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Why do firms use high discount rates?☆

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ABSTRACT

We present evidence consistent with operational constraints leading firms to use high discount rates that average twice the firms' cost of financial capital. Based on a survey of Chief Financial Officers matched to archival data, we find that firms with abundant access to capital but limited qualified management or manpower appear to forgo profitable projects in preparation for more profitable future investment opportunities. Consistent with this explanation, firms that use high discount rates have strong balance sheets, low leverage, and large cash holdings. In addition, firms appear to increase discount rates to account for idiosyncratic risk.

1. Introduction

Capital allocation, a crucial business function, is not well understood. While most large U.S. firms have long used discounted cash flow (DCF) methods to evaluate investment opportunities, little is known about what factors determine the discount rates that firms use.[1] In surveys conducted over the past 25 years, firms increasingly respond that their discount rates take into account their weighted average cost of capital (WACC) computed using the capital asset pricing model (CAPM) to estimate their cost of equity. Although WACC and CAPM are the focus of capital budgeting instruction in textbooks and business school classrooms (Womack and Zhang, 2005), firms typically evaluate projects using discount rates above their WACC to account for additional risks or other factors (see Jacobs and Shivdasani, 2012). Firms responding to our survey use, on average, a discount rate of 15% while their WACC is 8%—numbers that are similar to the survey results of Graham and Harvey (2011a, 2012).

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[1] In this article, we use the term "discount rate" to refer to both the discount rate used in net present value (NPV) analysis and the hurdle rate used in internal rate of return (IRR) analysis. For a given project, the two are the same.

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Using higher discount rates may be justified as a form of capital rationing when there are limitations on the investment program that prevent a company from undertaking all projects that have a positive net present value (NPV). Emery, Finnerty, and Stowe (2011, Chapter 11) provide an excellent discussion of possible rationales for capital rationing. Firms' investment may be rationed by their financial capital or by other scarce resources such as skilled workforce, managerial time, or organizational bandwidth. Otherwise, the discount rate should equal the firm's cost of financial capital and a firm should invest in every positive NPV project. We examine various explanations for why firms use discount rates that exceed their cost of financial capital, i.e., why firms forgo some *apparently* profitable investment opportunities. The traditional view is that financially constrained firms have to ration their available capital and forgo some profitable opportunities. In contrast, we find that financially constrained firms—identified in various ways—use discount rates closer to their cost of financial capital, while firms with ample financial flexibility in the form of low debt ratios and high cash balances use higher discount rates.

Rather, we find that nonfinancial (i.e., operational) constraints, such as managerial or organizational requirements, prevent firms from undertaking all opportunities as they arise and lead them to be more selective in making investments. Theory suggests that firms facing such constraints tend to hoard cash while waiting for better investment opportunities to emerge (Asvanunt, Broadie, and Sundaresan, 2011). Consistent with this view, we find that firms with (self-identified) operational constraints and significant cash balances use higher discount rates to screen their investment opportunities.

We find that firms also use higher discount rates to account for idiosyncratic risk. Adding this premium might reflect a truly higher cost of financial capital if the firm's investors are not well-diversified, but it could also reflect an undiversified manager's private interest in safer projects. Using a greater safety margin to select projects can protect the manager from poor corporate performance that could endanger his or her reputation and job security (Holmström, 1999). We find no evidence, however, that the high discount rates result from managerial optimism or myopia (i.e., short-termism).

Academic studies of capital budgeting have long recognized the empirical existence of capital rationing as a market phenomenon (Dean, 1951), a phenomenon that persists even today. For decades, the literature debated optimal decision rules under capital rationing, but never explained why firms were rationing capital in the first place (Weingartner, 1977). Over time, this debate moved from optimal decision rules for capital allocation to examining whether financial constraints were binding on firms, but financial constraints is only one of the reasons firms might ration capital. Our analysis confirms that financial constraints are not the predominant cause for capital rationing among public corporations, but rather that operational considerations, such as managerial and organizational constraints, lead firms to systematically evaluate projects using discount rates that exceed their costs of financial capital.

A distinguishing feature of our study is the analysis of survey responses in combination with accounting and archival data. This combination helps to resolve the long-standing puzzle from Chief Financial Officer (CFO) surveys as to why firms appear to require excessive rates of return when screening investment opportunities (Poterba and Summers, 1995; Arnold and Hatzopoulos, 2000). Our analysis takes a different approach than surveys that have asked CFOs directly why they do not take all projects that have a higher expected return than their cost of financial capital (e.g., Graham and Harvey, 2011b). Whereas the stated preference approach employed in those studies is more direct, our study instead examines firms' actual behavior using a revealed preference methodology. The two approaches are complementary and both point to the importance of operational constraints. Using the identities of our survey respondents to combine their survey responses with archival data, we show (i) that firms with strong balance sheets, low leverage, or large cash holdings tend to use higher discount rates[2] and (ii) that WACC and CAPM explain the cross-section of discount rates after we control for limited managerial bandwidth.

The remainder of the article is organized as follows. In Section 2, we describe the survey design, auxiliary data sources, and self-reported discount rates. We model firms' discount rates as a function of their costs of financial capital in Section 3 and evaluate potential explanations of why firms use high discount rates in Section 4. We conclude in Section 5.

2. Survey design and data description

2.1. Survey design

Because discount rates cannot be observed in archival databases, we surveyed firms directly. To relate firms' discount rates to their cost of financial capital, we then combined their survey answers with data from Compustat, Center for Research in Security Prices (CRSP), and Barra. To our knowledge, aside from Poterba and Summers (1995) and Ben-David, Graham, and Harvey (2013), ours is the only survey on discount rates for capital budgeting that includes the identity of the respondents. This enables us to combine survey responses with information from financial databases to examine the determinants of firms' discount rates.

In designing the questionnaire, we followed standard practices in the fields of psychology and marketing to avoid potential biases (Gillham, 2000; Morgan, 1988). For example, because survey respondents might try to please the conductor of the survey by providing the answers they think the survey's author expects (Singer and Presser, 1989), we tried to avoid using terms, such as "cost of capital" and "CAPM," that could trigger

[2] Although some firms might hoard cash because they have trouble accessing financial markets, the firms that use high discount rates neither describe themselves to be financially constrained in survey responses nor appear to be financially constrained based on typical proxies, including Altman's (1968) *Z*-score, current ratio, leverage, and Kaplan-Zingales index.