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The Effect of Labor Unionization on Corporate Investment Efficiency

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THE EFFECT OF LABOR UNIONIZATION ON CORPORATE INVESTMENT EFFICIENCY

A Thesis Presented

by

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ABSTRACT

THE EFFECT OF LABOR UNIONIZATION ON CORPORATE INVESTMENT EFFICIENCY

August 2015

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This paper examines the relationship between labor unionization rates and corporate investment efficiency using 55,300 firm-year observations from 1983–2002. I find evidence that labor unionization rates are negatively associated with underinvestment and overinvestment, which suggests that labor unions can improve investment efficiency. I also find that labor unions and financial reporting quality are complementary in improving investment efficiency.

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CHAPTER 1

INTRODUCTION

1.1. Motivation

Employees are vital assets in a firm, particularly in labor-intensive industries. Labor unions represent groups of individual workers and help the workers protect their job securities and benefits. To meet this purpose, labor unions have a powerful effect on corporate investment decision making through strikes or stakeholder activism. In 2004, as reported in the *New York Times*, labor unions urged Ford Motor Company to increase investment in its facilities in the United States instead of in other developing countries, which increased job opportunities for domestic workers. Recently, CBS News reported that a labor union is going to resist the construction of an NFL stadium near Los Angeles. This union has been gathering petition signatures to delay the project's development and force them to provide more benefits for workers before construction begins, such as commitments that create jobs for the community. These are examples of how labor unions can both increase and decrease corporate investments. This naturally leads us to an interesting question: If labor unions play a role in investment decision-making, do they affect the efficiency of such investments?

The relevant literature also provides ample evidence that labor unions influence investment decision-making in firms. Baldwin (1983) documents that unions work as rent-seekers and have incentives to extract quasi-rents from firms through strikes or other

stakeholder activities. Managers in highly unionized firms invest less intensively in research and development (R&D) in an attempt to mitigate the rent-seeking activities of labor unions (Connolly, Hirsch, & Hirschey, 1986). Bronars and Deere (1993) suggest that firms tend to decrease investment in specific durable assets and reduce employment growth in response to union contracts. Additionally, Faleye, Mehrotra, and Morck (2006) find that labor unions induce firms to invest less in long-term or high-risk projects. They suggestthat labor unions impact corporate investment. I extend this evidence further to test their impact on corporate investment efficiency.

Prior studies provide abundant evidence that agency cost is the main driver of investment inefficiency (i.e., underinvestment and overinvestment). For instance, when there is a conflict of interest between managers and shareholders, managers tend to invest in negative present value projects (overinvestment) to maximize their own interests (Jenson, 1986; Jensen & Meckling, 1976). Further, agency costs between less informed new investors and informed managers cause firms' stock prices to be discounted thereby leading to underinvestment (Myers, 1977; Myers & Majluf, 1984). Recent accounting literature on labor unions has shown evidence that labor unions perform a monitoring role of reducing agency costs between managers and investors (Banning & Chiles, 2007; Chyz et al. 2013; Farber et al., 2010; Huang Jiang, Lie, & Que, 2014; Leung, Li, & Rui, 2010). Besides labor unions' aim to protect unionized workers' long-term job security, unions also care about their firm's sustainability. A firm's underinvestment and overinvestment issues will hurt its long-term growth. Therefore, labor unions should be able to use their monitoring power to alleviate investment inefficiency.

1.2. Research Questions

Based on the above discussion, my first research question is: are labor unionization rates associated with investment efficiency? Because higher financial reporting quality enhances investment efficiency by playing a monitoring role of reducing agency cost (Biddle, Hilary, and Verdi, 2009), which is similar to the role played by labor unions, my next question is: How do labor unions affect investment efficiency when financial reporting quality is high? To answer my first question, I posit in my first two hypotheses that labor unionization is negatively (positively) associated with underinvestment and with overinvestment. My third hypothesis is that labor unions and financial reporting quality are complementary (or substitutes) in mitigating investment inefficiency problem.

1.3. Empirical Work

Three key constructs in this analysis are the measurement of investment inefficiency, the measurement of labor unions, and the measurement of financial reporting quality. Following Richardson (2006), I define positive or negative residuals acquiring from the expected investment expenditure model as a proxy for investment inefficiency. With the lack of a firm-level union database for publicly traded U.S. firms, I follow prior literature and use an industry-level unionization rate as a proxy (Connolly, Hirsch, & Hirschey, 1986; Huang et al., 2014; Klasa, Maxwell, & Ortiz-Molina, 2009). Following Biddle, Hilary, and Verdi (2009), I take accruals quality (AQ) as a proxy for financial reporting quality, which is based on the idea that accruals improve the informativeness of earnings by excluding transitory fluctuations in cash flow.

My testing results show significantly negative association between labor unions and underinvestment and overinvestment in both Ordinary Least Squares (OLS) regression and logistic regression. This means that firms with stronger union power face fewer underinvestment and overinvestment problems. I also find that, labor unions and financial reporting quality are complementary in improving investment efficiency.

1.4. Structure of the Study

The reminder of the paper proceeds as follows. Section 2 discusses related literature on underinvestment and overinvestment problem, the role of labor unions in firm decisions, and the relationship between financial reporting quality and investment efficiency. Section 3 develops testable hypotheses. Section 4 describes the research design. Section 5 shows the sample construction and data collection. Section 6 presents the main empirical results. Section 7 and Section 8 conclude the study and discuss further research work, respectively.

CHAPTER 2

LITERATURE REVIEW

In the theory of perfect capital markets, firms make investments until the marginal benefit of capital investment equals the marginal costs. Managers should invest in the positive net present value projects and make decisions in the best interests of shareholders. However, firms do not operate in such a world. The existence of capital market frictions stimulate firms in addition to optimal investments, which causes underinvestment or overinvestment.

2.1. Determinants of Underinvestment

Under market imperfections, information asymmetries can drive firm underinvestment, along with the agency cost between shareholders and debtholders (Myers, 1977; Myers & Majluf, 1984). Myers first brings the view that the existence of risky debt will stimulate managers to pass up positive net present value investment opportunities, which causes firm underinvestment. Under the assumption that managers are acting in favor of shareholders, they will try to make all investments with positive net present value to maximize their firm's value. However, Myers shows that if a firm is financed with risky debt, managers will make investment decisions by following a different rule. His model shows that issuing risky debt at time 0 weakens the firm's incentive to invest at time 1, induces a suboptimal strategy, and reduces the firm's present market value. As a result, current shareholders of the firm absorb the loss of the present

market value. Also, Stein (2001) points out that risky debt works as a tax on the proceeds derived from the new investment because most of the value increased by the new investments only serves debtholders. Therefore, managers, acting on behalf of shareholders' interests, will probably reject some valuable investment opportunities and lower the firm's value (Cariola, La Rocca, & La Rocca, 2005; Garven & MacMinn, 1993; Myers, 1977).

Later, Myers and Majluf (1984) develop a classic adverse-selection model showing that information asymmetries between informed managers and less informed new investors can cause firm underinvestment. Managers who act in the interest of existing shareholders will raise funding for positive net present value projects to increase the firm's value. New investors with less information usually ask for a higher premium to protect themselves from managers' probable opportunistic behaviors. Firms raise funding with a discounted stock price, which may outweigh the new investment profits. As a result, managers may refuse to get financed at a bargain stock price and pass up good investment opportunities.

Moreover, Stiglitz and Weiss (1981) claim that because debtholders (banks) are concerned about the probability of a firm's bankruptcy and the difficulty of monitoring a firm's behavior over time, debtholders tend to raise interest rates to protect themselves from managers' opportunistic behavior. Hubbard (1998) documents that costly external financing limits managers' ability to raise funding for new investments. Firms may reject positive net present value projects due to external financing constraints, thus causing underinvestment (Hubbard, 1998).

Some prior studies have discussed possible mechanisms mitigating the underinvestment problem. Berkovitch and Kim (1990) document that increases in the seniority rule to new debt will reduce underinvestment. Garven and Macminn (1993) propose that a designed insurance covenant can eliminate underinvestment issues and keep current shareholders receiving higher gains. Wu and Wang (2005) predict that firms with a small amount of private benefit can alleviate underinvestment problems and add value to the firm. Gay and Nam (1998) provide evidence that firms could use derivatives to avoid potential underinvestment problems. Biddle, Hilary and Verdi (2009) examines a sample of 49,543 firm-year observations to show that financial reporting quality is negatively correlated with underinvestment. They point out that the negative association between financial quality and underinvestment is even stronger in firms facing financing constraints.

2.2. Determinants of Overinvestment

There is a considerable amount of literature that has suggested that agency cost is the main driver of firms' overinvestment issues. Under the agency cost explanation, managers are agents of shareholders, and the relationship between managers and shareholders usually contains conflicting interests (Jenson, 1986; Jensen & Meckling, 1976). When there is difficulty in monitoring managers' roles, managers have incentives to invest in projects that maximize their own benefits.Thiscan be costly for shareholders (Berle & Means, 1932; Jensen & Meckling). Jenson (1986) suggest that managers could invest in negative present value projects and cause firms to grow beyond their optimal size. Stulz (1990) find that managers tend to invest "as much as possible" to acquire perquisites from investment. Holmstrom (1999) document that managers' concerns

regarding their future careers will affect the way they make investment decisions for their firms. Managers prefer a "quiet life" under poorly governed firms (Bertrand & Mullainathan, 2003).

There is also a positive relation between investment expenditure and internally generated cash flow (Hubbard, 1988; Jensen, 1986; Stulz, 1990). According to agency cost theory, if there are divergences in principal-agent interests, managers with free cash flow may engage in wasteful investments (Jensen, 1986; Stulz, 1990). Harford (1999) document that cash-rich firms are more likely to make acquisitionsAfter these acquisitions, the operating performance of cash-rich firms appear to decline abnormally. Opler, Pinkowitz, Stulz, & Williamson (1999) show that companies with extra cash are likely to spend more on acquisitions, even for poor investment opportunities. Blanchard, Lopez-de-Silanes, & Shleifer (1994) find evidence of 11 firms receiving cash windfalls which ends up resulting in wasteful expenditure. Perhaps the most direct evidence of overinvestment of free cash flow is from Richardson (2006). He measures overinvestment and free cash flow by using an accounting-based framework. He provides evidence that firms with free cash flow are more likely to overinvest.

However, the second explanation of the positive relation between investment expenditure and internally generated free cash flow is external financing constraints (Fazzari, Hubbard, & Petersen, 1988; Fazzari & Petersen, 1993; Hubbard, 1998). Costly external financing resources will push firms to invest more of their internally generated cash flow in response to the lower cost of capital (Hubbard, 1998). Fazzari et al. (1988) find evidence that if the cost disadvantage of external finance is high, a firm's investment is sensitive to the fluctuation of internally generated free cash flow. However, later

literature has cast doubt on the financing constraints hypothesis. Kaplan and Zingales (1997) document that financing constraints are not necessarily positively correlated with the sensitivity of investment decisions to cash flow. They find evidence that with fewer financing constraints, firms appear more sensitive.

Prior research has provided various possible mechanisms mitigating the overinvestment issue. Biddle, Hilary, and Verdi (2009) investigate the relation between financial reporting quality and investment efficiency. They document that higher financial reporting quality can improve investment efficiency. They also find evidence that higher financial reporting quality can mitigate overinvestment problems, especially for firms with large cash balances.

2.3. Role of Labor Unions

The impact of labor unions on firm investment decisions has been studied for decades. Earlier research work has posited that labor unions have a negative effect on firm operations. Hirsch (1991) finds that unionized firms have significantly lower profits. Since labor unions work as rent-seekers, they have an incentive to extract quasi-rents from firms by threatening strikes (Baldwin, 1983; Grout, 1984). To reduce labor unions' rent-seeking, unionized firms decline the returns to R&D and hold lower R&D investments, which affect the firms' profits (Connolly et al., 1986). Bronars and Deere (1993) document that incomplete union contracts drive firms to decrease some specific durable assets, reduce employment growth, and increase debt. Faleye et al. (2006) find that labor unions, similar to risky bondholders, are more concerned about whether firms can generate enough cash flow to pay their wages. They find that labor unions using their

corporate governance voices, induce firms to invest less in long-term or high-risk projects thereby lowering the firms' values.

Because labor unions aim to protect unionized workers' benefits, rights and job security, they should also perform a monitoring role to increase firms' long-term sustainability. Recent studies have started to pay attention to this aspect. Farber et al. (2010) and Leung at al. (2010) discuss that unionized firms are associated with higher accounting conservatism. Accounting conservatism has stricter standards to verify good economic gains and requires recognizing all possible losses in time, which can be used to monitor management behaviors and reduce agency costs (Watts, 2003). Further, Chyz, Leung, Li, and Rui (2013) find evidence that labor unions constrain managers' tax aggressiveness via the monitoring role. Banning and Chiles (2007), Gomez and Tzioumis (2006), and Huang et al. (2014) show that labor union-controlled firms pay less compensation to their CEOs. As mentioned earlier, the main cause of overinvestment is the agency cost. Labor unions can mitigate managers' opportunistic behaviors resulting from agency conflicts. Consequently labor unions should also be able to alleviate overinvestment problems and protect a firm's long-term value.

However, there is an opposite view that labor unions may *increase* overinvestment. Labor unions normally believe that firms with good growth opportunities could help secure unionized workers' long-term job security and benefits. To make a good impression, managers tend to invest in more new projects and have less cash on hand, which makes unions believe that the firm is operating and growing well. Sometimes managers may even engage in wasteful investment, invest in negative present value projects, and cause overinvestment problems. Klasa et al. (2008) find evidence that

unionized firms will save less cash from the current cash flow level and make larger capital expenditure investments than non-unionized firms.

On the other hand, the relationship between labor unions and underinvestment problems is complicated and depends on which drivers have a higher impact. Faleye et al. (2006) show that because labor unions' contractual stream of wages is similar to the payoff on high-risk debt, labor unions aligning with bondholders likely expropriate firm wealth, exacerbate the agency conflicts between shareholders and debtholders, and probably add to underinvestment problems. But, as mentioned before, the main goal of labor unions and shareholders is the same: keep the firm's value growing in the long-term. Underinvestment problems will harm a firm's long-term sustainability, which conflicts with the main aim of labor unions. Therefore, the monitoring role of labor unions would likely offset the impact on causing underinvestment. Also, prior research has suggested that, by the nature of fixed claimants, unionized firms have lower cost of debt than other firms (Chen, Kacperczyk, & Ortiz-Molina, 2009). As discussed before, costly external financing can cause underinvestment problems, and thus unionized firms with less cost of debt will help reduce underinvestment problems.

2.4. Financial Reporting Quality and Investment Efficiency

Prior studies have suggested that higher financial reporting quality improves a firm's investment efficiency by reducing adverse selection cost and mitigating agency cost between managers and shareholders (Bushman & Smith, 2001; Leuz & Verrecchia, 2000). Verrecchia (2001) shows that good financial reporting quality could alleviate the adverse selection cost by reducing information asymmetry between investors and firms. For example, firms with more disclosure commitments reduce such asymmetry and

enhances stock market liquidity (Leuz & Verrecchia, 2000). The existence of information asymmetry between investors and firms could cause higher external financing costs (Myers & Majluf, 1984). Managers who face high financing constraints tend to pass on good investment opportunities, resulting in underinvestment problems. Chang, Dasgupta, and Hilary (2009) construct a dynamic adverse-selection model and empirical work to show that firms with better financial reporting quality find it easier to raise capital. Therefore, based on these findings, financial reporting quality is positively associated with investment efficiency through the reduction of adverse selection costs. .

On the other side, as I discussed regarding underinvestment and overinvestment above, the agency cost is the main factor causing investment inefficiency. Previous literature has suggested that higher financial reporting quality reduces the agency problem between managers and shareholders through its monitoring role. Kanodia and Lee (1998) document that periodic performance reports, such as earnings statements, play an important role in monitoring managers through capital market prices. Without an effective monitoring mechanism, when there is a conflict of interest between managers and shareholders, managers have incentives to maximize their own benefit but hurt investors' benefits. Bushman and Smith (2001) show that financial accounting information contributes to managers' monitoring role by disciplining them to invest in good projects and stay away from bad projects. Based on these findings, financial reporting quality is positively related to investment efficiency through the reduction of the agency cost between managers and shareholders.

The directly empirical evidence that higher financial reporting quality can improve investment efficiency is derived from Biddle, Hilary, and Verdi's (2009) work.

Using a sample of 49,543 firm-year observations between 1980 and 2003, they find that the relation between proxies for financial reporting quality and underinvestment and overinvestment are negative. The negative relation between financial reporting quality and underinvestment is stronger for firms with costly external financing. Also, firms with large cash balances are more strongly associated with overinvestment.

CHAPTER 3

HYPOTHESES DEVELOPMENT

The relationship between labor unions and underinvestment is complicated. Because underinvestment issues hurt firms' long-term sustainability which conflicts with unions' main purpose of protecting workers' job security and benefits, labor unions should use their monitoring role to reduce firms' underinvestment problem. On the other hand, labor unions may *increase* underinvestment problems. According to prior studies, labor unions' contractual stream of wages is similar to the payoff on high-risk debt (Faleye et al., 2006). If the payoff of high-risk debt is higher than the profits created by new investment projects, managers may pass on good investment opportunities thereby resulting in underinvestment. Financing constraints can also cause underinvestment issues. Consistent with the nature of rent-seekers, unionized firms have lower costs of debt than other firms (Chen et al., 2009), and thus labor unions may help reduce underinvestment problems. Based on the above discussion, I hypothesize that labor unionization is negatively or positively correlated with underinvestment.

H1: Labor unionization is negatively or positively correlated with underinvestment

According to the literature review, the agency conflicts between managers and investors mainly drive overinvestment problems. The main goal of labor unions is to secure unionized workers' benefits and long-term employment, so labor unions will

use their power to help increase firms' operational efficiency and long-term profitability. From this view, labor unions and unionized workers share the same interests with investors; thus, labor unions should be able to use their monitoring role to lessen firms' overinvestment problems through the reduction of agency costs. However there is also a possibility that labor unions can *increase* overinvestment problems (Klasa et al., 2008). To make unions have a good opinion of the firms' growth opportunities, managers may engage in overinvestment thereby ending up with some bad investment projects and end up with lower cash balances on hand. . Therefore, I posit my hypothesis of the association between labor unions and overinvestment as follows

H2: Labor unionization is negatively or positively correlated with overinvestment.

Prior research has found evidence that higher financial quality reduces both underinvestment and overinvestment (Biddle, Hilary, and Verdi, 2009). Financial reporting quality plays an important role in alleviating the agency costs between managers and investors, which is consistent with the monitoring role of labor unions. Therefore, I offer the third hypothesis that the impact of labor unions on underinvestment and overinvestment is affected by financial reporting quality.

H3: Labor unions and financial reporting quality are complementary (substitutes) in mitigating investment inefficiency problem.

CHAPTER 4

RESEARCH DESIGN

I test my hypotheses in three steps. First, I directly use the abnormal residuals from the expected investment model to measure underinvestment and overinvestment. Second, I test the relation between labor unionization rates and underinvestment and overinvestment using OLS and logistic regressions. Third, I add financial reporting quality as an additional independent variable and the product between labor unionization and financial reporting quality as an interaction variable to examine the association between labor unions and underinvestment and overinvestment.

4.1. The Measurement of Underinvestment and Overinvestment

4.1.a The measurement of investment expenditure. To construct measures of underinvestment and overinvestment, I follow Richardson (2006)'s mythology to estimate a model that predicts firm investment levels and then use residuals from this model as proxies for investment inefficiency. Following Richardson (2006), I define total investment in a given firm-year, $In\_Tol_{i,t}$ as the sum of capital expenditures ($CAPX_{i,t}$), acquisitions ($Acq_{i,t}$), and research and development expenditures ($RD_{i,t}$), minus sales of property, plant, and equipment ($SPPE_{i,t}$):

$$In\_Tol_{i,t} = CAPX_{i,t} + Acq_{i,t} + RD_{i,t} - SPPE_{i,t}$$

Richardson (2006) splits total investment in a given firm-year into two main components: a) required investment expenditure that firms use to maintain assets in place, $In\_Maintenance_{i,t}$, and b) expenditures that firms invest in new projects, $In\_New_{i,t}$.

$$In\_Tol_{i,t} = In\_Maintenance_{i,t} + In\_New_{i,t}$$

Richardson (2006) takes amortization and depreciation expenditure as proxies for $In\_Maintenance_{i,t}$. Then $In\_New_{i,t}$ is decomposed into expected investment expenditure in new positive NPV projects, $In\_New^*_{i,t}$, and unexpected investment, $In\_New^{\varepsilon}_{i,t}$. Richardson (2006) defines negative unexpected investment as underinvestment and positive unexpected investment as overinvestment.

$$In\_New_{i,t} = In\_New^*_{i,t} + In\_New^{\varepsilon}_{i,t}$$

4.1.b Expectation model for firm new investment expenditure. I follow Richardson (2006) and construct the expected model to estimate expected investment:

$$In\_New_{i,t} = \alpha + \beta_1 V/P_{i,t-1} + \beta_2 Leverage_{i,t-1} + \beta_3 Cash_{i,t-1} + \beta_4 Age_{i,t-1} + \beta_5 Size_{i,t-1}$$
$$+ \beta_6 Stock\ Returns_{i,t-1} + In\_New_{i,t-1} + \Sigma Year\ Indicator + \Sigma Industry\ Indicator$$

The estimated value of the regression is defined as the expected level of new investment, $In\_New^*_{i,t}$. The negative residual of the regression is defined as underinvestment and the positive residual of the regression is defined as overinvestment. Expected investment expenditure is a function of growth opportunities. Following Richardson, I estimate growth opportunities as the ratio of value of assets in place, $V_{AIPi,t}$, to market value of equity, P, V/P.

$$V_{AIPi,t} = (1 - \alpha r)BV_{i,t} + \alpha(1+r)X_{i,t} - \alpha r d_{i,t}$$

$BV_{i,t}$ is the book value of common equity in a given firm-year, $X_{i,t}$ is operating income after depreciation in a given firm-year, and $d_{i,t}$ is annual dividends. $\alpha = (\omega/(1+r-\omega)$. ω is a

fixed abnormal earnings persistence parameter from the Ohlson (1995) framework, and r is the discount rate. I use Richardson's results, $\omega = 0.62$ and r =12%, in my analysis.

Additional control variables that have been shown in previous research regarding to the determinants of investment decisions are included in the expectation model (Richardson), including leverage, cash level, firm age, firm size, past stock returns, and previous year's expected investment expenditure on new projects. Hubbard (1998) suggest that when a firm has more difficulty raising additional cash to invest in new projects, the firm's investment will be less. Leverage, firm size, firm age, and the level of cash can capture this feature. Prior stock returns can capture growth opportunities not reflected in $V/P_{i,t}$ (Lamont, 2000), and prior firm level investment can capture non-modeled firm characteristics that affect investing decisions (Richardson). Year and industry indicators can capture additional variation in new investment expenditure not covered by the measure of growth opportunities and financing constraints (Richardson).

4.2. The Measurement of Labor Unions

The literature on labor unions has typically used unionization rates as the measure of unions' bargaining power because unions' bargaining strength is highly associated with the percentage of unionized employees within a firm. A larger percentage of unionized workers has more impact on a firm when unions engage in some activities. In the United States, there is no publically available database for firm-level unionization data within publically traded firms. Most prior studies of labor unions have used industry unionization rates as proxies for the unionization rates of individual firms within an industry (Bronars & Deere, 1991; Chen et al., 2009; Connolly et al., 1986; Huang et al., 2014; Klasa et al., 2009).

I, therefore, follow the lead of previous literature and collect industry level unionization rates from the Union Membership and Coverage Database (UMCD), created by Barry Hirsch and David Macpherson in 2002. For this study, the database provide private and public sector labor union membership, coverage, and density estimates derived from the monthly household Current Population Survey (CPS) conducted by the Bureau of Labor Statistics (BLS). The detailed estimates of union membership, coverage, density of state, and industry occupation begin in 1983. The CPS uses the Census Industry Classification (CIC) code as the industry indicator. CIC code corresponds with the Standard Industrial Classification (SIC) code from 1983–2002. After 2002, CIC code has corresponded to the North American Industry Classification System (NAICS). I examine the data sample from 1983–2002. I follow Farber's (2010) method to map a CIC code to a SIC of all COMPUSTAT firms for each year, which enables me to link industry unionization rates to firms from the COMPUSTAT database. In the mapping procedure, following the technical documents from the CPS database and US Census Bureau's website, the majority of unique SIC codes has an exact corresponding CIC code. If a SIC code does not match with an exact CIC code, I assign the corresponding CIC code based on the actual industry name. If a SIC code from the COMPUSTAT database matches with multiple CIC codes, I take a simple average of all CIC codes as the unionization rate of the SIC code. CIC code is normally in a three-digit format. I create mappings of three-digit CIC code to two-digit SIC code, to three-digit SIC code, and to four-digit SIC code. Comparing these three mappings, I find that, under the mapping of three-digit CIC code to two-digit SIC code, there are many more SIC codes from the COMPUSTAT database corresponding to multiple CIC codes, which results in more SIC codes from

COMPUSTAT database's using an average value of multiple CIC codes' unionization rates. This means much lower accuracy than the mapping of three-digit CIC code to three-digit and four-digit SIC code. According to the technical documents from the CPS database, the majority of CIC codes corresponds to three-digit SIC code formats, but there are several CIC codes corresponding to four-digit SIC codes. Under these conditions, I need to round these four-digit SIC codes to three digits, which could cause inaccuracy. Therefore, I decide to use the mapping of three-digit SIC code to four-digit SIC code for the further research analysis.

4.3. The Measurement of Financial Reporting Quality

Biddle, Hilary, and Verdi (2009) defines *conceptual financial reporting quality* as "the accuracy with which financial reporting conveys information about the firm's operations, in particular its expected cash flows, in order to inform investors in terms of equity investment decisions" (p.8). The definition is consistent with FASB–SFAC No. 8, which states that the objective of financial reporting is to provide useful financial information to primary users in decision making. Present and potential investors can use financial information to assess a firm's expected future cash inflows and make investment decisions. Biddle, Hilary, and Verdi (2009) measure financial reporting quality by using accruals quality. This measurement of financial reporting quality has been shown in prior studies (Dechow & Dichev, 2002; McNichols, 2002). The idea is that accruals are estimates of future cash flows, and earnings will be more predicative of future cash flows when there is less estimation error embedded in the accruals process. Following Biddle, Hilary, and Verdi (2009), I estimate discretionary accruals using the Dechow and Dichev model and add fundamental variables in the Jones (1991) model,

which is suggested by McNichols. The model is a regression of working capital accruals on lagged, current, and future cash flows plus the change in revenue and PPE. All variables are deflated by average total assets.

$$Accruals_{i,t} = \alpha + \beta_1 * CashFlow_{i,t-1} + \beta_2 * CashFlow_{i,t} + \beta_3 * CashFlow_{i,t+1} + \beta_4 * \Delta Revenue_{i,t} + \beta_5 * PPE_{i,t} + \varepsilon_{i,t}$$

Where Accruals = (ΔCA - ΔCash) – (ΔCL - ΔSTD) – Dep

ΔCA = Change in current assets

ΔCash = Change in cash/cash equivalents

ΔCL = Change in current liabilities

ΔSTD = Change in short-term debt

Dep = Depreciation and amortization expense

CashFlow = Net income before extraordinary items - Accruals

ΔRevenue = Change in revenue

PPE = Gross property, plant, and equipment

I estimate the model by running the cross-sectional regression for each industry with at least 20 observations in a given year based on the Fama and French (1997) 48-industry classification, following Biddle, Hilary, and Verdi (2009). The standard deviation of firm-level residuals from the model during the years between t-5 and t-1 are proxies for accruals quality at year t, $AQ_{i,t}$. I multiply accruals quality by -1, so accruals quality increases in financial report quality.

4.4. Labor Unions and Underinvestment and Overinvestment

I take negative residuals multiplying by -1 as proxies for underinvestment for a given firm year, $Under\_In_{i,t}$ and positive residuals from the expected investment

expenditure model as proxies for overinvestment for a given firm year, $Over\_In_{i,t}$. To investigate the relation between labor unions and underinvestment and overinvestment, I first run OLS regressions between labor unions and underinvestment and overinvestment:

$$Underr\_In_{i,t}\ (Over\_In_{i,t}) = \alpha + \sigma_1 Union_{i,t} + \varepsilon_{i,t}$$

Second, I add financial report quality into the equation to examine the association between labor unions and underinvestment and overinvestment:

$$Under\_In_{i,t}\ (Over\_In_{i,t}) = \alpha + \sigma_1 Union_{i,t} + \sigma_2 AQ_{i,t} + \sigma_3 Union*AQ_{i,t} + \varepsilon_{i,t}$$

Third, I create direction indictors for underinvestment and overinvestment. Negative (positive) residuals are classified in two categories. If a firm's residual is lower than the sample's median value, I define it as the less underinvestment and overinvestment firm; if a firm's residual is higher than the median value of the sample, I define it as the more underinvestment and overinvestment firm. I then run logistic regressions for the above equations.

CHAPTER 5

DATA CONSTRUCTION AND SAMPLE SELECTION

The main empirical tests of this study use two data sources. First, financial statement data are compiled from the COMPUSTAT North America annual database, which includes active and inactive securities. I only include firms with U.S. headquarters in my data sample because I focus on the analysis of U.S. unionization and underinvestment and overinvestment. I exclude financial firms with SIC codes from 6000–6999 from my data sample because financial firms normally have different operating, investing, and financing activities from other firms. The sample of the expected investment expenditure model covers the fiscal years 1983–2002 with 74,933 firm-year observations. Second, I obtain annual U.S. industry unionization data from the UMCD. To test the relation between labor unions and underinvestment and overinvestment, I merge the labor unions dataset with the investment expenditure model data sample and acquire a sample of 53,500 firm-year observations from 1983–2002. Third, I calculate AQ as a proxy for financial reporting quality during the fiscal years 1983-2002 and merge it with the data sample of labor unions and underinvestment and overinvestment. This yields a sample of 33,091 firm-year observations.

In the empirical tests, following Richardson (2006) and Biddle, Hilary, and Verdi (2009) (2009), I scale all financial variables by total average asset, and to reduce the influence of outliers, I winsorize all variables except for firm age, labor union, and

indicator variables at 1% and 99% levels by year. Further, I re-perform all tests using rank regressions and find results similar to the reported results. The detailed description of each variable is shown in Appendix A.

CHAPTER 6

EMPIRICAL RESULTS

In this section, I first present the replication results of Richardson (2006). I enlarge his sample period from 1988–2002 to 1983–2002 and discuss the results. Next, I show the regression results between labor unions and underinvestment and overinvestment. Finally, I add financial reporting quality as a new independent variable and show the results for both OLS regressions and logistic regressions.

6.1. Replication Results of Richardson (2006)

My data sample is from 1983–2002 with 74,933 firm-year observations because the data retrieved on industry unions from the UMCD are available from 1983. I expect to include more data to investigate the relationship between labor unions and underinvestment and overinvestment in the later analysis.

Table 1

Descriptive Statistics of Investment Expenditure

Panel A: Summary Statistics

This table reports summary statistics of investment expenditure variables, growth opportunity variables, and the other control variables used in the expected investment expenditure model. The sample covers 74,933 firm years with available COMPUSTAT data from 1983–2002. In_Tol is total investment expenditure. CAPX is capital expenditure. Acq is acquisition expenditure. RD is research and development expenditure. SPPE is the cash flow from sale of property, plant, and equipment. In_Maintenance is investment expenditure necessary to maintain assets in place, which is estimated by reported depreciation and amortization from cash flow statement. In_New is the difference between In_Tol and In_Maintenance. All expenditure variables are scaled by average total assets. The control variables are reported with lagged values which are used in the expected model. The detailed variable information is in Appendix A.

Variable	Mean	Std. Dev.	Minimum	Maximum
In_Tol	0.131	0.146	-0.077	0.808
CAPX	0.068	0.072	0.000	0.411
Aqc	0.021	0.064	-0.002	0.412
RD	0.047	0.100	0.000	0.604
SPPE	0.007	0.023	0.000	0.162
In_Maintenance	0.059	0.047	0.001	0.296
In_New	0.072	0.151	-0.281	0.862
Lag_V/P	0.518	1.058	-6.122	3.615
Lag_Leverage	0.358	0.440	-1.687	3.210
Lag_Cash	0.192	0.369	0.000	4.761
Lag_Age	2.110	1.079	0.000	4.331
Lag_Size	4.311	2.137	-1.328	9.730
Lag_Stock Returns	0.246	1.009	-0.895	6.464
Lag_In_New	0.081	0.152	-0.259	0.847

Table 1—Panel A presents the summary statistics of investment expenditure variables, growth opportunity variables, and other control variables used in the expected investment expenditure model. The average total investment activity costs for firms is 13.1% of firm assets. The main component of total investment costs is capital

expenditure with 6.8% of firm assets, and R&D expenditure takes the second place with 4.7% of firm assets. On average, 45% of total investment costs are used for maintaining existing assets and the rest is used to invest in new projects. Panel B shows the correlation coefficients for the main variables of the expected investment model. We can see that each variable is correlated with others with significance.

Panel B: Spearman Correlation Coefficients

This table shows the Spearman correlation coefficients of investment expenditure and control variables used in the expected investment expenditure model. The sample covers 74,933 firm-years with available COMPUSTAT data from 1983–2002. The control variables are reported with lagged values used in the expected model. The detailed variable information is in Appendix A.

Variable	In_New	Lag_V/P	Lag_Leverage	Lag_Cash	Lag_Age	Lag_Size	Lag_Stock Returns
Lag_V/P	-0.0784						
	(<.0001)						
Lag_Leverage	-0.1602	-0.1266					
	(<.0001)	(<.0001)					
Lag_Cash	0.2548	-0.0752	-0.2076				
	(<.0001)	(<.0001)	(<.0001)				
Lag_Age	-0.1378	0.1240	0.0624	-0.1875			
	(<.0001)	(<.0001)	(<.0001)	(<.0001)			
Lag_Size	-0.0875	0.1566	0.1382	-0.2171	0.4214		
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)		
Lag_Stock Returns	0.1417	-0.0213	-0.0453	0.2558	-0.0161	-0.0884	
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	
Lag_In_New	0.5272	-0.0729	-0.0837	0.2320	-0.1952	-0.0966	0.0953
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)

Table 2

Expected Investment Expenditure Analysis

This table tests the expected new investment expenditure, following Richardson (2006). The determinants of investment expenditure contain the measures of growth opportunities, leverage, cash balance, firm age, firm size, stock returns, yearly fixed effects, and annual fixed effects. The sample covers 74,993 firm-year observations from 1983–2002. T-statistics are reported in parentheses below the coefficients and are corrected for time-series correlation using Huber-White standard errors. The detailed variable description is in Appendix A.

Variable	Predicted Sign	Model			
		I	II	III	IV
Lag_V/P	-	-0.011 (-15.84)			-0.005 (-8.85)
Lag_Leverage	-			-0.033 (-21.28)	-0.031 (-19.56)
Lag_Cash	+			0.042 (19.11)	0.029 (13.38)
Lag_Age	-			-0.003 (-5.57)	-0.004 (-7.05)
Lag_Size	+			0.001 (2.58)	0.002 (7.46)
Lag_Stock Returns	+			0.010 (15.62)	0.011 (17.01)
Lag_In_New	+			0.481 (77.28)	0.433 (69.94)
Year Indicators		NO	YES	NO	YES
Industry Indicators		NO	YES	NO	YES
Adjusted R^2		0.006	0.126	0.309	0.336

Table 2 shows regression results for four expected investment expenditures models. Following Richardson (2006), I run pooled regression for these four models with Huber-White robust standard errors. Model I contains only the accounting-based measure

of growth opportunities, V/P, which only explains 0.6% of the variation in In_New. Model II tests only on fixed annual and industry effects, which explains 12.6% of the variation in In_New. Model III run the pooled regression for the control variables, resulting in 30.9% of the variation. Model IV includes all variables and explains 33.9% of the variation. In subsequent analyses, I obtain residuals as proxies for underinvestment and overinvestment by ruining pooled regression on Model IV.

6.2. Results for Labor Unions and Underinvestment and Overinvestment

To investigate the relation between labor unions and underinvestment and overinvestment, I merge the industry unionization rates sample with the sample that covers negative/positive residuals from the expected investment expenditure model from 1983–2002, which leave me 53,500 firm-year observations. Table 3—Panel A reports the summary statistics of labor unions and underinvestment and overinvestment. We can see that around 60% (31,879/53,500) of observations deal with underinvestment and the rest overinvestment. The maximum industry unionization strength is about 84% of an industry, and the average industry unionization rate is about 13%.

Table 3

Descriptive Statistics of Labor Unions and Underinvestment and Overinvestment

Panel A: Summary Statistics

This table reports the summary statistics of labor unions and underinvestment and overinvestment. The sample covers 53,500 firm-year observations. Under_In are negative residuals from the expected investment expenditure multiplied by -1. Over_In are positive residuals from the expected investment expenditure. The detailed variable description is in Appendix A.

Variable	N	Mean	Std. Dev.	Minimum	Maximum
Under_In	31,879	0.065	0.070	0.000	0.721
Over_In	21,621	0.097	0.129	0.000	0.982
Union	53,500	0.127	0.132	0.000	0.836

Panel B: Spearman Correlation coefficients

Variable	Union
Under_In	-0.1343
(N=31,879)	(<.0001)
Over_In	-0.1087
(N=21,621)	(<.0001)
Dummy_Over	-0.1228
(N=21,621)	(<.0001)
Dummy_Under	-0.1504
(N=31,879)	(<.0001)

Table 3—Panel B shows the strong negative association between labor unions and underinvestment and overinvestment, which suggests that the stronger the labor union, the lower the underinvestment and overinvestment. Further, Table 4—Panel A and Panel B show the results of running OLS regression and logistic regression. Both methods present strong negative correlations between labor unions and underinvestment and overinvestment with high significance.

Table 4

Labor Unions and Underinvestment and Overinvestment

Panel A: OLS Regression and Logistic Regression for Labor Unions and Underinvestment

This table shows the relation between labor unions and underinvestment. The sample covers 31,879 firm-year observations. In the OLS regression, negative residuals from the expected investment expenditure model multiplied by -1 are a proxy for underinvestment. In logistic regression, I create a dummy variable of Under_In to indicate more or less underinvestment. If residual > median value of residuals in the sample, I define it as more underinvestment, and then equals to 1. If residual < median value of residuals in the sample, I define it as less underinvestment, and then equals to 0. T-statistics are reported in parentheses below the coefficients and are corrected for time-series correlation using Huber-White standard errors clustered by firms. The detailed variable description is in Appendix A.

$$Under\_In_{i,t}\ (Dummy\_Under) = \alpha + \sigma_1 Union_{i,t} + \varepsilon_{i,t}$$

Model	A	σ1	Adjusted R^2
OLS Regression	0.074	-0.708	0.018
	(92.62)	(-20.67)	
	α	σ1	Pseudo R^2
Logistic Regression	0.299	-2.385	0.017
	(18.79)	(-25.95)	

Panel B: OLS Regression and Logistic Regression for Labor Unions and Overinvestment

This table shows the relation between labor unions and overinvestment. The sample covers 21,621 firm-year observations. In the OLS regression, positive residuals from the expected investment expenditure model are a proxy for overinvestment. In the logistic regression, I create a dummy variable of Over_In to indicate more or less overinvestment. If residual > median value of residuals in the sample, I define it as more overinvestment, and then equals to 1. If residual < median value of residuals in the sample, I defined it as less overinvestment, and then equals to 0. T-statistics are reported in parentheses below the coefficients and are corrected for time-series correlation using Huber-White standard errors clustered by firms. The detailed variable description is in Appendix A.

$$Over\_In_{i,t}\ (Dummy\_Over) = \alpha + \sigma_1 Union_{i,t} + \varepsilon_{i,t}$$

Model	α	σ1	Adjusted R^2
OLS Regression	0.110	-0.106	0.012
	(65.67)	(-14.03)	
	α	σ1	Pseudo R^2
Logistic Regression	0.242	-1.916	0.011
	(12.56)	(-17.26)	

6.3. Results for Labor Unions and Underinvestment and Overinvestment (Add Financial Reporting Quality)

As I discussed in the section 2.4, financial reporting quality can improve investment efficiency. According to Biddle, Hilary, and Verdi (2009), financial reporting quality mitigates underinvestment and overinvestment problems by reducing the agency cost between managers and investors. This study holds a similar view regarding the monitoring role of labor unions. For this section, I add a new independent variable of AQ as a proxy for financial reporting quality and create a continuous interaction variable of Union*AQ in my tests. After merging the labor unions and underinvestment and overinvestment data sample with the AQ sample, I get a sample of 33,091 firm-year observations from 1983–2002.

Table 5

Descriptive Statistics of Labor Unions and Underinvestment and Overinvestment (Add Financial Reporting Quality)

Panel A: Summary Statistics

This table reports the summary statistics of labor unions and underinvestment and overinvestment. The sample covers 33,091 firm-year observations. Under_In is negative residuals from the expected investment expenditure multiplied by -1. Over_In is positive residuals from the expected investment expenditure. AQ is a proxy for financial reporting quality. Union*AQ is the product of unionization rate and AQ as the interaction variable. The detailed variable description is in Appendix A.

Variable	N	Mean	Std. Dev.	Minimum	Maximum
Over_In	13,509	0.085	0.118	0.000	0.914
Under_In	19,582	0.057	0.062	0.000	0.721
Union	33,091	0.139	0.139	0.000	0.858
AQ	33,091	-0.075	0.079	-0.475	-0.004
Union*AQ	33,091	-0.007	0.009	-0.054	0.000

Panel B: Spearman Correlation coefficients

Variable	Union	Over_In	Under_In	Dummy_Over	Dummy_Under	AQ
Over_In	-0.1142					
(N=13,590)	(<.0001)					
Under_In	-0.1430					
(N=19,582)	(<.0001)					
Dummy_Over	-0.1275	0.5656				
(N=13,590)	(<.0001)	(<.0001)				
Dummy_Under	-0.1568		0.6187			
(N=19,582)	(<.0001)		(<.0001)			
AQ	0.2645	-0.2171	-0.2375	-0.1553	-0.1733	
(N=33,091)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	
Union*AQ	-0.4632	-0.0879	-0.0670	-0.0439	-0.0424	0.4499
(N=33,091)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)

Table 6

Labor Unions and Underinvestment and Overinvestment (Add Financial Reporting Quality)

Panel A: OLS Regression and Logistic Regression for Labor Unions and Underinvestment (Add Financial Reporting Quality)

This table shows the relation between labor unions and underinvestment. The sample covers 19,582 firm-year observations. In the OLS regression, negative residuals from the expected investment expenditure model multiplied by -1 are a proxy for underinvestment. In the logistic regression, I create a dummy variable of Under_In to indicate more or less underinvestment. If residual > median value of residuals in the sample, I define it as more underinvestment, and then equals to 1. If residual < median value of residuals in the sample, I define it as less underinvestment, and then equals to 0. AQ is a proxy for financial reporting quality. Union*AQ is the product of unionization rate and AQ as the interaction variable. T-statistics are reported in parentheses below the coefficients and are corrected for time-series correlation using Huber-White standard errors clustered by firms. The detailed variable description is in Appendix A.

$$\text{Under\_In}_{i,t}\ (\text{Dummy\_Under}) = \alpha + \sigma_1 \text{Union}_{i,t} + \sigma_2 \text{AQ}_{i,t} + \sigma_3 \text{Union*AQ}_{i,t} + \varepsilon_{i,t}$$

Model	α	σ1	σ2	σ3	Adjusted R^2
OLS Regression	0.050 43.27	-0.476 (-10.42)	-0.160 (-12.21)	-0.200 (-2.11)	0.064
	α	σ1	σ2	σ3	Pseudo R^2
Logistic Regression	0.025 0.8	-2.720 (-16.30)	-2.637 (-8.30)	-20.989 (-7.58)	0.035

Panel B: OLS Regression and Logistic Regression for Labor Unions and Overinvestment (Add Financial Reporting Quality)

This table tests the relation between labor unions and overinvestment. The sample covers 13,509 firm-year observations. In the OLS regression, positive residuals from the expected investment expenditure model are a proxy for over-investment. In the logistic regression, I create a dummy variable of Over_In to indicate more/less overinvestment. If residual > median value of residuals in the sample, I define it as more overinvestment, and then equals to 1. If residual < median value of residuals in the sample, I define it as less overinvestment, and then equals to 0. AQ is a proxy for financial reporting quality. Union*AQ is the product of unionization rate and AQ as the interaction variable. T-statistics are reported in parentheses below the coefficients and are corrected for time-

series correlation using Huber-White standard errors clustered by firms. The detailed variable description is in Appendix A.

$$Over\_In_{i,t}\ (Dummy\_Over) = \alpha + \sigma_1 Union_{i,t} + \sigma_2 AQ_{i,t} + \sigma_3 Union*AQ_{i,t} + \varepsilon_{i,t}$$

Model	α	σ1	σ2	σ3	Adjusted R^2
OLS Regression	0.072 28.90	-0.753 (-7.39)	-0.244 (-8.87)	-0.676 (-3.13)	0.051
	α	σ1	σ2	σ3	Pseudo R^2
Logistic Regression	-0.024 (-0.68)	-1.869 (-10.04)	-2.523 (-7.67)	-13.459 (-4.3)	0.025

Table 6–Panel A reports the similar strongly negative correlation between labor unions and underinvestment and the negative association between AQ and underinvestment. Table 6—Panel B shows the association between labor unions and overinvestment results. The negative correlation between labor unions and overinvestment still holds in this test. We can see that the coefficient of AQ is significantly negative on both the OLS regression and the logistic regression, which is consistent with prior research findings. Further, considering the interaction variable, I also can argue that with higher financial reporting quality, labor unions are associated with lower underinvestment and overinvestment.

CHAPTER 7

CONCLUSION

In this paper, I examine the impact of labor unions on underinvestment and overinvestment problems. Using a large sample of U.S. listed firms with available firm-year investment financial data and industry union rates as proxies for firm-level unionization, I find that the level of underinvestment and overinvestment decreases with labor union power. Adding financial reporting quality as an independent variable, my results are consistent with prior research results that financial reporting quality is negatively associated with underinvestment and overinvestment. I also find evidence that firms with higher financial reporting and labor unionization are complementary in mitigating underinvestment and overinvestment problems.

My study provides important implications for the impact of labor unions on firm investment efficiency. One possible explanation of labor unions reducing underinvestment and overinvestment is the reduction of agency costs. Labor unions perform an important monitoring role in firms thereby resulting in reducing agency problems and consequently any overinvestment and underinvestment problems. My study is the first study that links labor unions, investment efficiency and financial reporting quality, suggesting that labor unions and financial reporting quality function together to improve investment efficiency.

CHAPTER 8

FURTHER WORK

In my study, I pursue the general idea that strong labor unions have positive impact on firms' underinvestment and overinvestment. There are several ways to improve and extend my findings. First, I assume that labor unions and financial reporting quality are independently affecting investment efficiency. However, there is a possibility that labor unions improves investment efficiency through their impact on improving financial reporting quality. Second, I provide evidence that labor unionization is negatively associated with underinvestment and overinvestment, but I have not tested possible channels through which labor unions may impact them. The possible testing variables could include: a) earnings quality or conservatism, b) corporate governance variables (e.g., board of directors, G-index, product market competition), c) various industry factors (e.g., labor-intensive industries vs. capital-intensive industries), and d) state factors (e.g., union-friendly states vs. other states).

APPENDIX

A: VARIABLES DEFINITION

Variable	Description
Union	An industry-level unionization rate calculated as the number of unions members divided by the number of total employees in that industry. I used the industry-level unionization rate as a proxy for firm-level unionization.
Over_In	Positive residuals from the expected investment expenditure model IV.
Under_In	Negative residuals from the expected investment expenditure model IV.
AQ	The standard deviation of the firm level residuals from the Dechow and Dichev model during the year t-5 to t-1. See the discussion in Section 4.3.
Union*AQ	The product of unionization rate and accruals quality.
In_Tol	Total investment expenditure calculated as the sum of capital expenditures (CAPX), acquisitions (Acq) and research and development expenditures (RD), minus sales of property, plant, and equipment (SPPE).
In_Maintenance	I take amortization and depreciation expenditure as a proxy for In_Maintenance.
In_New	The difference between In_Tol and In_Maintenance.
V/P	The growth opportunities estimated as the ratio of value of assets in place, VAIP, to market value of equity, P, V/P. See the discussion in Section 4.1.b.
Leverage	The sum of book value of short-term and long-term debt scaled by the sum of the book value of total debt and the book value of equity.
Cash	The balance of cash and short-term investment deflated by total asset measured at the beginning of the year.
Age	The log of the number of years the firm has been listed on CRSP at the start of the year.
Size	The log of total assets measured at the start of the year.
Stock Returns	The change in market value of the firm over the prior year.
Year Indicator	The dummy variables to capture annual fixed effects.
Industry Indicator	The dummy variables to capture industry fixed effects by using Fama-French 48-industry grouping.

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