Testing Pecking Order Prediction from the Viewpoint of Managerial Optimism: Some Empirical Evidence from Taiwan

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Abstract

In this paper we examine the relationship between managerial optimism and corporate external financing decisions by empirically testing Heaton's (2002) model. Heaton theoretically shows that, besides traditional information explanations, managerial optimism is also able to lead to managers' pecking order preferences in financing decisions. By using a specification of Shaym-Sunder and Myers (1999), we conduct a comparative test to see whether the pecking order hypothesis performs better when managers are optimistic. That is, the sensitivities of the net debt issues in relation to financing deficits for optimistic managers are larger than those for non-optimistic ones. Using listed Taiwanese companies as our sample, we find that optimistic managers indeed exhibit greater net-debt-issue/financing-deficit sensitivities than do non-optimistic ones. These findings are consistent with the predictions of Heaton's model.

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1. Introduction

The pecking order theory of financing decisions is one of the most well-known theories of corporate finance. Pioneered by Myers (1984), the term "pecking order" refers to managers' preferences for sources of funds to cover their financing needs. Managers prefer internal to external financing and, when there is an inadequate amount of internal funds, debt financing is preferred to equity financing. Various empirical studies confirm managers' pecking order preference. Tests of capital structure theory (e.g., Friend and Lang, 1988; Titman and Wessels, 1988; Rajan and Zingales, 1995; Fama and French, 2002; Frank and Goyal, 2005) typically find that profitable firms, which have more internal funds, use less leverage. In studies that provide more direct evidence, Shaym-Sunder and Myers (1999) and Lemmon and Zender (2004) also find that managers' choice of financing method are consistent with the pecking order.

A controversial question concerning the pecking order serves as its driving force. Myers (1984) suggests that the pecking order preference arises because of information asymmetry between the firms and the capital market. However, subsequent evidence (e.g. Helwege and Liang, 1996; Frank and Goyal, 2003; and Leavy and Roberts, 2005) provides results that conflict with this view of information asymmetry. Recent theoretical work argues that the pecking order may also be driven by other forces such as agency costs (e.g., Myers, 2003), taxes (e.g., Hennessy and Whited, 2005), and managerial optimism (e.g., Heaton, 2002), while the corresponding tests have yet to be explored, as noted in the most recent survey by Frank and Goyal (2005). A somewhat similar study is Graham and Harvey's (2001) influential field study, in which they provide some supporting evidence of the pecking order and argue (p.219) that "the preference [of the survey executives] for pecking-order-like behavior might

be driven by managerial optimism."

This paper attempts to fill a gap in the literature. Given Graham and Harvey's (2001) important result, we believe that additional tests that focus on the driving force behind managerial optimism are warranted. In particular, we use financial data to empirically examine the extent to which managerial optimism provides satisfactory external financing decisions through testing Heaton's (2002) theoretical work. Heaton examines the managers' financing decisions from a behavioral perspective and shows that pecking order preference can be induced by managerial optimism.[1] Optimism here is a personal characteristic and describes a manager's subjective belief that a firm's future performance is rosier than it actually is. In systematically overestimating the probability of good firm performance versus the capital market's outlook, optimistic managers will have a tendency to perceive the market as undervaluing their own firm. Since riskier securities are more sensitive to managers' probability beliefs and are thus more undervalued by the market, optimistic managers will therefore prefer to rely on internal funding rather than issue risky securities to finance their needs. When these internal funds are not forthcoming, managers will choose debt financing first over equity. As a result, optimistic managers will display a pecking order preference when making financing decisions.

Our study also adds to the literature which tries to assess the impact of managerial optimism on corporate decisions. Besides Heaton (2002), Roll (1986), for example, argues that in takeover decisions, managerial optimism (i.e. hubris) results in the "winner's curse," that is, where a bidder pays too much for the target. Goel and Thakor (2000) point out that managerial optimism can increase firm value because a non-optimistic manager may invest too conservatively from the point of fully

[1] For a recent survey on behavioral corporate finance, see Baker, Ruback, and Wurgler (2005).

diversified shareholders. Gervais, Heaton, and Odean (2002) further prove that when optimism induces managers to a higher level of effort, it may be less expensive for shareholders than hiring only moderately optimistic managers.

This line of research related to managerial optimism builds upon the evidence of the cognitive psychology literature that most people naturally display optimistic expectations about the future. Managers are particularly prone to exhibit optimism in their decision-making for numerous reasons. First, individuals in general are more optimistic when they believe that outcomes are under their control (e.g., Weinstein, 1980), and managers in particular are more optimistic when they have a great deal of control over their firms' performance (e.g., March and Sharpia, 1987). Second, individuals are more optimistic regarding outcomes when they are highly committed (e.g., Weinstein, 1980), and managers are committed to the firms' good performance because their personal wealth, reputation, and employability are highly dependent upon it (e.g., Gilson, 1989). Third, people tend to overstate their skills relative to the average of others when the reference point is abstract (e.g., Larwood and Whittaker, 1977; Alicke, Klotz, Breitenbecher, Yurak, et al., 1995). A manager who seeks external financing for investment purposes is prone to overstate the value and importance of his/her project relative to the average portfolio of the projects introduced by other managers to the market (e.g., Malmendier and Tate, 2005a).

We use a specification spawned by Shaym-Sunder and Myers (1999) to test the pecking order by examining the sensitivities between the net debt issues and the financing deficits, defined as real investments and dividend commitment less internal funds. The driving force is now managerial optimism. We conduct comparative tests to see whether the pecking order hypothesis performs better in the case of optimistic managers. The testable hypothesis here, therefore, is that the sensitivities of the debt

issues in regard to financing deficits for optimistic managers are larger than those for non-optimistic ones.

One difficulty we face in carrying out the empirical research related to managerial optimism is a lack of a proper proxy. By using the Chief Executive Officers' (CEOs') personal portfolios of their firms' options and stockholdings in U.S. companies, Malmendier and Tate (2005a, 2005b) construct several measures of managerial optimism and find that in U.S. companies managerial optimism does indeed affect CEOs' investment and takeover decisions.[2] Following Lin, Hu, and Chen (2005), we construct an alternative measure of optimism by studying management earnings forecasts. The rationale for using forecasts is simply that if managers are optimistic in their assessment of future outcomes, they should be more likely to provide a forecast that is overestimated, i.e. above actual earnings. An important merit of management earnings forecasts is their prevalence. In most countries, earnings forecasts are allowed and legislatively regulated. Thus, the measure constructed from such earnings forecasts could be similarly established in these countries.

The managers researched here are the CEOs. We classify each CEO in our sample as optimistic if the number of the CEO's overestimated forecasts is greater than that of the underestimated forecasts. However, an obstacle to this classification is that CEOs may have reasons other than optimism to deliberately bias their forecasts. To address this concern, in constructing the measure we exclude all those forecasts

[2] In their articles, Malmendier and Tate (2005a, 2005b) label their measure as "overconfidence". According to the psychology literature, managerial upward bias towards future firm performance may be due to overconfidence, resulting from an overestimation of one's own abilities (such as managerial skills); or optimism, originating in an overestimation of exogenous outcomes (such as the growth of the economy) relating to the probability of success. However, the impact on financing decisions in this paper depends only on whether managers indeed possess an upward bias towards future firm performance, i.e. regardless of whether this bias is a result of their optimism or overconfidence. Hence, we label the measure used by Malmendier and Tate as "optimism".

that may be contaminated by incentive effects such as stock offerings, financial distress, and insider trading. As a result, we choose listed Taiwanese companies as our sample since we have access to detailed data. Take stock offerings as an example. Firms may temporarily boost their stock price prior to their issuance by releasing overestimated forecasts (e.g., Chin, Lin, and Chang, 1999; Lang and Lundholm, 2000). Thus, if a firm conducts any stock offerings within twelve months after the forecasts, we regard these forecasts as tainted by the CEOs' incentives and remove them from the sample. We provide several robustness tests to detect the use of the measure, and also classify our sample CEOs' optimism in accordance with their shareholdings data as explained in Malmendier and Tate (2005a). To the best of our knowledge, this paper is the first empirical study outside the U.S. to focus on the relationship between managerial optimism and financing decisions.

Overall, the empirical results are consistent with the conjecture of Heaton (2002) and Graham and Harvey (2001). We find that the net-debt-issue/financing-deficit sensitivities for optimistic managers are larger than those for non-optimistic ones. This result is found to be robust after controlling for the effects of the specific industries and of the conventional variables used in Rajan and Zingales (1995) and Frank and Goyal (2003). It appears that optimism indeed exerts an impact on managers' financing decisions.

The remainder of this paper is organized as follows. In Section 2 we describe the empirical methodology and the sample. The empirical results are presented in Section 3. In Section 4, we conclude with a summary.

2. Methodology and Sample

2.1 Empirical specification

Heaton (2002) suggests that optimistic managers will display a pecking order

preference in their financing decisions. The term "pecking order" was first coined by Myers (1984) from the point of view of information asymmetry. Suppose managers can fund their financing needs from retained earnings, debt, or equity, and that there is information asymmetry between the managers and the capital market. While retained earnings do not give rise to an information asymmetry problem, and debt does to a certain extent, equity suffers more information asymmetry problems than debt, because from the point of view of outside investors, equity is riskier and requires a higher risk premium. Therefore, from the perspective of managers, retained earnings are a better source of funds. When there is an inadequate amount of retained earnings, debt financing is less undervalued by the market and will be preferred to equity financing.

The rationale for the financing preferences of optimistic managers still depends on the extent of the undervaluation by the market from the perspective of the managers, while the source of undervaluation is different from that in Myers (1984). Although the required returns of risky securities reflect the capital market's expectation of good versus bad firm performance, optimistic managers systematically overestimate the probability of good firm performance and perceive that the market undervalues their firms. Riskier securities are more sensitive to managers' probability beliefs and thus tend to be more undervalued by the market. Optimistic managers will therefore prefer to rely on internal funding rather than issue risky security to finance their needs. When there are insufficient internal funds, optimistic managers will prefer debt financing to equity financing.

In this paper we apply the methodology initiated by Shaym-Sunder and Myers (1999) to test Heaton's (2002) model. Specifically, we start by using the "financing deficit" as a proxy for firms' financing needs. From the accounting cash flow identity,

the financing deficit for firm *i* in fiscal year t (DEF_{it}) is defined as follows:

$$DEF_{it} \equiv Div_{it} + I_{it} + \Delta W_{it} - C_{it} = \Delta D_{it} + \Delta E_{it}, \quad (1)$$

where Div is the cash dividend payments, I is the net investment, △W is the change in working capital, C is the operating cash flows after interest and taxes, △D is the net debt issues (i.e. debt issuance – debt reduction), and △E is the net equity issues (i.e. equity issuance – stock repurchase).[3] A positive financing deficit ($DEF > 0$) indicates that the internal funds are exhausted. By contrast, when the firm has a surplus, the financing deficit will be negative ($DEF < 0$).

The testing strategy focuses on the sensitivities between the net debt issues and the financing deficits. Heaton's (2002) model predicts that as internal funds are exhausted, optimistic managers will choose debt financing first while non-optimistic managers will not. The driving force now is managerial optimism. We thus perform a comparative test to compare the financing behavior of optimistic managers with that of non-optimistic managers, and to see whether the pecking order hypothesis performs better for optimistic managers. The hypothesis is

Hypothesis: The sensitivities between net debt issues and financing deficits are larger for optimistic managers than those for non-optimistic managers.

It is noteworthy that in Heaton's (2002) story, it is still not clear whether optimistic managers will first repurchase equity or pay off debt when the firms have surplus. On the one hand, since riskier securities are more undervalued by the market, optimistic managers should be inclined to repurchase them. On the other hand, optimistic managers should seek to reduce their reliance on external funds in the future, and thus will retain cash flow or avoid high debt levels by paying off debt. Therefore, given a negative financial deficit, the difference in the

[3] All the variables used in this paper are described in the Appendix.

net-debt-issue/financing-deficit sensitivities between optimistic and non-optimistic managers may be absent. To sum up, *ceteris paribus*, differences in the net-debt-issue/financing-deficit sensitivities between optimistic and non-optimistic managers will be distinguished when firms have financing needs, but may be absent when the firms record a surplus.

After classifying whether managers are optimistic (as discussed in the next section), we run the following regression on the whole of our sample:

$$\Delta D_{it} = \beta_1 + \beta_2 DEF_{it} + \beta_3 O_i + \beta_4 DEF \cdot O_i + \beta_5 X_{it} e_{it}, \quad (2)$$

where O is a dummy variable (i.e. the optimism measure described in the next section) which is 1 if the manager is classified as optimistic and 0 if not; and X is the conventional set of explanatory variables proposed in the earlier literature for additional controls. X includes two kinds of explanatory variables. First, in order to account for the potential effects of specific industries, we use two-digit industry classification codes (as given by the regulatory agency) to assign firms to 19 industries and include 18 industry dummy variables in the regressions as control variables. Second, we follow Rajan and Zingales (1995) and Frank and Goyal (2003) to attach the variables that include the tangibility of assets, market-to-book ratio, log sales, and profitability. As proposed in capital structure theories, these variables are able to explain the amount of leverage. Since the dependent variable here is the change in the amount of leverage, we follow Frank and Goyal (2003) to take these variables in first differences. The coefficient β_2 represents the net-debt-issue/financing-deficit sensitivities of non-optimistic managers, and the sum of the coefficients β_2 and β_4 stands for the sensitivities of optimistic managers. We expect that the sensitivities of optimistic managers will be larger than those of non-optimistic managers. That is, the difference in sensitivities between optimistic

CEOs and non-optimistic CEOs, β_4, is positive.

To avoid the possible distortion caused by firm size discrepancy, we follow Frank and Goyal (2003) to normalize the variables related to the financing deficit by using net assets, defined as total assets minus liabilities used for transaction purposes. As Rajan and Zingales (1995) suggest, some liabilities, such as accounts payable, are for trade credit rather than for financing purposes. Normalization by using net assets rather than total assets precludes the influence of liabilities for transaction purposes. To ensure that our results are not driven by this choice, we also normalize the variables by using total assets and obtain similar results. We only present the results of net assets in later sections so as to save space.[4]

As given that our sample pools cross-sectional with time-series data, the changes in debt can also be affected by macro factors not contained in our empirical model. Thus, besides the ordinary least squares (OLS) regressions, we also use two other approaches to estimate the coefficients. One involves the use of panel regressions with yearly fixed and random effects, and the other approach, initiated by Fama and French (2002) and following the spirit of Fama and MacBeth (1973), uses average point estimates from year-by-year cross-sectional regressions and the time-series standard errors of the average point estimates to draw inferences. These different approaches give rise to similar conclusions.

2.2 Data description

Our sample is made up of companies listed on the Taiwan Stock Exchange (TSE) and the Over-the-Counter (OTC) market which are include in the Taiwan Economic Journal database (TEJ). We collect the items required in this study from yearly financial statements covering the period from 1989 to 2004. We choose 1989 as our

[4] All the results not reported in this paper are available from the authors.

starting year because it is the first year in which cash flow statements started to include all the required variables. Firms in the financial industries or with fiscal years ending in months other than December are excluded.[5] To avoid survivorship bias (e.g., Kothari, Shanken, and Sloan, 1995), we remove data prior to a firm's IPO and include all delisted firms.

The managers investigated here are CEOs. A prevalent view in much of the finance literature and business press is that CEOs are key decision-makers in the determination of corporate practices (e.g., Bertrand and Schoar, 2003; and Adams and Ferreira, 2005). Therefore, we assume that the general financing policy or the ultimate financing decisions are made by the CEOs. Since the regulatory agency, the Securities and Futures Bureau (SFB), requires a monthly report from companies on shareholdings by directors at the end of the previous month, we are able to infer who the CEO is within the period by referring to from the monthly directors' shareholdings data. Some CEOs simultaneously control more than one firm. To avoid distorting our results due to cross-sectional correlation between firm-year observations arising due to having the same CEOs, we exclude these CEOs from our sample.[6]

The context of our managerial optimism measure involves management forecasts for earnings before tax. The data forecasts are point estimates and contain both mandatory forecasts from 1991 and voluntary forecasts from 1985. The former are required by the regulatory agency, while the latter are disclosed by firms through the media[7]. Since optimistic CEOs systematically overestimate the firms' future

[5] There are very few Taiwanese companies (less than 2%) whose fiscal year differs from the calendar year. These firms are typically utilities, whose incentives to prepare earnings forecasts and financing behaviors may be distinct those of other firms.

[6] In out untabulated test, in which we also include these firm observations as if they have different CEOs, the main results are similar. Therefore, this issue is not critical.

[7] Legislation covering statements of the quantitative forecasts was established in 1991 (and abolished in 2002) by the regulation "Criteria Governing the Offering and Issuance of Securities by Securities Issuers," which requires that a company publicizes a prospectus containing an estimate of profits for

performance, regardless of whether they are required to do this or do so voluntarily; we retain both mandatory and voluntary forecasts in our sample. The forecasts are also required to be released before the last day of the current fiscal year.

Unfortunately, the forecasts in the database are attributed to the whole management team rather than a specific publisher. We assume that the forecasts are made by CEOs. It is plausible to regard the forecast as the consensus of the whole management team, with the CEO having the final say in the team. We match the monthly directors' shareholdings with the data forecasts, identify whether the CEOs are optimistic (as discussed below), and then link the optimism measures to firms' financing data. We also repeat our research methodology by assuming that the President of the Board and the Chief Financial Officer (CFO), respectively, are the key determinants of the financing policy and the forecasts. The results are similar under these alternative assumptions, although in later sections, we do not report them so as to save space.

2.3 Managerial optimism measure

Given that a CEO's optimism in assessing a future outcome is likely to lead to a forecast above actual earnings, we define a forecast error (FE) as the difference between the CEO's forecast and actual (or realized) earnings:

$$FE \equiv \text{CEO's } \textit{forecast value} - \text{Actual (or } \textit{realized}\text{) } \textit{value}. \quad (3)$$

We regard a forecast as "overestimated (underestimated)" if the forecast error is positive (negative) and classify the optimism of the CEOs in the sample based on the relative frequency of overestimated forecasts to underestimated ones.

However, a major concern of the classification is the evidence presented in the earlier literature to the effect that managers may have incentives other than optimism

reasons such as an IPO or Seasoned Equity Offering (SEO), a merger or acquisition, and the acquisition or the disposition of major assets. Some British Commonwealth countries, such as Singapore, Canada, Malaysia and the UK, also have similar regulations for mandatory forecasts.

to deliberately make forecasts above or below actual earnings. To minimize the measurement error, before seeking to identify optimism we exclude forecasts that may be contaminated by incentives. We focus attention on three kind of potential incentives described as follows:

First, as indicated in previous literature (e.g., Jelic, Saadouni, and Briston, 1998; Chin et al., 1999; Lang and Lundholm, 2000; Core, 2001), in order to launch equity offerings at a favorable price, managers may temporarily boost the stock price prior to the issuance by releasing overestimated forecasts. We regard forecasts as possibly tainted by managers' incentives for stock offerings if managers disclose forecasts in a certain period prior to the equity offerings. Determining a proper certain period is another empirical problem. For example, Marquardt and Weidman (1998) document a significantly positive association between managerial participation and the voluntary disclosure of earnings forecasts in the nine-month period prior to registering the offering in the U.S.. We choose twelve months as the period so that the forecasts are orthogonal to actual earnings.[8] That is, we delete forecasts if managers conduct equity offerings within twelve months of the forecasts.

Second, due to employment concerns, managers of financially-distressed firms may release overestimated forecasts prior to such distress to mislead investors, even if the "cheating" only pertains for a short while. Potential penalties, like legal liability, loss of reputation, and a higher cost of capital, are ineffective in discouraging such forecasts, because managers are unlikely to keep their positions long enough to be punished (e.g., Koch, 1999; Irani, 2003). The prior literature also gives supporting empirical evidence (e.g., Frost, 1997; Betker, Ferris and Lawless, 1999; Koch, 1999;

[8] For example, managers may publish overestimated forecasts in January for equity offerings in December and then revise the forecasts downwards later in the fiscal year. Choosing a period shorter than twelve months is not able to clearly preclude the incentive effects.

Irani, 2003). We collect on which firms experience financial distress events (as given by the TEJ) and interpret the forecasts as being possibly on account of managers' incentives if the firm experienced financial distress events and the forecast is released within two years prior to the distress. The choice of a two-year period is based on the evidence that bankruptcy can be predicted by venerable models such as Z-Score and ZETA® using data compiled two statements prior to the events (see, Altman, 2000).

Third, managers may act in their own self-interest to profit from trading. Managers may publish overestimated (underestimated) forecasts, and then sell (buy) shares within a short period. Consistent with this conjecture, Noe (1999) finds that insider trading is higher after the release of a forecast. To detect whether a forecast may be trading-motivated, we collect information on expected earnings and month-end directors' shareholdings. If a forecast is lower (higher) than what the market expected and the company directors increase (decrease) their shareholdings within three months of the forecast, we assume that the forecast is trading-motivated and delete it. The "expected earnings" here is the latest forecast available from either management or analysts for that fiscal year. If there are no such forecasts, we use the actual earnings of the previous year as the market expectations. As for the choice of three-month period, we argue that the effects of the trading-motivated forecasts will be disturbed by the information provided by the quarterly earnings announcement. Managers will tend to trade shares within a period of one quarter of the trading-motivated forecasts. A concern regarding the use of monthly shareholdings is that it may not capture all the trading-motivated forecasts. The month-end shareholding may be unchanged even though the trading occurs, i.e. the directors may acquire (sell) shares and sell (repurchase) them within the same month. Because of the

law, however, insiders will not have incentives to engage in such kinds of trading.[9]

In spite of all these exclusions, there may be some forecasts that are contaminated by incentives but not captured. For instance, insiders may trade through untraceable accounts. To further minimize the potential measurement errors in relation to optimism, we examine only the last forecast for a fiscal year after discarding all the aforementioned forecasts. Managers in Taiwanese companies often first release overestimated forecasts deliberately to give investors an overly optimistic view of the firms' prospects, and then revise the forecasts downwards later in the fiscal year (e.g., Chin et al., 1999). They will then minimize their manipulation in the final set of forecasts to avoid being punished by the regulatory agency when the forecasts are proven false.[10]

Insert Table 1 about here

Table 1 describes the number and distribution of earnings forecasts over time. Panel A details the number of forecasts in the optimism identification process and the subsequent regression analysis. We start with 8,967 forecasts. After eliminating forecasts that may be contaminated by incentives related to stock offerings, financial distress and insider trading, we lose 4,706 forecasts. Of these lost forecasts, 26.65% are for stock offerings, 20.57% are for financial distress, and the other 52.78% are for insider trading.[11] About 73% of the lost forecasts because of insider trading come

[9] To prevent the unfair use of inside information, the Securities and Exchange Law permits the company to recover any profit which the director, supervisor, or manager realizes from any purchase and sale or sale and purchase of any equity security of the company within a period of less than six months.

[10] The TSFEC issued the regulation "Guidelines for Disclosure of Financial Forecasts by Public Companies," which permits the firms to revise their forecasts before the actual earnings are published, and stipulates a penalty if the last forecasted earnings diverge more than 20% from actual earnings. Aside from a penalty, the companies may not be allowed to finance their future capital needs from the capital market.

[11] The percentages are approximate since the elimination process is sequential. However, the focus here is that, among the three incentives, most of the lost forecasts are due to insider trading.

from the selling motivation. After the "last-forecast" filter we have 2,939 forecasts published by 1,385 different CEOs. *A priori*, the incentives apart from the insider buying motivation will induce managers to publish overestimated forecasts. We also observe that the forecasts eliminated in the process are, on average, more overestimated than those remain. The mean normalized (by total assets at the fiscal year end) forecast errors are 3.10% and 1.07% (untabulated) for the initial 8,967 forecasts and the remaining 2,939 forecasts, respectively.

We now turn to identify the sample CEOs' optimism through the forecasts that do not reflect incentives. For each CEO who has at least two forecasts during his/her tenure, we calculate the percentage of his/her forecasts that are overestimated. We then define a CEO as being optimistic if the percentage is equal to or larger than 50 percent. The purpose behind taking the CEOs with only one forecast away is to minimize the possibility that a CEO is misclassified as being optimism when in fact he/she overestimates for some other transitory reasons or just by chance. Among the 1,385 CEOs with forecasts that do not reflect incentives, 638 CEOs have only one forecast and are excluded from the analysis; and we are able to classify the other 747 CEOs by means of the remaining 2,301 forecasts. In the later regression analysis, we further lose some observations. Finally, we analyze a sample of 591 CEOs with 1,931 forecasts. As for the distribution of these forecasts over time, we observe that in Panel B of Table 1 the number of forecasts increases with each year until 2001. This reflects the fact that there are more firms listed on the TSE and OTC in recent years. On the other hand, the number of forecasts gradually diminishes after 2002. This may be for two reasons: First, from a legal point of view, the regulation covering the mandatory forecasts was abolished in 2002 (see, footnote 7), so that managers are not required to publish forecasts for specific scenarios. The second reason is related to the

"two-forecast" constraint. For example, some CEOs took up their positions in 2004 and have been dropped since they have only one forecast. Therefore, the remaining forecasts in 2004 don't include these dropped CEOs. By contrast, forecasts in 2002 may be published by CEOs who took up their positions in 2002, since these CEOs would have at least two forecasts and would therefore be included in the analysis.

Another observation in Panel B of Table 1 is that the number of forecasts is higher in April, August, October, and December. This is probably because in these months, the CEOs are more aware of the firms' performance in regard to the requirement to publicize quarterly or yearly financial reports. This explanation is also consistent with the argument in the earlier literature (e.g., Ami and Ganzach, 1998) that forecasters are likely to use their previous actual earnings and modify them on the basis of new information as they make predictions.[12]

Insert Table 2 about here

As we impose the two-forecast constraint, a potential drawback is that having only two forecasts may still not be large enough to conclude that a CEO is optimistic, since the forecasts errors may be random rather than reflecting a behavioral trait of the CEO. The results of the CEOs' classification in Panel A of Table 2, however, are able to alleviate this concern. We see that in the first row, around 70% of the CEOs are classified as being optimistic. The pattern whereby most CEOs display optimism is exhibited at all levels of forecasts number rather than just at the lower forecast levels. Given that we use stricter criteria to exclude forecasts arising from incentives rather than optimism, and that the forecasts eliminated in the analytical process are on average more overestimated than those remain; this pattern should not be altered

[12] Given in Panel B of Table 1 that approximately one sixth of the forecasts are in December, we also follow prior literature (see, McNichols, 1989) to replicate all the analysis without these forecasts in December. The results are similar.

under looser criteria. Nonetheless, to ensure that our main empirical results do not mostly stem from those CEOs with fewer forecasts, we also impose stricter constraints whereby CEOs are identified unless they have more forecasts. As we will see in Table 7, the bulk of our results are similar so that the numbers of forecasts CEOs have will not be a critical issue.

Another concern of the identification is that a CEO is classified as optimistic if the percentage of the CEO's forecasts that are overestimated is equal to or larger than 50 percent. One may argue that the "50 percent" criterion is somewhat arbitrary since a CEO with close to 50 percent overestimated forecasts may not exhibit optimism. In Panel B of Table 2 we report the distribution of the CEOs over the percentages and observe that for most of the optimistic CEOs the percentage is far from 50 percent. About 52% (=217/415) of the optimistic CEOs have in excess of 80 percent overestimated forecasts and another 30% (=123/415) more than 60 percent (and less than 80 percent) of overestimated forecasts. In an attempt to further circumvent this concern, we also examine whether our main results are derived from CEOs with a larger percentage of overestimated forecasts as compared with those with a smaller percentage. We find that the results mainly come from the former (see, Table 8).

3. Empirical Results

3.1 Preliminary results

Insert Table 3 about here

Panel A of Table 3 shows the summary statistics of the firm data. We see that in our sample period, the average amount of the financing deficits is 598.27 million New Taiwan (NT) dollars. Among the different components of Equation (1), investment is the major source of the deficits, and the needs are primarily covered by net debt issues. After normalization, these results are similar. By examining the average normalized

fund flows over time during 1989-2004 in Panel B; we find that the average deficits rise gradually prior to 2000 and then decline after 2001. A possible explanation is related to the economic trend. In Taiwan, the growth rate of Gross Domestic Product (GDP) after 2001 is the lowest in our sample period.[13] During the recession, firms have a lower working capital, invest less, distribute more cash to investors, and raise less funds through external financing. Both the net debt and the net equity issues also reach a local peak during the period 1997-2000. The average of the net equity issues is larger than that of the net debt issues in earlier periods. However, the importance of the net debt relative to the net equity issues grows over time. After 2001, the average of the net equity issues reduces to only approximately one fifth of the average net debt issues.

Given the silent prediction in the case of the CEOs that have a surplus, in Panel C of Table 3 we split the overall sample into two sub-samples. The first consists of about 64% of the observations where the financial slack is exhausted and the second the other 36% where the CEOs have a surplus. At first glance, the importance of debt relative to equity use seems to be understated without the division. In the first two columns the absolute value of the average net debt issues is much larger than that of the average net equity issues. When CEOs have to cover their financing needs, on average, 62% (=0.0949/0.1532) of the deficits are met by debt issues. With a surplus, CEOs tend to reduce their reliance on external funds in the future by paying off debt and even issuing some equity. This observation regarding such surpluses is somewhat related to the legislation. Taiwanese companies were not allowed to repurchase their own shares until late in the year 2000.[14] As a consequence, within most of our sample

[13] The yearly average growth rates of GDP during the 1989-2000 and 2001-2004 periods are 6.43%, and 2.69%, respectively.

[14] Legislation covering the share repurchase was established in August 2000 by the "Regulations Governing Share Repurchase by Listed and OTC Companies," which allows companies listed on the

period CEOs were only able to retire the debt when they had a surplus. However, it should be noted that the rapid drop in the net equity issues after 2001 does not originate from the legislation. CEOs' attitudes regarding the surplus remain after the repurchase is allowed. While the average deficit is -0.560, the average net debt issues and the average net equity issues are -0.522 and -0.038 (untabulated), respectively, for the period after 2001.

In Panel D of Table 3 we also divide the samples according to the extent of the managerial optimism. We confirm the result that the importance of debt relative to equity use is more pronounced for the optimistic CEOs. For all samples, in the first two columns, the ratios of net debt issues to total external financing are 53% and 49% for the optimistic and the non-optimistic CEOs, respectively. For the observations where the financial slack is exhausted, in the next two columns, the ratios of net debt issues to total external financing increase respectively to 63% and 60%. When there is a surplus, the behavior of optimistic CEOs is more likely to reduce the reliance on external funds in the future. The results in the rightmost two columns show that, on average, optimistic CEOs issue, whereas non-optimistic retire, some equity. However, given such a tiny amount of the absolute value of the average net equity issues relative to the net debt issues, as well as the silent prediction, the comparison among the surpluses may not be overly emphasized.

3.2 Main results

Table 4 shows the main results of this paper. Panel A presents the slope coefficients of the OLS regression results for net debt issues only in relation to financing deficits, as used in Shaym-Sunder and Myers (1999) and Frank and Goyal (2003). In the first column, we see that for the overall sample, the slope coefficient or

Taiwan Stock Exchange (TSE) and the Over-the-Counter (OTC) market to buy their own shares back from the market upon the approval of a majority of the directors in certain situations.

equivalently the net-debt-issue/financing-deficit sensitivity is 0.44. For the optimistic CEOs the sensitivity is 0.45. As the overall sample is partitioned into two sub-samples according to the sign of the financing deficits, we also observe that in the second column, given the positive deficits, the coefficients are 0.35 for the optimistic CEOs.

Insert Table 4 about here

Heaton's (2002) model predicts that optimistic managers will follow a pecking order financing preference. Originally, Shaym-Sunder and Myers (1999) suggest that when firms follow the pecking order, a unity slope coefficient should be observed. Given that the coefficients of optimistic CEOs in Panel A of Table 4 are far from one, we argue that it does not conflict with the pecking order according to Chirinko and Singha (2000). Chirinko and Singha show that when managers follow the pecking order, the observed slope coefficient will leave from one because of the equity finance. As a consequence, the unity slope will not be a good indication of the pecking order hypothesis. Under some plausible assumptions, Chirinko and Singha show that in the Shaym-Sunder and Myers' case, even if only 11% of the financing deficits are met by equity financing; the observed slope coefficient is actually 0.74 rather than one when the pecking order hypothesis is true. The observed slope coefficient is decreasing in terms of the proportion of equity financing. When the proportion of equity financing is 33% or 44%, the observed slope coefficient falls to 0.40 or 0.27 (see their footnote 6). In our sample period, the ratio of the equity issue to the financing deficit is 36.51% (=218.43/598.27). Equity issues indeed will leave the coefficient far from one. It seems improper here, however, to test whether or not optimistic managers follow the pecking order preference.

While the pecking order hypothesis in its strong form cannot be tested here, this does not mean that the effect of managerial optimism on financing deficits is ignored.

By comparing optimistic with non-optimistic CEOs, we are able to observe a relationship between managerial optimism and corporate external financing decisions. In the first two columns of Panel A, the net-debt-issue/financing-deficit sensitivities for optimistic CEOs are larger than those for non-optimistic CEOs. The differences in the slope coefficients between optimistic and non-optimistic CEOs are both 0.06. By having to cover their financing needs, optimistic CEOs tend to issue more debt than non-optimistic CEOs. In Panel B, we statistically test for the difference in the slope coefficients between optimistic and non-optimistic CEOs through Equation (2) without the conventional set of explanatory variables, i.e. the regressions for debt issues on financing deficits and optimism measure. In the first two columns, in the case of both the overall sample and the positive-deficit sub-sample, the OLS coefficients on the interaction between the financing deficit and the optimism dummy variable or equivalently, the differences in terms of the slope coefficients between optimistic and non-optimistic CEOs, are significant at the 1% level. These results are basically consistent with the hypothesis.

By contrast, for the negative-deficit sub-sample, we find that in the rightmost column of Panel A, the slope coefficients are unanimously close to unity, regardless of whether CEOs are optimistic or not. The difference in the slope coefficients between optimistic and non-optimistic CEOs in the rightmost column of Panel B, is -0.01 and insignificant.[15] The legislative restriction for shares repurchase in Taiwan can account for only part of the result. In untabulated test we also use the sub-sample after the repurchase is allowed, i.e. after 2001. The results are similar. In short, the differences in the sensitivities between optimistic and non-optimistic CEOs are mainly related to

[15] Because of rounding, the optimism-measure/financing-deficit interaction coefficient in Panel B may not exactly equal the difference in the slope coefficients between the optimistic and non-optimistic CEOs in Panel A.

the behaviors of exhibited to cover financing needs. Since throughout this paper the evidence supporting the hypothesis is similar for both the overall sample and the positive-deficit sub-sample, we report only the results for the overall sample hereinafter in this paper so as to save the space.

Insert Table 5 about here

To ensure that our results are not affected by the omitted variables, in Table 5 we further include the conventional variables in Equation (2) and the macro factors seen in Table 3 through the panel regressions with yearly fixed and random effects, as well as the approach proposed in Fama and French (2002). The first column reports the OLS tests. We find that the coefficients for the interaction term of the financing deficit with the optimism dummy variable are still significantly positive. As for the conventional variables, we find that the coefficients are statistically insignificant in regard to tangibility and log sales. This result echoes the small degree of consensus on the correlation of the explanatory variables with leverage in the literature. According to Harris and Raviv (1991), tangibility may have either a positive or negative correlation with the leverage ratio. From the point of view of information asymmetry, firms with few tangible assets have greater information asymmetry problems, tend to issue more debt, and become more highly leveraged. Another view, based on the agency costs of debt, predicts that firms with more tangible assets will take on more debt. Lenders will incur fewer agency costs of debt and will prefer to supply loans when firms have more tangible assets. The prediction of log sales, which proxies for firm size, is also ambiguous. Size may be an indicator of information asymmetry, since small firms suffer larger information costs and tend to issue more debt. On the other hand, size may also be an inverse indicator of the bankruptcy probability and positively related to debt issues.

On the contrary, the coefficients are significantly negative in regard to the market-to-book ratio and profitability. The former result is consistent with the arguments in Myers (1977) that firms expecting high future growth, or equivalently have high market-to-book ratios, should retain the ability to seize opportunities when they appear by paying off current debt. This latter result reconciles with the pecking order hypothesis in that, when there is profitability, firms prefer to finance their activities with internal funds rather than by taking on more debt.[16] In columns 2 to 4 of Table 5 we also find that for all the estimation methods, the aforementioned results are similar. This finding again confirms the relationship between managerial optimism and financing decisions.

3.3 Is the optimism measure proper?

A concern for our results is that the optimism measure might be improper. Prior literature argues that information asymmetry problems also have an impact on debt use and the net-debt-issue/financing-deficit sensitivities. Since the information asymmetry problems between the firms and the investors can be eliminated by earnings forecasts, the potential contemporaneous correlation between the forecasts and the information asymmetry problems cannot be ignored. In this case, there is a risk that the optimism measure constructed through these forecasts is related to information asymmetry problems. As a consequence, the significance of the optimism-measure/financing-deficit interaction coefficients may be in fact a result of information asymmetry rather than optimism.

Insert Table 6 about here

We use some firm characteristics tied to problems of information asymmetry

[16] Another conflicting view on the effects of profitability is mentioned in Jensen (1986), which predicts a positive effect if the market is effective in corporate control, and firms are forced to issue debt to commit towards paying out cash.

such as firm size, age, ownership concentration, and market-to-book ratio, to observe if the CEOs classified as optimistic face larger information asymmetry problems. We collect the firms' listed dates, and calculate the average book assets, the average monthly shareholding rate of the directors, and the average market-to-book ratios for each of the CEOs during their tenure. Then we compute the averages of optimistic CEOs and of non-optimistic CEOs respectively. If the optimism measure is related to information asymmetry, we should see that the CEOs classified as optimistic here control smaller, younger, less concentrated, or higher growth firms, i.e. firms with larger information asymmetry problems; and a significant difference between the averages of optimistic CEOs and of non-optimistic CEOs should be observed. For instance, if optimistic CEOs bear a larger information asymmetry problem, the average firm size of optimistic CEOs should be significantly smaller than that of non-optimistic CEOs. Results in Table 6, however, do not support this conjecture. For all of the characteristics, none of them exhibits a significant difference between optimistic and non-optimistic CEOs.

To further consider the concern of the contemporaneous correlation between the forecasts and the debt use due to information asymmetry problems, we separate the period of forecasts used to measure optimism from that in the regressions by removing the contemporaneous forecasts. Specifically, before Table 6 the optimism measure used as an independent variable is defined using the whole sample period, which overlaps with the dependent variable. For each observation in the regression, which stands for the behavior of a CEO in a single year t, we define corresponding optimism using that CEO's forecasts in a non-overlapping period with a one year gap, i.e. prior to year t-1. It is noteworthy that the treatment also allows for the managerial optimism to become time-varying; that is, for a CEO's financing behaviors during two

different periods, the corresponding managerial optimism for that CEO may differ. Moreover, this treatment is able to detect the potential endogeneity; that is, after making financing decisions, CEOs may become optimistic for whatever reason and disclose overestimated forecasts. The downside of the treatment is that using less "qualified" forecasts to classify CEOs decreases the sample size and enlarges the measurement error. As the number of firm-year observations declines from 2,997 to 1,111, in Panel A of Table 7 we still find that the coefficients of the interaction term are significantly positive for all estimation methods.

Insert Table 7 about here

In Panel A we also observe that the coefficients of the financing deficit are about 0.7, much larger than what we observed in Table 4. Since there are two differences between Table 7 and Table 4: the definition of optimism and the sample size, we further distinguish the source by using the sub-sample in Table 7 and the optimism definition in Table 4. In the untabulated tests, for all estimation methods the coefficients on the financing deficit of various estimation methods range from 0.77 to 0.79.[17] The result suggests that the source of the difference is the sample in composition. In Table 7, by using periods before financing decisions to define optimism, we in fact require a CEO to stay on the job for at least two years to be included in the sample. Therefore, differences between Tables 4 and 7 suggest that CEOs may use relatively less debt financing for a given deficit during their first few years of tenure.[18] A possible explanation is that the labor market updates the beliefs

[17] Besides the sub-sample in Table 7, we also run remaining (in Table 4 but not in Table 7) sub-samples and find that the coefficients on the financing deficit of various estimation methods range from 0.31 to 0.33. The results are not reported here.

[18] We also formally test whether CEOs may exhibit lower sensitivities during their early in tenure by constructing a dummy variable that equals 1 if the financing policy is observed after the third year of the CEO's tenure. The OLS coefficients are 0.36 and 0.38, respectively, on the financing deficit and the interaction term of the financing deficit with the dummy variable.

of CEOs' abilities over time. Concerns over their future career prod younger CEOs to adopt financing decisions that are less dependent on riskier debt. A similar finding in Chevalier and Ellison (1999) show that younger American mutual fund managers adopt herding behavior due to career concern.

As we exclude forecasts that may be contaminated by effects such as stock offering incentive in constructing the measure, one may argue that CEOs using equity financing and with fewer forecasts may be excluded in the analysis, and the main results may be due to the treatment of the data. A priori, if optimism CEOs really use more debt financing than non-optimistic ones, firm-year observations dropped due to the incentive of stock offerings here should be more likely to belong to the non-optimistic rather than optimistic CEOs. Subsequently, an upward bias of the net-debt-issue/financing-deficit sensitivities should be more pronounced in the non-optimistic CEOs, and the difference of the between optimistic and non-optimistic CEOs is underestimated. In Panel B of Table 7, we also repeat our research methodology, but in the construction of the optimism measure we do not exclude forecasts that may be contaminated by incentives of equity offerings. Under this treatment, additional 75 (untabulated) CEOs are included. For the 591 sample CEOs, the classification result changes only for 24 CEOs. Still, about 70% of the CEOs (including these additional ones) are identified optimistic. The number of the firm-year observations increases from 2,997 to 3,252, whereas the percentage of the observations with optimistic CEOs reduces slightly from 70.80% (=2,122/2,997) to 69.96% (=2,275/3,252). Compared to Table 5, in the first column of Panel B the OLS coefficients decrease to 0.35 on the financing-deficit, while increase to 0.14 on the optimism-measure/financing-deficit interaction. These results are in line with the above conjecture.

To further substantiate our use of earnings forecasts as a measure of optimism, we also measure optimism with the CEOs' stockholdings as in Malmendier and Tate (2005a). CEOs are exposed to their firms' idiosyncratic risk. Their personal wealth, reputation, and employability are linked to their firm's performance, however, CEOs cannot hedge their risk by short-selling stocks of their company. Therefore, Malmendier and Tate argue that CEOs should minimize their holdings of company stock. CEOs who are optimistic about future outcomes will repeatedly increase their equity positions early in their tenure in order to benefit from expected future gains.

Empirically, a measure based on stockholdings requires a sufficiently long tenure for the CEO and a properly defined term "early in tenure". Malmendier and Tate (2005a) use a sample of CEOs who have been in their positions for at least ten years, and define a CEO's first five years as the definition period for "early in tenure". However, in our sample only 82 CEOs (untabulated) have a tenure of more than ten years. Since the median of the tenure are about five years (62 months), we confine our sample to CEOs having at least five years tenure at a listed company, and use three years as the basis for the "early in tenure" designation. Specifically, we use CEOs' stockholding rates for their first three years in tenure to define optimism.[19] After computing the CEOs' average yearly dividend-adjusted shareholding rates for their first three years of tenure, we classify them as optimistic if their average shareholding rates increase for at least two years. We then use only the CEOs' financing behavior after the fifth year of their tenure to estimate equation (3). Among the 591 sample CEOs, there are 253 left in the regressions, and about 55% of the remain CEOs are

[19] Stock option grants will not affect the calculation here for two reasons. First, the number of option grants in hand reflects compensations decided by the board of directors rather than CEOs themselves. Second, Taiwanese companies are not allowed to issue employee stock options until 2001 (see, the "Regulations Governing the Offering and Issuance of Securities by Securities Issuers"). Given that the end of our sample period is 2004, the vesting restrictions naturally separate the option grants from the stock purchases in looking at CEO shareholdings.

identified optimistic. The correlation of the measure from forecasts with that from stockholdings is positive, though fairly weak (0.09). We also find that in Panel C of Table 7, the significance of the coefficients on the interaction term remains for all the estimation methods. The result is still similar for the optimism measure from stockholdings.

As described in the section 2, another potential drawback of the optimism measure is the inclusion of the CEOs with fewer forecasts, i.e. two-forecast constraint. The main empirical results may mainly stem from these CEOs, whose forecasts errors may be random rather than reflecting optimism. However, we already saw in Table 2 that most CEOs display optimism exhibits at all levels of forecasts number rather than just the fewer forecasts levels. In Panel D of Table 7 sample CEOs are also identified whenever they have more (three to seven) forecasts during their tenure; and rerun the OLS regressions of Equation (3). The results show that the five of the six coefficients on the optimism-measure/financing-deficit interaction are still significantly positive. It seems that the main results are not due to the two-forecast constraint.

Insert Table 8 about here

In preceding analysis we define managerial optimism dichotomously; that is, CEOs are identified either optimistic or not. One may argue that even optimistic CEOs may have different extent of optimism. As mentioned in section 2, a CEO with close to 50 percent overestimated forecasts may not exhibit optimism. To take this concern into account, in the final robustness check we use the percentage of the sample CEOs' overestimated forecasts during the CEO's tenure to distinguish the magnitude of managerial optimism. The sample CEOs are then classified into five

groups according to the percentages.[20] For each group we regress the net debt issues on financing deficits and observe the coefficient on the financing deficit. In Table 8 we find that the OLS regression coefficients on the financing deficit for the most and the least optimistic CEOs are respectively 0.50 and 0.27. The difference of the net-debt-issue/financing-deficit sensitivities between optimistic and non-optimistic CEOs in earlier tables is more likely to originate from the CEOs with extreme percentages. In short, predictions for the relation between managerial optimism and external financing behaviors are empirically supported and consistent.

4. Conclusions

In spite of the influence of the pecking order theory on corporate finance theories, recent evidence indicates that the driving force may not be the information asymmetry. Heaton (2002) theoretically shows that a specification of personal characteristic, managerial optimism, is also to lead to managers' pecking order preference. This paper empirically tests Heaton's argument, and explores the extent to which managerial optimism provides a satisfactory explanation for the financing decisions of listed Taiwanese firms.

Given the difficulty to find out a proper proxy for managerial optimism in carrying out the empirical research, the evidence related to managerial optimism is rare. We propose a measure of optimism from their earnings forecasts. This measure is helpful to test the theoretical predictions for the behaviors of optimistic managers. To avoid a misidentification due to other incentives, we carefully eliminate biased forecasts that may be contaminated by effects such as stock offerings, financial distress, and insiders' trading. Even using stricter criteria and removing these forecasts from the sample, we still find that 70% of the CEOs meeting our selection criteria are

[20] We do not classify the sample CEOs into quintiles because for near one-third of the sample CEOs all of their forecasts are overestimated, i.e. the percentage is one.

classified as optimistic.

Focusing on whether pecking order hypothesis performs better for optimistic managers, we apply Shaym-Sunder and Myers' (1999) approach and regress the net debt issues on the financing deficit, the optimism measure, and the interaction of optimism and the financing deficit. We find a strong positive relation between the sensitivity of net debt issues to financing deficits and managerial optimism. That is, the sensitivities between the net debt issues and financing deficits for optimistic managers are larger than those for non-optimistic ones. The result is very robust and confirms the role of managerial optimism in corporate financing decisions. Compared to prior evidence that correlates the financing decisions from the view of information asymmetry, this paper makes a contribution by providing evidence of an alternative source from which financing policies are impacted.

Appendix: variable definitions

Variable name	Definition
1. Measure of optimism	
Measure of optimism constructed from management earnings forecasts	Dummy variable equals to 1 for a CEO if the percentage of his/her overestimated forecasts during the tenure is equal to or larger than 50 percent.
Overestimated	Forecast error is positive.
Forecast error	CEO's forecast for earnings before tax – Actual earnings before tax.
Measure of optimism constructed from stockholdings	Dummy variable equals to 1 for the CEOs if they have been in their position for at least five years and if their average dividend-adjusted shareholding rates increase for at least two of the first three years in tenure.
Dividend-adjusted Shareholdings	Shares adjusted for earning reserve and capital reserve.
2. Test for optimism measures and external financing decisions	
Net debt issues (ΔD)	Increase (decrease) short-term debt+ Increase (decrease) long-term debt + Bond issued + Bond redeemed
Net equity issues (ΔE)	Proceed new issue + Decrease (increase) treasury stocks
Financing deficit (DEF)	Cash dividends + net investment + change in working capital – internal cash flow
Cash Dividends (Div)	Dividends paid +Director and employee bonus paid
Net investment (I)	Sale (purchase) short-term investment (investment purpose) + Decrease (increase) of derivative for investment + Sale long-term investment + Purchase long-term investment+ Sale fixed assets + Purchase fixed assets + Cash paid-merging
Change in working capital (ΔW)	Decrease (increase) in A/R and N/R + Decrease (increase) – inventories + Other adjustment operating + change in cash and cash equivalents
Internal cash flow (C)	Net income current + Non-cash extraordinary depreciation + Depreciation + Amortization + Investment income (equity method) +Investment loss (equity method) +Cash dividend long-term investment + Loss (gain) disposal short-term investment + Decrease (increase) short-term investment trading + Decrease (increase) of derivative for trade + Loss (gain) disposal fixed assets + Loss (gain) disposal Long-term investment + Provision (Reversal of reserve)
Tangibility of assets	Total fixed assets / Total assets
Q	Market value of total assets/Book value of total assets
Market value of total assets	Market capitalization + Total liabilities
Book value of total assets	Total assets
Log sales	Ln [Net sales]
Profitability	Return on asset (Earnings before interests and depreciation)
Net book assets	Total assets - Total current liabilities + Bill issued + short-term borrowing + Current of long-term debt

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Table 1

Number and distribution of management forecasts over time

Panel A: The details in the optimism identification process and the regression analysis

	Firm	CEO	Forecast
Forecasts in the TEJ database	1,130	1,808	8,967
Less: Forecasts possibly due to incentives rather than optimism:			
1.Forecasts that the firms conduct stock offerings within twelve months of the forecast			
2.Forecasts that are released within two years before the financial distress			
3.Forecasts that are viewed as bad [good] news by the market and the shareholding of director increases [decreases] within three months of the forecast			
Forecasts that meet any one of the above three criteria		(398)	(4,706)
Less: Forecasts that are not the last for the fiscal year		(25)	(1,322)
	1,049	1,385	2,939
Less: Forecasts by CEOs who have only one forecast		(638)	(638)
	643	747	2,301
Less: Treatment in the regression analysis			
1. Firms with other missing financing data			
2. CEOs whose tenure do not contain any whole fiscal years			
		(156)	(370)
Sample used to identify managerial optimism	511	591	1,931

Panel B: Distribution of forecasts over year and over month

Year	Number	Month	Number
1985	13	1	163
1986	17	2	109
1987	17	3	130
1988	20	4	252
1989	18	5	112
1990	33	6	127
1991	73	7	87
1992	50	8	163
1993	62	9	92
1994	60	10	248
1995	100	11	142
1996	100	12	306
1997	104		1,931
1998	148		
1999	180		
2000	228		
2001	239		
2002	221		
2003	143		
2004	105		
	1,931		

Table 2

The CEOs classification results

The sample period is from 1989 through 2004. We identify whether a CEO is optimistic if he/she has at least two forecasts, and classify the CEO as optimistic if the percentage of the CEOs' overestimated forecasts is equal to or larger than 50 percent.

Panel A: Percentage of optimistic CEOs, by number of forecasts CEOs have

Number of forecasts CEOs have	Number of total CEOs	Number of optimistic CEOs	Number of non-optimistic CEOs	Percentage of optimistic CEOs (%)
Total	591	415	176	70.22
2	235	164	71	69.79
3	179	123	56	68.72
4	75	53	22	70.67
5	45	34	11	75.56
6	28	23	5	82.14
≧7	29	18	11	62.07

Panel B: Distribution of the CEOs over the percentage of the CEOs' forecasts that are overestimated

Percentage of the CEOs' forecasts that are overestimated (%)	Number of CEOs	
<20	64	(10.83%)
[20, 40)	60	(10.15%)
[40, 60)	127	(21.49%)
[60, 80)	123	(20.81%)
≧80	217	(36.72%)
Total	591	(100.00%)

Table 3

Summary statistics, 1989-2004

In Panel A variables from "book value of total assets" to "internal cash flow" are in million of New Taiwan dollars. Panel B presents average corporate fund flows in a form of Equation (1), $DEF_{it} = Div_{it} + I_{it} + \Delta W_{it} - C_{it} = \Delta D_{it} + \Delta E_{it}$ over time; all the variables are normalized by the net assets. Panel C splits the overall sample into two sub-samples. The first consists of the observations where the financial slack is exhausted ($DEF > 0$), and the second the other where the CEOs have a surplus ($DEF < 0$). Panel D divides the samples according to the sign of financing deficits and the extent of the managerial optimism. The definitions of the variables refer to the Appendix.

Panel A: All sample

Variable name	Obs.	Mean	Median	Standard deviations	Minimum	Maximum
Book value of total assets	2997	12,023.22	5,090.21	25,188.93	343.80	317,384.95
Book value of debt	2997	5,143.90	1,885.08	11,464.18	47.55	164,657.19
Net debt issues	2997	379.84	30.00	2,064.43	-13,579.56	34,409.86
Net equity issues	2997	218.43	0.00	1,362.96	-4,599.64	37,035.71
Financing deficit (DEF)	2997	598.27	73.92	2,775.88	-11,840.97	68,940.55
Cash dividends	2997	164.62	7.01	621.46	0.00	11,904.02
△Working capital	2997	119.15	27.05	1,157.41	-10,975.62	20,517.18
Investments	2997	1,059.87	257.36	3,741.87	-7,106.00	84,398.10
Internal cash flow	2997	745.36	213.20	2,813.31	-9,906.15	57,085.79
Net debt issues/net assets	2997	0.0404	0.0101	0.1386	-0.4535	2.2414
Net equity issues/net assets	2997	0.0375	0.0000	0.1585	-0.1583	1.2125
Financing deficit/net assets	2997	0.0778	0.0234	0.2135	-0.3953	3.7752
Cash dividends/net assets	2997	0.0158	0.0020	0.0262	0.0000	0.2882
△Working capital/net assets	2997	0.0200	0.0079	0.1375	-4.0947	1.7321
Investment/net assets	2997	0.1107	0.0705	0.1738	-0.3246	3.4679
Internal cash flow/net assets	2997	0.0686	0.0629	0.1398	-3.6605	0.6135
Debt ratio	2997	0.3945	0.3920	0.1553	0.0208	0.9641
Log sales	2997	14.9784	14.8722	1.2247	9.4251	19.8597
Market-to-book	2997	1.6363	1.3754	1.0534	0.2796	7.6922
Tangibility	2997	0.3386	0.3308	0.1942	0.0012	0.9716
Return on assets	2997	0.0441	0.0441	0.0762	-0.3902	0.7561

Panel B: Average corporate normalized fund flows over time

	1989-1992	1993-1996	1997-2000	2001-2004
Number of observations	224	611	905	1257
Cash dividends	0.0157	0.0125	0.0102	0.0213
△Working capital	0.0194	0.0400	0.0279	0.0047
Investments	0.1349	0.1318	0.1424	0.0732
Internal cash flow	0.0886	0.0773	0.0553	0.0703
Financing deficit	0.0814	0.1070	0.1251	0.0290
Net debt issues	0.0231	0.0507	0.0600	0.0243
Net equity issues	0.0583	0.0563	0.0652	0.0047
Total external financing	0.0814	0.1070	0.1251	0.0290

Panel C: Average corporate normalized fund flows, by the sign of financing deficits (DEF)

	All (n=2997)	DEF≧0 (n=1912)	DEF<0 (n=1085)
Net debt issues	0.0404	0.0949	-0.0557
Net equity issues	0.0375	0.0583	0.0007
Total external financing	0.0778	0.1532	-0.0550

Panel D: Average corporate normalized fund flows for observations, by the sign of financing deficits and the extent of managerial optimism

	All (n=2997)		DEF≧0 (n=1912)		DEF<0 (n=1085)	
	Optimistic CEOs	Non-optimistic CEOs	Optimistic CEOs	Non-optimistic CEOs	Optimistic CEOs	Non-optimistic CEOs
Number of observations	2122	875	1383	529	739	346
Net debt issues	0.0444	0.0307	0.0997	0.0824	-0.0592	-0.0484
Net equity issues	0.0396	0.0323	0.0597	0.0547	0.0020	-0.0019
Total external financing	0.0840	0.0630	0.1594	0.1372	-0.0572	-0.0503

Table 4

OLS regression analysis of the sensitivities between net debt issues and financing deficits (DEF)

The sample period is 1989-2004. The dependent variable is the net debt issues scaled by net assets. The definitions of the variables refer to the Appendix. In Panel A the independent variable is the normalized financing deficits; but the intercept coefficients are suppressed so as to save the space. In Panels B the independent variables are the normalized financing deficits, optimism measure, and the interaction of the normalized financing deficit and the optimism measure, i.e. Equation (2) without the conventional set of explanatory variables. The definitions of all the variables refer to the Appendix. The hypothesis is that in Panel A, for the all sample (the first column) and the positive-deficit sub-sample (the second column) the coefficients on the financing deficit are larger for optimistic CEOs than non-optimistic CEOs; or equivalently, in the first two columns of Panel B, the coefficients on the interaction of the financing deficit and the optimism measure is positive. t-statistics are reported in parentheses. ***, **, and * respectively denote significant levels at 1%, 5%, and 10%.

Panel A: Slope coefficients of OLS regressions: net debt issues on financing deficits, by the sign of the financing deficits and the extent of managerial optimism

	All sample	DEF≧0	DEF<0
All	0.44***	0.33***	0.97***
CEOs	(49.40)	(29.06)	(54.76)
Optimistic	0.45***	0.35***	0.96***
CEOs	(43.71)	(26.43)	(38.66)
Non-optimistic	0.39***	0.29***	0.98***
CEOs	(22.98)	(12.44)	(61.25)

Panel B: Coefficients of OLS regressions: net debt issues on financing deficits and optimism measure, by the sign of financing deficits

	All sample	DEF≧0	DEF<0
Intercept (× 100)	0.60*	4.32***	0.07
	(1.66)	(7.28)	(0.30)
Financing deficit	0.39***	0.29***	0.98***
	(22.67)	(12.74)	(31.14)
Optimism measure (× 100)	0.06	0.05	-0.47
	(0.13)	(0.94)	(1.64)
Financing deficit × Optimism measure	0.06***	0.06***	-0.01
	(2.92)	(2.58)	(0.32)
R-square	0.45	0.31	0.74

Table 5

Test of the net-debt-issue/financing-deficit sensitivities difference between optimistic CEOs and non-optimistic CEOs, controlling for macro effects and conventional variables

The sample period is 1989-2004. The dependent variable is the debt issues scaled by net assets. The definitions of the variables refer to the Appendix. The independent variables are the normalized financing deficits, optimism measure, the interaction of the normalized financing deficit and the optimism measure, and the conventional set of explanatory variables; i.e. Equation (2). Sample firms are classified as 19 industries according to their two-digit industry classification codes. 18 industry dummy variables are included in the regression as additional control variables but the corresponding coefficients are suppressed so as to save the space. The alternative hypothesis is that the coefficient on the interaction of financing deficit and the optimism measure is positive. The observations are 2,997. In the first three columns t-statistics are reported in parentheses. *** denotes significant levels at 1%. In the rightmost column, the regressions are run for each year of 1989-2004 period (16 years). The regression coefficients are the means of those across years. The t-statistics in parentheses are defined as the mean divided by the standard error, the time series stand deviation of the regression coefficient divided by four. The critical t-value, proposed in Fama and French (2002, p.12 footnote 1), is adjusted with first-order autocorrelation from 1.96 to make inferences. [a] denotes the significance of the coefficient; that is, the absolute value of t-statistic is larger that of the adjusted critical t-value.

	OLS regressions	Yearly fixed effects	Yearly random effects	Average of cross sectional regressions
Intercept (× 100)	2.13	4.90***	2.01	1.66
	(1.55)	(3.20)	(1.43)	(1.44)
Financing deficit	0.40***	0.40***	0.40***	0.56[a]
	(22.70)	(22.91)	(22.88)	(28.79)
Optimism measure (× 100)	-0.01	-0.10	-0.06	-0.11
	(-0.02)	(-0.22)	(-0.14)	(-0.23)
Financing deficit × Optimism measure	0.06***	0.07***	0.06***	0.03[a]
	(2.96)	(3.34)	(3.22)	(3.26)
ΔTangibility (× 100)	3.62	3.95	3.80	8.58
	(1.16)	(1.26)	(1.22)	(1.97)
ΔMarket-to-book (× 100)	-0.94***	-1.09***	-1.01***	-1.94[a]
	(-5.25)	(-5.54)	(-5.37)	(-4.63)
ΔLog sales (× 100)	0.73	0.60	0.63	2.05[a]
	(1.46)	(1.20)	(1.25)	(2.42)
ΔProfitability (× 100)	-0.09***	-0.10***	-0.10***	-0.04
	(-2.91)	(-3.18)	(-3.11)	(-0.73)
R-square	0.46	0.47	0.46	

Table 6

The optimism measure and proxies for information asymmetry

The table presents the results of the tests that whether the CEOs classified as optimistic face a larger information asymmetry problem. We apply four proxies for information asymmetry including firm size, age, ownership concentration, and market-to-book ratio. Firm size is the book assets at the beginning of the fiscal year (in million of New Taiwan dollars). Age is computed by listed date (in years). The ownership concentration is the shareholding rate of directors (in percentage). The market-to-book ratio is calculated at the end of the fiscal year. For each of the CEOs during the tenure, we collect the firms' listed dates and calculate the average book assets, the average monthly shareholding rate of directors, and the average market-to-book ratios; then we compute the averages of optimistic CEOs and of non-optimistic CEOs respectively. The numbers of optimistic and non-optimistic CEOs are respectively 419 and 172. The null hypothesis is that for each proxy, the average number of optimistic CEOs equals that of non-optimistic CEOs.

Proxy	Average of		Absolute value of t-statistic	P-value
	Optimistic CEOs	Non-optimistic CEOs		
Firm Size	10,252.31	13,644.68	1.39	0.1656
Age	12.10	12.32	0.23	0.8168
Ownership concentration	25.63	25.41	0.17	0.8612
Market-to-book ratio	1.57	1.65	1.12	0.2627

Table 7

Regressions of debt issues on financing deficits and alternative optimism measures

The sample period is 1989-2004. The dependent variable is the debt issues scaled by net assets. The definitions of the variables refer to the Appendix. The independent variables are the normalized financing deficits, optimism measure, the interaction of the normalized financing deficit and the optimism measure, and the conventional set of explanatory variables; i.e. Equation (2). Only the coefficients on the normalized financing deficits and on the interaction of the normalized financing deficit and the optimism measure are reported here so as to save the space. In Panel A, for each observation in year t in the regression, we define that CEO's optimism using forecasts before year t-1. In Panel B, in the construction of the optimism measure, we do not exclude forecasts that may be contaminated by incentives for equity offerings. In Panel C, we define optimism based on the CEOs' stockholding behavior in their first three years in tenure, but exclude the first four years from regressions. In Panel D, we define optimism whenever a CEO has at least x (from 2 to 7) forecasts during his/her tenure. The alternative hypothesis is that the coefficient on the interaction of the financing deficit and the optimism measure is positive. The observations are respectively 1,111, 3,252, and 1,030 for Panels A to C. Except the rightmost column of Panels A to C t-statistics are reported in parentheses. ***, **, and * respectively denote significant levels at 1%, 5%, and 10%. In the rightmost column of Panels A to C, the regressions are run for each year of 1989-2004 period (16 years). The regression coefficients are the means of those across years. The t-statistics in parentheses are defined as the mean divided by the standard error, the time series stand deviation of the regression coefficient divided by four. The critical t-value is adjusted with first-order autocorrelation from 1.96 to make inferences. ^{a} denotes the significance of the coefficient; that is, the absolute value of t-statistic is larger that of the adjusted critical t-value.

	OLS regressions	Yearly fixed effects	Yearly random effects	Average of cross sectional regressions
Panel A: The period of forecasts used to measure optimism is prior to that in the regressions				
Financing deficit	0.70***	0.71***	0.71***	0.80^{a}
	(34.90)	(35.26)	(35.24)	(44.85)
Financing deficit × Optimism measure	0.06**	0.06**	0.06**	0.03^{a}
	(2.34)	(2.17)	(2.21)	(2.04)
Panel B: Optimism measure constructed from forecasts containing those related to equity offerings				
Financing deficit	0.35***	0.36***	0.36***	0.54^{a}
	(27.93)	(28.50)	(28.38)	(31.72)
Financing deficit × Optimism measure	0.14***	0.14***	0.15***	0.07^{a}
	(8.87)	(9.51)	(9.30)	(5.99)
Panel C: Optimism measure constructed from stockholdings				
Financing deficit	0.55***	0.55***	0.55***	0.62^{a}
	(41.89)	(41.48)	(41.70)	(41.97)
Financing deficit × Optimism measure	0.05*	0.06**	0.05**	0.04^{a}
	(2.16)	(2.39)	(2.29)	(4.27)

Panel D: Optimistic measure with an "x-forecast" constraint (OLS regressions)

	Full Sample (x=2)	x=3	x=4	x=5	x=6	x=7
Financing deficit	0.40***	0.32***	0.51***	0.37***	0.39***	0.95***
	(22.70)	(17.51)	(19.06)	(11.07)	(9.59)	(9.73)
Financing deficit × Optimism measure	0.06***	0.28***	0.16***	0.34***	0.30***	-0.32***
	(2.96)	(12.43)	(5.29)	(8.87)	(6.45)	(-3.10)
R-square	0.46	0.52	0.60	0.64	0.63	0.61
Observations	2997	2118	1352	919	553	317

Table 8

OLS regressions of net debt issues on financing deficits, by the percentage of the CEOs' overestimated forecasts

The sample period is 1989-2004. The dependent variable is the debt issues scaled by net assets. The definitions of the variables refer to the Appendix. The independent variable is the normalized financing deficits. After eliminating forecasts that may be contaminated by incentive effects, for each sample CEO who has at least two forecasts during the tenure we calculate the percentage of his/her forecasts that are overestimated, i.e. the forecast value above the actual (realized) value. The sample CEOs are then classified into five groups according to the percentages. The hypothesis is that the coefficients on the financing deficit of the CEOs in the larger percentage (more optimistic) groups are larger than those in the smaller (less optimistic) ones. ***, **, and * respectively denote significant levels at 1%, 5%, and 10%.

	Full Sample	Sub-samples according to the percentage of the CEOs' overestimated forecasts				
		<20% (The least Optimistic)	[20%, 40%)	[40%, 60%)	[60%, 80%)	≧80% (The most Optimistic)
Intercept	0.65***	2.05**	-0.43	0.43	0.85**	0.32
(× 100)	(3.25)	(0.56)	(0.91)	(1.02)	(0.14)	(0.87)
Financing	0.44***	0.27***	0.51***	0.43***	0.42***	0.50***
deficit	(49.40)	(8.93)	(22.25)	(22.13)	(29.49)	(27.60)
R-square	0.45	0.24	0.58	0.44	0.46	0.51
Observations	2997	365	258	622	747	1005