

# Behavioral Corporate Finance: A Survey\*

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## Abstract

Research in behavioral corporate finance takes two distinct approaches. The first emphasizes that investors are less than fully rational. It views managerial financing and investment decisions as rational responses to securities market mispricing. The second approach emphasizes that managers are less than fully rational. It studies the effect of nonstandard preferences and judgmental biases on managerial decisions. This survey reviews the theory, empirical challenges, and current evidence pertaining to each approach. Overall, the behavioral approaches help to explain a number of important financing and investment patterns. The survey closes with a list of open questions.

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## Table of Contents

I. Introduction.....	1
II. The irrational investors approach.....	4
A. Theoretical framework.....	6
B. Empirical challenges.....	10
C. Investment policy .....	13
C.1. Real investment .....	14
C.2. Mergers and acquisitions.....	16
C.3. Diversification and focus .....	18
D. Financial policy .....	19
D.1. Equity issues.....	19
D.2. Repurchases.....	23
D.3. Debt issues.....	24
D.4. Cross-border issues .....	26
D.5. Capital structure.....	27
E. Other corporate decisions .....	28
E.1. Dividends .....	29
E.2. Firm names .....	31
E.3. Earnings management.....	32
E.4. Executive compensation.....	33
III. The irrational managers approach.....	34
A. Theoretical framework.....	36
B. Empirical challenges.....	39
C. Investment policy .....	40
C.1. Real investment .....	40
C.2. Mergers and acquisitions.....	42
D. Financial policy .....	43
D.1. Capital structure.....	43
D.2. Financial contracting.....	44
E. Other behavioral patterns.....	44
E.1. Bounded rationality.....	45
E.2. Reference-point preferences.....	46
IV. Conclusion.....	48
References .....	51

## I. Introduction

Corporate finance aims to explain the financial contracts and the real investment behavior that emerge from the interaction of managers and investors. Thus, a complete explanation of financing and investment patterns requires an understanding of the beliefs and preferences of these two sets of agents. The majority of research in corporate finance assumes a broad rationality. Agents are supposed to develop unbiased forecasts about future events and use these to make decisions that best serve their own interests. As a practical matter, this means that managers can take for granted that capital markets are efficient, with prices rationally reflecting public information about fundamental values. Likewise, investors can take for granted that managers will act in their self-interest, rationally responding to incentives shaped by compensation contracts, the market for corporate control, and other governance mechanisms.

This paper surveys research in behavioral corporate finance. This research replaces the traditional rationality assumptions with potentially more realistic behavioral assumptions. The literature is divided into two general approaches, and we organize the survey around them. Roughly speaking, the first approach emphasizes the effect of *investor* behavior that is less than fully rational, and the second considers *managerial* behavior that is less than fully rational. For each line of research, we review the basic theoretical frameworks, the main empirical challenges, and the empirical evidence. Of course, in practice, both channels of irrationality may operate at the same time; our taxonomy is meant to fit the existing literature, but it does suggest some structure for how one might, in the future, go about combining the two approaches.

The “irrational investors approach” assumes that securities market arbitrage is imperfect, and thus that prices can be too high or too low. Rational managers are assumed to perceive mispricings, and to make decisions that may encourage or respond to mispricing. While their

decisions may maximize the short-run value of the firm, they may also result in lower long-run values as prices correct. In the simple theoretical framework we outline, managers balance three objectives: fundamental value, catering, and market timing. Maximizing fundamental value has the usual ingredients. Catering refers to any actions intended to boost share prices above fundamental value. Market timing refers specifically to financing decisions intended to capitalize on temporary mispricings, generally via the issuance of overvalued securities and the repurchase of undervalued ones.

Empirical tests of the irrational investors model face a significant challenge: measuring mispricing. We discuss how this issue has been tackled and the ambiguities that remain. Overall, despite some unresolved questions, the evidence suggests that the irrational investors approach has a considerable degree of descriptive power. We review studies on investment behavior, merger activity, the clustering and timing of corporate security offerings, capital structure, corporate name changes, dividend policy, earnings management, and other managerial decisions. We also identify some disparities between the theory and the evidence. For example, while catering to fads has potential to reduce long-run value, the literature has yet to clearly document significant long-term value losses.

The second approach to behavioral corporate finance, the “irrational managers approach,” is less developed at this point. It assumes that managers have behavioral biases, but retains the rationality of investors, albeit limiting the governance mechanisms they can employ to constrain managers. Following the emphasis of the current literature, our discussion centers on the biases of optimism and overconfidence. A simple model shows how these biases, in leading managers to believe their firms are undervalued, encourage overinvestment from internal resources, and a preference for internal to external finance, especially internal equity. We note that the predictions

of the optimism and overconfidence models typically look very much like those of agency and asymmetric information models.

In this approach, the main obstacles for empirical tests include distinguishing predictions from standard, non-behavioral models, as well as empirically measuring managerial biases. Again, however, creative solutions have been proposed. The effects of optimism and overconfidence have been empirically studied in the context of merger activity, corporate investment-cash flow relationships, entrepreneurial financing and investment decisions, and the structure of financial contracts. Separately, we discuss the potential of a few other behavioral patterns that have received some attention in corporate finance, including bounded rationality and reference-point preferences. As in the case of investor irrationality, the real economic losses associated with managerial irrationality have yet to be clearly quantified, but some evidence suggests that they are very significant.

Taking a step back, it is important to note that the two approaches take very different views about the role and quality of managers, and have very different normative implications as a result. That is, when the primary source of irrationality is on the investor side, long-term value maximization and economic efficiency requires insulating managers from short-term share price pressures. Managers need to be insulated to achieve the flexibility necessary to make decisions that may be unpopular in the marketplace. This may imply benefits from internal capital markets, barriers to takeovers, and so forth. On the other hand, if the main source of irrationality is on the managerial side, efficiency requires reducing discretion and obligating managers to respond to market price signals. The stark contrast between the normative implications of these two approaches to behavioral corporate finance is one reason why the area is fascinating, and why more work in the area is needed.

Overall, our survey suggests that the behavioral approaches can help to explain a range of financing and investment patterns, while at the same time depend on a relatively small set of realistic assumptions. Moreover, there is much room to grow before the field reaches maturity. In an effort to stimulate that growth, we close the survey with a short list of open questions.

## **II. The irrational investors approach**

We start with one extreme, in which rational managers coexist with irrational investors. There are two key building blocks here. First, irrational investors must influence securities prices. This requires limits on arbitrage. Second, managers must be smart in the sense of being able to distinguish market prices and fundamental value.

The literature on market inefficiency is far too large to survey here. It includes such phenomena as the January effect; the effect of trading hours on price volatility; post-earnings-announcement drift; momentum; delayed reaction to news announcements; positive autocorrelation in earnings announcement effects; Siamese twin securities that have identical cash flows but trade at different prices, negative “stub” values; closed-end fund pricing patterns; bubbles and crashes in growth stocks; related evidence of mispricing in options, bond, and foreign exchange markets; and so on. These patterns, and the associated literature on arbitrage costs and risks, for instance short-sales constraints, that facilitate mispricings, are surveyed by Barberis and Thaler (2003) and Shleifer (2000). In the interest of space, we refer the reader to these excellent sources, and for the discussion of this section we simply take as given that mispricings can and do occur.

But even if capital markets are inefficient, why assume that corporate managers are “smart” in the sense of being able to identify mispricing? One can offer several justifications.

First, corporate managers have superior information about their own firm. This is underscored by the evidence that managers earn abnormally high returns on their own trades, as in Muelbroek (1992), Seyhun (1992), or Jenter (2004). Managers can also create an information advantage by managing earnings, a topic to which we will return, or with the help of conflicted analysts, as for example in Bradshaw, Richardson, and Sloan (2003).

Second, corporate managers also have fewer constraints than equally “smart” money managers. Consider two well-known models of limited arbitrage: DeLong, Shleifer, Summers, and Waldmann (1990) is built on short horizons and Miller (1977) on short-sales constraints. CFOs tend to be judged on longer horizon results than are money managers, allowing them to take a view on market valuations in a way that money managers cannot.<sup>1</sup> Also, short-sales constraints prevent money managers from mimicking CFOs. When a firm or a sector becomes overvalued, corporations are the natural candidates to expand the supply of shares. Money managers are not.

Third and finally, managers might just follow intuitive rules of thumb that allow them to identify mispricing even without a real information advantage. In Baker and Stein (2004), one such successful rule of thumb is to issue equity when the market is particularly liquid, in the sense of a small price impact upon the issue announcement. In the presence of short-sales constraints, unusually high liquidity is a symptom of the fact that the market is dominated by irrational investors, and hence is overvalued.

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<sup>1</sup> For example, suppose a manager issues equity at \$50 per share. Now if those shares subsequently double, the manager might regret not delaying the issue, but he will surely not be fired, having presided over a rise in the stock price. In contrast, imagine a money manager sells (short) the same stock at \$50. This might lead to considerable losses, an outflow of funds, and, if the bet is large enough, perhaps the end of a career.

## A. Theoretical framework

We use the assumptions of inefficient markets and smart managers to develop a simple theoretical framework for the irrational investors approach. The framework has roots in Fischer and Merton (1984), De Long, Shleifer, Summers, and Waldmann (1989), Morck, Shleifer, and Vishny (1990b), and Blanchard, Rhee, and Summers (1993), but our particular derivation borrows most from Stein (1996).

In the irrational investors approach, the manager balances three conflicting goals. The first is to maximize fundamental value. This means selecting and financing investment projects to increase the rationally risk-adjusted present value of future cash flows. To simplify the analysis, we do not explicitly model taxes, costs of financial distress, agency problems or asymmetric information. Instead, we specify fundamental value as

$$f(K, \cdot) - K,$$

where  $f$  is increasing and concave in new investment  $K$ . To the extent that any of the usual market imperfections leads the Modigliani-Miller (1958) theorem to fail, financing may enter  $f$  alongside investment.

The second goal is to maximize the current share price of the firm's securities. In perfect capital markets, the first two objectives are the same, since the definition of market efficiency is that prices equal fundamental value. But once one relaxes the assumption of investor rationality, this need not be true, and the second objective is distinct. In particular, the second goal is to "cater" to short-term investor demands via particular investment projects or otherwise packaging the firm and its securities in a way that maximizes appeal to investors. Through such catering activities, managers influence the temporary mispricing, which we represent by the function

$$\delta(\cdot),$$



where the arguments of  $\delta$  depend on the nature of investor sentiment. The arguments might include investing in a particular technology, assuming a conglomerate or single-segment structure, changing the corporate name, managing earnings, initiating a dividend, and so on. In practice, the determinants of mispricing may well vary over time.

The third goal is to exploit the current mispricing for the benefit of existing, long-run investors. This is done by a “market timing” financing policy whereby managers supply securities that are temporarily overvalued and repurchase those that are undervalued. Such a policy transfers value from the new or the outgoing investors to the ongoing, long-run investors; the transfer is realized as prices correct in the long run.<sup>2</sup> For simplicity, we focus here on temporary mispricing in the equity markets, and so  $\delta$  refers to the difference between the current price and the fundamental value of equity. More generally, each of the firm’s securities may be mispriced to some degree. By selling a fraction of the firm  $e$ , long run shareholders gain

$$e\delta(\cdot).$$

We leave out the budget constraint, lumping together the sale of new and existing shares. Instead of explicitly modeling the flow of funds and any potential financial constraints, we will consider the reduced form impact of  $e$  on fundamental value.

It is worth noting that other capital market imperfections can lead to a sort of catering behavior. For example, reputation models in the spirit of Holmstrom (1982) can lead to earnings management, inefficient investment, and excessive swings in corporate strategy even when the capital markets are not fooled in equilibrium.<sup>3</sup> Viewed in this light, the framework here is

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<sup>2</sup> Of course, we are also using the market inefficiency assumption here in assuming that managerial efforts to capture a mispricing do not completely destroy it in the process, as they would in the rational expectations world of Myers and Majluf (1984). In other words, investors underreact to corporate decisions designed to exploit mispricing. This leads to some testable implications, as we discuss below.

<sup>3</sup> For examples, see Stein (1989) and Scharfstein and Stein (1990). For a comparison of rational expectations and inefficient markets in this framework, see Aghion and Stein (2004).

relaxing the assumptions of rational expectations in Holmstrom, in the case of catering, and Myers and Majluf (1984), in the case of market timing.

Putting the goals of fundamental value, catering, and market timing into one objective function, the irrational investors approach has the manager choosing investment and financing to

$$\max_{K,e} \lambda [f(K, \cdot) - K + e\delta(\cdot)] + (1 - \lambda)\delta(\cdot),$$

where  $\lambda$ , between zero and one, specifies the manager's horizon. When  $\lambda$  equals one, the manager cares only about creating value for existing, long-run shareholders, the last term drops out, and there is no distinct impact of catering. However, even an extreme long-horizon manager cares about short-term mispricing for the purposes of market timing, and thus may cater to short-term mispricing to further this objective. With a shorter horizon, maximizing the stock price becomes an objective in its own right, even without any concomitant equity issues.

We take the managerial horizon as given, exogenously set by personal characteristics, career concerns, and the compensation contract. If the manager plans to sell equity or exercise options in the near term, his portfolio considerations may lower  $\lambda$ . However, managerial horizon may also be endogenous. For instance, consider a venture capitalist who recognizes a bubble. He might offer a startup manager a contract that loads heavily on options and short-term incentives, since he cares less about valuations that prevail beyond the IPO lock-up period. Career concerns and the market for corporate control can also combine to shorten horizons, since if the manager does not maximize short-run prices, the firm may be acquired and the manager fired.

Differentiating with respect to  $K$  and  $e$  gives the optimal investment and financial policy of a rational manager operating in inefficient capital markets:

$$f_K(K, \cdot) = 1 - \left(e + \frac{1-\lambda}{\lambda}\right)\delta_K(\cdot), \text{ and}$$

$$-f_e(K, \cdot) = \delta(\cdot) + \left(e + \frac{1-\lambda}{\lambda}\right)\delta_e(\cdot).$$

In words, the first condition is about investment policy. The marginal value created from investment is weighed against the standard cost of capital, normalized to be one here, net of the impact that this incremental investment has on mispricing, and hence its effect through mispricing on catering and market timing gains. The second condition is about financing. The marginal value lost from shifting the firm's current capital structure toward equity is weighed against the direct market timing gains and the impact that this incremental equity issuance has on mispricing, and hence its effect on catering and market timing gains. This is a lot to swallow at once, so we consider some special cases.

**Investment policy.** Investment and financing are separable if both  $\delta_K$  and  $f_e$  are equal to zero. Then the investment decision reduces to the familiar perfect markets condition of  $f_K$  equal to unity. Real consequences of mispricing for investment thus arise in two ways. In Stein (1996) and Baker, Stein, and Wurgler (2003),  $f_e$  is not equal to zero. There *is* an optimal capital structure, or at least an upper bound on debt capacity. The benefits of issuing or repurchasing equity in response to mispricing are balanced against the reduction in fundamental value that arises from too much (or possibly too little) leverage. In Polk and Sapienza (2004) and Gilchrist, Himmelberg, and Huberman (2004), there is no optimal capital structure, but  $\delta_K$  is not equal to zero: mispricing is itself a function of investment. Polk and Sapienza focus on catering effects and do not consider financing ( $e$  equal to zero in this setup), while Gilchrist et al. model the market timing decisions of managers with long horizons ( $\lambda$  equal to one).

**Financial policy.** The demand curve for a firm's equity slopes down under the natural assumption that  $\delta_e$  is negative, e.g., issuing shares partly corrects mispricing.<sup>4</sup> When investment and financing are separable, managers act like monopolists. This is easiest to see when managers

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<sup>4</sup> Gilchrist et al. (2004) model this explicitly with heterogeneous investor beliefs and short-sales constraints.

have long horizons, and they sell down the demand curve until marginal revenue  $\delta$  is equal to marginal cost  $-e\delta_e$ . Note that price remains above fundamental value even after the issue: “corporate arbitrage” moves the market toward, but not all the way to, market efficiency.<sup>5</sup> Managers sell less equity when they care about short-run stock price ( $\lambda$  less than one, here). For example, in Ljungqvist, Nanda, and Singh (2004), managers expect to sell their own shares soon after the IPO and so issue less as a result. Managers also sell less equity when there are costs of suboptimal leverage.

**Other corporate decisions.** Managers do more than simply invest and issue equity, and this framework can be expanded to accommodate other decisions. Consider dividend policy. Increasing or initiating a dividend may simultaneously affect both fundamental value, through taxes, and the degree of mispricing, if investors categorize stocks according to payout policy as they do in Baker and Wurgler (2004a). The tradeoff is

$$-f_d(K, \cdot) = \left(e + \frac{1-\lambda}{\lambda}\right) \delta_d(\cdot),$$

where the left-hand side is the tax cost of dividends, for example, and the right-hand side is the market timing gain, if the firm is simultaneously issuing equity, plus the catering gain, if the manager has short horizons. In principle, a similar tradeoff governs the earnings management decision or corporate name changes; however, in the latter case, the fundamental costs of catering would presumably be small.

## B. Empirical challenges

The framework outlined above suggests a role for securities mispricing in investment, financing, and other corporate decisions. The main challenge for empirical tests in this area is

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<sup>5</sup> Total market timing gains may be even higher in a dynamic model where managers can sell in small increments down the demand curve.

measuring mispricing, which by its nature is hard to pin down. Researchers have found several ways to operationalize empirical tests, but none of them is perfect.

***Ex ante* misvaluation.** One option is to take an *ex ante* measure of mispricing, for instance a scaled-price ratio in which a market value in the numerator is related to some measure of fundamental value in the denominator. Perhaps the most common choice is the market-to-book ratio: A high market-to-book suggests that the firm may be overvalued. Consistent with this idea, and the presumption that mispricing corrects in the long run, market-to-book is found to be inversely related to future stock returns in the cross-section by Fama and French (1992) and in the time-series by Kothari and Shanken (1997) and Pontiff and Schall (1998). Also, extreme values of market-to-book are connected to extreme investor expectations by Lakonishok, Shleifer and Vishny (1994), La Porta (1996), and La Porta, Lakonishok, Shleifer, and Vishny (1997).

One difficulty that arises with this approach is that the market-to-book ratio or another *ex ante* measure of mispricing may be correlated with an array of firm characteristics. Book value is not a precise estimate of fundamental value, but rather a summary of past accounting performance. Thus, firms with excellent growth prospects tend to have high market-to-book ratios, and those with agency problems might have low ratios—and perhaps these considerations, rather than mispricing, drive investment and financing decisions. Dong, Hirshleifer, Richardson, and Teoh (2003) and Ang and Cheng (2003) discount analyst earnings forecasts to construct an arguably less problematic measure of fundamentals than book value.

Another factor that limits this approach is that a precise *ex ante* measure of mispricing would represent a profitable trading rule. There must be limits to arbitrage that prevent rational investors from fully exploiting such rules and trading away the information they contain about mispricing. But on a more positive note, the same intuition suggests that variables like market-to-

book are likely to be a more reliable mispricing metric in regions of the data where short-sales constraints and other (measurable) arbitrage costs and risks are most severe. This observation has been exploited as an identification strategy.

***Ex post misvaluation.*** A second option is to use the information in future returns. The idea is that if stock prices routinely decline after a corporate event, one might infer that they were inflated at the time of the event. However, as detailed in Fama (1998) and Mitchell and Stafford (2000), this approach is also subject to several critiques.

The most basic critique is the joint hypothesis problem: a predictable “abnormal” return might mean there was misvaluation *ex ante*, or simply that the definition of “normal” expected return (e.g., CAPM) is wrong. Perhaps the corporate event systematically coincides with changes in risk, and hence the return required in an efficient capital market. Another simple but important critique regards economic significance. Market value-weighting or focusing on NYSE/AMEX firms may reduce abnormal returns or cause them to disappear altogether.

There are also statistical issues. For instance, corporate events are often clustered in time and by industry—IPOs are an example considered in Brav (2000)—and thus abnormal returns may not be independent. Barber and Lyon (1997) and Barber, Lyon, and Tsai (1999) show that inference with buy-and-hold returns (for each event) is challenging. Calendar-time portfolios, which consist of an equal- or value-weighted average of all firms making a given decision, have fewer problems here, but the changing composition of these portfolios adds another complication to standard tests. Loughran and Ritter (2000) also argue that such an approach is a less powerful test of mispricing, since the clustered events have the worst subsequent performance. A final statistical problem is that many studies cover only a short sample period. Schultz (2003) shows

that this can lead to a small sample bias if managers engage in “pseudo” market timing, making decisions in response to past rather than future price changes.

Analyzing aggregate time series resolves some of these problems. Like the calendar time portfolios, time series returns are more independent. There are also established time-series techniques, e.g. Stambaugh (1999), to deal with small-sample biases. Nonetheless, the joint hypothesis problem remains, since rationally required returns may vary over time.

But even when these econometric issues can be solved, interpretational issues may remain. For instance, suppose investors have a tendency to overprice firms that have genuinely good growth opportunities. If so, even investment that is followed by low returns need not be *ex ante* inefficient. Investment may have been responding to omitted measures of investment opportunities, not to the misvaluation itself.

**Cross-sectional interactions.** Another identification strategy is to exploit the finer cross-sectional predictions of the theory. In this spirit, Baker, Stein, and Wurgler (2003) consider the prediction that if  $f_e$  is positive, mispricing should be more relevant for financially constrained firms. More generally, managerial horizons or the fundamental costs of catering to sentiment may vary across firms in a measurable way. Of course, even in this approach, one still has to proxy for mispricing with an *ex ante* or *ex post* method. To the extent that the hypothesized cross-sectional pattern appears strongly in the data, however, objections about the measure of mispricing lose some steam.

### C. Investment policy

Of paramount importance are the real consequences of market inefficiency. It is one thing to say that investor irrationality has an impact on capital market prices, or even financing policy,

which lead to transfers of wealth among investors. It is another to say that mispricing leads to underinvestment, overinvestment, or the general misallocation of capital and deadweight losses for the economy as a whole. In this subsection we review research on how market inefficiency affects real investment, mergers and acquisitions, and diversification.

### C.1. Real investment

In the rational managers, irrational investors framework, mispricing influences real investment in two ways. First, investment may itself be a characteristic that is subject to mispricing ( $\delta_k > 0$  above). Investors may overestimate the value of investment in particular technologies, for example. Second, a financially constrained firm ( $f_e > 0$  above) may be forced to pass up fundamentally valuable investment opportunities if it is undervalued.

Most research has looked at the first type of effect. Of course, anecdotal evidence of this effect comes from bubble episodes; it was with the late 1920s bubble fresh in mind that Keynes (1936) argued that short-term investor sentiment is, at least in some eras, a major or dominant determinant of investment. More recent US stock market episodes generally viewed as bubbles include the electronics boom in 1959-62, growth stocks in 1967-68, the “nifty fifty” in the early 1970s, gambling stocks in 1977-78, natural resources, high tech, and biotechnology stocks in the 1980s, and the Internet in the late 1990s; see Malkiel (1990) for an anecdotal review of some of these earlier bubbles, and Ofek and Richardson (2002) on the Internet. See Kindleberger (2000) for an attempt to draw general lessons from bubbles and crashes over several hundred years, and for anecdotal remarks on their sometimes dramatic real consequences.

The first modern empirical studies in this area asked whether investment is sensitive to stock prices over and above direct measures of the marginal product of capital, such as cash flow



or profitability. If it is not, they reasoned, then the univariate link between investment and stock valuations likely just reflects the standard, efficient-markets Q channel. This approach did not lead to a clear conclusion, however. For example, Barro (1990) argues for a strong independent effect of stock prices, while Morck, Shleifer, and Vishny (1990b) and Blanchard, Rhee, and Summers (1993) conclude that the incremental effect is weak.

The more recent wave of studies has taken a different tack. Rather than controlling for fundamentals and looking for a residual effect of stock prices, they try to proxy for the mispricing component of stock prices and examine whether it affects investment. In this spirit, Chirinko and Schaller (2001, 2004), Panageas (2003), Polk and Sapienza (2004), and Gilchrist, Himmelberg, and Huberman (2004) all find evidence that investment is sensitive to proxies for mispricing. Of course, the generic concern is that the mispricing proxies are still just picking up fundamentals. To refute this, Polk and Sapienza, for example, consider the finer prediction that investment should be more sensitive to short-term mispricing when managerial horizons are shorter. They find that investment is indeed more sensitive to mispricing proxies when share turnover is higher, i.e., where the average shareholder's horizon is shorter.

The second type of mispricing-driven investment is tested in Baker, Stein, and Wurgler (2003). Stein (1996) predicts that investment will be most sensitive to mispricing in equity-dependent firms, i.e. firms that have no option but to issue equity to finance their marginal investment, because long-horizon managers of undervalued firms would rather underinvest than issue undervalued shares. Using several proxies for equity dependence, Baker et al. confirm that investment is more sensitive to stock prices in equity-dependent firms.

Overall, the recent studies suggest that some portion of the effect of stock prices on investment is a response to mispricing, but key questions remain. The actual magnitude of the

effect of mispricing has not been pinned down, even roughly. The efficiency implications are also unclear. Titman, Wei, and Xie (2004) and Polk and Sapienza (2004) find that high investment is associated with lower future stock returns in the cross section, and Lamont (2000) finds a similar result for planned investment in the time series. However, sentiment and fundamentals seem likely to be correlated, and so, as mentioned previously, even investment followed by low returns may not be *ex ante* inefficient. Finally, even granting an empirical link between overpricing and investment, it is hard to determine the extent to which managers are rationally fanning the flames of overvaluation, as in the catering piece of our simple theoretical framework, or are simply just as overoptimistic as their investors. We return to the effects of managerial optimism in the second part of the survey.

## C.2. Mergers and acquisitions

Shleifer and Vishny (2003) propose a market timing model of acquisitions. They assume that acquirers are overvalued, and the motive for acquisitions is not to gain synergies, but to preserve some of their temporary overvaluation for long-run shareholders. Specifically, by acquiring less-overvalued targets with overpriced stock (or, less interestingly, undervalued targets with cash), overvalued acquirers can cushion the fall for their shareholders by leaving them with more hard assets per share. Or, if the deal's value proposition caters to a perceived synergy that causes the combined entity to be overvalued, as might have happened in the late 1960s conglomerates wave (see below), then the acquirer can still gain a long-run cushion effect, while offering a larger premium to the target.

The market timing approach to mergers helps to unify a number of stylized facts. The defensive motive for the acquisition, and the idea that acquisitions are further facilitated when

catering gains are available, help to explain the time-series link between merger volume and stock prices, e.g., Golbe and White (1988).<sup>6</sup> The model also predicts that cash acquirers earn positive long-run returns while stock acquirers earn negative long-run returns, consistent with the findings of Loughran and Vijh (1997) and Rau and Vermaelen (1998).

Recent papers have found further evidence for market timing mergers. Dong, Hirshleifer, Richardson, and Teoh (2003) and Ang and Cheng (2003) find that market-level mispricing proxies and merger volume are positively correlated, and (within this) that acquirers tend to be more overpriced than targets. They also find evidence that offers for undervalued targets are more likely to be hostile, and that overpriced acquirers pay higher takeover premia. Bouwman, Fuller, and Nain (2003) find evidence suggestive of a short-term catering effect. In high-valuation periods, investors welcome acquisition announcements, yet the subsequent returns of mergers made in those periods are the worst. Baker, Foley, and Wurgler (2004) find that FDI outflows, which are often simply cross-border acquisitions, increase with the current aggregate market-to-book ratio of the acquirer's stock market and decrease with subsequent returns on that market. All of these patterns are consistent with overvaluation-driven merger activity.

An unresolved question in the Shleifer-Vishny framework is why managers would prefer a stock-for-stock merger to an equity issue if the market timing gains are similar. One explanation is that a merger more effectively hides the underlying market timing motive from investors. Baker, Coval, and Stein (2004) consider another mechanism that can also help explain a generic preference for equity issues via merger.<sup>7</sup> The first ingredient of the story is that the acquiring firm faces a downward sloping demand curve for its shares, as in Shleifer (1986) and

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<sup>6</sup> See Rhodes-Kropf and Viswanathan (2003) for a somewhat different misvaluation-based explanation of this link, and Jovanovic and Rousseau (2002) for an explanation based on technological change in efficient markets.

<sup>7</sup> For example, in the case of S&P 100 firms over 1999-2001, Fama and French (2004) find that the amount of equity raised in mergers is roughly 40 times that raised in SEOs.

Harris and Gurel (1986). The second ingredient is that some investors follow the path of least resistance, passively accepting the acquirer's shares as consideration even when they would not have actively participated in an equity issue. With these two assumptions, the price impact of a stock-financed merger can be much smaller than the price impact of an SEO. Empirically, inertia is a prominent feature in institutional and especially individual holdings data that is associated with smaller merger announcement effects.

### C.3. Diversification and focus

Standard explanations for entering unrelated lines of business include agency problems or synergies, e.g., internal capital markets and tax shields. Likewise, moves toward greater focus are often interpreted as a triumph of governance. While our main task is to survey the existing literature, the topics of diversification and focus have yet to be considered from a perspective where investors are less than fully rational. So, we take a short detour here. We ask whether the evidence at hand is consistent with the view that the late-1960s conglomerate wave, which led to conglomerates so complex they were still being divested or busted up decades later, was in part driven by efforts to cater to a temporary investor appetite for conglomerates.

Investor demand for conglomerates appears to have reached a peak in 1968. Ravenscraft and Scherer (1987, p. 40) find that the average return on 13 leading conglomerates was 385% from July 1965 to June 1968, while the S&P 425 gained only 34%. Diversifying acquisitions were being greeted with a positive announcement effect, while other acquisitions were penalized (Matsusaka (1993)). Klein (2001) finds a "diversification premium" of 36% from 1966-68 in a sample of 36 conglomerates. Perhaps responding to these valuation incentives, conglomerate mergers accelerated in 1967 and peaked in 1968 (Ravenscraft and Scherer, pp. 24, 161, 218).

Conglomerate valuations started to fall in mid-1968. Between July 1968 and June 1970, the sample followed by Ravenscraft and Scherer lost 68%, three times more than the S&P 425. Announcement effects also suggest a switch in investor appetites: diversification announcements were greeted with a flat reaction in the mid- to late-1970s and a negative reaction by the 1980s (Morck, Shleifer, and Vishny (1990a)). Klein finds that the diversification premium turned into a discount of 1% in 1969-71 and 17% by 1972-74, and a discount seems to have remained through the 1980s (Lang and Stulz (1994), Berger and Ofek (1995)). Again, possibly in response to this shift in catering incentives, unrelated segments began to be divested, starting a long trend toward focus (Porter (1987), Kaplan and Weisbach (1992)).<sup>8</sup> Overall, while systematic evidence is lacking, the diversification and subsequent re-focus wave seems to fit the catering model well.

#### D. Financial policy

The simple theoretical framework suggests that long-horizon managers may reduce the overall cost of capital paid by their ongoing investors by issuing overpriced securities and repurchasing underpriced securities. Here, we survey the evidence on the extent to which market timing affects equity issues, repurchases, debt issues, cross-border issues, and capital structure.

##### D.1. Equity issues

Several lines of evidence suggest that overvaluation is a motive for equity issuance. Most simply, in the Graham and Harvey (2001) anonymous survey of CFOs of public corporations, two-thirds state that “the amount by which our stock is undervalued or overvalued was an

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<sup>8</sup> In a case study of the diversification and subsequent refocus of General Mills, Donaldson (1990) writes that the company spent some effort “to verify the dominant trends in investor perceptions of corporate efficiency, as seen in the company study of the impact of excessive diversification on the trend of price-earnings multiples in the 1970s” (p. 140).

important or very important consideration” in issuing equity (p. 216). Several other questions in the survey also ask about the role of stock prices. Overall, stock prices are viewed as more important than nine out of ten factors considered in the decision to issue common equity, and the most important of five factors in the decision to issue convertible debt.

Empirically, equity issuance is positively associated with plausible *ex ante* indicators of overvaluation. Pagano, Panetta, and Zingales (1998) examine the determinants of Italian private firms’ decisions to undertake an IPO between 1982 and 1992, and find that the most important is the market-to-book ratio of seasoned firms in the same industry. Lerner (1994) finds that IPO volume in the biotech sector is highly correlated with biotech stock indexes. Loughran, Ritter, and Rydqvist (1994) find that aggregate IPO volume and stock market valuations are highly correlated in most major stock markets around the world. Similarly, Marsh (1982) examines the choice between (seasoned) equity and long-term debt by UK quoted firms between 1959 and 1974, and finds that recent stock price appreciation tilts firms toward equity issuance. In US data, Jung, Kim, and Stulz (1996) and Hovakimian, Opler, and Titman (2001) also find a strong relationship between stock prices and seasoned equity issuance.

Of course, there are many non-behavioral reasons why equity issuance and market valuations should be positively correlated. More specific evidence for equity market timing comes from the pattern that new issues earn low subsequent returns. In an early test, Stigler (1964) tried to measure the effectiveness of the S.E.C. by comparing the *ex post* returns of new equity issues (lumping together both initial and seasoned) from 1923-28 with those from 1949-55. If the S.E.C. improved the pool of issuers, he reasoned, then the returns to issuers in the latter period should be higher. But he found that issuers in both periods performed about equally

poorly relative to a market index. Five years out, the average issuer in the pre-S.E.C. era lagged the market by 41%, while the average underperformance in the later period was 30%.

Other sample periods show similar results. Ritter (1991) examines a sample of IPOs, Speiss and Affleck-Graves (1995) examine SEOs, and Loughran and Ritter (1995) examine both. The last paper's sample includes 4,753 IPOs and 3,702 SEOs between 1970 and 1990. Five years out, the average IPO earns lower returns than a size-matched control firm by 30%, and the average SEO underperforms that benchmark by 31%. Gompers and Lerner (2003) fill in the gap between the samples of Stigler (1964) and Loughran and Ritter (1995). Their sample of 3,661 IPOs between 1935 and 1972 shows average five-year buy-and-hold returns that underperform the value-weighted market index by 21% to 35%.<sup>9</sup> Thus, a rough summary of non-overlapping samples is that, on average, US equity issues underperform the market somewhere in the ballpark of 20-40% over five years.

In a test that speaks closely to the question of opportunistic timing of new investors, Burch, Christie, and Nanda (2004) examine the subsequent performance of seasoned equity issued via rights offers, which are targeted to a firm's ongoing shareholders, and firm commitment offers. In their 1933 to 1949 sample, a period in which rights offers were more common, they find underperformance entirely concentrated in the latter group. This fits exactly with the framework sketched above, which emphasizes the opportunistic timing of *new* investors.

If equity issues cluster when the market as a whole is overvalued, the net gains to equity market timing may be even larger than the underperformance studies suggest. Baker and Wurgler (2000) examine whether equity issuance, relative to total equity and debt issuance, predicts

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<sup>9</sup> Gompers and Lerner also confirm what Brav and Gompers (1997) found in a later sample: while IPOs have low absolute returns, and low returns relative to market indexes, they often do not do worse than stocks of similar size and book-to-market ratio. One interpretation is that securities with similar characteristics, whether or not they are IPOs, tend to be similarly priced (and mispriced) at a given point in time.

aggregate market returns between 1927 and 1999. They find that when the equity share was in its top historical quartile, the average value-weighted market return over the next year was negative 6%, or 15% below the average market return. Henderson, Jegadeesh, and Weisbach (2004) find a similar relationship in several international markets over the period 1990 to 2001. In 12 out of the 13 markets they examine, average market returns are higher after a below-median equity share year than after an above-median equity share year.<sup>10</sup>

The equity market timing studies continue to be hotly debated. Some authors highlight the joint hypothesis problem, proposing that the reason why IPOs and SEOs deliver low returns is that they are actually less risky. For more on this perspective, see Eckbo, Masulis, and Norli (2000), Eckbo and Norli (2004), and the chapter by Eckbo in this volume. In a recent critique, Schultz (2003) points out that a small-sample bias he calls “pseudo market timing” can lead exaggerated impressions of underperformance when abnormal performance is calculated in “event time.” The empirical relevance of this bias has yet to be pinned down. Schultz (2003, 2004) argues that it may be significant, while Ang, Gu, and Hochberg (2004), Dahlquist and de Jong (2004), and Viswanathan and Wei (2004) argue that it is minor.<sup>11</sup>

We leave the resolution to future research, but we stress that the returns studies should not be considered in isolation. Survey evidence was mentioned above. Other relevant results include Teoh, Welch, and Wong (1998a,b), who find that the equity issuers who manage

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<sup>10</sup> Note that these aggregate predictability results should probably not be interpreted as evidence that “managers can time the aggregate market.” A more plausible explanation is that broad waves of investor sentiment lead many firms to be mispriced in the same direction at the same time. Then, the *average* financing decision will contain information about the *average* (i.e., market-level) mispricing, even though individual managers are perceiving and responding only to their *own* firm’s mispricing.

<sup>11</sup> Butler, Grullon, and Weston (2004) take Schultz’s idea to the time-series and argue that the equity share’s predictive power is due to an aggregate version of the pseudo market timing bias. Baker, Taliaferro, and Wurgler (2004) reply that the tests in Butler et al. actually have little relevance to the bias, and that simple simulation techniques show that small-sample bias can account for only one percent of the equity share’s actual predictive coefficient.



earnings most aggressively have the worst post-issue returns (we return to earnings management below). Jain and Kini (1994), Mikkelson, Partch, and Shah (1997), and Pagano et al. (1998) find that profitability deteriorates rapidly following the initial offering, and Loughran and Ritter (1997) document a similar pattern with seasoned issues. Jenter (2004) finds that seasoned equity offerings coincide with insider selling. When viewed as a whole, the evidence indicates that market timing plays a nontrivial role in equity issues.

## D.2. Repurchases

Undervaluation is an important motive for repurchases. Brav, Graham, Harvey, and Michaely (2004) survey 384 CFOs regarding payout policy, and “the most popular response for all the repurchase questions on the entire survey is that firms repurchase when their stock is a good value, relative to its true value: 86.6% of all firms agree” (p. 26). Other work finds positive abnormal returns for firms that conduct repurchases, suggesting that managers are on average successful in timing them. Ikenberry, Lakonishok, and Vermaelen (1995) study 1,239 open market repurchases announced between 1980 and 1990. Over the next four years, the average repurchaser earned 12% more than firms of similar size and book-to-market ratios. Ikenberry, Lakonishok, and Vermaelen (2000) find similar results in a recent sample of Canadian firms.

The evidence shows that managers tend to issue equity before low returns, on average, and repurchase before higher returns. Is there a ballpark estimate of the reduction in the cost of equity, for the average firm, that these patterns imply? Without knowing just how the “rational” cost of equity varies over time, this question is hard to answer. However, suppose that rationally required returns are constant. By following aggregate capital inflows and outflows into corporate equities, and tracking the returns that follow these flows, Dichev (2004) reports that the average

“dollar-weighted” return is lower than the average buy-and-hold return by 1.3% per year for the NYSE/Amex, 5.3% for Nasdaq, and 1.5% (on average) for 19 stock markets around the world. Put differently, if NYSE/Amex firms had issued and repurchased randomly across time, then, holding the time series of realized returns fixed, they would have paid 1.3% per year more for the equity capital they employed.

Of course, this reduction in the cost of equity capital is not evenly distributed in the cross section of firms. The difference between Nasdaq and NYSE/Amex gives a hint of this. For the many mature firms that rarely raise external equity, the gains may be negligible. For other firms that access the capital markets repeatedly through seasoned equity issues and stock-financed mergers, the gains may be much larger.

### D.3. Debt issues

A few papers have examined debt market timing, i.e., raising debt when its cost is unusually low. Survey evidence lends some initial plausibility to timing in this market as well. In particular, Graham and Harvey (2001) find that interest rates are the most cited factor in debt policy decisions: CFOs issue debt when they feel “rates are particularly low.” Expectations about the yield curve also appear to influence the *maturity* of new debt. Short-term debt is preferred “when short-term rates are low compared to long-term rates” and when “waiting for long-term market interest rates to decline.” Clearly, CFOs do not believe in the textbook version of the expectations hypothesis, under which the cost of debt is equal across maturities. At the same time, CFOs do not confess to exploiting their private information about credit quality, instead highlighting general debt market conditions.

On the empirical side, Marsh (1982), in his sample of UK firms, finds that the choice between debt and equity does appear to be swayed by the level of interest rates. And Guedes and Opler (1996) examine and largely confirm the survey responses regarding the effect of the yield curve. In a sample of 7,369 US debt issues between 1982 and 1993, they find that maturity is strongly negatively related to the term spread (the difference between long- and short-term bond yields), which was fluctuating considerably during this period.

Is debt market timing successful in any sense? In aggregate data, Baker, Greenwood, and Wurgler (2003) examine the effect of debt market conditions on the maturity of debt issues and, perhaps more interesting, connect the maturity of new issues to subsequent bond market returns. Specifically, in US Flow of Funds data between 1953 and 2000, the aggregate share of long-term debt issues in total long- and short-term debt issues is negatively related to the term spread, just as Guedes and Opler find with firm-level data. Further, because the term spread is positively related to future excess bond returns—i.e. the difference in the returns of long-term and short-term bonds, or the realized relative cost of long- and short-term debt—so is the long-term share in debt issues. Perhaps simply by using a naïve rule of thumb, “issue short-term debt when short-term rates are low compared to long-term rates,” managers may have timed their debt maturity decisions so as to reduce their overall cost of debt. Of course, such a conclusion is subject to the usual risk-adjustment caveats.

Unfortunately, the data on individual debt issues and their subsequent returns does not approach the level of detail of the IPO and SEO data. But one intriguing pattern that has been uncovered is that debt issues are followed by low *equity* returns. Speiss and Affleck-Graves (1999) examine 392 straight debt issues and 400 convertible issues between 1975 and 1989. The shares of straight debt issuers underperform a size- and book-to-market benchmark by an

insignificant 14% over five years (the median underperformance is significant), while convertible issuers underperform by a significant 37%. There is also a suggestion that the riskiest firms may be timing their idiosyncratic credit quality, despite the survey answers on this point: the shares of unrated issuers have a median five-year underperformance of 54%. If the equity did so poorly, the debt issues presumably also did poorly. In a much broader panel, Richardson and Sloan (2003) also find that net debt issuance is followed by low stock returns.

There are several potential explanations for this pattern. Certainly, equity overvaluation would be expected to lower the cost of debt directly—credit risk models routinely include stock market capitalization as an input—so the relationship with subsequent stock returns may reflect debt market timing *per se*. Or, managerial and investor sentiment is correlated; managers may tend to be most optimistic precisely when capital is cheap, and thus raise and invest as much as they can from any source. This story combines investor and managerial irrationality and so does not fit neatly within our taxonomy, but seems like a promising approach for future work. A third possibility, outlined in Baker, Stein, and Wurgler (2003), is that equity overvaluation relaxes a binding leverage constraint, creating debt capacity that subsequently gets used up. But debt is always correctly priced in this setting, so debt market timing *per se* is not possible.

#### D.4. Cross-border issues

The evidence in Froot and Dabora (1999) suggests that relative mispricings across international securities markets are possible, even between particularly liquid markets such as the US and the UK. This raises the possibility of international market timing. Along these lines, Graham and Harvey (2001) find that among US CFOs who have considered raising debt abroad,

44% implicitly dismissed covered interest parity in replying that lower foreign interest rates were an important or very important consideration in their decision.<sup>12</sup>

In practice, most international stock and bond issues are made on the US and UK markets. Henderson, Jegadeesh, and Weisbach (2004) find that when total foreign issues in the US or the UK are high, relative to respective GDP, subsequent returns on those markets tend to be low, particularly in comparison to the returns on issuers' own markets. In a similar vein, and consistent with the survey evidence mentioned above, foreign firms tend to issue more debt in the US and the UK when rates there are low relative to domestic rates.

#### D.5. Capital structure

As an accounting identity, every firm's capital structure is the cumulative outcome of a long series of incremental financing decisions, each driven by the need to fund some investment project, consummate a merger, or achieve some other purpose. To the extent that market timing is a determinant of any of these incremental financing decisions, then, it may help to explain the cross-section of capital structure. In particular, if market timing-motivated financing decisions are not quickly rebalanced away, low-leverage firms will tend to be those that raised external finance when their stock prices were high, and hence those that tended to choose equity to finance past investments and mergers, and vice-versa for high leverage firms.<sup>13</sup>

This market timing theory of capital structure is developed and tested in Baker and Wurgler (2002). In an effort to capture the historical coincidence of market valuations and the demand for external finance in a single variable, they construct an "external finance weighted-

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<sup>12</sup> Almost all equity raised by US corporations is placed in domestic markets, so Graham and Harvey do not ask about the determinants of international stock issues.

<sup>13</sup> Similarly, one could articulate a simple theory of debt maturity structure as reflecting the historical coincidence of debt issuance and debt market conditions like the term spread.

average” of a firm’s past market-to-book ratios. For example, a high value would mean that the firm raised the bulk of its external finance, equity *or* debt, when its market-to-book was high. If market timing has a persistent impact on capital structure, Baker and Wurgler argue, this variable will have a negative cross-sectional relationship to the debt-to-assets ratio, even in regressions that control for the current market-to-book ratio. In a broad Compustat sample from 1968 to 1999, a strong negative relationship is apparent.

This evidence has inspired debate. Hovakimian (2004) argues that equity issues do not have persistent effects on capital structure, and that the explanatory power of the weighted average market-to-book arises because it contains information about growth opportunities, a likely determinant of target leverage, that is not captured in current market-to-book. Leary and Roberts (2003) and Kayhan and Titman (2004) also argue that firms rebalance toward a target. On the other hand, Chen and Zhao (2004b) point out that mean reversion in leverage is not definitive evidence for a tradeoff theory. Because leverage is a ratio, shocks tend to cause mean reversion mechanically. In an analysis of the choice between equity and debt issues, which avoids this problem, Chen and Zhao (2004a) find that deviation-from-target proxies have little explanatory power, while market-to-book and past stock returns are very important.

#### E. Other corporate decisions

In this subsection, we consider what the irrational investors approach has to say about dividend policy, firm name changes, and earnings management.<sup>14</sup> We also discuss recent work that looks at executive compensation from this perspective.

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<sup>14</sup> We put dividend policy in this section and repurchases in the financing section, because, unlike a repurchase, pro-rata dividends do not change the ownership structure of the firm, and there is no market timing benefit or cost. For this reason, it fits more naturally with the category of corporate decisions that might influence the level of mispricing, but do not otherwise transfer value among investors.

## E.1. Dividends

The catering idea has been applied to dividend policy. Long (1978) provides some early motivation for this application. He finds that shareholders of Citizens Utilities put different prices on its cash dividend share class than its stock dividend share class, even though the value of the shares' payouts are equal by charter. In addition, this relative price fluctuates. The unique experiment suggests that investors may view cash dividends *per se* as a salient characteristic, and in turn raises the possibility of a catering motive for paying them.

Baker and Wurgler (2004a) outline and test a catering theory of dividends in aggregate US data between 1963 and 2000. They find that firms initiate dividends when the shares of existing payers are trading at a premium to those of nonpayers, and dividends are omitted when payers are at a discount. To measure the relative price of payers and nonpayers, they use an *ex ante* measure of mispricing they call the "dividend premium." This is just the difference between the average market-to-book ratios of payers and nonpayers. They also use *ex post* returns, and find that when the rate of dividend initiation increases, the future stock returns of payers (as a portfolio) are lower than those of nonpayers. This is consistent with the idea that firms initiate dividends when existing payers are relatively overpriced.

Time-varying catering incentives also appear to shed light on the "disappearance" of dividends. Fama and French (2001) document that the percentage of Compustat firms that pay dividends declines from 67% in 1978 to 21% in 1999, and that only a part of this is due to the compositional shift towards small, unprofitable, growth firms which are generally less likely to pay dividends. Baker and Wurgler (2004b) observe that the dividend premium switched sign from positive to negative in 1978 and has remained negative through 1999, suggesting that dividends may have been disappearing in part because of the consistently lower valuations put on

payers over this period. An analysis of earlier 1963-77 data also lends support to this idea. Dividends “appeared,” “disappeared,” and then “reappeared” in this period, and each shift roughly lines up with a flip in the sign of the dividend premium. In UK data, Ferris, Sen, and Yui (2004) find that dividends have been disappearing during the late 1990s, and that a dividend premium variable formed using UK stocks lines up with this pattern.

The evidence suggests that the dividend supply responds to catering incentives, but why does investor demand for payers vary over time? One possibility is that “dividend clienteles” vary over time, for example with tax code changes. However, in US data, the dividend premium is unrelated to the tax disadvantage of dividend income, as is the rate of dividend initiation. Shefrin and Statman (1984) develop explanations for why investors prefer dividends based on self-control problems, prospect theory, mental accounting, and regret aversion. Perhaps these elements vary over time. Baker and Wurgler (2004a) argue that the dividend premium reflects sentiment for “risky” nonpaying growth firms versus “safe” dividend payers, since it falls in growth stock bubbles and rises in crashes. Fuller and Goldstein (2003) show more explicitly that payers outperform in market downturns. Perhaps investors seek the perceived safety of cash dividends in these gloomy periods, and bid up the shares of payers.

There are clear limitations to a catering theory of dividends, however. For one, it is a descriptive theory of whether firms pay dividends at all, not how much—in US data, at least, the dividend premium does not explain aggregate fluctuations in the level of dividends. Also, it works better for explaining initiations than omissions, and it has little to say about the strong persistence in dividend policy. Catering is probably best viewed as one building block in an overall descriptive theory of dividend policy.



## E.2. Firm names

Name changes provide some of the simplest and most colorful examples of catering. In frictionless and efficient markets, firm names should be about as irrelevant as dividends. But there is a low fundamental cost of changing names, and perhaps through a name change a firm can create a salient association with an overpriced category of stocks.

Evidence of a catering motive for corporate names is most prominent in bubbles. In the 1959-62 era which Malkiel (1990) refers to as the “tronics boom,” firms “often included some garbled version of the word ‘electronics’ in their title even if the companies had nothing to do with the electronics industry” (p. 54). Systematic evidence has been assembled for the Internet bubble. Cooper, Dimitrov, and Rau (2001) find that 147 (generally small) firms changed to “dotcom” names between June 1998 and July 1999, as Internet valuations were rapidly rising. Catering to Internet sentiment did seem to deliver a short-term price boost: Cooper et al. report an average announcement effect of 74% for their main sample, and an even larger effect for the subset that had little true involvement with the Internet. Interestingly, Cooper et al. (2004) find that names were also used to *dissociate* companies from the Internet sector, as prices started crashing. Between August 2000 and September 2001, firms that dropped their dotcom name saw a positive announcement effect of around 70%. The effect was almost as large for firms that dropped the dotcom name but kept an Internet business focus, and for the “double dippers” which dropped the name they had newly adopted just a few years earlier.

The names of mutual funds also seem to be sensitive to investor sentiment. Cooper, Gulen, and Rau (2003) find that fund names shift away from styles that experience low returns and toward those with high returns. The authors find that name changes do not predict fund performance, yet inflows increase dramatically, even for “cosmetic” name changers whose

underlying investment style remains constant. Presumably, then, the name change decision is driven in part by the desire to attract fund inflows, which increase the fund's size and the fees its managers earn. Indeed, Cooper et al. find that the inflow effect is increased when money is spent to advertise the "new" styles. While we group this study with other name changes, it actually involves an investment policy decision, in the sense that the goal of the name change is to increase the fundamental value of the franchise.

### E.3. Earnings management

The quarterly net income figure that managers report to shareholders does not equal actual economic cash flows, but instead includes various non-cash accruals, some of which are fairly discretionary. According to the survey by Graham, Harvey, and Rajgopal (2004), CFOs believe that investors care more about earnings per share than cash flows.<sup>15</sup>

As the irrational investors theory predicts, managers with "short horizons" are especially likely to manage earnings. Bergstresser and Philippon (2004) find that accruals management increases as the CEO's compensation, via stock and options holdings, becomes more sensitive to current share prices. Sloan (1996) finds that firms with high accruals earn low subsequent returns, which suggests that earnings management may be successful in boosting share price, or at least in maintaining overvaluation. Consistent with the view that managers use earnings management to fool investors and issue overvalued equity, Teoh, Welch, and Wong (1998a,b) find that initial and seasoned equity issuer underperformance is greatest for firms that most aggressively manage pre-issue earnings.

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<sup>15</sup> There is a large literature in financial accounting on corporate earnings management. Here, we offer a brief and incomplete review, focusing on the link between earnings management and corporate financing decisions.

An interesting and largely unexplored question is whether earnings management has serious consequences for investment. Graham et al. (2004) present CFOs with hypothetical scenarios and find that 41% of them would be willing to pass up a positive-NPV project just to meet the analyst consensus EPS estimate. Direct evidence of this type of value loss is difficult to document, but Jensen (2004) presents a range of anecdotes, and highly suggestive empirical studies include Teoh et al. (1998a,b), Erickson and Wang (1999), Bergstresser, Desai, and Rauh (2004), and Pshisva and Saurez (2004). The last three papers report that earnings management activity increases prior to stock acquisitions.

#### E.4. Executive compensation

In the theoretical framework at the beginning of this section, we assumed that managers may have the incentive to cater to short-term mispricing. One question is why shareholders do not set up executive compensation contracts to force managers to take the long view.<sup>16</sup> Bolton, Scheinkman, and Xiong (2003) suggest that short horizons may be an equilibrium outcome. They study the optimal incentive compensation contract for the dynamic speculative market of Scheinkman and Xiong (2003), in which two groups of overconfident investors trade shares back and forth as their relative optimism fluctuates. The share price in this market contains a speculative option component, reflecting the possibility that nonholders might suddenly become willing to buy at a high price. Bolton et al. find that the optimal contract may induce the CEO to take costly actions that exacerbate differences of opinion, thus increasing the value of the option component of stock prices, at the expense of long-run value.

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<sup>16</sup> A separate but related question is how managers compensate lower level employees within the firm. Bergman and Jenter (2004) argue that rational managers may minimize costs by paying optimistic employees in overvalued equity, in the form of options grants. Benartzi (2001) offers a foundation for this sort of optimism, showing that employees have a tendency to extrapolate past returns, and as a consequence hold too much company stock. See also Core and Guay (2001) and Oyer and Schaefer (2004).

### **III. The irrational managers approach**

The second approach to behavioral corporate finance takes the opposite extreme, in which irrational managers operate in efficient capital markets. To be more precise, by irrational managerial behavior we mean behavior that departs from rational expectations and expected utility maximization of the manager. We are not interested in rational moral hazard behavior, such as empire building, stealing, and plain slacking off. Instead, we are concerned with situations where the manager believes that he is actually close to maximizing firm value—and, in the process, some compensation scheme—but is in fact deviating from this ideal.

As in the irrational investors approach, an extra building block is required. In order for less-than-fully-rational managers to have an impact, corporate governance must be limited in its ability to constrain them into making rational decisions. In general, an assumption of limited governance seems like a reasonable one to maintain. Takeover battles and proxy fights are notoriously blunt tools. Boards may be more a part of the problem than the solution if they have their own biases or are pawns of management. And unlike in a traditional agency problem, which arises when there is a conflict of interest between managers and outside investors, standard incentive contracts have little effect: An irrational manager may well think that he is maximizing value. Finally, in the US, a significant element of managerial discretion is codified in the business judgment rule. See Adams, Almeida, and Ferreira (2004) and Bertrand and Schoar (2003) for direct evidence that managers have discretion, and Shleifer and Vishny (1997) for a broader review of corporate governance institutions.

The psychology and economics literatures relevant to managerial behavior are vast. For us, the main themes are that individuals do not always form beliefs logically, nor do these beliefs convert to decisions in a consistent and rational manner—see Gilovich, Griffin, and Kahneman

(2002) and Kahneman and Tversky (2000) for collected works. Thus far, most research in corporate finance has focused on the positive illusions of optimism and overconfidence. Illustrating the pattern of optimism, Weinstein (1980) finds that subjects tend to believe themselves to be more likely than average to experience positive future life events (e.g. owning own home, living past 80) and less likely to experience negative events (being fired, getting cancer). Illustrating overconfidence in one's own skills, Svenson (1981) finds that 82% of a sample of students placed themselves in the top 30% in terms of driving safety.

There are good reasons to focus on these particular biases in a managerial setting. First, they are strong and robust, having been documented in many samples, in particular samples of managers (Larwood and Whittaker (1977), March and Shapira (1987), and Ben-David (2004)). Second, they are often fairly easy to integrate into existing models, in that optimism can be modeled as an overestimate of a mean and overconfidence as an underestimate of a variance. Third, overconfidence leads naturally to more risk-taking. Even if there is no overconfidence on average in the population of *potential* managers, those that are overconfident are more likely to perform extremely well (and extremely badly), placing them disproportionately in the ranks of upper (and former) management. And fourth, even if managers start out without bias, an attribution bias—the tendency to take greater responsibility for success than failure (e.g., Langer and Roth (1975))—may lead successful managers to *become* overconfident, as in Gervais and Odean (2001).

After reviewing the theory and evidence on optimism and overconfidence, we turn briefly to potential applications of bounded rationality and reference-point preferences. Given the state of the literature, our treatment there is necessarily more speculative. Further, we do not discuss at all the impact of several other judgmental biases, such as representativeness, availability,

anchoring, and narrow framing—not because we believe them to be unimportant, but because no systematic studies of their impacts on corporate finance decisions have yet been conducted.

#### A. Theoretical framework

The idea of managerial optimism and overconfidence in finance dates at least to Roll (1986). The derivation below is in the spirit of Heaton (2002) and Malmendier and Tate (2004), as modified to match our earlier notation as much as possible. We start by assuming the manager is optimistic about the value of the firm’s assets and investment opportunities. He then balances two conflicting goals. The first is to maximize *perceived* fundamental value. To capture this, we augment fundamental value with an optimism parameter  $\gamma$ ,

$$(1 + \gamma)f(K, \cdot) - K,$$

where  $f$  is increasing and concave in new investment  $K$ . Note that here, the manager is optimistic about both the assets in place ( $f$  can include a constant term) and new opportunities. Once again, if traditional market imperfections cause the Modigliani and Miller (1958) theorem to fail, financing may enter  $f$  alongside investment.

The manager’s second concern is to minimize the *perceived* cost of capital. We assume here that the manager acts on behalf of existing investors, because of his own stake in the firm and fiduciary duty. This leads to a similar setup to the market timing objective in Section II.A., except that an optimistic manager believes there is never a good time to issue equity. In particular, since the capital market is efficient and values the firm at its true fundamental value of  $f-K$ , the manager believes that the firm is undervalued by  $\gamma$ , and thus in selling a fraction of the firm  $e$  he perceives that existing, long-run shareholders will lose

$$e\gamma f(K, \cdot).$$

Putting the two concerns together, the optimistic manager chooses new investment and financing to solve

$$\max_{K,e} (1 + \gamma)f(K, \cdot) - K - e\mathcal{Y}(K, \cdot).$$

We do not explicitly include a budget constraint. Instead, again to keep the notation simple, we consider its reduced-form impact on  $f$ .

Differentiating with respect to  $K$  and  $e$  gives the optimal investment and financial policy of an optimistic manager operating in efficient capital markets:

$$f_K(K, \cdot) = \frac{1}{1 + (1 - e)\gamma}, \text{ and}$$

$$(1 + \gamma)f_e(K, \cdot) = \gamma(f(K, \cdot) + ef_e(K, \cdot)).$$

Put into words, the first condition is about investment policy. Instead of setting the marginal value created from investment equal to the true cost of capital, normalized to be one here, managers overinvest, to the point where the marginal value creation is less than one. The more optimistic ( $\gamma$ ) is the manager and the less equity ( $e$ ) he is forced to raise in financing investment, the greater the problem. The second is about financing. The marginal value lost from shifting the firm's current capital structure away from equity is weighed against the perceived market timing losses. As in the analysis of irrational investors, we consider some special cases.

**Investment policy.** If there is no optimal capital structure, so that  $f_e$  is equal to zero, the manager will not issue equity, setting  $e$  to zero, and there is no interaction among financing, internal funds, and investment. In this case, the optimistic manager will clearly overinvest:  $f_K$  is less than unity. In Heaton (2002) and Malmendier and Tate (2004), there is an optimal capital structure, or more precisely an upper bound on debt. If the manager needs equity to invest ( $f_e$  greater than zero, here), the degree of overinvestment falls.

Needing equity is akin to having little cash or cash flow available for investment. Thus in this setup, investment can be strongly related to current cash flow and profits, controlling for investment opportunities. This leads to a behavioral foundation for the Jensen (1986) agency costs of free cash flow. But instead of receiving private benefits of control, managers are simply overconfident and overinvest from current resources as a result. Leverage reduces the degree of overinvestment by increasing  $f_e$ , thereby increasing equity issues  $e$  and reducing  $K$ .

In a more complex specification, these conclusions may change. One might have the manager optimistic only about assets in place, in which case there is no overinvestment, and there will typically be underinvestment as a firm approaches its debt capacity. Also, it is worth emphasizing that we are examining optimism in isolation here. Layering on other imperfections, such as risk aversion, may mean that optimism moves investment from an inefficiently *low* level toward the first best, as in Gervais, Heaton, and Odean (2003) and Goel and Thakor (2002). In a related vein, Hackbarth (2003) argues that managerial optimism and overconfidence can reduce the underinvestment associated with debt overhang, as in Myers (1977).

**Financial policy.** An optimistic manager never sells equity unless he has to. If there is an upper bound on leverage ( $f_e$  greater than zero, here), optimism predicts a ‘pecking order’ of financing decisions: The manager relies on internal capital and debt and uses outside equity only as a last resort. Again, other imperfections may mitigate the aversion to equity. If the manager is risk averse with an undiversified position in the firm’s equity, for example, he may wish to issue equity even though it is below what he thinks it to be worth.

**Other corporate decisions.** It is not as easy to incorporate other decisions into this framework. Consider dividend policy. If the manager is more optimistic about future cash flow and assets in place than outside investors, he might view a dividend payment as more



sustainable. On the other hand, if he views future investment opportunities, and hence funding requirements, as greater, he might be reluctant to initiate or increase dividends and retain internal funds instead. This analysis requires a more dynamic model of investment and cash flow and a decomposition of firm value into assets in place and growth opportunities.

## B. Empirical challenges

If the main obstacle to testing the irrational investors approach is finding a proxy for misvaluation, the challenge here is to identify optimism, overconfidence, or the behavioral bias of interest. Without an empirical measure, the irrational managers approach is difficult to distinguish from traditional agency theory, in particular. That is, in Stein (2003), an empire-building manager will

$$\max_{K,e} (1 + \gamma)f(K) - K - c(e),$$

where  $\gamma$  reflects the preference for or the private benefits that come with presiding over a larger firm, as in Jensen and Meckling (1976) or Grossman and Hart (1988), rather than optimism. Rational investors recognize the agency problem up front, so  $c$  reflects the cost of raising outside equity, and management and existing shareholders bear the agency costs.

This reduced form is almost identical to the objective function of an optimistic manager. Both can generate overinvestment, underinvestment, cash flow-investment sensitivities, pecking order financing, and so forth. Moreover, Stein points out that the agency model is itself hard to distinguish from models of costly external finance built on asymmetric information. Thus, to test the behavioral theories, one must separate the  $\gamma$  related to overconfidence and optimism from the  $\gamma$  that arises from agency or asymmetric information problems.

## C. Investment policy

Despite the obvious difficulty of obtaining direct, manager-level measures of optimism and overconfidence, evidence is accumulating that these biases do affect business investment.

### C.1. Real investment

We begin with startup investments. The evidence indicates that entrepreneurial startups are generally made under a halo of overconfidence and optimism. Cooper, Woo, and Dunkelberg (1998) find that 68% of entrepreneurs think that their startup is more likely to succeed than comparable enterprises, while only 5% believe that their odds are worse, and a third of entrepreneurs view their success as essentially guaranteed. The survey responses of French entrepreneurs tabulated in Landier and Thesmar (2004) also seem consistent with an initial underestimation of the task of starting a firm: At startup, 56% expect “development” in the near future, and 6% expect “difficulties.”

The actual performance of startup investments is more sobering. Landier and Thesmar find that when surveyed three years into their endeavor, only 38% of French entrepreneurs expect further “development” while 17% anticipate “difficulty.” Leaving profitability aside entirely, only half of all startups survive more than three years (Scarpetta, Hemmings, Tressel, and Woo (2002)). Moskowitz and Vissing-Jorgensen (2002) argue more generally that the return on private equity in the US between 1952 and 1999 is lower than seems justified given the undiversified nature of entrepreneurial investment. As a whole, the evidence on startup investments seems consistent with the overconfidence that Camerer and Lovallo’s (1999) experimental subjects display when making entry decisions.

Optimism also appears to influence investment in more mature firms. Merrow, Phillips, and Myers (1981) compare forecast and actual construction costs for pioneer process plants in the energy industry. There is a strong optimism bias in project cost forecasts, with actual costs typically more than double the initial estimates. Statman and Tyebjee (1985) survey several other studies of this sort, involving military hardware, drugs, chemicals, and other development projects, and conclude that optimistic biases in cost and sales forecasts are fairly widespread.

Malmendier and Tate (2004) provide cross-sectional tests of the effects of optimism in a broader sample. They form a clever manager-level proxy for optimism: the propensity for a manager to voluntarily hold in-the-money stock options in his own firm. The intuition is that since the CEO's human capital is already so exposed to firm-specific risk, voluntarily holding in-the-money options can be seen as a strong vote of optimism.<sup>17</sup> With this optimism proxy in hand for a large sample of US firms between 1980 and 1994, Malmendier and Tate find that the sensitivity of investment to cash flow is higher for the more optimistic CEOs. This sensitivity is especially high for optimistic CEOs in equity-dependent firms, that is, in situations where perceived financial constraints are most binding. Their results support the predictions of the basic optimism model.

While the empirical evidence that optimism affects investment may not seem extensive, keep in mind that optimism, as discussed earlier, shares many predictions with more established theories, and thus is a candidate to explain various earlier results. For example, the fact that managers invest rather than pay out cash windfalls (Blanchard, Lopez de Silanes, and Shleifer (1994)) looks like a moral hazard problem, but is also consistent with optimism. Likewise, some investment patterns that look like adverse-selection-driven costly external finance may actually

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<sup>17</sup> Malmendier and Tate find that the propensity to voluntarily retain in-the-money options is not significantly related to future abnormal stock returns, supporting their assumption that such behavior indeed reflects optimism rather than genuine inside information.

reflect a mistaken managerial belief that external finance is costlier. A possible example is the higher investment-cash flow sensitivities among younger and entrepreneurial firms (Schaller (1993)), which as noted above appear to be run by especial optimists.

## C.2. Mergers and acquisitions

Roll (1986) pioneered the optimism and overconfidence approach to corporate finance with his “hubris” theory of acquisitions. He suggests that successful acquirers may be optimistic and overconfident in their own valuation of deal synergies, and fail to properly account for the winner’s curse. Roll interprets the evidence on merger announcement effects, surveyed by Jensen and Ruback (1983) and more recently by Andrade, Mitchell, and Stafford (2001) and Moeller, Schlingemann and Stulz (2004), as well as the lack of evidence of fundamental value creation through mergers, as consistent with this theory.

More recently, Malmendier and Tate (2003) develop this argument and use their proxy for CEO optimism, outlined above, to test it. They find a number of patterns consistent with the optimism and overconfidence theory. First, optimistic CEOs complete more mergers, especially diversifying mergers, which are perhaps of more dubious value. Second, optimism has its biggest effect among the least equity dependent firms, i.e. when managers do not have to weigh the merger against an equity issue that they, as optimists, would perceive as undervalued. Third, investors are more skeptical about bid announcements when they are made by optimistic CEOs. This last result is consistent with the theme of irrational managers operating in efficient markets.<sup>18</sup>

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<sup>18</sup> For additional, anecdotal evidence on the role of hubris in takeovers, see Hietala, Kaplan, and Robinson (2003) and Shefrin (2000, chapter 16).

## D. Financial policy

Direct empirical tests of how optimism and overconfidence affects financing patterns is not extensive. Existing work addresses capital structure and financial contracting.

### D.1. Capital structure

The basic optimism model predicts a pecking order financing policy. Thus, much of the existing evidence of pecking-order policies, from Donaldson (1961) to Fama and French (2002), is at face value equally consistent with pervasive managerial optimism. And the notion of pervasive managerial optimism does not seem farfetched. In Graham's (1999) (anonymous) survey, almost two-thirds of CFOs state their stock is undervalued while only three percent state it is overvalued. Such responses are all the more striking given the fact that the survey was taken shortly *before* the Internet crash.

To distinguish optimism from other explanations of pecking order behavior (for example, adverse selection as in Myers and Majluf (1984)), a natural test would use cross-sectional variation in measured optimism to see whether such behavior is more prevalent in firms run by optimists. To our knowledge, exactly this test has yet to be conducted, but certain results in Malmendier and Tate (2003, 2004) have a closely related flavor. First, and as noted above, firms run by optimists (as identified by the Malmendier and Tate options-based proxies for optimism) display a higher sensitivity of investment to internal cash flow. Second, managers classified as optimistic show a differentially higher propensity to make acquisitions when they are not dependent on external equity.

## D.2. Financial contracting

Landier and Thesmar (2004) examine financial contracting between rational investors and optimistic entrepreneurs.<sup>19</sup> They highlight two aspects of contracting with optimists. First, because optimists tend to inefficiently persist in their initial business plan, the optimal contract transfers control when changes are necessary. (Kaplan and Stromberg (2003) find that contingent transfers of control are common features of venture capital contracts.) Second, because optimists believe good states to be more likely, they are willing to trade some control and ownership rights in bad states for greater claims in good ones; in this sense, the optimal contract “pays the entrepreneur with dreams.” Ultimately, optimists may self-select into short-term debt, as it transfers payments and control to the investor in states that seem unlikely to occur, while realistic entrepreneurs prefer less risky long-term debt.

Landier and Thesmar find some empirical evidence of this separation in a data set of French entrepreneurs. Among other results, they find that the use of short-term debt is positively related to an *ex post* measure of optimistic expectations, the difference between realized growth and initial growth expectations. They also find that the use of short-term debt is positively related to psychologically-motivated instruments for expectations, such as regional sunlight exposure and rates of mental depression.

## E. Other behavioral patterns

In the remainder of the survey, we briefly explore patterns other than optimism and overconfidence, in particular bounded rationality and reference-point preferences.

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<sup>19</sup> Manove and Padilla (1999) also consider how banks separate optimists and realists. They focus on the overall efficiency of the credit market.

## E.1. Bounded rationality

Perhaps the simplest deviation from the benchmark of full rationality is bounded rationality, introduced by Simon (1955). Bounded rationality assumes that some type of cognitive or information-gathering cost prevents agents from making fully optimal decisions. Boundedly-rational managers cope with complexity by using rules of thumb that ensure an acceptable level of performance and, hopefully, avoid severe bias. Conlisk (1996) reviews the bounded rationality literature.

Rules of thumb are hardly uncommon in financial management. For example, the net present value criterion is the optimal capital budgeting rule (in efficient markets), yet in practice managers employ various simpler rules. Gitman and Forrester (1977) find that less than 10% of 103 large firms use NPV as their primary technique, while over 50% use the IRR rule, which avoids a cost of capital calculation. The Graham and Harvey (2001) survey of CFOs also finds that the IRR rule is more widely used than NPV, and over 50% of CFOs use the payback period rule, an even less sophisticated rule that requires neither a cost of capital input nor forecasts of cash flows beyond a cutoff date. Graham and Harvey also find that among managers who do use a discounting procedure, it is common to apply a firm-wide discount rate rather than a project-specific rate, again in stark contrast to normative principles.<sup>20</sup>

Other instances of rule-based management include the use of simple targets for capital structures and payouts. Graham and Harvey (2001) find that 10% of the CFOs in their sample use a “very strict” target debt-equity ratio and 34% use a “somewhat tight” target or range. Such leverage targets are typically defined in terms of book value, and Welch (2004) confirms that

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<sup>20</sup> A good question is whether the use of such rules is better understood as an agency problem than as bounded rationality. That is, executives might use simple rules to shorten the workday and save time for golf. However, Graham and Harvey find that high-ownership managers are if anything *less* likely to use NPV and *more* likely to use the payback period rule.

market leverage is, to a large extent, allowed to float with stock prices. Likewise, the Lintner (1956) field interviews revealed a set of common rules of thumb in payout policy that led him to an empirically accurate specification for dividends.

## E.2. Reference-point preferences

Psychological experiments and intuition suggest that people value *changes* in economic states, such as wealth or performance, not just levels. This is reflected in the value function in Kahneman and Tversky's (1979) prospect theory, which is defined in terms of gains and losses relative to a reference point.

In corporate finance, the most developed application of reference-point preferences has been to IPO underpricing, the pattern that the initial offering price is, on average, below the market price that prevails after a day of trading. (For more on this, see the chapter by Ljungqvist in this volume.) There are, of course, many non-behavioral explanations for this pattern. Loughran and Ritter (2002) develop an explanation that combines reference-point preferences and mental accounting (Thaler (1980, 1985)). They assume that issuing managers mentally account for two quantities in judging an offering's success: the (perceived) gain from the gap between the first day closing price and a natural reference point, the midpoint of the file price range; and the (real) loss from the dilutive effect of the underpricing. If the gain is judged to outweigh the loss, where each is evaluated with the prospect theory value function, the executives are net satisfied. Intuitively, they may be too overwhelmed by the "windfall" gain versus the reference point to complain much about underpricing.<sup>21</sup>

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<sup>21</sup> Loughran and Ritter assume that the underwriter prefers underpricing, perhaps because it generates profitable rent-seeking activities among investors, e.g. trading with the underwriter's brokerage arm, or because it reduces marketing costs.



This setup is designed, in part, to explain the pattern that underpricing is greater when the offer price is above the initial file price range. Hanley (1993) finds that in issues where the offer price is below the minimum of the file price range, first-day returns are a relatively small 4%, on average, while those priced above the maximum have average first-day returns of 32%. This is consistent with issuers acquiescing in severe underpricing only when they are simultaneously getting good news in the form of upward revisions from the filing range.<sup>22</sup> Ljungqvist and Wilhelm (2004) test some of the behavioral underpinnings of the Loughran and Ritter view. Using data on the ownership stakes of executives in IPO firms, they crudely proxy for the proposed notion of issuer satisfaction by taking the dollar amount of executives' perceived "gain" from revisions from the midpoint of the file price range and subtracting the dollar amount of dilution due to underpricing. They find that executive teams that are more "satisfied" with their IPOs by this criterion are more likely to use the same underwriter for seasoned offerings, and to pay higher fees for those transactions.

A different application of reference-point thinking is the widely asserted, but less well documented, managerial propensity to "throw good money after bad." Such behavior is most relevant for us to the extent that it reflects something more than rational career concerns, e.g. a situation where the manager tries to distort the updating process to maintain high compensation. Shefrin (2001) offers several anecdotes concerning major corporate investments that have the flavor of good money after bad, and Statman and Sepe (1989) find that the market reaction to the termination of historically unprofitable investment projects is positive, suggesting that investors recognize that executives have a tendency to continue poor projects. Related evidence comes from the Guedj and Scharfstein (2004) study of drug development decisions. Those authors find

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<sup>22</sup> See Benveniste and Spindt (1989) for an alternative explanation for this asymmetry based on information gathering in the book-building process; and Edelen and Kadlec (2003) for an alternative explanation, based on sample truncation bias related to the withdrawal of IPOs whose prospects deteriorate during the waiting period.

that single-product early stage firms appear highly reluctant to abandon their only viable drug candidates, even when the results of clinical trials are less than promising. Some combination of agency, managerial optimism, and a gambling-to-get-back-to-even attitude seems like a plausible explanation for these results.

#### **IV. Conclusion**

The behavioral corporate finance literature has matured to the point where one can now sketch out a handful of canonical theoretical frameworks and use them to organize the accumulated evidence of dozens of empirical studies. This survey suggests that the behavioral approaches to corporate finance offer a useful complement to the other paradigms in the field. They deliver intuitive and sometimes quite compelling explanations for important financing and investing patterns, including some that are difficult to reconcile with existing theory.

In its current state of flux, the field offers a number of exciting research questions. We close by highlighting just a few. In no particular order, we wonder:

- Are behavioral factors at the root of why managers do not more aggressively pursue the tax benefits of debt, as in Graham (2000)?
- While the existing literature has generally considered the two approaches separately, the irrational manager and irrational investor stories can certainly coexist. Would a model featuring a correlation between investor and managerial sentiment, for example, lead to new insights?
- What are the determinants of managerial “horizons,” and how can they be measured and appropriately governed? Polk and Sapienza (2004) and Gaspar, Massa, and Matos (2004) use share turnover by investors to proxy for shareholder horizons.

- To what extent should the venture capital industry be viewed as an institution that identifies and caters to emerging pockets of investor sentiment?
- What determines investor sentiment, and how is it managed through corporate investor relations? Potential avenues to consider are interactions with past stock market returns, technological change and the valuation of new industries, media coverage, financial analysts and financial reporting, or investment banking. Brennan and Tamarowski (2000) offer an overview of investor relations.
- Do equity and debt market timing reduce the overall cost of capital by a large amount, or just a little? Dichev (2004) offers an approach here.
- To what extent can features of financial contracts be understood as a response to assorted behavioral biases? Williamson took first steps here. Regarding consumer contracts, Della Vigna and Malmendier (2004) suggest that credit cards and health club contracts, among others, are shaped by naïve expectations and time inconsistent preferences.
- How should one approach the proper regulation of inefficient markets?
- What are the limits of corporate arbitrage, including detecting and generating mispricing, maintaining reputation, and avoiding fraud?
- Can a catering approach help to explain the diversification and subsequent re-focus wave that has taken place in the US since the late-1960s? We speculated in Section II.C.2., but are aware of no systematic studies.
- How significant is the economy-wide misallocation of capital caused by collected behavioral distortions, and in particular how do these distortions interact with traditional capital market imperfections? For example, if there is underinvestment due to agency or asymmetric information, bubbles may bring investment closer to the efficient level.

- What are the behavioral underpinnings of Lintner's (1956) dividend model?
- If bounded rationality or investor pressures lead managers to rely on specific performance metrics, will third parties exploit this? The marketing of takeovers and financing vehicles as EPS-improving transactions by investment banks is a potential example.
- To what extent are corporate "hedging" policies actually directional bets? The evidence in Brown, Crabb, and Haushalter (2002) and Faulkender (2004) suggests that in many companies, interest rate risk management and the use of derivatives has little to do with textbook hedging.
- In the Introduction, we pointed out that the normative implication of the irrational investors approach is to insulate managers from short-term market pressures, while the implication of the irrational managers approach is to obligate them to follow market prices. What, in the end, is the right balance?

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