

Managerial Optimism and Corporate Finance

J.B. Heaton*

Two dominant features emerge from a simple model of corporate finance with excessively optimistic managers and efficient capital markets. First, optimistic managers believe that capital markets undervalue their firm's risky securities, and may decline positive net present value projects that must be financed externally. Second, optimistic managers overvalue their own corporate projects and may wish to invest in negative net present value projects even when they are loyal to shareholders. These results establish an underinvestment-overinvestment tradeoff related to free cash flow without invoking asymmetric information or rational agency costs.

In this paper, I explore the implications of a single specification of managerial irrationality in a simple model of corporate finance. Specifically, I focus on *managerial optimism* and its relation to the benefits and costs of free cash flow.

Managers are “optimistic” when they systematically overestimate the probability of good firm performance and underestimate the probability of bad firm performance. This assumption finds support in a large psychological literature demonstrating that people are, in general, too optimistic. That literature presents two pervasive findings (e.g., Weinstein, 1980) that make optimism an interesting subject of study for corporate finance researchers. First, people are more optimistic about outcomes that they believe they can control. Consistent with this first experimental finding, survey evidence indicates that managers underplay inherent uncertainty, believing that they have large amounts of control over the firm’s performance (see March and Shapira, 1987). Second, people are more optimistic about outcomes to which they are highly committed. Consistent with the second experimental finding, managers generally appear committed to the firm’s success (somehow defined), probably because their wealth, professional reputation, and employability partially depend on it (e.g., Gilson, 1989).

The approach taken here departs from the standard assumption of managerial rationality in corporate finance. Behavioral approaches are now common in asset pricing, of course, but little work in corporate finance has dropped the assumption that managers are fully rational.¹ This is somewhat surprising considering that the common objections to behavioral economics have less vitality in corporate finance than in asset pricing. The “arbitrage” objection (rational agents will exploit irrational agents) is weaker, because there are larger arbitrage bounds protecting managerial irrationality than protecting security market mispricing. The most obvious “arbitrage” of managerial irrationality—the corporate takeover—incurs high transactions costs, and the

¹The best known exception is surely Roll (1986). See also DeMeza and Southey (1996) and Boehmer and Netter (1997). For helpful comments, I thank Gregor Andrade, Alon Brav, Judith Chevalier, Harry DeAngelo, Deborah DeMott, Ed Glaeser, John Graham, Dennis Gromb, Chip Heath, Peter Hecht, Tim Johnson, Steven Kaplan, Adam Long, Cade Massey, Mark Mitchell, Allen Poteshman, Jay Ritter, Andrei Shleifer, Erik Stafford, Jeremy Stein, Richard Thaler, Rob Vishny, Tuomo Vuolteenaho, Richard Willis, Luigi Zingales, Lemma Senbet and Alex Triantis (the Editors), two anonymous referees, and participants at the NBER Summer Institute.

*J.B. Heaton is an Associate at Bartlit Beck Herman Palenchar & Scott (Chicago) and an Adjunct Associate Professor of Finance at Duke University.

specialized investors who pursue takeovers bear much idiosyncratic risk. Arbitrage strategies short of a corporate takeover are difficult to implement, because managerial decisions usually concern assets (including human assets) that trade in markets without short sale mechanisms or other derivative assets that make arbitrage possible (see Russell and Thaler, 1985). The “learning” objection (irrational agents will learn from experience to be rational) is also weaker, because important corporate financial decisions about capital structure and investment policy are more infrequent than trading decisions, with longer-delayed outcomes and noisier feedback. Learning from experience is less likely in such circumstances (see Brehmer, 1980).

It is also unclear whether a firm’s internal incentive mechanisms or ‘corporate culture’ will eliminate managerial irrationality. Some internal incentive mechanisms (e.g., “tournaments”) may select *against* rational managers, in favor of irrational managers. Irrational managers, for example, may take large risks that lower their true expected utility (although not their perceived expected utility), yet increase the probability that some irrational manager wins the tournament.² Further, the interests of principals may be served best by the design of mechanisms that exploit managerial irrationality rather than quash it. For example, principals may design incentive mechanisms that underpay irrational agents by exploiting the agents’ incorrect assessments of their ability or the firm’s risk.

The benefits and costs of free cash flow offer an attractive laboratory for exploring the implications of managerial irrationality in corporate finance. Since Jensen’s famous 1986 paper, “Agency Costs of Free Cash Flow, Corporate Finance and Takeovers,” free cash flow (cash flow above that needed to fund current positive net present value projects) has been the focus of a tremendous amount of academic research. The finance profession’s views toward the benefits and costs of free cash flow have been shaped largely by two dominant and often *conflicting* paradigms of corporate finance. The first is the asymmetric information approach typified by Myers and Majluf (1984). In that approach, free cash flow is beneficial, because managers loyal to existing shareholders are assumed to have information the market does not have. The main claim is that managers will sometimes decline new positive net present value investment opportunities when taking them requires issuance of undervalued securities to the under-informed capital market. The financial slack provided by large amounts of free cash flow prevents this socially (and privately) undesirable outcome.

In the agency cost approach of Jensen (1986), free cash flow is costly, because of a conflict between managers and shareholders. Managers want to retain free cash flows and invest them in projects that increase managerial benefits like compensation or power and reputation (see Avery, Chevalier, and Schaefer, 1998). Shareholders want managers to pay out free cash flows, because the projects that increase managerial benefits often may be negative net present value projects. Thus, Jensen (1986) argues, leverage increasing transactions that bond the firm to pay out free cash flows increase shareholder value and mitigate the conflict of interest between shareholders and managers.

The managerial optimism assumption delivers both of these results in a single framework, implying an underinvestment-overinvestment tradeoff from managerial optimism without invoking asymmetric information or rational agency costs.

On the one hand, managerial optimism leads managers to believe that an efficient capital market undervalues their firm’s risky securities. Therefore, managerial optimism leads to a preference for internal funds that can be socially costly. Optimistic managers dependent on external finance sometimes decline positive net present value projects, believing that the cost of external finance is simply too high. Free cash flow can, therefore, be valuable. When

²This is analogous to the potential survivability and dominance of noise traders in financial markets for the same reason. See DeLong, Shleifer, Summers, and Waldmann (1991).

the firm has positive net present value projects that optimistic managers would otherwise decline because of incorrectly perceived costs of external finance, free cash flow can prevent social losses from under-investment.

On the other hand, managerial optimism causes systematically upward biased cash flow forecasts and causes managers to overvalue the firm's investment opportunities. Managers without free cash flow may decline taking a negative net present value project that they perceive to be a positive net present value project, because the cost of external finance seems too high. In this situation, free cash flow is harmful. Free cash flow alleviates the need to obtain external finance and makes it easier to take negative net present value projects mistakenly perceived to be positive net present value projects.

Thus, the managerial optimism theory links the benefits and costs of free cash flow to two variables—the level of managerial optimism and the investment opportunities available to the firm. Optimistic managers want to undertake more projects. The more optimistic the manager, the less likely he is to finance these projects externally. The better are the firm's projects, the more costly this underinvestment is to shareholders. For firms with poor investment opportunities, reliance on the external capital market is beneficial. This implies a shareholder preference for cash flow retention (and cash flow risk management) at firms with both high optimism and good investment opportunity, and a shareholder preference for cash flow payouts at firms with both high optimism and bad investment opportunity. The basic prediction is not new, but the model is parsimonious—it need not invoke the conflicting possibilities of rational, loyal better informed managers versus rational disloyal (and perhaps no better informed) managers.

Beyond parsimony, managerial optimism provides an independent “as if” foundation for several investment and capital structure phenomena of interest to academic finance. For researchers who are fully content with the “as if” explanations of these phenomena offered by rational agency cost models and asymmetric information models, the theoretical power of managerial optimism may be of little interest. The degrees of freedom offered by both rational agency cost and asymmetric information theories should, in most cases, allow them to capture many of the predictions generated by the optimism assumption (albeit less parsimoniously). The theoretical power of managerial optimism (and other behavioral assumptions) cannot be denied, however, by those who seek to sort out which of several “as if” theories seems best to describe the world, perhaps partly by reference to the realism of assumptions. While a full discussion of this issue is far beyond the scope of this paper, suffice it to say that some important part of the rational-behavioral debate in financial economics can be linked to such inquiries.³

The rest of the paper is structured as follows: Section I presents a simple model of managerial optimism. Section II presents results, and section III concludes.

I. A Simple Model

This section describes the simple three date-two period model. To explore managerial optimism's explanatory power, it is important to isolate its effects from the influence of assumptions made by the two predominant approaches to corporate finance: the asymmetric information approach and the empire-building/rational agency cost approach. Asymmetric information theories (e.g., Myers and Majluf, 1984) assume that managers have information

³The best known statement of the “as if” principle in economics is Friedman (1953). For one recent analysis of “as if” and “realist” philosophies of science, see Maki (2000).

that the capital market does not have. Empire-building/rational agency cost theories (e.g., Hart, 1993 and Jensen, 1986) assume that it is impossible (or at least very costly) to write contracts that fully control managerial incentives. Therefore, I make two assumptions that isolate these effects. The first assumption ensures informational symmetry, while the second ensures the absence of rational agency problems.

Assumption 1: Information about the firm's cash flows and investment opportunities is simultaneously available to the capital market and the managers.

Assumption 2: Managers take all projects that they believe have positive net present values (including the perceived net present value of financing) and never take projects—including perquisite consumption—that they believe to have negative net present value.

The third assumption ensures that the capital market is rational:

Assumption 3: Security prices always reflect discounted expected future cash flows under the true probability distributions.

While future work with the managerial optimism assumption could relax the third assumption to study the interactions of irrational managers and inefficient markets,⁴ assuming that the competitive capital market is *more* rational than the management of a single firm seems the better benchmark. All that really matters for present purposes, however, is that the market is less optimistic than the managers. There are at least two reasons why this is the most plausible case. First, arbitrage is easier against investors in the capital market than against managers in firms, so prices are more likely (even if not certain) to reflect the beliefs of rational investors. Second, even if all investors are also optimistic, they are unlikely to be as optimistic about *this* firm's prospects as its managers. The psychological evidence suggests that optimism is more severe when an individual believes he can control the outcome, and when the outcome is one to which he is highly committed. Both findings suggest that managers would be more optimistic: managers are more likely than investors to believe that they can control the outcome of the firm's investments, and managers have more at stake in the outcomes at this firm than would a diversified investor.

Together, Assumptions 1 and 3 imply that security prices in the model are always strong-form efficient. It is important to note that Assumption 1 does *not* imply that there is no role for managers. Both Assumptions 1 and 3 are statements about *aggregate* information availability and pricing. That the capital market collectively both has and accurately prices this information does not imply that it is possible to contract on this information and force managers always to take the right action. To further simplify the model, I make the following assumption about risk preferences, interest rates, taxes, and costs of financial distress:

Assumption 4: The capital market is risk neutral and the discount rate is zero. There are no taxes and no costs of financial distress.

There are three dates, $t=0$, $t=1$, and $t=2$. The initial project requires investment of K at time $t=0$. The managers and/or the project's owners (who may or may not be the same) have no capital of their own and must finance K by selling some mix of securities in the capital market.

⁴Stein (1996) examines the interactions of *rational* managers in an inefficient market.

The project generates cash flows at date $t=1$ and date $t=2$. Cash flow at date $t=1$ is certain, denoted y_1 . Cash flow at date $t=2$ is uncertain. There is a “good” cash flow state and a “bad” cash flow state, denoted ${}_G y_2$ and ${}_B y_2$ respectively, where ${}_G y_2 > {}_B y_2$. The true probabilities of the time $t=2$ states are ${}_T p_G$ and ${}_T p_B$, respectively, where of course ${}_T p_G + {}_T p_B = 1$. Subscript “T” denotes “True” probability. The True probability distribution can be viewed as the actual probability distribution governing assets in the firm’s industry (alternatively, it is the subjective probability distribution that all parties would agree to if no one was affected by the cognitive bias of optimism). The values of y_1 , ${}_G y_2$, ${}_B y_2$, ${}_T p_G$, and ${}_T p_B$ are known to the capital market and the managers at time $t=0$. However, the managers disagree with the capital market about the probabilities (see Definition 1), and do not believe that ${}_T p_G$ and ${}_T p_B$ are accurate.

The firm receives an unexpected (that is, not expected at time $t=0$) new investment opportunity at time $t=1$ that requires investment of i at time $t=1$ if taken. The project has uncertain time $t=2$ payoff of either r_H or r_L . Subscript “H” denotes a “high” payoff state to the new investment and subscript “L” denotes a “low” payoff state, where $r_H > r_L$. The true payoff probabilities for the new investment opportunity are ${}_T p_H$ and ${}_T p_L$, for r_H and r_L . The values of i , r_H , r_L , ${}_T p_H$ and ${}_T p_L$ are known to the capital market and the managers at time $t=1$ but the managers once again disagree with the capital market about the probabilities (see Definition 1) and do not believe that ${}_T p_H$ and ${}_T p_L$ are accurate.

The following definition captures the managerial behavior of interest:

Definition 1: Managers are “optimistic” and exhibit “managerial optimism” when they perceive probabilities ${}_M p_G$ and ${}_M p_H$ such that

$${}_M p_G > {}_T p_G \Rightarrow {}_M p_B < {}_T p_B \text{ and } {}_M p_H > {}_T p_H \Rightarrow {}_M p_L < {}_T p_L.$$

The “M” subscript denotes managerial perception. Optimistic managers systematically attach too much probability to good outcomes (“good” cash flow at time $t=2$ and “high” payoffs to new projects at time $t=2$) and, correspondingly, too little probability to bad outcomes (bad cash flow at time $t=2$ and “low” payoffs to new projects at time $t=2$). I rule out “side-bets” on these events. Modeling managerial risk aversion in the model would alleviate this possibility, but add nothing to the intuition of the model. Put another way, I assume that the existence of optimism is not enough to create “money pump” opportunities against managers (e.g., Rabin and Thaler, 2001).

At date $t=2$, the firm’s operations are wrapped up and cash flows are distributed to security holders according to the rights of their particular security. The following set of securities may be issued by the firm (when feasible) in any combination: 1) risk-free debt, 2) risky debt, and 3) equity. Debt contracts promise a fixed amount in the future in exchange for money today. Debt is risk-free when the probability of repayment of the fixed amount is 1.0. Debt is risky when some probability exists that the firm will be unable to repay the fixed amount. Equity is a security that receives all cash flows left in the firm at time $t=2$ after debt repayment. Debt may be either short-term, that is, payable at date $t=1$, or long-term, payable at date $t=2$.

II. Results

This section presents the paper’s main results. These include the effects of managerial optimism on perceptions of external finance, the effect of optimism on cash flow forecasts, the benefits and costs of free cash flow, and additional testable implications.

A. Managerial Perceptions of External Finance

The prices of risky securities reflect the capital market's probabilities of good versus bad states of the world. Because optimistic managers systematically attach higher probabilities to good outcomes than the capital market, optimistic managers believe that the capital market undervalues the firm's risky securities. To optimistic managers in an efficient market, issuing a risky security is always perceived to be a negative net present value event (without considering the possibly greater perceived positive net present value of the project being financed).

This induces a pecking order capital structure preference, where managers attempt to minimize costs of external finance by minimizing the amount of risky securities issued.⁵ Safer securities are less sensitive to probabilistic beliefs and, thus, (managers believe) are less undervalued by the capital market. Whenever the managers can use internal cash or risk-free debt, both of which are insensitive to probabilistic beliefs, they strictly prefer this to issuing any risky security. Risky debt is preferred to all equity financing, since any issuance of risky debt is a weighted average of risk-free debt and equity, and the risk-free component is insensitive to probabilistic beliefs. Therefore, risky debt (that puts positive weight on risk-free debt) must have lower perceived borrowing costs than all equity financing, and the preference results.

Formally, assume there is no $t=1$ cash flow. The firm can be financed if and only if $E_T(y_2) \geq K$. That is, the firm can be financed if and only if the expected value of the time $t=2$ payoff is greater than the required investment. If $E_B y_2 \geq K$, the manager can issue risk-free debt sufficient to finance the firm, since the debt is repaid in either state of the world. The manager correctly perceives the cost of this financing to be $K/K = 1$. To finance the firm entirely by equity requires selling fraction $\alpha = K/E_T(y_2)$ of the firm's equity to the capital market. The manager incorrectly perceives the cost of all-equity financing to be:

$$\left(\frac{K}{E_T(y_2)} \right) \left(\frac{E_M(y_2)}{K} \right) > 1$$

since $E_M(y_2) > E_T(y_2)$. $K/E_T(y_2)$ is the fraction of the firm that is sold to raise K , and $E_M(y_2)$ is the total value of the firm perceived by the manager. The manager believes the required equity flotation should be smaller, specifically:

$$\alpha_M = \frac{K}{E_M(y_2)} < \frac{K}{E_T(y_2)} = \alpha.$$

It follows that since the manager can issue risk-free debt, he will not issue equity. The result for risky debt is analogous. Any issue of risky debt is equivalent to a weighted average of risk-free debt and equity. The managers are indifferent between this weighted average (risky debt) and the individual components. Letting "w" denote the amount raised by risk-free debt, the cost of any combination of risk-free debt and equity is:

⁵The pecking order is thus a testable prediction of the managerial optimism model. Harris and Raviv (1991) summarize the empirical evidence suggesting that many firms in fact have "pecking order" capital structure preferences. Survey evidence also bears out this prediction. Surveys by Pinegar and Wilbricht (1989; Fortune 500 firms) and Kamath (1997; NYSE firms) find that roughly twice as many firms report following a pecking order as report attempting to maintain a target capital structure. Nearly 85% of financial managers in the Kamath (1997) study reported a first preference for internal equity, with straight debt second, and equity (of any form) a distant third. More recently, Graham and Harvey (2001) present survey evidence of a pecking order effect that, importantly, does not seem well-explained by traditional asymmetric information theories.

$$\begin{aligned} & \frac{w}{K} + \left(\frac{K-w}{K} \right) \left(\frac{K-w}{E_T(y_2) - w} \right) \left(\frac{E_M(y_2) - w}{K-w} \right) \\ &= \frac{w}{K} + \left(\frac{K-w}{K} \right) \left(\frac{E_M(y_2) - w}{E_T(y_2) - w} \right) > 1 \end{aligned}$$

for any $w < K$ since $E_M(y_2) > E_T(y_2)$.

Now assume that ${}_B y_2 < K$ so that cash flow in the bad state is now insufficient to pay the required initial investment and the manager can no longer issue risk-free debt to finance the entire amount K . The financing combination that maximizes the risk-free debt component issues ${}_B y_2$ of risk-free debt and then equity (obviously, this is equivalent to an issue of risky debt). The manager perceives the cost of this financing to be:

$$\begin{aligned} & \frac{{}_B y_2}{K} + \left(\frac{K - {}_B y_2}{K} \right) \left(\frac{K - {}_B y_2}{E_T(y_2) - {}_B y_2} \right) \left(\frac{E_M(y_2) - {}_B y_2}{K - {}_B y_2} \right) \\ &= \frac{{}_B y_2}{K} + \left(\frac{K - {}_B y_2}{K} \right) \left(\frac{E_M(y_2) - {}_B y_2}{E_T - {}_B y_2} \right) \end{aligned}$$

To see that the manager will prefer this to any financing combination that places greater weight on equity, simply note that:

$$\frac{{}_B y_2}{K} + \left(\frac{K - {}_B y_2}{K} \right) \left(\frac{E_M(y_2) - {}_B y_2}{E_T(y_2) - {}_B y_2} \right) < \frac{w}{k} + \left(\frac{K-w}{K} \right) \left(\frac{E_M(y_2) - w}{E_T(y_2) - w} \right)$$

That is, the perceived weighted average cost of capital under issue of ${}_B y_2$ of risk-free debt is less than any lower issue, since $w < {}_B y_2$ means that more weight is placed on a term greater than one.

It is easy to see that nothing changes significantly if there is certain cash flow at time $t=1$. Assume that the time $t=1$ cash flow y_1 is certain. Consider first the case where the manager can raise risk-free debt to finance the entire investment K , because $(y_1 + {}_B y_2) \geq K$. That is, certain cash flow to the project is enough to pay back K . Then the manager will always strictly prefer an issue of risk-free debt to any issue that includes equity. Considering the case where $(y_1 + {}_B y_2) < K$, that is, where the manager must issue some risky security to finance the project, it also follows that the manager will issue the security with the largest component of risk-free debt, equivalent to a preference for risky debt over equity.

B. Managerial Cash Flow Forecasts

Cash flow forecasts are the most important inputs to project valuation and selection. Optimism leads the managers' forecasts to be biased. Consider the manager who forecasts time $t=2$ cash flow at time $t=0$. While the best forecast is $E_T(y_2) = {}_T p_G * {}_G y_2 + {}_T p_B * {}_B y_2$, the optimistic manager forecasts $E_M(y_2) = {}_M p_G * {}_G y_2 + {}_M p_B * {}_B y_2$. By Definition 1, $E_M(y_2) > E_T(y_2)$, since ${}_G y_2 > {}_B y_2$. This provides a very sharp testable prediction: if managers are optimistic, average realized cash flows fall short of managerial forecasts. Downward biased forecasts would present strong evidence against the managerial optimism theory. Indeed, upwardly biased cash flow forecasts may be the sharpest testable prediction of the managerial optimism model, particularly against asymmetric information and rational agency cost theories that make no such sharp predictions.

Available evidence is consistent with the managerial optimism prediction of upwardly biased cash flow forecasts. Kaplan and Ruback (1995) study long run cash flow forecasts made in connection with management buyouts and recapitalizations. They find statistically significant

upward bias of both operating income and operating margins. While they attribute some of this bias to the fact that a recession began in 1990, a year included in part of the sample, similar evidence is presented by Kaplan (1989) who studied the performance of a large sample of management buyout firms not affected by the 1990 recession. Hotchkiss (1995) finds similar results for the performance of firms exiting bankruptcy. Even short-term earnings forecasts seem biased. While McNichols (1989) finds no statistically significant bias in managerial earnings forecasts (which are short-term, less than one year), the direction of the statistically insignificant bias is upwards in every year of her sample, strongly suggesting the presence of managerial optimism, albeit at statistically insignificant levels. While short-term earnings (at time $t=1$) in the model here are known, the introduction of any uncertainty would deliver biased short-term earnings forecasts as well.⁶ Additional tests of the sharp prediction on managerial cash flow forecasts would benefit by the introduction of proxies for the *level* of managerial optimism.⁷

C. Benefits of Free Cash Flow

The perception that risky securities are undervalued can lead to social losses that are alleviated by sufficient amounts of free cash flow. Consider what happens when the managers face a new investment opportunity. If the managers have internal cash flow of y_1 , then it is clear that they will use this before raising external funds. Denote any necessary external funds by E and let $C_M(E)$ denote the additional cost of external funds perceived by the managers, that is, the perceived wedge between the cost of internal funds and the cost of external funds. Since prices are always efficient in the model, there is never any overvaluation of the firm's external securities, and so $C_M(E) \geq 0$ (that is, since the markets are efficient, the manager never perceives a *gain* from selling securities). Of course, the true cost is zero; there is no additional cost of external financing since by assumption there is no informational asymmetry and prices are efficient. Faced with a new project that requires investment of i where $i > y_1$, the managers' decision rule (see Assumption 2) is:

$$\begin{array}{ll} \text{invest if:} & E_M(r) - i - C_M(E) > 0 \\ \text{do not invest if:} & E_M(r) - i - C_M(E) \leq 0 \end{array}$$

When $E_T(r) - i > 0$, but $E_M(r) - i - C_M(E) \leq 0$, the manager passes up a positive NPV project because he believes the cost of external financing is too high, despite the fact that he believes the project has a positive NPV (he must believe this since by Definition 1, $E_M(r) > E_T(r)$).

Free cash flow alleviates this problem by eliminating the perceived costs of external funds from the decision. This may help explain the appearance of a positive correlation between investment and cash flow, after controlling for investment opportunities (see Fazzari, Hubbard, and Petersen, 1988 and Kaplan and Zingales, 1997). For any given project perceived to be positive net present value, the managers always take the project if they have sufficient internally generated cash flow or can issue risk-free debt. However, if risky securities must be issued to finance the project, managers will perceive $C_M(E) \geq 0$. *Ceteris paribus*, more projects will be rejected by firms that do not have sufficient cash flow to finance them

⁶These upward biased forecasts also appear to manifest themselves in dividend changes. DeAngelo, DeAngelo, and Skinner (1996), for example, find no evidence that dividend increases signal superior future earnings. They attribute this result to the fact that managers are too optimistic about future earnings and make dividend decisions consistent with those optimistic expectations that are not borne out by later results. Loughran and Ritter (1997, p. 1824) find analogous evidence for seasoned equity offerings, suggesting that "managers are just as overoptimistic about the issuing firms' future profitability as are investors." See also Lee (1997) and Schultz and Zaman (2001).

⁷For example, in a recent extension and test of the underinvestment hypothesis developed below, Malmendier and Tate (2001) use option exercise behavior and stock purchases to proxy for chief executive optimism.

internally (or cannot issue risk-free debt), inducing a positive correlation between cash flow and investment. Note that the correlation is unrelated to any *actual* costs of external financing. This is important, since Kaplan and Zingales (1997) find large cash flow sensitivities for most firms, but no reliable relationship between those sensitivities and the actual cost of external financing for a given firm.

D. Costs of Free Cash Flow

Optimistic managers sometimes want to take negative net present value projects that they believe are positive net present value projects. This can lead to social losses that are lessened when free cash flow is paid out of the firm.

A simple way to think about the effects of optimism on project selection is to imagine a ranking of all projects by their net present values. In this simple model, the optimistic managers' ranking will be the same as the rational one, but their optimism will lead to the perception of a "cutoff" that is too low. Put another way, the managers will want to take too many projects from the ranking. In terms of the model, the true expected cash flow for a given new project is $E_T(r) = {}_T p_H * r_H + {}_T p_L * r_L$. The managers' perceived expected cash flow is $E_M(r) = {}_M p_H * r_H + {}_M p_L * r_L$. Optimistic managers believe that negative net present value projects are positive net present value projects when $E_M(r) > i > E_T(r)$. This range of projects occurs for probabilistic beliefs where:

$$1 \geq {}_M p_H > \frac{(i - r_L)}{(r_H - r_L)} > {}_T p_H \geq 0.$$

It is important to note, therefore, that there is a *limited* set of bad decisions that will be made by optimistic managers. When the investment cost i exceeds the high cash flow state r_H , then the optimistic managers never take the project. In other words, there are projects that are bad enough that even the most optimistic managers will not take them, because optimism about the probability of the good state can never overcome the fact that the good state is never good enough to cover the investment costs of the project. Nevertheless, the range of negative NPV projects that the optimistic manager will accept can be large.

This is why free cash flow has costs, as well as possible benefits. Jensen (1986) defines free cash flow as "cash flow in excess of that required to fund all projects that have positive net present values when discounted at the relevant cost of capital." Whenever $E_M(r) > i > E_T(r)$, the optimistic manager wants to take negative net present value projects that he perceives to have positive net present value. He will not use outside financing (leaving a possible marginal role for free cash flow) in two circumstances. First, and trivially, he will not use outside financing when it is unavailable, because the firm (objectively) will generate insufficient cash flow to provide the necessary return to the security; thus, the market will refuse to buy the newly issued securities. Second, he will not use outside financing when the perceived negative net present value of that financing outweighs the perceived positive net present value of the project, that is, when $C_M(E) > E_M(r) - i > 0$. Assuming one of these conditions holds, it follows that free cash flow in the amount i will allow the manager to accept the project, he will accept it, and the value of the firm will fall. In this case, access to free cash flow is harmful. Forcing the optimistic manager to the capital market might not prevent all bad investments, but it will prevent those where $E_M(r) - i - C_M(E) \leq 0$. Without free cash flow, the misperceived cost of external financing actually prevents some value destruction by the optimistic managers.

E. Some Additional Testable Implications

In addition to the pecking order capital structure preferences and biased cash flow forecasts predicted by the managerial optimism model (and largely supported by the available evidence), the overinvestment-underinvestment tradeoff described in sections C and D provide a basis for additional new tests of the theory.⁸ Recall that $C_M(E)$ is the additional cost of external financing perceived by the optimistic manager. While this term is capable of both deterring bad overinvestment and causing value destructive underinvestment, it is clear that managers—none of whom believe they undertake value destroying overinvestment (see Assumption 2)—will seek to reduce their reliance on external funds. Retaining cash flow and avoiding high debt levels are two ways of doing so. Employing risk management techniques to protect the firm's cash flow is another. The hedging motive to protect corporate cash flow to avoid actual high costs of external finance is the subject of two papers by Froot, Sharfstein, and Stein (1993, 1994). There, the authors argue for cash flow-based hedging that protects investment opportunities from high marginal costs of external finance. The theory rests, of course, on an assumption that asymmetric information can drive a wedge between internal and external costs of funds.

By allowing for a false, but perceived, wedge between the internal and external cost of funds, the managerial optimism model provides a new testable theory of cash flow risk management motives. In this model, proxies for optimism (such as those employed by Malmendier and Tate, 2001) should predict the extent of cash flow risk management. This prediction may help sort out whether or not *actual* information asymmetries play a role in cash flow risk management. In Geczy, Minton, and Schrand (1997), for example, the authors find evidence of cash flow based risk management, but their proxies for “growth opportunities” (such as research and development) are not necessarily good measures of information asymmetry. Managerial optimism provides a testable theory of why firms hedge, a question that logically precedes questions of whether they should and how they should do it (see Culp, 2001).

Other testable implications are also apparent. Consider corporate merger and acquisition activity. The role of optimism in corporate takeovers is, of course, the subject of the first significant paper to address optimism in corporate finance—Roll (1986). Roll (1986) argues that managerial hubris (essentially a heuristic way of describing optimism) might explain corporate takeovers. In particular, Roll (1986) argues that managerial hubris helps explain why *acquirers* fail to make significant gains on takeover announcement. But managers are also *targets* of corporate takeovers, and agency conflicts arise between managers and shareholders when managers refuse to sell assets at a price higher than their current price. This resistance may be explained in a measurable way by managerial optimism, which predicts that optimistic managers make sub-optimal decisions to resist takeovers.

Consider a date $t=1$ bid B for which the firm can be sold. This value may in general exceed $E_T(y_2)$. This may be true because of operational synergy, economies of scale or scope, the incompetence of current management, or because other optimistic managers believe the firm will be worth more in their hands. That incumbent managers may resist this bid sub-optimally in the view of current shareholders follows simply from the fact that optimality, from the shareholders' perspective, requires that the firm be sold when future expected cash flow is less than the bid. That is, (assuming no new project is taken at time $t=1$) the firm should be sold when $B > E_T(y_2)$. Since the managers will acquiesce to the takeover attempt only when

⁸In direct extension and test of the underinvestment result presented above, Malmendier and Tate (2001) find evidence that cash flow sensitivities of investment to cash flow can be explained by optimism of the chief executive officer. Their measures of CEO optimism (options exercise and patterns of own-stock acquisition) provide promising candidates for future research.

$B > E_M(y_2)$, and since $E_M(y_2) > E_T(y_2)$, the managers' resistance decision may be sub-optimal. This offers a prediction for the study of corporate control contests where managers fight for independence (often at very high financial and personal cost), even when takeovers would leave the incumbent managers with large post-takeover wealth through stock gains and golden parachute provisions. Proxies for top executive optimism such as those employed by Malmendier and Tate (2001) are well-suited to tests of this hypothesis, which would logically focus on the degree to which takeover resistance (poison pill adoption and rescission; deal failure, etc.) is explained by proxies for managerial optimism.

III. Conclusion

This paper adopts an explicitly behavioral approach in a simple corporate finance model, and examines its implications for the free cash flow debate. Two dominant features emerge. First, optimistic managers believe that capital markets undervalue their firm's risky securities and may pass up positive net present value projects that must be financed externally. Second, optimistic managers overvalue their own corporate projects and may wish to invest in negative net present value projects even when they are loyal to shareholders. These results imply an underinvestment-overinvestment tradeoff related to free cash flow, without invoking asymmetric information or (rational) agency cost theories.

The model suggests that the effects of free cash flow are ambiguous. Optimistic managers will sometimes decline *positive* NPV projects if those projects require outside financing. Free cash flow in an amount required to fund positive net present value projects can prevent socially costly under-investment. In a world with optimistic managers, therefore, it is unclear that mechanisms that force the firm to pay out all cash flow and acquire external finance are necessarily good mechanisms. This is true both for debt (as in Jensen, 1986) and dividends (as in Easterbrook, 1984). Whether the savings in preventing bad investment outweighs the social costs of under-investment is likely to vary by firm. If all managers are optimistic, and markets are efficient (or at least are less optimistic about particular firms than their managers), then shareholders may prefer large amounts of free cash flow to be retained by firms with good investment opportunities.

The managerial optimism model generates several new additional testable predictions as well. First, managerial optimism predicts the existence of biased cash flow forecasts. Second, managerial optimism predicts pecking order capital structure preferences. Third, managerial optimism predicts efforts to hedge corporate cash flow, even in the absence of significant asymmetric information, by generating a false, but perceived wedge between the internal and external cost of funds. Fourth, managerial optimism predicts takeover resistance. Using proxies such as those presented in recent work by Malmendier and Tate (2001), each of these predictions provides significant future challenges to the managerial optimism theory of corporate finance.

The managerial optimism approach may also shed light on numerous institutional mechanisms. For example, managerial optimism may help explain the role of outsiders in corporate governance. Kahneman and Lovallo (1993) argue that organizational optimism is best alleviated by introducing an "outside" view, one capable of realizing all the reasons the "inside" view might be wrong. Outsiders are capable of drawing managerial attention to information that might indicate that their perceptions are wrong. The recent push in corporate governance circles for outside directors and outside chairmen of the board is consistent with this prescription. This also suggests that the most effective prescription for managerial

optimism combines strong incentives with strong outside monitoring. In his study of Kohlberg, Kravis, and Roberts (“KKR”), for example, Anders (1992, p. 179) describes KKR’s role in monitoring managerial decisions, particularly to ensure that managers receive constant feedback against targets:

Even the executives who prospered in KKR’s regimen knew that if their companies fell badly short of the bank-book projections, their wonderful rapport with the partners and associates of KKR could vanish. The chief executive and chairman of Owens-Illinois in the late 1980’s, Robert Lanigan, described the underlying message from KKR as follows: “If you miss the targets, we don’t want to know about the dollar, the weather, or the economy.” KKR wanted results, not excuses. “There are negatives if we don’t meet those targets,” Lanigan confided in an interview. He paused, as if afraid to say more. Then he concluded: “That’s 90 percent of what drives us.”

Of course, managerial optimism may have limits as a complete theory of corporate finance. On its own, and without some amount of asymmetric information, it may not explain the rich results on announcement effects, nor can it account for the importance of legal mechanisms that target rational agency problems and problems of managerial loyalty. Nevertheless, the results presented here suggest that managerial irrationality may play a role in future corporate finance research, delivering some results more parsimoniously and as plausibly as competing theories. ■

References

- Anders, G., 1992, *Merchants of Debt*, New York, NY, BasicBooks.
- Avery, C., J.A. Chevalier, and S. Schaefer, 1998, “Why Do Managers Undertake Acquisitions? An Analysis of Internal and External Awards for Acquisitiveness,” *Journal of Law, Economics, and Organizations* 14, 24-43.
- Boehmer, E. and J.M. Netter, 1997, “Management Optimism and Corporate Acquisitions: Evidence from Insider Trading,” *Managerial and Decision Economics* 18, 693-708.
- Brehmer, B., 1980, “In One Word: Not from Experience,” *Acta Psychologica* 45, 223-241.
- Culp, C.L., 2001, *The Risk Management Process: Business Strategy and Tactics*, New York, NY, Wiley.
- DeAngelo, H., L. DeAngelo, and D.J. Skinner, 1996, “Reversal of Fortune: Dividend Signaling and the Disappearance of Sustained Earnings Growth,” *Journal of Financial Economics* 40, 341-371.
- DeLong, J.B., A. Shleifer, L.H. Summers, and R.J. Waldmann, 1991, “The Survival of Noise Traders in Financial Markets,” *Journal of Business* 64, 1-19.
- DeMeza, D. and C. Southey, 1996, “The Borrower’s Curse: Optimism, Finance, and Entrepreneurship,” *The Economic Journal* 106, 375-386.
- Easterbrook, F.H., 1984, “Two Agency-Cost Explanations of Dividends,” *American Economic Review* 74, 650-659.
- Fazzari, S.R., G. Hubbard, and B. Petersen, 1988, “Financing Constraints and Corporate Investment,” *Brookings Papers on Economic Activity* 1, 141-195.
- Friedman, M., 1953, “The Methodology of Positive Economics,” *Essays in Positive Economics*, Chicago, IL, University of Chicago Press.
- Froot, K.A., D.S. Scharfstein, and J.C. Stein, 1993, “Risk Management: Coordinating Investment and Financing Policies,” *Journal of Finance* 48, 1629-1658.
- Froot, K.A., D.S. Scharfstein, and J.C. Stein, 1994, “A Framework for Risk Management,” *Harvard Business Review* 72, 91-102.

- Geczy, C., B.A. Minton, and C. Schrand, 1997, "Why Firms Use Currency Derivatives," *Journal of Finance* 52, 1323-1354.
- Gilson, S., 1989, "Management Turnover and Financial Distress," *Journal of Financial Economics* 25, 241-262.
- Graham, J.R. and C.R. Harvey, 2001, "The Theory and Practice of Corporate Finance: Evidence from the Field," *Journal of Financial Economics* 60, 187-243.
- Harris, M. and A. Raviv, 1991, "The Theory of Capital Structure," *Journal of Finance* 46, 297-355.
- Hart, O., 1993, "Theories of Optimal Capital Structure: A Managerial Discretion Perspective," in M. Blair, Ed., *The Deal Decade: What Takeovers and Leveraged Buyouts Mean for Corporate Governance*, Washington, D.C., Brookings, 19-53.
- Hotchkiss, E.S., 1995, "Postbankruptcy Performance and Management Turnover," *Journal of Finance* 50, 3-21.
- Jensen, M.C., 1986, "Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers," *American Economic Review* 76, 323-329.
- Kahneman, D. and D. Lovallo, 1993, "Timid Choices and Bold Forecasts: A Cognitive Perspective on Risk Taking," *Management Science* 39, 17-31.
- Kamath, R.R., 1997, "Long-Term Financing Decisions: Views and Practices of Financial Managers of NYSE Firms," *Financial Review* 32, 331-356.
- Kaplan, S.N., 1989, "The Effects of Management Buyouts on Operating Performance and Value," *Journal of Financial Economics* 24, 217-254.
- Kaplan, S.N. and R.S. Ruback, 1995, "The Valuation of Cash Flow Forecasts: An Empirical Analysis," *Journal of Finance* 50, 1059-1093.
- Kaplan, S.N. and L. Zingales, 1997, "Do Investment-Cash Flow Sensitivities Provide Useful Measures of Financing Constraints," *Quarterly Journal of Economics* 112, 169-215.
- Lee, I., 1997, "Do Firms Knowingly Sell Overvalued Equity," *Journal of Finance* 52, 1439-1465.
- Loughran, T. and J.R. Ritter, 1997, "The Operating Performance of Firms Conducting Equity Offerings," *Journal of Finance* 52, 1823-1850.
- Maki, U., 2000, "Reclaiming Relevant Realism," *Journal of Economic Methodology* 7, 109-125.
- Malmendier, U. and G. Tate, 2001, "CEO Overconfidence and Corporate Investment," Harvard University, Working Paper.
- March, J.G. and Z. Shapira, 1987, "Managerial Perspectives on Risk and Risk Taking," *Management Science* 33, 1404-1418.
- Myers, S.C. and N.S. Majluf, 1984, "Corporate Financing and Investment Decisions When Firms Have Information That Investors Do Not Have," *Journal of Financial Economics* 13, 187-221.
- Pinegar, J.M. and L. Wilbrecht, 1989, "What Managers Think of Capital Structure Theory: A Survey," *Financial Management* 18, 82-91.
- Rabin, M. and R.H. Thaler, 2001, "Anomalies: Risk Aversion," *Journal of Economic Perspectives* 15, 219-232.
- Roll, R., 1986, "The Hubris Hypothesis of Corporate Takeovers," *Journal of Business* 59, in R.H. Thaler, Ed., *Advances in Behavioral Finance*, New York, NY, Russell Sage, 197-216.
- Russell, T. and R.H. Thaler, 1985, "The Relevance of Quasi Rationality in Competitive Markets," *American Economic Review* 75, 1071-1082.
- Schultz, P. and M. Zaman, 2001, "Do The Individuals Closest To Internet Firms Believe They Are Overvalued?," *Journal of Financial Economics* 59, 347-381.
- Stein, J.C., 1996, "Rational Capital Budgeting in an Irrational World," *Journal of Business* 69, 429-455.
- Weinstein, N., 1980, "Unrealistic Optimism about Future Life Events," *Journal of Personality and Social Psychology* 39, 806-820.

