declared "international market" have higher financial debt ratios. This last result is in favour of the reputation capital hypothesis: companies with a higher reputation (higher intangible assets) have more collateral and so can be more indebted.

Financial deficit approach

For the pecking order and timing approach, the financial deficit, or equivalently, the amount of external capital that is raised, plays a central role (Shyam-Sunder and

Legal structure (% of sample)	Dependent variable	Difference	Significant	*t*	*p*
Cooperative (19.1%)	LTD/Total assets	0.059	Yes	2.523	0.012
	(LTD+STD)/Total assets	0.015	No		
	Total liab./Total assets	−0.015	No		
	STD/Total assets	−0.042	Yes	−3.103	0.002

Table IV.
Cooperatives ("2003 sample")

Note: Results on the "2000-2003 sample" are not significant due to the low number of cooperatives in this sample

Myers, 1999; Baker and Wurgler, 2002; Frank and Goyal, 2003). Financial deficit (FD) is defined (Frank and Goyal, 2003) as the sum of investments (I), dividends (D), and changes in working capital (ΔWC), net of net cash flow (CF). It can also be computed as the sum of net debt issues (Δd) and net equity issues (Δe):

$$\text{FD} = \Delta\text{WC} + I + D - \text{CF} \equiv \Delta e + \Delta d \quad (1)$$

When the financial deficit is positive, the company invests more than it internally generates funds. When it is negative, the company generates more cash than it invests. If POT is correct, since debt is likely to be the marginal source of financing, companies with high financial deficits are likely to increase their debt ratios.

Under POT the financial deficit is first financed by issuing debt. The empirical specification is thus given as:

$$\Delta D_{it} = a + b_{\text{POT}}\text{FD}_{it} + e_{it} \quad (2)$$

In equation (2), the pecking order hypothesis is that $a = 0$ and $b_{\text{POT}} = 1$.

Table V shows regression results for the pecking order model.

Our results using simple OLS method with cumulated net debt issue and cumulated financial deficit are between those of Shyam-Sunder and Myers (1999) ($b_{\text{POT}} = 0.75, R^2 = 0.68$) and Frank and Goyal (2003) ($b_{\text{POT}} = 0.28, R^2 = 0.27$) when they use similar method (OLS) and dependent variable (net debt issue). We make a distinction between financial deficit and positive financial deficit (Kayhan and Titman, 2007). Our results are slightly in favour of positive financial deficit. But when panel least squares with fixed effect is used a very low and not significant coefficient is obtained probably due to the very small number of periods in our sample (three periods).

Summary and conclusion

The paper investigates the significant determinant of capital structure of a sample of French companies in the wine industry. Our main results are:

- negative impact of profitability, cash, asset turn over, age and non-debt tax shield (on short-term debt only);

	Dependent variable: cumulative net debt issued (2000-2003) Independent variable: cumulative financial deficit (2000-2003) Method: ordinary least squares		Dependent variable: net debt issued Independent variable: financial deficit Method: panel least squares (fixed effect)
	Financial deficit $R^2 = 0.471$	Positive financial deficit $R^2 = 0.57$	Financial deficit $R^2 = 0.93$
b_{POT}	0.447	0.556	0.011
t	28.56	19.77	1.27
p	0.000	0.000	0.2042
Constant (a)	0.018	0.023	−1.12
t	6.291	3.717	−4.72
p	0.000	0.000	0.000

Note: All variables are scaled by book value of total assets

Table V.
Regression results for pecking order model

- positive impact of past growth and tangibility; and
- no significant impact of size and risk.

These results are more in favour of the POT of capital structure which is often the case for sample of small medium companies (SMEs). This result is also supported by the findings of the financial deficit approach.

We also find a "legal structure effect"; the debt structure of cooperatives is different from other companies, the presence of a "sector effect" and weak evidence for the positive impact of reputation on leverage.

We conclude that, concerning the determinants of capital structure, the French wine industry is very similar to other industries.

Notes

1. Fama an French (2005) although they find that firms issue equity too often to be consistent with POT, advocate in their conclusion that researchers should not regard the two theories as competing but as "stable mates, with each having elements of truth".
2. Following Lemmon and Zender (2002), for young firms, new issues of equity track the financial deficit fairly well.
3. I would like to thank the anonymous referee for clarifying this point.
4. Following Declerck (2005), Champagne concentration ratio is far below the 40 per cent threshold for a top-four-firm concentration ratio considered (Declerck and Sherrick, 1993) as a limit for perfect competition in the food industry.
5. This result can be seen as an illustration of the debate between those who defend the existence of a positive correlation between competitive intensity and leverage (Brander and Lewis, 1986, 1988; Maksimovic, 1988) while others reach the opposite (Poitevin, 1989; Bolton and Scharfstein, 1990; Dasgupta and Titman, 1998).

References

Akhtar, S. (2005), "The determinants of capital structure for Australian multinational and domestic corporations", *Australian Journal of Management*, Vol. 30 No. 2, pp. 321-41.

Ang, J.S., Chua, J.H. and McConnel, J.J. (1982), "The administrative costs of corporate bankruptcy: a note", *Journal of Finance*, Vol. 37, pp. 337-48.

Baker, M. and Wurgler, J. (2002), "Market timing and capital structure", *The Journal of Finance*, Vol. 57, pp. 1-32.

Balakrishnan, S. and Fox, I. (1993), "Asset specificity, firm heterogeneity and capital structure", *Strategic Management Journal*, Vol. 14, pp. 1-16.

Barton, S.L., Hill, N.C. and Sundaram, S. (1989), "An empirical test of stakeholder theory predictions of capital strucuture", *Financial Management*, Vol. 18 No. 1, pp. 36-44.

Berger, A.N. and Udell, G.F. (1988), "The economics of small business finance: the roles of private equity and debt markets in the financial growth cycle", *Journal of Banking and Finance*, Vol. 22, pp. 613-73.

Bolton, P. and Scharfstein, D. (1990), "A theory of predation based on agency problems in financial contracting", *American Economic Review*, Vol. 80, pp. 93-106.

Booth, L., Aivazian, V., Demirguc-Kunt, A. and Maksimovic, V. (2001), "Capital structure in developing countries", *The Journal of Finance*, Vol. 56, pp. 87-130.

Bradley, M., Jarell, G. and Kim, E.H. (1984), "On the existence of an optimal capital structure: theory and evidence", *The Journal of Finance*, Vol. 39, pp. 857-78.

Brander, J.A. and Lewis, T.R. (1986), "Oligopoly and financial structure: the limited liability effect", *American Economic Review*, Vol. 76, pp. 956-70.

Brander, J.A. and Lewis, T.R. (1988), "Bankruptcy costs and the theory of oligopoly", *Canadian Journal of Economics*, Vol. 21, pp. 221-43.

Cassar, G. and Holmes, S. (2003), "Capital structure and financing of SMEs: Australian evidence", *Accounting and Finance*, Vol. 43, pp. 123-47.

Chittenden, F., Hall, G. and Huchinson, P. (1996), "Small firm growth, access to capital markets and financial structure: review of issues and an empirical investigation", *Small Business Economics*, Vol. 8 No. 1, pp. 59-67.

Chung, K.H. (1993), "Asset characteristics and corporate debt policy: an empirical test", *Journal of Business Finance and Accounting*, Vol. 20, pp. 83-98.

Coelho, A. and Rastoin, J.-L. (2006), "Les stratégies de développement des grandes firmes mondiales du vin", *Progrès Agricole et Viticole*, Vol. 123 Nos. 2-3, pp. 34-41, 55-62.

Dasgupta, S. and Titman, S. (1998), "Pricing strategy and financial policy", *Review of Financial Studies*, Vol. 11, pp. 705-35.

DeAngelo, H. and Masulis, R.W. (1980), "Optimal capital structure under corporate and personal taxation", *Journal of Financial Economics*, Vol. 8, pp. 3-29.

Declerck, F. (2005), "Managing price cycles in the champagne industry", *Agribusiness*, Vol. 21 No. 4, pp. 531-44.

Declerck, F. and Sherrick, B. (1993), "Profit structure relationships in US food industries", *Economie et Gestion Agro-Alimentaire*, Vol. 26, pp. 12-17.

Deesomsak, R., Krishna, P. and Pescetto, G. (2004), "The determinants of capital structure: evidence from the Asia Pacific region", *Journal of Multinational Financial Management*, Vol. 14, pp. 387-405.

Donaldson, G. (1961), "Corporate debt capacity: a study of corporate debt policy and the determinants of corporate debt capacity", working paper, Division of Research, Harvard Business School, Harvard University, Cambridge, MA.

Fama, E. and French, K.R. (2002), "Testing trade-off and pecking order predictions about dividends and debt", *The Review of Financial Studies*, Vol. 15, pp. 1-33.

Fama, E. and French, K.R. (2005), "Financing decisions: who issues stock?", *Journal of Financial Economics*, Vol. 76, pp. 549-82.

Fattouh, B., Scaramozzino, P. and Harris, L. (2005), "Capital structure in South Korea: a quantile regression approach", *Journal of Development Economics*, Vol. 76, pp. 231-50.

Fischer, E.O., Heinkel, R. and Zechner, J. (1989), "Dynamic capital structure choice: theory and tests", *Journal of Finance*, Vol. 44, pp. 19-40.

Frank, M.Z. and Goyal, V.K. (2003), "Testing the pecking order theory of capital structure", *Journal of Financial Economics*, Vol. 67, pp. 217-48.

Gaud, P., Jani, E., Hoesli, M. and Bender, A. (2005), "The capital structure of Swiss companies: an empirical analysis using dynamic panel data", *European Financial Management*, Vol. 11 No. 1, pp. 51-69.

Ghosh, A., Cai, F. and Li, W. (2000), "The determinants of capital structure", *American Business Review*, Vol. 29 No. 2, June, pp. 129-32.

Grinblatt, M. and Titman, S. (1998), *Financial Markets and Corporate Strategy*, international edition, McGraw-Hill, Boston, MA.

Harris, M. and Raviv, A. (1990), "Capital structure and the informational role of debt", *The Journal of Finance*, Vol. 45 No. 2, pp. 321-49.

Harris, M. and Raviv, A. (1991), "The theory of capital structure", *Journal of Finance*, Vol. 49, pp. 297-355.

Homaifar, G., Zietz, J. and Benkato, O. (1994), "An empirical model of capital structure: some new evidence", *Journal of Business Finance & Accounting*, Vol. 21 No. 1, pp. 1-14.

Hutchinson, R.W. and Hunter, R.L. (1995), "Determinant of capital structure in the retailing sector in the UK", *The International Review of Retail, Distribution and Consumer Research*, Vol. 5 No. 1, pp. 63-78.

Jalilvand, A. and Harris, R. (1984), "Corporate behavior in adjusting to capital structure and dividend targets: an econometrics study", *The Journal of Finance*, Vol. 39 No. 2, pp. 127-46.

Jensen, G.R., Donald, P.S. and Thomas, S.Z. (1992), "Simultaneous determination of insider ownership, debt, and dividend policies", *Journal of Financial and Quantitative Analysis*, Vol. 27 No. 2, pp. 247-64.

Jensen, M. (1986), "Agency costs of free cash flow, corporate finance and takeovers", *American Economic Review*, Vol. 76, pp. 323-9.

Jensen, M. and Meckling, W. (1976), "Theory of the firm: managerial behaviour, agency costs and capital structure", *Journal of Financial Economics*, Vol. 3, pp. 305-60.

Jordan, J., Lowe, J. and Taylor, P. (1998), "Strategy and financial policy in UK small firms", *Journal of Business Finance and Accounting*, Vol. 25 No. 1, pp. 1-27.

Jung, K., Kim, Y. and Stulz, R. (1996), "Timing, investment opportunities, managerial discretion, and the security issue decision", *Journal of Financial Economics*, Vol. 42, pp. 159-85.

Kayhan, A. and Titman, S. (2007), "Firms' history and their capital structures", *Journal of Financial Economics*, Vol. 83, pp. 1-32.

Kester, W.C. (1986), "Capital and ownership structure: a comparison of US and Japanese manufacturing corporations", *Financial Management*, Vol. 15, Spring, pp. 5-16.

Korajczyk, R., Lucas, D. and McDonald, R. (1991), "The effects of information releases on the pricing and timing of equities issues", *Review of Financial Studies*, Vol. 4, pp. 685-708.

Lee, K. and Kwok, C.Y. (1988), "Multinational corporations vs domestic corporations: international environmental factors and determinants of capital structure", *Journal of International Business Studies*, Vol. 19, pp. 195-217.

Leland, H.E. (1994), "Corporate debt value, bond covenants and optimal capital structure", *The Journal of Finance*, Vol. 49, pp. 1213-52.

Leland, H.E. (1998), "Agency costs, risk management and capital structure", *The Journal of Finance*, Vol. 53, pp. 1213-43.

Lemmon, M.L. and Zender, J.F. (2002), "Debt capacity and tests of capital structure theories", unpublished working paper, available at: www.ssrn.com

Long, M. and Malitz, I. (1992), "The investment-financing nexus: some empirical evidence", in Stern, J. and Chew, D. (Eds), *The Revolution in Corporate Finance*, Blackwell, Oxford, pp. 156-62.

Loughran, T., Ritter, J. and Rydqvist, K. (1994), "Initial public offerings: international insights", *Pacific Basin Finance Journal*, Vol. 2, pp. 165-99.

Lucas, D. and McDonald, R. (1990), "Equity issues and stock price dynamics", *The Journal of Finance*, Vol. 45, pp. 1019-44.

Maksimovic, V. (1988), "Capital structure in repeated oligopolies", *Rand Journal of Economics*, Vol. 19, pp. 389-407.

Mehran, H. (1992), "Executive incentive plans, corporate control and capital structure", *Journal of Financial and Quantitative Analysis*, Vol. 27 No. 4, pp. 539-60.

Miao, J. (2005), "Optimal capital structure and industry dynamics", *The Journal of Finance*, Vol. 60 No. 6, pp. 2621-59.

Michaelas, N., Chittenden, F. and Poutziouris, F. (1999), "Financial policy and capital structure choice in UK SMEs: empirical evidence from company panel data", *Small Business Economics*, Vol. 12, pp. 113-30.

Miguel, A. and Pintado, J. (2001), "Determinants of capital structure: new evidence from Spanish panel data", *Journal of Corporate Finance*, Vol. 7, pp. 77-99.

Modigliani, F. and Miller, M.H. (1958), "The cost of capital, corporate finance, and the theory of investment", *The American Economic Review*, Vol. 48 No. 2, pp. 261-97.

Modigliani, F. and Miller, M.H. (1963), "Corporate income taxes and the cost of capital: a correction", *The American Economic Review*, Vol. 53 No. 2, pp. 433-43.

Myers, S.C. (1977), "Determinants of corporate borrowing", *Journal of Financial Economics*, Vol. 5, pp. 147-75.

Myers, S.C. (1984), "The capital structure puzzle", *The Journal of Finance*, Vol. 39 No. 3, pp. 575-92.

Myers, S.C. and Majluf, N.S. (1984), "Corporate financing and investment decisions when firms have information that investors do not have", *Journal of Financial Economics*, Vol. 13, pp. 187-221.

O'Brien, T. and Vanderheiden, P. (1987), "Empirical measurement of operating leverage for growing firms", *Financial Management*, Vol. 16 No. 2, Summer, pp. 45-53.

Ozkan, A. (1996), "Corporate bankruptcies, liquidation costs and the role of banks", *The Manchester School*, Vol. 64, pp. 104-19.

Ozkan, A. (2001), "Determinants of capital structure and adjustment to long run target: evidence from UK company panel data", *The Journal of Business Finance & Accounting*, Vol. 28 Nos. 1-2, pp. 175-98.

Panno, A. (2003), "An empirical investigation on the determinants of capital structure: the UK and Italian experience", *Applied Financial Economics*, Vol. 13, pp. 97-112.

Petersen, M.A. and Rajan, R.G. (1994), "The benefits of lending relationships: evidence from small business data", *The Journal of Finance*, Vol. 49 No. 1, pp. 3-37.

Pettit, R. and Singer, R. (1985), "Small business finance: a research agenda", *Financial Management*, Vol. 14 No. 3, Autumn, pp. 47-60.

Plimsoll (2005), *Wines & Spirits Wholesalers*, Plimsoll Publishing Limited, Stockton-on-Tees.

Poitevin, M. (1989), "Financial signalling and the deep pocket argument", *Rand Journal of Economics*, Vol. 20, pp. 26-40.

Prowse, S.D. (1991), "Institutional investment patterns and corporate financial behaviour in the US and Japan", *Journal of Financial Economics*, Vol. 27, pp. 43-66.

Rajan, R.G. and Zingales, L. (1995), "What do we know about capital structure? Some evidence from international data", *The Journal of Finance*, Vol. 50 No. 5, pp. 1421-60.

Saulpic, O. and Tanguy, H. (2002), "Influence de la structure financière sur les choix stratégiques: étude de cas dans l'industrie du vin", *Cahier 2002-05*, INRA-LORIA.

Scott, J.H. (1977), "Bankruptcy, secured debt, and optimal capital structure", *The Journal of Finance*, Vol. 32, pp. 1-19.

Shyam-Sunder, L. and Myers, S.C. (1999), "Testing static trade-off against pecking order models of capital structure", *Journal of Financial Economics*, Vol. 51, pp. 219-44.

Smith, C.W. and Warner, J.B. (1979), "On financial contracting: an analysis of bond covenants", *Journal of Financial Economics*, Vol. 7, pp. 117-36.

Sogorb-Mira, F. (2002), "On capital structure in the small and medium enterprises: the Spanish case", working paper, Centre Européen Jean Monnet de l'Université de San Pablo, Madrid.

Song, H.-S. (2005), "Capital structure determinants. an empirical study of Swedish companies", electronic working paper series, CESIS, January, p. 25.

Stiglitz, J. (1972), "Some aspects of the pure theory of corporate finance: bankruptcies and take-overs", *Bell Journal of Economics and Management Science*, Vol. 3, pp. 458-82.

Storey, D.J. (1994), "The role of legal status in influencing bank financing and new firm growth", *Applied Economics*, Vol. 26, pp. 129-36.

Stulz, R. (1990), "Managerial discretion and optimal financing policies", *Journal of Financial Economics*, Vol. 26, pp. 3-27.

Titman, S. (1984), "The effect of capital structure on the firm's liquidation decision", *Journal of Financial Economics*, Vol. 13, pp. 137-52.

Titman, S. and Wessels, R. (1988), "The determinants of capital structure choice", *The Journal of Finance*, Vol. 43, pp. 1-19.

Van der Wijst, N. and Thurik, R. (1993), "Determinants of small firm debt ratios: an analysis of retail panel data", *Small Business Economics*, Vol. 5, pp. 55-65.

Vinexpo (2007), "La conjoncture mondiale du vin et ses perspectives à l'horizon 2010", *Vinexpo, Bordeaux, 17-21 June*, pp. 1-10.

Voulgaris, F., Asteriou, D. and Agiomirgianakis, G. (2004), "Size and determinants of capital strucuture in the Greek manufacturing sector", *International Review of Applied Economics*, Vol. 18 No. 2, pp. 247-62.

Warner, J.B. (1977), "Bankruptcy costs: some evidence", *The Journal of Finance*, Vol. 32, pp. 337-47.

Welch, I. (2004), "Capital structure and stock returns", *Journal of Political Economy*, Vol. 112, pp. 106-31.

Williamson, O. (1988), "Corporate finance and corporate governance", *The Journal of Finance*, Vol. 43, pp. 567-91.

Further reading

Barclay, M.J. and Smith, C.W. (1995), "The maturity structure of corporate debt", *The Journal of Finance*, Vol. 50, pp. 609-32.

Krishnaswami, S., Spindt, P.A. and Subramaniam, V. (1999), "Information asymmetry, monitoring and the placement structure of corporate debt", *Journal of Financial Economics*, Vol. 51, pp. 407-34.

Marsh, P. (1982), "The choice between debt and equity: an empirical study", *The Journal of Finance*, Vol. 37, pp. 121-44.

Appendix 1. Regression results on the "2003 sample"

Dependent variable: $\left(\frac{\text{LTD}}{\text{LTD}+E}\right)_{2003}$

Number of observations: 410
Method: stepwise regression

Variables	Coefficient	t	Signification	VIF[a]
Profitability	−0.865	−4.967	0.000	1.123
Cash	−0.304	−3.489	0.001	1.123
Asset turnover	−0.037	−3.056	0.002	1
Constant	0.482	18.926	0.000	
R^2: 0.137				
Adjusted R^2: 0.131				

Notes: [a]VIF: variance inflation factor, the higher the VIF, the greater the collinearity of the variable with other predictor variables. In Appendix 5, Tables AXVII and AXVIII, one can verify that correlations are low between independent variables except for the two measures of size

Table AI.
Regression results (2003 only)

Dependent variable: $\left(\frac{\text{LTD}}{\text{Total assets}}\right)_{2003}$

Number of observations: 410
Method: stepwise regression

Variables	Coefficient	t	Signification	VIF
Profitability	−0.461	−3.732	0.000	1.125
Cash	−0.159	−2.129	0.034	1.643
Tangibility	0.089	1.650	0.100	1.81
Asset turnover	−0.049	−5.068	0.000	1.301
Non-debt tax shield	1.21	2.458	0.014	1.008
Constant	0.241	5.312	0.000	
R^2: 0.191				
Adjusted R^2: 0.181				

Table AII.
Regression results (2003 only)

Dependent variable: $\left(\frac{\text{LTD}+\text{STD}}{\text{Total assets}}\right)_{2003}$

Number of observations: 410
Method: stepwise regression

Variables	Coefficient	t	Signification	VIF
Profitability	−0.615	−4.784	0.000	1.124
Cash	−0.178	−2.292	0.022	1.643
Tangibility	0.135	2.407	0.017	1.808
Asset turnover	−0.047	−4.667	0.000	1.294
Constant	0.312	6.736	0.000	
R^2: 0.219				
Adjusted R^2: 0.211				

Table AIII.
Regression results (2003 only)

Table AIV.
Regression results
(2003 only)

Dependent variable: $\left(\frac{\text{Total liab.}}{\text{Total assets}}\right)_{2003}$				
Number of observations: 410 Method: stepwise regression				
Variables	Coefficient	t	Signification	VIF
Profitability	−0.978	−4.433	0.000	1.002
Asset turnover	0.059	6.447	0.000	1.029
Age	−0.001	−3.058	0.002	1.032
Non-debt tax shield	−1.283	−2.459	0.014	1.014
Constant	0.692	29.614	0.000	
R^2: 0.233				
Adjusted R^2: 0.225				

Table AV.
Regression results
(2003 only)

Dependent variable: $\left(\frac{\text{STD}}{\text{Total assets}}\right)_{2003}$				
Number of observations: 410 Method: stepwise regression				
Variables	Coefficient	t	Signification	VIF
Profitability	−0.164	−2.343	0.020	1.025
Tangibility	0.048	2.001	0.046	1.024
Non-debt tax shield	−0.907	−3.118	0.002	1.001
Constant	0.064	4.115	0.000	
R^2: 0.047				
Adjusted R^2: 0.04				

Appendix 2. Regression results on the "2000-2003 sample"

Table AVI.
Regression results:
ordinary least square
and panel least square

Dependent variable: $\left(\frac{\text{LTD}}{\text{LTD}+E}\right)_{2003}$					$\left(\frac{\text{LTD}}{\text{LTD}+E}\right)$	
Number of observations: 303 Method: stepwise regression					No. of cross-sections: 303 Method: panel least square, cross-section fixed effect	
Variables	Coefficient	t	p	VIF	Coefficient	p
Profitability	−0.836	5.033	0.000	1.171	−0.000446	0.0000
Cash	−0.351	−3.690	0.000	1.048	−0.0296	0.6671
Asset turnover	−0.045	−3.123	0.002	1.009	0.0001	0.0000
Growth in sale	0.060	2.798	0.005	1.130	0.00572	0.0564
Constant	0.493	15.508	0.000		0.3046	0.0000
R^2: 0.166					R^2: 0.898	
Adjusted R^2: 0.155					Adjusted R^2: 0.846	

Dependent variable: $\left(\frac{\text{LTD}}{\text{Total assets}}\right)_{2003}$					$\left(\frac{\text{LTD}}{\text{Total assets}}\right)$	
Number of observations: 303 Method: stepwise regression					No. of cross-sections: 303 Method: panel least square, cross-section fixed effect	
Variables	Coefficient	t	p	VIF	Coefficient	p
Profitability	−0.407	−3.808	0.000	1.171	0.00005	0.0000
Cash	−0.236	−3.855	0.000	1.048	0.0043	0.8932
Asset turnover	−0.056	−6.078	0.000	1.009	−0.000006	0.0000
Growth in sale	0.032	2.348	0.020	1.130	0.0033	0.0027
Constant	0.317	15.469	0.000		0.1651	0.0000
R^2: 0.202					R^2: 0.8905	
Adjusted R^2: 0.191					Adjusted R^2: 0.8348	

Table AVII.
Regression results: ordinary least square and panel least square

Dependent variable: $\left(\frac{\text{LTD+STD}}{\text{Total assets}}\right)_{2003}$					$\left(\frac{\text{LTD+STD}}{\text{Total assets}}\right)$	
Number of observations: 303 Method: stepwise regression					No. of cross-sections: 303 Method: panel least square, cross-section fixed effect	
Variables	Coefficient	t	p	VIF	Coefficient	p
Profitability	−0.676	−5.330	0.000	1.422	0.1049	0.1011
Cash	−0.288	−4.330	0.000	1.066	−0.1123	0.0610
Asset turnover	−0.067	−6.721	0.000	1.009	−0.01	0.1010
Growth in assets	0.022	2.390	0.017	1.377	0.0008	0.1012
Constant	0.429	19.436	0.000		1.863	0.0609
R^2: 0.262					R^2: 0.9207	
Adjusted R^2: 0.252					Adjusted R^2: 0.8804	

Table AVIII.
Regression results: ordinary least square and panel least square

Dependent variable: $\left(\frac{\text{Total liab.}}{\text{Total assets}}\right)_{2003}$					$\left(\frac{\text{Total liab.}}{\text{Total assets}}\right)$	
Number of observations: 303 Method: stepwise regression					No. of cross-sections: 303 Method: panel least square, cross-section fixed effect	
Variables	Coefficient	t	p	VIF	Coefficient	p
Profitability	−0.998	−8.079	0.000	1.136	−0.000316	0.0000
Asset turnover	0.07	5.666	0.000	1.309	0.00007	0.0000
Tangibility	0.114	2.135	0.034	1.296	0.0213	0.1457
Age	−0.001	−2.933	0.004	1.043		
Growth in sale	0.057	3.507	0.001	1.133	0.0057	0.05479
Constant	0.602	13.814	0.000		0.6452	0.000
R^2: 0.290					R^2: 0.9628	
Adjusted R^2: 0.278					Adjusted R^2: 0.9439	

Table AIX.
Regression results: ordinary least square and panel least square

Table AX.
Regression results: ordinary least square and panel least square

Dependent variable: $\left(\frac{\text{STD}}{\text{Total assets}}\right)_{2003}$					$\left(\frac{\text{STD}}{\text{Total assets}}\right)$	
Number of observations: 303 Method: stepwise regression					No. of cross-sections: 303 Method: panel least square, cross-section fixed effect	
Variables	Coefficient	t	p	VIF	Coefficient	p
Profitability	−0.191	−2.809	0.005	1.006	−0.000004	0.0452
Tangibility	0.065	2.352	0.019	1.007	0.0228	0.2715
Non-debt tax shield	−0.72	−2.035	0.043	1.002	−0.3658	0.2802
Constant	0.063	3.588	0.000		0.0591	0.0000
R^2: 0.06					R^2: 0.7344	
Adjusted R^2: 0.051					Adjusted R^2: 0.6447	

Appendix 3. Sector effects: regression results

Industry sub-sectors (% of sample[a])	Dependent variable 2003	Difference	Significant	t	p
Wholesale of drinks (52.3%)	LTD/Total assets	0	No		
	(LTD + STD)/Total assets	0	No		
		0.054	Yes	2.715	0.007
	Total liab./Total assets	0.028	Yes	2.599	0.01
	STD/Total assets				
Champagnization (14.3%)	LTD/Total assets	0.071	Yes	2.631	0.009
	(LTD + STD)/Total assets	0.082	Yes	2.917	0.004
		0.008	No		
	Total liab./Total assets	−0.024	No		
	STD/Total assets				
Wine making (16%)	LTD/Total assets	0.05	Yes	1.978	0.049
	(LTD + STD)/Total assets	0.032	No		
		0.025	No		
	Total liab./Total assets	−0.017	No		
	STD/Total assets				
Wine growing (3.8%)	LTD/Total assets	−0.018	No		
	(LTD + STD)/Total assets	−0.057	No		
		−0.073	No		
	Total liab./Total assets	−0.039	No		
	STD/Total assets				
Spirits and brandies (9.8%)	LTD/Total assets				
	(LTD + STD)/Total assets	−0.054	Yes	−	0.067
		−0.058	Yes	1.836	0.058
	Total liab./Total assets	−11.4	Yes	−1.9	0
	STD/Total assets	−0.017	No	− 3.685	

Table AXI.
Sector effect "2003 sample" (Method: OLS)

Note: [a]3.8 per cent are missing corresponding to other sectors

Industry sub-sector (% of sample[a])	Dependent variable 2003	Difference	Significant	t	p
Wholesale of drinks (62.9%)	LTD/Total assets	0	No		
	(LTD + STD)/Total assets	0.017	No		
	Total liab./Total assets	0.054	Yes	2.357	0.019
	STD/Total assets	0.016	No		
Champagnization (11.4%)	LTD/Total assets	0.091	Yes	3.041	0.003
	(LTD + STD)/Total assets	0.08	Yes	2.471	0.014
	Total liab./Total assets	0.005	No		
	STD/Total assets	−0.034	No	− 1.632	0.104
Wine making (5.5%)	LTD/Total assets	0.006	No		
	(LTD + STD)/Total assets	0.037	No		
	Total liab./Total assets	0.064	No		
	STD/Total assets	0.034	No		
Spirits and brandies (10.7%)	LTD/Total assets	−0.033	No		
	(LTD + STD)/Total assets	−0.057	Yes	− 1.808	0.072 0.016
		−0.082	Yes		

Table AXII.
Sector effect "2000-2003 sample" (Method: OLS)

Industry sub-sector (% of sample[a])	Dependent variable	Difference	Significant	t	p
Wholesale of drinks (62.9%)	LTD/Total assets	−0.0392	Yes	−12.28	0.0000
	(LTD + STD)/Total assets	−0.0286	Yes	−5.63	0.0000
	Total liab./Total assets	11.18	Yes	335.89	0.0000
	STD/Total assets	0.02	Yes	3.44	0.0006
Champagnization (11.4%)	LTD/Total assets	0.1427	Yes	51.11	0.0000
	(LTD + STD)/Total assets	0.13	Yes	36.68	0.0000
	Total liab./Total assets	−0.0282	Yes	−13.76	0.0000
	STD/Total assets	−0.0374	Yes	−2.76	0.0059
Wine making (5.5%)	LTD/Total assets	0.0232	Yes	2.15	0.0318
	(LTD + STD)/Total assets	0.0559	Yes	4.85	0.0000
	Total liab./Total assets	0.0607	Yes	14.75	0.0000
	STD/Total assets	0.0422	Yes	17.25	0.0000
Spirits and brandies (10.7%)	LTD/Total assets	−0.0152	Yes	−2.86	0.0043
	(LTD + STD)/Total assets	−0.0374	Yes	−6.87	0.0000
	Total liab./Total assets	−0.1444	Yes	− 102.53 −4.13	0.0000 0.0000
	STD/Total assets	−0.196	Yes		

Note: [a]3.8 per cent are missing corresponding to other sector

Table AXIII.
Sector effect "2000-2003 sample" (Method: panel least squares)

Appendix 4. Reputational effects: regression results

Market (% of sample)	Dependent variable 2003	Difference	Significant	*t*	*p*
Local or regional (21.2%)	LTD/Total assets	0.048	Yes	2.137	0.033
	(LTD + STD)/Total assets	0.052	Yes	2.326	0.02
	Total liab./Total assets	−0.016	No		
	STD/Total assets	0.000	No		
National (32.2%)	LTD/Total assets	−0.018	No		
	(LTD + STD)/Total assets	−0.031	No		
	Total liab./Total assets	0.004	No		
	STD/Total assets	−0.008	No		
International (46.5%)	LTD/Total assets	−0.016	No		
	(LTD + STD)/Total assets	−0.009	No		
	Total liab./Total assets	0.008	No		
	STD/Total assets	0.008	No		

Table AXIV.
Reputational effect "2003 sample" (Method: OLS)

Market (% of sample)	Dependent variable 2003	Difference	Significant	*t*	*p*
Local or regional (16%)	LTD/Total assets	0.043	Yes	1.689	0.092
	(LTD + STD)/Total assets	0.052	Yes	1.928	0.055
	Total liab./Total assets	−0.026	No		
	STD/Total assets	0.016	No		
National (32.6%)	LTD/Total assets	−0.03	No		
	(LTD + STD)/Total assets	−0.043	Yes	–	0.042
	Total liab./Total assets	−0.012	No	2.043	
	STD/Total assets	−0.011	No		
International (51.5%)	LTD/Total assets	0.004	No		
	(LTD + STD)/Total assets	0.011	No		
	Total liab./Total assets	0.028	No		
	STD/Total assets	0.003	No		

Table AXV.
Reputational effect "2000-2003 sample" (Method: OLS)

Market (% of sample)	Dependent variable	Difference	Significant	*t*	*p*
Local or regional (16%)	LTD/Total assets	0.0136	Yes	6.26	0.0000
	(LTD + STD)/Total assets	0.0132	Yes	2.63	0.0085
	Total liab./Total assets	−0.0144	Yes	−3.04	0.0024
	STD/Total assets	0.0053	No		
National (32.6%)	LTD/Total assets	−0.0491	Yes	–	0.0000
	(LTD + STD)/Total assets	−0.0615	Yes	11.42	0.0000
	Total liab./Total assets	0.0152	Yes	–	0.0000
	STD/Total assets	−0.0030	No	14.26	
				5.55	
International (51.5%)	LTD/Total assets	0.0362	Yes	7.30	0.0000
	(LTD + STD)/Total assets	0.0474	Yes	9.49	0.0000
	Total liab./Total assets	−0.0068	Yes	−3.84	0.0001
	STD/Total assets	0.0001	No		

Table AXVI.
Reputational effect "2000-2003 sample" (Method: panel least squares)

Appendix 5. Correlation between dependent variables

	$L(s)$	$L(a)$	Risk1	Risk2	NDTS	$G(a)$	$G(s)$	Prof	Cash	Tang	ATO	Age
$L(s)$	1	0.798*	−0.495*	−0.102*	−0.132*	0.025	0.047	−0.030	−0.026	−0.050	0.014	0.039
$L(a)$		1	−0.494*	−0.149*	−0.175*	0.058	0.026	−0.058	−0.049	0.239*	−0.521*	0.153*
Risk1			1	0.059	0.068	0.019	0.037	−0.145*	−0.077	−0.022	0.133*	−0.033
Risk2				1	0.022	0.041	0.018	0.34*	0.147*	−0.100**	−0.122**	−0.005
NDTS					1	−0.011	0.013	0.227*	−0.055	0.030	0.059	0.087
$G(a)$						1	0.572*	−0.023	0.049	−0.031	−0.046	−0.065
$G(s)$							1	−0.009	−0.070	0.001	0.146*	0.082
Prof								1	0.236*	−0.096	0.043	−0.008
Cash									1	−0.532*	0.021	−0.074
Tang										1	−0.418	0.170*
ATO											1	−0.154*
Age												1

Notes: *sig. bilateral < 1 per cent; **sig. bilateral < 5 per cent

Table AXVII. Correlation between independent variables (2003 sample)

	$L(s)$	$L(a)$	Risk1	Risk2	NDTS	$G(a)$	$G(s)$	Prof	Cash	Tang	ATO	Age
$L(s)$	1	0.804*	−0.489*	−0.199*	−0.063	0.029	0.026	−0.038	−0.006	−0.083	−0.046	0.107
$L(a)$		1	−0.493*	−0.201*	−0.163*	0.069	0.060	−0.065	−0.033	0.211*	−0.579*	0.199*
Risk1			1	0.090	0.051	0.020	0.033	−0.151*	−0.063	−0.021	0.155*	−0.058
Risk2				1	0.115*	0.039	0.043	0.339	0.173*	−0.080	−0.098	0.018
NDTS					1	−0.002	−0.033	0.288*	−0.060	−0.037	0.100	−0.009
$G(a)$						1	0.648*	−0.027	−0.057	−0.023	−0.062	−0.072
$G(s)$							1	−0.001	−0.046	−0.031	−0.037	0.118**
Prof								1	0.173*	−0.053	0.049	0.007
Cash									1	−0.525*	0.046	0.052
Tang										1	−0.467	0.123
ATO											1	−0.160*
Age												1

Table AXVIII.
Correlation between independent variables (2003 sample)

Notes: *sig. bilateral < 1 per cent; **sig. bilateral < 5 %. $L(s)$ = Ln(size), $L(a)$ = Ln(assets), risk1 = standard deviation of profit–mean of profit, risk2 = standard deviation of profit/assets, NDTS = amortization/assets, $G(a)$ = assets growth, $G(s)$ = sales growth, prof = benefit/assets, cash = cash/assets, tang = (fixed assets+stock)/assets, ATO = Sales/assets, age = 2003 − date of birth

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