

THE GOVERNANCE ROLE OF LABOR UNIONS IN IMPROVING INVESTMENT EFFICIENCY



Yong-Chul Shin ^(a) Surjit Tinaikar ^{(b)1} Yu Zhang ^(c)

^(a) Ph.D., Associate Professor, College of Management, University of Massachusetts Boston, Boston, U.S.A.; E-mail: yong-chul.shin@umb.edu

^(b) Ph.D., Associate Professor, College of Management, University of Massachusetts Boston, Boston, U.S.A.; E-mail: surjit.tinaikar@umb.edu

^(c) Ernst & Young, U.S.A.; E-mail: yu.zhang0326@gmail.com

ARTICLE INFO

Article History:

Received: 14th March 2022

Accepted: 24th April 2022

Online Publication: 27th April 2022

Keywords:

Corporate Governance
Investment Efficiency
Labor Union

JEL Classification Codes:

J51, J59, O16, G31

ABSTRACT

We focus on the role that labor unions can play in influencing firms' efficiency in corporate investment decisions where investment efficiency is defined as the extent to which deviations from optimal investment levels are minimized. We argue that unions may not simply be adversaries of managements as is often believed but have incentives to monitor managements in ways similar to that of other corporate governance players. These incentives stem from the fact that unions, like other corporate stakeholders, are adversely affected by investment inefficiencies that may result from firm-level overinvestment and underinvestment decisions. Consistent with this explanation, we find that labor unionization is indeed positively associated with improvements in investment efficiency and that these effects are generally stronger in bargaining environments that are favorable to unions. For instance, union effects in improving investment efficiencies are stronger in states where the Democratic Party is more influential and in states which have not enacted legislations that restrict union activities. These results indicate that union monitoring of investment efficiency is more likely to occur through channels that are a part of unions' collective bargaining processes. Our results are robust to different measures of investment efficiency, different empirical specifications, and endogeneity of union membership.

© 2022 by the authors. Licensee CRIBFB, USA. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).

INTRODUCTION

This study examines the governance role that labor unions can play in guiding a firm's investment expenditures in physical capital and R&D towards more optimal levels. Deviations from these optimal levels are seen as inefficient investment decisions that may cause firms to overinvest in negative net present value (NPV) projects or underinvest in positive NPV projects.

It is widely held in the neo-classical economy that corporate investment is a function of marginal Q (Abel, 1983). Firms generally invest until the marginal benefit of capital equals the marginal cost. However, imperfections due to the information asymmetry may cause firms to deviate from optimal capital investment policy (Jensen, 1986; Stiglitz & Weiss, 1981). Prior literature has explored several factors that can mitigate these agency problems and thereby improve investment efficiency. For example, an effective corporate governance system that encompasses managerial incentives and optimal organization of external resources could minimize problems relating to sub-optimal investment decisions. Firm-level corporate governance structures in the form of managerial ownership, institutional holdings, equity-linked compensation and board independence could reinforce managerial incentives to make optimal investment decisions. We extend this line of literature by examining the monitoring of investment efficiency that is associated with yet another important corporate governance institution - labor unions.

Labor unions, as representatives of workers constitute an important stakeholder group and are increasingly assuming the role of insiders. Unlike shareholders and institutional owners who can reduce the risk associated with a firm's bad performance by holding a diversified portfolio, employees are unlikely to be able to diversify their earnings from the firm (Amihud & Lev, 1981). This makes employee welfare even more dependent on the firm value which in turn makes employee incentives to monitor the firm's capital investment policy even more important than in the case of shareholders.

¹Corresponding author: ORCID ID: 0000-0003-2654-0366

© 2022 by the authors. Hosting by CRIBFB. Peer review under responsibility of CRIBFB, USA.
<https://doi.org/10.46281/ijfb.v10i1.1698>

Workers and unions could impact corporate investment decisions directly by securing board representation through equity ownership or indirectly by engaging in disruptive activities such as strikes and political lobbying (Chen, Kacperczyk, & Ortiz-Molina, 2011). The focus on unionization therefore allows us to examine an important channel through which investment projects may be monitored viz. the collective bargaining process. This is a relatively unexplored area in the literature examining corporate governance structures and their role in contributing to investment efficiency.

The governance role of labor unions has often been understated in prior literature. Yet unions have the potential to contribute positively to firm performance by facilitating a cooperative labor relations environment (Freeman & Medoff, 1979), monitoring contracts between management and shareholders (Jensen, 2010; Banning & Chiles, 2007) and inducing better financial reporting practices by demanding higher quality audits and internal control systems (Chung, Cho, Lee, & Son, 2017). We envisage that labor unions can play a similar constructive role in nudging managements towards making more efficient investment decisions. Prior literature in this area has generally documented a decline in investment in physical capital and R&D in unionized firms. In the union rent-seeking framework of Hirsch (1991), firms respond to the increased wage premiums by reducing investment levels. However, not all reduction of investment expenditures can be seen as evidence of union rent-seeking. If managers overinvest solely with the purpose of consuming perquisites and growing the firm beyond the optimal size (Jensen, 1986), then a decline in such investments in unionized firms could reflect a monitoring effect of labor unions rather than a rent-seeking one.

When it comes to managerial underinvestment, there is an intuitive explanation for unions to possess incentives in limiting underinvestment. Unions acting on behalf of employees have much at stake if the underinvestment problem becomes severe particularly during times of structural change and economic and social upheaval. Unions' demand for higher wages can end up being redundant if companies are not resourceful enough to work out the higher labor costs. The Textile Workers' Union of America (TWUA) often encouraged companies to modernize and invest even though such measures often ended up eliminating jobs. Aware that underinvestment was often an early warning signal of eventual liquidation, the TWUA sought to preserve a number of high paying positions by coupling wages with corporate investment policy (Hartford, 1996). Union leader Jimmy Settles once said to the press, "When they invest in plants, plants stay open" (Pridle & Snively, 2015). Unions thus have an incentive in ensuring that managements do not underinvest in assets that may threaten future employee job security and consequently unions' own survival and relevance in labor markets.

Using a large sample of 3,658 firms over a period of thirty-one years, we document that firms in industries that are unionized are less likely to overinvest or underinvest in physical assets and R&D. To measure investment efficiency, we rely on the overinvestment and underinvestment measures discussed in Biddle, Hilary, and Verdi (2009). We are aware that any test of unionization effects on over- or underinvestment is a joint test of the union effects as well as the appropriateness of the model that defines "optimal" investment. Hence, we also conduct our primary empirical analyses using alternative investment efficiency measures such as those discussed in Richardson (2006) and continue to obtain similar results. Our results are also robust to inclusion of several firm-level characteristics and endogeneity of union membership.

We also study the cross-sectional variation in investment efficiency that may arise from differences in the quality of the bargaining environment. Our focus on the bargaining environment is for the following reason. If the positive association between unionization and investment efficiency is not driven by the monitoring role of unions exercised as a part of bargaining, then we should find no observable differences in this relationship when the bargaining environment is allowed to differ. It is not obvious why the positive union effects on investment efficiency would be systematically higher in situations where unions have an advantage in bargaining. Stronger union effects on investment efficiency in settings where unions have greater bargaining power would thus strengthen our hypothesis of unions assuming a monitoring role during the collective bargaining process. Consistent with this explanation, we find that the positive union effects on firms' investment efficiency are generally stronger in states where the political party to which unions are affiliated viz. the Democratic Party is more influential and weaker in states which have enacted legislations that make it harder for unions to acquire new members. (Note 1) Our results are also largely unchanged even when we decompose investments into physical capital investments (Capex) and R&D. (Note 2)

This study contributes to the literature in at least two ways. First, using a large sample of 3,658 firms we discover an important governance institution that may influence corporate investment efficiency viz. labor unions. Second, we find that union monitoring of managerial overinvestment is more likely to occur as a part of unions' collective bargaining processes. This is evidenced by the stronger union effects on investment efficiency observed in environments where unions have greater bargaining power.

RELATED LITERATURE AND HYPOTHESES DEVELOPMENT

A number of studies have examined the role of labor unions in influencing corporate strategic decisions. For instance, Denny and Nickell (1991) and Bradley, Kim, and Tian (2017) find that unionized firms invest less in innovation related R&D in an attempt to offset union rent-seeking. Others have examined how unionization can induce firms to increase information asymmetry (Hilary, 2006), reduce CEO compensation (Banning & Chiles, 2007) and reduce strategic cash holdings (Klasa, Maxwell, & Ortiz-Molina, 2009). Our development of the hypotheses below is in line with these studies.

Relationship between Overinvestment and Unionization

Examining the relationship between union strength and managerial incentives to overinvest necessitates an understanding of the two competing views in the labor economics literature about union effects on investment. Hirsch (1991) contrasts these two views in his book. The traditional view argues that unions' ability to raise wages above competitive levels causes firms to move up along the labor demand curve. Investment in capital or innovation then depends on scale and substitution effects that work in opposing directions. Hence this view argues that the net effect of unionization on investment is thus

unclear. The union rent-seeking view hypothesizes that firms reduce investment to levels similar to those firms with a nonunion labor force. These models posit that unions divert some of the firm's quasi-rents from capital to themselves. This in turn reduces the incentives of firms to invest. More formal models of the union rent-seeking view are described in Baldwin (1983) among others. Empirical studies have generally documented results that are consistent with the union rent-seeking view (Bronars & Deere, 1993).

However, to assume that unions always play an adversarial role with respect to the interests of the firm in its choice of investment projects may be an incomplete characterization of the problem. A labor union can be a key player in maintaining a system of checks and balances within the governance structure relating to monitoring overinvestment. Managers consider the firm a source of extracting private benefits (Jensen & Meckling, 1976) and increasing their own human capital (Zingales, 1998). Hence, managers sometimes make investment decisions that may not be purely value-maximizing. For example, when profitable investment opportunities are limited, managers may prefer to use excess free cash flows for opportunistic reasons (Jensen, 1986). These activities ultimately result in an increase in firm size, but not firm value.

A dilution in firm value hurts all other stakeholders, including employee unions. Unions are hurt because diversion of corporate resources away from unionized members to those who run the corporation reduces the magnitude of rents available for unions to negotiate and capture during collective bargaining. In effect, overinvestment has the consequence of diluting the unions' bargaining power vis-à-vis the firm. Furthermore, overinvestment of free cash flows takes away valuable funds that could be used to finance growth options that may arise in the future. Lack of financing options during these times could then lead firms to a state of underinvestment (Opler, Pinkowitz, Stulz, & Williamson, 1999) thereby leading to an increased probability of liquidation and bankruptcy. Unions therefore have incentives to monitor managerial overinvestment. The monitoring may happen through several channels – by making wage demands that affect managerial flexibility to choose projects, by organizing protests or strikes that may delay new investment plans, through threats to use political connections which in turn can create uncertainties for new plans or through more aggressive posturing in give-and-take during collective bargaining negotiations.

Based on the set of arguments described above, we state our first hypothesis in alternate form as follows:

H₁: *Unionization is positively associated with investment efficiency that results from mitigating overinvestment problems.*

Relationship between Underinvestment and Unionization

The implications of unionization for underinvestment can be understood in context of theories developed to understand debt holders and shareholder conflicts. Stiglitz and Weiss (1981) show that debtholders can anticipate the opportunistic behavior of managers and shareholders and attempt to limit it by raising the cost of debt or by rationing credit. Consequently, a positive NPV investment opportunity ends up not being taken due to the high cost of debt. Because employee remuneration cash flow streams are similar to the payouts on risky debt (Chen, Kacperczyk, & Ortiz-Molina, 2012) underinvestment could occur if unions pressure firms to raise wages which may reduce shareholders' incentives to invest in positive NPV projects. The union rent-seeking theories also predict similar outcomes. In these models, unions end up capturing a portion of the firm's economic rents from capital thereby creating incentives for firms to underinvest. These theoretical arguments would imply that unionization exacerbates underinvestment problems.

Yet anecdotal evidence abounds that unions have incentives to prevent underinvestment because underinvestment is often a precursor to bankruptcy and eventual loss of jobs. Unions therefore have to balance their demands for higher wages with concerns relating to continuation of future employment. The TWUA union often encouraged companies to modernize their plants in post-war America when the textile industry was seen as extremely unstable, even if it meant the elimination of some jobs. Hartford (1996) documents that union leaders faced the difficult problem of not only convincing mill owners to make much needed investments, but also persuading workers and union representatives that such economic modernization measures were in their own best long-term interests. Labor economist, Solomon Barkin has argued that workers do not approve of managements who neglect the company's physical, competitive and financial capital (Hartford, 1996). The mega-billion dollar agreement between the United Automobile Workers (UAW) and Ford in November 2015 has new investment in plants and products as its cornerstone. UAW Vice President Jimmy Settles in a statement to the press said "When they invest in plants, plants stay open". Unions thus have an incentive in ensuring that managements do not underinvest in assets that may threaten future jobs. This seems to suggest that unions are not myopic and are concerned about management investment decisions that may erode the competitiveness and financial stability of the firm in the long run. Liberty and Zimmerman (1986) note that labor negotiations often take place every three years suggesting that unions care about long-term issues.

Given the strong anecdotal evidence available, we propose the second hypothesis as:

H₂: *Unionization is positively associated with investment efficiency that results from mitigating underinvestment problems.*

CROSS-SECTIONAL VARIATION IN INVESTMENT EFFICIENCY

In this section we examine the cross-sectional variation in investment efficiency arising from differences in the quality of the bargaining environment. (Note 3) If the positive association between unionization and investment efficiency that we document in this study is unrelated to the governance role of unions, then we should find no observable difference in this relationship when the bargaining environment is allowed to differ. It is not obvious why union effects on investment efficiency would be systematically higher in situations where unions have greater bargaining power. A more facilitative bargaining environment may allow unions to better exercise their governance role by having a more forceful say on corporate

strategic investment plans through give-and-take during negotiations, through threats of strikes, and through threats to bring in legislation by using their political connections. Favorable bargaining environments may also spur unions in demanding better quality financial information from employers (Chung et al., 2017) which in turn may help unions to better assess investment plans and projects and detect managerial opportunistic behavior in investment decision-making.

Right-to-Work (RTW) laws enacted in many states prohibit agreements between unions and employers and put restrictions on the extent to which employees can join unions. These restrictions can create free-rider problems for unions and dilute their bargaining power (Ellwood & Fine, 1987). Lower bargaining power implies that unions are unlikely to have a forceful say at the bargaining table or be able to garner enough financial resources to organize effective protests when managers take investment decisions that are unfavorable to the union. Thus, one would expect union effects of improving investment efficiency to be lower in states that have enacted RTW laws. The first part of the third hypothesis is thus stated in alternate form as:

H_{3A}: The positive association between unionization and investment efficiency is weaker in states that have enacted Right-to-Work legislation.

Unions have also developed close ties with the Democratic Party ever since unions benefitted from the friendly labor policies of President Roosevelt in the 1930's. Union members typically tend to vote Democratic Party candidates. Union leaders can threaten to use their political connections to bring in legislation unfavorable to employers or better use their political contacts to garner organizational resources in an attempt to prevent management opportunism or indifference in investment decision making. We therefore argue that unions tend to be more powerful and have greater bargaining power in states ruled by the Democratic Party. Thus, the positive union effects on investment efficiency may be stronger in states ruled by the Democratic Party. The second part of the third hypothesis is thus stated as:

H_{3B}: The positive association between unionization and investment efficiency is stronger in states that are ruled by the Democratic Party.

RESEARCH DESIGN

Measurement of Investment Efficiency (*INVEFF*)

Biddle et al. (2009) employ a model of firm-level investment as a function of growth opportunities (as measured by lagged growth in Sales). The residuals are then interpreted as a firm-specific measure of unexplained investment. Their model of expected investment is described below as:

$$INVESTMENT_{i,t+1} = \beta_0 + \beta_1 * SALES_{i,t} + \varepsilon_{i,t+1} \quad (1)$$

Equation (1) is estimated within each industry-year level using Fama-French 48-industry classification and with at least 20 observations in each industry-year.

Firm-years that are grouped in the lowest quartile (i.e., the most negative residuals) are classified as the underinvesting group while those in the highest quartile (i.e., the most positive residuals) are classified as the overinvesting group. Firm-years that are grouped in the middle two quartiles are classified as the benchmark group. We estimate a logistic model that predicts that a firm will be more likely to be in the benchmark group (*INVEFF* =1) as opposed to each of the extreme quartile (i.e., the underinvesting and overinvesting) groups (*INVEFF* =0).

Measurement of Union Strength (*UNION*)

Since firm-level unionization data is not required to be disclosed by U.S. firms, many large-sample U.S. prior studies of labor unions have relied on the unionization data from the industry-level union database that Hirsch and Macpherson constructed (see Hirsch & Macpherson, 2003) (e.g., Chen et al., 2011; Klasa et al., 2009; Chen et al., 2012). Some others have transformed the industry-level unionization rates into a firm-level measure by using the product of the unionization rate and the number of employees for each firm-year scaled by the book value of total assets (Hilary, 2006; Hamm, Jung, & Lee, 2018; Hsieh, Jung, & Yi, 2017). We adopt this approach for our study as we believe that this approach strikes a good balance between preserving the sample size and recognizing the fact that unionization is both a firm level and an industry-level decision. We also perform our analyses by directly using the industry-level unionization rates. (Note 4) Our results continue to remain qualitatively unchanged. All empirical results are presented using the firm-level unionization measure.

Empirical Models for Testing Unionization Effects on Investment Efficiency

The primary logistic regression model to test the association between *INVEFF* and *UNION* is described below.

$$INVEFF_{it} = \alpha + \beta_1 UNION_{it} + X'_{it} + Industry\ Effects + Year\ Effects + \varepsilon_{it} \quad (2)$$

Where *i* indicates firm and *t* the year. X'_{it} is a vector of firm specific control variables that have been known to drive capital investment (Biddle & Hilary, 2006; Biddle et al., 2009; Richardson, 2006). ε_{it} is an error term. (Note 5)

Endogeneity of Union Membership

A potential econometric problem in our study could arise if firms choose to unionize based on unobserved factors that could be correlated with our measures of investment efficiency. This would make our *UNION* variable an endogenous variable that could confound our findings. We attempt to address this problem using an instrumental variables approach. We use three instruments to address endogeneity – state-level unemployment rates (*UNEMPRATE*), industry concentration (*HHI*), and old economy industry (*OLDECON*). Blanchflower, Crouchley, Estrin, and Oswald (1990) argue that when local unemployment rates are high, the penalty associated with being sacked would be higher due to fewer job opportunities, spurring more individuals to join unions. Employees in concentrated industries are also more likely to be unionized due to

high expected benefits that can be captured in a firm facing less competition and lower coordination and organization costs. Industry concentration implies higher economic profits and unionism may provide a means of redistributing some portion of these profits to workers (Hirsch & Berger, 1984). Unionization is also more likely to occur in highly regulated environments as is often associated in “old economy” industries such as transportation, utilities and government, where entry is regulated and minimum prices are set by regulatory commissions. If profits are enforced through price regulation, individual firms may have fewer incentives to confront unions on wages, thereby encouraging unionization (Hendricks, 1977).

SAMPLE AND EMPIRICAL RESULTS

Sample Selection

Our initial sample for calculating the overinvestment and underinvestment residuals consists of all firm-year observations from the period 1974–2013. We then merge this data with the labor union coverage data which is first available from 1983. So our final sample includes observations from the period 1983–2013. We match industry-level union coverage data at the 4-digit SIC level to each firm-year in COMPUSTAT North America. We exclude financial firms with SIC codes from 6000–6999 because financial firms typically have different operating, investing, and financing activities from other firms in the economy. Our final sample after deleting missing observations for *UNION*, *INVEFF* and control variables consists of 23,475 firm-years and 3,658 unique firms.

Empirical Results

Table 1 describes the characteristics of the sample. The mean (median) *INVESTMENT* for the firm is about 17% (10%) of total assets, while that for *CAPEX* is about 41% (22%) of a firm’s Property, Plant and Equipment. The median firm has total assets of around \$88 million (Log of total assets i.e. *LOGAT* = 4.48). The average Market-to-Book ratio (*MKTBOOK*) for our sample is around 1.74, which means our sample is dominated by firms with relatively fewer growth opportunities. The median industry-level and firm-level unionization rates for the firms in our sample are around 10% and 7% respectively. Correlation statistics (not reported) also reveal that unionized firms typically tend to be older, more leveraged, have fewer growth opportunities, are less likely to be financial distressed or loss-making and show lesser firm-level uncertainty as evidenced in volatility of cash flows. This is consistent with the profile of unionized firms documented in prior literature (Liberty & Zimmerman, 1986).

Table 1. Descriptive Statistics

| Variable | Mean | STD | 25% | Median | 75% |
|-----------------------|-------|--------|-------|--------|-------|
| <i>INVEFF</i> | 0.50 | 0.50 | 0.00 | 1.00 | 1.00 |
| <i>INVESTMENT</i> | 16.71 | 32.85 | 4.87 | 10.28 | 19.79 |
| <i>CAPEX</i> | 41.46 | 156.97 | 11.60 | 21.89 | 41.02 |
| <i>NONCAPEX</i> | 8.89 | 24.11 | 0.00 | 1.87 | 9.91 |
| <i>UNION</i> | 0.13 | 0.15 | 0.03 | 0.07 | 0.18 |
| <i>LOGAT</i> | 4.63 | 2.19 | 2.89 | 4.48 | 6.25 |
| <i>D/A</i> | 0.17 | 0.16 | 0.02 | 0.14 | 0.29 |
| <i>MKTBOOK</i> | 2.47 | 2.11 | 1.09 | 1.74 | 3.02 |
| $\bar{\sigma}(CFO)$ | 0.09 | 0.08 | 0.03 | 0.07 | 0.12 |
| $\bar{\sigma}(SALES)$ | 0.32 | 0.27 | 0.12 | 0.24 | 0.44 |
| $\bar{\sigma}(I)$ | 0.61 | 1.33 | 0.00 | 0.04 | 0.39 |
| <i>ZSCORE</i> | 4.03 | 3.90 | 1.61 | 3.11 | 5.29 |
| <i>TANGIBILITY</i> | 0.60 | 0.42 | 0.28 | 0.51 | 0.86 |
| <i>CFOSALE</i> | 0.05 | 0.25 | 0.01 | 0.08 | 0.17 |
| <i>SLACK</i> | 0.63 | 1.16 | 0.02 | 0.11 | 0.56 |
| <i>OPCYCLE</i> | 4.76 | 0.65 | 4.33 | 4.82 | 5.25 |
| <i>AGE</i> | 15.60 | 15.64 | 5.00 | 11.00 | 21.00 |

Note. This table presents descriptive statistics of selected variables used in the main analyses. The sample includes 23,475 firm-year observations over the period 1983–2013. All variables are defined in Appendix A.

Table 2 describes the relationship between the unionization rates and investment efficiency using logistic regressions. Columns (1) and (2) compare optimal investment with overinvestment and underinvestment respectively. Consistent with our primary hypotheses H1 and H2, investment efficiency resulting from mitigating both under- and overinvestment is positively associated with unionization rates. The results also reveal that larger firms (as measured by *LOGAT*) with a higher proportion of tangible assets (*TANGIBILITY*) and better growth opportunities (*MKTBOOK*) are more likely to overinvest (i.e. they display lower investment efficiency). We believe that firm size, growth opportunities and tangibility of assets proxy for the complexity of the firms’ operations making it harder for outsiders to accurately observe managerial action, thereby making overinvestment more likely. Consistent with prior literature, larger firms are more likely to display investment efficiencies resulting from lower underinvestment due to more financing options available for larger firms. However, more leverage (*D/A*) increases underinvestment (i.e. it decreases investment efficiency) because any benefits from investing are captured primarily by debt holders thereby reducing managerial incentives to invest in marginally positive NPV projects. The pseudo r-squared ranges from 0.09 to 0.23 indicating that the models are well specified.

Table 2. Unionization and Investment Efficiency

| | (1) Overinvestment | (2) Underinvestment |
|-------------------------------|-----------------------------|----------------------------|
| <i>UNION</i> | 0.49** (2.07) | 0.76** (2.46) |
| <i>LOGAT</i> | -0.04*** (-1.84) | 0.18*** (9.03) |
| <i>D/A</i> | 0.75** (4.05) | -0.84*** (-4.27) |
| <i>MKTBOOK</i> | -0.17*** (-14.36) | 0.04** (3.22) |
| <i>̄(CFO)</i> | -0.21 (-0.64) | 0.24 (0.68) |
| <i>̄(SALES)</i> | -0.41*** (-4.09) | -0.15 (-1.29) |
| <i>̄(I)</i> | -0.03 (-1.34) | 0.01 (0.57) |
| <i>ZSCORE</i> | -0.00 (-1.33) | 0.04*** (3.89) |
| <i>TANGIBILITY</i> | -1.01*** (-9.25) | 0.99*** (8.84) |
| <i>CFOSALE</i> | 0.85*** (7.42) | -0.26*** (-2.27) |
| <i>SLACK</i> | -0.09*** (-3.76) | 0.08*** (3.21) |
| <i>DIVIDEND</i> | -0.40 (-0.57) | 1.02* (1.89) |
| <i>AGE</i> | 0.02*** (8.41) | -0.00*** (-3.73) |
| <i>OPCYCLE</i> | 0.16*** (2.97) | 0.22*** (3.61) |
| <i>LOSS</i> | 0.42*** (7.71) | -0.40*** (-7.78) |
| <i>Industry Fixed Effects</i> | Yes | Yes |
| <i>Year Fixed Effects</i> | Yes | Yes |
| <i>Firm Cluster</i> | Yes | Yes |
| <i>Observations</i> | 17,392 | 17,398 |
| <i>Pseudo R-squared</i> | 0.09 | 0.23 |

Note. This table presents results from logistic pooled regressions of *INVEFF* on *UNION*. Column (1) presents the results for a sample that includes overinvestment and benchmark observations. Column (2) presents the results for a sample that includes underinvestment and benchmark observations. All variables are defined in Appendix A. Standard errors in parentheses are robust and adjusted using one-way clustering by firm. ***, **, and * indicate statistical significances at the 1%, 5%, and 10% levels, respectively. Tests are two-tailed.

Table 3 provides evidence on the cross-sectional variation in investment efficiency that may arise from differences in the quality of the collective bargaining environment. Panels A and B show the unionization effects on investment efficiency partitioned by states where the Democratic Party is more influential and by states which have enacted Right-to-Work (RTW) legislation, respectively. We find in Panel A that while unionization tends have a stronger effect on mitigating overinvestment in Democratic Party states, there seems to be no such difference in instances of underinvestment. In the underinvestment sample, the coefficients on *UNION* in both Democratic and Non-Democratic Party states are significant but a test of difference of coefficients reveals that the coefficients are not statistically different from each other. One reason for this could be that underinvestment in Republican states has been traditionally high due to the Republican Party’s skepticism of big infrastructure projects (Surowiecki, 2016). Thus, while unions may not be as powerful in Republican states, there may be more opportunities of underinvestment for unions to have a significant impact on, relative to those in Democratic Party states. Our results in Panel B on the union effects on investment efficiency partitioned by states that have and have not enacted RTW legislation, appear more robust. In both overinvestment and underinvestment situations, the coefficient on *UNION* tends to be stronger in states which have not enacted RTW laws, i.e., in states where unions have greater bargaining power.

Table 3. Cross-Sectional Variation in the Effect of Unionization on Investment Efficiency

| Panel A: Unionization Effect and Political Affiliation | Overinvestment | | Underinvestment | |
|--|------------------------|----------------|------------------------|-------------------------|
| | Democrat | Non-Democrat | Democrat | Non-Democrat |
| <i>UNION</i> | 0.59* (1.87) | 0.47 (1.25) | 0.84* (1.84) | 0.97** (2.19) |
| <i>Control Variables</i> | Yes | Yes | Yes | Yes |
| <i>Industry Fixed Effects</i> | Yes | Yes | Yes | Yes |
| <i>Year Fixed Effects</i> | Yes | Yes | Yes | Yes |
| <i>Firm Cluster</i> | Yes | Yes | Yes | Yes |
| <i>State Fixed Effects</i> | Yes | Yes | Yes | Yes |

| | 9,956 | 7,390 | 7,442 | 9,860 |
|-------------------------|-------|-------|-------|-------|
| <i>Observations</i> | | | | |
| <i>Pseudo R-squared</i> | 0.11 | 0.11 | 0.26 | 0.23 |

| Panel B: Unionization Effect and Right-To-Work | | | | |
|---|-------------------------|----------------|--------------------------|----------------|
| | Overinvestment | | Underinvestment | |
| | No RTW | RTW | No RTW | RTW |
| <i>UNION</i> | 0.66** (2.12) | 0.31 (0.80) | 1.42*** (3.71) | 0.22 (0.43) |
| <i>Control Variables</i> | Yes | Yes | Yes | Yes |
| <i>Industry Fixed Effects</i> | Yes | Yes | Yes | Yes |
| <i>Year Fixed Effects</i> | Yes | Yes | Yes | Yes |
| <i>Firm Cluster</i> | Yes | Yes | Yes | Yes |
| <i>State Fixed Effects</i> | Yes | Yes | Yes | Yes |
| <i>Observations</i> | 10,775 | 6,571 | 10,838 | 6,490 |
| <i>Pseudo R-squared</i> | 0.09 | 0.09 | 0.23 | 0.26 |

Note. This table presents results from the logistic pooled regressions of *INEFF* on *UNION* and other control variables, partitioned by *DEMOCRAT* and *Right-to-Work (RTW)*. Panel A presents the regression results of *INEFF* on *UNION* and other control variables, partitioned for Democrat and Non-Democrat states. Panel B presents the regression results of *INEFF* on *UNION* and other control variables, partitioned for RTW and No-RTW states. All variables are defined in Appendix A. Standard errors in parentheses are robust and adjusted using one-way clustering by firm. ***, **, and * indicate statistical significances at the 1%, 5%, and 10% levels, respectively. Tests are two-tailed.

As a robustness check, we decompose the overall investment into two components in Table 4 – *CAPEX* and *NONCAPEX*. Panel A shows that unionization improves investment efficiency associated with mitigating *CAPEX* underinvestment but not that associated with mitigating *CAPEX* overinvestment. The coefficient on *UNION* is not significant in the case of *CAPEX* overinvestment. One reason for the relatively weaker results in the case of *CAPEX* overinvestment is that unlike *NONCAPEX* expenditures such as R&D that is often governed by science and/or regulation, *CAPEX* investment decisions have more managerial discretion and may be more opaque in nature, making it harder for unions to monitor whether an investment is efficient or excessive. Panel B shows that unionization tends to increase *NONCAPEX* investment efficiency resulting from mitigating both overinvestment and underinvestment.

Table 4. CAPEX vs. NONCAPEX Investment Efficiency and Unionization

| Panel A: Unionization Effect and CAPEX Investment Efficiency | | |
|---|----------------|--------------------------|
| | Overinvestment | Underinvestment |
| <i>UNION</i> | 0.15 (0.66) | 0.76*** (3.29) |
| <i>Control Variables</i> | Yes | Yes |
| <i>Industry Fixed Effects</i> | Yes | Yes |
| <i>Year Fixed Effects</i> | Yes | Yes |
| <i>Firm Cluster</i> | Yes | Yes |
| <i>Observations</i> | 17,362 | 17,415 |
| <i>Pseudo R-squared</i> | 0.08 | 0.21 |

| Panel B: Unionization Effect and NONCAPEX Investment Efficiency | | |
|--|-------------------------|--------------------------|
| | Overinvestment | Underinvestment |
| <i>UNION</i> | 0.78** (2.08) | 1.38*** (3.23) |
| <i>Control Variables</i> | Yes | Yes |
| <i>Industry Fixed Effects</i> | Yes | Yes |
| <i>Year Fixed Effects</i> | Yes | Yes |
| <i>Firm Cluster</i> | Yes | Yes |
| <i>Observations</i> | 17,302 | 15,187 |
| <i>Pseudo R-squared</i> | 0.27 | 0.51 |

Note. This table presents pooled time-series cross-sectional regressions of models predicting *CAPEX* and *NONCAPEX* investment. Panel A presents the regression results of *INEFF* on *UNION* where *INEFF* is based on the residuals computed from industry-year regressions of current *CAPEX* investment on lagged sales growth. Panel B presents the regression results of *INEFF* on *UNION* where *INEFF* is based on the residuals computed from industry-year regressions of current *NONCAPEX* investment on lagged sales growth. All variables are defined in Appendix A. Standard errors in parentheses are robust and adjusted using one-way clustering by firm. ***, **, and * indicate statistical significances at the 1%, 5%, and 10% levels, respectively. Tests are two-tailed.

Table 5 addresses the endogeneity of union membership by using an instrumental variables approach. Column (1) of Table 5 shows the first-stage results relating *UNION* to *HHI*, *UNEMPRATE* and *OLDECON*. Columns (2) and (3) report the second-stage results of the regression of *INEFF* on the instrumented *UNION* value for the overinvestment and underinvestment sub-samples respectively. (Note 6) Consistent with our conjecture, *UNION* is positively associated with *HHI*, *UNEMPRATE* and *OLDECON* in Column (1). The second-stage results in Columns (2) and (3) continue to confirm our prior evidence from Table 3 on the strong association between unionization rates and investment efficiency. The instrumental variables coefficient is positive and statistically significant for both the overinvestment and underinvestment sub-samples.

Table 5. Instrumental Variables Estimation for Addressing Endogeneity of Union Membership

| | (1) First Stage Regression Dep. Variable = <i>UNION</i> | (2) Second Stage Regression. Dep. Variable = <i>INVEFF</i> (Overinvestment) | (3) Second Stage Regression. Dep. Variable = <i>INVEFF</i> (Underinvestment) |
|----------------------------------|---|--|---|
| <i>HHI</i> | 0.07*** (3.32) | | |
| <i>UNEMPRATE</i> | 0.01*** (10.01) | | |
| <i>OLDECON</i> | 0.05*** (8.97) | | |
| Instrumented <i>UNION</i> | | 1.55** (2.04) | 2.97 (3.55) |
| <i>Control Variables</i> | No | Yes | Yes |
| <i>Industry Fixed Effects</i> | No | Yes | Yes |
| <i>Year Fixed Effects</i> | No | Yes | Yes |
| <i>Firm Cluster</i> | Yes | Yes | Yes |
| <i>Observations</i> | 23,425 | 17,359 | 17,363 |
| <i>Adj. R-squared</i> | 0.05 | 0.09 | 0.23 |

Note. This table presents results from the instrumental variables regressions for addressing endogeneity of *UNION*. Column (1) reports the results from the 1st-stage regressions of *UNION* on the instrumental variables (*HHI*, *UNEMPRATE*, and *OLDECON*). Columns (2) and (3) present the results from the 2nd-stage Probit regressions of *INVEFF* on the instrumented *UNION* and control variables for the overinvestment and underinvestment sub-samples respectively. All variables are defined in Appendix A. Coefficients on control variables are excluded for brevity. Standard errors in parentheses are robust and adjusted using one-way clustering by firm. ***, **, and * indicate statistical significances at the 1%, 5%, and 10% levels, respectively. Tests are two-tailed.

Finally, Table 6 presents our main results using alternative measures of investment efficiency from Richardson (2006). Panel A presents the results from the expected model of investment in his study. The coefficients on all control variables load as expected—new investment expenditure increases with firm size, lagged cash holdings, lagged stock returns and prior investment expenditure and decreases with firm age and leverage. The positive and negative residuals from the model are then stored and analyzed separately in Panel B. Positive residuals ($I_{Overinv,t}^E$) from this model are deemed as overinvestment while negative residuals ($I_{Underinv,t}^E$) are interpreted as underinvestment. Panel B shows both pooled and Fama-Macbeth (1973) regressions separately of $I_{Overinv,t}^E$ and $I_{Underinv,t}^E$ on *UNION*. The results continue to confirm our main hypotheses. *UNION* is negatively associated with $I_{Overinv,t}^E$ (i.e. unionization makes the most positive residuals less positive) but positively associated with $I_{Underinv,t}^E$ (i.e. unionization makes the most negative residuals less negative).

Table 6. Alternative Investment Efficiency Measures

| Panel A: Expected Model of Investment | | |
|---------------------------------------|----------------|----------------------|
| | Predicted Sign | |
| <i>V/P_{t-1}</i> | - | -0.01*** (-10.75) |
| <i>Leverage_{t-1}</i> | - | -0.03*** (-18.82) |
| <i>Cash_{t-1}</i> | + | 0.04*** (19.76) |
| <i>Age_{t-1}</i> | - | -0.00*** (-7.29) |
| <i>Size_{t-1}</i> | + | 0.00*** (3.86) |
| <i>Stock Return_{t-1}</i> | + | 0.01*** (18.38) |
| <i>I_{new,t-1}</i> | + | 0.47*** (63.30) |
| <i>Year Indicators</i> | | Yes |
| <i>Industry Indicators</i> | | Yes |
| <i>Adjusted R-squared</i> | | 0.381 |

| Panel B: Relation between Investment Efficiency and Unionization Rates | | | | |
|--|-------------------------------|-------------------------------------|--------------------------------|--------------------------------------|
| | (1) | (2) | (3) | (4) |
| <i>Dependent Variable</i> | $I_{Overinv,t}^E$ (Pooled) | $I_{Overinv,t}^E$ (Fama-MacBeth) | $I_{Underinv,t}^E$ (Pooled) | $I_{Underinv,t}^E$ (Fama-MacBeth) |
| <i>UNION</i> | -0.06*** (-7.62) | -0.08*** (-5.91) | 0.04*** (9.65) | 0.05*** (6.96) |
| <i>Observations</i> | 8,529 | 8,141 | 11,786 | 11,243 |
| <i>Adjusted R-squared</i> | 0.04 | 0.08 | 0.07 | 0.09 |

Note. This table investigates the relationship between investment efficiency and unionization rates using investment efficiency measures from Richardson (2006). Panel A described the expected model of investment: $I_{New,t} = \alpha + \beta_1 V/P_{t-1} + \beta_2 Leverage_{t-1} + \beta_3 Cash_{t-1} + \beta_4 Age_{t-1} + \beta_5 Size_{t-1} + \beta_6 Stock\ Returns_{t-1} + \beta_7 I_{New,t-1} + \Sigma Year\ Indicator + \Sigma Industry\ Indicator$. I_{New} is the difference between I_{Total} and $I_{Maintenance}$. I_{Total} is total investment expenditure, calculated as the sum of Capex, acquisitions and R&D expenditures, minus sales of PPE. $I_{Maintenance}$ is investment expenditure necessary to maintain assets in place, using depreciation and amortization as a proxy. All other variables are as described in Richardson (2006). Panel B shows the regression of residuals estimated in Panel A on UNION. Positive residuals from this model are deemed as those representing overinvestment and are depicted by $I_{OverInv,t}^e$. Negative residuals from this model are deemed as those representing underinvestment and are depicted by $I_{UnderInv,t}^e$. Standard errors in parentheses are robust and adjusted using one-way clustering by firm. ***, **, and * indicate statistical significances at the 1%, 5%, and 10% levels, respectively. Tests are two-tailed.

CONCLUSION

We examine the effects of labor unionization in the U.S. and their interactions with political and legislative factors on firms' investment decisions. We believe that this study is an important contribution to academic literature in this area given the recent focus on the political ramifications of unions' collective bargaining. (Note 7) In this context, any study that is involved with revisiting or critiquing the contributions of unions to workers, firms and the economy at large, is likely to be of immense help not only to labor economists but also corporate finance academics and practitioners involved in understanding the determinants of corporate investment efficiency.

Prior empirical evidence in the literature on union effects on economic performance has held the view that unions tax investments inducing firms to invest less in physical assets and R&D. The implication is that unions cause underinvestment that causes companies to shrink thereby creating a significant cost to the economy. We re-examine the evidence in this area by looking at whether the documented union effects on investment are a result of underinvestment or whether they are a mitigation of managerial inclinations to overinvest. We find evidence that unionization is associated with mitigating both overinvestment and underinvestment problems in firms. In other words, unionization appears to reduce significant deviations from optimal investment policy in both directions. This result is consistent with the larger governance and long-term role that unions play in firms' strategic decisions. Furthermore, we generally find that the union effects on managerial inclinations tend to be stronger in environments where unions have greater bargaining power, indicating that the positive union effects on investment efficiency could likely be driven by the monitoring exercised by unions as part of its collective bargaining duties. Our results are robust to endogeneity of union membership, different empirical specifications, and alternative investment efficiency measures.

Author Contributions: Conceptualization, Y.S., S.T., and Y.Z.; Data Curation, Y.S., S.T., and Y.Z.; Methodology, Y.S., S.T., and Y.Z.; Validation, Y.S., S.T., and Y.Z.; Visualization, Y.S., S.T., and Y.Z.; Formal Analysis, Y.S., S.T., and Y.Z.; Investigation, Y.S., S.T., and Y.Z.; Resources, Y.S., S.T., and Y.Z.; Writing – Original Draft, Y.S., S.T., and Y.Z.; Writing – Review & Editing, Y.S., S.T., and Y.Z.; Supervision, Y.S., S.T., and Y.Z.; Software, Y.S., S.T., and Y.Z.; Project Administration, Y.S., S.T., and Y.Z.; Funding Acquisition, Y.S., S.T., and Y.Z. Authors have read and agreed to the published version of the manuscript.

Institutional Review Board Statement: Ethical review and approval were waived for this study, due to that the research does not deal with vulnerable groups or sensitive issues.

Funding: The authors received no direct funding for this research.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data presented in this study are available on request from the corresponding author. The data are not publicly available due to restrictions.

Conflicts of Interest: The authors declare no conflict of interest.

REFERENCES

- Abel, A. B. (1983). Optimal investment under uncertainty. *The American Economic Review*, 73(1), 228-233.
- Amihud, Y., & Lev, B. (1981). Risk reduction as a managerial motive for conglomerate mergers. *The Bell Journal of Economics*, 12(2), 605-617. <https://doi.org/10.2307/3003575>
- Baldwin, C. Y. (1983). Productivity and labor unions: An application of the theory of self-enforcing contracts. *The Journal of Business*, 56(2), 155-185. <https://doi.org/10.1086/296195>
- Banning, K., & Chiles, T. (2007). Trade-offs in the labor union-CEO compensation relationship. *Journal of Labor Research*, 28(2), 347-357. <https://doi.org/10.1007/BF03380050>
- Biddle, G. C., & Hilary, G. (2006). Accounting quality and firm-level capital investment. *The Accounting Review*, 81(5), 963-982. <https://doi.org/10.2308/accr.2006.81.5.963>
- Biddle, G. C., Hilary, G., & Verdi, R. S. (2009). How does financial reporting quality relate to investment efficiency? *Journal of Accounting and Economics*, 48(2), 112-131. <https://doi.org/10.1016/j.jacceco.2009.09.001>
- Blanchflower, D. G., Crouchley, R., Estrin, S., & Oswald, A. (1990). Unemployment and the Demand for Unions. NBER Working Papers (No. w3251). *National Bureau of Economic Research*.
- Bradley, D., Kim, I., & Tian, X. (2017). Do unions affect innovation? *Management Science*, 63(7), 2049-2395. <https://doi.org/10.1287/mnsc.2015.2414>
- Bronars, S. G., & Deere, D. R. (1993). Unionization, incomplete contracting, and capital investment. *Journal of Business*, 66(1), 117-132. <https://doi.org/10.1086/296596>
- Chen, H. J., Kacperczyk, M., & Ortiz-Molina, H. (2011). Labor unions, operating flexibility, and the cost of equity. *Journal of Financial and Quantitative Analysis*, 46(1), 25-58. <https://doi.org/10.1017/S0022109010000645>
- Chen, H. J., Kacperczyk, M., & Ortiz-Molina, H. (2012). Do nonfinancial stakeholders affect the pricing of risky debt? Evidence from unionized workers. *Review of Finance*, 16(2), 347-383. <https://doi.org/10.1093/rof/rfq028>

- Cho, H., Lee, B. B., Lee, W., & Sohn, B. C. (2017). Do labor unions always lead to underinvestment? *Journal of Management Accounting Research*, 29(1), 45-66. <https://doi.org/10.2308/jmar-51534>
- Chung, J. R., Cho, E. J., Lee, H. Y., & Son, M. (2017). The impact of labour unions on external auditor selection and audit scope: evidence from the Korean market. *Applied Economics*, 49, 4833-4850. <https://doi.org/10.1080/00036846.2017.1296546>
- Denny, K., & Nickell, S. (1991). Unions and investment in British manufacturing industry. *British Journal of Industrial Relations*, 29(1), 113-121. <https://doi.org/10.1111/j.1467-8543.1991.tb00231.x>
- Ellwood, D. T., & Fine, G. (1987). The impact of right-to-work laws on union organizing. *The Journal of Political Economy*, 95(2), 250-273. <https://doi.org/10.1086/261454>
- Fama, E. F., & MacBeth, J. D. (1973). Risk, return, and equilibrium: Empirical tests. *The Journal of Political Economy*, 81(3), 607-636. <https://doi.org/10.1086/260061>
- Freeman, R. B., & Medoff, J. L. (1979). The two faces of unionism. *The Public Interest*, 57, 69-93.
- Hamm, S. J. W., Jung, B., & Lee, W. J. (2018). Labor unions and income smoothing. *Contemporary Accounting Research*, 35(3), 1201-1228. <https://doi.org/10.1111/1911-3846.12321>
- Hartford, W. F. (1996). Where is Our Responsibility?: Unions and Economic Change in the New England Textile Industry, 1870-1960. *University of Massachusetts Press*.
- Hendricks, W. (1977). Regulation and labor earnings. *The Bell Journal of Economics*, 8(2), 483-496. <https://doi.org/10.2307/3003298>
- Hilary, G. (2006). Organized labor and information asymmetry in the financial markets. *Review of Accounting Studies*, 11(4), 525-548. <https://doi.org/10.1007/s11142-006-9015-y>
- Hirsch, B. T. (1991). Union coverage and profitability among US firms. *The Review of Economics and Statistics*, 73(1), 69-77. <https://doi.org/10.2307/2109688>
- Hirsch, B. T., & Berger, M. C. (1984). Union membership determination and industry characteristics. *Southern Economic Journal*, 50(3), 665-679. <https://doi.org/10.2307/1057983>
- Hirsch, B. T., & Macpherson, D. A. (2003). Union membership and coverage database from the current population survey: Note. *Industrial & Labor Relations Review*, 56(2), 349-354. <https://doi.org/10.1177/001979390305600208>
- Hsieh, H. Y. S., Jung, B., & Yi, H. (2017). The impact of non-financial stakeholders on accounting conservatism: The case of labor unions. *Seoul Journal of Business*, 23(1), 1-38. <https://doi.org/10.35152/snusjb.2017.23.1.001>
- Jensen, M. C. (1986). Agency cost of free cash flow, corporate finance, and takeovers. *Corporate Finance, and Takeovers. The American Economic Review*, 76(2), 323-329.
- Jensen, M. C. (2010). Value maximization, stakeholder theory, and the corporate objective function. *Journal of Applied Corporate Finance*, 22(1), 32-42. <https://doi.org/10.1111/j.1745-6622.2010.00259.x>
- Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3(4), 305-360. [https://doi.org/10.1016/0304-405X\(76\)90026-X](https://doi.org/10.1016/0304-405X(76)90026-X)
- Klasa, S., Maxwell, W. F., & Ortiz-Molina, H. (2009). The strategic use of corporate cash holdings in collective bargaining with labor unions. *Journal of Financial Economics*, 92(3), 421-442. <https://doi.org/10.1016/j.jfineco.2008.07.003>
- Liberty, S. E., & Zimmerman, J. L. (1986). Labor union contract negotiations and accounting choices. *Accounting Review*, 61(4), 692-712.
- Opler, T., Pinkowitz, L., Stulz, R., & Williamson, R. (1999). The determinants and implications of corporate cash holdings. *Journal of Financial Economics*, 52(1), 3-46. [https://doi.org/10.1016/S0304-405X\(99\)00003-3](https://doi.org/10.1016/S0304-405X(99)00003-3)
- Priddle, A., & Snavely, B. (2015, November 9). Jobs, plant investment cornerstone of Ford-UAW contract. *Detroit Free Press*.
- Richardson, S. (2006). Over-investment of free cash flow. *Review of Accounting Studies*, 11(2-3), 159-189. <https://doi.org/10.1007/s11142-006-9012-1>
- Stiglitz, J. E., & Weiss, A. (1981). Credit rationing in markets with imperfect information. *The American Economic Review*, 71(3), 393-410.
- Surowiecki, J. (2016, April 18). System Overload. *The Financial Page*.
- Zingales, L. (1998). Survival of the Fittest or the Fattest? Exit and Financing in the Trucking Industry. *Journal of Finance*, 53(3), 905-938. <https://doi.org/10.1111/0022-1082.00039>

NOTES

Note 1. The positive union effects in states where the Democratic Party is more influential, is observed only in instances of overinvestment.

Note 2. Unionization is positively associated with mitigating overinvestment of NonCapex investments only but not Capex investments.

Note 3. Cho, Lee, Lee, and Sohn (2017) using 343 Korean firms also examine union effects on investment. In their setting, channels for variation in investment efficiency arise from corporate governance structures such as equity and foreign ownership.

Note 4. To link the industry-level labor union data to firms in COMPUSTAT, we map the CIC or NAICS industry codes to SIC for all COMPUSTAT firms for each year.

Note 5. All continuous variables are winsorized at the 5th and 95th percentile.

Note 6. We use a Probit model in the second stage so that error terms in both the first and second stage can be assumed to be jointly bivariate normal.

Note 7. The U.S. Supreme Court heard a case in 2016, challenging rules that force government workers to pay hefty fees to

unions that they have no interest in joining. The unions had argued that such fees are vital to insure the operating efficiency and survival of companies.

APPENDICES

Appendix A: Variable Measurement for Regression Models

INVEFF = Coded as 1 if a firm's investment residual belongs to benchmark group; and 0 otherwise.

INVESTMENT = The sum of R&D expenditure, Capex, and acquisition expenditure less cash receipts from sale of Property, Plant and Equipment (PPE) multiplied by 100 and scaled by total assets (TA).

CAPEX = Capital expenditure multiplied by 100 and scaled by lagged PPE.

NONCAPEX = The sum of R&D expenditure and acquisition expenditure multiplied by 100 and scaled by lagged TA.

UNION = Calculated as the product of a firm's number of employees and the percentage unionization rate within the firm's SIC industry scaled by the book value of TA.

LOGAT = The natural logarithm of TA.

D/A = The ratio of total debts to TA.

MKTBOOK = The ratio of the market value of TA to book value of TA.

$\sigma(CFO)$ = Standard deviation of the cash flow from operations deflated by average TA from years t-5 to t-1.

$\sigma(SALES)$ = Standard deviation of the Sales deflated by average TA from years t-5 to t-1.

$\sigma(I)$ = Standard deviation of *INVESTMENT* from years t-5 to t-1.

ZSCORE = Z-Score = $1.2 * (\text{Working Capital to TA}) + 1.4 * (\text{Retained Earnings to TA}) + 3.3 * (\text{EBIT to TA}) + 0.6 * (\text{Market Value of Equity to Total Liabilities}) + 1.0 * (\text{Sales to TA})$.

TANGIBILITY = The ratio of PPE to TA.

CFOSALE = The ratio of CFO to Sales.

SLACK = The ratio of Cash to PPE

DIVIDEND = An indicator variable that coded as 1 if the firm paid a dividend; 0 otherwise.

AGE = the number of years a firm has been listed in CRSP.

OPCYCLE = Natural Logarithm of the ratio of receivables to sales plus the ratio of inventory to COGS multiplied by 360.

LOSS = An indicator variable that coded as 1 if net income before extraordinary items is negative; and 0 otherwise.

DEMOCRAT = Coded as 1 if a firm's operations are primarily located in a state that has consistently voted for the Democratic Party in most of the Presidential elections during the sample period; and 0 otherwise.

RTW = 1 if the state in which the firm is primarily located, has enacted a Right-to-Work legislation; 0 otherwise.

HHI = Herfindahl-Hirschman Index (*HHI*) measures the concentration of sales within a 3-digit SIC industry.

OLDECEN = Coded as 1 if a firm primarily operates in an "old-economy" industry where a firm's SIC code lies between 0100 and 3999, except computer industry (SIC codes: 3571, 3572, 3575 and 3577) and communications equipment industry (SIC codes: 3663, 3669 and 3674); 0 otherwise.

UNEMPRATE = State-level unemployment rate in a particular year.

Publisher's Note: CRIBFB stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



© 2022 by the authors. Licensee CRIBFB, USA. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).

Indian Journal of Finance and Banking (P-ISSN 2574-6081 E-ISSN 2574-609X) by CRIBFB is licensed under a Creative Commons Attribution 4.0 International License.