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An Investigation of the Asymmetric link between Credit Re-ratings and Corporate Financial Decisions: "Flicking the Switch" with Financial Flexibility

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ABSTRACT

Using a large sample of non-financial US listed firms over the period from 1985-2009, we analyze the interactive effect of financial flexibility and credit re-ratings on corporate investment and financing decisions. Essentially, we document that financial flexibility (inflexibility) "flicks the switch" in the re-rating upgrades (downgrades) scenario. Specifically, a credit rating upgrade (downgrade) for financially flexible firms is followed by a reduction (no change) in their cost of capital, an increase (no change) in their capital expenditure and an increase (no change) in their net debt versus net equity issuance. In contrast, a rating upgrade (downgrade) for financially inflexible firms is followed by an insignificant change (an increase) in their cost of capital, an insignificant change (decrease) in their capital expenditure and an insignificant change (decrease) in their net debt versus net equity issuance. We offer plausible explanations for these asymmetric relations.

Keywords: financial flexibility, credit re-rating, corporate financial decision making

1. Introduction

We know from prior studies that credit re-ratings can affect the cost of capital, as well as capital budgeting and financing decisions. In this paper, we investigate whether variation in financial flexibility impacts these effects.[1] A major motivation for identifying the dual flexibility/ratings focus of our study comes from survey-based evidence documented in Graham and Harvey (2001). They report that corporate managers consider financial flexibility, or financial "slack", as the most important factor affecting a firm's debt financing policy, followed by the desire to maintain a good credit rating. To the best of our knowledge, no existing research has considered the combined effect of financial flexibility and credit ratings on corporate decision making.

Kisgen (2006) is the first to analyze the effect of credit ratings on capital structure. He finds that firms that are near a credit rating upgrade or downgrade issue less net debt versus net equity (INDNE) than firms that are not near a rating change.[2] This finding implies that issuing less net debt versus net equity increases the chance of being upgraded for firms that are near an upgrade and decreases the chance of being downgraded for firms that are near a downgrade. Extending his first paper, Kisgen (2009) finds that firms reduce their net debt versus net equity issuance after a credit rating downgrade, but they do not increase their issuance of net debt versus net equity after a credit rating upgrade to avoid a reversal of their recent upgrade — suggesting that firms try to maintain minimum credit rating levels.

Although there have been recent advances in our understanding of the influence of credit ratings on the financing decision of firms, the influence of credit ratings on

[1] As explained in the research method section, we operationalize "financial flexibility" as a function of the reserve borrowing capacity of the firm, broadly captured by the signed deviation from its (modelled) target leverage.

[2] Kisgen defines "issuance of net debt versus net equity" as net debt issuance minus net equity issuance, all scaled by total assets at the start of the year. In his work, "net debt issuance" is defined as: long-term debt issuance minus long-term debt reduction plus changes in current debt, and "net equity issuance" is defined as: sale of common and preferred stock minus purchase of common and preferred stock.

investment decisions is less well understood. Notably, Gul et al. (2011) in part explore this question and find that a credit rating upgrade (downgrade) is followed by an increase (decrease) in capital expenditure, in response to the decrease (increase) in the cost of capital following these events.

While Kisgen (2009) focuses on the financing decision and Gul et al. (2011) is concerned with the investment decision, in both cases the role of financial flexibility is ignored. Our key innovation is to combine the critical insights emanating from both studies with regard to the role of credit re-ratings. In particular, we argue that it is important to relate their findings to each other given that firms usually issue new net debt to finance their growth opportunities. That is, realistically, managers adopt an integrated approach to corporate decision-making. Further, we extend the collective thrust of Kisgen (2009) and Gul et al. (2011) by incorporating the potentially important influence of financial flexibility. As such, we provide an integrated treatment of financial flexibility and credit re-ratings on three fronts: (1) the investment decision; (2) the financing decision; and (3) the cost of capital (with the last conceptually linking the investment and financing decisions).

Our initial analysis shows that a credit rating upgrade (downgrade) is followed by a decrease (increase) in the cost of capital and an increase (decrease) in capital expenditure, confirming the results found by Gul et al. (2011). Moreover, we find that, on average, firms do not increase their net debt versus net equity issuance after an upgrade, but reduce their net debt versus net equity issuance after a credit rating downgrade — confirming the findings of Kisgen (2009). For ease of reference, Panel A of Figure 1 summarizes the state of play in the current literature regarding Kisgen (2009) and Gul et al. (2011).

Notably, when we introduce financial flexibility, we find that the response of firms to a credit re-rating is *asymmetric*. A summary of these findings is shown in Panel B of Figure 1. When benchmarked relative to financially flexible firms with stable credit ratings,

a credit rating upgrade for financially *flexible* firms is followed by a decrease in their cost of capital and an increase in both capital expenditure and net debt versus net equity issuance. However, a rating downgrade for financially *flexible* firms does not induce significant changes in their cost of capital, capital expenditure or net debt versus net equity issuance.

In contrast, when benchmarked against financially *inflexible* firms with stable credit ratings, a rating upgrade for financially *inflexible* firms is not followed by a significant change in their cost of capital, capital expenditure or net debt versus net equity issuance. A rating downgrade for these firms is followed by a significant increase in their cost of capital and a reduction in both capital expenditure and net debt versus net equity issuance.

Thus, a careful comparison of Panels A and B of Figure 1 exposes a key new insight: the presence/absence of financial flexibility is an asymmetric driver of the collective findings documented in Kisgen (2009) and Gul et al. (2011). More specifically, our analysis shows that financial flexibility interacts with re-ratings asymmetrically: flexibility (inflexibility) "flicks the switch" exclusively for how re-rating upgrades (downgrades) impact the cost of capital and financial decisions. When inflexibility combines with upgrades (or when flexibility combines with downgrades), the cost of capital and financial decisions are unaffected.[3]

When decomposed into the underlying components of the cost of capital and financing, we find that the *asymmetry* between the two types of firms manifests even further. Panels C and D of Figure 1 summarize these findings relating to the cost of capital and financing components for financially flexible and financially inflexible firms, respectively.

[3] We also document that our overall results hold for firms that have investment grade ratings. Further, when we distinguish re-ratings to the investment-speculative grade boundary versus all other re-ratings, we find that all our main findings hold for firms re-rated to the boundary (BBB- or BB+) and non-boundary ratings, except that financially flexible firms upgraded to a non-boundary rating do not show a significant change in their net debt versus net equity issuance after an upgrade.

Regarding the cost of debt, while both flexible and inflexible firms experience a reduction (an increase) in their cost of debt after upgrades (downgrades), the response of their cost of equity to a credit re-rating is asymmetric. Specifically, financially flexible firms experience a reduction in their cost of equity after upgrades, while inflexible firms do not. With regard to downgrades, financially flexible firms experience no significant change in their cost of equity, while inflexible firms suffer an increase in their equity cost.

As to how firms respond to changes in their cost of capital components following upgrades, we find that financially flexible firms increase their net debt issuance while inflexible firms do not. Following downgrades, financially flexible firms make no significant changes to their net debt issuance, while inflexible firms choose to retire debt. Finally, irrespective of the direction of any credit rating change, neither flexible nor inflexible firms make significant changes to their net equity issuance.

To the best of our knowledge, we are the first to analyze the joint effect of financial flexibility and credit re-ratings on firms' cost of capital, investment and financing decisions. Moreover, our finding of a distinct asymmetry across firms in response to credit re-ratings, driven by their financial flexibility/inflexibility status, is a new contribution to the literature. In addition, our results confirm the importance of financial flexibility (Graham and Harvey, 2001). The remainder of our paper is structured as follows. In Section 2, we develop our empirical predictions. In Section 3, we describe the empirical framework. In Section 4, we present the empirical analysis and Section 5 concludes.

2. Empirical Predictions

Graham and Harvey (2001) report that corporate managers consider financial flexibility and the maintenance of a good credit rating as the two most important determinants of their debt financing policy.[4] Although the literature lacks a universally accepted definition of financial flexibility, the reserve borrowing capacity that enables a firm to raise new debt when needed to finance growth opportunities is commonly cited (see, for example, Graham, 2000). A credit rating is a summary measure or index designed to capture a firm's credit risk, that is, a categorical score that ranks a firm's ability to honor its financial obligations to creditors in the short and long run.

The desire to maintain a good credit rating by firms should not be underestimated. Kisgen (2006) reports several pieces of anecdotal evidence of firms striving to avoid being downgraded for various reasons. Firms might try to maintain a good credit rating because regulations prohibit some institutional investors such as banks, insurance companies and pension funds from investing in bonds below investment grade. Moreover, a change in a firm's credit rating also signals its quality and future prospects to investors, which can subsequently affect its cost of capital. Furthermore, a credit re-rating may trigger a re-negotiation between the firm and its fund suppliers that might affect the subsequent interest rates charged by creditors, the coupon rates on bonds, the compulsory repurchase of bonds or retirement of debt to creditors and the ability of the firm to access capital or commercial paper markets. Alternatively, it might result in a loss of major contracts with customers. The occurrence of any of these events, depending on whether they are induced by a rating upgrade or downgrade, will see the underlying firm enjoy benefits or bear costs — ultimately affecting its cost of capital and investment and financing policies.

[4] Notably, according to their survey results, these two factors are even more highly ranked than the tax deductibility advantage of interest on debt.

Extending Kisgen (2006), Kisgen (2009) finds that firms issue less net debt versus net equity after a credit rating downgrade, but do not increase their net debt versus net equity issuance after an upgrade to avoid a reversal of their recent upgrade. This suggests that firms try to maintain minimum credit rating levels. However, Kisgen does not differentiate between financially flexible and inflexible firms, nor does he analyze the effect of credit re-ratings on corporate cost of capital or capital expenditure. Gul et al. (2011) find that a credit rating upgrade (downgrade) is followed by an increase (decrease) in capital expenditure in response to the decrease (increase) in the cost of capital following these events, but again they do not differentiate between financially flexible and inflexible firms nor do they incorporate the financing decision into their analysis.

Conceptually, a firm decides to undertake a marginal project based on whether the investment in the underlying project will increase its value or not, that is, whether the project has NPV > 0. Obviously, if a credit re-rating conveys information about the future prospects of the firm, fund suppliers such as creditors and stockholders will incorporate this information into the return required on their debt and equity funds, thereby affecting the firm's opportunity cost of capital. Other things being constant, a changed cost of capital will produce a different NPV and, thus, affect the firm's decision to undertake marginal projects. Subsequently, a project that might otherwise be considered economically unviable (viable) might be transformed into a NPV > 0 (NPV < 0) case if the cost of capital decreases (increases) after a credit rating upgrade (downgrade). The foregoing discussion leads to our first empirical prediction:

Prediction 1 (baseline prediction)
A credit rating upgrade (downgrade) is followed by a decrease (increase) in the firms' cost of capital and an increase (decrease) in their capital expenditure.

However, if corporate management maximizes the wealth of shareholders, management will not increase the firm's capital expenditure, unless most of the benefits from undertaking these new projects flow to the shareholders. Here in lies the importance of financial flexibility. Firms with greater financial flexibility are better qualified to take advantage of a credit rating upgrade and are less likely to be affected by a downgrade compared to firms with low financial flexibility. Financially flexible firms are those that have relatively low leverage (for example, relative to the industry norm, stage of their life cycle, and so on). Having greater financial flexibility means that these firms are less risky and less likely to suffer from the debt overhang problem or to be restricted by tight debt covenants. Indeed, a credit rating upgrade will very likely reduce their cost of capital, leading to more viable projects at the margin, and subsequently these firms are expected to increase their capital expenditure and issuance of net debt versus net equity as most of the benefits will be reaped by the shareholders rather than the creditors. Moreover, since these financially flexible firms are relatively under-levered, by definition, and less risky, it is less likely that their cost of capital will be significantly affected by a downgrade. Therefore, these firms have less motivation to reduce their capital expenditure and/or retire some of their debt after receiving a downgrade.

In contrast, relatively highly levered firms are considered financially inflexible because they are more risky and are very likely to be restricted by tight debt covenants and/or to suffer from the debt overhang problem. Therefore, a rating upgrade is less likely to affect their cost of capital, and if it does, these firms are still unlikely to increase their capital expenditure as most of the benefits from undertaking new projects will be reaped by the creditors rather than the shareholders. Moreover, since financially inflexible firms are already relatively highly levered and more risky, a credit rating downgrade could significantly increase their cost of capital, rendering some of their marginal projects

economically unviable. Indeed, a credit rating downgrade could trigger an intervention from creditors if debt covenants require the firm to retire some debt if its credit rating falls to a certain level. As such, these firms are more likely to reduce their capital expenditure and retire some of their debt after receiving a downgrade in an attempt to resume their former credit rating.

Distilling all of the foregoing discussion and arguments regarding the interplay of re-ratings with the financial flexibility status of firms, we offer the following set of asymmetric empirical predictions under three headings (a) cost of funding; (b) investment; and (c) financing:

Cost of Funding Predictions
P2a. For financially flexible (inflexible) firms, a credit rating upgrade is followed by a decrease (negligible change) in their cost of capital.

P2b. For financially flexible (inflexible) firms, a credit rating downgrade is followed by a negligible change (an increase) in their cost of capital.

Investment Predictions
P3a. For financially flexible (inflexible) firms, a credit rating upgrade is followed by an increase (negligible change) in their capital expenditure.

P3b. For financially flexible (inflexible) firms, a credit rating downgrade is followed by a negligible change (decrease) in their capital expenditure.

Financing Predictions
P4a. For financially flexible (inflexible) firms, a credit rating upgrade is followed by an increase (negligible change) in their net debt versus net equity issuance.

P4b. For financially flexible (inflexible) firms, a credit rating downgrade is followed by a negligible change (decrease) in their net debt versus net equity issuance.

3. Empirical Framework

3.1. Data and Sampling

The cross-sectional dimension of our sample comprises all non-financial firms with a credit rating in the *S&P 1500* index, while the time series dimension spans the sample period from

1985 to 2009. It should be noted that the starting point for our sample is driven by the fact that *Compustat* only began collecting data on corporate credit ratings in 1985. All firms with missing data on the primary variables of interest and negative equity have been excluded. Over the sample period, we have 12,705 firm-year observations representing 971 firms, that is, unbalanced panel data. We employ *Standard & Poor's* credit ratings drawn from the *Compustat* database, while financial data are drawn from the *CRSP* and *Compustat* merged database. Data on annual betas, stock market returns and Treasury bill rates needed to calculate the cost of equity are drawn from the *CRSP* database. Data on yield spreads and yield-to-maturity on bond issues needed to calculate the cost of debt are drawn from *Mergent Fixed Income Securities Database (FISD).* The processing of these data is described in the following subsections.

3.2. Variable Definitions and Measurement

3.2.1. The Dependent Variables

The primary dependent variables in our analysis are the weighted average cost of capital (*WACC*), capital expenditure (CAPEX) and issuance of net debt versus net equity (INDNE). WACC is calculated as the weighted average cost of debt and equity capital using standard textbook definitions.[5] Following Khurana and Raman (2003), among others, we proxy the marginal cost of debt for any year by the yield-to-maturity. To capture any potential effect of a credit re-rating on the cost of debt, we use the yield-to-maturity on the largest existing bond issues made by the issuing firm in the prior year as a proxy for the current year. A proxy for the marginal cost of debt for firms that did not make any bond issue in a particular year is calculated as the average yield-to-maturity on bond issues made

[5] We use an average corporate tax rate of 40% to calculate the after-tax cost of debt. Also, to rule out the variability in the cost of equity that can arise from the variation in the historical market returns, we use the long-run average total return on the NYSE Composite index during the past 30 years as a proxy for the expected market return.

by firms with the same credit rating. Given the survey evidence of Graham and Harvey (2001) that the CAPM is the most popular model for estimating the cost of equity, to mimic the actual decisions made by managers in practice, we use a CAPM-based cost of equity estimate.[6] The cost of equity for any year is calculated *ex-ante* using the annual beta at the start of the year, the rate on one year Treasury-bills at the start of the year, and the long-run average market total return. Capital expenditure (CAPEX) is defined as total capital expenditure for any year scaled by net property, plant and equipment at the start of the year. As in Kisgen (2006) and Kisgen (2009), issuance of net debt versus net equity is defined as net debt issuance (long-term debt issuance minus long-term debt reduction plus changes in current debt) minus net equity issuance (sale of common and preferred stock minus purchase of common and preferred stock), all scaled by total assets at the start of the year.

3.2.2. The Explanatory Variables: Financial Flexibility and Credit Re-rating

Our two core "test" variables are credit ratings, particularly changes therein, and financial flexibility. Following Horrigan (1966) and Kisgen (2006), credit ratings are transformed into numerical scores ranging from 1 for the lowest credit ratings (C and D) to 21 for the highest credit rating (AAA). When a credit rating change occurs, the change is simply captured as the difference between the numerical credit rating score after the change and the numerical credit rating score before the change. That is, a positive (negative) change reflects a rating upgrade (downgrade) for the company in question.

Regarding financial flexibility, we need to differentiate between those firms that are financially flexible and those that are financially inflexible. Although the literature lacks a

[6] Gul et al. (2011) calculate the cost of equity using the Easton (2004) PEG model as the square root of the difference between the expected earnings per share (EPS) over two consecutive years, scaled by the beginning of year stock price. However, this method requires the difference in the expected EPS to be positive, which would result in a sizable reduction in our sample (25%) and a bias in favor of firms with stable earnings. Hence, to overcome these problems, we use the CAPM-based method. Notably, this difference is not critical as our findings on the cost of capital/credit re-rating linkage are qualitatively similar to theirs.

universally accepted definition/measure, financial flexibility typically refers to the firm's reserve borrowing capacity (e.g., Graham, 2000). To this end, we follow the firm-specific method employed by Denis and McKeon (2012) to delineate financially flexible firms from inflexible firms. This proxy measures the deviation of each firm's annual leverage ratio from its long-run target. The variables they use in their model are drawn from the work of Frank and Goyal (2009), who find that median industry leverage, market-to-book ratio (Tobin's Q), asset tangibility (NPPE/Assets), operating profit (EBIT/Assets), size (the log of total assets) and expected inflation are the most reliable factors affecting leverage decisions of US publicly traded firms. Accordingly, we estimate the following annual double-censored Tobit regression:

$$Mleverage_{it} = \alpha + \beta_1[Median\ Industry\ Mleverage]_{i,t-1} + \beta_2[Q]_{i,t-1} + \beta_3[NPPE/A]_{i,t-1} + \beta_4[EBIT/A]_{i,t-1} + \beta_5[Ln(assets)]_{i,t-1} + \varepsilon_{it} \quad (1)$$

To achieve an economically meaningful differentiation between financially flexible and inflexible firms, we apply a ± 3% filter. Specifically, firms that have a market leverage ratio that is at least 3% below (above) their target are considered financially flexible (inflexible), while firms with a market leverage ratio that falls within ± 3% of their target are considered financially "neutral".[7]

Combining the two concepts of credit rating change and financial flexibility, we require a set of compound variables that capture the interaction between credit re-rating and financial flexibility status. Accordingly, we create the following seven interaction dummy variables:

DFS: represents financially flexible firms which experience no change in their credit rating. The variable takes a value of unity if, in a given year, the firm is financially flexible with a stable credit rating, and zero otherwise.

[7] We thank an anonymous referee for proposing this cut-off approach to delineate firms based on their relative financial flexibility.

DFU: represents financially flexible firms which experience a rating upgrade. The variable takes a value of unity if, in a given year, the firm is financially flexible and experiences a credit rating upgrade, and zero otherwise.

DFD: represents financially flexible firms which experience a rating downgrade. The variable takes a value of unity if, in a given year, the firm is financially flexible and experiences a credit rating downgrade, and zero otherwise.

DIS: represents financially inflexible firms which experience no change in their credit rating. The variable takes a value of unity if, in a given year, the firm is financially inflexible with a stable credit rating, and zero otherwise.

DIU: represents financially inflexible firms which experience a rating upgrade. The variable takes a value of unity if, in a given year, the firm is financially inflexible and experiences a credit rating upgrade, and zero otherwise.

DID: represents financially inflexible firms which experience a rating downgrade. The variable takes a value of unity if, in a given year, the firm is financially inflexible and experiences a credit rating downgrade, and zero otherwise.

DNA: represents all financially neutral firms (whether stable, upgraded or downgraded). The variable takes a value of unity if, in a given year, the firm is financially neutral, and zero otherwise.

Additionally, for robustness purposes, we re-estimate Equation (1) and create an alternative set of interaction variables using book leverage to delineate financially flexible firms, financially inflexible firms and financially neutral firms.

3.2.3. The Control Variables

To control for firm profitability and internally generated funds, we use EBITDA. EBITDA is calculated as earnings before interest, tax, depreciation and amortization, scaled by total assets. Moreover, following Gray et al. (2006) who document the importance of a change in profitability in signaling the prospects of the firm, we also include the change in EBITDA as a control variable. Tobin's Q controls for growth opportunities and is calculated as total liabilities plus market value of equity, divided by the book value of assets. To control for firm size, we use the natural logarithm of total assets, Ln(Assets). NPPE controls for asset tangibility and is defined as the ratio of net property, plant and equipment, divided by total

assets. We also use research and development expense, R&D, as a control variable calculated as research and development expense divided by total assets.[8]

Further, given that Graham and Harvey (2001) report that the concern about financial flexibility is more profound for dividend paying firms, a dividend variable is included as a control. Specifically, dividend is defined as the ratio of cash dividends to total assets. Moreover, since firms might accumulate some cash reserves to finance their growth opportunities, the variable 'Cash" is included as a control. Cash is defined as the ratio of cash and cash equivalents to total assets. Finally, we also use firm credit rating levels to control for firm credit risk.

3.3. Background and Basic Descriptive Statistics

Table 1 presents some basic descriptive statistics on the main variables for our subsamples of financially flexible, inflexible and neutral firms, delineated based on the market leverage proxy for financial flexibility.[9] All ratio variables have been winsorized at the 1st and 99th percentile. Several interesting comparisons are noted from this table. First, we see that flexible firms have a higher sample mean cost of capital compared with their inflexible firm counterparts: 11.8% versus 9.2% due to the (on average) higher weighting of equity in the capital structure of financially flexible firms. This difference in WACC is also suggestive of a higher likelihood that flexible firms invest in higher risk projects, on average. Second, while mean CAPEX is very similar between the two groups (22%), INDNE is much higher for inflexible firms: 9.8% versus 0.7%. Third, as expected, firms classified as financially

[8] A dummy variable is also created to capture missing R&D observations.

[9] The aggregate sample descriptive statistics are suppressed for brevity reasons. A few interesting observations can be made regarding our key variables of interest. First, the sample mean (median) WACC is around 10-11% per annum – a value that is plausible and comparable to existing similar studies – e.g., Fama and French (1999), whose estimated nominal cost of capital is 10.72% for the period 1950-1996. Second, the sample mean (median) cost of debt at 7.5% (7%) is comfortably lower than the counterpart for the cost of equity at 13.1% (12.7%). Third, on average, sample firms have invested around 22% in new capital expenditure, which closely accords with figures reported in Gul et al (2011) (21.4%). Fourth, the sample mean (median) issuance of net debt versus net equity is 4.5% (1.4%) indicating a considerable right skew to this distribution.

inflexible have a higher sample mean leverage (35.3%) compared to their flexible firm counterparts (13.7%.)[10] Finally, the WACC and INDNE of financially neutral firms fall in between those of financially flexible and inflexible firms, while the CAPEX of these financially neutral firms is not substantially different from the others.

[Insert Table 1 here]

Table 2 reports the distribution of corporate bond credit ratings across our sub-samples of financially flexible, inflexible and neutral firms, delineated based on the market leverage proxy for financial flexibility. The credit rating data used in the analysis are from Standard & Poor's Long-term Domestic Issuer Credit Rating (data item 280), defined by Standard & Poor's (2001) as the "current opinion on an issuer's overall capacity to pay its financial obligations". As shown in the table, there are a total of 2,775 credit re-ratings during the sample period, of which 1,236 are upgrades and 1,539 are downgrades.

From the table, several interesting observations can be made. First, we see that there is a healthy spread of cases across all the investment grade ratings, with only the very lowest ratings below B- showing few observations. Second, in terms of upgrade transitions, the majority of movement occurs between the grades of A and BB-, with the highest incidence of upgrades to BB (N = 154). Third, in terms of downgrade transitions, the greatest concentration occurs between A- and BB-, with a maximum of sample cases downgrading to BBB (N = 203). As expected, we see a higher incidence of flexible firms with higher credit ratings than inflexible firms. For example, of the 253 firm-year observations falling in the AAA category, 125 (28) are assigned to flexible (inflexible) firms, whereas of the 725 firm-year observations falling in the B+ category, 216 (378) are assigned to flexible (inflexible) firms. A compatible pattern is noted regarding credit re-

[10] Nevertheless, given the method that we use to delineate flexibility/inflexibility, it is still quite possible for firms within our sample to have low (high) financial leverage per se, but be deemed financially inflexible (flexible). The reader should be wary of this important distinction throughout all the ensuing analysis and discussion.

ratings — generally, there is a higher incidence of upgrades for flexible firms compared to their inflexible firm counterparts. Nevertheless, we see a meaningful spread of ratings/re-ratings across both of these segments of our sample.

[Insert Table 2 here]

4. Empirical Analysis

4.1. Baseline Model Estimation — Ignoring Financial Flexibility

We begin our analysis by combining and replicating the work of Kisgen (2009) and Gul et al. (2011), to establish baseline relations between the cost of capital and financial decisions versus credit re-ratings. Given that we have a system of equations, we estimate the three functions jointly using full information maximum likelihood (FIML), which uses all information embedded in each equation. As such, this analysis serves the dual purpose of relating their findings to each other and providing a baseline set of results, against which the main part of our study can be benchmarked and developed. To this end, we create two dummy variables for credit re-ratings as follows:

DUP: represents an upgrade credit rating event. The variable takes a value of unity if a firm's credit rating was upgraded in a particular year, and zero otherwise.

DDOWN: represents a downgrade credit rating event. The variable takes a value of unity if a firm's credit rating was downgraded in a particular year, and zero otherwise.

Table 3 reports the results from regressing the change in the cost of capital, capital expenditure and net debt versus net equity issuance functions on credit rating upgrades and downgrades, in addition to the control variables. As shown in the table, a credit rating upgrade is followed by a significant decrease in the cost of capital and a significant increase in capital expenditures, supporting the findings of Gul et al (2011). Further, the upgrade is not followed by a significant change in net debt versus net equity issuance, supporting the

finding of Kisgen (2009). The increase in capital expenditures seems to be driven by the decrease in the cost of capital, which makes some marginal projects that would have been otherwise rejected, now acceptable after the upgrade.

The second key result in Table 3 shows that a credit rating downgrade is followed by an increase in the cost of capital and a decrease in capital expenditure, supporting the findings of Gul et al. (2011), and a decrease in net debt versus net equity issuance, which supports the findings of Kisgen (2009). Thus, Table 3 provides a baseline set of results that collectively confirm the prior work of Gul et al. (2011) and Kisgen (2009) regarding the linkage between corporate financial decision making and credit re-ratings. Moreover, this analysis supports baseline Prediction 1, as outlined earlier.

[Insert Table 3 here]

While the change in capital expenditure after an upgrade or a downgrade seems to be driven by the change in the cost of capital following these events, it is less clear whether the change in net debt versus net equity issuance is also related to the change in the cost of capital following a credit re-rating. To examine whether the change in capital expenditure and net debt versus net equity issuance are both driven by the effect of credit re-ratings on the cost of capital, we use two-stage least squares, following Gul et al. (2011), modified to include additional interaction terms to capture the nonlinear effect of credit re-ratings across the ratings spectrum.[11, 12] In the first stage, the costs of debt and equity functions are estimated as follows:

$$K_{di,t} = \beta_0 + \beta_1.\Delta Rating_{i,t-1} + \beta_2.Rating_{i,t-1} + \beta_3.\left(\Delta Rating_{i,t-1}\right)\left(Rating_{i,t-1}\right) + \varepsilon_{it} \quad (2)$$

$$K_{ei,t} = \beta_0 + \beta_1.\Delta Rating_{i,t-1} + \beta_2.Rating_{i,t-1} + \beta_3.\left(\Delta Rating_{i,t-1}\right)\left(Rating_{i,t-1}\right) + \varepsilon_{it} \quad (3)$$

[11] We thank an anonymous referee for alerting us to the need to model these nonlinear effects. Our findings are robust to the removal of the nonlinear terms. Details are available from the authors upon request.

[12] As an alternative robustness check, these equations are re-estimated using spline regressions to capture the nonlinear effect and the results are qualitatively similar to those reported in the paper. Details are available from the authors upon request.

The results from regressions (2) and (3) are as follows:[13]

$$K_{di,t} = 0.1120 - 0.0035.\Delta Rating_{i,t-1} - 0.0029.Rating_{i,t-1} + 0.0003.(\Delta Rating_{i,t-1})(Rating_{i,t-1})$$

(t-stat) *(29.40)* *(4.42)* *(40.41)* *(4.48)*

$$K_{ei,t} = 0.1750 - 0.0058.\Delta Rating_{i,t-1} - 0.0030.Rating_{i,t-1} + 0.0004.(\Delta Rating_{i,t-1})(Rating_{i,t-1})$$

(t-stat) *(11.80)* *(3.94)* *(30.25)* *(3.28)*

As shown above, the costs of both debt and equity are negative functions of the changes in credit rating and the rating level. Further, the positive estimated coefficient on the interaction term between the changes in credit rating and the credit rating levels suggests that both the costs of debt and equity are less negatively related to the change in credit rating (rating level) for highly rated (strongly upgraded) firms. This supports the notion of nonlinearity.

In the second stage, we regress capital expenditure and net debt versus net equity issuance on the estimated cost of capital (derived from the first stage estimates of the component costs), in addition to the control variables. Table 4 reports the results from these regressions. As shown in the table, both capital expenditure and net debt versus net equity issuance decrease significantly in the estimated cost of capital, implying that the change in both capital expenditure and net debt versus net equity issuance are driven by the effect of a credit re-rating on the cost of capital.

[Insert Table 4 here]

4.2. The Effect of Financial Flexibility and Credit Re-rating on the Cost of Capital and Corporate Financial Decisions

In this subsection, using separate OLS regressions, we re-estimate our models and include the set of interaction dummy variables defined in Section 3.2.2. to assess whether

[13] Since the composition of rating changes vary widely by year, e.g., see Table 3 of Benmelech and Dlugosz (2009), both equations (2) and (3) are estimated with year dummies. These dummies are not reported to conserve space.

introducing financial flexibility into the analysis offers new insights (following our empirical Predictions 2, 3 and 4). We begin with the cost of capital and its components. Table 5 reports the results from modeling the change in the cost of debt, the change in the cost of equity and the change in the cost of capital as functions of the interaction between credit re-rating and financial flexibility, in addition to a set of control variables. For robustness and comparison purposes, we report the results using both market and book leverage-based proxies for financial flexibility. The table contains several notable findings.[14]

[Insert Table 5 here]

Benchmarked relative to stable rating financially flexible firms (this group of firms is the omitted case captured by the constant term), an upgrade to financially *flexible* firms (i.e., DFU) is followed by a decrease in their (a) cost of debt; (b) cost of equity; and (c) overall cost of capital using either market or book leverage-based proxies for financial flexibility. In contrast, when benchmarked against stable rating financially inflexible firms (this group of firms is the omitted case captured by the constant term), an upgrade to financially *inflexible* firms (i.e., DIU) is followed by a decrease (no change) in their cost of debt (equity), leading to an insignificant change in their overall cost of capital. It appears that the contribution of the decrease in the cost of debt on the cost of capital of these firms, after an upgrade, is dominated by the insignificant effect of the upgrade on their cost of equity.[15] Generally, these findings support prediction P2a.

[14] To make the analysis easier to interpret, we report the results for upgraded and downgraded financially flexible (inflexible) firms against the relevant benchmark i.e. stable rating financially flexible (inflexible) firms. We achieve this by estimating two equivalent versions of the system in each case – one version omits the DFS dummy and this is used to benchmark DFU/DFD, while the second version omits the DIS dummy and this is used to benchmark DIU/DID. For each base, the regression includes all the remaining interaction dummies, but we report the result for each group to conserve space.

[15] Similar to the above, the lack of response by the equity holders of these firms to an upgrade is influenced by a range of factors. For example, we see: (i) a relatively lower incidence of upgrades compared to downgrades for these firms (241 cases vs. 708 cases; refer to Table 2); and (ii) a relatively lower rating level of these upgrades compared to that witnessed for counterpart flexible firms (concentrated in the range BBB to B+ for the former group vs. A+ to B+ for the latter group; refer to Table 2). The combined effect of these factors tend

The analysis reported in Table 5 also shows that a downgrade to financially flexible firms (i.e., DFD) is followed by (a) an increase in their cost of debt; and (b) an insignificant change in their cost of equity and overall cost of capital.[16] The low debt weighting and the insignificant change in the cost of equity following a downgrade jointly explains the insignificant effect on the overall cost of capital of these firms.[17] In contrast, a downgrade to financially *inflexible* firms (i.e., DID) is followed by a significant increase in both the costs of debt and equity, leading to an increase in their overall cost of capital. This uniform directional impact on the component costs of capital is most likely attributable to the higher risk borne by both the creditors and the shareholders of these downgraded firms. Generally, these findings support prediction P2b.

Table 6 reports the results of modeling the investment and financing decisions on the interaction variables, in addition to a set of control variables. Benchmarked relative to stable rating financially flexible firms (this group of firms is the omitted case captured by the constant term), an upgrade to financially *flexible* firms (i.e., DFU) is followed by an increase in their capital expenditure and net debt versus net equity issuance.[18] In contrast, when benchmarked against stable rating financially inflexible firms (this group of firms is the omitted case captured by the constant term), an upgrade to financially *inflexible* firms

to make shareholders less sensitive, on average, to the potentially positive effects of the rating upgrade experienced by these inflexible firms.

[16] The asymmetric response of equity returns to downgrades/upgrades and across various scenarios has been well documented in the literature (see, e.g., Goh and Ederington, 1993). Investigating the various possible reasons for this asymmetric response is beyond the scope of our work.

[17] The lack of response by the equity holders of these firms to a downgrade is influenced by a range of factors, including the combined effect of: (i) the relatively lower incidence of downgrades compared to upgrades for these firms (445 cases vs. 694 cases; refer to Table 2); (ii) the relatively higher rating level of these downgrades compared to that witnessed for counterpart inflexible firms (concentrated in the range A- to BBB- for the former group vs. BBB to B- for the latter group; refer to Table 2); and (iii) the low weighting of debt in the capital structure of these firms that make the shareholders less concerned about losing their stake in the event of bankruptcy.

[18] It is worth noting that issuance of net debt versus net equity for upgraded financially flexible firms (DFU) becomes much more significant when benchmarked against stable financially inflexible firms and financially neutral firms.

(i.e., DIU) does not seem to trigger a significant change in either their capital expenditures or net debt versus net equity issuance. Hence, predictions P3a and P4a are supported.

[Insert Table 6 here]

The analysis reported in Table 6 also shows that a downgrade for financially *flexible* firms (i.e., DFD) is not followed by a significant change in either their capital expenditure or their net debt versus net equity issuance. However, a downgrade to financially *inflexible* firms (i.e., DID) is followed by a significant reduction in both their capital expenditure and net debt versus net equity issuance. Hence, broadly speaking, we also find strong support for predictions P3b and P4b in our sample.

The asymmetry identified in our full package of findings in terms of cost of capital and financial decisions, which cuts across both the re-rating dimension and the financial flexibility dimension, has strong intuitive appeal. If we consider financial flexibility as an indication of underlying firm "quality", while re-rating events represent news about the firm's financial health, it is not surprising that our strong results occur when these two dimensions are reinforcing one another — namely, when flexibility (i.e., higher quality) combines with rating upgrades (i.e., good news) or when inflexibility (i.e., lower quality) combines with rating downgrades (i.e., bad news). Alternatively, when these two dimensions are in conflict, their opposing forces tend to cancel each other out. That is, our insignificant results occur (a) when a firm manages to retain its flexibility (i.e., higher quality) status despite suffering a rating downgrade (i.e., bad news); or (b) when a firm fails to clear its inflexibility (i.e., lower quality) status despite achieving a rating upgrade (i.e., good news).

4.3. The Joint Effect of Financial Flexibility and Credit Re-rating on the Cost of Capital and Corporate Financial Decisions

Given that we have three key focus variables, our model constitutes a trivariate system of equations comprising: a cost of capital equation; an investment decision equation (i.e., modeling CAPEX); and a financing decision equation (i.e., modeling INDNE). Based on individual OLS regressions, the preceding analysis ignores the interrelated nature of this system, which might induce unreliable inferences. Accordingly, Table 7 reports the results of re-estimating the three functions jointly using FIML estimation.[19]

The results reported in Table 7 continue to confirm the asymmetric findings reported in Tables 5 and 6. This *asymmetric* response to credit re-ratings highlights the critical importance of financial flexibility not only to firms' financing decisions, but also to their capital expenditure decisions. As such, this confirms the survey evidence documented by Graham and Harvey (2001), and also gives support to the debt overhang problem proposed by Myers (1977). Most notably, our results suggest that the core findings of Gul et al. (2011) — namely that capital expenditure increases (decreases) after an upgrade (downgrade) are primarily driven by financially flexible (inflexible) firms. Similarly, the core finding of Kisgen (2009) — that firms reduce their debt after a downgrade but do not issue new debt after an upgrade — seems to be largely driven by financially inflexible firms, as we document that financially *flexible* firms do issue new debt after an upgrade and do not reduce their debt after a downgrade.

[Insert Table 7 here]

Next, we decompose the cost of capital into its nominal (unweighted) components and associated financing forms to analyze how each form of financing responds to changes in its cost after a credit re-rating. Table 8 reports the results from regressing the change in

[19] Given that both market and book leverage-based proxies produce very similar results in the earlier analysis, to conserve space we retain only the market leverage-based proxy from this point on.

the nominal cost of debt versus net debt issuance and the change in the nominal cost of equity versus net equity issuance. As net equity issuance is found to be insensitive to any of our four scenarios, no further comment on it follows.

When benchmarked against stable rating financially flexible firms, an upgrade to the credit rating of financially *flexible* firms is followed by a reduction in their cost of debt associated with an increase in their net debt issuance. The upgrade to these firms is also followed by a reduction in their cost of equity capital. In contrast, while an upgrade to financially inflexible firms is also followed by a decrease in the cost of debt, here it is associated with an insignificant change in net debt issuance, possibly motivated by a desire to avoid a reversal of their recent upgrade (as per the argument of Kisgen, 2009). The upgraded ratings of these firms are also followed by insignificant changes in their cost of equity.

Further, while a downgrade to the rating of financially flexible firms is followed by an increase in their cost of debt, such downgrade does not seem to have an effect on the net debt issuance or cost of equity of these firms. In contrast, a downgrade to the credit ratings of financially inflexible firms, while also followed by an increase in their cost of debt, is associated with a reduction in their net debt issuance and an increase in their cost of equity.

The foregoing discussion reiterates our primary message: that financial flexibility matters and that flexibility is an important determinant of corporate decision making. Beyond this, our analysis produces additional insights. For example, we see that financially inflexible firms reduce their debt after a downgrade but do not change their equity issuance, and that a downgrade to the credit rating of these firms is followed by an increase in their cost of capital and a reduction in their capital expenditure and net debt versus net equity issuance. Collectively, these results imply that these firms, rather than risk sending a signal that could be interpreted negatively by the market if they increase their equity issuance after

a downgrade (seeking to improve their credit standing), prefer to reduce their capital expenditure. This outcome might be achieved by sacrificing those projects that become unprofitable after the downgrade, thereby allowing them to retire some of their debt with the goal of resuming their former credit rating.

[Insert Table 8 here]

4.4. Investment/Speculative Grade and Boundary Effects[20]

In this subsection, we investigate whether our core results are being driven by firms with very low ratings or firms with re-ratings across the investment/speculative grade boundary. To address the first concern, we re-estimate our main models for the subset of our sample involving investment grade firms i.e., firms with credit ratings ≥ (BBB-). Table 9 reports these results and show that the main findings documented in Table 7 are reaffirmed for this subsample. Hence, our main findings do not appear to be driven by firms rated in the speculative grades.

[Insert Table 9 here]

Further, some researchers find that the boundary between investment and speculative grade ratings (i.e., BBB- and BB+ ratings) has a profound influence on corporate financial decisions (e.g., see Chernenko and Sunderam, 2012). For various reasons, firms upgraded or downgraded to this boundary experience a substantial shift in their economic conditions, which is likely to materially affect their investment and financing decisions. Accordingly, we design a variation of our experiment that aims to capture the potential importance of this "investment/speculative grade boundary effect".

One challenging empirical problem in dealing with firms rated at the boundary is the noise inherent in the ratings defining this boundary. According to Chernenko and Sunderam

[20] We thank an anonymous referee for motivating us to consider the potential impact/importance of the boundary between investment and speculative grade firms on our analysis.

(2012), for example, some firms rated BBB- should be rated BB+ and vice versa. Therefore, to minimize this potential source of noise and also to have sufficient observations on re-ratings to the boundary that yield reliable inferences, we treat both ratings jointly as the "boundary" cases. In the context of our earlier key analyses, to see whether the boundary plays a role in influencing corporate cost of capital and financial decisions, we develop 11 interaction variables as follows:

DFS: represents financially flexible firms which experience no change in their credit rating. The variable takes a value of unity if, in a given year, the firm is financially flexible and experiences no change in its credit rating, and zero otherwise.

DFNBU: represents financially flexible firms that are upgraded to a non-boundary rating. The variable takes a value of unity if, in a given year, the firm is financially flexible and experiences a credit rating upgrade to a non-boundary rating (i.e., to neither BBB- nor BB+ ratings), and zero otherwise.

DFNBD: represents financially flexible firms that are downgraded to a non-boundary rating. The variable takes a value of unity if, in a given year, the firm is financially flexible and experiences a credit rating downgrade to a non-boundary rating (i.e., to neither BBB- nor BB+ ratings), and zero otherwise.

DFBU: represents financially flexible firms that are upgraded to the boundary. The variable takes a value of unity if, in a given year, the firm is financially flexible and experiences a credit rating upgrade to the boundary (i.e., to either BBB- or BB+), and zero otherwise.

DFBD: represents financially flexible firms that are downgraded to the boundary. The variable takes a value of unity if, in a given year, the firm is financially flexible and experiences a credit rating downgrade to the boundary (i.e., to either BBB- or BB+), and zero otherwise.

DIS: represents financially inflexible firms which experience no change in their credit rating. The variable takes a value of unity if, in a given year, the firm is financially inflexible and experiences no change in its credit rating, and zero otherwise.

DINBU: represents financially inflexible firms that are upgraded to a non-boundary rating. The variable takes a value of unity if, in a given year, the firm is financially inflexible and experiences a credit rating upgrade to a non-boundary rating (i.e., to neither BBB- nor BB+ ratings), and zero otherwise.

DINBD: represents financially inflexible firms that are downgraded to a non-boundary rating. The variable takes a value of unity if, in a given year, the firm is financially inflexible and experiences a credit rating downgrade to a non-boundary rating (i.e. to neither BBB- nor BB+ ratings), and zero otherwise.

DIBU: represents financially inflexible firms that are upgraded to the boundary. The variable takes a value of unity if, in a given year, the firm is financially inflexible and experiences a credit rating upgrade to the boundary (i.e., to either BBB- or BB+), and zero otherwise.

DIBD: represents financially inflexible firms that are downgraded to the boundary. The variable takes a value of unity if, in a given year, the firm is financially inflexible and experiences a credit rating downgrade to the boundary (i.e., to either BBB- or BB+), and zero otherwise.

DNA: represents all financially neutral firms (whether stable, upgraded or downgraded). The variable takes a value of unity if, in a given year, the firm is financially neutral, and zero otherwise.

Table 10 reports the results obtained from jointly regressing the cost of capital, capital expenditure and net debt versus net equity issuance on the interaction variables defined above and the control variables. As shown in the table, our main results reported in Table 7 hold whether financially flexible or inflexible firms are upgraded to a boundary or to a non-boundary rating — with the exception of one notable difference regarding issuance of net debt versus net equity by financially flexible firms after an upgrade. Specifically, according to the results reported in Table 10, financially flexible firms upgraded to a non-boundary rating (DFNBU) do not increase their net debt versus net equity issuance after an upgrade, whereas financially flexible firms upgraded to the boundary (DFBU) do increase their net debt versus net equity issuance following an upgrade. This latter finding implies a material change in the economic conditions of these "boundary-upgraded" firms that encourage them to raise new debt to finance their growth opportunities. Thus, it appears that the finding in Table 7, that financially flexible firms increase their issuance of net debt versus net equity after an upgrade, is mainly driven by those financially flexible firms upgraded to the boundary.

The other interesting feature of the analysis portrayed in Table 10 relates to the robust asymmetric effect of rating downgrades. On the one hand, a downgrade has an

insignificant effect on the cost of capital and financial decisions of financially flexible firms, irrespective of whether they are downgraded to the boundary or to a non-boundary rating. In contrast, a downgrade to financially inflexible firms does have a significant effect on the cost of capital and financial decisions of these firms in both scenarios. Collectively, these findings again highlight the importance of financial flexibility in influencing corporate financial decisions.

[Insert Table 10 here]

4.5. Endogeneity

Although credit rating agencies have private access to firms' future plans and take them into consideration when assigning their credit rating, we argue that the main empirical results reported in Table 7 are unlikely to be driven by this private access. Since we find that financially flexible (inflexible) firms increase (reduce) their debt after an upgrade (downgrade), it is less likely that the rating agency will upgrade (downgrade) a firm that intends to increase (reduce) its debt in the following year. Generally, responses of firms to credit re-ratings seem to be driven by the change in their cost of capital after a change in their credit rating (as reported in Table 4).

Nevertheless, we test the robustness of our findings and address the possibility of endogeneity using two stage least squares, as in Kisgen (2006). Kisgen regresses the numerical credit rating scores on variables that are considered highly influential in determining firms' credit ratings. Following the principle of parsimony, Kisgen finds three instrumental variables that are most critical in determining credit rating scores: namely, the natural logarithm of total assets, *Ln(Assets)* the ratio of Earnings before interest, tax, depreciation and amortization to total assets, *(EBITDA/A)*, and debt to total capitalization *(Debt/Total.Cap)*. In the second stage, he uses the predicted credit rating scores from the

first stage regression to rank firms into terciles under each predicted score for the purpose of analyzing the effect of the firm's rank on its issuance of net debt versus net equity.

We follow his approach and use the same instrumental variables to predict credit rating scores for each firm-year. The results from our regression are shown in Equation (4), which is similar to the counterpart estimated by Kisgen (2006):

$$Rating\ Score = 1.3526\ Ln(Assets) + 11.1531\left(\frac{EBITDA}{A}\right) - 4.5586\left(\frac{Debt}{Total.Cap}\right) \quad (4)$$

(t-stat) *(25.32)* *(12.83)* *(14.19)*

The predicted credit rating scores are rounded to whole numbers (positive integers). Further, since firm leverage may increase or decrease for reasons other than the desire to maintain financial flexibility, the deviation of the firm's actual market leverage from the predicted firm's market leverage estimated in Equation (1), Section 3.2.2. is used in conjunction with the predicted credit rating scores estimated above. This creates a new set of interaction variables similar to those created in Section 3.2.2.

Table 11 reports the results obtained from regressing the change in the cost of capital, capital expenditure and net debt versus net equity issuance on the estimated interaction variables. As shown in the table, the inferences emanating from Table 11 are identical to the main results drawn from Table 7.

[Insert Table 11 here]

4.6. Further Robustness Tests

Finally, we check the robustness of our results to several other accepted measures used in the literature. In our main analysis, we proxy the marginal cost of debt for any year by the yield-to-maturity on the largest existing bond issues made by the issuing firm in the prior year, which then feeds into our overall WACC measure. Alternatively, Shaw (2012) and Brockman et al. (2010) use the yield spread as a proxy for the cost of debt, calculated as the difference between the yield-to-maturity on corporate bonds and the yield-to-maturity on

Treasury bonds of comparable maturity. To this end, we test the robustness of our main results with regard to the effect of a credit re-rating on the cost of debt, proxied as either the yield spread on the most recent bond issue made in the prior year or the yield spread on the largest bond issue made in the prior year. These proxies produce qualitatively similar findings, as shown in Table 12. Specifically, Panel A of the table provides the robustness checks relating to the cost of debt modeling (core results shown in Table 5), while Panel B provides the robustness checks relating to the joint estimation of the WACC, CAPEX and INDNE equations (core results shown in Table 7).[21]

[Insert Table 12 here]

In a final set of robustness analysis, we re-estimate our findings using financial flexibility proxies based on the overall sample median market leverage ratio and industry median market leverage ratio. Specifically, in the former case, firms with a financial leverage ratio that is at least 3% below (above) the full sample median ratio of 20% are deemed financially flexible (inflexible). In the latter case, relative to a four-digit definition of industry, firms with a financial leverage ratio that is at least 3% below (above) the industry sample median leverage ratio are deemed financially flexible (inflexible).[22] We also apply an alternative estimation method for robustness purposes: namely, seemingly unrelated regressions (*SUR*). The *SUR* method estimates the three equations jointly, allowing them to be related through their error terms. Our findings, inferences and conclusions remain solidly robust with each of these variations.[23]

[21] Since the alternative cost of debt proxies are net of the risk-free rate, we apply this consistently to the cost of capital equation in the robustness checks. While netting the risk-free rate does not affect the sign or magnitude of the coefficients of interest in any way, the estimated intercepts in both panels are lower (compared to their Table 5 and 7 counterparts) by an amount equal to the sample average implied estimate of the risk-free rate. Based on a comparison of the coefficient estimates in this table, the implied estimate of the risk-free rate is plausible and lies in the range of 2.1% to 2.4% per annum.

[22] If in any year there are less than 10 observations in a given four-digit pool, we use the median for the associated three or two-digit code.

[23] Since all estimations produce very similar outcomes to the results reported in this paper, we do not tabulate these alternative analyses. Full estimation details are available from the authors upon request.

5. Conclusion

Using a large sample of non-financial US listed firms over the period 1985-2009, this paper analyzes the joint effect of financial flexibility and credit re-ratings on corporate cost of capital, capital expenditure and financing decisions. Our main findings can be summarized as follows. When benchmarked against stable rating financially flexible firms, a credit rating upgrade to financially flexible firms is followed by a reduction in their cost of capital and an increase in their capital expenditure and issuance of net debt versus net equity, while a downgrade is not followed by any significant changes. In contrast, an upgrade to financially inflexible firms is not followed by significant changes, while a downgrade is followed by an increase in the cost of capital and a reduction in the capital expenditure and net debt versus net equity issuance of these firms.[24]

Thus, the key finding from our study is that corporate financial flexibility matters. Moreover, we show that flexibility matters in a very particular way when it is examined conjointly with the critical corporate event of credit re-ratings. In terms of recent key literature, we find that financial flexibility is an asymmetric driver of the collective findings reported in Kisgen (2009) and Gul et al. (2011). More specifically, we document that flexibility interacts with credit re-ratings asymmetrically, that is, flexibility (inflexibility) "flicks the switch" exclusively in the re-rating upgrades (downgrades) scenario. In contrast, when inflexibility (flexibility) combines with re-rating upgrades (downgrades), financial decision making is unaffected. Given the research design of both Kisgen (2009) and Gul et al. (2011), such subtleties are undetectable in their analyses. As such, the findings from our study contribute new and significant insights to the current literature.

[24] Notably, these results hold for firms having investment grade ratings, as well as firms re-rated to the boundary between investment and speculative ratings. The one additional new insight in the latter case is that financially flexible firms upgraded to the investment/speculative rating boundary drive the increase in net debt versus net equity issuance observed for these firms.

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Panel A: Findings in Gul et al. (2011) and Kisgen (2009) independently confirmed in the current paper

	Rating Upgrade	Rating Downgrade
Gul et al. (2011)	K ↓	K ↑
	CAPEX ↑	CAPEX↓
Kisgen (2009)	□ INDNE	INDNE↓

Panel B: Current Paper New Results – Conditional on Financial Flexibility*

	Rating Upgrade		Rating Downgrade	
	FLEX	INFLEX	FLEX	INFLEX
WACC *(K)*	↓	□	□	↑
CAPEX	↑	□	□	↓
INDNE	↑	□	□	↓

Panel C: Current Paper New Results – Components of Cost of Capital Conditional on Financial Flexibility

	Rating Upgrade		Rating Downgrade	
	FLEX	INFLEX	FLEX	INFLEX
Cost of Debt *(K_d)*	↓	↓	↑	↑
Cost of Equity *(K_e)*	↓	□	□	↑

Panel D: Current Paper New Results – Components of Financing Decision Conditional on Financial Flexibility

	Rating Upgrade		Rating Downgrade	
	FLEX	INFLEX	FLEX	INFLEX
Net Debt Issuance	↑	□	□	↓
Net Equity Issuance	□	□	□	□

Fig 1. Summary of our core findings and comparison with key papers. This figure summarizes the findings on the impact of credit rating changes, i.e., upgrades vs. downgrades, on the corporate cost of capital and investment and financing decisions. Panel A shows the main findings for two key papers in the literature: Kisgen (2009) and Gul et al. (2011), which are independently replicated in our study. Panel B shows the new main findings of the current paper in which the analysis is partitioned on the basis of financial flexibility status (i.e., firms that are financially flexible vs. firms that are financially inflexible). Panel C (Panel D) shows the new main findings of the current paper when decomposed into the underlying components of the cost of capital, i.e., cost of debt vs. cost of equity (the forms of financing, i.e., net debt issuance vs. net equity issuance), for financially flexible (FLEX) versus inflexible (INFLEX) firms. K denotes the opportunity cost of capital; K_d denotes the cost of debt capital; K_e denotes the cost of equity capital; CAPEX denotes capital expenditure by the firm; INDNE denotes issuance of net debt versus net equity, defined as net debt issuance: (long-term debt issuance minus long-term debt reduction plus change in current debt) minus net equity issuance (sale of common and preferred stock minus purchase of common and preferred stock), all scaled by beginning of year total assets; "↓" denotes a decline in the variable in question; "↑" denotes an increase in the variable in question; and "□"denotes no change in the variable in question. *All results reported in Panel B hold for the subset of firms with investment grade ratings (i.e., ≥ BBB-), as well as for firms re-rated to the boundary between investment and speculative grade ratings (i.e., BBB- and BB+), with one exception (financially flexible firms upgraded to a non-boundary rating are not found to increase their INDNE).

Table 1

Basic descriptive statistics for financially flexible, inflexible and neutral firms.

Panel A: Financially flexible firms (N = 5,475)							
Variable	Mean	Std. Dev.	Minimum	Lower Q	Median	Upper Q	Maximum
Core Experimental variables							
WACC (K)	0.118	0.036	0.046	0.095	0.116	0.135	0.270
Cost of debt (K_d)	0.073	0.020	0.038	0.062	0.068	0.084	0.169
Cost of Equity (K_e)	0.134	0.040	0.048	0.111	0.130	0.153	0.270
CAPEX	0.222	0.160	0.004	0.120	0.184	0.271	1.027
INDNE	0.007	0.109	-0.295	-0.038	-0.001	0.045	0.823
Control variables							
EBITDA	0.150	0.066	-0.029	0.105	0.147	0.190	0.343
Tobin's Q	1.805	0.787	0.805	1.268	1.576	2.091	5.535
Ln(Assets)	21.961	1.299	17.845	21.059	21.802	22.823	26.417
NPPE	0.367	0.241	0.015	0.169	0.313	0.556	0.897
R & D	0.019	0.033	0.000	0.000	0.000	0.024	0.152
Dividends	0.016	0.016	0.000	0.000	0.013	0.025	0.080
Cash	0.089	0.098	0.001	0.019	0.053	0.124	0.472
M. Leverage	0.137	0.089	0.001	0.069	0.123	0.193	0.619
B. Leverage	0.209	0.111	0.002	0.131	0.203	0.281	0.667
Panel B: Financially inflexible firms (N = 3,780)							
Core experimental variables							
WACC (K)	0.092	0.026	0.046	0.073	0.089	0.107	0.229
Cost of debt (K_d)	0.078	0.021	0.038	0.064	0.072	0.089	0.169
Cost of Equity (K_e)	0.131	0.040	0.048	0.107	0.127	0.149	0.270
CAPEX	0.218	0.178	0.004	0.104	0.170	0.268	1.027
INDNE	0.098	0.204	-0.295	-0.016	0.040	0.148	0.823
Control variables							
EBITDA	0.120	0.058	-0.029	0.087	0.116	0.148	0.343
Tobin's Q	1.330	0.559	0.805	1.020	1.164	1.450	5.535
Ln(Assets)	21.880	1.432	16.496	20.834	21.764	22.812	27.405
NPPE	0.382	0.251	0.015	0.166	0.327	0.598	0.897
R & D	0.011	0.025	0.000	0.000	0.000	0.012	0.152
Dividends	0.012	0.015	0.000	0.000	0.007	0.017	0.080
Cash	0.056	0.080	0.001	0.010	0.026	0.064	0.472
M. Leverage	0.353	0.126	0.046	0.258	0.351	0.436	0.619
B. Leverage	0.428	0.111	0.130	0.350	0.418	0.500	0.667
Panel C: Financially neutral firms (N = 3,450)							
Core experimental variables							
WACC (K)	0.106	0.031	0.046	0.084	0.104	0.123	0.260
Cost of debt (K_d)	0.073	0.020	0.038	0.062	0.069	0.083	0.168
Cost of Equity (K_e)	0.128	0.038	0.048	0.105	0.125	0.144	0.270
CAPEX	0.218	0.165	0.004	0.114	0.176	0.267	1.027
INDNE	0.046	0.128	-0.295	-0.017	0.025	0.085	0.823
Control variables							
EBITDA	0.153	0.067	-0.029	0.109	0.144	0.192	0.343
Tobin's Q	1.816	1.013	0.805	1.172	1.442	2.047	5.535
Ln(Assets)	22.058	1.310	17.948	21.136	21.952	23.004	26.127
NPPE	0.391	0.238	0.015	0.191	0.340	0.586	0.897
R & D	0.019	0.033	0.000	0.000	0.000	0.025	0.152
Dividends	0.019	0.018	0.000	0.003	0.015	0.028	0.080
Cash	0.069	0.091	0.001	0.012	0.032	0.088	0.472
M. Leverage	0.203	0.101	0.001	0.126	0.198	0.282	0.598
B. Leverage	0.297	0.099	0.002	0.233	0.297	0.361	0.667

This table summarizes the descriptive statistics for the main variables used in the empirical analysis for the subsamples of financially flexible, inflexible and neutral firms, using the market leverage proxy for financial flexibility as defined in Section 3.2.2. The cross-sectional dimension of our sample comprises all non-financial firms with credit ratings in the S&P 1500 index, while the time series covers the sample period, 1985 to 2009. All firms with missing data on the primary dependent variables and negative equity have been excluded. The final sample comprises 12,705 firm-year observations representing 971 firms (unbalanced panel data). WACC, the overall cost of capital, is calculated as the weighted average cost of debt and equity capital. Cost of debt for any year is calculated as the yield-to-maturity on the largest existing bond issue made by the firm in the prior year or, where the former is absent, the average yield-to-maturity on largest existing bond issues made by other firms in the prior year with the same credit rating. Cost of equity is calculated using the CAPM. CAPEX is defined as capital expenditure for any year scaled by net property, plant and equipment at the start of the year. INDNE is issuance of net debt versus net equity defined as: net debt issuance (long-term debt issuance minus long-term debt reduction plus changes in current debt) minus net equity issuance (sale of common and preferred stock minus purchase of common and preferred stock), all scaled by total assets at the start of the year. EBITDA is calculated as earnings before interest, tax, depreciation and amortization, scaled by total assets. Tobin's Q is calculated as total liabilities plus market value of equity, divided by the book value of assets. Ln(Assets) is the natural logarithm of total assets. NPPE is the ratio of net property, plant and equipment, divided by total assets. Dividend is defined as the ratio of total cash dividends to total assets. Cash is defined as the ratio of cash and cash equivalents to total assets. Market leverage is defined as the sum of long-term debt plus debt in current liabilities, all scaled by the market value of total assets. Book leverage is defined as the sum of long-term debt plus debt in current liabilities, all scaled by the book value of total assets. All ratio variables are winsorized at 1st and 99th percentiles.

Table 2

Sample distribution of corporate bond credit ratings and re-ratings for financially flexible, inflexible and neutral firms.

Credit rating	Credit score	Number of firm-years				Number upgraded to this grade				Number downgraded to this grade				Credit score	Credit rating
		Flexible	Inflexible	Neutral	Total	Flexible	Inflexible	Neutral	Total	Flexible	Inflexible	Neutral	Total		
AAA	21	125	28	100	253	6	0	1	7	0	0	0	0	21	AAA
AA+	20	56	1	18	75	4	0	0	4	3	1	0	4	20	AA+
AA	19	233	54	124	411	13	2	1	16	1	3	8	12	19	AA
AA-	18	277	72	133	482	14	1	8	23	20	11	15	46	18	AA-
A+	17	402	129	273	804	36	7	14	57	23	17	18	58	17	A+
A	16	665	272	507	1444	56	12	33	101	27	39	38	104	16	A
A-	15	542	224	332	1098	62	12	32	106	56	39	40	135	15	A-
BBB+	14	601	318	340	1259	78	19	38	135	58	61	41	160	14	BBB+
BBB	13	712	465	476	1653	77	26	46	149	52	88	63	203	13	BBB
BBB-	12	482	389	316	1187	79	26	31	136	50	82	43	175	12	BBB-
BB+	11	318	259	216	793	67	30	33	130	38	57	25	120	11	BB+
BB	10	383	426	211	1020	94	38	22	154	32	61	29	122	10	BB
BB-	9	373	514	198	1085	71	32	26	129	36	74	26	136	9	BB-
B+	8	216	378	131	725	28	22	11	61	23	73	22	118	8	B+
B	7	59	151	48	258	7	8	4	19	15	53	11	79	7	B
B-	6	25	60	21	106	1	6	1	8	8	30	4	42	6	B-
CCC+	5	4	30	6	40	1	0	0	1	1	13	3	17	5	CCC+
CCC	4	0	4	0	4	0	0	0	0	0	1	0	1	4	CCC
CCC-	3	0	2	0	2	0	0	0	0	0	2	0	2	3	CCC-
CC	2	0	4	0	4	0	0	0	0	0	3	0	3	2	CC
C&D	1	2	0	0	2	0	0	0	0	2	0	0	2	1	C&D
Total		5,475	3,780	3,450	12,705	694	241	301	1,236	445	708	386	1,539		Total

This table reports the distribution of corporate bond credit ratings and re-rating activity for the subsamples of financially flexible, inflexible and neutral firms, as well as the overall totals over the period 1985-2009 using the market leverage proxy of financial flexibility, as defined in Section 3.2.2. The credit rating used in the analysis is Standard & Poor's Long-term Domestic Issuer Credit Rating (data item 280), defined by Standard & Poor's (2001) as the "current opinion on an issuer's overall capacity to pay its financial obligations". Following Horrigan (1966) and Kisgen (2006), credit ratings are transformed into numerical scores, ranging from 1 for the lowest credit ratings (C and D) to 21 for the highest credit rating (AAA).

Table 3

Baseline joint regressions of the change in the cost of capital, capital expenditure and issuance of net debt versus net equity on credit rating upgrades and downgrades.

	Δ Cost of Capital	*Capital Expenditure*	*Issuance of Net Debt versus Net Equity*
Constant	0.0153	0.2604	0.0280
	(2.04)**	(9.00)***	(0.87)
DUP (t-1)	-0.0033	0.0179	0.0041
	-(3.99)***	(5.38)***	(1.08)
DDOWN (t-1)	0.0039	-0.0178	-0.0140
	(4.46)***	-(3.98)***	-(3.11)***
EBITDA (t-1)	-0.0198	0.4990	0.3094
	-(3.58)***	(23.46)***	(12.59)***
Δ*.EBITDA (t-1)*	0.0109	-0.0710	0.0501
	(1.69)	-(2.48)**	(1.67)
Tobin's Q (t-1)	-0.0006	0.0314	0.0104
	-(1.47)	(19.54)***	(5.92)***
Ln(Assets) (t-1)	-0.0004	-0.0007	-0.0015
	-(1.56)	-(0.55)	-(1.11)
NPPE (t-1)	0.0041	-0.1850	-0.0040
	(2.85)***	-(34.56)***	-(0.63)
R & D (t-1)	0.0139	0.3062	-0.1557
	(1.27)	(6.91)***	-(2.91)***
R & D Dummy (t-1)	-0.0003	0.0151	0.0031
	-(0.37)	(4.35)***	(0.91)
Dividend (t-1)	0.0146	-1.7455	-0.2790
	(0.65)	-(17.40)***	-(2.92)***
Cash (t-1)	-0.0058	0.1357	-0.0177
	-(1.71)	(10.49)***	-(1.11)
Rating (t-1)	-0.0003	-0.0038	0.0016
	-(1.88)	-(6.15)***	(2.46)**
Leverage (t-1)		-0.0749	-0.1086
		-(8.66)***	-(11.28)***
Adjusted- R^2	0.14	0.33	0.11

This table reports the outcome of estimating full-information maximum likelihood regressions. The dependent variables are the (a) change in the cost of capital; (b) capital expenditure; and (c) issuance of net debt versus net equity. DUP: is a dummy variable which takes a value of unity if a firm's credit rating was upgraded in a particular year, and zero otherwise. DDOWN: is a dummy variable which takes a value of unity if a firm's credit rating was downgraded in a particular year, and zero otherwise. All other variables are measured as defined in Table 1. All equations include industry and year dummies. The three equations are estimated simultaneously. The regressions pertain to our sample of 971 firms and 12,705 firm-year observations. ***, **, indicate that the coefficient is significant at the 1% and 5% levels, respectively.

Table 4

2SLS regressions of capital expenditure and issuance of net debt versus net equity on the estimated cost of capital.

	Capital Expenditure	*Issuance of Net Debt versus Net Equity*
Constant	0.7143	0.2701
	(7.92)***	(3.44)***
E(Cost of Capital) (t-1)	-3.1568	-1.6879
	-(5.17)***	-(3.18)***
EBITDA (t-1)	0.4798	0.2891
	(14.58)***	(10.08)***
Δ.*EBITDA (t-1)*	-0.0716	0.0558
	-(1.83)	(1.64)
Tobin's Q (t-1)	0.0351	0.0086
	(10.91)***	(3.07)***
Ln(Assets) (t-1)	0.0014	-0.0005
	(0.94)	-(0.37)
NPPE (t-1)	-0.1783	-0.0005
	-(23.11)***	-(0.07)
R & D (t-1)	0.4032	-0.0849
	(6.00)***	-(1.45)
R & D Dummy (t-1)	0.0098	0.0009
	(2.41)**	(0.26)
Dividend (t-1)	-2.5690	-0.7335
	-(13.74)***	-(4.50)***
Cash (t-1)	0.2109	0.0276
	(8.26)***	(1.24)
Rating (t-1)	-0.0094	-0.0011
	-(7.67)***	-(1.06)
Leverage (t-1)	-0.3363	-0.2552
	-(7.89)***	-(6.87)***
Adjusted- R^2	0.293	0.144

This table reports the outcome of estimating two-stage least squares (2SLS) regressions, as described in the text where changes in credit rating, credit rating level and the interaction between the change in credit rating and credit rating are used as instruments to estimate cost of capital components as captured by Equations (2) and (3). The dependent variables are capital expenditure and issuance of net debt versus net equity. All control variables are defined in Table 1. All equations include industry and year dummies. The equation pair is estimated simultaneously in the second stage. The two regressions pertain to our sample of 971 firms and 12,705 firm-year observations. ***, **, indicate that the coefficient is significant at the 1% and 5% levels, respectively.

Table 5

OLS regressions of the change in the cost of capital and its components on the interaction between financial flexibility and credit re-rating.

	Δ Cost of Debt		*Δ Cost of Equity*		*Δ Cost of Capital*	
	M. Leverage	*B. Leverage*	*M. Leverage*	*B. Leverage*	*M. Leverage*	*B. Leverage*
Base = stable rating, financially flexible firms						
Constant	-0.0232	-0.0229	0.0185	0.0188	0.0130	0.0133
	-(6.25)***	-(8.94)***	(2.30)**	(2.33)**	(2.09)**	(2.12)**
DFU (t-1)	-0.0047	-0.0047	-0.0034	-0.0035	-0.0046	-0.0046
	-(7.93)***	-(9.71)***	-(2.17)**	-(2.32)**	-(3.81)***	-(3.92)***
DFD(t-1)	0.0033	0.0033	0.0017	0.0014	0.0016	0.0015
	(4.67)***	(5.30)***	(0.87)	(0.72)	(1.05)	(1.03)
DNA(t-1)	-0.0005	-0.0006	-0.0019	-0.0024	-0.0010	-0.0015
	-(1.72)	-(2.18)**	-(2.09)**	-(2.58)***	-(1.51)	-(2.06)**
Base = stable rating, financially inflexible firms						
Constant	-0.0238	-0.0235	0.0181	0.0184	0.0140	0.0143
	-(6.57)***	-(9.15)***	(5.22)***	(2.28)**	(2.23)**	(2.29)**
DIU (t-1)	-0.0032	-0.0034	-0.0013	-0.0015	-0.0009	-0.0010
	-(3.10)***	-(4.27)***	-(0.52)	-(0.61)	-(0.48)	-(0.50)
DID (t-1)	0.0057	0.0058	0.0052	0.0049	0.0059	0.0058
	(9.77)***	(11.74)***	(2.71)***	(3.18)***	(4.79)***	(4.87)***
DNA(t-1)	-0.0002	-0.0003	-0.0014	-0.0020	-0.0020	-0.0025
	-(0.62)	-(0.05)	-(1.55)	-(1.95)	-(2.51)**	-(3.16)***
EBITDA (t-1)	-0.0005	-0.0004	-0.0152	-0.0151	-0.0092	-0.0089
	-(0.30)	-(0.18)	-(2.68)***	-(1.93)	-(1.51)	-(1.47)
Δ.EBITDA (t-1)	-0.0056	-0.0057	0.0120	0.0118	0.0109	0.0107
	-(2.01)**	-(2.49)**	(1.51)	(1.64)	(1.96)	(1.92)
Tobin's Q (t-1)	-0.0003	-0.0002	-0.0005	-0.0005	-0.0011	-0.0011
	-(2.17)**	-(1.21)	-(1.29)	-(0.88)	-(2.45)**	-(2.35)**
Ln(Assets) (t-1)	0.0001	0.0001	-0.0004	-0.0005	-0.0004	-0.0004
	(2.69)***	(1.08)	-(2.89)***	-(1.35)	-(1.62)	-(1.70)
NPPE (t-1)	0.0001	0.0001	0.0047	0.0047	0.0041	0.0040
	-(0.02)	-(0.04)	(5.01)***	(2.46)**	(2.74)***	(2.72)***
R & D (t-1)	0.0027	0.0023	0.0141	0.0142	0.0169	0.0167
	(0.85)	(0.47)	(1.64)	(0.91)	(1.40)	(1.38)
R & D Dummy (t-1)	0.0002	0.0001	0.0005	0.0004	-0.0002	-0.0003
	(1.33)	(0.48)	(1.02)	(0.46)	-(0.33)	-(0.40)
Dividend (t-1)	0.0128	0.0118	0.0065	0.0066	0.0111	0.0106
	(2.81)***	(1.27)	(0.39)	(0.23)	(0.49)	(0.47)
Cash (t-1)	-0.0003	-0.0003	-0.0101	-0.0101	-0.0035	-0.0035
	-(0.26)	-(0.17)	-(2.73)***	-(2.03)**	-(0.92)	-(0.90)
Rating (t-1)	-0.0001	-0.0001	-0.0001	-0.0001	-0.0002	-0.0002
	-(2.52)**	-(1.59)	-(1.35)	-(0.78)	-(1.60)	-(1.49)
Adjusted- R^2	0.31	0.31	0.11	0.11	0.14	0.14

This table reports the outcome of estimating, respectively, the change in the cost of debt, the change in the cost of equity and the change in the weighted average cost of capital on the interaction between financial flexibility and credit re-rating. Two alternative proxies for financial flexibility are used: one based on market leverage and the other based on book leverage. Each proxy is a function of the deviation of each firm's annual leverage ratio from its long-run target leverage ratio following the method employed by Denis and McKeon (2012) as explained in Section 3.2.2. DFU (DFD): is a dummy variable which takes a value of unity if, in a given year, the credit rating of the firm is upgraded (downgraded) and it is deemed financially flexible i.e., the firm's leverage ratio is at least 3% below its target; and zero otherwise. DIU (DID): is a dummy variable which takes a value of unity if in a given year the credit rating of the firm is upgraded (downgraded) and it is deemed financially inflexible i.e. the firm's leverage ratio is at least 3% above its target; and zero otherwise. DNA: is a dummy variable which takes a value of unity if in any year the firm is deemed financially neutral i.e., the firm's leverage ratio is within ± 3% from its target, and zero otherwise. To enhance interpretation, we report the results for upgraded and downgraded financially flexible (inflexible) firms against the relevant benchmark i.e. stable rating financially flexible (inflexible) firms. We achieve this by estimating two equivalent versions of the system in each case — one version omits the DFS dummy and this is used to benchmark DFU/DFD, while the second version omits the DIS dummy and this is used to benchmark DIU/DID. For each base, the regression includes all the remaining interaction dummies, but we report the result for each group to conserve space. All other variables are measured as defined in Table 1. All equations include industry and year dummies. The regressions pertain to our sample of 971 firms and 12,705 firm-year observations. ***, **, indicate that the coefficient is significant at the 1% and 5% levels, respectively.

Table 6

OLS regressions of capital expenditure and issuance of net debt versus net equity on the interaction between financial flexibility and credit re-rating.

	Capital Expenditure		*Issuance of Net Debt versus Net Equity*	
	M. Leverage	*B. Leverage*	*M. Leverage*	*B. Leverage*
Base = stable rating, financially flexible firms				
Constant	0.2843	0.2843	0.0210	0.0211
	(10.27)***	(10.45)***	(0.75)	(0.75)
DFU (t-1)	0.0226	0.0221	0.0128	0.0118
	(4.25)***	(4.55)***	(2.37)**	(2.22)**
DFD(t-1)	-0.0100	-0.0102	-0.0101	-0.0108
	-(1.50)	-(1.54)	-(1.48)	-(1.59)
DNA(t-1)	-0.0116	-0.0125	-0.0088	-0.0080
	-(3.80)***	-(3.98)***	-(2.83)***	-(2.50)**
Base = stable rating, financially inflexible firms				
Constant	0.2684	0.2673	-0.0048	-0.0048
	(9.67)***	(9.63)***	-(0.17)	-(0.17)
DIU (t-1)	0.0018	0.0021	-0.0022	-0.0028
	(0.21)	(0.24)	-(0.24)	-(0.31)
DID (t-1)	-0.0336	-0.0336	-0.0251	-0.0240
	-(6.14)***	-(6.32)***	-(4.50)***	-(4.42)***
DNA(t-1)	0.0042	0.0045	0.0170	0.0179
	(1.21)	(1.26)	(4.76)***	(4.96)***
EBITDA (t-1)	0.3549	0.3524	0.2495	0.2472
	(13.25)***	(13.15)***	(9.14)***	(9.05)***
Δ*.EBITDA (t-1)*	-0.1832	-0.1824	-0.1393	-0.1371
	-(7.41)***	-(7.39)***	-(5.53)***	-(5.44)***
Tobin's Q (t-1)	0.0425	0.0418	0.0164	0.0158
	(21.03)***	(20.68)***	(7.95)***	(7.65)***
Ln(Assets) (t-1)	-0.0026	-0.0024	-0.0025	-0.0025
	-(2.21)**	-(2.08)**	-(2.15)**	-(2.08)**
NPPE (t-1)	-0.1934	-0.1930	-0.0141	-0.0137
	-(29.41)***	-(29.37)***	-(2.11)**	-(2.04)**
R & D (t-1)	0.2903	0.2951	-0.1474	-0.1444
	(5.42)***	(5.50)***	-(2.70)***	-(2.64)***
R & D Dummy (t-1)	0.0146	0.0150	0.0029	0.0032
	(4.46)***	(4.59)***	(0.88)	(0.96)
Dividend (t-1)	-1.6462	-1.6375	-0.2434	-0.2443
	-(16.39)***	-(16.30)***	-(2.38)**	-(2.38)**
Cash (t-1)	0.0989	0.0976	-0.0295	-0.0297
	(5.81)***	(5.74)***	-(1.70)	-(1.71)
Rating (t-1)	-0.0028	-0.0029	0.0026	0.0026
	-(4.60)***	-(4.83)***	(4.32)***	(4.18)***
Adjusted- R^2	0.32	0.32	0.10	0.10

This table reports the outcome of regressing, respectively, the capital expenditure and issuance of net debt versus net equity on the interaction between financial flexibility and credit re-rating. Two alternative proxies for financial flexibility are used: one based on market leverage and the other based on book leverage. Each proxy is a function of the deviation of each firm's annual leverage ratio from its long-run target leverage ratio following the method employed by Denis and McKeon (2012) as explained in Section 3.2.2. DFU (DFD): is a dummy variable which takes a value of unity if, in a given year, the credit rating of the firm is upgraded (downgraded) and it is deemed financially flexible i.e. the firm's leverage ratio is at least 3% below its target; and zero otherwise. DIU (DID): is a dummy variable which takes a value of unity if, in a given year, the credit rating of the firm is upgraded (downgraded) and it is deemed financially inflexible i.e., the firm's leverage ratio is at least 3% above its target and zero otherwise. DNA: is a dummy variable which takes a value of unity if in any year the firm is deemed financially neutral i.e. the firm's leverage ratio is within ± 3% from its target, and zero otherwise. To enhance interpretation, we report the results for upgraded and downgraded financially flexible (inflexible) firms against the relevant benchmark i.e., stable rating financially flexible (inflexible) firms. We achieve this by estimating two equivalent versions of the system in each case — one version omits the DFS dummy and this is used to benchmark DFU/DFD, while the second version omits the DIS dummy and this is used to benchmark DIU/DID. For each base, the regression includes all the remaining interaction dummies, but we report the result for each group to conserve space. All other variables are measured as defined in Table 1. All equations include industry and year dummies. The regressions pertain to our sample of 971 firms and 12,705 firm-year observations. ***, **, indicate that the coefficient is significant at the 1% and 5% levels, respectively.

Table 7

Joint regressions of the change in the cost of capital, capital expenditure and issuance of net debt versus net equity on the interaction between financial flexibility and credit re-rating.

	Δ Cost of Capital	*Capital Expenditure*	*Issuance of Net Debt versus Net Equity*
Base = stable rating, financially flexible firms			
Constant	0.0125	0.2789	0.0186
	(1.67)	(9.57)***	(0.58)
DFU (t-1)	-0.0046	0.0226	0.0128
	-(4.47)***	(5.34)***	(2.63)***
DFD(t-1)	0.0016	-0.0100	-0.0101
	(1.14)	-(1.35)	-(1.14)
DNA(t-1)	-0.0010	-0.0116	-0.0088
	-(1.49)	-(3.51)***	-(2.73)***
Base = stable rating, financially inflexible firms			
Constant	0.0139	0.2680	-0.0049
	(1.87)	(9.10)***	-(0.15)
DIU (t-1)	-0.0010	0.0018	-0.0022
	-(0.43)	(0.21)	-(0.24)
DID (t-1)	0.0059	-0.0337	-0.0251
	(4.22)***	-(5.00)***	-(3.97)***
DNA(t-1)	-0.0020	0.0042	0.0170
	-(2.27)**	(1.14)	(4.65)***
EBITDA (t-1)	-0.0092	0.3560	0.2495
	-(1.67)	(17.15)***	(10.28)***
Δ.EBITDA (t-1)	0.0110	-0.1836	-0.1393
	(2.17)**	-(9.30)***	-(5.98)***
Tobin's Q (t-1)	-0.0011	0.0425	0.0164
	-(2.70)***	(25.98)***	(9.69)***
Ln(Assets) (t-1)	-0.0004	-0.0025	-0.0025
	-(1.44)	-(1.85)	-(1.86)
NPPE (t-1)	0.0041	-0.1934	-0.0142
	(2.72)***	-(32.71)***	-(2.13)**
R & D (t-1)	0.0170	0.2894	-0.1479
	(1.55)	(6.53)***	-(2.77)***
R & D Dummy (t-1)	-0.0002	0.0146	0.0029
	-(0.31)	(4.15)***	(0.85)
Dividend (t-1)	0.0110	-1.6478	-0.2437
	(0.50)	-(16.37)***	-(2.57)**
Cash (t-1)	-0.0034	0.1001	-0.0293
	-(0.98)	(7.84)***	-(1.85)
Rating (t-1)	-0.0002	-0.0028	0.0026
	-(1.51)	-(4.65)***	(4.20)***
Adjusted- R^2	0.14	0.32	0.10

This table reports the outcome of jointly estimating (a) the change in the cost of capital; (b) capital expenditure; and (c) issuance of net debt versus net equity on the interaction between financial flexibility and credit re-rating based on the market leverage proxy for financial flexibility and using the full-information maximum likelihood estimation technique. The flexibility proxy is a function of the deviation of each firm's annual leverage ratio from its long-run target leverage ratio, following the method employed by Denis and McKeon (2012) as explained in Section 3.2.2. DFU (DFD): is a dummy variable which takes a value of unity if, in a given year, the credit rating of the firm is upgraded (downgraded) and it is deemed financially flexible i.e., the firm's leverage ratio is at least 3% below its target; and zero otherwise. DIU (DID): is a dummy variable which takes a value of unity if, in a given year, the credit rating of the firm is upgraded (downgraded) and it is deemed financially inflexible i.e., the firm's leverage ratio is at least 3% above its target and zero otherwise. DNA: is a dummy variable which takes a value of unity if in any year the firm is deemed financially neutral i.e., the firm's leverage ratio is within ± 3% from its target, and zero otherwise. To enhance interpretation, we report the results for upgraded and downgraded financially flexible (inflexible) firms against the relevant benchmark i.e., stable rating financially flexible (inflexible) firms. We achieve this by estimating two equivalent versions of the system in each case – one version omits the DFS dummy and this is used to benchmark DFU/DFD, while the second version omits the DIS dummy and this is used to benchmark DIU/DID. For each base, the regression includes all the remaining interaction dummies, but we report the result for each group to conserve space. All other variables are measured as defined in Table 1. All equations include industry and year dummies. The regressions pertain to our sample of 971 firms and 12,705 firm-year observations. ***, **, indicate that the coefficient is significant at the 1% and 5% levels, respectively.

Table 8

Joint regressions of the change in the cost of debt and net debt issuance, and the change in the cost of equity and net equity issuance on the interaction between financial flexibility and credit re-rating.

	Δ Cost of Debt	*Net Debt issuance*	*Δ Cost of Equity*	*Net Equity issuance*
Base = stable rating, financially flexible firms				
Constant	-0.0233	0.1327	0.0185	0.1112
	-(6.84)***	(4.50)***	(1.95)	(9.73)***
DFU (t-1)	-0.0047	0.0141	-0.0034	0.0013
	-(10.58)***	(3.02)***	-(2.32)**	(0.75)
DFD(t-1)	0.0033	-0.0069	0.0017	0.0032
	(5.72)***	-(0.80)	(0.90)	(1.28)
DNA(t-1)	-0.0005	-0.0066	-0.0019	0.0022
	-(1.49)	-(2.16)**	-(1.99)**	(2.00)**
Base = stable rating, financially inflexible firms				
Constant	-0.0238	0.1112	0.0181	0.1159
	-(6.99)***	(3.76)***	(1.90)	(10.10)***
DIU (t-1)	-0.0032	-0.0017	-0.0013	0.0005
	-(4.87)***	-(0.20)	-(0.53)	(0.18)
DID (t-1)	0.0057	-0.0277	0.0052	-0.0026
	(11.97)***	-(4.54)***	(3.69)***	-(1.02)
DNA(t-1)	0.0002	0.0145	-0.0014	-0.0025
	(0.51)	(4.24)***	-(1.34)	-(1.83)
EBITDA (t-1)	-0.0006	0.0716	-0.0152	-0.1778
	-(0.23)	(3.08)***	-(2.06)**	-(22.48)***
Δ.EBITDA (t-1)	-0.0056	-0.0701	0.0119	0.0692
	-(2.77)***	-(3.14)***	(1.80)	(8.82)***
Tobin's Q (t-1)	-0.0002	0.0139	-0.0005	-0.0025
	-(1.14)	(8.21)***	-(0.87)	-(4.50)***
Ln(Assets) (t-1)	0.0001	-0.0048	-0.0004	-0.0022
	(1.10)	-(3.89)***	-(1.27)	-(4.64)***
NPPE (t-1)	0.0000	0.0121	0.0047	0.0262
	(0.02)	(1.90)	(2.56)**	(11.34)***
R & D (t-1)	0.0026	-0.0441	0.0141	0.1034
	(0.59)	-(0.80)	(0.90)	(6.86)***
R & D Dummy (t-1)	0.0002	0.0028	0.0005	-0.0001
	(0.65)	(0.84)	(0.50)	-(0.07)
Dividend (t-1)	0.0128	-0.2917	0.0065	-0.0482
	(1.36)	-(3.32)***	(0.21)	-(1.53)
Cash (t-1)	-0.0003	-0.0684	-0.0101	-0.0388
	-(0.18)	-(4.56)***	-(2.07)**	-(7.70)***
Rating (t-1)	-0.0001	0.0003	-0.0001	-0.0023
	-(1.59)	(0.51)	-(0.77)	-(10.81)***
Adjusted- R^2	0.31	0.06	0.11	0.19

This table reports the outcome of joint estimation of the change in the nominal cost of debt and net debt issuance, and joint estimation of the change in the nominal cost of equity and net equity issuance on the interaction between financial flexibility and credit re-rating, based on the market leverage proxy of financial flexibility and using the full-information maximum likelihood estimation technique. The flexibility proxy is a function of the deviation of each firm's annual leverage ratio from its long-run target leverage ratio following the method employed by Denis and McKeon (2012) as explained in Section 3.2.2. DFU (DFD): is a dummy variable which takes a value of unity if, in a given year, the credit rating of the firm is upgraded (downgraded) and it is deemed financially flexible i.e., the firm's leverage ratio is at least 3% below its target; and zero otherwise. DIU (DID): is a dummy variable which takes a value of unity if in a given year the credit rating of the firm is upgraded (downgraded) and it is deemed financially inflexible i.e., the firm's leverage ratio is at least 3% above its target; and zero otherwise. DNA: is a dummy variable which takes a value of unity if, in any year, the firm is deemed financially neutral i.e., the firm's leverage ratio is within ± 3% from its target, and zero otherwise. To enhance interpretation, we report the results for upgraded and downgraded financially flexible (inflexible) firms against the relevant benchmark i.e. stable rating financially flexible (inflexible) firms. We achieve this by estimating two equivalent versions of the system in each case — one version omits the DFS dummy and this is used to benchmark DFU/DFD, while the second version omits the DIS dummy and this is used to benchmark DIU/DID. For each base, the regression includes all the remaining interaction dummies, but we report the result for each group to conserve space. All other variables are measured as defined in Table 1. All equations include industry and year dummies. The regressions pertain to our sample of 971 firms and 12,705 firm-year observations. ***, **, indicate that the coefficient is significant at the 1% and 5% levels, respectively.

Table 9

Joint regressions of the change in the cost of capital, capital expenditure and issuance of net debt versus net equity on the interaction between financial flexibility and credit re-rating for investment grade firms (ratings ≥ BBB-).

	Δ Cost of Capital	*Capital Expenditure*	*Issuance of Net Debt versus Net Equity*
Base = stable rating, financially flexible firms of investment grade			
Constant	0.0094	0.2124	0.0276
	(1.21)	(7.36)***	(0.82)
DFU (t-1)	-0.0054	0.0199	0.0157
	-(4.36)***	(4.73)***	(2.68)***
DFD(t-1)	0.0027	0.0057	-0.0051
	(1.72)	(0.77)	-(0.57)
DNA(t-1)	-0.0023	-0.0081	-0.0076
	-(3.10)***	-(2.65)***	-(2.27)**
Base = stable rating, financially inflexible firms of investment grade			
Constant	0.0098	0.2029	0.0068
	(1.43)	(7.50)***	(0.23)
DIU (t-1)	-0.0016	0.0179	0.0218
	-(0.61)	(1.68)	(1.84)
DID (t-1)	0.0038	-0.0166	-0.0216
	(2.40)**	-(2.66)***	-(3.11)***
DNA(t-1)	-0.0029	0.0027	0.0068
	-(3.27)***	(0.76)	(0.23)
EBITDA (t-1)	-0.0118	0.3900	0.2678
	-(1.72)	(16.43)***	(9.21)***
Δ.EBITDA (t-1)	0.0067	-0.2159	-0.0805
	(1.04)	-(9.29)***	-(2.87)***
Tobin's Q (t-1)	-0.0004	0.0375	0.0144
	-(0.97)	(23.48)***	(7.97)***
Ln(Assets) (t-1)	-0.0004	-0.0005	-0.0024
	-(1.28)	-(0.42)	-(1.76)
NPPE (t-1)	0.0042	-0.1847	-0.0089
	(2.33)**	-(26.52)***	-(1.08)
R & D (t-1)	0.0112	0.0941	-0.1278
	(0.86)	(1.90)	-(2.03)**
R & D Dummy (t-1)	-0.0002	0.0078	0.0011
	-(0.25)	(2.25)**	(0.30)
Dividend (t-1)	-0.0217	-1.7848	-0.1930
	-(0.93)	-(18.26)***	-(1.97)
Cash (t-1)	-0.0015	0.0338	0.0050
	-(0.34)	(2.33)**	(0.24)
Rating (t-1)	-0.0001	-0.0007	0.0020
	-(0.61)	-(1.00)	(2.37)**
Adjusted- R^2	0.10	0.34	0.09

This table reports the outcome of jointly estimating (a) the change in the cost of capital, (b) capital expenditure and (c) issuance of net debt versus net equity on the interaction between financial flexibility and credit re-rating for the investment grade ratings (≥ BBB) subsample, based on the market leverage proxy for financial flexibility and using the full-information maximum likelihood estimation technique. The flexibility proxy is a function of the deviation of each firm's annual leverage ratio from its long-run target leverage ratio, following the method employed by Denis and McKeon (2012) as explained in Section 3.2.2. DFU (DFD): is a dummy variable which takes a value of unity if in a given year the credit rating of the firm is upgraded (downgraded) and it is deemed financially flexible i.e. the firm's leverage ratio is at least 3% below its target; and zero otherwise. DIU (DID): is a dummy variable which takes a value of unity if in a given year the credit rating of the firm is upgraded (downgraded) and it is deemed financially inflexible i.e. the firm's leverage ratio is at least 3% above its target and zero otherwise. DNA: is a dummy variable which takes a value of unity if in any year the firm is deemed financially neutral i.e. the firm's leverage ratio is within ± 3% from its target, and zero otherwise. To enhance interpretation, we report the results for upgraded and downgraded financially flexible (inflexible) firms against the relevant benchmark i.e. stable rating financially flexible (inflexible) firms. We achieve this by estimating two equivalent versions of the system in each case – one version omits the DFS dummy and this is used to benchmark DFU/DFD, while the second version omits the DIS dummy and this is used to benchmark DIU/DID. For each base, the regression includes all the remaining interaction dummies, but we report the result for each group to conserve space. All other variables are measured as defined in Table 1. All equations include industry and year dummies. The regressions pertain to our sample of 971 firms and 12,705 firm-year observations. ***, **, indicate that the coefficient is significant at the 1% and 5% levels, respectively.

Table 10

Joint regressions of the change in the cost of capital, capital expenditure and issuance of net debt versus net equity on the interaction between financial flexibility and credit re-rating distinguishing firms re-rated to the boundary of investment/speculative grade (BBB- and BB+).

	Δ Cost of Capital	*Capital Expenditure*	*Issuance of Net Debt versus Net Equity*
Base = stable rating, financially flexible firms			
Constant	0.0142	0.2799	0.0182
	(1.90)	(9.58)***	(0.56)
DFNBU (t-1)	-0.0039	0.0198	0.0039
	-(3.37)***	(4.18)***	(0.68)
DFNBD (t-1)	0.0015	-0.0103	-0.0084
	(0.96)	-(1.24)	-(0.88)
DFBU(t-1)	-0.0075	0.0340	0.0491
	-(4.17)***	(4.41)***	(6.00)***
DFBD(t-1)	0.0018	-0.0089	-0.0175
	(0.62)	-(0.56)	-(0.74)
DNA(t-1)	-0.0011	-0.0116	-0.0088
	-(1.52)	-(3.52)***	-(2.73)***
Base = stable rating, financially inflexible firms			
Constant	0.0139	0.2677	-0.0044
	(1.86)	(9.06)***	-(0.14)
DINBU (t-1)	-0.0010	0.0098	-0.0014
	-(0.41)	(1.03)	-(0.14)
DINBD(t-1)	0.0058	-0.0310	-0.0224
	(3.75)***	-(4.09)***	-(3.25)***
DIBU(t-1)	-0.0008	-0.0213	-0.0044
	-(0.16)	-(1.23)	-(0.19)
DIBD(t-1)	0.0064	-0.0437	-0.0354
	(2.36)**	-(3.31)***	-(2.60)***
DNA(t-1)	-0.0020	0.0042	0.0169
	-(2.26)**	(1.13)	(4.63)***
EBITDA (t-1)	-0.0091	0.3551	0.2488
	-(1.65)	(17.05)***	(10.24)***
Δ.EBITDA (t-1)	0.0109	-0.1827	-0.1387
	(2.15)**	-(9.21)***	-(5.95)***
Tobin's Q (t-1)	-0.0011	0.0424	0.0162
	-(2.66)***	(25.92)***	(9.59)***
Ln(Assets) (t-1)	-0.0004	-0.0025	-0.0025
	-(1.56)	-(1.85)	-(1.85)
NPPE (t-1)	0.0039	-0.1932	-0.0135
	(2.60)***	-(32.50)***	-(2.03)**
R & D (t-1)	0.0167	0.2905	-0.1455
	(1.52)	(6.55)***	-(2.73)***
R & D Dummy (t-1)	-0.0003	0.0148	0.0031
	-(0.39)	(4.17)***	(0.90)
Dividend (t-1)	0.0108	-1.6448	-0.2373
	(0.49)	-(16.33)***	-(2.50)**
Cash (t-1)	-0.0037	0.0990	-0.0292
	-(1.05)	(7.73)***	-(1.85)
Rating (t-1)	-0.0002	-0.0027	0.0027
	-(1.62)	-(4.60)***	(4.27)***
Adjusted- R^2	0.14	0.32	0.10

This table reports the outcome of jointly estimating (a) the change in the cost of capital; (b) capital expenditure; and (c) issuance of net debt versus net equity on the interaction between financial flexibility and credit re-rating to the investment/speculative grade boundary and non-boundary re-ratings. This analysis is based on the market leverage proxy for financial flexibility and uses the full-information maximum likelihood estimation technique. The flexibility proxy is a function of the deviation of each firm's annual leverage ratio from its long-run target leverage ratio, following the method employed by Denis and McKeon (2012) as explained in Section 3.2.2. A firm is deemed financially flexible (inflexible) if the firm's leverage ratio is at least 3% below (above) its target. DFNBU (DFNBD): is a dummy variable which takes a value of unity if in a given year the credit rating of the firm is upgraded (downgraded) to any rating other than BBB- or BB+ and the firm is deemed to be financially flexible; and zero otherwise. DFBU (DFBD): is a dummy variable which takes a value of unity if, in a given year, the credit rating of the firm is upgraded (downgraded) to either BBB- or BB+ and the firm is deemed to be financially flexible; and zero otherwise. DINBU (DINBD): is a dummy variable which takes a value of unity if, in a given year, the credit rating of the firm is upgraded (downgraded) to any rating other than BBB- or BB+ and the firm is deemed to be financially inflexible; and zero otherwise. DIBU (DIBD): is a dummy variable which takes a value of unity if, in a given year, the credit rating of the firm is upgraded (downgraded) to either BBB- or BB+ and the firm is deemed to be financially inflexible; and zero otherwise. DNA: is a dummy variable which takes a value of unity if, in any year, the firm is deemed financially neutral i.e., the firm's leverage ratio is within ± 3% from its target, and zero otherwise. To enhance interpretation, we report the results for upgraded and downgraded financially flexible (inflexible) firms against the relevant benchmark i.e., stable financially flexible (inflexible) firms. For each base, the regression includes all the remaining interaction dummies, but we report the result for each group to conserve space. All other variables are measured as defined in Table 1. All equations include industry and year dummies. The three equations are estimated simultaneously. The regressions pertain to our sample of 971 firms and 12,705 firm-year observations. ***, **, indicate that the coefficient is significant at the 1% and 5% levels, respectively.

Table 11

Robustness Check — 2SLS regressions of the change in the cost of capital, capital expenditure and issuance of net debt versus net equity on the estimated interaction between financial flexibility and credit re-rating.

	Δ Cost of Capital	*Capital Expenditure*	*Issuance of Net Debt versus Net Equity*
Base = stable rating, financially flexible firms			
Constant	0.0112	0.2939	0.0316
	(1.79)	(10.62)***	(1.12)
DFU* (t-1)	-0.0046	0.0398	0.0217
	-(3.10)***	(6.11)***	(3.27)***
DFD*(t-1)	0.0002	-0.0092	-0.0144
	(0.11)	-(1.14)	-(1.75)
DNA*(t-1)	-0.0010	-0.0109	-0.0086
	-(1.43)	-(3.63)***	-(2.83)***
Base = stable rating, financially inflexible firms			
Constant	0.0127	0.2760	0.0059
	(2.02)**	(9.93)***	(0.21)
DIU*(t-1)	0.0021	0.0174	-0.0005
	(0.75)	(1.41)	-(0.04)
DID* (t-1)	0.0048	-0.0376	-0.0458
	(2.99)***	-(5.28)***	-(6.32)***
DNA*(t-1)	-0.0025	0.0070	0.0171
	-(3.22)***	(2.06)**	(4.97)***
EBITDA (t-1)	-0.0109	0.3647	0.2601
	-(1.81)	(13.61)***	(9.53)***
Δ.EBITDA (t-1)	0.0144	-0.2174	-0.1685
	(2.54)**	-(8.67)***	-(6.59)***
Tobin's Q (t-1)	-0.0012	0.0421	0.0161
	-(2.61)***	(20.82)***	(7.79)***
Ln(Assets) (t-1)	-0.0003	-0.0033	-0.0031
	-(1.21)	-(2.86)***	-(2.69)***
NPPE (t-1)	0.0044	-0.1957	-0.0153
	(2.99)***	-(29.78)***	-(2.29)**
R & D (t-1)	0.0180	0.2897	-0.1398
	(1.48)	(5.40)***	-(2.56)**
R & D Dummy (t-1)	-0.0002	0.0144	0.0031
	-(0.31)	(4.39)***	(0.93)
Dividend (t-1)	0.0204	-1.6766	-0.2565
	(0.90)	-(16.77)***	-(2.52)**
Cash (t-1)	-0.0035	0.0987	-0.0278
	-(0.90)	(5.80)***	-(1.60)
Rating (t-1)	-0.0003	-0.0022	0.0029
	-(2.02)**	-(3.71)***	(4.73)***
Adjusted- R^2	0.13	0.32	0.10

This table reports the outcome of estimating two-stage least squares (2SLS) regressions, as described in the text. The dependent variables are (a) the change in the cost of capital; (b) capital expenditure; and (c) issuance of net debt versus net equity. The estimated interaction variables between credit rating and financial flexibility are created based on the interaction between the deviation of the firm's actual market leverage ratio from the predicted firm market leverage estimated in Equation (1) and the predicted credit ratings estimated in Equation (4). The flexibility proxy is a function of the deviation of each firm's annual leverage ratio from its long-run target leverage ratio, following the method employed by Denis and McKeon (2012), as explained in Section 3.2.2. A firm is deemed financially flexible (inflexible) if the firm's leverage ratio is at least 3% below (above) its target. DFU* (DFD*): is a dummy variable which takes a value of unity if, in a given year, the credit rating of the firm is upgraded (downgraded), based on 2SLS predicted ratings, and the firm is deemed to be financially flexible; and zero otherwise. DIU* (DID*): is a dummy variable which takes a value of unity if, in a given year, the credit rating of the firm is upgraded (downgraded), based on 2SLS predicted ratings, and the firm is deemed to be financially inflexible; and zero otherwise. DNA*: is a dummy variable which takes a value of unity if, in any year, the firm is deemed financially neutral i.e., the firm's leverage ratio is within ± 3% from its target, and zero otherwise. To enhance interpretation, we report the results for upgraded and downgraded financially flexible (inflexible) firms against the relevant benchmark i.e., stable rating financially flexible (inflexible) firms. We achieve this by estimating two equivalent versions of the system in each case — one version omits the DFS^* dummy and this is used to benchmark DFU^*/DFD^*, while the second version omits the DIS^* dummy, and this is used to benchmark DIU^*/DID^*. For each base, the regression includes all the remaining interaction dummies, but we report the result for each group to conserve space. All other variables are measured as defined in Table 1. All equations include industry and year dummies. The three equations are estimated simultaneously. The regressions pertain to our sample of 971 firms and 12,705 firm-year observations. ***, **, indicate that the coefficient is significant at the 1% and 5% levels, respectively.

Table 12

Further robustness tests - OLS and joint regressions with alternative cost of debt proxies.

	Panel A: Robustness of OLS estimation of Δ Cost of Debt Equation reported in Table 5						Panel B: Robustness of Joint estimation of WACC, CAPEX and INDNE equations reported in Table 7								
	YTM: Yield-to-maturity (Table 5)		*YS-RB: Yield spread on recent bond issue*		*YS-LB: Yield spread on largest bond issue*		*Δ Cost of Capital (WACC)*			*Capital expenditure (CAPEX)*			*Issuance of net debt versus net equity (INDNE)*		
	Market Leverage	*Book Leverage*	*Market Leverage*	*Book Leverage*	*Market Leverage*	*Book Leverage*	*YTM*	*YS-RB*	*YS-LB*	*YTM*	*YS-RB*	*YS-LB*	*YTM*	*YS-RB*	*YS-LB*
Base = stable rating, financially flexible firms															
Constant	-0.0232	-0.0229	0.0010	0.0011	0.0001	0.0002	0.0125	0.0342	0.0342	0.2789	0.2843	0.2841	0.0186	0.0210	0.0205
	-(6.25)***	-(8.94)***	(0.57)	(0.66)	(0.03)	(0.11)	(1.67)	(4.59)***	(4.60)***	(9.57)***	(9.76)***	(9.76)***	(0.58)	(0.65)	(0.64)
DFU (t-1)	-0.0047	-0.0047	-0.0038	-0.0037	-0.0037	-0.0037	-0.0046	-0.0041	-0.0041	0.0226	0.0226	0.0227	0.0128	0.0128	0.0129
	-(7.93)***	-(9.71)***	-(11.69)***	-(11.77)***	-(12.80)***	-(12.83)***	-(4.47)***	-(4.00)***	-(3.97)***	(5.34)***	(5.35)***	(5.36)***	(2.63)***	(2.64)***	(2.65)***
DFD(t-1)	0.0033	0.0033	0.0035	0.0034	0.0033	0.0032	0.0016	0.0017	0.0017	-0.0100	-0.0100	-0.0100	-0.0101	-0.0101	-0.0101
	(4.67)***	(5.30)***	(8.71)***	(8.33)***	(9.08)***	(8.66)***	(1.14)	(1.22)	(1.20)	-(1.35)	-(1.35)	-(1.35)	-(1.14)	-(1.14)	-(1.14)
DNA(t-1)	-0.0005	-0.0006	-0.0001	-0.0002	-0.0001	-0.0001	-0.0010	-0.0011	-0.0011	-0.0116	-0.0116	-0.0116	-0.0088	-0.0088	-0.0088
	-(1.72)	-(2.18)**	-(0.76)	-(0.84)	-(0.40)	-(0.59)	-(1.49)	-(1.60)	-(1.58)	-(3.51)***	-(3.52)***	-(3.51)***	-(2.73)***	-(2.72)***	-(2.72)***
Base = stable rating, financially inflexible firms															
Constant	-0.0238	-0.0235	0.0008	0.0010	-0.0003	-0.0001	0.0139	0.0359	0.0346	0.2680	0.2709	0.2693	-0.0049	-0.0046	-0.0048
	-(6.57)***	-(9.15)***	(0.47)	(0.60)	-(0.21)	-(0.09)	(1.87)	(4.82)***	(4.65)***	(9.10)***	(9.20)***	(9.14)***	-(0.15)	-(0.14)	-(0.15)
DIU (t-1)	-0.0032	-0.0034	-0.0032	-0.0034	-0.0029	-0.0030	-0.0010	-0.0011	-0.0009	0.0018	0.0018	0.0018	-0.0022	-0.0022	-0.0022
	-(3.10)***	-(4.27)***	-(6.01)***	-(6.51)***	-(6.03)***	-(6.24)***	-(0.43)	-(0.51)	-(0.42)	(0.21)	(0.21)	(0.21)	-(0.24)	-(0.24)	-(0.24)
DID (t-1)	0.0057	0.0058	0.0047	0.0046	0.0045	0.0043	0.0059	0.0039	0.0039	-0.0337	-0.0336	-0.0337	-0.0251	-0.0252	-0.0251
	(9.77)***	(11.74)***	(13.95)***	(14.16)***	(14.99)***	(14.75)***	(4.22)***	(2.76)***	(2.76)***	-(5.00)***	-(5.00)***	-(5.00)***	-(3.97)***	-(3.98)***	-(3.97)***
DNA(t-1)	-0.0002	-0.0003	0.0003	-0.0001	0.0003	0.0002	-0.0020	-0.0018	-0.0017	0.0042	0.0042	0.0042	0.0170	0.0170	0.0170
	-(0.62)	-(0.05)	(0.12)	-(0.26)	(1.52)	(1.05)	-(2.27)**	-(2.04)**	-(1.93)**	(1.14)	(1.13)	(1.14)	(4.65)***	(4.65)***	(4.65)***
Adjusted- R^2	0.31	0.31	0.48	0.48	0.48	0.48	0.14	0.38	0.38	0.32	0.32	0.32	0.10	0.10	0.10

This table assesses the robustness of the OLS regressions of the cost of debt equation (Table 5) and the joint regressions of the WACC, CAPEX and INDNE equations (Table 7), using alternative proxies for the cost of debt. Two alternative cost of debt proxies are used: one based on the yield spread on recent bond issue made in the former year (YS-RB) and the other is based on yield spread on largest bond issue made in the former year (*YS-LB*). For comparative purposes, we repeat the counterpart results from Tables 5 and 7, based on the yield-to-maturity proxy (*YTM*). Matching the format of the earlier tables, Panel A (B) reports two (one) alternative proxies (proxy) for financial flexibility based on: market leverage and book leverage (market leverage). Specifically, each proxy is a function of the deviation of each firm's annual leverage ratio from its long-run target leverage ratio following the method employed by Denis and McKeon (2012) as explained in Section 3.2.2. DFU (DFD): is a dummy variable which takes a value of unity if, in a given year, the credit rating of the firm is upgraded (downgraded) and it is deemed financially flexible i.e., the firm's leverage ratio is at least 3% below its target; and zero otherwise. DIU (DID): is a dummy variable which takes a value of unity if, in a given year, the credit rating of the firm is upgraded (downgraded) and it is deemed financially inflexible i.e., the firm's leverage ratio is at least 3% above its target; and zero otherwise. DNA: is a dummy variable which takes a value of unity if, in any year, the firm is deemed financially neutral i.e., the firm's leverage ratio is within ± 3% from its target, and zero otherwise. To enhance interpretation, we report the results for upgraded and downgraded financially flexible (inflexible) firms against the relevant benchmark i.e., stable rating financially flexible (inflexible) firms. We achieve this by estimating two equivalent versions of the system in each case — one version omits the DFS dummy and this is used to benchmark DFU/DFD, while the second version omits the DIS dummy and this is used to benchmark DIU/DID. For each base, the regression includes all the remaining interaction dummies, but we report the result for each group to conserve space. Each regression also includes all the same control variables as before (measured as defined in Table 1), in addition to year and industry dummies, but these results are not reported to conserve space. The regressions pertain to our sample of 971 firms and 12,705 firm-year observations. ***, **, indicate that the coefficient is significant at the 1% and 5% levels, respectively.

Highlights:

An Investigation of the Asymmetric link between Credit Re-ratings and Corporate Financial Decisions: "Flicking the Switch" with Financial Flexibility

- flexibility mediates the influence of credit ratings asymmetrically
- flexibility "flicks the switch" exclusively for rating upgrades
- inflexibility "flicks the switch" exclusively for rating downgrades
- combining inflexibility with upgrades leaves financial decision making unaffected
- combining flexibility with downgrades leaves financial decision making unaffected