
Capital structure choice: the influence of sentiment in France

Barry R. Oliver*

School of Finance and Applied Statistics,
Australian National University,
Canberra ACT 0200, Australia
E-mail: Barry.Oliver@anu.edu.au
*Corresponding author

Salma Mefteh

ESSCA Business School, Pôle Finance,
1 rue Lakanal, BP40348,
Angers, France,
E-mail: Salma.MEFTEH@essca.fr

Abstract: The overconfidence bias in relation to investment decisions is well documented in psychology and behavioural finance literature. Less known is that an overconfidence bias also relates to financing decisions. Managers that are overconfident of their firm's future are likely to prefer debt to equity financing. This may lead to increased probability of bankruptcy and higher costs of capital. Empirically it is difficult to measure overconfidence. In this paper we decompose a publicly available measure of industry sentiment into two components: a component common with investor confidence and a component more aligned with manager industry confidence. We find in a sample of French firms that industry confidence and investor confidence are negatively related to leverage and that the unique component of manager industry confidence is positively related to leverage. This provides some support to the theory that overconfident managers prefer debt to equity. In the sample of French firms, the investor confidence component dominates, resulting in an overall negative effect of industry confidence with leverage. This may be due to higher levels of blockholder control and/or a weaker business environment in France relative to other countries.

Keywords: behavioural finance; confidence; sentiment; capital structure; leverage; France.

Reference to this paper should be made as follows: Oliver, B.R. and Mefteh, S. (xxxx) 'Capital structure choice: the influence of sentiment in France', *Int. J. Behavioural Accounting and Finance*, Vol. X, No. Y, pp.000–000.

Biographical notes: Barry R. Oliver is an Associate Professor in Finance at the School of Finance and Applied Statistics, Australian National University, Australia.

Salma Mefteh is a Professor in Finance at ESSCA Business School, Angers, France.

1 Introduction

Many traditional corporate finance models rely on assumptions such as rationality in decision making. However, behavioural finance models assume decisions are influenced by psychological and/or cognitive biases. This area of research has developed from the work of Kahneman and Tversky (1979) and prospect theory. It provides insight into the influence of psychology on the behaviour of managers and investors and the subsequent effects on markets of their financial decision making (Nofsinger, 2008).

In this paper, we consider the impact of market sentiment as a determinant of capital structure in a sample of French firms. We explore the components of market sentiment and how they help explain capital structure. This has not been documented previously. In addition, very little has been documented on the traditional aspects of capital structure of French firms.¹

We find that traditional determinants of capital structure are significant for French firms, as they are for firms in many other countries. We find that market sentiment is highly negatively significant in explaining French firm financing decisions. Our results are the opposite of what has been found in the US market, where a positive relation between leverage and market sentiment has been found (Oliver, 2006). We also find that industry sentiment is also significantly negatively related to leverage. However, when we decompose the measure of industry sentiment into a common investor component and a unique manager component we find that the manager component has a positive relation with leverage. We argue that this is due to the effect of management overconfidence. The dominance of the common investor confidence component of sentiment may be due to the uniqueness of the French capital market, particularly the high levels of blockholder control in French firms. This may induce a stronger preference for issuing equity by managers. In other words, the manager bias for preferring debt is dampened by an investor bias preferring equity. Our results are robust to a range of alternative methods and measures.

The rest of this paper proceeds as follows. Section 2 summarises the relevant literature. Section 3 describes the research design, including variable definitions. Section 4 describes the data. The results are presented in Section 5. Section 6 presents some robustness checks. Finally, Section 7 concludes the paper.

2 Literature review

When managers make financing decisions, a choice between debt and equity must be made. The psychological bias in managers regarding financing decisions does not necessarily result in decisions that are consistent with the expected preferences of shareholders. One case where psychological bias causes managers to prefer debt over equity is when they are overconfident of the firm's future (Hackbarth, 2008). In such cases, shareholders may prefer equity to be issued rather than debt. Hackbarth (2008) shows theoretically that optimistic and overconfident managers will tend to choose higher debt levels and to issue new debt more often compared to otherwise identical less confident managers. Fairchild (2005) has also shown theoretically that managerial overconfidence may lead to excessive use of debt and higher expected bankruptcy costs.

Malmendier et al. (2007) test these predictions. They find that managerial confidence leads to a preference for internal financing over external finance and, conditional on

accessing the capital market, debt over equity. The main argument for the manager bias towards debt financing is that confident managers underestimate the probability of financial distress and therefore take on higher levels of debt than optimal. This may lead to higher probability of bankruptcy and higher costs of capital.

Identifying the determinants of capital structure can help managers make more informed decisions and the considerable body of research since Modigliani and Miller (1958) has demonstrated the academic interest in the area. However, there is no one universal theory of capital structure and it is only recently that manager confidence has been considered an important variable in capital structure choice.

Confidence is a term that is used in many disciplines. In philosophy, the term confidence is related to the validity of beliefs (Adams and Adams, 1961). In statistics it is used to measure the confidence that a range of numbers is believed to include an unknown population parameter. This measure of confidence is a probability, usually as a percentage, such as 95% or 99%. This statistical definition took accord in the area of decision making at least as far back as the 1970s: confidence judgements were elicited as assessments of the probability that a statement is true (Lichtenstein et al., 1977). Koriat et al. (1980) conceptualised confidence as having two stages. The first stage involves searching one's knowledge for an answer. The second stage requires an assessment of the confidence in the chosen alternative. To assess one's confidence in the truth of a statement, one first arrives at a confidence judgment based on internal cues or feelings of doubt (Adams and Adams, 1961). The judgement is then transformed into a quantitative expression such as the probability that the statement is correct.

Ben-David et al. (2007) consider the narrowness of an individual probability distribution as a proxy for confidence. They consider an estimate of a specific value as being related to optimism. Peterson and Pitz (1988) use a similar idea but used the terms 'uncertainty' and 'confidence'. They define uncertainty as a person's belief about the variability of possible outcomes while confidence is defined as a person's belief that a previously stated prediction is correct.

Griffin and Tversky (1992) refer to confidence as being comprised of the strength of evidence and the weight of evidence supporting a particular statement. They also consider that it is not always possible to decompose the impact of evidence into the separate contributions. Adams and Adams (1961, p.34) adequately sum up the terminology: "as with any philosophical problem, wording rapidly becomes critical and even to state the problem is to invite both confusion and a challenge". Even though this was written in 1961 it remains relevant today in relation to the term 'confidence' which has been used in various disguises as 'optimism', 'sentiment' and 'uncertainty' (Peterson and Pitz, 1988; Barberis et al., 1998; Shiller, 2000; Gombola and Marciukaityte, 2007; Ben-David et al., 2007).

Lichtenstein et al. (1982) provide a summary of the work on calibration (a narrow form of confidence) up to the 1980s. Since that time the broadening of the definition of confidence has resulted in confusion as to what overconfidence is. Moore and Healy (2008) have recognised this confusion and have attempted to redress it by considering overconfidence as comprising three distinct aspects:

- 1 overestimation of one's actual ability, performance, level of control, or chance of success (overestimation)
- 2 overplacement of one's performance relative to others (better than average)

3 overprecision in one's beliefs (overprecision).

These three areas have at least one thing in common – they all relate to the self – that is overconfidence in one's ability, performance or beliefs.

Irrespective of the definitional issues, in many studies evidence indicates that there is an unwarranted belief in the correctness of one's answers (Lichtenstein et al., 1977). Where does this unwarranted belief originate? Griffin and Tversky (1992) consider that overconfidence is created by domination of the strength of evidence over its weight. This leads people to underutilise other variables that control predictive ability, such as base rate and discriminability. This treatment combines judgement by representativeness, which is based entirely on the strength of an impression with an anchoring and adjustment process that takes the weight of evidence into account, albeit insufficiently.

Generally, overconfidence can manifest itself in various forms. People think that their knowledge is more precise than it really is (miscalibration, Lichtenstein et al., 1982). People believe that their abilities are above average (better than average effect, Svenson, 1981; Taylor and Brown, 1988), they think they can control random tasks and they are excessively optimistic about the future (illusion of control and unrealistic optimism, Langer, 1975; Glaser et al., 2005).

What drives overconfidence has been the base for a number of theories. Tversky and Kahneman (1974) argued that as a result of limited information processing abilities, people adopt simplifying rules or heuristics when making judgements under uncertainty. These heuristics can lead to severe and systematic errors. Types of heuristics include 'representativeness', 'availability' and 'adjustment and anchoring'. These heuristics provide an illusion of knowledge and an illusion of control, which in turn leads to overconfidence in judgements.

Research dating back to the 1960s and 1970s found that overconfidence was most extreme with tasks of greatest difficulty and as the tasks became easier overconfidence was reduced (Lichtenstein et al., 1977). This research spawned a plethora of work on testing overconfidence in just about every judgement decision imaginable (Moore and Healy, 2008).

In relation to many judgements under risk, particularly in a business environment, the overconfidence relates to an over estimation of one's ability. However, what is less clear in these definitions is the impact of overconfidence associated with management decisions where there is a different level of control and knowledge, either real or illusory, over the outcome. An example is the business manager's expectation about the future performance of his firm. Future firm performance is generally a function of many factors ranging from broad economic issues to firm specific issues. For example, the manager may believe he can influence the behaviour of his salesmen and through this control he will be able to improve firm performance. The illusion of control creates overconfidence (Presson and Benassi, 1996; Thompson et al., 1988; Moore and Healy, 2008). In addition to the illusion of control, overconfidence can be created by illusion of knowledge. This knowledge can range from an understanding of the economy down to an understanding of the firm and like control it can be illusory. The illusion of knowledge can lead to overconfidence. For example, a manager may believe he has a good knowledge of the future of the economy and this can lead to overconfidence in the manager's view of the future performance of the firm. Generally, overconfidence causes people to underestimate risks, to be more certain about predictions and to exaggerate their ability to control events (Gilovich et al., 2002, for an overview of this area).

The discussion so far has been related specifically to overconfidence in individuals. A question arises as to whether overconfidence at a market wide level can induce overconfidence at an individual level. To explore this further we need to consider research on herding. Herding, like confidence, is a difficult concept to precisely define. According to Devenow and Welch (1996) herding leads to systematic erroneous decision making by entire populations. Herding behaviour has been documented in a broad range of areas both theoretically and empirically including investment recommendations, price behaviour of IPOs, fads and customs, earnings forecasts, corporate conservatism, delegated portfolio managers, institutional and individual investors (for example, Sias, 2004; Graham, 1999; Devenow and Welch, 1996; Nofsinger and Sias, 1999). In addition to herding, many financial markets phenomena display either waves and/or certain fragility (Devenow and Welch, 1996). The financial crisis in 2008 is a good example. Therefore, if there is evidence that the market is high in confidence it may be an indication that managers are also experiencing high levels of confidence. Herding however does require some coordination mechanism or signal. A signal that the market is high in confidence could be the level of market sentiment.² The biggest challenge for the analyses of confidence is to construct a plausible measure of confidence. Biased beliefs naturally defy direct and precise measurement (Malmendier and Tate, 2005). We argue that confidence at least in part is likely to be influenced by market sentiment as a result of herd behaviour.

Since the work of Modigliani and Miller (1958) on the irrelevance of capital structure to firm value a series of theoretical and empirical analyses have been developed to discuss the determinants of corporate financing decisions in practice. This research has generally followed traditional finance theory and comprises the trade-off theory, the pecking-order theory and more recently the market timing theory. However, there is no universal theory of capital structure and no reason to expect one (Myers, 2001).

The trade-off theory argues that a firm's optimal capital structure results from a trade-off between tax advantages of debt and bankruptcy costs of debt (Miller, 1977).³ According to the pecking-order theory, formalised by Myers and Majluf (1984) and Myers (1984), there is a hierarchy in manager financing choices based on transaction costs. External financing transaction costs, especially those associated with adverse selection, result in managers having a preference for internal financing and then new debt and finally new equity financing. Concerning the market timing theory, managers will issue equity when the firm's market value relative to book value is high and they will issue debt when the debt market conditions are perceived relatively more favourable (Myers, 1984; Graham and Harvey, 2001; Hovakimian et al., 2001). Intensive empirical research has been conducted to test the predictions of these theories (for example, Rajan and Zingales, 1995; Shyam-Sunder and Myers, 1999; Fama and French, 2002; Frank and Goyal, 2003, 2007). The theories are supported in the empirical research to varying degrees.

3 Variable definitions and empirical method

Given the numerous theories on capital structure without any consistency on the determinants, Frank and Goyal (2007) evaluate the importance on leverage of 36 variables from an empirical perspective. Using a large US sample they find only six

factors are significant in explaining capital structure. These are used as control variables in this study. The median industry leverage (*INDUSTRY LEVERAGE*) is used as a determinant in traditional capital structure research on the grounds that managers use the industry median leverage as a benchmark or target (Frank and Goyal, 2007). Also, it has been suggested that industry effects reflect a set of correlated, but otherwise omitted variables (Hovakimian et al., 2004). The market value to book value of common stock (*MB*) is included to control for agency problems. Myers (1977) argues that agency problems are especially serious for higher growth firms. Growth increases costs of financial distress, reduces free cash flow problems and exacerbates debt-related agency problems (Frank and Goyal, 2007). Trade-off theory predicts higher growth firms to have lower leverage. However, under the pecking order theory of capital structure firms with higher investment opportunities are expected to have higher leverage as debt is higher in the pecking order than equity. Firms that are financially constrained are expected to pay less dividends and utilise more debt than non-financially constrained firms. Therefore, if a firm pays a dividend then it is expected to have less debt. A dichotomous variable for dividend payments (*DIVIDEND*) is used to capture the impact of financial constraints on leverage. Firms with high levels of collateral assets are expected to have lower expected distress costs. Such firms are expected to have higher leverage. However, there is some ambiguity in the expected relation between leverage and collateral assets. Firms with higher levels of collateral assets are expected to have lower information asymmetries. Lower information asymmetries induces a preference for equity resulting in lower leverage. The book value of collateral assets (*COLLATERAL*) is used as the proxy for this variable. Firms that are profitable (*PROFITABILITY*) face a range of issues regarding leverage. Frank and Goyal (2007) indicate that it is not clear exactly what drives the relation between leverage and profit with some theories predicting a positive relation while others predicting a negative relation. The expected relation between firm size (*SIZE*) and leverage is also ambiguous. Trade-off theory predicts larger firms to have relatively less debt as they face lower expected bankruptcy. The pecking order theory generally predicts that larger firms are expected to have lower equity issue costs and hence less leverage. However, large firms also have more assets and thus the adverse selection may be more important if it impinges on a larger base (Frank and Goyal, 2007).

$LEVERAGE_{i,t}$ is defined as total debt to market value of assets of firm i at a time t , defined as:

$$LEVERAGE_{i,t} = \frac{Long\ term\ debt_{i,t} + Short\ term\ debt_{i,t}}{Market\ value\ of\ assets_{i,t}}$$

Market value of assets is obtained as the sum of the market value of equity, long term debt, short term debt, preferred-liquidation value, deferred taxes and investment tax credit. Rajan and Zingales (1995) and Frank and Goyal (2007) discuss various definitions of leverage and argue that the most appropriate measure is the total debt to market value of assets. We report tests of robustness regarding this variable later.

In the next sub-sections, we present the model considered relevant to study the capital structure choice of French firms.

3.1 The model

Traditionally, financing decisions of managers are generally regarded as the outcome of a wide range of determinants related to market, industry and firm characteristics. We control for these and consider if market sentiment provides any significant additional power in explaining corporate structure of a sample of French firms.

Following Baker and Wurgler (2002) amongst others, we use a model that relates leverage – the proxy of the firm capital structure, to the level of market sentiment and the control variables. To ascertain the significance of these determinants for leverage we use a pooled cross-sectional time-series model as follows:⁴

$$\begin{aligned} LEVERAGE_{i,t} = & \alpha_0 + \alpha_1 SENTIMENT_{j,i,t-1} + \alpha_2 INDUSTRY\ LEVERAGE_{i,t-1} + \alpha_3 MB_{i,t-1} \\ & + \alpha_4 DIVIDEND_{i,t-1} + \alpha_5 COLLATERAL_{i,t-1} \\ & + \alpha_6 PROFITABILITY_{i,t-1} + \alpha_7 SIZE_{i,t-1} + \varepsilon_{it} \end{aligned} \quad (1)$$

All the independent variables are lagged one year. This allows the information regarding the determinants of capital structure to be available to managers in the year prior to the observed level of leverage.

3.2 Industry sentiment ($SENTIMENT_{j,i,t}$)

As mentioned previously, there is a growing body of evidence supporting manager overconfidence as a determinant of capital structure. However, obtaining a reliable estimate of confidence is extremely difficult, particularly for an adequate time series. We know that overconfident managers are likely to prefer debt over equity. The more confident the manager is, the less likely they will expect the firm to go into bankruptcy and the greater they will use debt finance.

However, obtaining a precise measure of management confidence is extremely difficult, particularly over time. Therefore, it is not clear whether we can directly test empirically the theoretically proposed management overconfident bias for debt. We take an indirect approach and proxy manager confidence through the results of sentiment surveys of industry representatives in four industry classifications (industrial, services, retail and construction) of which all the sample companies exist. The surveys are conducted by the Economic and Financial Affairs Department of the European Commission. The European Commission distributes surveys to managers of a sample of firms in each of the four industry sectors each month. The surveys are sent to managers of a sample of firms and the managers are legally required to complete them. The results of all surveys and the process of collection and sample selection are publicly available from the European Commission. The surveys elicit responses on manager sentiment about firm production, inventory levels and sales for the next period. They represent the combination of manager sentiment about the firm, industry and the economy as a whole. We take the December figure as the relevant measure of confidence in the firm's industry for that year.⁵

We believe that the variable $SENTIMENT_{j,i,t}$ is likely to be comprised of three components of a manager's view about the future:

- 1 a market component comprising manager knowledge and control of the impact of broad economic factors influencing the firm
- 2 an industry component comprising manager knowledge and control of the impact of industry factors influencing the firm
- 3 a firm specific component comprising manager knowledge and control of the impact of firm specific factors influencing the firm.

Each firm, i , in each industry j , is allocated a sentiment value for time period t . In Section 5 we present a unique way to decompose the industry sentiment measure to capture the market component and a proxy for the industry manager component and document some evidence of the management bias towards debt.

4 Data

The sample consists of all French firms listed on the Compustat database with at least three years of data over the years 1995–2004. Financial companies (SIC 6000–6999) are excluded because they are subjected to legal regulations regarding capital structure. This approach resulted in 1,670 firm/year observations.⁶ All the accounting and financial statement data are sourced from Compustat Global. Stock return data are sourced from Datastream. The confidence indices are sourced from the European Commission.

Table 1 presents summary statistics of the relevant variables. The average leverage of firms (*LEVERAGE*) in the sample is approximately 45%. This value represents an average in both time series and cross section.

The average value of industry sentiment (*SENTIMENT*) over the sample period for each industry is: –1.4 for industrial companies, 2.5 for service firms, –15 for retail firms and –12 for construction firms. The indices showed considerable variation from a low of –53 to a high of 30, which occurred in the construction industry with a possible maximum and minimum of each index is being + or –100. We would expect average sentiment levels over a sufficiently long period to be close to zero indicating that managers are on average neither over- or under-confident. Simple t-tests of differences from zero indicated only the average retail index was significantly different from zero. The average industry median leverage (*INDUSTRY LEVERAGE*) is 50% across the sample. The minimum of 8% and maximum of 85% indicates a wide range of annual industry median leverage ratios. The average market-to-book ratio (*MB*) is 0.72. This implies that French firms are in general value firms over the sample period, trading at a discount to their book value. The average proportion of collateral assets to total assets (*COLLATERAL*) is 33%. The average profitability of French firms (*PROFITABILITY*) in the sample over the period is 11% per annum. The average firm size (*SIZE*), measured as total assets is 584 million euro [$\exp(6.37)$].

Table 1 Explanatory variables: summary statistics

| <i>Variable</i> | <i>Variable description (source)</i> | <i>N</i> | <i>Mean</i> | <i>Median</i> | <i>Std. dev.</i> | <i>Min.</i> | <i>Max.</i> |
|---|---|--------------------------|---------------------------|----------------------------|--------------------|--------------------------|----------------------|
| Leverage: <i>LEVERAGE</i> | The sum of current liabilities plus long-term debt divided by the market value of assets. Source: Compustat and Datastream. | 1670 | 0.45 | 0.42 | 0.30 | 0 | 1.15 |
| Industry sentiment: <i>SENTIMENT</i> | The value of the industry sentiment for the company in December of each year. This measure has a possible range between -100 and +100. Source: European Commission | Code 1 2 3 4 | -1.4 2.5 -15 -12 | 1.5 3.5 -16 -11.5 | 10 8 6 27 | -17 -12 -24 -53 | 11 14 -8 30 |
| Median industry leverage: <i>INDUSTRY LEVERAGE</i> | The median of total debt divided by the market value of assets by SIC code and by year. Source: Compustat and Datastream. | 1670 | 0.50 | 0.58 | 0.23 | 0.08 | 0.85 |
| Market-to-book ratio: <i>MB</i> | The market-to-book ratio is defined as the market value of assets divided by book value of assets. The market value of assets equals the book value of assets minus the book value of equity plus market value of equity. Source: Compustat and Datastream. | 1670 | 0.72 | 0.47 | 0.75 | 0.04 | 6.78 |
| Collateral: <i>COLLATERAL</i> | The sum of inventory plus property, plant and equipment divided by total assets. Source: Compustat and Datastream. | 1670 | 0.33 | 0.34 | 0.18 | 0.00 | 0.89 |
| Firm profitability: <i>PROFITABILITY</i> | The operating income before depreciation divided by total assets. Source: Compustat and Datastream. | 1670 | 0.11 | 0.11 | 0.10 | -0.95 | 0.59 |
| Firm size: <i>SIZE</i> | Natural logarithm of total assets. Source: Compustat and Datastream. | 1670 | 6.37 | 6.10 | 2.27 | 1.03 | 13.06 |

Note: Code: 1 = industrial; 2 = service; 3 = retail; 4 = construction.

Table 2 reports correlations between variables and tests of significance to detect multicollinearity among independent variables. As shown in Table 2, the correlations of the independent variables and leverage accord with various theory of capital structure. These are consistent with the multivariate results shown in Table 3 and discussed later. Also shown in Table 2, the industry median leverage variable (*INDUSTRY LEVERAGE*) and the size variable (*SIZE*) are significantly correlated with most of the other variables. The sentiment variable is significantly correlated with market-to-book and collateral. Analyses regarding accounting for multicollinearity are discussed under the section on robustness checks.

Table 2 Pearson correlation coefficients

| | <i>LEVERAGE</i> | <i>SENTIMENT</i> | <i>INDUSTRY LEVERAGE</i> | <i>MB</i> | <i>DIVIDEND</i> | <i>COLLATERAL</i> | <i>PROFITABILITY</i> |
|--------------------------|-----------------|------------------|--------------------------|-----------|-----------------|-------------------|----------------------|
| <i>SENTIMENT</i> | -0.076* | | | | | | |
| <i>INDUSTRY LEVERAGE</i> | 0.509* | 0.061 | | | | | |
| <i>MB</i> | -0.423* | -0.095* | -0.480* | | | | |
| <i>DIVIDEND</i> | 0.032 | -0.012 | 0.121* | 0.064* | | | |
| <i>COLLATERAL</i> | 0.410* | -0.109* | 0.391* | -0.264* | 0.036 | | |
| <i>PROFITABILITY</i> | -0.079* | 0.052 | 0.155* | -0.016 | 0.042 | 0.197* | |
| <i>SIZE</i> | 0.375* | 0.013 | 0.447* | -0.310* | 0.137* | 0.171* | 0.057* |

Note: * significantly different from zero at the 1% level.

5 Industry sentiment and leverage

Table 3 presents the results of the estimation of equation (1). The pooled time-series cross-sectional regression has an adjusted R^2 of 40%.⁷ The results identify all the independent variables as significantly related to firm leverage, except the dividend variable. We find strong evidence that industry sentiment (*SENTIMENT*) is highly significant but negatively related to leverage. Firstly, this implies that industry sentiment is an important variable in explaining firm leverage after controlling for major traditional capital structure determinants. Secondly, the sign on this variable is negative implying that when industry sentiment increases leverage decreases. This is not consistent with other studies on manager confidence, either on a theoretical level (Fairchild, 2005; Hackbarth, 2008) or on an empirical level (Malmendier and Tate, 2005). We posit later an explanation for this result. The results for the control variables are similar to that reported using US data (Frank and Goyal, 2007; Hovakimian, 2006, amongst others).

The coefficient estimate for the median industry leverage (*INDUSTRY LEVERAGE*) has an expected positive sign and is highly significant. This result supports the hypothesis that firms in the same industry follow a similar capital structure for benchmarking, as a target or it is acting for industry omitted variables.

For the market-to-book variable (*MB*), the coefficient is negative and significant indicating that when market values are higher than book values, leverage is lower. This result supports the agency related issues of Myers (1977) that firms with higher growth opportunities have relatively higher agency problems resulting in lower leverage. It also

supports the view that higher growth increases costs of financial distress and reduces free cash flow problems resulting in less leverage.

Table 3 Capital structure determinants

| <i>Variable</i> | <i>Coefficient</i> | <i>T-statistic</i> | <i>Prob.</i> |
|--------------------------|--------------------|--------------------|--------------|
| <i>SENTIMENT</i> | -0.0019 | -3.4232 | 0.0006 |
| <i>INDUSTRY LEVERAGE</i> | 0.3928 | 13.29134 | 0.0000 |
| <i>MB</i> | -0.0222 | -4.1328 | 0.0000 |
| <i>DIVIDEND</i> | -0.0366 | -1.5843 | 0.1133 |
| <i>COLLATERAL</i> | 0.4067 | 12.3213 | 0.0000 |
| <i>PROFITABILITY</i> | -0.5486 | -9.8299 | 0.0000 |
| <i>SIZE</i> | 0.0244 | 8.8262 | 0.0000 |
| Constant | 0.0260 | 1.2574 | 0.2088 |
| Adjusted R-squared | | 0.39 | |
| F-statistic | | 147.85 | |
| Prob. (F-statistic) | | 0.0000 | |

The coefficient for dividend dummy (*DIVIDEND*) is negative, as predicted, but not significant. This result provides little support for the hypothesis that paying dividend is a solution for the free cash flow problem and a substitute for leverage. It is also little support for any impact of financial constraints on leverage.

In accordance with our prediction, the collateral variable (*COLLATERAL*) is positively and significantly correlated with leverage. The French firms with higher tangibility of assets may have relatively lower expected distress costs and hence higher leverage. The lower asymmetry effect predicting the opposite relation is not evident.

The results also show that profitable French firms use less debt with the variable for firm profitability (*PROFITABILITY*) being negative and significant. In the pecking order world, this finding can be interpreted by the fact that these firms prefer not to use debt in order to have a higher borrowing power to finance future investments. The trade-off theory predictions on profitability are more complex (Frank and Goyal, 2007).

Firm size (*SIZE*) is positively and significantly related to leverage. This is not consistent with the trade-off theory of capital structure that predicts that larger, more mature firms to have relatively less debt. However, it is supportive of the view that larger firms have more assets and the adverse selection problem is more important as it impinges on a larger base (Frank and Goyal, 2007).

In summary, the results are significant, particularly for the sentiment coefficient. However, as mentioned earlier this is negative and not what was expected. A negative relation means that managers are not acting as manager psychological bias would predict.

5.1 The decomposition of industry sentiment

As mentioned previously the measure of industry sentiment comprises at least three components. The first one is the component associated with manager sentiment in the market as a whole. The second one is the component associated with manager sentiment in the industry in which the firm operates and the third one is the component associated

with manager sentiment of the firm in which he or she manages. We expect the manager psychological bias to be most evident in the third component, less evident in the second and least evident in the first. The reason for this is that if we could identify the component of manager sentiment that is solely related to the firm then we would expect this measure to allow the strongest test of the psychological bias, as a direct link between manager sentiment about the firm and leverage could be identified. Individuals are the most optimistic about outcomes in which they believe are under their control (Langer, 1975). Managers are more likely to be confident about specific firm issues where they are likely to have the strongest control. As mentioned previously, obtaining this measure of manager confidence is extremely difficult if not impossible. The next best measure of manager confidence is a measure associated with manager confidence from managers in the industry in which the firm operates. However, this measure will still comprise all three components of manager confidence. For example, a question requiring a response from a manager on expected future sales will incorporate the managers' sentiment about the economy, the industry and the firm.

We propose a method which separates the industry sentiment measure into two components. The first component is associated with manager confidence in the market as a whole and the second component is manager confidence associated with the industry and the firm which they manage. We cannot isolate the second component into industry and firm specific components of manager confidence due to the lack of a specific link between the survey responses and the individual firm. However, research on herding behaviour in capital markets suggests that manager confidence may be more pervasive than solely at individual firm levels (Hirshleifer and Teoh, 2003). To separate the economy and the industry and firm components of manager confidence, we consider the impact of a broad measure of market confidence.

The European Commission survey 3,300 French individuals regarding a range of issue on their sentiment and the survey results are used to construct an index of consumer sentiment. This measure of sentiment represents a broad market view about the future. Qui and Welch (2004) document that similar measures of consumer sentiment provide a good estimate of investor confidence. Therefore, we posit that this measure of consumer sentiment is a reasonably proxy for investor confidence. We obtained the results of this survey over the period from 1995–2004 and selected the December value of the index for each year. Correlation between industry sentiment and consumer sentiment indices is 0.68. As expected, when we replace the measure of industry sentiment with the measure of investor confidence and re-estimate equation (1), a similar result is found. That is, consumer sentiment, or investor confidence, is also significantly negatively related to leverage.

The impact of industry manager confidence is analysed by constructing a two-stage model. The first model separates industry sentiment into two components: a common component and a unique component. The common component is the amount of manager confidence associated with a broad view of the market. The unique component is the amount of manager confidence that relates to the industry and the firm in which the manager operates. The influence of the common component is represented by α_1 in equation (2). The residuals in equation (2) represent the unique component of manager confidence that is not explained by investor confidence. This is shown as follows:

$$SENTIMENT_{j,i,t} = \alpha_0 + \alpha_1 SENTIMENT_t^{INV} + SENTIMENT_{j,i,t}^{Unique} \quad (2)$$

where

$SENTIMENT_{j,i,t}$ = industry sentiment j for firm i at time t , which is the same as in equation (1)

$SENTIMENT_t^{INV}$ = investor confidence at time t

$SENTIMENT_{j,i,t}^{Unique}$ = unique component of manager confidence in industry j at time t allocated to firm i . This is the unexplained variation between $SENTIMENT_{j,i,t}$ and $SENTIMENT_t^{INV}$ ($\varepsilon_{j,i,t}$).

The second stage is to respecify equation (1) as follows:

$$\begin{aligned} LEVERAGE_{i,t} = & \alpha_0 + \alpha_1 SENTIMENT_{i,t-1}^{INV} + \alpha_2 SENTIMENT_{j,i,t-1}^{Unique} \\ & + \alpha_3 INDUSTRY LEVERAGE_{i,t-1} + \alpha_4 MB_{i,t-1} + \alpha_5 DIVIDEND_{i,t-1} \\ & + \alpha_6 COLLATERAL_{i,t-1} + \alpha_7 PROFITABILITY_{i,t-1} + \alpha_8 SIZE_{i,t-1} + \varepsilon_{it} \end{aligned} \quad (3)$$

The coefficient α_2 measures the impact of the unique components manager industry confidence, after controlling for the impact of the broader view of the market, represented by investor confidence. If manager industry confidence does have a positive effect on leverage as predicted by the manager bias then α_2 will be positive and significant. The results of equation (3) are shown in Table 4.

Table 4 The impact of management sentiment

| Variable | Coefficient | T-statistic | Prob. |
|----------------------|-------------|-------------|--------|
| $SENTIMENT^{INV}$ | -0.0049 | -8.3518 | 0.0000 |
| $SENTIMENT^{Unique}$ | 0.0016 | 2.2462 | 0.0248 |
| INDUSTRY LEVERAGE | 0.3965 | 13.7477 | 0.0000 |
| MB | -0.0200 | -3.8402 | 0.0001 |
| DIVIDEND | -0.0393 | -1.7094 | 0.0876 |
| COLLATERAL | 0.4269 | 13.0547 | 0.0000 |
| PROFITABILITY | -0.5512 | -10.0161 | 0.0000 |
| SIZE | 0.0254 | 9.2890 | 0.0000 |
| Constant | -0.0512 | -2.2937 | 0.0219 |
| Adjusted R-squared | | 0.39 | |
| F-statistic | | 137.97 | |
| Prob. (F-statistic) | | 0.0000 | |

Table 4 shows that the unique component of industry manager confidence ($SENTIMENT^{Unique}$) enters equation (3) with a positive sign and is significant at the 5% level.⁸ We therefore conclude that the component of industry manager confidence, which is not explained by a broader view of the market, has a significant positive impact on leverage as predicted. The impact of the manager's views of the market as a whole dominates the relation, resulting in an overall negative relation with leverage. This

domination may be due to the higher levels of blockholder control of firms in France, or the weaker business environment. These factors are likely to dampen the unique component of manager confidence, particularly the component relating specifically to manager confidence about the firm they have control over. Also, when investors are confident they are more likely to prefer equity. An example is the issuance of equity by rational managers when firms are overvalued due to investor confidence (Baker and Wurgler, 2000, 2002). In France, the industry sentiment measure generally represents the views of managers who are likely to be blockholders. When French managers are confident about the firm (and the future generally) they are more likely to prefer equity investment rather than debt, as they are also blockholders in the firm. This broader confidence view dominates the industry sentiment measure. We have isolated this out and have shown that manager confidence is indeed positively related to leverage as behavioural finance predicts.

6 Robustness checks

Table 2 shows significant correlations, particularly between the industry median leverage variable (*INDUSTRY LEVERAGE*) and the size variable (*SIZE*) with most of the other variables. To assess the robustness of our results we re-estimate equations (1) and (3) omitting first the industry median leverage variable and then the size variable. When *INDUSTRY LEVERAGE* is omitted from the regression, the results are similar to those reported in Tables 3 and 4. Specifically, in Table 4 the investor confidence variable ($SENTIMENT^{INV}$) remains negative and significant and the unique component of industry manager confidence ($SENTIMENT^{Unique}$) remains positive and significant. Also, removing firm size (*SIZE*) from the regression does not cause significant changes in the results.

In Table 2 a significant correlation is reported between market-to-book (*MB*) and industry sentiment (*SENTIMENT*). Correlation analysis with market-to-book (*MB*) and investor confidence ($SENTIMENT^{INV}$) and the unique component of industry management confidence ($SENTIMENT^{Unique}$) shows insignificant correlation. However, to confirm the robustness of our result we removed market-to-book (*MB*) variable from the model and re-estimated equations (1) and (3) and the result did not change in any significant way from that reported. Therefore, multicollinearity is not a problem.

To gauge the sensitivity of the choice of the December sentiment index we calculate a series as the average 12 monthly values for the year, rather than selecting the value of the index as of December each year. The results are again similar to those reported in Table 4.

In the literature ‘leverage’ has at least five different definitions. Most studies focus on a single measure of leverage being the total debts to market value of assets. This definition is referred to as the market value of leverage. Possibly the second most common measure of leverage is a book-based measure of leverage, being total debts to book value of assets. Market values are determined by looking forward in time, while book values are determined by accounting for what has already taken place (Frank and Goyal, 2007). Management decisions are expected to be a forward looking process, therefore a leverage definition that is market based or forward looking is most appropriate, particularly when we are considering the influence of market sentiment on market leverage in the following period. What is also interesting from the literature is that the book value of leverage is often used to check robustness of the market leverage

results. This seems counter-intuitive as the two measures of leverage measure different aspects of a firm's capital. Furthermore, since there are numerous different measures of leverage and often different determinants and expected relations it is important to define leverage appropriately. However, we undertook further analyses on book-values of leverage. We found the correlation between market leverage and book leverage to be 58%. Running regression [equation (1)] with book leverage (total debt/total assets) resulted in industry sentiment entering the equation with a significant positive coefficient (prob. value = 0.055). The Adj R^2 of the regression fell to approximately 18% as compared to approximately 40% in the original model. The industry leverage entered the regression with a negative and significant coefficient (rather than a significant positive coefficient in the initial results) and the MB coefficient was not significant (rather than significantly negative in the initial results). The other variables remained similar to those reported in Table 3. These results provide further evidence that sentiment has a strong effect on leverage and further supports our initial results.

As a final robustness test the results are replicated using OLS rather than pooled regression with consistent results. Overall, we conclude that the results are a good representation of the relationships between leverage and the independent variables explaining approximately 40% of the variation in leverage.

7 Conclusions

The overconfidence bias in relation to investment decisions is well documented in psychology and behavioural finance literature. Less known is that an overconfidence bias also relates to financing decisions. Managers that are overconfident of their firm's future are likely to prefer debt to equity financing. This may lead to increased probability of bankruptcy and higher costs of capital. Empirically it is difficult to measure overconfidence. In this paper we decompose a publicly available measure of industry sentiment into two components: a component common with investor confidence and a component more aligned with manager industry confidence. We find in a sample of French firms that industry confidence and investor confidence are negatively related to leverage and that the unique component of manager industry confidence is positively related to leverage. This provides some supports to the theory that overconfident managers prefer debt to equity. In the sample of French firms, the investor confidence component dominates, resulting in an overall negative effect of industry confidence with leverage. This may be due to higher levels of blockholder control and/or a weaker business environment in France relative to other countries.

Acknowledgements

Comments from Tom Smith (ANU), seminar participants at University of Amsterdam Business School, the Technological University of Munich, Germany and ESSCA, France are gratefully acknowledged.

References

- Adams, J. and Adams, P. (1961) 'Realism of confidence judgments', *Psychological Review*, Vol. 68, No. 1, pp.33–45.
- Antoniou, A., Guney, Y. and Paudyal, K. (2008) 'The determinants of capital structure: capital market-oriented versus bank-oriented institutions', *Journal of Financial and Quantitative Analysis*, Vol. 43, No. 1, pp.59–92.
- Baker, M. and Wurgler, J. (2000) 'The equity share in new issues and aggregate stock returns', *Journal of Finance*, Vol. 55, pp.2219–2257.
- Baker, M. and Wurgler, J. (2002) 'Market timing and capital structure', *Journal of Finance*, Vol. 57, pp.1–32.
- Barberis, N., Shleifer, A. and Vishny, R. (1998) 'A model of investor sentiment', *Journal of Financial Economics*, Vol. 49, pp.307–343.
- Ben-David, I., Graham, J. and Harvey, C. (2007) 'Managerial overconfidence and corporate policies', NBER working paper, W13711.
- Bloch, L. and Kremp, E. (2002) in Barca, F. and Becht, M. (Eds.): *The Control of Corporate Europe*, pp.106–128, Oxford University Press, available at <http://dx.doi.org/10.1093/0199257531.001.0001>.
- Devenow, A. and Welch, I. (1996) 'Rational herding in financial economics', *European Economic Review*, Vol. 40, pp.603–615.
- Fairchild, R. (2005) 'The effect of managerial overconfidence, asymmetric information, and moral hazard on capital structure decisions', *ICFAI University Journal of Behavioral Finance*, Vol. 2, No. 4.
- Fama, E. and French, K. (2002) 'Testing trade-off and pecking order predictions about dividends and debt', *Review of Financial Studies*, Vol. 15, pp.1–33.
- Frank, M. and Goyal, V. (2003) 'Testing the pecking order theory of capital structure', *Journal of Financial Economics*, Vol. 67, pp.217–248.
- Frank, M. and Goyal, V. (2007) 'Capital structure decisions: which factors are reliably important', *Financial Management*, forthcoming.
- Gilovich, T., Griffin, D. and Kahneman, D. (2002) *Heuristics and Biases: The Psychology of Intuitive Judgement*, Cambridge University Press, New York, USA.
- Glaser, M., Langer, T. and Weber, M. (2005) 'Overconfidence of professionals and lay men: individual differences within and between tasks?', SSRN working paper, available at <http://ssrn.com/abstract=712583>.
- Gombola, M. and Marciukaityte, D. (2007) 'Managerial overoptimism and the choice between debt and equity financing', *Journal of Behavioral Finance*, Vol. 8, No. 4, pp.225–235.
- Graham, J. (1999) 'Herding among investment newsletters: theory and evidence', *Journal of Finance*, Vol. 54, pp.237–268.
- Graham, J. and Harvey, C. (2001) 'The theory and practice of corporate finance: evidence from the field', *Journal of Financial Economics*, Vol. 60, pp.187–243.
- Griffin, D. and Tversky, A. (1992) 'The weighting of evidence and the determinants of confidence', *Cognitive Psychology*, Vol. 24, pp.411–435.
- Hackbarth, D. (2008) 'Managerial traits and capital structure decisions', *Journal of Financial and Quantitative Analysis*, forthcoming, December.
- Hirshleifer, D. and Teoh, S. (2003) 'Herd behaviour and cascading in capital markets: a review and synthesis', *European Financial Management*, Vol. 9, No. 1, pp.25–66.
- Hovakimian, A. (2006) 'Are observed capital structures determined by equity market timing', *Journal of Financial and Quantitative Analysis*, Vol. 41, No. 1, pp.221–248.
- Hovakimian, A., Hovakimian, G. and Tehranian, H. (2004) 'Determinants of target capital structure: the case of combined debt and equity financing', *Journal of Financial Economics*, Vol. 71, pp.517–540.

- Hovakimian, A., Opler, T. and Titman, S. (2001) 'The debt-equity choice', *Journal of Financial and Quantitative Analysis*, Vol. 36, pp.1–24.
- Kahneman, D. and Tversky, A. (1979) 'Prospect theory: an analysis of decisions under risk', *Econometrica*, Vol. 46, pp.171–185.
- Koriat, A., Lichtenstein, S. and Fischhoff, B. (1980) 'Reasons for confidence', *Journal of Experimental Psychology: Human Learning and Memory*, Vol. 6, No. 2, pp.107–118.
- Lamoreaux, N. and Rosenthal, J. (2006) 'Legal regime of business's organizational choice – A comparison of France and US', NBER working paper, W10288.
- Langer, E. (1975) 'The illusion of control', *Journal of Personality and Social Psychology*, Vol. 32, pp.311–328.
- Lichtenstein, S., Fischhoff, B. and Phillips, L. (1977) 'Calibration of probabilities: the state of the art', in Jungermann, H. and deZeeuw, G. (Eds.): *Decision Making and Change in Human Affairs*, Reidel, Amsterdam.
- Lichtenstein, S., Fischhoff, B. and Phillips, L. (1982) 'Calibration of probabilities: the state of the art as of 1980', in Kahneman, D., Slovic, P. and Tversky, A. (Eds.): *Judgment Under Uncertainty: Heuristics and Biases*, pp.306–334, Cambridge University Press, Cambridge.
- Malmendier, U. and Tate, G. (2005) 'Does overconfidence affect corporate investment? CEO overconfidence measures revisited', *European Financial Management*, Vol. 11, No. 5, pp.649–659.
- Malmendier, U., Tate, G. and Yan, J. (2007) 'Corporate financial policies with overconfident managers', NBER working paper, W13124.
- Miller, M. (1977) 'Debt and taxes', *Journal of Finance*, Vol. 32, pp.261–275.
- Modigliani, F. and Miller, M. (1958) 'The cost of capital, corporation finance and the theory of investment', *American Economic Review*, Vol. 53, pp.261–297.
- Moore, D. and Healy, P. (2008) 'The trouble with overconfidence', *Psychological Review*, Vol. 115, No. 2, pp.502–517.
- Myers, S. (1977) 'Determinants of corporate borrowing', *Journal of Financial Economics*, Vol. 5, pp.147–175.
- Myers, S. (1984) 'The capital structure puzzle', *Journal of Finance*, Vol. 39, pp.575–592.
- Myers, S. (2001) 'Capital structure', *Journal of Economic Perspectives*, Vol. 15, No. 2, pp.81–102.
- Myers, S. and Majluf, N. (1984) 'Corporate financing and investment decisions when firms have information that investors do not have', *Journal of Financial Economics*, Vol. 13, pp.187–221.
- Nofsinger, J. (2008) *The Psychology of Investing*, 3rd ed., Pearson Education-Prentice Hall, New Jersey, USA.
- Nofsinger, J. and Sias, R. (1999) 'Herding and feedback trading by institutions trading on stock prices', *Journal of Finance*, Vol. 54, pp.2263–2295.
- Oliver, B. (2006) 'Management confidence and capital structure', paper presented at the *AAANZ and Asia Finance Association conferences in New Zealand*, Working paper, School of Finance and Applied Statistics, Australian National University, Canberra Australia.
- Peterson, D. and Pitz, G. (1988) 'Confidence, uncertainty and the use of information', *Journal of Experimental Psychology: Learning, Memory and Cognition*, Vol. 14, No. 1, pp.85–92.
- Presson, P. and Benassi, V. (1996) 'Illusion of control: a meta-analytic review', *Journal of Social Behaviour and Personality*, Vol. 11, No. 3, pp.493–510.
- Qui, L. and Welch, I. (2004) 'Investor sentiment measures', NBER working paper, W10794.
- Rajan, R. and Zingales, L. (1995) 'What do we know about capital structure? Some evidence from international data', *Journal of Finance*, Vol. 50, pp.1421–1460.
- Roger, F. (2006) 'Structure d'endettement et développement des entreprises françaises', *Eclairages Recherche*, Vol. 3, pp.1–13.
- Shiller, R. (2000) 'Measuring bubble expectations and investor confidence', *Journal of Psychology and Financial Markets*, Vol. 1, No. 1, pp.49–60.

- Shyam-Sunder, L. and Myers, S. (1999) 'Testing static tradeoff against pecking order models of capital structure', *Journal of Financial Economics*, Vol. 51, pp.219–244.
- Sias, R. (2004) 'Institutional herding', *Review of Financial Studies*, Vol. 17, No. 1, pp.165–206.
- Sraer, D. and Thesmar, D. (2006) 'Performance and behavior of family firms – evidence from the French stock market', EGCI Finance, Working paper No 130/2006.
- Svenson, O. (1981) 'Are we less risky and more skilful than our fellow drivers', *ACTA Psychologica*, Vol. 47, pp.143–151.
- Taylor, S. and Brown, J. (1988) 'Illusion and well-being: a social psychological perspective on mental health', *Psychological Bulletin*, Vol. 103, pp.193–210.
- Thompson, S., Armstrong, W. and Thomas, C. (1988) 'Illusions of control, underestimations and accuracy: a control heuristic explanation', *Psychological Bulletin*, Vol. 123, No. 2, pp.143–161.
- Tversky, A. and Kahneman, D. (1974) 'Judgement under uncertainty: heuristics and biases', *Science*, Vol. 185, pp.1124–1131.
- Wald, J. (1999) 'How firm characteristics affect capital structure: an international comparison', *Journal of Financial Research*, Vol. 22, No. 2, pp.161–187.

Notes

- 1 It has also been documented that France is different from many other countries, notable the UK and the US, in terms of shareholder control, legal environments and social attitudes (Rajan and Zingales, 1995; Wald, 1999; Bloch and Kremp, 2002; Lamoreaux and Rosenthal, 2006; Roger, 2006; Sraer and Thesmar, 2006; Antoniou et al., 2008). This makes the issue particularly interesting.
- 2 Throughout this paper we use the terms 'confidence' and 'sentiment' interchangeably.
- 3 The trade-off theory has two forms: static and dynamic forms. The static view suggests that the firm must always have the optimal debt/equity mix. Under the dynamic view firms that consider fixed costs of adjustment allow the actual leverage ratio to deviate from the target ratio until it becomes too extreme.
- 4 The technique corrects for both cross-sectional heteroskedasticity and contemporaneous correlation.
- 5 We consider the significance of other ways to select the index in the section on robustness checks later in the paper.
- 6 Fifteen observations had market-to-book values in excess of seven with one being over 225. When these were removed the MB variable became significant. The significance of the other variables remained the same both in sign and size. As these observations only influenced the MB variable they were excluded as outliers. There are 303 different firms in the sample. Ten observations had leverage values over one. This implies these firms are bankrupt. These observations were initially removed, but no significant differences in the regression results were obtained, so results are reported with them included.
- 7 The method used for the estimation is the Seemingly Unrelated Regression method in Eviews Pooled Regression. It estimates a feasible GLS specification correcting for both cross-section heteroskedasticity and contemporaneous correlation. A common intercept was also selected. The result is robust to different specifications and estimation methods. For example, OLS provided similar results.
- 8 Based on maximum historical annual changes in the consumer sentiment and industry sentiment indices over the sample period, the economic significance on leverage is approximately 25 million and five million Euros, respectively.