



Investor sentiment, executive compensation, and corporate investment

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ABSTRACT

We develop a model that predicts corporate investment level increases with investors' optimism and that the relationship between investment level and executive compensation depends on investor sentiment and other parameters. The empirical test shows that optimism is significantly and positively related to the level of investment and that executive compensation is insignificantly related to the level of investment. The managerial share ownership is positively related to the level of investment, conditional on the degree of optimism. The empirical results suggest that executives make investment decisions that not only cater to investor sentiment but also reflect their own interest in the company.

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1. Introduction

Classical theory states that a share price should reflect investors' rational expectations about the share's future cash flow; so, there should be no relationship between the share price and the amount of corporate investment given the firms' fundamentals, such as the potential payoff from current investments. Consistent with this theory, a number of papers find little additional explanatory power above the fundamentals of share prices for investments at both the firm level and the aggregate level (Morck et al., 1990; Blanchard et al., 1993). In contrast to the classical theory, which gives no role to investor sentiment in the determination of corporate investment, Stein (1996) argues that if the apparent required return on a share is not a reflection of the share's fundamental risk but is rather the reflection of investor sentiment, e.g., an investor's overestimation of the share's future payoff, then investment decisions will depend on investor sentiment. For example, if investors are overly optimistic, a manager seeking to maximize the current share price should adopt an aggressive investment policy. Following Stein's work, a few empirical papers investigate the effect of investor sentiment on corporate investment. The general finding

of these papers is that corporate investment is positively associated with investor sentiment (Goyal and Yamada, 2004; Baker et al., 2003; Gilchrist et al., 2004; Baker and Wurgler, 2006; Polk and Sapienza, 2009; Dong et al., 2007).

DeLong et al. (1990) develop a model in which investors hold heterogeneous beliefs about a share's fundamental value. The model assumes two types of investors: sophisticated informed investors and uninformed noise traders. The noise traders have biased beliefs about the fundamental value of shares. The authors show that a share price will deviate from its fundamental value if there are limits on the arbitrage activities, sophisticated traders make profit on. Wang (2010) also shows that informed traders trade against the naïve speculative noise traders. The assumptions of DeLong et al. (1990) provide a useful framework to investigate the effect of investor sentiment on corporate investment. In this paper, we contribute to the theoretical literature in terms of developing a model that takes into account the composition of investors in the market and the heterogeneous beliefs of these investors, while investigating the relationships between investor sentiment, executive compensation and corporate investment. Previous empirical tests on the effect of investor sentiment on corporate investment do not consider possible conflicts of interest between shareholders and managers. In this paper, we also make an empirical contribution towards in this gap in knowledge by allowing for an effect of investor sentiment on corporate investment, while

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investigating the relationship between corporate investment decisions and levels of executive compensation.

According to Murphy (1999), the median cash compensation paid to S&P CEOs has more than doubled since 1970, and the median total realized compensation (including gains from exercising stock options) has nearly quadrupled. Our data show that more than 60% of firms in the Execucomp database provide options to their CEOs over the period between 1992 and 2005 (see Table 1). More than 30% of the sample firms also use restricted shares as another incentive in compensation contracts. Tong (2008) finds that changes in CEO ownership are associated with firms' future returns. Sun et al. (2009) report a significant positive association between the amount of a CEO's stock option grants and a firm's future performance as compensation committee quality increases. Agrawal and Mandelker (1987) and Datta et al. (2001) report evidence that supports the view that executive stock option grants provide effective and strong motivation for executives to make value-maximizing investment decisions regarding a firm's acquisitions.

A fundamental reason for the use of equity incentives in executive compensation is the desire by firms to directly link the wealth of executives to share prices while reducing agency costs. However, when a manager's goal is to maximize her personal wealth and she has different opinions from current shareholders about share prices, providing equity incentives may not be an appropriate solution to the agency problem. Due to the undisputed escalation in compensation for top executives and the implications of agency theory, it is important to investigate the effect of compensation structure on corporate investment decisions. In the presence of agency problems, investor sentiment could indirectly affect corporate investment decisions if executives' pay scales are tied to share prices.

A richer model that takes into account investor sentiment and different forms of executive compensation may provide us with further insights into understanding investment decisions made by executives. The model we present in this paper has the following characteristics: the shareholders are risk-averse, and the manager is risk-neutral; the firm has an investment opportunity at time 0, and the payoff of this investment will be realized at time 1 when the firm will be liquidated; the shareholders have heterogeneous beliefs about the investment's payoff, and the manager has an unbiased belief about the payoff (this feature differentiates this research from the research that assumes an overconfident manager, as described in Malmendier and Tate, 2005). There are two types of investors in the world – the informed and the uninformed. The informed investors have unbiased expectations about the firm's expected future cash flow and its volatility, while the uninformed investors have biased expectations. Under these assumptions, we show that the equilibrium share price will be determined by the investor sentiment, the investors' risk aversion and the fraction of the investors who are informed (uninformed).

We develop a hypothesis concerning the relationship between the levels of corporate investment, executive compensation and

investor sentiment. The hypothesis predicts a positive relationship between investment level and investors' optimism and an uncertain relationship between investment level and amount of options (shares) held by the managers. The empirical proxy used to measure investor sentiment is the mispricing component (non-fundamental component) in a firm's *Q* ratio (the ratio of the market value of assets to the current replacement cost of the assets).¹ The sample data include all of the firms in the Compustat/CRSP merged database for the period between 1992 and 2005. We obtain executive compensation data from the Execucomp database. We fit the model using panel data regression, controlling for firm-fixed effects and year-fixed effects, with standard errors corrected for the clustering of residuals at the firm level. The dependent variable is the level of corporate investment, defined as capital expenditure to net PPE (property, plant and equipment) ratio. The independent variables are the proportion of options holdings, the proportion of share holdings, the sentiment proxy as measured by the non-fundamental component in the *Q* ratio, the firm's lagged fundamental *Q* ratio, which captures growth opportunities (we also use an alternative measurement for growth opportunities, which is the firm's assets in place divided by its lagged market value as described in detail in Richardson, 2006),² cash flows, and the interaction between the sentiment proxy and the options (shares) holdings.

We test our hypotheses using the sample that includes all of the top executives reported in Execucomp. The results suggest that neither the options holdings nor the share ownership is significantly associated with the investment level, and that the investment level is significantly and positively associated with the investor sentiment. These results are consistent with the hypothesis that managers seek to pursue an investment strategy that caters to current investor sentiment. The results also show that executives consider their own interest in the company, which is tied to its share price, because conditional on investor sentiment, managerial share ownership is positively related to the level of investment. This result may indicate that, if there is a high degree of investor optimism in the market, a higher proportion of shares held by managers may induce problems due to overinvestment.

This paper is organized as follows: Section 2 develops the model and its predictions, and Section 3 proposes the hypothesis to be tested, depicts the empirical methodologies and data, and analyzes the empirical results. Section 4 presents the conclusions of the paper.

2. The model

The model assumes two types of investors: the informed and the uninformed (this assumption is similar to that in Delong et al., 1990). The informed investors have unbiased beliefs about the fundamental value of the firm and can correctly estimate the mean and the variance of the firm's future cash flows. The uninformed investors have biased beliefs. The model demonstrates that the equilibrium share price depends on investor sentiment, investment decisions, and the fraction of the informed investors in the market. After deriving the share price, we consider the optimal investment decisions assuming that the manager's goal is to

Table 1

Managerial Compensation Forms. This table summarizes the executive compensation that includes options or stocks or both. The sample period is between 1992 and 2005. We obtain the data from the Execucomp database. The data include all of the top executives. The "options" column is for the firms whose top executives only hold options in the fiscal years examined. The "restricted shares" column is for the firms whose top executives only hold restricted shares. The "both" column is for the firms whose top executives hold both restricted shares and options. The "none" column is for the firms whose top executives hold neither options nor restricted shares.

	Sample	Options	Restricted shares	Both	None
Observation	20,289	12,948	0	7,328	13
Percentage (%)	100	63.82	0.00	36.12	0.06

¹ Baker et al. (2003) use *Q* as a proxy for share mispricing. They point out that *Q* could contain information that includes both non-fundamental and fundamental components of a share price. In our empirical model, we run regressions of investment on the mispricing proxy and a number of control variables that control investment opportunities. The procedure for constructing the non-fundamental component of *Q* is described in Rhodes-Kropf et al. (2005). Polk and Sapienza (2009) use discretionary accruals as a proxy for mispricing. We also use discretionary accruals as an alternative proxy for investor sentiment in the robustness test, which gives similar results to our main test.

² We thank an anonymous referee for this suggestion.

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