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ARTICLE

# Corporate R&D and Creditor Value: A Contingency Perspective

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ABSTRACT

This study investigates the relationship between corporate R&D and creditor value. The empirical results suggest that such relationship is contingent on the situations of existing R&D investment and institutional arrangement of corporate governance. We find that R&D investment increases creditor value when insufficient R&D threatens survival, while reduces creditor value when such threat is mitigated. Moreover, such curvilinear relationship is mainly driven by firms with relatively weak managerial entrenchment. Hypotheses are tested with 98 U.S. listed firms in manufacturing sector over 2001-2007.

## 1. Introduction

How corporate innovation creates value for investors has long been discussed among economists and management scholars. However, the emphasis of the research is mostly on shareholder value, i.e. stock market returns (e.g. [1,2]). And less is understood about how innovation affects creditor value. In spite of a few empirical studies debating on R&D and creditor value (e.g. [3,4]), different predictions and results imply that certain nuances in the relationship, such as situational and institutional factors, are underexplored. In this study, we focus on how the effect of growing R&D investment on creditor value varies across firms with different levels of existing R&D investment and managerial entrenchment.

Creditors are critical because debt accounts for over 90 percent of all new external financing [5]. Some recent evidence shows that the importance of debt persists and even increases over time. According to statistics of the Securities Industry and Financial Markets Association, total value of issued corporate debt in the U.S. is about $14.4 trillion during 2000-2014, while total value of equity is only about $3.4 trillion. The considerable size and influence of corporate debt financing call for more attention on corporate creditors.

This study contributes to literature by exploring the nuanced effect of R&D on creditor value. Shi (2003) documents that for creditors R&D risks dominate the benefits, while Eberhart, Maxwell, and Siddique (2008) find that R&D intensity increases creditor value. We show that the effect of R&D on creditors may not be monotonic. Although R&D as well as other innovative activities are generally not favorable to creditors [4,6], creditors have different attitudes towards R&D in different situations.

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When lack of R&D threatens survival of the firm, additional R&D investment mitigates such threat, reduces firm default risk, and increases creditor value. However, when R&D investment is beyond certain level and the problem of insufficient R&D is mitigated, additional R&D investment imposes extra risks on creditors without extra benefits, and thus impairs creditor value.

In addition, this study highlights the contingent role of corporate governance in creditor value creation and protection. Managers are empowered and entrenched when the governance provisions are beneficial to them rather than shareholders. Although managerial entrenchment impairs shareholder value due to less risk-taking than the optimal level [7,8], it affects creditor value in a more nuanced way. Given the varying attitude of creditor vis-à-vis R&D, how the managerial entrenchment affects creditor value depends on the situation of existing R&D investment, or more specifically, whether creditors are currently concerned about the scarcity of R&D that threatens survival, or the excess of R&D that brings more risks than returns to them.

## 2. Literature Review and Hypothesis Development

### 2.1 Credit Market and Creditors

Credit market is a critical source of financing and serves as a marketplace where firms are evaluated based on ability and willingness to repay the debt obligations. Different from that in stock market, firm value in credit market is not decided by the excess return but by the safety of creditors' investments, due to the special position of creditors in terms of exposure to risk and return [9-12]). Creditor value declines if the firm becomes riskier, and *vice versa*.

Credit risk is generally measured by credit rating and yield spread. Credit ratings are assigned by rating agencies such as Standard & Poor's, Moody's and Fitch Ratings, to represent rating agencies' assessment of a firm's creditworthiness. The poorer the credit rating, the heavier discount of firm value by creditors due to higher risks. Yield spread as another commonly used instrument, measures firm credit risk more directly. It represents additional yield or "spread" of corporate bond over the yield of government bond, and shows the incremental probability that a firm will not be able to meet its debt obligations. Government bond, particularly the U.S. Treasury bond serving as benchmark in calculating yield spread, is regarded as risk-free and will never default [13-16]). The wider the yield spread, the heavier discount of firm value by creditors due to higher risks.

### 2.2 Creditors and Innovation

Creditors are different from shareholders and managers *vis-à-vis* risk-taking. As has been discussed since the seminal work of Jensen and Meckling (1976) and Myers (1977), shareholders have strong incentives to invest in risky projects as they are able to win the upside benefits from risk-taking with limited losses. They can further reduce their risk of loss by keeping diversified investment portfolios [17]. On the contrary, creditors seek to minimize firm risks as they do not share any of the benefits above their promised principal and interests in the contract. On top of that, creditors also have to bear the downside cost of increased default risk. And managers, whose employment and income are tied to one firm, cannot diversify their risks, and therefore are risk-averse in decisions [18-20].

Creditors bear the downside risk and shareholders enjoy the upside potential when firms invest in risk projects, creditors are expected to have a negative attitude towards risky investment such as R&D. R&D is characterized as risky due to its long investment horizon, large variance of outcomes, and high probability of failure [21,22]). While R&D increases returns, it also increases the risks of the firm, and the concern of the increasing risks dominates the creditors' perception of firm value, because their payout is predetermined in the debt contract and they cannot share the high returns (Shi, 2003). Although Acharya and Subramanian (2009) and Seifert and Gonenc (2012) do not test how creditors evaluate R&D directly, they find that creditors try to influence management to suppress R&D and other innovative activities as long as they have such ability. Moreover, R&D investment generates highly intangible and specialized resources that cannot serve as favorable collateral for creditors, as they are difficult to value if not readily redeployed [23-26].

A more recent study, however, suggest that R&D actually contributes to higher creditor value. Eberhart, Maxwell, and Siddique (2008) replicate Shi's (2003) work with alternative measures of R&D intensity, and find that firms with more R&D intensity have better bond rating and lower required spreads, which implies that R&D creates value for bondholders as it does for shareholders. In this paper, Eberhart, et al. (2008) focus on five traditional R&D-intensive industries, and argue that the original measure of R&D intensity in Shi (2003)—R&D to market capitalization—gives misleading impression of R&D dynamics because stock market generally reacts positively to an R&D increase. They suggest that the ratio of R&D to sales or R&D to assets are better measures of R&D intensity. In addition, Eberhart, et al. (2008) find that the positive effect of R&D is larger when the initial default risk of

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the firms is higher.

The lack of sufficient R&D is long been regarded as one source of business failure, which results in high default risk. Through intensive studies on global business history across 15 industries since the 1960s, Franko (1989) finds that insufficient R&D and neglect of technological innovation are the determining factors that explain why many U.S. and U.K. firms lost their market shares and competitiveness to their Asian and European counterparts. Cohen and Levinthal (1990) also documents that successive R&D investments contribute to a firm's absorptive capacity and facilitate knowledge accumulation. The path-dependence nature of absorptive capacity and knowledge accumulation makes ceasing investment extremely costly. Because exploitation of new knowledge is based on the understanding of prior one, a firm may fail to recognize the significance of new technological opportunities in subsequent periods without early-stage investments in the knowledge of the field. Therefore, insufficient investment in R&D hampers a firm's survival and increases default risk, and reduces the possibility that creditors receive payments specified in the debt contract.

We propose that that the relationship between R&D investment and creditor value is non-monotonic. Either too little or too much R&D investment is associated with low creditor value. On the one hand, when the survival of firm is threatened by the lack of R&D, even lower R&D investment leads to shrinking market shares and obsolete production and management techniques. This increases risk of bankruptcy and default, and impairs creditor value. On the other hand, when the problem of insufficient R&D is mitigated, R&D investment becomes the instrument to capture technological opportunities and market returns. Since creditors cannot share the high returns brought by high R&D (Eberhart, Maxwell, and Siddique, 2008; Jensen and Meckling, 1976; Myers, 1977; Smith and Warner, 1979), increasing R&D investment impairs creditor value in this situation.

*Hypothesis 1: R&D investment first increases creditor value, and reduces creditor value after R&D investment surpasses a threshold.*

### 2.3 Managerial Entrenchment, Creditors, and Innovation

Although shareholders are owners of firms and have rights to discipline management, their abilities to do so differ across firms. Institutional arrangements of corporate governance, in terms of corporate charter and bylaw provisions, affect relations between shareholders and the management. In some cases, the provisions such increase costs of shareholders challenging the management, restrict shareholder participation, and shift the power of shareholders to the management [27]. The increased power of management over shareholders leads to entrenchment and entrenched managers are more likely to pursue their private interests (Bebchuk, Cohen, and Ferrell, 2009), to engage in shirking and empire building, to have higher compensation, and to invest in projects with lower risks than the optimal level for shareholders [28-30]. With regard to corporate R&D, Meulbroek, Mitchell, Mulherin, Netter, and Poulsen (1990) [31] find that the passage of antitakeover provisions, which entrench managers but restrict shareholders, leads to decrease of R&D intensity. O'Connor and Matthew Rafferty (2012) [32] argue that although it is hard to establish the causality between entrenched executives and R&D expenditures, firms that invest little in R&D are more likely to have governance provisions that entrench executives.

When the existing R&D investment is insufficient, the scarce investment in R&D is regarded as problematic and risky by creditors as it threatens survival and reduces the probability that a firm would meet its debt obligations. Then creditors benefit if R&D investment increases in this situation. However, the presence of strong managerial entrenchment reduces such expected benefits, since strongly entrenched managers are capable to minimize their risks and to suppress R&D investment easily. On the other hand, when existing R&D investment is highly intensive, further increasing R&D investment is regarded as risky by creditors as they cannot enjoy the excess returns brought by innovation. Then the presence of strong managerial entrenchment increases creditor value, because strongly entrenched managers are enabled to restrict R&D investment in a foreseeable future, which also reduces the distress of creditors caused by the enlarged mismatch between risks and returns associated with even more R&D investment.

*Hypothesis 2: The curvilinear relationship between R&D investment and creditor value is more salient to firms with weak managerial entrenchment.*

## 3. Data and Methods

We collect data from different sources. Data of corporate bonds is from the Fixed Investment Securities Database (FISD) and the Trade Reporting and Compliance Engine (TRACE). We obtain quarterly firms-level financial information and credit ratings from COMPUSTAT and CRSP, to match the bond characteristics in FISD and TRACE which are also quarterly based. Managerial entrenchment data is compiled by Bebchuk, Cohen, and Ferrell (2009). We also collect industrial tax credit data from Internal Revenue Service (IRS), which serves as the potential instrumental variable to examine the endogeneity of



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independent variables. Our sample only includes firms in manufacturing sector in the U.S. (4-digit SIC codes 2000-3999). We also exclude bonds that are convertible, putable, callable, asset backed, are not issued in U.S. dollars, not domiciled in the U.S., not senior unsecured obligations of the issuing firm, that have floating coupons or credit enhancements, or have less than one year to maturity, because their yield spreads are not accurate representations of creditor value (Dick-Nielsen, 2009 [33]; Elkamhi, Pungaliya, and Vijh, 2014). After we clean data for missing variables, the final sample includes 98 U.S. listed firms and covers the period from the fourth quarter of 2001 to the fourth quarter of 2007. There are 766 firm-year-quarter observations in total. Since we measure creditor value at $t$+1 year-quarter to detect the credit market reaction to the increase of R&D investment at $t$ year-quarter, 519 observations are examined.

Models are jointly estimated by seemingly unrelated regressions (SUR) based on ordinary least squares (OLS), in order to deal with the cross-equation correlation of error terms, which is raised in Shi (2003) and Eberhart, et al. (2008). To correct for the unobserved within-firm correlation, we estimate regressions with clustered standard errors by firm. To mitigate the impact of extreme values, we winsorize all variables at top and bottom 1% level.

### 3.1 Dependent Variables

The first dependent variable is credit rating at $t$+1 year-quarter. We adopt S&P domestic long term issuer credit rating and concert rating from letter designations to numerical grades (AAA = 1, AA+ = 2, AA = 3, ……, D = 22). Smaller number indicates better credit rating and lower perceived default risks.

The second dependent variable is yield spread at $t$+1 year-quarter. We follow Bessembinder, Kahle, Maxwell, and Xu (2009) [34] and transform bond yield in the database into end-of-day yield. We then choose the first end-of-day bond yield available within the 15 days after quarterly earnings announcement date. We compute yield spread of the bond by subtracting the yield of U.S. Treasury bond with the most similar maturity from the end-of-day yield. We calculate the weighted average yield spread for firms with multiple bonds. Narrower yield spread indicates lower perceived default risks.

### 3.2 Independent Variables

The main independent variable in this study is R&D intensity at t year-quarter, which is measured as R&D expenses to total assets. The higher value indicates the higher proportion of resources that have been used to generate potential firm-specific intangible assets in the long run, which is hard to be valued (Balakrishnan and Fox, 1993; Vincente-Lorente, 2001).

### 3.3 Control Variables

We also control for several covariates that affect credit rating or yield spread. Debt *Maturity* is the number of years to final maturity; *Liquidity* is measured as current assets to current liabilities; *SG&A* controls for non-production costs, which is measures as selling, general and administrative expenses to total assets; return on assets (*ROA*) controls for firm profitability , which is measured as operating income before depreciation to total assets; market-to-book ratio (*M/B Ratio*) is included to control for firm performance in stock market; *Leverage* is measured as total liabilities to total assets; *Equity Volatility* is the annualized standard deviation of daily stock returns of the 254-day period ending one day before the earnings announcement date [35-37]; *Size* is measured by natural logarithm of total assets; Finally, we control for industry heterogeneity and economic turbulence over time by industry and year-quarter dummies.

## 4. Empirical Results

Table 1 presents descriptive statistics for the whole sample. Credit rating and yield spread are closely correlated as expected in the literature, but each of them still measures some different aspects that have not been captured by the other. R&D intensity is negatively and significantly correlated with credit rating and yield spread, which confirm the argument of Eberhart et al. (2008) that increasing R&D intensity benefits creditors. There is not severe multicollinearity among explanatory variables.

**Table 1.** Descriptive Statistics

| | Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | Credit $Rating_{it+1}$ | 1.00 | | | | | | | | | |
| **2** | Yield $Spread_{it+1}$ | 0.70* | 1.00 | | | | | | | | |
| **3** | R&D $Intensity_{it}$ | -0.60* | -0.25* | 1.00 | | | | | | | |
| **4** | Debt $Maturity_{it}$ | -0.03 | 0.02 | 0.04 | 1.00 | | | | | | |
| **5** | $SG\&A_{it}$ | -0.36* | -0.23* | 0.42* | -0.01 | 1.00 | | | | | |
| **6** | $ROA_{it}$ | -0.38* | -0.22* | 0.25* | -0.03 | 0.49* | 1.00 | | | | |
| **7** | M/B $Ratio_{it}$ | -0.21* | -0.07 | 0.20* | 0.01 | 0.27* | 0.20* | 1.00 | | | |
| **8** | $Leverage_{it}$ | 0.30* | 0.21* | -0.23* | 0.03 | -0.07 | -0.11* | 0.09* | 1.00 | | |

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| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **9** | Equity Volatility$_{it}$ | 0.39* | 0.54* | -0.01 | -0.03 | -0.20* | -0.23* | -0.01 | 0.14* | 1.00 |
| **10** | Size$_{it}$ | -0.53* | -0.39* | 0.20* | 0.08* | -0.4* | -0.09* | 0.0821* | -0.11* | -0.14* | 1.00 |
| | Mean | 6.45 | 97.34 | 0.01 | 7.81 | 0.12 | 0.04 | 3.73 | 0.63 | 25.45 | 9.53 |
| | Min | 1.00 | 24.02 | 0.00 | 1.08 | 0.01 | 0.01 | -15.73 | 0.25 | 11.76 | 7.43 |
| | Max | 16.00 | 642.45 | 0.06 | 29.00 | 0.45 | 0.08 | 21.96 | 1.04 | 71.00 | 11.65 |
| | Std. Dev. | 2.93 | 87.09 | 0.01 | 5.69 | 0.09 | 0.02 | 3.66 | 0.16 | 10.63 | 1.07 |

***Note:*** Industry and year-quarter dummies not presented; * *if* $p$ <0.05.

Table 2 shows models that examine the full sample. Model 1 and model 3 include only linear term of R&D intensity and the control variables, and have credit rating and yield spread as proxies of creditor value, respectively. The negative and significant coefficients of *R&D intensity*$_{it}$ in both models suggest that more R&D investment leads to better credit rating and narrower yield spread, and contributes to more creditor value. This is consistent with the findings of Eberhart et al. (2008). As for the results for control variables, lower leverage and larger size are signals of lower credit risk and associated with better credit rating. High equity volatility implies the risk-taking propensity of the firm, which is negatively associated with creditor value.

**Table 2.** Seemingly Unrelated Regressions: Full Sample

| | ***DV:* Credit Rating**$_{it+1}$ | | ***DV:* Yield Spread**$_{it+1}$ | |
|---|---|---|---|---|
| | Model 1 | Model 2 | Model 3 | Model 4 |
| **R&*D Intensity*$_{it}$** | -37.825*** | -112.469** | -1190.195* | -7200.937** |
| | (10.984) | (43.388) | (566.007) | (2651.628) |
| **Sq.R&*D Intensity*$_{it}$** | | 1261.083* | | 101549.288** |
| | | (601.015) | | (39408.925) |
| **Debt Maturity**$_{it}$ | 0.016+ | 0.018* | 0.387 | 0.513 |
| | (0.009) | (0.009) | (0.308) | (0.323) |
| **SG&*A*$_{it}$** | -1.137 | 0.164 | -11.003 | 93.771 |
| | (1.766) | (1.357) | (78.669) | (74.030) |
| **ROA**$_{it}$ | -15.350+ | -14.826+ | -1007.249 | -965.100 |
| | (8.821) | (8.386) | (632.539) | (631.100) |
| **M/B Ratio**$_{it}$ | -0.013 | -0.011 | -0.214 | -0.072 |
| | (0.028) | (0.022) | (1.125) | (0.768) |
| **Leverage**$_{it}$ | 4.904*** | 4.318*** | 172.797* | 125.620+ |
| | (1.210) | (1.179) | (87.963) | (70.495) |
| **Equity Volatility**$_{it}$ | 0.035* | 0.033* | 2.602** | 2.464*** |
| | (0.016) | (0.015) | (0.816) | (0.717) |
| **Size**$_{it}$ | -1.107*** | -1.084*** | -21.711*** | -19.812*** |
| | (0.148) | (0.132) | (4.831) | (4.877) |
| **Constant** | 16.965*** | 17.036*** | 369.538*** | 375.230*** |
| | (1.361) | (1.208) | (63.782) | (63.786) |
| **F-Statistics** | 151.67*** | 153.59*** | 32.36*** | 33.96*** |
| **Adj. R-Squared** | 0.9475 | 0.9489 | 0.7896 | 0.8003 |
| **Wooldridge's F-Test of Endogeneity** | 1.03 | 0.41 | 0.01 | 0.06 |
| **Observations** | 519 | 519 | 519 | 519 |

***Note:*** + *if* $p$ < 0.10; * *if* $p$ < 0.05; ** *if* $p$ < 0.01; *** *if* $p$ < 0.001; p-value are calculated for two-tailed test; Clustered standard errors in parentheses; industry and year-quarter dummies are included but are not reported to preserve space.

Model 2 and model 4 test and support hypothesis 1. The negative and significant coefficient of *R&D Intensity*$_{it}$ and the positive and significant coefficient of *Sq.R&D Intensity*$_{it}$ jointly suggest that increasing R&D intensity increases creditor value by mitigating the problem of insufficient R&D initially, but gradually impairs creditor value because it brings more risks then returns to creditors.

Tables 3 presents effects of R&D intensity on creditor value in firms with different levels of managerial en-

**Table 3.** Seemingly Unrelated Regressions: Subsample Analysis

| | Weak Managerial Entrenchment | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | ***DV:* Credit Rating**$_{it+1}$ | | ***DV:* Yield Spread**$_{it+1}$ | | ***DV:* Credit Rating**$_{it+1}$ | | ***DV:* Yield Spread**$_{it+1}$ | |
| | Model 5 | Model 6 | Model 7 | Model 8 | Model 9 | Model 10 | Model 11 | Model 12 |
| **R*D Intensity*$_{it}$** | -45.667** | -145.816*** | -2736.344* | -9731.792*** | -4.219 | -30.666 | -38.499 | -1297.300 |
| | (14.891) | (38.394) | (1170.840) | (2610.851) | (6.116) | (52.657) | (280.152) | (2740.791) |
| **Sq.R*D Intensity*$_{it}$** | | 1928.448*** | | 134702.840*** | | 355.614 | | 16925.885 |
| | | (552.492) | | (40868.728) | | (630.853) | | (34364.961) |
| **Debt Maturity**$_{it}$ | 0.017* | 0.016* | 0.628 | 0.559 | -0.000 | 0.001 | -0.036 | 0.024 |
| | (0.008) | (0.008) | (0.452) | (0.434) | (0.009) | (0.008) | (0.407) | (0.303) |
| **SG&*A*$_{it}$** | -0.989 | 0.509 | 40.069 | 144.670+ | 2.973 | 3.352 | -68.736 | -50.686 |
| | (1.235) | (0.987) | (86.658) | (85.417) | (2.660) | (3.022) | (46.284) | (47.565) |
| **ROA**$_{it}$ | -14.956 | -13.403 | -1127.603 | -1019.133 | -1.528 | -3.296 | 330.992 | 246.831 |
| | (9.120) | (8.320) | (689.565) | (699.333) | (10.465) | (11.287) | (339.750) | (365.182) |
| **M/B Ratio**$_{it}$ | -0.001 | 0.002 | 0.442 | 0.657 | -0.109 | -0.110 | -2.547 | -2.632 |
| | (0.029) | (0.022) | (1.136) | (0.803) | (0.079) | (0.082) | (1.925) | (1.977) |



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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Leverage$_{it}$** | 5.975*** | 5.545*** | 251.275** | 221.201*** | 1.723 | 1.830 | -85.868** | -80.788* |
| | (1.033) | (0.882) | (81.167) | (65.088) | (1.709) | (1.802) | (32.367) | (37.047) |
| **Equity Volatility$_{it}$** | 0.019 | 0.016 | 1.802* | 1.582* | -0.011 | -0.009 | 0.633 | 0.720 |
| | (0.017) | (0.017) | (0.749) | (0.695) | (0.017) | (0.016) | (0.442) | (0.583) |
| **Size$_{it}$** | -1.430*** | -1.370*** | -18.618* | -14.387 | 0.496 | 0.384 | 27.226* | 21.921 |
| | (0.273) | (0.246) | (8.693) | (9.781) | (0.499) | (0.601) | (12.503) | (19.355) |
| **Constant** | 19.701*** | 19.495*** | 345.921*** | 331.512*** | 2.217 | 3.119 | -88.577 | -45.672 |
| | (2.325) | (2.036) | (89.833) | (98.619) | (3.745) | (4.574) | (93.793) | (142.778) |
| **F-Statistics** | 148.10*** | 153.48*** | 32.46*** | 34.38*** | 110.65*** | 105.59*** | 12.47*** | 11.91*** |
| **Adj. R-Squared** | 0.9540 | 0.9562 | 0.8159 | 0.8270 | 0.9771 | 0.9768 | 0.8172 | 0.8145 |
| **Observations** | 441 | 441 | 441 | 441 | 78 | 78 | 78 | 78 |

***Note:*** + *if* $p < 0.10$; * *if* $p < 0.05$; ** *if* $p < 0.01$; *** *if* $p < 0.001$; p-value are calculated for two-tailed test; Clustered standard errors in parentheses; industry and year-quarter dummies are included but are not reported to preserve space.

trenchment. We adopt the E-Index developed by Bebchuk, Cohen, and Ferrell (2009) as our measure of managerial entrenchment. The E-index is a commonly used measure for managerial entrenchment in corporate governance literature, as it combines direct restrictions on shareholder power (staggered boards, limits to shareholder amendments of the bylaws, supermajority requirements for mergers, and supermajority requirements for charter amendments) and antitakeover provisions (poison pills and golden parachute), all of which contribute to managerial entrenchment. Higher score indicates stronger managerial entrenchment. As the E-Index is only available in year 1990, 1993, 1995, 1998, 2000, 2002, 2004, and 2006, we have to assume level of managerial entrenchment fixed until the score updates. For example, the level of managerial entrenchment of firm A is assumed to be the same in 2002 and 2003.

A firm is identified as strongly (weakly) entrenched if it's E-index score if above (below) the industry average in year-quarter *t*. A firm's industry is identified by the 4-digit SIC code reported in Compustat. The results in Table 3 support hypothesis 2. R&D intensity has strong and varying effects on creditor value in different situations of existing R&D investment only when managerial entrenchment is absent or weak. But strong managerial entrenchment offsets such effects, and R&D intensity is no longer a determinant of creditor value.

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