# Stock Overpricing, Managerial Incentives and Firm Investment

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**Abstract**

This paper examines how managerial compensation structures and market sentiment jointly influence managerial behavior and firm-level investment decisions. Drawing on insights from behavioral and corporate finance, it develops a theoretical framework in which managers, motivated by stock-based compensation and attentive to market expectations, may respond to over-optimistic valuations by increasing investment, even in projects with weak fundamentals, in an effort to signal firm quality. The analysis highlights how information frictions and market sentiment can lead to investment distortions when market valuations deviate from intrinsic value. This framework lays the groundwork for studying firm-level heterogeneity and its role in aggregate misallocation. It also provides a lens through which to interpret episodes of "irrational exuberance," such as the dot-com bubble, and offers tools for quantifying their broader macroeconomic effects.

## 1 Introduction

This paper examines how stock overpricing influences real economic activity through the lens of firm-level investment and aggregate efficiency. While prior literature has highlighted the potential for overpricing to relax financial constraints or facilitate market timing, this study focuses on a distinct mechanism: the catering channel. In this framework, firm managers face imperfect capital markets and valuation-sensitive incentives, i.e., adjusting their investment decisions to align with prevailing investor sentiment, even when such decisions deviate from long-run value maximization.

The core mechanism arises from an information friction: financial markets observe firm investment but cannot directly assess the quality or efficiency of available investment opportunities. As a result, mispricing at the firm level can emerge from a common bias in investors' beliefs, inducing endogenous distortions in firm valuation. Anticipating this, managers strategically cater to sentiment by selecting investment profiles that are perceived favorably by the market, thereby boosting short-term share prices. This behavior generates over- or under-investment at the micro level, depending on the direction of the mispricing.

Importantly, the aggregate implications of this mechanism diverge from those implied by models that feature only financial frictions. In contrast to the financing channel, where investment misallocation stems from heterogeneous access to capital, the catering channel operates even in environments with frictionless financing and may generate inefficient investment booms concentrated in firms with low marginal efficiency of capital.

Motivated by empirical findings such as those in Polk and Sapienza (2009) and Warusawitharana and Whited (2016), this chapter develops a formal framework to assess the equilibrium consequences of catering-driven investment under stock overpricing. The model endogenizes both firm behavior and market mispricing, and is used to evaluate the extent to which stock overpricing induces aggregate inefficiencies via the reallocation of investment toward sentiment-aligned but economically unproductive uses. The mechanism provides a theoretical explanation for episodes such as the dot-com bubble of the late 1990s, as well as other historical periods characterized by "irrational exuberance."

# 2 Analytical Insights in a Three-period Environment

I develop a three-period model demonstrating that, under information asymmetry and a specific compensation structure, firm managers respond to market sentiment by over-investing when the market is overly optimistic. This strategic over-investment leads to stock overpricing, which in turn increases managerial compensation.

## 2.1 Timing

There are two types of agents: the manager and the market investors. The project productivity is $\varepsilon$.

**At t=1: Physical investment.** The market randomly receives a signal $\hat{\varepsilon}_i$, where $\hat{\varepsilon}_i = \varepsilon + v$, $\hat{\varepsilon}_i \sim \mathcal{N}(\varepsilon, 1/\pi_v)$. $v \sim \mathcal{N}(0, 1/\pi_v)$ is a noise in the market's signal. After receiving this signal, the market forms a prior: $\varepsilon \sim \mathcal{N}(\hat{\varepsilon}_i, 1/\pi_v)$.

The manager observes the market's signal $\hat{\varepsilon}_i$ and the true $\varepsilon$. Then, she makes investment decision $I_m(\hat{\varepsilon}_i, \varepsilon)$.

But the actual physical investment taken place would be $I$, where $I = I_m + u$, $u \sim \mathcal{N}(0, 1/\pi_u)$. $u$ captures the implementation noise in reality. The manager owns $\theta$ share of the stock. She has to bear the cost of investment: $\theta \cdot I^2/2$, for her own stock share.

**At t=2: Stock trading.** The market observes investment $I$, and then update its belief on $\varepsilon$: $\varepsilon_i = \mathbf{E}(\varepsilon|\hat{\varepsilon}_i, I)$. After that, there would be massive trading of the firm's stock in the market. Suppose the outstanding stock share, i.e. stock supply, is fixed at $\mathcal{S}^s$, so that the firm does not issue new equity. The market's stock share demand is characterized by $\mathcal{S}^d(P)$ where $P$ is the market price of the entire project.

The manager is allowed to sell $\beta$ fraction of her stock (included in the stock supply) and obtain value $\theta \cdot \beta \cdot P$ in this period, according to the compensation scheme. **Assume the manager would like to sell the $\beta$ fraction in this period due to liquidity reasons**.

**At t=3: Payoff Released.** $\varepsilon$ is publicly revealed. Then, the market receives payoff: $\mathcal{S}^d(P) \cdot (\varepsilon I - P)$. The manager gets the final return from the remaining $1 - \beta$ fraction of her stock share in the final period. The manager's payoff would be: $\theta \cdot \left(-\frac{I^2}{2} + \beta \cdot P + (1-\beta) \cdot \varepsilon I\right)$.

## 2.2 Benchmark

If there is no information friction, or if the manager is only allowed to get return from her stock share in the final period ($\beta = 0$), then the manager would make investment decisions to maximize the following objective:

$$\max_{I_m} \mathbf{E}\left[\theta \cdot \left(-\frac{I^2}{2} + \varepsilon I\right) | I_m\right],$$

which is equivalent to

$$\max_{I_m} \mathbf{E}\left[\theta \cdot \left(-\frac{(I_m + u)^2}{2} + \varepsilon(I_m + u)\right) | I_m\right].$$

Therefore, the F.O.C. implies that $I_m(\varepsilon) = \varepsilon$.

## 2.3 Financial market

The stock supply $\mathcal{S}^s$ is perfectly inelastic. The representative investor maximizes her objective:

$$\max_{\mathcal{S}^d} \; -P \cdot \mathcal{S}^d(P) + \mathbf{E}(\varepsilon I | \hat{\varepsilon}_i, I) \cdot \mathcal{S}^d(P),$$

which implies that the stock demand $\mathcal{S}^d(P)$ is perfectly elastic, and $P = \mathbf{E}(\varepsilon I | \hat{\varepsilon}_i, I)$. If the price $P$ is higher than the expected return $\mathbf{E}(\varepsilon I | \hat{\varepsilon}_i, I)$, the investors would not buy any share, $\mathcal{S}^d = 0$. On the other hand, if the price $P$ is lower than their expected return, the stock demand $\mathcal{S}^d$ would increase to infinite.

Therefore, we can get the market clearing conditions in the stock market:

$$\begin{aligned} \mathcal{S}^d(P) &= \mathcal{S}^s \\ P &= \mathbf{E}(\varepsilon I | \hat{\varepsilon}_i, I) \end{aligned}$$

## 2.4 Equilibrium definition

Given productivity $\varepsilon$ and stock supply $\mathcal{S}^s$, an equilibrium is the investment decision $I_m(\cdot)$, stock demand $\mathcal{S}^d(\cdot)$ and the project market price $P(\cdot)$ such that

i) A representative investor maximizes her objective:

$$\max_{\mathcal{S}^d} \; -P \cdot \mathcal{S}^d(P) + \mathbf{E}(\varepsilon I | \hat{\varepsilon}_i, I)\mathcal{S}^d(P).$$

ii) The manager maximizes her expected payoff:

$$\max_{I_m} \; \mathbf{E}\left[\theta \cdot \left(-\frac{I^2}{2} + \beta P(\hat{\varepsilon}_i, I) + (1-\beta)\varepsilon I\right) | I_m\right].$$

iii) Stock market clear:

$$\mathcal{S}^d(P) = \mathcal{S}^s.$$

## 2.5 Equilibrium characterization

According to the stock market clearing, the market price would be

$$P(\hat{\varepsilon}_i, I) = \mathbf{E}(\varepsilon I | \hat{\varepsilon}_i, I) = \mathbf{E}(\varepsilon | \hat{\varepsilon}_i, I) I = \varepsilon_i I.$$

Manager with information $\hat{\varepsilon}_i$ and $\varepsilon$, knowing that the decision on investment affects the market's expectation on $P$, decides to invest $I_m(\hat{\varepsilon}_i, \varepsilon)$ to maximize her objective:

$$\max_{I_m} \; \mathbf{E}\left[-\frac{I^2}{2} + \beta P(\hat{\varepsilon}_i, I) + (1-\beta)\varepsilon I | I_m\right]. \tag{1}$$

This is equivalent to

$$\max_{I_m} \; -\frac{\mathbf{E}[(I_m + u)^2 | I_m]}{2} + \beta \mathbf{E}\left[P(\hat{\varepsilon}_i, I_m + u) | I_m\right] + (1-\beta)\varepsilon I_m.$$

By F.O.C., the manager invests until

$$\varepsilon = \frac{I_m - \beta d\mathbf{E}\left[P(\hat{\varepsilon}_i, I_m + u) | I_m\right] / dI_m}{1-\beta}. \tag{2}$$

Assuming linearity:

$$I_m(\hat{\varepsilon}_i, \varepsilon) = \kappa_0 + \kappa_1 \hat{\varepsilon}_i + \kappa_2 \varepsilon, \tag{3}$$

then investment $I$ is a noisy linear signal for $\varepsilon$:

$$I = I_m + u = \kappa_0 + \kappa_1 \hat{\varepsilon}_i + \kappa_2 \varepsilon + u.$$

For the market, observing signal $\hat{\varepsilon}_i$ and investment $I$ is informationally equivalent to observing signal $\hat{\varepsilon}_i$ and $z$, where $z$ is:

$$z = \frac{I - \kappa_0 - \kappa_1 \hat{\varepsilon}_i}{\kappa_2} = \varepsilon + \frac{1}{\kappa_2} u,$$

where $z \sim \mathcal{N}(\varepsilon, 1/\pi_z)$, and $\pi_z = \kappa_2^2 \pi_u$. Then, the investors update their belief using information on investment $I$:

$$\varepsilon_i = \mathbf{E}(\varepsilon | \hat{\varepsilon}_i, I) = \mathbf{E}(\varepsilon | \hat{\varepsilon}_i, z) = \frac{\pi_v}{\pi_v + \pi_z} \hat{\varepsilon}_i + \frac{\pi_z}{\pi_v + \pi_z} z = \frac{\pi_v}{\pi_v + \pi_z} \hat{\varepsilon}_i + \frac{\pi_z}{\pi_v + \pi_z} \frac{I - \kappa_0 - \kappa_1 \hat{\varepsilon}_i}{\kappa_2}.$$

The price would be

$$\begin{aligned} P(\hat{\varepsilon}_i, I) = \varepsilon_i I &= \left( \frac{\pi_v}{\pi_v + \pi_z} \hat{\varepsilon}_i + \frac{\pi_z}{\pi_v + \pi_z} z \right) I = \frac{\pi_v}{\pi_v + \pi_z} \hat{\varepsilon}_i I + \frac{\pi_z}{\pi_v + \pi_z} \frac{I^2 - \kappa_0 I - \kappa_1 \hat{\varepsilon}_i I}{\kappa_2} \\ &= \frac{\pi_z}{\pi_v + \pi_z} \frac{I^2}{\kappa_2} + \left( \frac{\pi_v}{\pi_v + \pi_z} \hat{\varepsilon}_i - \frac{\pi_z}{\pi_v + \pi_z} \left( \frac{\kappa_0}{\kappa_2} + \frac{\kappa_1}{\kappa_2} \hat{\varepsilon}_i \right) \right) I. \end{aligned}$$

Thus, we have

$$\begin{aligned} \mathbf{E}[P(\hat{\varepsilon}_i, I_m + u) | I_m] = &\frac{\pi_z}{\pi_v + \pi_z} \frac{\mathbf{E}[(I_m + u)^2 | I_m]}{\kappa_2} \\ &+ \left( \frac{\pi_v}{\pi_v + \pi_z} \hat{\varepsilon}_i - \frac{\pi_z}{\pi_v + \pi_z} \left( \frac{\kappa_0}{\kappa_2} + \frac{\kappa_1}{\kappa_2} \hat{\varepsilon}_i \right) \right) I_m, \end{aligned}$$

and plug into (2):

$$\varepsilon = \frac{I_m}{1 - \beta} - \frac{\beta}{1 - \beta} \left[ \frac{\pi_z}{\pi_v + \pi_z} \frac{2 I_m}{\kappa_2} + \left( \frac{\pi_v}{\pi_v + \pi_z} \hat{\varepsilon}_i - \frac{\pi_z}{\pi_v + \pi_z} \left( \frac{\kappa_0}{\kappa_2} + \frac{\kappa_1}{\kappa_2} \hat{\varepsilon}_i \right) \right) \right].$$

Therefore, compared with (3), we would have

$$\begin{aligned} \frac{1}{\kappa_2} &= \frac{1}{1 - \beta} - \frac{\beta}{1 - \beta} \frac{\pi_z}{\pi_v + \pi_z} \frac{2}{\kappa_2}, \\ -\frac{\kappa_1}{\kappa_2} &= -\frac{\beta}{1 - \beta} \left[ \frac{\pi_v}{\pi_v + \pi_z} - \frac{\pi_z}{\pi_v + \pi_z} \frac{\kappa_1}{\kappa_2} \right], \\ -\frac{\kappa_0}{\kappa_2} &= \frac{\beta}{1 - \beta} \frac{\pi_z}{\pi_v + \pi_z} \frac{\kappa_0}{\kappa_2}, \\ \Rightarrow \kappa_0 &= 0, \\ \kappa_2 &= 1 + \beta \frac{\pi_z - \pi_v}{\pi_v + \pi_z}, \\ \kappa_1 &= \kappa_2 \frac{\beta \pi_v}{(1 - \beta) \pi_v + \pi_z}. \end{aligned}$$

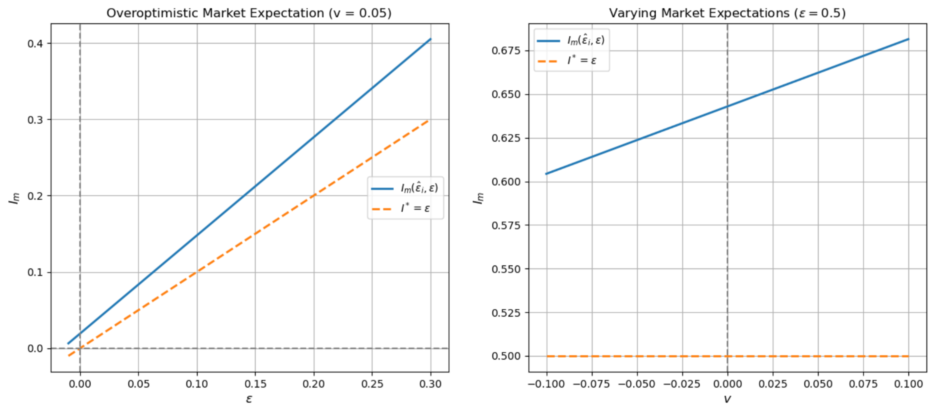


Figure 1: Over-investment

The investment strategy is:

$$
\begin{aligned}
I_m(\hat{\varepsilon}_i, \varepsilon) &= \left(1 + \beta \frac{\pi_z - \pi_v}{\pi_v + \pi_z}\right) \frac{\beta \pi_v}{(1-\beta)\pi_v + \pi_z} \hat{\varepsilon}_i + \left(1 + \beta \frac{\pi_z - \pi_v}{\pi_v + \pi_z}\right) \varepsilon \\
&= \left(1 + \beta \frac{\pi_z - \pi_v}{\pi_v + \pi_z}\right) \frac{\beta \pi_v}{(1-\beta)\pi_v + \pi_z} (\varepsilon + v) + \left(1 + \beta \frac{\pi_z - \pi_v}{\pi_v + \pi_z}\right) \varepsilon \\
&= \left(1 + \frac{\beta \pi_z}{(1-\beta)\pi_v + \pi_z}\right) \varepsilon + \left(1 + \beta \frac{\pi_z - \pi_v}{\pi_v + \pi_z}\right) \frac{\beta \pi_v}{(1-\beta)\pi_v + \pi_z} v
\end{aligned}
$$

Therefore, we can see that i) the manager positively reacts to the non-fundamental shock $v$ which captures the market sentiment; ii) the manager tends to over-invest in the sense that the coefficient on $\varepsilon$ is greater than 1 (compared to the most efficient case where optimal investment should be $I_m = \varepsilon$).

Figure 1 illustrates the key intuition. The left panel depicts a scenario where the market is overly optimistic ($v = 0.05$), and the fundamental $\varepsilon$ varies, mostly taking positive values. In this case, the manager overinvests relative to the benchmark. Even when the fundamental is exactly zero ($\varepsilon = 0$), the manager still invests, driven solely by the market's belief in the project's positive value. The right panel fixes the fundamental at ($\varepsilon = 0.5$) while allowing market sentiment to vary. Here too, the manager overinvests compared to the benchmark. Notably, even under negative market sentiment, the manager chooses to overinvest in an effort to signal stronger fundamentals than actually exist.

$$
\begin{aligned}
\kappa_2 = 1 + \beta \frac{\pi_z - \pi_v}{\pi_v + \pi_z} &= 1 + \beta \frac{\kappa_2^2 \pi_u - \pi_v}{\pi_v + \kappa_2^2 \pi_u}, \\
\Rightarrow \kappa_2^3 - (1+\beta)\kappa_2^2 + \frac{\pi_v}{\pi_u}\kappa_2 - (1-\beta)\frac{\pi_v}{\pi_u} &= 0
\end{aligned}
$$

We can prove that $\kappa_2 \in (1-\beta, 1+\beta)$.

The market price is

$$
P(\hat{\varepsilon}_i, I) = \varepsilon I + \frac{\pi_v}{\pi_v + \pi_z} v I + \frac{\pi_z}{\pi_v + \pi_z} \frac{1}{\kappa_2} u I.
$$

Comparing to the correct valuation $P^* = \varepsilon I$, there would be overvaluation if the market is over-optimistic ($v > 0$), or if there is a positive investment implementation noise ($u > 0$).

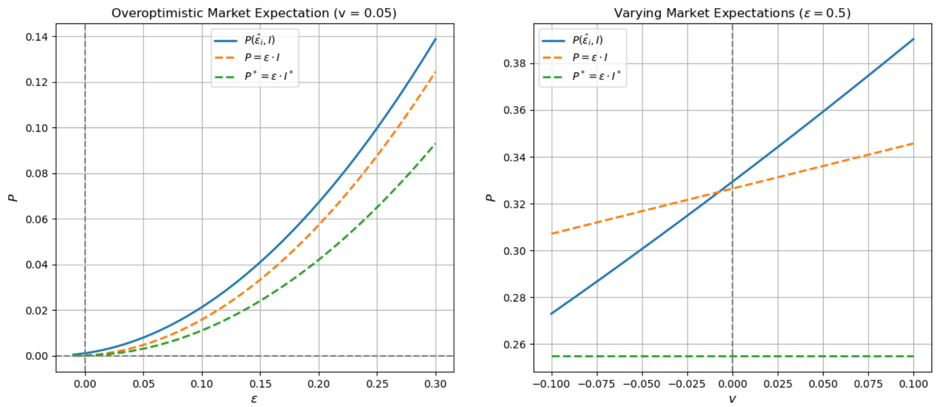


Figure 2: Stock Price

Figure 2 illustrates how the market misprices stocks in the absence of full information and how overinvestment can inflate stock prices. The gap between the orange and green lines captures the effect of overinvestment, as both are priced using full information about fundamentals. This implies that investment itself serves as a signal to the market. Conversely, the gap between the blue and orange lines reflects the influence of market sentiment, which can lead to mispricing. The right panel, which varies market sentiment, demonstrates that when the market is overly optimistic ($v > 0$), stocks tend to be overpriced, while pessimistic sentiment ($v < 0$) leads to underpricing.

## 2.6 Welfare analysis

The massive tradings of stocks in period 2 are just pure transfers among individuals. There is no gains or losses in total. The ex post total return of the economy is

$$\mathcal{R} = -\frac{I^2}{2} + \varepsilon I.$$

Assume the social planner cannot predict the investment implementation noise $u$. The ex ante expected return is

$$\mathbf{E}(\mathcal{R}|I_b) = \mathbf{E}\left(-\frac{(I_b + u)^2}{2} + \varepsilon(I_b + u)|I_b\right).$$

Thus, the ex ante best investment strategy should be

$$I_b(\varepsilon) = \varepsilon,$$

without any response to the market sentiment $v$. Given the ex ante best investment strategy, the ex post return would be

$$\begin{aligned}
\mathcal{R} &= -\frac{(I_b + u)^2}{2} + \varepsilon(I_b + u) \\
&= -\frac{(\varepsilon + u)^2}{2} + \varepsilon(\varepsilon + u)
\end{aligned}$$

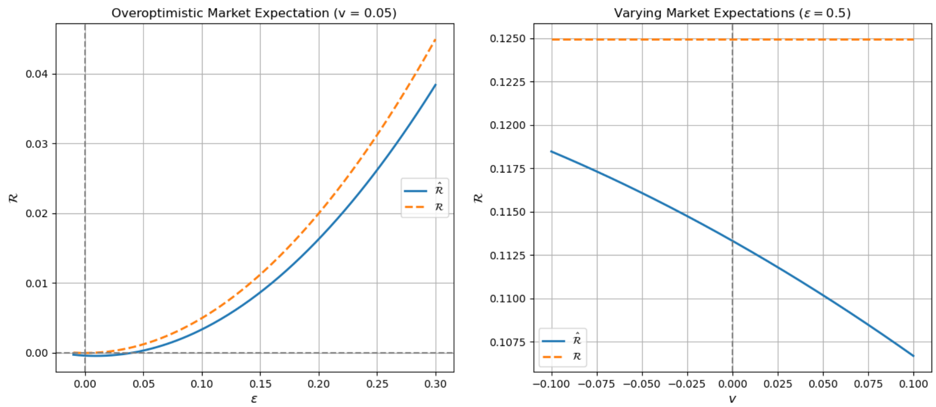


Figure 3: Welfare

However, according to the manager's investment strategy $I_m(\hat{\varepsilon}_i, \varepsilon)$:

$$
\begin{aligned}
I_m(\hat{\varepsilon}_i, \varepsilon) &= \left(1 + \frac{\beta\pi_z}{(1-\beta)\pi_v + \pi_z}\right)\varepsilon + \left(1 + \beta\frac{\pi_z - \pi_v}{\pi_v + \pi_z}\right)\frac{\beta\pi_v}{(1-\beta)\pi_v + \pi_z} v \\
&= (\kappa_1 + \kappa_2)\varepsilon + \kappa_1 v,
\end{aligned}
$$

the total return would be

$$
\begin{aligned}
\widehat{\mathcal{R}} &= -\frac{(I_m(\hat{\varepsilon}_i, \varepsilon) + u)^2}{2} + \varepsilon(I_m(\hat{\varepsilon}_i, \varepsilon) + u) \\
&= -\frac{((\kappa_1 + \kappa_2)\varepsilon + \kappa_1 v + u)^2}{2} + \varepsilon((\kappa_1 + \kappa_2)\varepsilon + \kappa_1 v + u) \\
&= \mathcal{R} - \frac{(\kappa\varepsilon + \kappa_1 v)^2}{2} - u(\kappa\varepsilon + \kappa_1 v),
\end{aligned}
$$

where $\kappa = \kappa_1 + \kappa_2 - 1 > 0$. Therefore, there would be a return loss:

$$
\mathcal{R} - \widehat{\mathcal{R}} = \frac{(\kappa\varepsilon + \kappa_1 v)^2}{2} + u(\kappa\varepsilon + \kappa_1 v).
$$

Without investment implementation noise, i.e. $u = 0$, there would still be return loss as long as there is market sentiment noise $v$. The return loss is big especially when there is an over-optimistic market sentiment $v > 0$. This is because the manager's over-investment incentive is extremely high if she notices a positive market sentiment $v$.

Figure 3 clearly demonstrates how this mechanism undermines social welfare. The figure highlights the inefficiencies introduced by overinvestment driven by market misperceptions, leading to a misallocation of resources. As a result, overall welfare declines compared to a benchmark scenario in which investment decisions are based solely on fundamentals.

# 3 Conclusion

This chapter develops a theoretical framework to explore how stock overpricing driven by market sentiment and information asymmetry distorts firm-level investment decisions and generates aggregate inefficiencies. By modeling a three-period environment where a manager observes both true productivity and the market's noisy signal, we show that compensation structures incentivizing short-term stock sales (e.g., through partial liquidity events) induce strategic over-investment in response to investor optimism.

The manager internalizes how her investment decision affects market beliefs and stock prices, and chooses to over-invest when sentiment is high, even if the fundamental value does not warrant it. This catering behavior not only amplifies the mispricing but also directly boosts managerial compensation in the short term. However, such behavior leads to an inefficient allocation of capital, particularly when the economy is characterized by strong investor optimism.

The model characterizes the distortion quantitatively: investment becomes more sensitive to non-fundamental sentiment shocks, and the manager's investment coefficient on fundamentals exceeds the socially optimal level. As a result, aggregate returns decline relative to the benchmark with no information frictions or catering incentives. Even in the absence of financing constraints, this mechanism illustrates how stock market mispricing can create real, persistent distortions in firm behavior and reduce welfare.

The analysis provides a unified explanation for historical episodes of exuberant investment during stock market booms—such as the dot-com bubble—by formalizing how rational managers may endogenously respond to irrational investor sentiment. The findings emphasize the importance of understanding how compensation design and market perception interact to shape investment efficiency in asset price boom periods.

This framework lays the groundwork for analyzing how heterogeneity across firms, particularly in fundamentals, managerial incentives, and exposure to market sentiment, can lead to aggregate inefficiencies. By modeling how individual firms respond differently to distorted market signals, the analysis highlights how overinvestment or underinvestment at the micro level can accumulate into meaningful macroeconomic misallocation. In doing so, the model provides a useful lens for understanding how informational frictions and behavioral distortions in financial markets can propagate through firm-level decisions to affect overall economic performance.