Corporate Financial and Investment Policies when Future Financing is not Frictionless*

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ABSTRACT

Much of corporate finance is concerned with the implications of financing frictions on firms’ behavior. When firms face the possibility of future financial constraints, they will adjust their policies today to minimize the potential impact of these constraints. We present a stylized model in which future financing constraints lead firms to have a preference for investments with shorter payback periods, investments with less risk, and investments that utilize more liquid (pledgeable) assets. The model has a host of implications in different areas of corporate finance, including firms’ capital budgeting rules, risk-taking behavior, capital structure choices, product markets conduct, and cash management policies. For example, contrary to Jensen and Meckling (1976), firms have incentives to reduce rather than increase risk when leverage increases. In contrast to standard corporate finance teaching, a firm’s valuation of projects depends on the firm’s financial condition in addition to the project’s expected cash flows. Firms in economies with less developed financial markets will not only take different quantities of investment, but will also take different kinds of investment (safer, short-term projects that are potentially less profitable). We show how a number of patterns reported in the existing empirical literature can be interpreted in light of the intertemporal optimization problem firms solve when they face costly external financing. We also point out to several predictions that have not been empirically examined.

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1 Introduction

Keynes (1936) originally pointed out that the ability of capital markets to provide financing for projects can affect a firm’s corporate financial policy (p. 196). Keynes argued that if a firm can always costlessly access external capital markets, then it has no reason to save cash internally. Alternatively, if a firm faces incremental costs each time it raises capital, then it can increase its value by maintaining a more liquid balance sheet. Keynes focused his discussion on corporate cash policy, but the argument is much more general: any decision that affects a firm’s ability to finance future projects will be affected by the distribution of future financing demands and costs.

In this paper, we extend Keynes’ ideas to the question of how real investments are affected by intertemporal financing frictions.\(^1\) In particular, we show that when future projects are valuable and capital markets imperfect, then factors related to a firm’s ability to smooth the financing of investment over time become relevant to capital budgeting decisions today. Our argument is quite general and has relevance to any situation in which a firm potentially faces costly financing decisions in the future. Indeed, we show that a number of empirical regularities can be explained through this idea, in which firms take actions today to minimize the impact of potential future financial constraints.\(^2\)

We formalize our arguments through a stylized model. Suppose that a firm can choose between a menu of projects varying across a number of dimensions, including not only the value of the cash flows produced, but also their timing, risk, and the liquidity of the assets the firm must acquire. The NPV rule implies that the appropriate calculation for determining the value of the investment is to compare the initial cost to the discounted expected cash flows from the project using the discount rate that reflects the project’s market-adjusted risk. But investment decision-making becomes more complex when firms face capital markets imperfections. In the absence of competitively-priced external funding, observed firm investments can depart significantly from those that would result from following standard valuation approaches, such as the net present value (NPV) rule.

Our model characterizes the nature of these departures. In particular, when credit constraints are likely to bind in the future, then firms’ capital budgeting rules are distorted towards projects that generate earlier cash flows, and against those that generate back-loaded flows. This distor-

\(^1\) We are not the first to explore Keynes’ ideas in the recent corporate finance literature. Froot, Scharfstein, and Stein (1993) consider intertemporal financing frictions as a rationale for corporate hedging, while we formalize and test Keynes’ arguments about cash holdings in Almeida, Campello and Weisbach (2004) (see also Acharya, Almeida, and Campello (2006)).

\(^2\) We use the term “financial constraints” more broadly than is common in the literature. Whenever a firm’s current and/or future investments differ from the “unconstrained” (first-best) solution due to costly external finance, we consider it to be financially constrained.
tion occurs because cash flows from current investments can provide financing for future valuable projects that otherwise would go unfunded. We also model a firm’s choice between projects that differ with respect to their risk profile. When financing constraints bind, a firm will prefer safer cash flows over risky ones as safe cash flows can be used to buffer the firm’s investment spending against tighter funding constraints. In addition, the constrained firm will tend to distort the risk profile of the more liquid projects, rather than that of illiquid ones. Because illiquid projects have a lower impact on future financing capacity, their riskiness matters less for a constrained firm. As a result, liquidity and safety become complementary. Finally, our model also shows how firms will tend to distort investment policy towards projects that generate more verifiable cash flows (including liquidating cash flows) when they face financing constraints; this effect even when those projects have lower expected cash flows.

Our analysis yields fairly general points that can be applied in various areas of corporate finance. In particular, it provides insights into the following much-debated research questions: 1) Why do firms use payback in addition to NPV in capital budgeting? 2) Why firms do not appear to “risk-shift” even though existing theory says they should? 3) Why are firms typically “underleveraged”? 4) Why do managers care so much about bond ratings when making leverage decisions? 5) How do firms decide on the liquidity of their asset portfolio, in particular, how much cash to hold? 6) Why do managers appear to hedge operationally in addition to financially, even if these operational hedges come at a real cost to the firm? 7) Why do tests of product market/capital market interactions suggest leverage reduces competitiveness despite theories that say leverage might increase it? 8) Why do firms in countries with less developed capital markets make different types of investments than firms in countries with more developed capital markets? and 9) Why does financial development add so much to growth by changing the mix and profitability of investments, in addition to their quantity?

The possibility that capital market imperfections affect firm investment policies over time leads to departures from traditional valuation rules. The standard NPV-based valuation approach takes the atomistic view of investment projects: they are valued on the basis of their individual characteristics. Under the NPV rule, the value of a project equals the sum of the expected payoffs from the project, discounted at a rate that reflects the project’s particular risk profile. This valuation rule, however, fails when credit markets are imperfect. When firms face credit frictions, cash flows from current investment are channeled towards the funding of future projects. Hence, for a financially

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3 See Brealey and Myers (2004) for an excellent textbook discussion of alternative project valuation approaches.
constrained firm, the true value of an investment opportunity today incorporates the value of future projects that can be financed with its payoffs. While traditional discounting accounts for cash flow timing and riskiness, the role of cash flows in funding future investments provides a reason why sooner and more certain cash flows are particularly valuable.\textsuperscript{4} Crucially, this additional factor is independent of the merits of an individual project; rather it is a function of the firm’s attributes and its position in the capital markets.\textsuperscript{5}

One of the most widely-discussed arguments in corporate finance is the Jensen and Meckling’s (1976) “risk-shifting” story, by which firms have incentives to increase project risk when they become highly leveraged and near financial distress. While this argument has been widely cited as an important consideration in capital structure decisions, there has been very little direct evidence of risk-shifting in practice. Our model describes an important effect that offsets a firm’s incentives to risk-shift. In particular, we show that when firms anticipate higher costs of external finance in the future they prefer safer projects. It is possible that this effect is one reason why firms are almost never observed increasing risk for the reasons described in the finance literature.

The model does, however, suggest that leverage can lead to inefficient investment, albeit for a very different reason than the standard agency stories. High leverage increases the likelihood that the firm will be subsequently face deadweight costs when they raise capital in the future. To minimize these costs, managers should limit the amount of debt they issue today, even if limiting leverage means sacrificing potential tax shields. This cost of leverage is a function of future financing costs. Therefore, anything that measures these costs, such as the effect of a new financing on a firm’s bond rating, should be a determinant of leverage decisions. In other words, the model implies that the policy of targeting bond ratings can have the effect of ensuring financial flexibility and increasing value by decreasing future financing costs.

Our model generalizes Almeida, Campello, and Weisbach’s (2004) arguments about cash holdings. As in that paper, we argue that a firm’s cash balances and incremental savings out of new cash flows should be a function of the firm’s position in the financial markets. Our model resembles that of Froot, Stein, and Scharfstein (1993), and like their study, argues that one reason for hedging

\textsuperscript{4}The payback method values more highly those cash flows that occur earlier in the project’s life. Although the payback method is an imperfect approach to capital budgeting, our model does imply that the use of payback in combination with NPV could be a reasonable way to do capital budgeting when firms face financing constraints. Interestingly, Graham and Harvey (2001) find that the majority of firms in their survey still consider the payback method for project valuation. They report that the use of the payback method is particularly prevalent amongst small, private firms.

\textsuperscript{5}Survey evidence in Graham and Harvey (2001) agrees with this notion (p. 1): “A surprising number of firms use firm risk rather than project risk in the evaluation of new investment.”
is to minimize future financing costs. In addition, when financing costs are large, firms should hedging operationally in addition to financially, even if doing so involves real value losses.

Our analysis is also useful in reconciling a number of findings on the literature on interactions between firm financing decisions and product market competition. Empirical research in that literature has considered the notion that financial leverage may credibly commit a firm to adopt aggressive market strategies (see for example Brander and Lewis (1986)). While adopting such strategies should, in theory, lead a leveraged firm to capture market shares from its rivals, empirical research has consistently found the opposite outcome. Our model suggests that because higher leverage may increase the deadweight cost of future financing, investment in product markets (e.g., pricing and production decisions) could be distorted in suboptimal ways, leading to poor competitive performance. Our ideas about the intertemporal impact of financing constraints on product market behavior coincide with those of Chevalier and Scharfstein (1996).

Our arguments also have implications for the burgeoning literature on international comparisons of corporate financial policy. Much of this literature documents that there is substantial variation across countries in the ability of firms to raise external finance (see, e.g., La Porta, Lopez de Silanes, Shleifer, and Vishny (1997, 1998)). Our model suggests that a high cost of external finance should affect not only the quantity of investments made in different countries, but also the types of investments that we observe. In particular, where costs of raising external finance are high, we expect to observe a preference for investments that use more liquid assets and generate more collateral. The empirical literature largely confirms these predictions (see Demirgüç-Kunt and Maksimovic (1999). A consequence of our theory is that financial development should make firms in emerging markets more prone to make longer term, potentially riskier investments over time. The effect of financial development on investment distortions inside firms can help explain the strong link between financial development and investment efficiency (see Beck, Levine, and Loyaza (2000) and Wurgler (2000)).

The remainder of the paper proceeds as follows. Section I introduces our theory, and formally describes its main implications. Section II presents a discussion of findings in several areas of corporate finance in light of the implications of the model. We show how findings in disparate areas such as capital structure, hedging and cash policies, product market competition, and international corporate finance can be understood as implications of the same types of investment distortions. We also discuss hitherto untested implications. Section III concludes.
2 A Model of Intertemporal Investment Decisions with Deadweight Costs of External Financing

2.1 Structure

Our model is a simple representation of a dynamic problem in which the firm has both present and future investment opportunities, and in which external finance entails deadweight costs. There are three dates, 0, 1, and 2. The future investment, \( I_1 \), if made at date 1, produces cash flows in period \( t_2 \) equal to \( g_1(I_1) \). We parametrize the costs of external finance as in Froot, Scharfstein, and Stein (1993), by assuming that the firm pays a deadweight cost \( C(E, k) \) if it raises an amount \( E \) in external funds. For example, if the firm has zero internal funds at date 1, it will pay deadweight costs \( C(I_1, k) \) for any amount of investment \( I_1 > 0 \). We assume that \( C_E(E, k) > 0 \) if \( E > 0 \), \( C_E(E, k) = 0 \) if \( E = 0 \), \( C_k(E, k) > 0 \), and \( C_{EE}(E, k) > 0 \). The parameter \( k \) summarizes the variables that affect the marginal cost of external funds for the firm. Firms that have high costs of external funds have high \( k \).

The cost of external finance can come from a number of sources, including information asymmetries, stockholder/bondholder conflicts, insufficient legal protection, as well as the general state of financial development. We do not model the source of the incremental cost of external finance since the underlying reason for the financing cost does not affect the analysis. The ideas that come from the model are very general and they can be applied whenever there is a potential incremental cost of external finance in the future.

At date 0, the firm has access to a menu of investment opportunities that differ along the following dimensions:

**Pledgeability/Liquidity.** Some date-0 investments produce cash flows that have high pledgeability to creditors, while others produce cash flows that cannot be pledged at date 1. For example, some investments might have front-loaded cash flows (short-term projects), which can be used for (re-)investment at date 1. Other investments might only produce long-term cash flows (at date 2). The firm can borrow against these cash flows at date 1, but the extent to which these cash flows can serve as collateral at date 1 varies across different investments.\(^6\)

We capture these differences in asset pledgeability/liquidity in the following way. One of the date-0 investments that the firm can make, \( I \), produces cash flows at date 2, equal to \( (1 + \theta)g(I) \).

\(^6\)One can, alternatively, think of the resale value/redeployability of the assets that are acquired with investment funds at date 0. Some assets may provide high level of collateral (liquidating values) in the future, while other types of assets may not provide collateral (either because their liquidating cash flows are unverifiable or because liquidation costs are too high).
with \( \theta > 0 \). We assume that these cash flows generate zero collateral at date 1. There is also another set of investments, \( I^\lambda \), that generate total cash flows equal to \( g(I^\lambda) \) at date 2. A fraction \( \lambda \) of these cash flows can be used as collateral at date 1. There are two interpretations for \( \lambda g(I^\lambda) \). One is that the firm can borrow against the date-2 cash flow \( \lambda g(I^\lambda) \) without paying any deadweight costs of external finance. The other interpretation is simply that \( \lambda g(I^\lambda) \) is a date-1 cash flow (investment with front-loaded cash flows). In either case, \( (1 - \lambda)g(I^\lambda) \) is a date-2 cash flow that is totally illiquid, in the same way that the cash flow \( (1 + \theta)g(I) \) is illiquid. The assumption that \( \theta > 0 \) means that the perfectly illiquid investment has higher productivity.

**Risk.** Some date-0 investments produce risky cash flows, while others produce certain future cash flows.

As it will become clear, the riskiness of the illiquid investment \( I \) is irrelevant for the constrained firm. Thus, we can assume that the payoff \( (1 + \theta)g(I) \) is non-random. In contrast, there are two types of liquid investment, \( I^\lambda_R \) and \( I^\lambda_S \). The latter produces non-random cash flow equal to \( g(I^\lambda_S) \), while the former produces risky cash flows. In particular, with probability \( p \), the firm is in the high state \((H)\), where the cash flow is equal to \( c_H g(I^\lambda_R) \); and with probability \((1 - p)\) the firm is in the low state \((L)\), where the cash flow is equal to \( c_L g(I^\lambda_R) \). We let \( \bar{c} = pc_H + (1 - p)c_L \), and we assume \( \bar{c} > 1 > c_L \). Thus, the risky investment is more productive than the safe one, but the safe investment produces higher cash flows than the risky one in state \( L \). The uncertainty about the state gets resolved in date 1.

In addition to these investment opportunities, the firm has assets in place that produce exogenous cash flows equal to \( w_0 \) at date 0, and \( w_1 \) at date 1. We assume that the cash flow \( w_1 \) is risky, and is equal to \( w_{1H} \) in state \( H \), and 0 in state \( L \). Cash flows from assets in place will help determine the marginal cost of external funds.

### 2.2 Analysis

At date 0, the firm must allocate funds to the investments \( I, I^\lambda_S \) and \( I^\lambda_R \). To economize on notation, we drop the superscript and let \((I^\lambda_S, I^\lambda_R) = (I_S, I_R)\). If the firm’s total investment is larger than \( w_0 \) the firm must pay the deadweight cost of external finance, \( C(I_R + I_S + I - w_0, k) \). At date 1, we assume that the cash flow \( w_{1H} \) is large enough that the firm can invest at first best levels in state \( H \) without paying any deadweight cost. Put differently, the firm is unconstrained in state \( H \). In state \( L \), the firm pays the deadweight cost \( C(I_{1L} - \lambda c_L g(I_R) - \lambda g(I_S), k) \), where \( I_{1L} \) indicates that date 1 investment takes place in state \( L \). Thus, the liquid investments \( I_R \) and \( I_S \) allow the firm to
reduce deadweight costs of external finance at date 1 in state $L$, in that a fraction $\lambda$ of these cash flows can be used to invest.

The firm’s program is to maximize the sum of the NPVs of the investments, net of the deadweight costs of external funds:

$$\max_{I_S, I_R, I^*, I^*_L} p [c_L g(I_R) + g_1(I_R) - I_{1H}] + (1 - p) [c_L g(I_R) + g_1(I_{1L}) - I_{1L}] - I_R + g(I_S)$$

$$- I_S + (1 + \theta)g(I) - I - pC(I_R + I_S + I - w_0, k) - (1 - p)C(I_1 - \lambda c_L g(I_R) - \lambda g(I_S), k),$$

where we incorporate the assumption that $C(., k) = 0$ in state $H$. In state $H$, the firm will invest at the first-best level defined by:

$$g^*(I_{1H})^B = 1.$$  

(2)

Notice that a sufficient condition to ensure that $C(., k) = 0$ in state $H$ is that $w_{1H} > I_{1H}^B$.

In state $L$, investment is determined by:

$$g^*(I^*_L) = 1 + C_E(E_L, k),$$

(3)

where $E_L = I_{1L} - \lambda c_L g(I_R) - \lambda g(I_S)$. If $E_L > 0$, then $C_E(E_L, k) > 0$, and $I^*_L < I^B_{1L}$. This setup captures the idea that the firm is more likely to be constrained in the future if future cash flows turn out to be low.\footnote{For simplicity, we implicitly assume that investment opportunities are uncorrelated with future cash flows. If the firm has higher investment opportunities in state $H$, then it could become more financially constrained in that state. We are also abstracting away from active financial hedging policies that might allow the firm to transfer cash flows across states (where they are most needed for investment). Both of these issues are analyzed in Acharya, Almeida, and Campello (2005).}

We can divide the solution in two cases:

**Case 1:** The firm is unconstrained in state $L$, that is, $I^*_L = I^B_{1L}$.

If we define $(\tilde{I}, \tilde{I}_S, \tilde{I}_R)$ as:

$$(1 + \theta)g^*(\tilde{I}) = \phi^*(\tilde{I}_R) = g^*(\tilde{I}_S) = 1 + C_E(\tilde{I} + \tilde{I}_S + \tilde{I}_R - w_0, k),$$

(4)

then this case obtains as long as $I^B_{1L} < \lambda c_L g(\tilde{I}_R) + \lambda g(\tilde{I}_S)$.

The investment levels $(\tilde{I}, \tilde{I}_S, \tilde{I}_R)$ represent the optimal investment policy that obtains if the firm ignores the interplay between current investment policies and future financing constraints. In that case, the firm simply equates the marginal productivity of the three types of investment. This combination of investments also maximizes the firm’s NPV, disregarding future external financing.
The condition for optimality is modified in a straightforward way: investments is invariant to the different types of investment are the same under either investment regime:

\[
0 = \text{set at first-best levels: } (\tilde{I}, \tilde{I}_S, \tilde{I}_R) = (I^{FB}, I^{FB}_S, I^{FB}_R).
\]

In contrast, if \(C_E(I^{FB} + I^{FB}_S + I^{FB}_R - w_0, k) > 0\), then \((\tilde{I}, \tilde{I}_S, \tilde{I}_R) < (I^{FB}, I^{FB}_S, I^{FB}_R)\). However, the ratios of the marginal productivities of the different types of investment are the same under either investment regime:

\[
\frac{g'(\tilde{I})}{g'(\tilde{I}_R)} = \frac{\bar{c}}{(1 + \theta)} = \frac{g'(I^{FB})}{g'(I^{FB}_R)},
\]

\[
\frac{g'(\tilde{I})}{g'(\tilde{I}_S)} = \frac{1}{(1 + \theta)} = \frac{g'(I^{FB})}{g'(I^{FB}_S)},
\]

\[
\frac{g'(\tilde{I}_R)}{g'(\tilde{I}_S)} = \frac{1}{\bar{c}} = \frac{g'(I^{FB}_R)}{g'(I^{FB}_S)}.
\]

Thus, in this case solution, the proportion of funds that is allocated across different types of investments is invariant to the current costs of external finance.

**Case 2:** The firm is constrained in state \(L\). This case obtains if \(I^{FB}_L > \lambda c_L g(\tilde{I}_R) + \lambda g(\tilde{I}_S)\).

If the firm invests myopically at date 0, it will become constrained in future low cash flow states. The condition for optimality is modified in an straightforward way:

\[
(1 + \theta)g'(I^*) = [\bar{c} + (1 - p)c_L \lambda C_E(E^*_{1L}, k)] g'(I^*_R) = [1 + (1 - p)\lambda C_E(E^*_{1L}, k)] g'(I^*_S) = 1 + C_E(E^*_0, k),
\]

where \(E^*_0 = I^* + I^*_S + I^*_R - w_0\), and \(E^*_{1L} = I^*_{1L} - \lambda c_L g(I^*_R) - \lambda g(I^*_S)\). The cash flows from the liquid investments \(I^*_R\) and \(I^*_S\) reduce the marginal cost of external finance in state \(L\) (the term \(C_E(E^*_{1L}, k)\)) by an amount that is proportional to the liquidity of investments (the parameter \(\lambda\)). This equation implies that:

\[
\frac{g'(I^*_R)}{g'(I^*_S)} = \frac{\bar{c} + (1 - p)c_L \lambda C_E(E^*_{1L}, k)}{(1 + \theta)} > \frac{g'(\tilde{I})}{g'(\tilde{I}_R)}
\]

\[
\frac{g'(I^*_R)}{g'(I^*_S)} = \frac{1 + (1 - p)\lambda C_E(E^*_{1L}, k)}{(1 + \theta)} > \frac{g'(\tilde{I})}{g'(\tilde{I}_S)}
\]

In words, the firm’s investment policy is distorted towards more liquid investments because of future financing constraints. In equilibrium, the ratios \(\frac{g'(I^*_R)}{g'(I^*_S)}\) and \(\frac{g'(I^*_R)}{g'(I^*_S)}\) are higher than in the myopic case.

In addition, we have:

\[
\frac{g'(I^*_R)}{g'(I^*_S)} = \frac{1 + (1 - p)\lambda C_E(E^*_{1L}, k)}{\bar{c} + (1 - p)c_L \lambda C_E(E^*_{1L}, k)} > \frac{g'(\tilde{I}_R)}{g'(\tilde{I}_S)}.
\]
Because the safe investment produces greater cash flows in state $L$ ($1 > c_L$), the investment policy is also distorted towards safe investments. Thus, among the liquid investments, the constrained firm is particularly prone to increasing the allocation of funds to the safest investments.

Noteworthy, if $\lambda = 0$, then future constraints create no distortions in the riskiness of the firm’s investment policy. In other words, if all investments are illiquid, then the firm does not care about the riskiness of its investments, and simply allocates funds according to marginal productivities. Thus, there is a complementarity effect between risk and liquidity induced by financing constraints. The firm is particularly prone to fine-tuning the riskiness of its liquid investment, as opposed to that of the illiquid ones. This positive interaction is a specific implication of the financing constraints framework (more on this below).

2.3 Results

It is important to demonstrate that our framework can be used to derive precise empirical implications about investment distortions under financing constraints. To do so, we make a mild parametric assumption regarding the function $g(.)$.

Assumption 1: $\frac{g'(x)}{g(y)}$ is monotonically decreasing in the ratio $\frac{x}{y}$. In words, the ratio between marginal productivities is monotonic in the ratio of investment levels.

This assumption is satisfied, for example, by a simple log production function $g(x) = \ln x$. The same applies to $g(x) = Ax^\alpha$, for $\alpha < 1$, which is a standard Cobb-Douglas functional form. We stress that our results should also hold under many other parametric choices for $g(.)$. Depending on the complexity chosen, these other choices can produce countervailing effects; however, the first-order intuition we obtain are similar to what we discuss under Assumption 1.

A number of testable predictions follow from our framework.

Result 1: If future financing constraints are binding, the ratio between liquid and illiquid investments increases relative to a benchmark case in which future constraints are not binding:

$$\frac{I^*_R}{I^*_R} > \frac{\hat{I}_R}{\hat{I}_R} \quad \text{and} \quad \frac{I^*_S}{I^*_S} > \frac{\hat{I}_S}{\hat{I}_S}. \quad (9)$$

Result 2: If future financing constraints are binding, the ratio between safe and risky investments increases relative to a benchmark case in which future constraints are not binding:

$$\frac{I^*_S}{I^*_R} > \frac{\hat{I}_S}{\hat{I}_R}. \quad (10)$$
Proof: Both results follow directly from Eqs. (7) and (8) and Assumption 1.

These two results suggest that, in order to test the implications of the model, it is important to focus on implications about investment ratios. It is considerably more difficult to make statements about the levels of investment in isolation. For example, it is possible that the constrained firm chooses to overinvest in both risky and safe investments ($I^*_R > \hat{I}_R$ and $I^*_S > \hat{I}_S$), because both increase the firm’s date-1 liquidity. This result happens, for example, if the date-0 financial constraint is not binding, $C_E(E_0^*, k) = 0$. For other parameter values, the constrained firm can underinvest in safe and risky assets. However, we can always guarantee that the ratio between safe and risky assets will be biased upwards in comparison to the benchmark solution.

We already mentioned that there is a complementarity effect between risk and liquidity for constrained firms. If investments are illiquid, $\lambda = 0$, then the firm does not benefit from distorting the risk of its investment policy. For example, even though we assumed that the illiquid investment ($I^*$) is risk-free, the optimal choice of $I^*$ would be independent of its riskiness. We can show a more complete characterization of this result.

Result 3: There is a threshold level of $\lambda$, $\overline{\lambda}$, such that for all $\lambda < \overline{\lambda}$ the optimal ratio between safe and risky investments increases with the liquidity of the investments, that is, $\frac{\partial \frac{I^*_S}{I^*_R}}{\partial \lambda} > 0$.

Proof: Eq. (8) and Assumption 1 imply that $\frac{I^*_S}{I^*_R}$ is monotonically increasing in the following expression:

$$h(\lambda) = \frac{1 + (1 - p)\lambda C_E(E_{1L}^*, k)}{\overline{\lambda} + (1 - p)c_L \lambda C_E(E_{1L}^*, k)}.$$ (11)

Differentiating $h(\lambda)$ with respect to $\lambda$ we obtain:

$$\text{sgn} \left[ h'(\lambda) \right] = \text{sgn} \left[ (\overline{\lambda} - c_L)(C_E(E_{1L}^*, k) + \lambda \frac{\partial C_E(E_{1L}^*, k)}{\partial \lambda}) \right].$$ (12)

While the first term inside brackets is positive, the second term can be negative because $\frac{\partial C_E(E_{1L}^*, k)}{\partial \lambda}$ can be lower than zero (an increase in liquidity decreases marginal costs of external funds). However, because the effect of the second term is proportional to the level of $\lambda$, it follows that for sufficiently low values of $\lambda$, one can guarantee that $h'(\lambda) > 0$, which gives $\frac{\partial \frac{I^*_S}{I^*_R}}{\partial \lambda} > 0$.

Notice that the parameter $\lambda$ captures the liquidity of the liquid investments with respect to the illiquid ones. In particular, we assume in this derivation that the change in $\lambda$ is uncorrelated with the parameter $k$, which captures variables that change the firm’s overall costs of external funds.
For example, in an international context the effect of laws that improve the protection of external investors would be captured by $k$. Of course, one issue with Result 3 is that $\lambda$ and $k$ can be correlated. For instance, better laws might help the firm collateralize future cash flows more easily (higher $\lambda$). In order to test Result 3, it is important to look for sources of variation in $\lambda$ that are uncorrelated with $k$. For example, some firms might invest in more pledgeable assets because of the properties of their technology (e.g., they may invest more in buildings and machines as opposed to R&D and human capital). Result 3 would then say that such firms would be particularly likely to distort their investment choices towards safe investments.

Result 3 can also be applied to understand the risk choices of financial versus fixed investments. Financial investments such as cash and stocks of other firms generate cash flows whenever the firm needs them, and thus should be interpreted as liquid investments. Result 3 would then suggest that if a constrained firm decides to invest in financial securities, it should also choose safe investments such as cash, as opposed to risky investments such as stocks. In contrast, the firm would care less about the risk profile of its fixed (and presumably more illiquid) capital investments.

Maintaining the assumption that $k$ and $\lambda$ are uncorrelated, we can also derive predictions regarding variations in $k$.

**Result 4:** The ratio between liquid and illiquid investments is increasing in $k$, that is, $I_L^* / I^*$ increases with $k$.

**Proof:** Eq. (7) and Assumption 1 imply that $I_L^* / I^*$ is monotonically increasing in the following expression:

$$\nu(k) = \frac{\check{\pi} + (1 - p)c_L\lambda C_E(E^*_L, k)}{(1 + \theta)}.$$  \hspace{1cm} (13)

Since $\frac{dC_E(E^*_L, k)}{dk} > 0$, this expression is increasing in $k$. The proof is similar for $I_S^* / I^*$.

Result 4 is also straightforward. However, once again, it is important to focus on investment ratios to derive this implication. In particular, it is not necessarily the case that both $I_L^*$ and $I_S^*$ are increasing in $k$. An increase in $k$ raises both current and future external financing costs. Thus, while higher future costs push towards higher liquid investments, higher current costs tend to reduce investment. Result 4 obtains because it pertains to the ratio between liquid and illiquid investments.

We can show a similar result for the firm’s risk choices.

**Result 5:** The ratio between safe and risky investments is increasing in $k$, that is, $I_S^* / I_R^*$ increases
with \( k \).

**Proof:** Eq. (8) and Assumption 1 imply that \( \frac{I^*_R}{K^*_R} \) is monotonically increasing in the following expression:

\[
h(k) = \frac{1 + (1 - p)\lambda C_E(E_{1L}^*, k)}{\tau + (1 - p)c_L\lambda C_E(E_{1L}^*, k)}.
\] (14)

Differentiating \( h(k) \) with respect to \( k \) we obtain:

\[
sgn \left[ h'(k) \right] = sgn \left[ (\tau - c_L) \frac{dC_E(E_{1L}^*, k)}{dk} \right] > 0.
\] (15)

One caveat regarding Results 4 and 5 is that it is hard to isolate sources of variation in \( k \) that do not affect \( \lambda \). If the cost of external funds is higher, it should also be harder for firms to collateralize future cash flows, and thus \( \lambda \) should decrease. This effect could push towards the opposite direction to that emphasized in Results 4 and 5. For example, in the region in which \( \lambda < \bar{\lambda} \), Result 3 suggests that a decrease in \( \lambda \) will push towards a decrease in \( \frac{I^*_R}{K^*_R} \).

One way to separate variations in external finance costs from liquidity is to focus on variations in the availability of internal funds, the parameters \( w_0 \) and \( w_1 \). In the model, these parameters represent cash flows that are not associated with the new investments made at time 0 and time 1 (e.g., cash flows from assets in place). These cash flows affect the marginal costs of external finance through their effect on \( E_0^* \) and \( E_{1L}^* \). More generally, these parameters capture any sources of cash that are available to finance new investments. For example, subject to the caveat that leverage is endogenously chosen, one can think of highly levered firms as having lower \( w_0 \) and \( w_1 \) as well.

**Result 6:** Increases in \( w_0 \) and/or \( w_1 \) decrease the ratio of liquid to illiquid investments, and also the ratio of safe to risky investments.

**Proof:** An increase in \( w_0 \), for example, increases all current investments (liquid, illiquid, safe, risky), since investment–cash flow sensitivities are positive. As date-0 liquid investments go up, \( E_{1L}^* \) goes down due to the effect of liquid investments on future external financing costs. Thus, we have that \( \frac{dC_E(E_{1L}^*, k)}{dw_0} \) < 0. We can then replicate the proofs of Results 4 and 5, to show Result 6. Similarly, an increase in \( w_{1L} \) has a negative effect on \( C_E(E_{1L}^*, k) \).

Simply put, increases in \( w_0 \) and \( w_1 \) relax current and future financing constraints and thereby reduce the distortions towards safer and more liquid investments. Notice that this result holds even for variations in the current availability of internal funds, \( w_0 \). Higher \( w_0 \) increases current liquid investments, which in their turn decrease future costs of external financing.
Testing this implication is subject to the standard problem that cash flow might capture variations in investment opportunities. Thus, investment can increase with cash flows even if financial constraints are never binding (see. e.g., Gomes (2001), and Alti (2003)). However, we note that our focus on investment ratios is potentially helpful. Higher investment opportunities should increase all types of investment. Unless cash flow contains significantly more information about the marginal productivity of one of the types of investment (e.g., safe versus risky), the sensitivity of the ratio of investments to cash flow can still capture the effect of future financing constraints.

3 Implications

We have presented a stylized model that illustrates how future expected financing costs can influence investment today. The model leads to a host of empirical predictions through several propositions regarding investment choices and how they relate to financial constraints. In this section, we discuss these implications and the relevant empirical evidence. In addition, we point out to additional implications that can be tested in future empirical work.

Our model can be interpreted in a fairly general fashion since the comparative static results apply in any circumstance in which the firm is likely in the future to face financial constraints, or an increased cost of capital due to capital market imperfections. When interpreting the model, the key issue is how one operationalizes the idea of “constraints.” There are a number of circumstances in which the cost of capital can rise due to financing imperfections, leading the model and its implications to become relevant. This section discusses some of these circumstances, the resulting predictions of the model in each setting, as well as existing empirical evidence related to them. Our discussion is summarized in Table 1.

- Capital Budgeting Rules

Finance professors have always taught students to use the net present value rule for capital budgeting decisions. They often seem puzzled and surprised when discussing the reasons why so many firms still use the payback method. Our model provides a rationale for why some firms use the payback rule in addition to the net present value rule.\(^8\)

To a firm facing financial constraints, the value of a project increases when cash is returned to the

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\(^8\)Graham and Harvey (2001) find that nearly 60% of firms in their CFO survey still use the payback method as a criterion for project valuation. An alternative explanation for the use of payback in capital budgeting has been developed by Harris and Raviv (1996, 1998). Their explanation differs from ours as it is based on information and incentive problems inside the firm, while ours depends on the firm’s cost of external financing.
firm sooner because it can be used to finance future projects. Given these financing considerations, payback can be a useful criterion as it values cash flows returned sooner more highly than is reflected by an NPV valuation. We emphasize, however, that even in a world with financing constraints, payback is not the optimal capital budgeting approach, as it does not take account of any cash flows after the payback period (among other reasons). Our model suggests that the optimal capital budgeting approach would require discounting of cash flows, albeit at an firm-specific interest rate that takes account of the firm’s cost of raising external capital, the expected value of future projects that would require raising capital, and the firm’s distribution of internally-generated cash flow relative to the capital required to fund these projects.⁹

Alternatively, it is possible that some kind of combination of payback and NPV methods would approximate this optimal discounting approach. A clear empirical prediction that comes from this analysis is that we expect financially-constrained firms to be more likely to use payback for their capital budgeting decisions than financially unconstrained firms. The survey evidence of Graham and Harvey (2001) suggests that this pattern may hold in the data. These authors find that firms are more likely to use payback rather than NPV when they are smaller, do not pay dividends, have more growth opportunities, and are private. All of these characteristics are likely to be associated with a relatively high demand for and cost of external financing.

- **Leverage and Risk-Shifting**

As a firm becomes more leveraged, financial imperfections can increase the cost of capital beyond the level implied by the Modigliani-Miller theorem. The cause of this extra risk is typically referred to as “debt overhang,” an effect that arises, supposedly, from conflicts of interest between stockholders and bondholders. The extent to which these conflicts actually increase the cost of capital for most firms is far from clear (see Parrino and Weisbach (1999)). What is evident, however, is that highly leveraged firms are often unable to raise new capital from banks or public debt markets, and can face deep discounts when they issue equity. These financing frictions can lead to suboptimal investment in the way suggested by our model.¹⁰

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⁹ Understanding these optimal capital budgeting rules under financing constraints and providing guidance for practitioners to implement them would be an excellent topic for future research.

¹⁰ We do not mean to say that all highly leveraged firms face financing constraints. For example, some firms have higher debt capacity (e.g., their assets offer higher collateral capacity) and debt may be the optimal financing instrument. In addition, low leverage firms can be financially constrained to the extent that not all of their profitable investments are finding fairly-priced financing. Indeed, unleveraged firms can be seen as highly financially constrained under certain circumstances (e.g., when financial markets are severely underdeveloped) and a highly leveraged firm may be unconstrained if there are no new available profitable investment opportunities.
We view it as reasonable to apply the inferences drawn from our model to a firm that increases its leverage substantially (either voluntarily or involuntarily). Given that highly leveraged firms are more likely to face financing frictions when raising capital in the future, such firms should distort their investments in the directions suggested by our model. In particular, we expect highly leveraged firms to have a preference for safer investments, investments that produce cash flows sooner, and for investments that utilize (or produce) assets that can be collateralized to help finance other investments. We emphasize that the first prediction, the preference for safe investments by highly leveraged firms, is exactly the opposite of what comes from the classic Jensen and Meckling (1976) risk-shifting analysis. Hence, our model provides a plausible explanation for the lack of evidence for Jensen and Meckling’s proposition.

The preference for safe assets is consistent with the findings of several studies. Andrade and Kaplan (1998) examine a sample of firms undergoing financial distress following leveraged recapitalizations. Despite the fact that these firms are plausibly the most likely place to observe risk shifting (if in fact it did occur), Andrade and Kaplan find no evidence, even in their firm-by-firm analysis, that any of their sample firms take any actions that increase risk. Instead, consistent with our model, the distressed firms’ investments tend to be safer ones, designed to increase the probability of firm survival. Rauh (2006) considers how firms manage the assets in their pension fund and how pension fund management relates to firm-wide risk. He finds that as firms get into financial difficulties, their pension fund management becomes more conservative, the opposite of what the Jensen and Meckling arguments would imply, but consistent with the arguments in our model. His result is also consistent with the implication of our model that the preference for safer assets by constrained firms would be primarily in liquid assets.

Peyer and Shivdasani (2001) consider a sample of firms that have undergone leveraged recapitalizations. Consistent with our second prediction, these authors find that their sample firms tend to undertake investments that yield cash flows sooner, even though these investments do not appear to be as profitable as the ones they took prior to the recapitalization. Ahn, Denis, and Denis (2006) show that higher leverage causes conglomerates to curtail investment in non-core/high Q segments, to the benefit of core/low Q segments, indicating that higher financing frictions lead conglomerates to refocus on corporate survival at the expense of inefficient investment decisions.

See also Maksimovic and Phillips (1998) for evidence on the efficiency of plant sales (disinvestment) by distressed firms. Khanna and Poulsen (1995) contrast the decisions of bankrupt firms with those of a matched sample of non-bankrupt firms. Based on stock market reactions to managerial actions (e.g., asset sales, personnel reductions, acquisitions), the authors conclude that managers of bankrupt firms make investment decisions that are very similar to those of non-bankrupt firms with respect to risk and efficiency.
We do not know of any studies that examine the liquidity of the assets used in investments by firms undergoing large changes in leverage; studying such changes would be a useful topic for future research. Whenever firms can substitute into investments with varying degrees of liquidity, our model suggests that we should observe “liquidity-shifting” into more tangible assets when firms begin to face financial constraints. In addition, one prediction of our model is that financing constraints should have a higher effect on the risk profile of the firm’s liquid investments than on its illiquid ones. Thus, to the extent that risk-shifting does occur, we expect to observe it more with a firm’s real (illiquid) assets than its financial (liquid) ones, since the effect of financial constraints is less likely to offset stockholder/bondholder considerations for illiquid assets.

- **Capital Structure Choices**

One of the most commonly discussed and taught theories of capital structure is that a firm adjusts its capital structure over time to maintain (or to be near) a prespecified “target,” determined by the tradeoff between taxes and bankruptcy costs. But a puzzle for this theory is that firms in the real world appear to be setting their targets too low. For example, Graham (2000) argues that most firms could add substantial leverage and reap the corresponding tax benefits of debt without noticeably increasing distress costs. Indeed, it is the fact that bankruptcy costs appear to be too small — relative to the value of tax shields — to explain observed leverage levels that motivated the original arguments by Jensen and Meckling (1976) and Myers (1977) about the agency costs of debt.

Our model identifies an additional cost of financial leverage: if higher leverage today increases the likelihood of financing constraints in the future, then today’s investments are likely to be distorted away from their first-best levels. This investment policy distortion can be viewed as an indirect cost of distress, albeit one that has been less emphasized by the academic literature. While it is difficult to quantify the magnitude of this effect, the expected value losses from distorted investment could be one factor leading firms to set their target debt ratio lower than one might otherwise expect.\(^\text{12}\)

Empirically, this argument predicts that in addition to tax shields and bankruptcy costs, managers will be concerned about the ability to secure additional financing when deciding on capital structures. Anecdotal evidence is certainly consistent with this argument; in the Graham and Harvey (2001) sample, “financial flexibility,” presumably referring the ability to be able to issue capital in the future, was cited by 59% of CFOs as an important determinant of leverage levels; the most

\(^{12}\text{Naturally, there are other explanations for debt conservatism (see, among others, Hennessy and Whited (2005)).} \)
commonly cited determinant of leverage in this survey. Richard Passov, the treasurer of Pfizer, argues in Passov (2003) that, because of the high value they place on future R&D expenditures, technology and life science companies carry very little (or even “negative”) debt in their balance sheets.

The observable prediction of this argument is that the relevant cost of leverage to a firm is not the quantity of leverage, but rather the marginal change in financing costs associated with incremental leverage. Empirically, leverage levels are likely to be related to the marginal cost of financing; however, they are likely to be a much noisier measure of the marginal cost of financing than bond ratings, which are constructed by professionals to be forward-looking predictors of future financing costs. Our argument implies that managers should be very concerned about bond ratings, even potentially more so than about leverage levels. Consistent with this prediction, bond ratings are the second most commonly cited determinant of leverage by the Graham and Harvey sample of CFOs, cited by 57% of CFOs. In addition, Kisgen (2006a, 2006b) shows empirically that firms target bond ratings rather than leverage levels, consistent with the idea that they set capital structure in large part to facilitate future financings. Although somewhat preliminary, the available evidence is consistent with the hypothesis that the expected future costs of financing are an important determinant of capital structure.

- **Cash Management**

Another important financial decision is how liquid a balance sheet a firm should have. This was the context in which Keynes (1936) proposed his original argument, and this idea has been further extended by Almeida, Campello, and Weisbach (2004). The decision to hold cash is, at its core, an investment decision. A firm could otherwise invest the money in a physical or alternative financial investments, or pay it out to shareholders. One advantage of holding cash is that it is riskless. Another is that it has the shortest possible time horizon. Thus, our model suggests that when firms are anticipating financial constraints in the future, they will hold more cash today. More specifically, out of a marginal dollar of cash flow, a constrained firm should be more likely to save it as cash than an unconstrained firm.

These ideas about corporate cash policies have been empirically tested in a few recent papers. Almeida, Campello, and Weisbach (2004) consider a number of measures of credit constraints, and estimate the sensitivity of cash holdings to incremental cash flow. They find that the “cash flow sensitivity of cash” is noticeably higher for the firms classified as financially constrained than
for those classified as unconstrained.\textsuperscript{13} Sufi (2006) uses data that allow him to refine further the financial constraint proxies used in Almeida, Campello, and Weisbach. Looking at information on whether a firm has access to an unused line of credit, Sufi finds that firms that do not have access to a line of credit are more likely to save cash out of cash flows. Using Almeida, Campello, and Weisbach’s measures, Faulkender and Wang (2006) show that the value of the cash that is saved out of internal cash flows increases with the degree of financing constraints a firm faces (see also Sibilkov (2005)). Han and Qiu (2006) use those same measures of financing constraints to show that constrained firms’ cash savings policies are also sensitive to the volatility (i.e., the riskiness) of their cash flows.\textsuperscript{14} Overall, there is substantial evidence suggesting that the idea coming from our model, that concern about future financing ability should affect investment today, is an important determinant of firms’ cash policies.

- **Hedging Policy**

When a firm hedges its cash flows, it is essentially taking a series of investments that alter its cash flow distribution. Froot, Scharfstein, and Stein (1993) argue that one reason why a firm hedges is to better align its cash flows with its investment opportunities, and minimize the deadweight costs associated with future financing needs.\textsuperscript{15} To a degree, our model is a generalization of Froot, Scharfstein, and Stein, and hence, the implications of their model are implications of ours as well.\textsuperscript{16} In particular, one can think of the constrained firm’s preference for safer investments as a hedging-like strategy.

One important difference between our paper and Froot, Scharfstein, and Stein is that they focus their applications on the use of financial derivatives and options. In fact, there seems to be a strong theoretical justification for this choice. Barring transaction costs, a financial derivative such as futures contracts can be thought of as a zero NPV investment that transfers funds across future states of the world. In contrast, the investment distortions that we discuss in this paper can have real costs for a firm that pursues them. Following the Froot et al. argument, the empirical

\textsuperscript{13} A number of recent papers have reported similar results using international data. See Ferreira and Vilela (2004) for Continental Europe; Nguyen (2005) for Japan; Chang, Tan, and Wong (2005) for Australia; Costa and Paz (2005) for Brazil; Marchica (2006) for the UK; and Saddour (2006) for France.

\textsuperscript{14} Opler et al. (1999) also report a positive relationship between volatility and cash holdings. However, they do not examine the mediating role of financing constraints.

\textsuperscript{15} Mello and Parsons (2000) propose an alternative model of the relation between financial constraints and optimal hedging strategies. Smith and Stulz (1985) argue that financial distress creates incentives for hedging. To the extent that financial distress and financial constraints are related (see discussion above), their arguments are also related to ours.

\textsuperscript{16} Indeed, our work was motivated in part by thinking about the Froot, Stein, and Scharfstein original analysis.
hedging literature has attempted to characterize the use of similar kinds of financial instruments (futures, forwards, etc.).\textsuperscript{17} The bulk of the evidence suggests that — contrary to intuition — the use of financial derivatives is concentrated in large (likely unconstrained) companies. As a result, the link between future financial constraints and hedging remains somewhat controversial.

We believe that a potential advantage of our argument is precisely that we have \emph{not} focused on financial derivatives.\textsuperscript{18} In practice, the effectiveness of derivatives might be hampered by the difficulty of securitizing cash flows that are not contingent on easily verifiable variables, such as commodity prices and exchange rates. These limits to securitization should be particularly stringent on firms that face deadweight costs of issuing more standard securities such as debt (i.e., potentially constrained firms). This argument might explain why, in practice, firms use alternative means of hedging that involve both financial and operating strategies (see Petersen and Thiagarajan (2000)). It might also explain why the literature has struggled to find evidence for a link between hedging and financial constraints. In particular, while the investment distortions that we discuss in this paper involve true NPV costs, they might be more easily implementable, hence they can be a more relevant hedging mechanism than futures and forwards for constrained firms.

\textbf{Product Markets}

A firm’s investment in its future business opportunities goes much beyond the choice of assets in its balance sheet. Real-side investment decisions include not only optimal choices along the capital–labor tradeoff, but also along product market considerations (e.g., choice of technology, product quality, and pricing strategies). In recent years, researchers have looked at the interaction between product markets and firm financing. The work of Titman (1984), Brander and Lewis (1986), Bolton and Scharfstein (1991), and Chevalier and Scharfstein (1996) characterizes a number of ways in which intertemporal policy choices can be affected by a firm’s position in its product markets and the firm’s financial condition. A common thread of these theories is the idea that the worsening of firm financial condition and/or product market position may cause the firm to make suboptimal investment decisions over time. These sorts of frictions between optimal investment policies and financing constraints are closely related to the intertemporal tradeoffs discussed in our model, although we do this in a much more general setting that transcends the product markets environment.

\textsuperscript{17}Papers with evidence that speak to the link between financial constraints and hedging include Nance et al. (1993), Mian (1996), Géczy et al. (1997), Gay and Nam (1998), and Guay (1999).

\textsuperscript{18}Additional examples are Vickery (2004), who analyzes the maturity structure of corporate debt, and Acharya, Almeida, and Campello (2006), who analyze the choice between cash and debt capacity. Both papers report evidence that is consistent with a link between hedging and financial constraints. See also Faulkender (2005).
There have been a number of studies testing these theories, typically measuring “investment” in terms of outcomes that capture decisions related to production levels, such as product price/markup, or firm technology/R&D investment. These studies generally support the notion that firms distort their investment decisions over time in a manner consistent with the logic of our theory. For example, Chevalier and Scharfstein (1995, 1996) and Campello (2003) examine the pricing policies of firms facing unusually high credit frictions during aggregate recessions. These studies find that constrained firms increase markups in a way that is consistent with boosting cash flows in the short term at the expense of long-term profits. This finding is consistent with the idea that financial constraints cause firms to distort investments toward shorter-term, safer investments, as suggested by our model.

In a related series of tests, Opler and Titman (1994), Campello (2003), and Campello and Fluck (2005) consider how financing constraints affect the relation between leverage and market share. They find, again consistent with the ideas in our model, that firms with higher than industry-average leverage lose market share to their unleveraged rivals when financing constraints appear to bind (high debt service coupled with low product demand). These observed outcomes are consistent with policies that although suboptimal (e.g., underinvestment in market share building) are designed to ensure corporate survival. Finally, studies in this literature examining theories suggesting that firms’ financing and investment policies are chosen as a commitment to riskier, more aggressive market strategies à la Jensen and Meckling generally find little or no support for these arguments (see Phillips (1995), Kovenock and Phillips (1997), and Khanna and Tice (2000)).

- Cross-Country Comparisons

There is substantial evidence that in many countries the financial system does an imperfect job of allocating capital across the economy’s investment opportunities (see Levine (2005), and Demirgüç-Kunt and Levine (2001), for recent surveys). These capital allocation frictions arise partly from costly external financing. For example, in environments with poor investor protection (La Porta, Lopez de Silanes, Shleifer, and Vishny (1998)), firms may not be able to fully undertake their investment opportunities due to the high costs associated with external funding by minority investors (Shleifer and Wolfenzon (2002)).

As a result of these international differences in financing costs, our model predicts that we should observe different types of investments across countries depending on the costs of external finance. In countries where costs of raising external finance are high, we expect to observe a preference for
shorter term, safer investments that use more liquid assets (such as cash) than in countries with low costs of external finance. The findings of Dittmar, Mahrt-Smith, and Servaes (2003) are consistent with these predictions. Those authors show that firms in countries with poor shareholder protection (thus high cost of external finance), hold substantial more cash than otherwise similar firms from high shareholder protection countries. In addition, Khurana, Pereira, and Martin (2006) show that the cash flow sensitivity of cash decreases with the degree of financial development, indicating that firms are more concerned with cash management if the level of financial development is low.\footnote{Nevertheless, Kalcheva and Lins (2005) and Pinkowitz, Stulz, and Williamson (2006) have argued that because poor investor protection is associated with more severe agency costs of managerial entrenchment, higher cash balances may also intensify overinvestment by entrenched managers. Specifically, they report evidence suggesting that a dollar of liquid assets is valued at less than a dollar in countries with poor investor protection, and that this discount is even greater in firms that show large separation between cash flow and control rights. Thus, further research is required to establish the optimality of cash balances for firms in poor investor protection countries.}

There is also substantial evidence that firms try to increase the pledgeability of their assets as a response to financial market underdevelopment. Demirgüç-Kunt and Maksimovic (1999) find that firms in developing countries have higher proportions of fixed assets to total assets and use less intangible assets than firms in developing countries. Carlin and Mayer (2003) show that the structure of countries’ financial systems has a stronger effect on R&D expenditures than in fixed capital. As emphasized by Rajan and Zingales (2001), this finding is consistent with the idea that fixed assets create collateral, which is more valuable when financial markets are underdeveloped. Claessens and Laeven (2003) find that sectors that use intangible assets grow faster in countries with more secure property rights, again consistent with the idea that tangible assets are relatively more valuable than intangible assets when financing costs are higher. Finally, Braun (2003) shows that in countries with poorly developed financial systems, industrial composition is skewed towards industries with tangible assets. In addition, the impact of underdevelopment on industry growth is greater if the industry is more dependent on external finance. The evidence in all of these papers strongly supports the notion that increased financing costs distort the types of investments firms make toward more tangible assets, that can be used to secure financing for future investments.

The literature has paid less attention to the effect of poor investor protection on corporate risk-taking. However, the available evidence is also consistent with the implications of our model. Specifically, John, Litov, and Yeung (2005) report cross-country evidence that suggest that risk-taking is positively associated with the degree of investor protection. However, they interpret the evidence as suggestive of insider entrenchment as opposed to costly external finance. Again, more research is required to confirm the link between financial market underdevelopment and corporate
risk-taking, and to identify the best explanation for the observed correlations.

- **Real Effects of Financial Development**

The cross-country evidence suggests that higher financing costs lead to different types of investment. When financing costs are high, firms are willing to sacrifice profits at the margin in exchange for more tangible assets and less risky, shorter-term cash flow distributions that can be used to finance subsequent investments. As a country develops financially, its companies will be therefore less likely to sacrifice profits to facilitate future financing, and we should observe changes in the nature of their investments, as well as an increase in their ultimate profitability.

This prediction is consistent with much of the recent literature in international finance indicating that financial development lowers the cost of external funding and leads to higher investment and growth (e.g., King and Levine (1993), Levine and Servos (1998), Rajan and Zingales (1998), and Demirgüç-Kunt and Maksimovic (1998)). Our argument suggests that financial development will affect not only the level of investment, but also its quality. Consistent with this argument, Beck, Levine and Loyaza (2000) find that financial intermediary development affects growth mostly through its effect on productivity growth and technological change. In addition, Wurgler (2000) also suggest a strong link between financial development and investment efficiency across countries.

Clearly, there are other explanations for why financial development has specially large effects on the productivity of investment. For example, developed financial systems might do a better job at generating information about investment projects, improving the flow of capital across firms. Future research could try to provide further evidence that helps disentangle the role of these alternative channels, and thereby quantify the importance of investment distortions inside firms for economic growth and welfare.

4 **Conclusion**

The vast majority of managers in the U.S. and Europe list “financial flexibility” as the most important goal of their firms’ financial policies (see Graham and Harvey (2001) and Bancel and Mittoo (2002)). More generally, their stated policies are consistent with the idea of ensuring funding for present and future investment undertakings in a world where contracting and information frictions often force firms to pass up profitable opportunities. A consequence of these frictions is that they affect the marginal costs and benefits of various projects depending on both the firm’s financial position and on the project’s ability to help the firm finance future investments. We develop this
idea in a formal model and discuss numerous implications. In its essence, the model shows that future financing constraints lead firms to have a preference for investments with shorter payback periods, investments with less risk, and investments that utilize more liquid (pledgeable) assets. All these investment characteristics are valued by firms because they help relax future financing constraints.

Our model has implications for a number of areas of corporate finance. It suggests that, in contrast to the commonly-discussed risk-shifting arguments, firms should take safer rather than riskier projects as they become more leveraged. This implication is in line with the empirical literature that finds that firms tend to focus on projects that generate quicker, more certain cash flows when leverage increases. In addition, the idea that future financing considerations are important to firms has implications for capital structure theory. For example, it provides a rationale for managers’ often-stated focus on bond ratings rather than leverage levels, as bond ratings are likely to be better predictors of future financing costs than are leverage levels.

Contrary to the usual arguments about capital budgeting, our analysis shows that the value of a project depends not only on the project’s cash flows, but also on how these cash flows interact with the firm’s financial position. It also provides an explanation for the popularity of capital budgeting methods such as payback, which places a large weight on the timing of cash flows. In addition, our model suggests that high costs of external financing in a particular country will affect not only the quantity of investment, but also the kind of investments that firms make. In countries with high costs of external financing, we expect firms to focus on shorter-term, safer investments and ignore longer-term, potentially more profitable ones. This prediction implies that when a country develops its financial system, we should observe an increase not only in the quantity of investment, but a change to more long-term, risky investments, that ultimately may prove more profitable.

Much of what we know about corporate finance was developed under the assumption that firms can access capital markets costlessly. When this assumption is relaxed, we show that firms will distort their investments in predictable ways. This leads to a host of implications that may help explain and reconcile empirical findings in different areas of corporate finance. In addition, our paper points out to understudied consequences of financing constraints on firm behavior. Admittedly, the dynamics of investment and financial constraints are more complicated than our stylized model makes it out to be. Studying these issues further would be a useful topic for future research.
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**Table 1: Summary of Model’s Implications and Relevant Empirical Evidence**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Empirical Implications</th>
<th>Relevant Empirical Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Highly levered firms should take more liquid investments</td>
<td>Untested</td>
</tr>
<tr>
<td></td>
<td>Asset substitution more likely to be observed in illiquid assets</td>
<td>Untested</td>
</tr>
<tr>
<td><strong>Capital Budgeting</strong></td>
<td>Investment distortion towards liquid assets is highest if assets are safer</td>
<td>Untested</td>
</tr>
<tr>
<td>(General)</td>
<td>(complementarity between safety and liquidity)</td>
<td></td>
</tr>
<tr>
<td><strong>Capital Budgeting</strong></td>
<td>Constrained firms are more likely to use rules that place higher weight on earlier cash flows (e.g., payback method)</td>
<td>Graham/Harvey (2001)</td>
</tr>
<tr>
<td>(Valuation Rules)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Leverage Levels</strong></td>
<td>Lower leverage than traditional tradeoff model predicts</td>
<td>Graham (2000)</td>
</tr>
<tr>
<td><strong>Bond Ratings</strong></td>
<td>Firms target bond ratings rather than leverage levels</td>
<td>Graham/Harvey (2001), Kisgen (2006a, 2006b)</td>
</tr>
<tr>
<td><strong>Cash Management</strong></td>
<td>Difference between constrained and unconstrained firms in cash flow sensitivity of cash</td>
<td>Almeida/Campello/Weisbach (2004), Sufi (2006), numerous international studies</td>
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<td></td>
<td>Cash management more valuable for constrained firms</td>
<td>Faulkender/Wang (2006), Sibilkov (2005)</td>
</tr>
<tr>
<td><strong>Hedging</strong></td>
<td>Constrained firms should use real investments to hedge</td>
<td>Untested</td>
</tr>
<tr>
<td><strong>Product Markets</strong></td>
<td>Constrained firms adopt policies that boost short term cash flows</td>
<td>Chevalier/Scharfstein (1996), Campello (2003)</td>
</tr>
<tr>
<td><strong>Cross-Country Comparisons</strong></td>
<td>More liquid investments in countries with high costs of external financing</td>
<td>Dittmar/Mahrt-Smith/Servaes (2003), Khurana/Pereira/Martin (2006)</td>
</tr>
<tr>
<td></td>
<td>Safer investments in countries with high costs of external financing</td>
<td>John/Litov/Yeung (2005)</td>
</tr>
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