行政院國家科學委員會專題研究計畫　成果報告

經理人財務預測及企業投資行為關係之研究

計畫類別：個別型計畫
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計畫主持人：陳明賢

計畫參與人員：林岳祥

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行政院國家科學委員會補助專題研究計畫成果報告

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計畫類別：V□個別型計畫　　□整合型計畫

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□出席國際學術會議心得報告及發表之論文各一份

□國際合作研究計畫國外研究報告書一份

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一、中文摘要

本計畫檢視經理人個人的特質(Characteristics)對公司融資決策的影響。本計畫將蒐集經理人的個人資料，並利用經理人個人的公司持股與財務預測資料，提出一個衡量經理人是否過度樂觀(Optimism)的指標。本計畫將檢測：一、過度樂觀的經理人，其公司內部資金與舉債程度之關聯性是否較沒有過度樂觀的經理人的大；二、公司內部資金與舉債程度之關聯性是否會受到經理人個人特質的影響。本計畫將利用台灣上市、上櫃公司之財務資料來檢測上述分析，此一分析可以讓我們瞭解公司融資決策的影響因素，除了代理問題與資訊不對稱之外，經理人個人的特質是否也是另一種可能的解釋。

本研究實證結果發現，69%台灣企業之高階主管具有過度樂觀的特質。這種過度樂觀現象，或許可以解釋台灣經理人之具有偏高之盈餘預測現象。我們也發現在融資途徑有限制的企業，樂觀經理人會比不樂觀的經理人具有更高的投資決策對現金流量之敏感性。

本文經改寫後，在 94 年 2 月間業經國外著名期刊 Pacific Basin Finance Journal 接受，並將於今年稍後發表登出。

Abstract

This paper proposes a measure of managerial optimism from their earnings forecasts. The measure is helpful to test the theoretical predictions for the behaviors of optimistic managers. We find that 69% of the CEOs meeting our selection criteria are classified as optimistic. The results indicate that managerial optimism may be a possible reason for the upward bias in management forecasts in Taiwan.

Focusing on whether cash flow plays a relatively more important role in investment decisions for optimistic managers than for non-optimistic managers, we find that in Taiwanese companies, optimistic managers exhibit higher investment-cash flow sensitivity than do non-optimistic managers. Compared to prior literature that agency or information asymmetry problems results in the investment-cash flow sensitivity, this paper makes a contribution by providing evidence of an alternative source from which corporate decisions are impacted. The evidence proposes that managerial optimism plays a role in their investment decisions.

JEL Classification: G31; G32

Keywords: Managerial optimism; Investment; Financing constraints

Managerial Optimism and Corporate Investment:

Some Empirical Evidence from Taiwan

1. Introduction

This paper aims to examine the impact of managerial irrationality on corporate policies. We focus on the role of managerial optimism in explaining a firm's investing decisions. Optimism here is a personal characteristic, which describes a manager's systematic overestimation of a firm's future performance.

The cognitive psychology literature suggests that most people naturally display optimistic expectations about the future. Managers are particularly prone to exhibit optimism in their decision-making. In his well-known paper on this subject, Roll (1986) argues that managerial optimism (i.e. hubris) results in "winner's curse" when it comes to corporate takeovers. Recently, there has been a growing amount of research into the impact of managerial optimism on various corporate decisions. DeAngelo, DeAngelo, and Skinner (1996) show that managerial optimism may cause a firm's dividend to go up. Hackbarth (2002) proposes that optimistic managers will choose higher leverage and follow a pecking order. 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.

As for the investment decisions specifically, Heaton (2002) shows that the existence of managerial optimism may result in a distorted investment policy, in forms of either underinvestment or overinvestment, without invoking the traditional theories of agency and information asymmetry. Due to the systematic overvaluation of the projects, optimistic managers may invest in negative NPV projects with sufficient

internal funds. Once internal funds are exhausted and firms are constrained, because of overestimating the probability of good firm performance versus the capital market's outlook, optimistic managers have the tendency to perceive the market as undervaluing their own firm. They will be reluctant to issue new equity, and then reject positive NPV projects. The twist here is that managerial optimism could increase the sensitivity between corporate investment and cash flow in constrained firms. This is so because optimistic managers will invest more than non-optimistic managers do when the cash flows are ample, and less when the cash flows are insufficient.

Even the empirical prediction is clear; however, empirical evidence for the hypothesis is relatively rare due to a lack of the proxy for managerial optimism. Using the Chief Executive Officer's (CEO's) personal portfolio of the firm's options and stockholdings of American companies, Malmendier and Tate (2005) construct measures of managerial overconfidence and find that in American companies, managerial overconfidence affects the investment-cash flow sensitivity.[1] Given the importance of this subject, we believe that additional tests are warranted. To provide a robustness check of Heaton's (2002) model, we use listed companies in Taiwan as the sample. To the best of our knowledge, this paper is the first empirical study outside of the United States on the relation between managerial optimism and corporate investment decisions.

Another contribution of this paper is to provide an alternative measure of

[1] According to 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. Melmendier and Tate (2005) label their measure as "overconfidence;" however, the rationale of Heaton's (2002) model depends only on whether managers indeed possess an upward bias towards future firm performance, whether this bias is a result of their optimism or overconfidence. Therefore, we do not discriminate between overconfidence and optimism hereinafter in this paper.

optimism using management earnings forecasts. If CEOs are optimistic in the assessment of future outcomes, they are more likely to provide a forecast that is biased upward. An important merit of management earnings forecasts is their prevalence because in most countries, earnings forecasts are allowed and legislatively regulated. The measure constructed from earnings forecasts could be similarly established in these countries.

We classify each CEO in our sample as optimistic if the number of the CEO's upwardly-biased forecasts is more than that of the downwardly-biased. However, an obstacle of the classification is that CEOs may have reasons other than optimism to deliberately bias their forecasts. To address this concern, we exclude all those forecasts that may be contaminated by incentive effects in constructing the measure. For example, intending to make a stock offering, some firms may temporarily boost their stock price by releasing upwardly-biased forecasts. Therefore, if a firm conducts any stock offerings within 12 months after the forecasts, we regard these forecasts as tainted by the CEOs' incentives and remove them from the sample.

To ensure that whether a firm is constrained is properly identified, we follow the literature of "financing constraints" to use several classifications of firms. We find that managerial optimism increases investment-cash flow sensitivity for constrained companies under the different sample splits. This finding is consistent with Heaton's (2002) prediction.

The rest of this paper is organized as follows. Section 2 describes 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 Hypothesis

In Heaton's (2002) model, optimistic managers will overvalue both their investment projects and firms. The overvaluation of the projects causes optimistic managers invest more than non-optimistic managers do with sufficient internal funds. Once internal funds are exhausted and firms are constrained, optimistic managers overestimate the probability of good firm performance versus the capital market's outlook and perceive the market as undervaluing their own firm. Therefore, they will be reluctant to issue new equity, and then invest less than non-optimistic managers do. Thus, the hypothesis for the impact of managerial optimism on the investment-cash flow sensitivity is:

Hypothesis: In constrained firms, the investment-cash flow sensitivity is larger for optimistic managers than non-optimistic managers.

To test this hypothesis, we use a constrained subsample to run the following empirical model:

$$I_{it} = \beta_1 + \beta_2 C_{it} + \beta_3 Q_{it-1} + \beta_4 O_i + \beta_5 C_{it} Q_{it-1} + \beta_6 C_{it} O_i + \varepsilon_{it}, \quad (1)$$

where I is the investment, C is the cash flow from operation, Q is the ratio of market value to book value of equity, and O is the dummy variable (i.e. the optimism measure) which is 1 if the manager is classified optimistic and 0 if he/she is not. To avoid possible distortion caused by firm size discrepancy, we normalize the investment and the cash flow by total assets at the beginning of the fiscal year. The hypothesis predicts that β_6, the coefficient on the interaction of cash flow and the optimism dummy variable, is positive.

Another important issue to test the hypothesis is the identification of the extent of firms' financing constraints. We follow the literature of "financing constraints" and use several classifications to split our sample firms into two groups: one is more constrained and the other less constrained.

The dividend payout is the first classification. If the external financing for a firm is costly, the firm should retain its cash and pay low cash dividends out. For each firm, we calculate the ratio of the number of years with non-zero cash dividend to that in our sample period. Then we rank all firms from small to large by the ratios and define the smaller 50% firms as more constrained and the larger 50% firms as less constrained.

The second classification here is interest coverage. Firms with high interest expenses relative to earnings are likely to have limited access to debt market and face the borrowing constraints. For each firm we calculate its average interest coverage, the ratio of interest expense to the sum of the interest expense and the cash flow, in our sample period. Then we rank the firms from large to small by the averages and define the larger 50% firms as more constrained and the smaller 50% firms as less constrained.

Some literature identifies financing constraints by firm characteristics which are tied to problems of agency or asymmetric information.[2] We use firm characteristics which are tied to problems of asymmetric information or agency. Firms are more likely to involve a problem of information asymmetry or agency, and have a larger financing cost if they are smaller firm size, younger, manufacturing, not in business groups,. less concentrated ownership, or less cash flow rights of the controlling shareholder. For each characteristic except industry and business group affiliation, we rank the firms by the average of the characteristics in the sample period and split sample firms into two groups: one is more constrained and the other less constrained.

2.2 Sample

Our sample consists of the companies listing on the Taiwan Stock Exchange

[2] See a related review by Hubbard (1998).

(TSE) and the Over the Counter (OTC) during the period from 1985 through 2002. Except the business groups' information, collected from *the Business Groups in Taiwan*, other data employed in this paper are from Taiwan Economic Journal database (TEJ).

The context of our measures involves management forecasts for earnings before tax. The earnings forecasts data contain both mandatory forecasts from 1991 and voluntary forecasts from 1985. The mandatory forecasts are required by the regulatory agency, Securities and Futures Commission (SFC) and the voluntary forecasts are disclosed by firms through the media.[3] Contrary to most literature, which studies voluntary forecasts or mandatory forecasts only, we retain both mandatory forecasts and voluntary forecasts in our sample since optimistic managers should have overestimations of earnings; whether they are required or voluntary to publish forecasts. Some of the voluntary forecasts in the sample are in fact estimated by the media reporter through the interview. We drop these observations. We also eliminate the forecasts that are not released within the same fiscal year.

The forecasts don't record the publisher; however, optimism is a personal characteristic. Although the forecasts may be the consensus of the whole management team, we assume that the CEO has the final say in the team, and that the forecasts are made by CEOs. The screenings lead to a sample of 8,711 forecasts released by 1,386 CEOs in 869 different companies.

2.3 The managerial optimism measure

Given that a CEO's optimism in assessing future outcome is likely to result in

[3] Legislation covering the quantitative forecasts of statement was firstly established in 1991 by the regulation "Criteria Governing the Offering and Issuance of Securities by Securities Issuers," which requires a company to publicize a prospectus to contain an estimate of profits for reasons such as IPO or SEO, merge or acquisition, and the acquisition or the disposition of main assets. Some British Commonwealth countries, like Singapore, Canada, Malaysia and the UK, also have similar regulations for mandatory forecasts.

upwardly-biased forecasts, we classify whether a CEO is optimistic if he/she has at least two forecasts and define a CEO to be optimistic if there are more upwardly-biased forecasts than downwardly-biased forecasts during the CEO's tenure. A forecast is defined as upward-biased if the forecast error is positive, where the definition of forecast error in this paper is

$$FE \equiv Manager's\ forecast\ for\ earnings\ before\ tax - Actual\ earnings\ before\ tax\ . \quad (2)$$

However, previous literature confirms that managers may also have other incentives to bias their forecasts. To address the concern that the measure may reflect managers' incentives other than their optimism, we exclude from the measure construction any forecasts that may be contaminated by incentive effects. We detect three potential incentives and then remove forecasts from the sample if they meet any one of the following three criteria:

First, intending to make stock offerings at a favorable price, some firms may temporarily boost their stock price by releasing upwardly-biased forecasts. We regard forecasts as possibly tainted by managers' incentives for stock offerings and delete them if a firm conducts an equity offering within 12 months of the forecast. Second, for employment concerns, managers of financial distressed firms may release upwardly-biased forecasts to mislead investors; even 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. We interpret the forecasts as possibly due to managers' incentives if the firm had experienced financial distress and the forecast is released within 24 months before the distress. Third, managers may act in self-interest to profit from trading. Managers may publish upwardly-biased (downwardly-biased) forecasts, and then sell (buy) shares. 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. "Expected earnings" 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. Despite all these exclusions, the measure construction process may fail to capture all the forecasts contaminated by incentive effects. To alleviate this problem, we only examine the last forecast for a fiscal year after discarding all the aforementioned forecasts.

3. Empirical Results

Insert Table 1 about here

Table 1 presents the classification results of the CEOs. We find that 69% of the CEOs are classified as optimistic. In addition, most CEOs display optimism at all levels of forecasts number. Excluding forecasts that may be contaminated by incentive effects, we conjecture that managerial optimism may be a possible reason for the upward bias of management forecasts in Taiwan.

Insert Table 2 about here

Table 2 presents the OLS regression coefficients for the investment-cash flow sensitivity. Column 2 provides evidence that aside from agency and information asymmetry view, managerial optimism may also be an explanation to impact the investment-cash flow sensitivity. We see that the coefficient on interaction term of cash flow with the optimism dummy variable is positive and significant at a 1% level. Columns 3 to 10 report the OLS regression coefficients for the more constrained subsample. We observe that the coefficients on the optimism measure-cash flow interaction term range from 0.10 to 0.49. Moreover, the coefficients are significant at

a 1% level for seven out of eight classifications. This is consistent with the hypothesis that in constrained firms, the investment-cash flow sensitivities are larger for optimistic managers than non-optimistic managers.

4. Conclusions

Compared to other areas of behavioral finance, literature for the impact of managerial optimism on corporate decisions is relatively rare. This paper proposes a measure of managerial optimism from their earnings forecasts. The 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 insider trading. Even removing these forecasts from the sample; we still find that 69% of the CEOs meeting our selection criteria are classified as optimistic. The results indicate that managerial optimism may be a possible reason for the upward bias in management forecasts in Taiwan.

We explore the extent to which managerial optimism provides a satisfactory explanation for the investment decisions of listed Taiwanese firms. Focusing on whether cash flow plays a relatively more important role in investment decisions for optimistic managers than for non-optimistic managers, we use several classifications to identify whether firm is more financing constrained, and then regress the investment on the cash flow, the optimism measure, and the interaction of optimism and the cash flow using the more constrained firms. We find that in Taiwanese companies, optimistic managers exhibit higher investment-cash flow sensitivity than do non-optimistic managers. Compared to prior literature that agency or information asymmetry problems results in the investment-cash flow sensitivity, this paper makes a contribution by providing evidence of an alternative source from which corporate

decisions are impacted. The evidence proposes that managerial optimism plays a role in their investment decisions.

Appendix A: variable definitions

Variable name	Definition
1. Measure of optimism	
Measure of optimism constructed from management earnings forecasts	Dummy variable equals to 1 for the CEOs if they have at least two earnings forecasts and if the number of upward-biased forecasts is more than that of downward-biased forecasts in their forecasts.
Upward bias	Forecast Error is positive.
Downward bias	Forecast Error is negative.
Forecast error	Management 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 keep their position as CEO for at least five years and if their average dividend-adjusted shareholdings 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 and investment	
Investment	-(Purchase) fix assets -Sale fix assets.
Cash flow	Earnings before interest, taxes, depreciation, and amortization (EBITDA).
Q	Ln[1+ (Market value of equity/Book value of equity)]
Market value of equity	Market capitalization.
Book value of equity	Total assets -Total liabilities +Miscellaneous long-term liabilities -Preferred stocks
Lagged assets	Total assets at the beginning of the fiscal year
3. Classifications for more constrained firms	
Dividend payout	The ratio of the number of years with non-zero cash dividend to that in the sample period
Interest coverage	The ratio of interest expense to the sum of the interest expense and the cash flow
Firm size	Total assets
Age	The number of years the firm had been listed
Business group affiliation	Whether a firm is in a business group (from *the business Groups in Taiwan*)
Industry	SFC Sector
Ownership concentration	Directors and supervisors' shareholdings rate (%)
Cash flow right of the controlling shareholder	The average cash flow rights of the ultimate controlling shareholders

Appendix B: Number of management forecasts, 1985-2002

	Firm	CEO	Forecast
Number of the sample	869	1,386	8,711
Less: Forecasts possibly due to incentives rather than optimism:			
1. Forecasts that the firms conduct stock offerings within 12 months of the forecast			
2. Forecasts that are released within 24 months 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	(213)	(470)	(5,346)
Less: Forecasts that are not the last for the fiscal year	____	(20)	(1,148)
	656	896	2,217
Less: Forecasts by CEOs who have only one forecast	(222)	(355)	(355)
	434	541	1,862
Less: Treatment in the regression analysis			
1. Firms with other missing financing data			
2. CEOs whose tenure do not contain any whole fiscal years			
	(22)	(34)	(103)
Subsample analyzed in this paper	412	507	1,759

Appendix C: Summary statistics

All variables except age are over 1985-2002. The definitions of the variables refer to the Appendix. Tenure is in months; average shareholdings within tenure is in thousand shares; average shareholdings rate within tenure, dividend payout, interest coverage, ownership concentration, and cash flow right of the controlling shareholder are in percentage; asset, investment, and cash flow are in million of new Taiwan dollars; Age is in years. Due to a lack of data, some classifications for defining firms' more constraints may not include all of the firms in the regressions.

Panel A: CEO data

Variable name	Obs.	Mean	Median	Standard deviations	Minimum	Maximum
Tenure	507	73.59	68.00	37.74	14.00	214.00
Average shareholdings within tenure	507	13,557.31	4,648.50	34,678.95	1.00	406,711.42
Average shareholdings rate within tenure	507	6.52	3.38	8.90	1.6E-6	59.73

Panel B: Firm data

Panel B-1: Variables in the regression analysis						
Variable name	Obs.	Mean	Median	Standard deviations	Minimum	Maximum
Asset	2,124	11,285.20	5,008.31	22,151.11	343.80	317,384.95
Investment	2,124	668.64	150.48	2,495.83	36.00	75,296.64
Investment normalized by lagged assets	2,124	0.06	0.03	0.09	2.0E-5	1.53
Cash flow	2,124	1,191.56	397.14	3,142.70	-6,436.51	77,418.26
Cash flow normalized by lagged assets	2,124	0.11	0.10	0.10	-0.28	1.10
Q	2,124	0.97	0.94	0.44	0.13	2.77
Panel B-2: Classifications that are ranking the firms and defining firms' more constraints						
Dividend payout	355	36.76	33.33	16.67	5.56	100.00
Interest coverage	412	18.95	15.47	20.30	-95.65	148.33
Firm size	412	9,058.71	3,774.54	18,182.41	478.57	169,715.78
Age	412	9.90	7.00	8.80	2.00	41.00
Ownership concentration	412	26.77	24.41	12.91	6.74	76.94
Cash flow right of the controlling shareholder	164	13.94	11.00	11.99	0.00	66.02

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Table 1

Proportion of optimistic CEOs

This table presents the proportion of optimistic CEOs in Taiwanese companies under our measure. We identify whether the CEO is optimistic if he/she has at least two forecasts, and classify CEOs as optimistic if there are more upwardly-biased forecasts than downwardly-biased forecasts during their tenure.

Number of forecasts CEOs have	Number of total CEOs	Number of optimistic CEOs	Number of non-optimistic CEOs	Proportion of optimistic CEOs (%)
2	212	147	65	69.34
3	123	89	34	72.36
4	61	43	18	70.49
5	43	25	18	58.14
6	27	18	9	66.67
7	17	14	3	82.35
≧8	24	14	10	58.33
Total	507	350	157	69.03

Table 2

OLS regressions of investment on cash flow and optimism measure

The dependent variable is investment. The definitions of the variables refer to the Appendix. To avoid possible distortion caused by firm size discrepancy, we normalize the investment and the cash flow by total assets at the beginning of the fiscal year. The alternative hypothesis is that the coefficient on the interaction of cash flow and the optimism measure is positive. ***, **, and * denote significant levels at 1%, 5%, and 10% respectively.

	Full sample		More constrained subsample firms							
			Dividend payout	Interest coverage	Size	Age	Group affiliation	Industry	Ownership concentration	Cash flow right
Intercept (× 100)	1.68***	1.81**	4.09***	3.38***	1.85*	3.06	3.37***	2.85***	3.25***	5.66***
Cash flow	0.22***	0.10*	0.19**	0.09*	0.14*	0.25**	0.10	0.11**	0.10*	-0.02
Q (× 100)	2.51***	3.15***	-0.04	0.79***	1.19***	0.22	0.45	0.84***	0.55	0.55***
Optimism measure(× 100)		-1.32**	-2.53**	-1.44*	0.57	-1.17	-1.24	-1.25*	-1.17	-4.68***
Cash flow × Q		0.01	0.04*	-0.01	-0.04	0.01	0.02	0.01	0.03	0.01
Cash flow × Optimism measure		0.19***	0.31***	0.17***	0.10	0.31***	0.27***	0.28***	0.30***	0.49***
Adjusted R-square	0.11	0.13	0.22	0.13	0.06	0.22	0.15	0.15	0.17	0.14
Observations	2124	2124	788	1027	729	623	989	1834	1167	626