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Abstract

A fundamental tenet of traditional theories of investment and monetary policy transmission is that interest rates are a critical determinant of business investment expenditures. Yet, a large body of empirical research offers mixed evidence, at best, for substantial interest-rate effects on investment. We examine the sensitivity of investment plans to interest rates based on surveys of CFOs during the recent economic recovery. We find that most firms claim their investment plans to be quite insensitive to decreases in interest rates, and only somewhat more responsive to interest rate increases. CFOs most frequently cited either ample cash or the low level of interest rates as reasons for lack of sensitivity. In the cross-section, we find that insensitivity to interest rate changes tends to be most pronounced among firms that do not indicate financial constraints as a top concern and firms with no near-term plans to borrow. Perhaps more surprisingly, investment is also less interest-rate sensitive at firms expecting higher year-ahead growth. These findings appear to be consistent with survey data on the "hurdle rates" firms report using to make new investments decisions: the average reported hurdle rate has hovered near15 percent for decades, despite the downward trend in market interest rates. Moreover, firms expecting to grow more tend to have higher hurdle rates, suggesting a possible connection between interest rate insensitivity and high hurdle rates.

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1. Introduction

A fundamental tenet of investment theory and of the traditional view of monetary policy transmission is that, all else the same, a sizable increase in interest rates, say on the order of one to two percentage points should generally have a sizable negative effect on capital expenditures by businesses. The market interest rate is traditionally incorporated as a key building block in measuring firms' user cost of capital, which, together with the projected stream of cash flows, are the central determinants of investment decisions. Yet, a large body of empirical research, predicated on estimating the elasticity of observed capital expenditures with respect to the user cost of capital or market interest rates offers mixed evidence, at best, for a substantial interest-rate effect on investment.[1] Indeed, much of the effort in that line of research has focused on trying to control for the supply-demand identification problem that is presumed to impede estimation of the effect of interest rates on investment.

This study attempts to gauge the interest-rate sensitivity of investment using a very different approach from previous research. In particular, we use data from surveys of corporate executives, which asks directly how their companies' investment plans are likely to be influenced by changes in interest rates, holding other factors constant. In addition, we take a new look at historical survey data on corporate hurdle rates, the rate of return firms reportedly require to embark on new investments. Although subject to some of the usual concerns about biases in survey-based approaches, our study avoids the conventional identification bias widely thought to plague conventional investment regressions. The main data source is the quarterly Duke University/CFO Magazine Global Business Outlook survey of financial executives, a web-based survey completed by around 600 to 900 U.S. companies each quarter. Our analysis mainly focuses on the responses from CFOs of U.S. firms in nonfinancial industries who provided answers to two special questions that were included in the September 2012 survey.

The key survey questions asked the respondents to assume that "demand and cost conditions faced by your firm and industry remain the same" and then answer the following:

[1] See Caballero (1999) for an overview of the literature.

"By how much would your borrowing costs have to decrease to cause you to initiate, accelerate, or increase investment projects in the next year?" After responding, the executives were asked the opposite question: "by how much would your borrowing costs have to increase to cause you to delay or stop investment projects." They were given six response choices (in addition to the option to answering "not applicable"). These choices were: 0.5 percentage point, 1 percentage point, 2 percentage points, 3 percentage points, more than 3 percentage points, or "likely would not change investment plans in response to an interest rate increase." If the latter response is chosen, the respondent was prompted with an open-ended question: "Why not?"

To provide further context for interpreting those responses and to analyze factors that influence the firm's reported interest-rate sensitivity, we construct indicators of the firm's financial condition and its outlook based on the regular quarterly survey questions that ask about the firm's expectations for growth and about issues of greatest management concern. Another important piece of information came from a special question that asks: "Do you plan to borrow to fund at least part of your investment in the next year?" The survey also provides information on some basic firm characteristics such as broad industry and firm size.

In response to the key survey question, we find that the vast majority of CFOs indicated that their investment plans are quite insensitive to potential changes in their borrowing costs. Only 8% of firms would increase investment if borrowing costs declined 100 basis points, and an additional 8% would respond to a decrease of 100 to 200 basis points. Strikingly, 68% did not expect *any* decline in interest rates would induce more investment. In addition, we find that firms expect to be somewhat more sensitive to an *increase* in interest rates. Still, only 16% of firms indicated they would reduce investment in response to a 100 basis point increase, and another 15% would respond to an increase of 100 to 200 basis points.

As noted above, firms that expected their investment plans to be unresponsive to any conceivable decrease (or increase) in borrowing cost were given the space to provide a reason, and most offered one. The most commonly cited reason for insensitivity was (i) the firm's ample cash reserves or cash flow. Two other common reasons were that (ii) interest rates are

already low (absolutely, or compared to firm's rate of return); and (iii) the firm's investment was based largely on product demand or long-term plans rather than on current interest rates. Only about 10% of firms providing a reason for insensitivity to a decrease cited a lack of profitable opportunities. Perhaps even more surprising, only a handful offered high uncertainty or lack of access to credit as a reason.

In probit and Tobit regressions, a few factors help to explain the cross-sectional variation in reported investment insensitivity to interest rates. One of the most influential factors, particularly with regard to increases in interest rates, is whether a firm has plans to borrow to finance some of their investment plans in the year ahead. Firms with no plans to borrow were much less likely to indicate they would cut back investment in response to any interest rate increase; or, they required a larger increase to induce a cutback. This suggests that firms not expecting to be looking to borrow new funds were much less prone to consider the interest rate as a relevant opportunity cost for their investment decisions.

Another factor that influenced investment sensitivity to interest rates was whether the firm indicated working capital management to be among its top three concerns (about 25% of firms), which we interpret as indicating the presence of financial constraints. Firms that did not have such concerns were, on average, substantially less sensitive to interest rate changes in either direction. Also keying off of a regular survey question asking about firm's top concerns, we tested for uncertainty effects, related to the option value of waiting, and found only mixed evidence supporting the hypothesis that high uncertainty reduced the firm's sensitivity to interest rate changes.

Perhaps the most intriguing factor we uncover that appears to influence interest-rate sensitivity is a firm's growth expectations over the coming year. In particular, firms with higher revenue or earnings growth expectations were found to be substantially less sensitive to changes in interest rates. Based in part on ancillary findings, we interpret this result as suggesting that firms with stronger growth prospects focus on investment projects promising returns well above their cost of capital. On the other hand, investment sensitivity to interest

rates did not appear to be directly related to firm characteristics such as firm size, whether the firm is publicly or privately owned, or its industry classification.

Twelve months after survey respondents were questioned on their likely responses to prospective changes in interest rates, actual longer-term interest rates had risen about 100 basis points higher. The September 2013 Global Business Outlook thus asked CFOs how their firms reacted to these developments, and how they would likely react to further increases. The responses broadly confirmed the limited sensitivity indicated in our analysis of the predicted reactions in the original survey. Finally, we provide some additional corroborating evidence from surveys of corporate hurdle rates.

The rest of this paper is organized as follows. Section 2 reviews previous research on the interest-elasticity of investment and examines some stylized facts on previous surveys of corporate hurdle rates for deciding on what new investments to embark upon. Section 3 examines responses to the key special questions on the interest rate sensitivity of investment plans in the Global Business Outlook survey. Section 4 describes sample selection and firm characteristics of respondents. Section 5 presents our empirical methodology and main results. Section 6 discusses corroborating evidence from follow-up surveys as well as surveys of corporate hurdle rates and section 7 concludes.

2. Previous Research and Stylized Facts

Much of the research on this topic has been focused on measuring the elasticity of investment expenditures with respect to the all-in user cost of capital, from which an implied interest-rate elasticity can be backed out. In the earlier studies, the short- to medium-term effects of changes in the user cost of capital on investment estimated from aggregate time-series data were generally surprisingly small (Chirinko, 1993). More recent time series studies that focus on estimating the long-run elasticity of investment to the all-in user cost tend to find larger user-cost effects that are a little more in line with standard theory (Caballero, 1994; Schaller, 2006).

Regardless of horizon, interest rate elasticities from most empirical studies are predicated on the restrictions imposed by the user cost formula. Indeed, the few attempts to separately estimate elasticities for each component of user cost generally find no negative effect associated with the interest rate component, but relatively sizable effects from the other user cost components (Tevlin and Whelan, 2003; Schaller, 2013). Schaller (2013) argues that this result may owe to financial market imperfections that induce a shadow cost of funds that may behave very differently from interest rates. More typically, researchers have attributed the lack of empirical support for a sizable negative interest rate effect to the identification problem induced by unobservable shifts in investment demand.

Studies using microeconomic data on investment, particularly when combined with natural experiments, generally find larger user-cost effects than aggregate studies. Here again though, empirical tests mostly focus on estimating implied interest-rate effects under the constraints assumed within the user cost formula; so results could be driven by the non-interest rate components. Indeed, Cummins, Hassett, and Hubbard (1994), one of the most commonly cited microeconomic studies, find that all-in user cost elasticity estimates are largely unaffected if the firm-level measures of required return employed in the user-cost formula are replaced with a fixed 4% real required rate of return.

In contrast to real interest rates, credit spreads—the differential between yields on corporate bonds and Treasury bonds—tend to exhibit strong predictive power for business investment, as well as economic activity more broadly. Philippon (2009) estimates a structural model in which capital's q-value (capital value relative to its replacement cost) is gauged using corporate bond prices, which can be split into a real interest rate component plus a credit spread; his measure of q-value has a strong empirical relationship to actual investment. In that framework, however, the substantial effects of credit spreads might not reflect cost-of-capital effects, but rather the bond market's ability to signal future economic fundamentals such as profits and default probabilities.

Gilchrist and Zakrajsek (2012) attempt to identify credit *supply* effects by decomposing bond spreads into a component that controls for changes in expected defaults and a residual

called the "excess bond premium." Shifts in the latter component are thus meant to reflect changes in investor risk aversion, financial sector lending capacity, and liquidity premiums. The predictive power of this excess bond premium thus could reflect credit rationing as well as cost-of-capital effects; moreover, to the extent that the default proxy is imperfect and investor risk aversion moves with the business cycle, the excess spread may not entirely purge the effects of future profit expectations.[2] Finally, in both this study and Philippon (2009), the marginal effect of real (riskless) interest rates tends to be much less robust or reliably negative compared with credit spread effect.

Leaving aside the empirical estimates of the interest-rate elasticity, there are other reasons to believe that discount rates firms use for investment decisions are not as closely linked to prevailing interest rates as the baseline theories would imply. As argued by Zenner et al. (2014), for instance, there are two margins for slippage between interest rates and the discount rates (conventionally called "hurdle rates") that companies use to decide whether to undertake a project. First, weighted-average cost of capital (WACC), is the prevailing analytical concept firms begin with to determine a project's required return; but the weight applied to the cost of debt for most firms tends to be dwarfed by the weight applied to the cost of equity, or market equity value. And it is now widely understood that the "equity premium" is quite variable, meaning that the cost of equity is not closely tied to current market interest rates. The second source of delinking owes to companies ultimately choosing a risk-adjusted hurdle rate to make capital allocation decisions: "While most practitioners agree that the hurdle rate should be greater than or equal to their cost of capital [WAAC], there is little agreement about the size of the [appropriate] difference between the two." What is more, the authors claim, "many companies rarely, if ever," revise those hurdle rates.

Indeed, using data from a 2003 survey designed to examine the determinants of corporate investment decisions, Meier and Tarhan (2007) document that 52% of the respondents reported not having changed their hurdle rate even once over the 3 years preceding the survey, while a

[2] In a wide-ranging empirical investigation of the predictors of aggregate corporate investment, Kothari, Lewellen and Warner (2015) finds that the (negative) predictive effect of the risk spread diminishes substantially once one controls for current profitability.

quarter of them reported having changed it only once. Using the same data, Jagannathan, Matsa, Meier, and Tarhan (2014), analyze the relationship between self-reported hurdle rates and the cost of capital (mostly WACC), which they estimate using the firm's public (Computat) data. They find that the average firm reports a hurdle rate of about 15 percent, nearly twice the estimated cost of capital, and then go on to explore a variety of hypotheses to explain cross-sectional variation in the gap between company hurdle rates and their cost of capital.

Over the past 30 years, a few other surveys focusing on firms' capital budgeting practices have included questions asking respondents for their current investment hurdle rates—the expected rates of return they require for dedicating capital to new projects. Three of those survey snapshots come from the Duke CFO Business Outlook Survey, which has included special questions asking for firms' hurdle rates, the most recent instance being the second quarter of 2012 survey, one quarter before the survey focused on in this paper.

Based on all 328 completed responses from that survey, we find that the average respondent reported a hurdle rate of 14.1%, while the median value was 13.4%. On the face of it, this seems quite high relative to the average BBB-rated corporate bond yield at that time, which was close to 4%. To compare Global Business Outlook survey results with previous hurdle rate surveys, we calculate and plot the results for the subsample of 150 respondents that are nonfinancial corporations with sales in excess of $100 million. In this subsample, both the mean and median hurdle rates are even a bit higher, at 15%.

What is perhaps more relevant to the focus of our paper than the level of hurdle rate in 2012 is how little hurdle rates appear to have changed over time. Figure 1 plots average corporate hurdle rates drawn from five different surveys conducted between 1985 and 2011, alongside a plot of the BBB 10-year corporate bond yield and the 10-year Treasury yield over this period. The two most recent snapshots prior to 2012 also came from the Global Business Outlook survey, which in the first quarter of 2011 included a question asking firms for their current hurdle rates and how much they had changed from their hurdle rates in 2007. The other three snapshots each came from one-off surveys conducted to provide the inputs to academic studies.

[Insert Figure 1 about here]

Together, these data points suggest that the average discount rate used by U.S. businesses has been quite stable for at least ten years, with little evidence of a downward shift, despite the sizable decline in interest rates over this period. The only hint of an influence from interest rates is from the two earliest surveys, where the mean hurdle rate was about 2 percentage points higher, though this pales in comparison to the 8 percentage point drop in interest rates between mid-1985 and 2012. What is more, the median and modal responses are pretty much unchanged, at 15%, over the entire period. The fact that the mode has been about 15% throughout the entire period suggests that hurdle rates are determined using rough rules of thumb, rather than fine-tuned calculations, an interpretation that would seem consistent with the low interest rate elasticities often found in previous research on investment.

3. Survey Questions and Basic Findings

3.1 The CFO Survey

The Duke University/CFO Magazine Global Business Outlook (or Duke/CFO) survey, conducted quarterly by Duke University and the CFO magazine since 1996, polls financial executives of firms with sales ranging from less than $25 million to more than $10 billion, from a wide spectrum of industries.[3] Each quarter, e-mail invitations to complete the web-based survey are sent to thousands of firms. In recent years, around 800 to 900 companies have completed the survey each quarter.

The measure of CFO sentiment constructed from the survey and published by Duke CFO Magazine tracks fairly closely the sentiment gauge that is constructed from the Global Business Outlook Survey conducted by the Federal Reserve Bank of Philadelphia. Special questions from the Duke/CFO survey have been used to study a wide range of topics in corporate finance, including capital structure (Graham and Harvey, 2001), payout policies (Brav et al., 2005),

[3] General information about the survey can be found at http://www.cfosurvey.org. The survey instrument from the 2012 second quarter is viewable at http://www.cfosurvey.org/12q4/Q3-All-HTML/Q3_12_2.htm.

liquidity management in periods of stress (Campello et al., 2011), and the effects of financial crises on nonfinancial firms (Campello, Graham, and Harvey, 2010).

3.1 Special questions on the sensitivity of investment to interest rate changes

The CFO survey conducted in September 2012 included, for the first time, questions asking respondents how sensitive their investment plans are likely to be in response to potential increases or decreases in the interest rates they faced. Our analysis focuses on the survey responses from about 550 private sector CFOs at U.S. nonfinancial firms, thereby excluding responses from non-for-profit and government entities as well as financial firms. To gauge the sensitivity of investment plans to changes in interest rates, all survey respondents were asked the following question:

> "We'd like to better understand the extent to which borrowing costs affect your investment plans. Assuming demand and cost conditions faced by your firm and industry remain the same, please answer the following: By how much would your borrowing costs have to decrease to cause you to initiate, accelerate, or increase investment projects in the next year?"

Responses were structured in multiple choice format; in addition to the option of choosing "N.A." (not applicable), there were six possible responses: (1) "0.5 percentage points," (2) "1 percentage point," (3) "2 percentage points," (4) "3 percentage points," (5) "More than 3 percentage points," or (6) "Likely would not change investment plans in response to an interest rate increase." If the sixth option was chosen, the respondent was prompted with an open-ended question: "Why not?"

3.2. Univariate results on response to interest rate change

Column (1) of Table 1 shows the distribution of responses regarding a hypothetical decrease in interest rates. A large majority of respondents reported that their investment plans would be quite insensitive to decreases in interest rates; indeed, among the 541 completed responses to this question, 68% indicated they would *likely not change* their investment plans in response to any conceivable decrease in borrowing costs. At the other end, only 8% of firms

indicated that they would react to a decrease in borrowing costs of 1 percentage point or less, and an additional 8% would respond to a 2 percentage point decrease in borrowing costs. Finally, as noted at the bottom of the table, 139 of the respondents chose "not applicable".[4]

[Insert Table 1 about here]

Following the question on interest rate decreases, survey respondents were asked in the same multiple-choice format about a hypothetical increase in their borrowing costs: "By how much would your borrowing costs have to increase to cause you to delay or stop investment projects?" The responses to this second question, in column (2), indicate somewhat more sensitivity to an interest rate increase, but the size of the increase most would bear before cutting back investment again tended to be quite large. Among the 534 firms that answered this question, 16% said they would react to an increase in borrowing costs of 1 percentage point or less; another 16% would react to a 2 percentage point increase. On the other hand, 31% would only react to an increase of 3 percentage points or more, while 37% indicated they would likely not change their investment plans in response to an increase in borrowing costs.

3.3. Reasons for not changing investment plans

Respondents who indicated their firms would not change investment plans as a result of a decrease (or an increase) in borrowing costs were prompted with the question, "why not?" and most offered a reason. Those responses were unguided (with a blank to fill in), but we found that the majority of them fell into a handful of fairly well-delineated categories, which are shown in Table 2. The most commonly cited type of rationale offered for insensitivity to prospective interest rate changes was an explanation indicating that debt was not a marginal source of finance. Most of the responses falling into this category invoked the firm's ability to finance all desired investments internally, owing either to ample cash reserves or sufficient cash flow from ongoing operations. Also included in this category are several cases where the respondent indicated that their firm does not use debt or that they had already locked in financing. Together, these responses accounted for about a third of the firms that would not

[4] Only 10 respondents provided no response to the question whatsoever.

respond to a decrease in borrowing costs and half the firms that would not respond to a decrease.

[Insert Table 2 about here]

The two other commonly provided reasons were: (i) interest rates are already low, either in an absolute sense or compared to firm's rate of return; or (ii) the firm's investment is based largely on product demand or a long-term plan, rather than on current interest rates. The fourth and final common type of reason, invoked by about 10% of responding firms, was a lack of profitable opportunities.

Also notable is that only 3% of respondents cited high uncertainty as the reason for not responding to a decrease, while only 2% cited lack of access to credit. Of course, lack of access could be an underrepresented reason if firms lacking access to credit were prone to choose N.A. in response to the interest rate sensitivity questions. But, as will be shown later, firms responding N.A. were prone to be among the smallest firms and were much less likely to even provide a forecast of capital expenditure plans. Still, even if half of the N.A. respondents would have cited lack of credit access, this reason would have been cited by less than 15% of interest rate-insensitive firms. Overall, the findings summarized in Table 2, suggest that, for many firms in September 2012, prospective interest rates were not an important determinant of investment plans either because debt was not viewed as a marginal source of funding or because interest rates were so low.

4. Survey-based characteristics of respondent firms

4.1 Constructing explanatory variables

In order to delve further into the factors influencing interest-rate sensitivity, we extract three different types of information on respondent firm characteristics from the regular quarterly survey questions. First, and most straightforward, the survey reports basic firm characteristics, namely firm *size* (by revenues and number of employees), *ownership* (public

or privately owned), broad *industry* category, and the credit rating of firms that have one.[5] Second, we exploit quantitative questions asking for the respondent's expectations regarding several financial performance metrics for their firm over the coming 12 months, which we interpret as measures of the firm's (medium-term) growth prospects. Third, we extract some potentially interesting characteristics from the responses firms choose to the (regular) multiple-choice survey question that asks for their top three firm-specific concerns.

Regarding measures of growth prospects, we focus on the three most promising metrics: the firm's expected 12-month growth of (i) revenue, (ii) earnings, and (iii) capital expenditures.[6] While expected capital expenditures (capex) are obviously a very relevant measure given our focus, the measure from the survey only gauges capex relative to its previous year level, which could be quite small, even zero. Furthermore, since capital expenditures can be lumpy, one-year growth will tend to be a noisy measure of overall growth prospects. A better measure would be expected growth in their stock of capital assets, which is unfortunately unavailable in the survey.

Consequently, the two measures of growth prospects we focus on are expected revenue growth and expected earnings growth (over next 12 months), which ought to be reasonable measures of growth prospects, at least in the medium term, and closely related to each other. Indeed, using the data from the complete 15-year history of Duke/CFO Magazine survey, Gennaioli, Ma, and Shleifer (2015) find that expected 12-month earnings growth is very highly correlated with both investment plans and realized investment in the year ahead. Among these two measures, however, we favor expected revenue growth because, in the cross-section, earnings has the disadvantage of potentially taking on negative values, making the interpretation of the expected growth rate problematic for some firms. For this reason, we use

[5] The standard quarterly survey begins by asking for the respondents' optimism (on a scale of 0 to 100) regarding the U.S. economy and then their own firm, and whether they have become more or less optimistic since the previous quarter, on each account. This information was not used in our analysis.

[6] We also considered a measure of expected employee growth, which was correlated with the others, missing more frequently than revenue and more complicated to construct, owing to separate questions about domestic and foreign employment.

expected revenue growth as our baseline measure of growth opportunities, and report results with earnings growth in our robustness checks.

While there is no simple canonical theoretical prediction of how a firm's growth prospects would affect the interest-rate sensitivity of its investment, perhaps the most intuitive hypothesis would be that firms with more at-the-money growth prospects should be more sensitive to an increase in interest rates. If so, then we might presume that firms expecting little or no growth should be less sensitive. More precisely, what should matter is which firm are considering projects that are near the margin, that is, those that promise "close-to-the-money" returns.

In that light, it is possible that firms with stronger growth prospects are more likely to be focused on projects with returns that are "far into the money", that is, projects not near the margin where moderate changes in interest rates would influence decisions. Indeed, as noted earlier, Jagannathan et al. (2014) find evidence that most firms use hurdle rates for investment decisions that are far above their cost of capital. Moreover, they find that companies with the larger gaps also appear to face binding operational constraints owing to limited human capital or "managerial bandwidth." If such operational constraints were a dominant feature of the business world, then it seems plausible that firms with stronger growth prospects are most prone to face such operational constraints. In that case, investment at higher-growth firms would tend to be less sensitive to changes in market interest rates.

Next, we consider the information from a regular survey question that asks firms to indicate their top three company-specific concerns they face, with 13 standard response options offered, as well as the opportunity write in "other" concerns. The responses a firm chooses to this question might be indicative of characteristics likely to influence firm investment plans. The two most commonly chosen of the response options for top concerns are "ability to maintain margins" and "cost of health care," flagged by about 60% and 40% of sample respondents, respectively. For our analysis, we focus on two somewhat less, but still fairly frequently, flagged responses: one indicates whether *uncertainty* is a dominant concern and one that indicates whether access to *financing constraints* is a major concern.

The choice of company-specific concerns that best indicates the importance of uncertainty as a top concern is "ability to forecast results," flagged by 32% of sample firms. We therefore construct a dummy indicator for uncertainty, equal to 1 for all those observations where the respondent chose "ability to forecast results" as one of top three concerns. Theories of investment that focus on the option value of waiting (e.g., Abel and Eberly, 1996; Dixit and Pindyck, 1994) suggest that, all else the same, firms facing relatively high uncertainty are likely to be relatively insensitive to changes in user-cost parameters, including the interest rate.

The other choice of company-specific concerns potentially germane to our question about interest rates is "working capital management," flagged by 26% of the sample firms as a top concern. If working capital management is a top concern, this suggests that the respondent firm faces more binding financial constraints or is more sensitive to financial market conditions, perhaps because it does not have access to ample internally-generated funds or because it has a weak credit rating. Thus, it seems reasonable to hypothesize that the investment (as well as operational) plans of firms that chose "working capital concerns" would tend to be more sensitive to changes in the cost of borrowing. The only other option among top concerns closely related to financial constraints was "weak balance sheet," chosen by 16% of the firms. One might expect investment by firms choosing this response to be more sensitive to interest rates, but only if they had flexibility to borrow more or refinance.

In addition to the regular survey questions, there is one special question that is quite obviously related to the focus of our analysis. This question asks: "Do you plan to borrow to finance some of your investment plans next year?" We construct a dummy indicator equal to 1 for those firms that indicated plans to borrow and zero for firms that indicated no plans to borrow or indicated that the question about borrowing is not applicable.

On one hand, firms with "no plans to borrow" are probably less likely to have debt in their capital structure. For instance, all equity financed firms might not see a change in interest rates as affecting their opportunity cost of capital if their estimated cost of equity is seen as being

uncorrelated with interest rates.[7] What is more, even for firms that already have debt, but no plans to borrow more, prospective interest rate changes might not be perceived as affecting marginal financing costs, as evidence by the most popular reason provided for insensitivity in Table 2. Of course, in theory, current (and the expected future) interest rates should be viewed as gauging the firm's opportunity cost, regardless of whether the firm needs to borrow more, so firms with debt in their capital structure should adjust their discount rate for investment in response to interest rate changes, even absent plans to raise debt in the near term.

4.2 Sample Characteristics

Sample statistics are tabulated for the subsample of 428 firms that provided (non-N.A.) responses to both interest rate sensitivity questions and that completed all the other survey questions needed to construct our main explanatory variables. The distributions of the responses to the interest rate sensitivity questions in this subsample are very similar to those shown for the full sample of responses in Table 1.

Our primary gauge of firm size is based on a question asking firms to categorize their annual revenue within one of seven buckets: (1) less than $25 million, (2) $25 million to $99 million, (3) $100 million to $499 million, (4) $500 million to $999 million, (5) $1 billion to $4.9 billion, (6) $5 billion to $9.9 billion, (7) more than $10 billion. A similar question asks firms to categorize their employee count, but the response rate is a bit lower than the revenue question. Figure 2 (Panel A) shows the respondent distribution by current revenue). The sample is clearly heavily weighted towards smaller firms, with about half of respondents in the two smallest size categories.

[Insert Figure 2 about here]

Figure 2 also shows the distribution of firms in our sample by expected growth in capital expenditures (Panel B), expected revenue growth (Panel C) and expected earnings growth

[7] In some textbook treatments, the cost of equity would be estimated as the sum of the risk-free interest rate, plus an equity premium. In this case, the cost of equity might move one for one with interest rates, similar to the cost of debt.

(Panel D). The leftmost and rightmost bars of each distribution includes the bottom and top 10 percent of each distribution. The distribution of firms by expected growth in capital expenditures clearly has very long tails, with the 10th and 90th percentiles at -20 percent and 25 percent, respectively. This is consistent with annual capital expenditures being quite lumpy and volatile, which would presumably make this a relatively noisy measure of a firm's growth prospects.

In panel C, the distribution of revenue is, for the most part, substantially more compact and smooth, with 8 of 10 observations having a growth rate ranging between -6 and 20 percent. Still, the 1st and 99th percentiles are -35% and 100%, meaning that a substantial fraction of the variation among the relatively few firms in each tail. Consequently, the measure of *expected revenue growth* used in the regressions is winsorized at the 10th and 90th percentiles. Finally, the distribution of expected earnings growth, in Panel D, is similar to that for revenue growth, though somewhat more skewed to the right. Also, this measure is missing for about 10 percent of the sample (observations with non-missing revenue growth).

Table 3 summarizes dichotomous characteristics of our sample firms. Column (1) shows statistics—the percent of firms having the relevant characteristic—for the entire 428-firm sample used in regression model estimation. The relationship between each of these characteristics and interest rate sensitivity can be examined by comparing the figures in column (1) to those in column 2 (or column 3), which are the analogous statistics calculated on the subset of firms that indicated they would not change their plans in response to any decrease (any increase) in interest rates.

[Insert Table 3 about here]

As shown in first column, 26% of sample firms have working capital concerns, 32% have concerns about uncertainty, and 51% have no plans to borrow. In addition, 78% of respondents are privately held, the remainder being publicly-listed firms. To facilitate univariate comparisons, the table also shows that 58% expect revenue growth of at least 5% over the next year, while 53 percent expect earnings growth of at least 5%. Small firms with revenues less

than $100 million account for 57% of sample. Manufacturing firms account for a third of the sample, with services (18%) and retail (14%) being the second and third most represented industry groups. Finally, as indicated at the bottom of the table, 15% of our sample firms did not provide a response to the inquiry about their expected growth in capital expenditures. Some of the regression analysis excludes those observations as an attempt to impose additional quality requirements on the survey data.

When compared with the full sample, firms that would not change their plans in response to any decrease in interest rates (column (2)), are somewhat less likely (20%) to consider working capital management to be a top concern. Similarly, among the increase-insensitive firms (column 3), 21% list working capital as one their top concerns. Perhaps the most notable difference across the subsamples is with regard to borrowing plans, where there also appears to be an asymmetry. Among the decrease-insensitive group (column 2), 51% have no plans to borrow (the same fraction as in the full sample), compared to 66% of the increase-insensitive firms. Finally, and perhaps surprisingly, firms that are insensitive to an increase (or decrease) are more likely to be anticipating higher (5% or faster) revenue or earnings growth, compared with the full sample.

The last column in Table 3 shows the characteristics of the observations that were omitted from our study because the firm chose to respond "N.A." (Not Applicable) to the question on interest rate increases. It is not entirely clear how one should interpret the choosing of N.A. It is tempting to infer that choosing N.A. is tantamount to responding that a change in borrowing cost is not relevant and thus would not affect the firm or its investment decisions. Of course, assuming such an interpretation is somewhat speculative, so we have excluded such observations from our main analysis. Still, it is instructive to compare the characteristics of the firms responding N.A. to our primary sample firms. Although the non-respondents are similar in many dimensions to the sample of respondents, the firms that responded N.A. were much less likely to report plans to borrow, and they were a lot more likely to leave blank their response for expected 12-month growth in capital spending. Finally, they were somewhat less

likely to report robust revenue growth, and tended to be smaller in size when compared with our regression sample.

5. Regression Analysis

5.1. Estimation Methodology

As the responses to the special questions reported in Table 1 clearly indicate, a significant portion of firms reported that they would not adjust their investment plans in response to any of the hypothetical changes in interest rates. This raises the methodological question of whether these respondents should be treated as an entirely different category from those that indicated a threshold interest rate change that would induce them to adjust capital expenditures. This interpretation would call for a qualitative response regression model, such as a probit. Alternatively, we could treat firms that would not change their investment plans as very insensitive, but still falling somewhere along the interest-rate sensitivity continuum. In this case, we could assume they would respond but only to a large change in rates that was inconceivable in the context of the survey question, and a magnitude that is also unobservable to the econometrician. This second interpretation would call for a censored response model (i.e., a Tobit). Both approaches are employed.

In the qualitative response approach, we define $No\ Reaction\ to\ Increase$ as a dummy variable that is equal to one if the firm answered that it would not delay or stop investment projects in response to an increase in interest rates. On the other hand, the dummy variable was set to zero if the firm reported that it would delay or stop investment projects in response to an interest rate increase of 0.5 percentage point, 1 percentage point, 2 percentage points, 3 percentage points, or more than 3 percentage points. . We analogously define the dummy variable $No\ Reaction\ to\ Decrease$ based on the special question about the adjustment of investment plans in response to interest rate decreases.

We thus model the probability of a firm reporting that it would not react to a rate increase using a probit regression:

$$Prob(No\ Reaction\ to\ increase_i = 1) = F(\beta' X_i), \text{ and}$$

$$\beta' X_i = \alpha_{ind} + \beta_1 Working\ capital_i + \beta_2 Balance\ Sheet\ + \beta_3 Uncertainty_i + \beta_4 No\ Plans\ to\ borrow_i + \beta_5 Revenue\ Growth_i + \beta_6 Size_i + \beta_7 Private_i, \qquad (1)$$

where i indexes firms, F is the standard normal cumulative distribution, and α_{ind} represents industry dummies (retail, mining, transportation, technology/telecommunications, services, health, and other industries, with manufacturing as the omitted industry). Dummy variables $Working\ capital\ (concerns)$, $Balance\ Sheet\ (concerns)$, and $Uncertainty\ (concerns)$ are equal to one for firms reporting, respectively, that working capital management, weak balance sheet, and uncertainty are one of their top three business concerns, and zero otherwise. $No\ Plans\ to\ Borrow$ is also an indicator variable, constructed from responses to the question: "Do you plan to borrow to fund at least part of your investment plans next year?" $Revenue\ Growth$ is the firm's expected revenue growth over the next 12 months.[8] $Size$ is an index based on annual revenues ranging from 1 (less than $25 million) to 7 (more than $10 billion), $Private$ is a dummy variable for privately held firms. We similarly estimate equation (1) with dependent variable $No\ Reaction\ to\ decrease$, the dummy variable that identifies whether or not firms would not change investment plans in response to an interest rate decrease.

In the second approach to modeling the interest rate sensitivity of investment plans, the dependent variable is the degree of interest rate sensitivity; specifically, it is the (minimum) interest rate change that would induce the respondent firm to alter its investment. The clear advantage of this approach is that we exploit more of the information in the responses by measuring differences in sensitivity along a continuum. The disadvantage is that it requires us to impute a more subtle interpretation to the respondent's choice of "would likely not react".

[8] We winsorize $Revenue\ Growth$ at the 10th and 90th percentiles in all regressions. Results are qualitatively similar using other winsorization thresholds.

In particular, in the second approach to modeling the response to the question about an increase in borrowing costs, we estimate the following tobit specification:

$$Threshold\ rate\ increase_i = \max\{3.1,\ \delta' X_i + u_i\}\,, \qquad (2)$$

where $Threshold\ rate\ increase$ is equal to the numerical response to the special survey question, either 0.5, 1, 2, or 3 percentage points, when one of these responses are chosen. The response is assumed to be censored, or unobserved, when the true threshold is above 3 percentage points. In particular, we assume that the unobserved threshold is above 3.1 percentage points[9] both for firms that chose "More than 3 percentage points" and those that choose "Likely would not change plans" in response to the question about a prospective increase in borrowing costs. The vector of explanatory variables is the same as in equation (1), and u is an independent and identically distributed normal disturbance. Finally, we also estimate a similar equation with $Threshold\ rate\ decrease$ as the censored dependent variable, which is constructed in an analogous fashion from responses to the question about a prospective decrease in borrowing costs.

5.2. Qualitative response results: Interest-rate sensitive versus not sensitive

The results from estimating the probit model in equation (1) for the probability that a firm would not react to an *increase* in rates are summarized in the first four columns of Table 4. The table reports estimated marginal effects for a firm with average characteristics and associated standard errors. In the initial specification, column (1), we include the baseline explanatory variables, using the full sample.

[Insert Table 4 about here]

In column (2) *Expected Revenue Growth* is replaced with *Expected Earnings Growth*. In column (3) we re-estimate the first specification but exclude sample firms for which expected revenue growth is below −5%, as these firms are more likely to have few investment opportunities, and thus their behavior may not be responsive to the same factors. The sample

[9] Our results are robust to right-censoring the dependent variable at 3.5 percentage points instead.

in column (4) is further restricted by excluding those firms that, when asked about their expected growth in capital expenditures over the next 12 months, left it blank, rather than choosing a quantitative response (as instructed for questions that are "not applicable"). Firms that provide a forecast for growth in capital expenditures would seem to be better positioned to respond to a question about how interest rates would affect their investment plans.

Consistent with the univariate statistics reported in Table 3, the coefficient in the first row indicates that firms reporting no plans to borrow are, all else equal, significantly more likely—by 28 percentage points—to leave investment plans intact following an increase in interest rates. This is a very large effect, though perhaps not surprising since it largely echoes the most common reasons firms reported for their insensitivity (Table 2).

Another significant factor for interest rate sensitivity is whether a firm sees working capital management as one of its top three concerns. Our estimates suggest that, holding all else constant, a firm reporting working capital concerns is 14 percentage points less likely to indicate it would not reduce capital expenditures in response to some interest rate increase. Together, these first two findings suggest that, in contrast to the generally low level of sensitivity to interest rate changes by most firms in the survey, firms with less financial slack are more likely to respond to interest rate movements. On the other hand, we do not find investment by firms concerned about a weak balance sheet to be any more sensitive to interest rates, perhaps because their weak balance sheet largely precludes further investment.

Perhaps most intriguing is the significant positive coefficient on *Expected Revenue Growth,* which is meant to be a proxy for expected medium-term growth prospects. This implies that firms expecting higher revenue growth are less likely to respond to interest rate increases. On the face of it, the opposite result might seem more intuitive; that is, firms having no "in the money," growth opportunities would not see a rise in interest rates as much effect on their current investment options. But perhaps the lower sensitivity of higher-growth firms is a reflection of these firms having plenty of investment opportunities that are well above the positive net present value (NPV) threshold. This would be the case if such firms tend to face binding operational constraints, such as limited managerial attention, which prevents them

from considering projects closer to the margin, those with only mildly positive NPVs. Even absent any rise in interest rates, such firms are already passing up positive NPV projects that are not valuable enough value to warrant managerial attention. At such firms, changes in interest rates would tend to have little effect on investment decisions.

As for the remaining variables, we find that our measure of firm uncertainty does not have a significant positive effect on interest rate insensitivity. There also appears to be no affect from firm size, its ownership status (public/private), or having a credit rating on the likelihood of not reacting to interest rates.

In the specification shown in column (2), *Expected Revenue Growth* is replaced with our alternative proxy for growth prospects, *Expected Earnings Growth*. Here we find largely identical results, albeit with a somewhat smaller sample; in particular, the coefficient on earnings growth is positive, indicating that firms with better prospects are less sensitive to interest rates. Again, this would appear to be consistent with the hypothesis that firms with stronger growth prospects are only pursuing investments that promise returns well above the marginal cost of capital, perhaps owing to managerial attention constraints. The coefficient estimates for all the other variables are unaffected.

A possible alternative interpretation of the positive coefficient on expected growth, particularly when measured by earnings growth, is that it might be an indicator of (less binding) internal funding or cash constraints, even though our other variables are meant to control for this. One indirect read on the validity of this alternative could be the data on "reasons" (Table 2) for insensitivity. The most frequently-provided reason for insensitivity to interest rate increases was *ample funding from cash/debt not marginal funding source*. We consider whether this reason is more frequently invoked by firms expecting high earnings growth; however, the data do not support this. For instance, considering the subset of firms (among those providing reasons for insensitivity) that expect earnings growth below 5 percent (or negative), we find that 51 percent of them cite ample funding as the reason for insensitivity. This is even a bit *higher* than the proportion of higher-growth firms (46 percent) that cite ample funding as a reason for insensitivity.

In specification (3), we re-estimate our benchmark specification, but in this case exclude observations where firms are expecting revenue to decline by 5% or more. Such firms are presumably less likely to be contemplating substantial capital expenditures to begin with, and perhaps are the firms for which growth prospects are relatively far "out of the money." Indeed, excluding those firms results in a substantial boost to the estimated effect of expected growth. In this case, the coefficient estimate implies that firms with a 10 percentage point higher expected revenue growth rate are 11 percentage points less likely to respond to an interest rate increase. This result also seems consistent with our conjecture that firms with high growth rates are only contemplating investment projects with prospective returns well above their cost of capital, perhaps owing to managerial attention constraints.

Indeed, all the influential variables appear to have larger effects in specification (3), and the pseudo-R^2 increases as well, suggesting that our model fits better for firms that are more likely to be contemplating expansion. In a similar vein, the model appears to fit even a bit better in column (4), where we omit firms that did not report an expected growth rate for capital expenditures (as if it the question was seen as not applicable). Thus, the model fits better on those observations in which firms appear to be in a better position to contemplate the potential effect of interest rates on investment plans.

Using a parallel set of specifications, we similarly estimate how firm characteristics affect sensitivity to interest rate *decreases*. Results from these probit regressions reported in columns 5-8 of Table 4. Most of the results are quite similar, with one major exception. Interestingly, in contrast with the results in columns 1-4, here we find that whether or not a firm has plans to borrow has a smaller and less robust effect on interest rate sensitivity. In addition, there is some evidence that, all else equal, privately held firms are more likely to be unresponsive to an interest rate decline.

Similar to our finding for rate increases, firms concerned about working capital management are also less likely to be insensitive to interest rate decreases. In addition, firms expecting higher sales growth are again more likely to be insensitive to interest rates. Results using earnings growth are again similar. Finally, we find that the coefficient estimates on

working capital concerns are robust, if not a little stronger, when we exclude firms expecting large revenue declines (column 7) and firms that did not report an expected growth rate for investment (column 8).

5.3. Determinants of the degree of investment sensitivity to interest rates

In this section our estimation procedure treats the firms that indicated they would not alter their investment plans to changes in interest rates as having a high unobservable threshold, beyond 3 percent, below which they are insensitive. Given their unobservable (censored) threshold, and the same for those firms indicating they would respond to some change greater than 3 percent, we estimate a tobit model on the size of the interest rate change that would induce a response, assuming the censoring occurs at an interest rate change of 3.1 percent or larger. As with the probit regressions, we first consider the reaction to interest rate increases.

The results from estimating equation (2) on the minimum rate increase that would cause firms to adjust their investment plans are summarized in Table 5. The first four columns again show results for the interest-rate increase question, while columns 5-8 show results for interest rate decreases. The four specifications for each direction are analogous to the specifications in Table 4.

[Insert Table 5 about here]

Consistent with the results from the probit regressions, the results in first four columns indicate that firms with *No plans to borrow* are less sensitive to an increase in interest rate, that is, they require a larger interest rate increase in induce them to adjust their investment plans. The estimated incremental increase they require before cutting investment ranges from 78 to 96 basis points. In contrast to the probit regressions, in columns 5-7, here we find evidence that having *No plans to borrow* similarly reduces sensitivity to a decrease in interest rates.

We also find that having *Working capital concerns* significantly reduces the interest rate change required to induce an investment response, in either direction, again consistent with the probit results. What is more, in the Tobit specifications, we now find some evidence to suggest that firms which have greater concerns about uncertainty are somewhat less responsive to

interest rate decreases—that is, they require a larger decrease to trigger a change in investment plans, consistent with option theories of investment.

The coefficient estimates on *Expected Growth* are again positive, suggesting that higher growth firms would only change investment plans in response to a larger interest rate change. Unlike in the probit regressions, however, the results here suggest this effect is much more robust for interest rate increases than for decreases. Indeed, only in the specification using expected earnings is expected growth statistically significant.

5.4. Comparing estimates for public versus private firms

One concern that might be raised is whether the high degree of representation of small privately-owned firms in our sample makes our findings less applicable for public firms included in Compustat data, which tend to be the focus of firm-level empirical analysis in the investment literature. That concern is even more salient to the extent that one wish to draw inferences about aggregate investment, which is mostly accounted for by publicly-held firms. For instance, smaller private firms might be less sensitive to interest rates to the extent that they tend to avoid borrowing altogether. Alternatively, if such firms tend to be more reliant on shorter-term floating rate debt, such as bank debt, their investment could be more sensitive to interest rates.

While the power of any tests will be limited by the 94 observation subsample of public firms, it would still be instructive to examine whether there are any qualitative differences in the sensitivities and factors for public as compared to private firms. Indeed, as already seen in Tables 4 and 5, firm size and the private firm indicator almost never show any significant effects. Consistent with this, the univariate statistics on interest-rate sensitivity shown in Table 1 break down quite similarly if when comparing our private and public firms (or, for that matter, comparing larger versus small firms) In what follows, we compare regression results when estimated separately on private and public firm subsamples.

Table 6 shows coefficient estimates for four pairs of regressions (public and private subsamples) based on the benchmark specification (the first column) from each set of four

regressions in Tables 4 and 5. One broad observation is that, in each case, the regression fit as measured by pseudo-R^2 is generally much higher for the public firms than for the private firms, suggesting that our regression specification fits the public-firm sample better. Among the significant factors from the full-sample specification, it appears that *No Plans to borrow* tends to have a somewhat more attenuated effect among public firms. In contrast, perhaps the most striking difference between coefficient estimates across subsamples is for the *Working Capital Concerns* variable; in each case it's effect is more the twice the magnitude for the public firms. What is more, among public firms, *Balance Sheet Concerns* appears to have a similar and in some specifications significant effect on the insensitivity of public firms to interest rates. Even the coefficient on *Expected Revenue Growth* is also about twice the size for the public subsample in the three (of four) specifications where it is significant. All told, it seems fair to conclude that our findings are not an artifact of having a sample dominated by private firms.

[Insert Table 6 about here]

In order to get a better sense of the quantitative effects of financial constraints and growth prospects among public firms, in Table 7 we report the distribution of interest-rate sensitivity for this subset of firms, divided into three subgroups based on key characteristics. In particular, we group all firms that reported either working capital or balance sheet concerns into column (1); among those that did not report either concern, we split them firms into a slower-growth group (less than 5%), in column (2), and a faster-growth group (at least 5%), in column (3).

[Insert Table 7 about here]

Similar to our baseline results that include both private and public firms, we find that CFOs of publicly traded firms on the whole report that their investment plans are fairly insensitive to both interest rate increases (Panel A) and decreases (Panel B). Comparing column (1) with columns (2) and (3) in the top panel indicates that 40% of the firms with working capital concerns exhibit high sensitivity to interest rate increases, while a 28% exhibit no sensitivity. On the other end of the spectrum, among firms with no working capital or balance sheet concerns, almost none of those with higher expected growth, in column (3), exhibit high

interest sensitivity, and 75% report their investment would be insensitive to any conceivable increase in interest rates. Simple independence tests suggest that the differences across the three groups are statistically significant.

The cross-sectional pattern of investment insensitivity among publicly traded firms is similar when considering the responses to interest rate decreases reported in Panel B. Overall, the results in Table 7 suggest that the pattern of insensitivity of investment plans to interest rate changes documented in our baseline results do not appear to be driven by the very high representation of privately held firms in the survey. Indeed, if anything, the results appear to be stronger for publicly-held corporations.

6. Validation from other surveys

6.1 Reported sensitivity to an actual interest rate increase

By August 2013, 12 months after Global Business Outlook surveyed firms on their sensitivity to hypothetical interest rate changes, long-term interest rates had in fact risen substantially; notably, yields on 10-year Treasury bonds and investment-grade bonds were about 100 basis points higher. Fortuitously, the Global Business Outlook survey for the third quarter of 2013 once again included questions about interest-rate sensitivity, including a retrospective question:

> "Over the past quarter, interest rates have increased by 1%. What effect have higher rates had to this point on your capital spending [also hiring, debt financing]?"

Among the 396 usable responses to this question, 9 CFOs indicated their capital spending was "reduced significantly" and 28 indicated it was "reduced somewhat". Thus, in total, 9.3% of respondents claimed they had reduced capital spending in response, closely in line with the 10% of respondents from the 2012 survey who predicted their firm would reduce investment plans in response to a 100 basis point increase. Also consistent with our previous findings, those firms that reported reduced capital spending owing to the interest rate increase were also

prone to report relatively low growth prospects on average. Their median expected 12-month revenue growth was –0.5%, compared to a median of 7.0% among firms that did not report a cut in capital spending due to the interest rate increase.

Following the question about effects of the recent rise in interest rates, the 2013 survey asked forward-looking questions about interest rate increases, the first being:

> "If benchmark long-term interest rates increase 1% [more] by the end of 2013, will this affect your capital spending?"

For the 91% of the sample respondents that had not already indicated reducing capital spending as a result of the recent 1 percentage point increase in interest rates, responses to the forward-looking question in principle should indicate whether a *total* increase in interest rates (by year end) of 2 percentage points would induce a cutback in their capital spending. Among this group, only 15 respondents (about 3.7% of the overall sample) indicated they would likely reduce capital spending as a result. This suggests even less sensitivity to a 2 percentage point increase than the results from the original survey. All told, responses to this later survey thus appear to support inferences from the original survey.

6.2 Has interest rate sensitivity changed?

An important remaining caveat is the question of how special the recent period has been with regard to the interest rate insensitivity of investment. A definitive response to that question will require the passage of several years and the return to a more normal interest rate environment. In the meantime, the 2014:Q1 Duke University/CFO Magazine survey did include a question about interest rate sensitivity similar to that in 2012:Q3. We can thus examine whether interest rate sensitivity increased along with the firming of the U.S. economy in the year and a half since the original survey. The 2014:Q1 survey asked: "Compared to interest rates today, how much would your borrowing costs have to increase to cause your company to reduce capital spending?" Respondents were allowed to choose any integer, or mid-point between integers, ranging from 0 to 10, but were not offered the choice "likely would

not change plans." It seems quite likely that, because this choice was not offered, many who might have chosen "likely would not change plans" instead chose "not applicable".

We summarize the distribution of responses to this question in Table 8. In order to compare the results with the distribution of responses in the 2012:Q3 survey reported in Table 1, response choices 1.5 and 2.5 (percentage points) were grouped with responses 1 and 2, respectively. Overall, the distribution of responses is quite similar to that from the 2012:Q3 survey, confirming that the propensity to report little sensitivity to increases in borrowing costs had yet to significantly change. Moreover, splitting the sample by expected revenue growth, as shown in Table 9, indicates that firms expecting stronger year-ahead revenue growth are substantially less sensitive to interest rates than those expecting little or no growth, consistent with our earlier findings from the 2012:Q3 survey.

[Insert Tables 8 and 9 about here]

6.3 Some evidence on investment hurdle rates

One final bit of insight on the relation between growth expectations and interest rate insensitivity might come from survey data on self-reported investment hurdle rates and their use, collected by the Global Business Outlook Survey in the second quarter of 2012 and the fourth quarter of 2011.[10] If firms with higher revenue growth also tend to have higher hurdle rates, this would be consistent with the idea that the low interest-rate sensitivity and high hurdle rate phenomena were connected.

As a simple test of this idea, we divide the 268 nonfinancial firms that provided a numerical response to the question asking for their hurdle rate in the 2012 survey into quintiles according to their expected 12-month revenue growth. These quintile ranges are: (i) below 1%, (ii) 1% to 5%, (iii) 5% to 8%, (iv) 8% to 15%, and (v) 15% or higher. Moving from

[10] Unfortunately, the 2012:Q3 survey we use in our baseline regressions did not ask respondents to report their hurdle rates for investment.

lowest to highest revenue growth quintile, we calculate the subsample median hurdle rates as: 12%, 12%, 14.5%, 15%, and 18.5%. The median (and mean) hurdle rate for the highest expected growth quintile is significantly higher than that for the lowest expected growth quintile, which is confirmed by regression analysis.[11] These findings are consistent with our conjecture that investment by higher-growth firms may be more insensitive to interest rates because their hurdle rates are far above and perhaps largely divorced from this measure of opportunity cost.[12]

Unfortunately, reported hurdle rates do not necessarily fully characterize corporate investment decisions, since apparently firms do not undertake all projects that meet their hurdle rate. Indeed, the 2011:Q4 CFO survey, respondents were asked whether, during "normal times," their firms pursue all investment projects for which returns are expected to meet their hurdle rate; and if not, "what prevents" them from doing so (that is, check all explanations that apply among the 13 offered). More than half of responding CFOs (156 of 296) indicated they do not pursue all such projects, and many chose multiple reasons. As pointed out by Jagannathan et al. (2014), the most popular reason, chosen by 58% of CFOs, was "shortage of management time and expertise."

This provides the opportunity to delve into one fairly specific hypothesis for the expected-growth effect in the interest-rate insensitivity regressions. In particular, we ask whether CFOS at firms with higher expected growth are more prone to indicate "shortage of management time" as a reason for passing up expected positive NPV projects. First we perform a simple nonparametric test comparing firms that expect at least 5 percent (high) revenue growth with those expecting less than 5 percent (low) growth. Among the 84 high-growth firms that do not pursue all such projects, 66.7% indicated "shortage of management time" as a reason. On the

[11] Similar results obtains when we control for (self-reported) WACC. When hurdle rates are regressed on (windsorized) expected revenue growth and WACC, the coefficient on expected revenue growth is positive (.12) and significant at the 2.3% level. Similar to the interest-rate sensitivity regressions, if firms that expect revenue growth below −5% are excluded, the coefficient is a bit larger and more significant.

[12] It would also be consistent with the influence of financial constraints, but the distribution of reasons provided for insensitivity runs against that explanation.

other hand, among the 72 low-growth firms, only 48.6 percent chose this reason, a disparity that is significant at the 2 percent level. This qualitative relationship is present but less robust when the effect of expected growth is estimated (linearly) in a probit regression for choosing (or not) "shortage of management time" as a reason to forego positive NPV projects; it is statistically significant if we exclude firms with expected growth below -5%, similar to the second specification of the interest-sensitivity regressions.

In sum, the results from these final explorations both seem to at least point toward the same direction for an interpretation of the lower interest-rate sensitivity of firms with higher expected growth rates. These firms show a tendency to report hurdle rates that are far above current interest rates. They also appear to be more prone to pass up some investments that meet their hurdle rates due to constraints posed by constraints on managerial time and attention.

7. Conclusions

This study provides some new perspective on the interest rate sensitivity of investment, a central question in investment theory, corporate finance, as well as the transmission of monetary policy. In contrast to previous work in this area, which has mostly relied on observed (ex-post) investment outcomes at the firm or aggregate levels, our survey-based approach allows us to focus on firms' planned (ex-ante) policies. The policies are inferred from questions asked of CFOs regarding their firms' likely reactions to hypothetical increases and decreases in interest rates. We find that most firms in the third quarter of 2012 did not see themselves as likely to increase investment if interest rates were to decrease further. Firms expected to be somewhat more sensitive to interest rate increases than decreases; but, for the most part, even the interest rate increases required to elicit adjustments to investment plans are quite large.

Our evidence regarding the average firm's investment insensitivity to interest rates seems to be consistent another seemingly puzzling finding from surveys of business management—the hurdle rates corporations reportedly use for investment decisions. Results we collate from

various business surveys conducted sporadically over the past few decades indicate that hurdle rates used by the average corporate respondent have changed little over that period, and remain quite high, despite a marked downward trend in interest rates.

From the cross-section of responses, we find that the investment plans of firms that do not expect to borrow over the coming year, or for firms that do not report that working capital management as one of their top business concerns, tend to be less sensitive to interest rate changes than the average sample firm. More surprisingly, we find that firms expecting stronger future growth in revenue—presumably firms with brighter investment opportunities—also tend to be less sensitive to interest rates. A plausible interpretation of this finding is that firms with stronger growth prospects tend to face marginal investment returns that substantially exceed the cost of borrowing. Indeed, recent cross-sectional data on firm hurdle rates indicate that firms with stronger growth prospects tend to have somewhat higher hurdle rates, on average.

Of course, there are many caveats to our study. Perhaps most importantly, the key survey questions we analyze were asked in 2012, a time of extraordinarily low interest rates and ongoing recovery from the Great Recession. Although we bring to bear some corroborating evidence from similar survey questions asked in 2013 and 2014, the extent to which inferences can be extrapolated to periods when interest rates are not so low remains to be seen. Moreover, while our analysis is less vulnerable to the usual identification problems faced by analysis of ex-post investment behavior, survey responses to hypotheticals should be interpreted with caution. Finally, the survey results do not necessarily rule out a sizable aggregate investment response if the minority of firms that do respond to interest rate changes tend to alter investment by large amounts. Still, our findings on the interest rate sensitivity of investment from the Duke University/Global Business Outlook survey, together with the evidence on the apparent rigidity of surprisingly high investment hurdle rates from several prior surveys over the years, provide support for the view that investment is not nearly as tightly linked to interest rates as traditional theory would suggest.

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Tevlin, Stacey, and Karl Whelan, 2003, Explaining the investment boom of the 1990s, *Journal of Money, Credit, and Banking* 35, 1-22.

Zenner, Marc, Evan Junek, and Ram Chivukula, 2014, Bridging the gap between interest rates and investments, *Journal of Applied Corporate Finance* 26, 75-81.

Figure 1
Hurdle rates from previous surveys

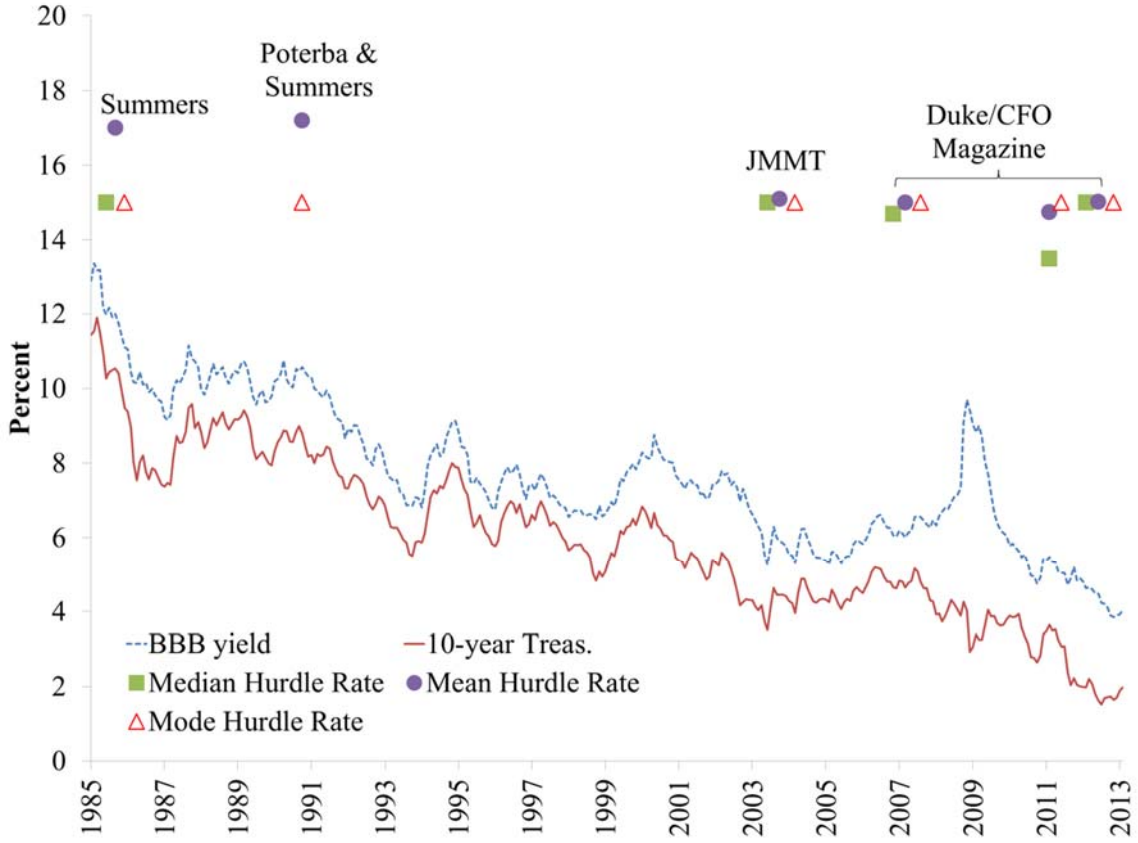
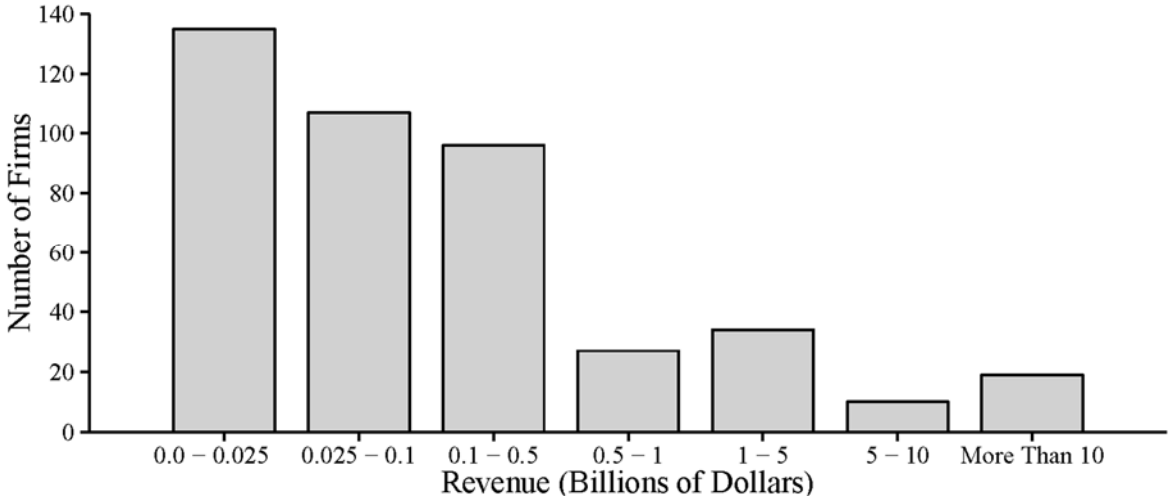
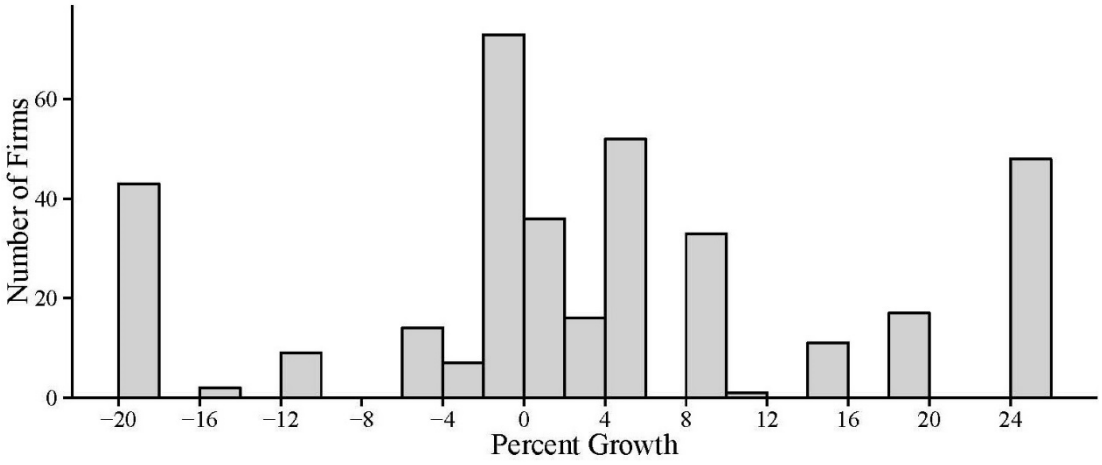


Figure 1. The figure plots hurdle rates from different surveys compared with long-term interested rates. The dotted line is the 10-year BBB bond yield estimated from a yield curve fitted to Merryll Lynch bond data. The solid line is the 10-year Treasury yield from a smoothed yield curve estimated from off-the-run securities. Squares, circles, and triangles represent the median, mean, and mode, respectively, of the hurdle rates in the surveys. The surveys are taken from Summers (1987), Poterba and Summers (1995), Jagannathan, Matsa, Meier, and Tarhan (2014), and the Duke University/CFO Magazine Global Business Outlook survey.

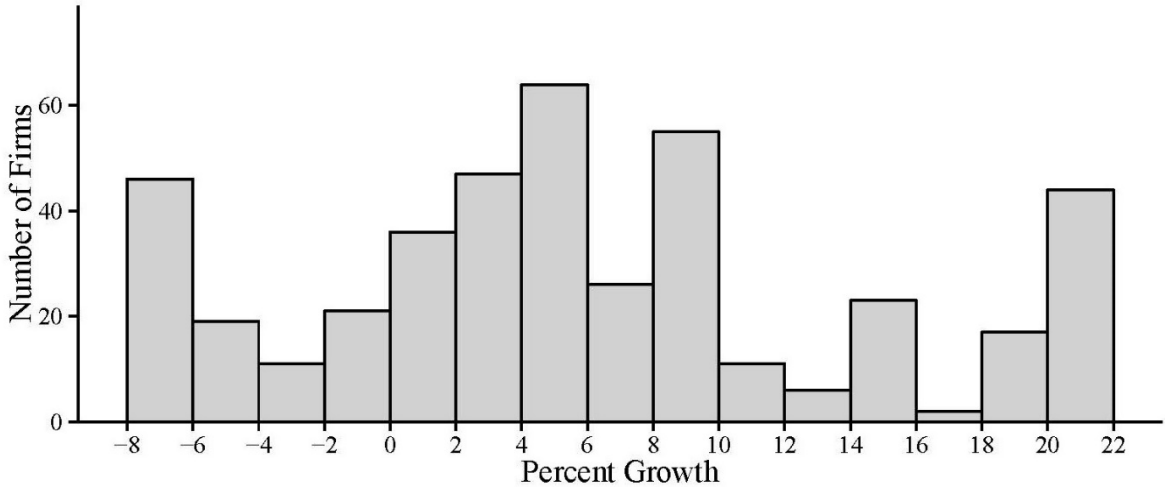
Panel A. Distribution by Revenue



Panel B. Distribution by Expected Growth in Capital Expenditures



Panel C. Distribution by Expected Revenue Growth



Panel D. Distribution by Expected Earnings Growth

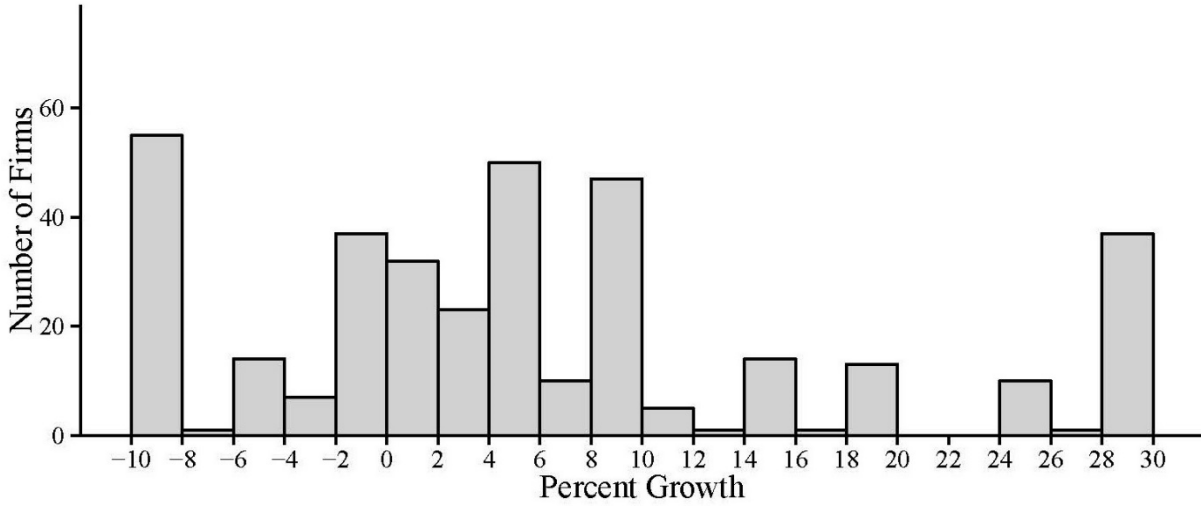


Figure 2. The figure plots the distribution of respondents to the Duke CFO survey in the third quarter of 2012 that compose the sample of firms in Table 2 by revenue (Panel A), expected growth in capital expenditures (Panel B), by expected revenue growth (Panel C), and by expected earnings growth (Panel D).

Table 1. Interest Rate Sensitivity of Investment Plans

This table summarizes responses in the 2012:Q3 Duke/CFO Magazine Global Business Outlook Survey to special questions about the sensitivity of investment plans to changes in interest rates. Column (1) summarizes responses to the question: "By how much would your borrowing costs have to decrease to cause you to initiate, accelerate, or increase investment projects next year?" Column (2) summarizes responses to the question: "By how much would your borrowing costs have to increase to cause you to delay or stop investment projects next year?" Percentages are reported with respect to the total number of firms that answered the question with an answer different from "Not applicable."

	(1)	(2)
Change in borrowing costs that would prompt a change in investment plans	In response to a decrease in interest rates	In response to an increase in interest rates
	Number (pct.)	Number (pct.)
0.5 percentage point	17 (3%)	30 (6%)
1 percentage point	27 (5%)	52 (10%)
2 percentage points	43 (8%)	85 (16%)
3 percentage points	27 (5%)	61 (11%)
More than 3 percentage points	60 (11%)	108 (20%)
Likely would not change plans	367 (68%)	198 (37%)
Total	541 (100%)	534 (100%)
Memo: "Not applicable" answers	139	146

Table 2. Reasons for Insensitivity to Interest Rate Changes

Column (1) reports the reasons offered by respondents to the 2012:Q3 Duke/CFO Survey for choosing the answer "It's likely we would not change investment plans in response to an interest rate decrease" to the question "By how much would your borrowing costs have to decrease to cause you to initiate, accelerate, or increase investment projects next year?" Responses are reported as a percent of the number of firms that reported a reason for their insensitivity to interest rate decreases. Similarly, column (2) reports the reasons offered for choosing no interest rate sensitivity to the corresponding question about interest rates increases.

Category of reason offered	(1) Decrease in interest rates	(2) Increase in interest rates
Financing related		
Ample funding from cash flow or cash stock / Debt is not marginal source of finance	32%	49%
Interest rate already very low / Return on investment much higher than interest rate	27%	11%
Too much debt / Weak balance sheet	4%	1%
Lacking access to credit	2%	2%
Non-financing related		
Investment based on product demand / Based on long-term plan, not current rates	17%	17%
Lack profit opportunities given demand / All desired projects funded	10%	11%
High uncertainty	3%	1%
Firm is not capital intensive / Other	5%	7%
Number of firms offering reasons	286	141
Number of firms not offering reasons	81	57

Table 3. Sample Characteristics

Reports characteristics of firms with complete data for baseline regression specifications. Column 1 summarizes characteristics for full regression sample. Column 2 (3) summarizes the characteristics for subset of firms that would not change their investment plans in response to any interest rate decrease (increase). For reference, column 4 summarizes characteristics of firms excluded from sample because respondent chose "Not applicable" when asked about response to interest rate increase. *No plans to borrow* is a dummy equal to 1 for firms that responded "no" or N/A to question: "Do you plan to borrow to fund at least part of your investment plans next year?" *Working capital concerns (uncertainty concerns*) [*Balance sheet concerns*] is a dummy variable indicating firms that chose "working capital management" ("ability to forecast results") ["balance sheet weakness"] as one of their top three concerns. *Privately held* is a dummy indicator. Manufacturing, services, and retail are industry dummies. Remaining industries include technology/telecommunications, mining, transportation, health, and "other" industries (as reported in the survey). Percentages are computed as a fraction of the total number of firms with data on all characteristics for the same column.

Firm characteristic	(1) Full sample (428 firms)	(2) Not respond to rate decrease (298 firms)	(3) Not respond to rate increase (167 firms)	(4) Memo: Chose "N.A." for question on rate increase (146 firms)
	(Percent of sample/group with characteristic)			
No plans to borrow	51%	51%	66%	87%
Working capital concerns	26%	20%	21%	26%
Balance sheet concerns	16%	13%	16%	11%
Uncertainty concerns	32%	33%	34%	34%
Privately held	78%	80%	80%	82%
Expected revenue growth ≥ 5%	58%	64%	63%	52%
Expected earnings growth ≥ 5%	53%	58%	59%	51%
Revenue < $100 million	57%	56%	58%	78%
Manufacturing	32%	34%	31%	27%
Services	18%	16%	19%	27%
Retail	14%	16%	16%	18%
Industries other than manuf., services, and retail	37%	34%	35%	29%
Expected capex growth=N.A	15%	13%	13%	42%

Table 4. Probability of No Reaction to Interest Rate Change

Reports estimated marginal effects [and standard errors] from probit regressions, where dependent variable is a dummy equal to one for respondents that chose "would not respond" to any interest rate increase (or, in a separate question, to any interest rate decrease). *No plans to borrow* is a dummy equal to 1 for firms that responded "no" or N/A to question: "Do you plan to borrow to fund at least part of your investment plans next year?" *Working capital concerns (uncertainty concerns*) [*Balance sheet concerns*] is a dummy variable indicating firms that chose "working capital management" ("ability to forecast results") ["balance sheet weakness"] as one of their top three concerns. *Expected revenue (earnings) growth* is reported expected growth over next 12 months, windsorized at 10th and 90th percentiles. *Firm size* ranges from 1, revenue less than $25 m., to 7, revenue more than $10 b. *Privately held* is a dummy. All regressions include broad industry dummies (retail, mining, transportation, technology/communications, services, health, and other). Sample in columns (3), (7) is restricted to firms expecting growth greater than −5%. Sample in columns (4), (8) is further restricted to firms that provided a response for expected growth in capital expenditures. *** indicates statistical significance at the 1% level, ** at the 5% level, and * at the 10% level.

Dependent variable	Not respond to increase				Not respond to decrease			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
No plans to borrow	0.286***	0.304***	0.319***	0.335***	0.057	0.088*	0.062	0.053
	[0.049]	[0.052]	[0.053]	[0.057]	[0.048]	[0.051]	[0.051]	[0.054]
Working capital concerns	-0.148***	-0.157***	-0.180***	-0.216***	-0.267***	-0.272***	-0.279***	-0.297***
	[0.054]	[0.058]	[0.058]	[0.061]	[0.058]	[0.062]	[0.061]	[0.067]
Balance sheet concerns	0.062	0.072	-0.006	0.037	-0.085	-0.047	-0.09	-0.022
	[0.071]	[0.078]	[0.083]	[0.093]	[0.067]	[0.071]	[0.078]	[0.080]
Uncertainty concerns	0.036	0.054	0.062	0.094	0.024	0.025	0.025	0.022
	[0.053]	[0.056]	[0.058]	[0.063]	[0.048]	[0.050]	[0.051]	[0.053]
Expected revenue growth	0.007**		0.011***	0.009*	0.009***		0.012***	0.012***
	[0.003]		[0.004]	[0.005]	[0.003]		[0.004]	[0.004]
Expected earnings growth		0.005**				0.007***		
		[0.002]				[0.002]		
Firm size	-0.027	-0.03	-0.015	-0.031	0.001	0.003	0.014	0.004
	[0.018]	[0.019]	[0.019]	[0.021]	[0.016]	[0.017]	[0.017]	[0.018]
Privately held	0.05	0.044	0.073	0.048	0.122*	0.149**	0.130*	0.092
	[0.067]	[0.072]	[0.070]	[0.077]	[0.067]	[0.073]	[0.070]	[0.072]
Observations	428	373	365	314	428	373	365	314
Pseudo R^2	0.0862	0.0944	0.1126	0.129	0.1018	0.098	0.1063	0.1119

Table 5. Regressions of Interest Rate Change Required to Prompt Investment Reaction

Reports coefficients estimates [and standard errors] from tobit regressions with dependent variable equal to the reported interest rate change needed to induce respondent to change investment plans in the next year. The dependent variable is right censored at 3.1 percentage points. All explanatory variables are defined as in Table 4. Sample in columns (3), (7) is restricted to firms expecting growth greater than −5%. Sample in columns (4), (8) is further restricted to firms that gave a response for expected growth in capital expenditures. *** indicates statistical significance at the 1% level, ** at the 5% level, and * at the 10% level.

Dependent variable	Increase needed to prompt response				Decrease needed to prompt response			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
No plans to borrow	0.781***	0.860***	0.915***	0.957***	0.658**	0.860***	0.673*	0.449
	[0.184]	[0.191]	[0.202]	[0.220]	[0.310]	[0.191]	[0.347]	[0.373]
Working capital concerns	-0.714***	-0.799***	-0.780***	-0.866***	-1.268***	-0.799***	-1.490***	-1.596***
	[0.201]	[0.205]	[0.215]	[0.232]	[0.341]	[0.205]	[0.380]	[0.412]
Balance sheet concerns	-0.050	-0.068	-0.031	0.024	0.036	-0.068	0.008	0.518
	[0.236]	[0.247]	[0.278]	[0.305]	[0.392]	[0.247]	[0.468]	[0.547]
Uncertainty concerns	0.004	0.238	0.132	0.180	0.562*	0.238	0.668*	0.692*
	[0.184]	[0.189]	[0.200]	[0.214]	[0.324]	[0.189]	[0.361]	[0.384]
Expected revenue growth	0.041***		0.046***	0.042***	0.020		0.041	0.033
	[0.010]		[0.015]	[0.016]	[0.017]		[0.025]	[0.027]
Expected earnings growth		0.024***				0.024***		
		[0.007]				[0.007]		
Firm size	0.000	-0.026	0.005	-0.007	-0.035	-0.026	-0.050	-0.123
	[0.060]	[0.062]	[0.064]	[0.069]	[0.101]	[0.062]	[0.109]	[0.120]
Privately held	0.331	0.368	0.386	0.430	0.660*	0.368	0.677	0.323
	[0.236]	[0.242]	[0.246]	[0.266]	[0.387]	[0.242]	[0.413]	[0.446]
Constant	2.823***	2.933***	2.572***	2.457***	4.988***	2.933***	5.114***	5.928***
	[0.403]	[0.410]	[0.429]	[0.468]	[0.729]	[0.410]	[0.806]	[0.947]
Observations	428	373	365	314	428	373	365	314
Pseudo R^2	0.0502	0.0614	0.0623	0.0744	0.0563	0.0614	0.0702	0.0749
Censored Observations	255	228	226	194	343	223	294	257

Table 6. Differences in Insensitivity Factors between Public and Private Firms

The first four columns report the estimated marginal effects [and standard errors] from probit regressions, as in columns (1) and (5) in Table 4, where dependent variable is a dummy equal to one for respondents that chose "would not respond" to any interest rate increase (or decrease). Here, separate regression are run on the subsamples of public and private firms separately. The columns to the right report coefficients estimates [and standard errors] from tobit regressions, as in columns (1) and (5) in Table 5, with dependent variable equal to the reported interest rate change needed to induce respondent to change investment plans in the next year, which is right censored at 3.1 percentage points. *** indicates statistical significance at the 1% level, ** at the 5% level, and * at the 10% level.

Dependent variable	No reaction to rate change				Rate change required to induce reaction			
	Increase		Decrease		Increase		Decrease	
	Public	Private	Public	Private	Public	Private	Public	Private
No plans to borrow	0.152	0.286***	-0.039	0.034	0.616	0.676***	0.516	0.430
	[0.105]	[0.053]	[0.117]	[0.050]	[0.389]	[0.199]	[0.656]	[0.327]
Working capital concerns	-0.250**	-0.112*	-0.499***	-0.186***	-1.096**	-0.537**	-2.156***	-0.861**
	[0.108]	[0.060]	[0.121]	[0.060]	[0.449]	[0.219]	[0.744]	[0.362]
Balance sheet concerns	-0.224	0.099	-0.555***	-0.027	-1.095*	0.090	-0.147	0.019
	[0.146]	[0.075]	[0.147]	[0.068]	[0.564]	[0.259]	[0.891]	[0.421]
Uncertainty concerns	-0.080	0.055	0.030	0.004	0.027	-0.051	2.441**	0.069
	[0.107]	[0.060]	[0.117]	[0.054]	[0.404]	[0.208]	[0.932]	[0.347]
Expected revenue growth	0.016**	0.006*	0.012	0.008***	0.046	0.037***	-0.003	0.032*
	[0.008]	[0.003]	[0.008]	[0.003]	[0.028]	[0.011]	[0.043]	[0.018]
Firm size	-0.023	-0.019	-0.000	0.009	-0.091	0.075	-0.057	0.007
	[0.028]	[0.021]	[0.030]	[0.019]	[0.100]	[0.075]	[0.169]	[0.122]
Constant					3.440***	2.916***	4.494***	4.772***
					[0.596]	[0.250]	[1.069]	[0.466]
N	94	334	94	334	94	334	94	334
Pseudo R^2	0.1294	0.0748	0.2330	0.0464	0.0815	0.0349	0.1348	0.0207
Censored Observations					55	200	72	271

Table 7. Interest rate sensitivity of investment plans for publicly traded firms

Panel A reports the distribution of publicly traded firms responding to the 2012:Q3 survey according to their reported sensitivity to interest rate increases and reported capital concerns and expected revenue growth. High sensitivity firms are those that report that they would change their investment plans in response to an increase in interest rates of 0.5 or 1 percentage points. Low sensitivity firms are those that report that they would change their plans in response to an increase of 2 or 3 percentage points. Insensitive firms are those that report that they would change in response to an increase of more than 3 percentage points or would be unlikely to respond to any increase in rates. Firms in the first column reported working capital concerns or balance sheet weakness concerns as one of their top three concerns in the survey. The p-value of the Pearson test of independence for the matric formed by Panel A is 0.1%. Panel B reports the distribution of publicly traded firms responding to the 2012:Q3 survey according to their reported sensitivity to interest rate decreases and reported capital concerns and expected revenue growth. Firms are classified according to their sensitivity to interest rate decrease analogously to the way they are classified in Panel A. The p-value of the Pearson test of independence for the matrix formed by Panel B is less than 0.1%.

Panel A

	Working capital or balance sheet concerns	No working capital or balance sheet concerns	
	(1)	(2)	(3)
Sensitivity to interest rate increases		Expected growth < 5%	Expected growth ≥ 5%
	Number (pct.)	Number (pct.)	Number (pct.)
High	10 (40%)	5 (16%)	1 (3%)
Low	8 (32%)	6 (19%)	9 (24%)
Insensitive	7 (28%)	20 (65%)	28 (74%)
Total	25	31	38

Panel B

	Working capital or balance sheet concerns	No working capital or balance sheet concerns	
	(1)	(2)	(3)
Sensitivity to interest rate decreases		Expected growth < 5%	Expected growth ≥ 5%
	Number (pct.)	Number (pct.)	Number (pct.)
High	6 (24%)	5 (16%)	2 (5%)
Low	7 (28%)	1 (3%)	1 (3%)
Insensitive	12 (48%)	25 (81%)	35 (92%)
Total	25	31	38

Table 8. Sensitivity to Increase in Interest Rates

This table compares responses in the 2012:Q3 survey (column (1)) to responses to a similar question added to the 2014:Q1 survey (column (2)) that asked "Compared to interest rates today, how much would your borrowing costs have to increase to cause your company to reduce capital spending?" One notable variation from Table 1, percentages are reported with respect to the total number of firms that answered the question, including those that chose "N.A." as their response. In the later survey, respondents were allowed to choose any integer, or mid-point between integers, ranging from 0 to 10, but were not offered the choice "likely would not change plans." For comparison purposes, response choices 1.5, 2.5, were grouped with responses 1, 2, respectively.

Minimum interest rate increase required to reduce capital spending	(1) 2012:Q3 survey	(2) 2014:Q1 survey
	Number (pct.)	Number (pct.)
0.5 percentage point	30 (4.4%)	4 (1.4%)
1 percentage point	52 (7.6%)	13 (4.6%)
2 percentage points	85 (12.5%)	43 (15.3%)
3 percentage points	61 (9.0%)	20 (7.1%)
More than 3 percentage points	108 (15.9%)	84 (29.9%)
Likely would not change plans	198 (29.1%)	----
Not applicable	146 (21.5%)	117 (41.6%)
Memo: Total no. of responses	680	281

Table 9. Sensitivity to Increase in Interest Rates, Split by Growth

This table examines responses to the question in the 2014:Q1 survey that asked "Compared to interest rates today, how much would your borrowing costs have to increase to cause your company to reduce capital spending?" Respondents are split into two subsamples according to whether expected 12-month-ahead revenue growth is less than 5% (82 firms) in column (1) or greater than or equal to 5% (147 firms) in column (2), information extracted from a regular survey question.

Minimum interest rate increase required to reduce capital spending	(1) Expected revenue growth < 5%	(2) Expected revenue growth ≥ 5%
	(pct.)	(pct.)
1.5 percentage point or less	9.7	4.7
2 or 2.5 percentage points	23.1	12.2
3 percentage points	9.8	6.8
More than 3 percentage points	25.7	34.7
Not applicable	31.7	41.5