ESSAYS IN CORPORATE FINANCE

A Dissertation

by

BINA SHARMA

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BINA SHARMA

COMMITTEE MEMBERS

Dr. Binay K. Adhikari
Chair of the Committee

Dr. Diego Escobari
Co-chair of the Committee

Dr. Andre Mollick
Committee Member

Dr. David C. Cicero
Committee Member

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ABSTRACT

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I examine how firms and their managers respond to varying legal and financial market environments. The first essay examines the effect of shareholder-initiated litigation risk on opportunistic insider trading by exploiting US states' staggered adoption of Universal Demand (UD) laws, which weakened shareholders' ability to file derivative lawsuits against corporate insiders. I find that UD laws lead to significantly more profitable insider trades, specifically insider sales. After the adoption of UD laws, insider sales on average avoid an additional loss of about 2 percent ($24,000) per month in buy-and-hold abnormal returns. The benefit of UD laws is greater for insiders of firms where information asymmetry is high and where monitoring by institutional blockholders is low. Moreover, the greater profitability of insider trading after UD laws comes from more opportunistic timing of trades. For instance, insiders engage in more profitable insider trading, both purchase and sales prior to their quarterly earnings announcements after UD laws. Overall, this study suggests that a decrease in shareholder-initiated litigation threat increases more serious types of insider trading in the US firms.

The second essay examines the *ex-ante* risk of credit rating change on corporate payout policies. My results suggest that firms near a credit rating change are less likely to pay dividends and pay less dividends than other firms. Firms that are on the border of their rating

categories, i.e., those with a plus or a minus (POM) modifier in their ratings and those on investment-speculative cutoffs (IG/SG) on average have 0.09% and 0.20% less dividend yields respectively in the next quarter than other similar firms. Furthermore, POM firms are less likely to initiate a dividend and increase dividends compared to other firms. These results are novel and are not obvious predictions of traditional theories of dividends and are consistent with Kisgen's (2006) credit-rating capital structure (CR-CS) theory. My results indicate that POM and IG/SG firms pay less dividends in all industries and almost every year from 1986 to 2016. Overall, my results show that firms with similar ability to pay dividend can have significantly different dividend policies in response to their credit rating risks.

DEDICATION

I would like to dedicate my PhD dissertation to my husband Shankar Parajulee and two beautiful daughters Aarati and Adittya for their unconditional support. Thank you for your love and support throughout my doctoral studies.

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All errors are mine.

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CHAPTER I

INTRODUCTION

This dissertation consists of two essays in corporate finance. In the first essay, I explore the role of litigation risk on opportunistic insider trading. In the second essay, I examine the effect of *ex-ante* risk of credit rating change on firms' dividend and share repurchase policies.

The first essay examines whether the staggered adoption of Universal Demand (UD) laws by some states, which weakens shareholders' ability to file derivative lawsuits against corporate insiders, affect insider trading profitability in firms incorporated in those states. I use difference-in-differences estimates to examine the buy-and-hold abnormal returns, total trading volume, and total trading profits for 1, 3 and 6 months period after the insider trading between the treated (firms incorporated in the states that adopted UD laws) and control (firms incorporated in the states that did not adopt UD laws) firms for the period 1985 to 2013. I find that *ex-ante* reduction in litigation threat leads to significantly more profitable insider trading, especially insider sales. My results suggest that after the adoption of UD laws, insiders in the treated firms on average avoid an additional loss of about 2 percent in insider sale per month in buy-and-hold abnormal returns which corresponds to $24,000 saving per month. The benefit of UD laws is greater for insiders of firms where information asymmetry is high and monitoring by institutional blockholders is low. On average, insider purchase remains unchanged. Further analysis suggests that the greater profitability of insiders' trades after UD laws comes from more opportunistic timing of trades. I find that the total number of shares sold remains constant, but the total dollar

volume of insider sale increases by 16% after the adoption of UD laws in the treated firms. More interestingly, after the adoption of UD laws, insiders make more profitable trades, in both sales and purchases, before quarterly earnings announcements (QEA). Overall, my evidence suggests that a decrease in the risk of shareholder-initiated lawsuits encourages corporate insiders to engage in more serious types of insider trading.

In the second essay, I investigate whether the *ex-ante* risk of credit rating change affects firms' payout policies. I use a large sample of firm-quarter observations of all rated firms from 1986 to 2016, and examine their dividends and stock repurchase activities based on their exposure to credit rating risk. Following Kisgen (2006), I group firms into high risk of credit rating change if they are on "Plus", "Minus", "Plus or Minus" (or "POM") or on the investment-speculative grades cutoffs (IG/SG), and low risk of credit rating change if they are in the middle of their rating categories. My results suggest that firms near a credit rating change pay less dividends and are less likely to pay dividends compared to other firms. I find that POM and IG/SG firms on average pay 0.09% and 0.20% less dividend yields, respectively, in the next quarter than non-POM firms after controlling a number of determinants of dividend. These results are novel and are not obvious predictions of traditional theories of dividends. Furthermore, I analyze the probabilities of future dividend initiations of past nonpayers and a future dividend increase of past dividend payers separately. I find that POM firms are less likely to initiate and increase dividends compared to other firms. Likewise, I analyze firms' dividend pattern each year over 30 years, and across five industries. My results indicate that POM and IG/SG firms pay less dividends each year and across all industries. Overall, my work suggests that firms with similar underlying credit quality and ability to pay dividends can have significantly different dividend payouts in response to their risks of the rating change. I also

conduct a similar set of tests for firms' stock repurchase decisions. However, my results from stock repurchase are not statistically significant, although they show a negative relation between repurchase and *ex-ante* risk of the rating change. These results are consistent with the notion that, unlike the dividends, stock repurchases are transient and paid from non-operating cash flows.

Overall, my dissertation examines firms' payout policies and corporate insiders' trading behaviors in different legal and market environments. My two essays are not directly related to each other and contribute to the two important topics in corporate finance: insider trading and payout policy. Thus, the findings of my dissertation can be used by various market participates, such as, shareholders, debtholders, government and researchers interested in those areas.

The rest of the document is structured as follows. Chapter II presents the first essay. Chapter III presents the second essay. Each chapter contains a brief literature review, data and summary statistics, empirical methodologies, results, and conclusion. Chapter IV summarizes the dissertation.

CHAPTER II

DOES LITIGATION RISK DETER OPPORTUNISTIC INSIDER TRADING? EVIDENCE FROM UNIVERSAL DEMAND LAWS

2.1 Introduction

I find that corporate insiders trade more opportunistically when their risk of being sued decreases. Many scholars and policymakers believe that opportunistic trading by corporate insiders erodes outside investors' confidence in the fairness and integrity of financial markets, and if left unchecked, may even lead to market failures.[1] Therefore, there is a continuing interest in understanding the mechanisms, especially regulations, designed to restrain insider trading.

However, empirical evidence on the effectiveness of regulations in deterring insider trades has been mixed. One set of studies finds that insider trading regulations have been effective in reducing the frequency and profitability of opportunistic trades, particularly in the United States (e.g., Agrawal and Jaffe 1995; Garfinkel 1997; Xu 2008). On the other hand, several other studies have cast doubt on the efficacy of regulations. For example, Seyhun (1992) finds that even the sweeping statutory sanctions on insider trading activities in the 1980s did very little to change volume and profitability of such trades. Jaffe (1974) finds no significant change in the volume or profitability of insider trades after some important court decisions regarding insider trading.

[1] Please see a recent review of literature by Bhattacharya (2014) for arguments for and against this view.

Banerjee and Eckard (2001) analyze a sample of merger events from 1897 to 1903 and find that the nature of insider trading was not much different in this "pre-regulation" era from that in the modern era of heavy regulation. Agrawal and Jaffe (1995) find that the short-swing rule (Section 16b of Securities Exchange Act) deters opportunistic purchase but does not deter sales.

One reason for the lack of robust evidence for the effectiveness of the existing regulations could be that most regulations or enforcements thereof are not strong enough to deter insider trades. Supporting this notion, Xu (2008) reports views held by many in Silicon Valley that by trading on private information, one "… can make a million dollars and … have a million-in-one chance of getting caught".[2] Indeed, Bhattacharya and Marshall (2012) find that top executives of public companies face prosecutions for illegal insider trades that involve surprisingly too little money to justify the risk. The authors posit that this happens because most insiders do not think they will ever get caught. Another possibility is that even the most sweeping regulations and their strictest enforcements may not be adequate to stop insider trading because the persistence of firms' culture and individual traits of opportunism defy threats of litigation (e.g., Ali and Hirshleifer 2017).

Another possible reason for the disagreement in the existing empirical findings is the lack of strong identification techniques to disentangle the causal effect of litigation risk on insider trading. An important hurdle for identification is posed by the fact that most modern insider trading laws in the United States are adopted at the federal level[3] and are designed to affect all firms at the same time. Besides, regulatory reforms are seldom random, and they often

[2] Stephen Bainbridge, *Financial Times*, June 20, 2002.
[3] For example, SEC rule 10b-5, Section 16b of the Securities Exchange Act of 1934, Insider Trading Sanctions Act of 1984 (ITSA), and Insider Trading and Securities Fraud Enforcement Act of 1988 (ITSFEA)

follow heightened concerns about illegal insider trading activities. The lack of adequate cross-sectional variation and potential endogeneity of regulatory changes add to the possibility that existing studies that rely on regulatory shocks may not cleanly establish causality. For instance, a decrease in insider trading activities after the passage of a stricter law may simply be mean-reversion. Other studies that focus on enforcement intensity and court decisions (e.g., Cheng et al. 2016; Del Guercio et al. 2017) are also subject to the same criticism. Perhaps recognizing this issue, Bhattacharya (2014) concludes his extensive review of the insider trading literature with the verdict that "We need methodologies (such as natural experiments) to evaluate the efficacy of current and future insider trading rules."

I attempt to fill this important gap in the literature. I exploit the staggered adoption of Universal Demand Law (UD Law) in 23 states over 28 years to examine the effect of litigation risk on opportunistic insider trading. My research is motivated by some recent studies which find that UD laws significantly decrease shareholders' ability to bring derivative lawsuits against corporate insiders for allegedly harming the corporation (Davis, 2008; Appel, 2016). I argue that states' adoption of UD laws serves as excellent quasi-natural experiments to study insider trading activities for two reasons: 1) UD laws are state-level laws adopted by different states in different points in time over several years. So, adoption of UD laws offers rich time-series and cross-sectional variations in the *ex-ante* probability of shareholder-initiated derivative lawsuits. 2) Although derivative lawsuits encompass insider trading, they are much wider in scope; and most states seem have adopted these laws for reasons largely unrelated to insider trading concerns. This feature makes UD laws plausibly exogenous to pre-existing insider trading activities.

My empirical methodology builds on some contemporary studies such as Bertrand and Mullainathan (2003), Gormley and Matsa (2016), and Appel (2016), who employ multiple

shock-based causal inferences. I create 'treatment' and 'control' groups using indicator variables based on the timing of adoption of UD laws by states of firms' incorporation. I then employ difference-in-differences (DiD) regression specifications to estimate the effect of shareholders' *ex-ante* litigation threat on the volume and profitability of insider trades. Following similar previous studies, my regression models include firm, industry-by-time, and state of firms headquarter location-by-time fixed effects, which control for time-invariant heterogeneities within firms, and time-varying differences across and within industries and states that may have coincided with passages of the UD laws.

Using the full sample of trades, I analyze the effect of UD laws on the profitability of insiders' trades measured by their 1, 3 and 6 month buy-and-hold abnormal returns (BHARs). My baseline regressions show that sales by insiders of treatment firms, compared to those of control firms, avoid a loss of about 2%, 3% and 5% BHARs in 1, 3, and 6 months respectively. These returns translate into abnormal loss avoidances of about $24,000, $66,000, and $120,000 per trade, respectively. I do not find significant effect of UD laws on the profitability of insiders' purchase in the full sample. However, as discussed shortly, I find significant effects in some relevant subsamples.

I conduct several additional tests to check if UD laws affect informed insider trading. I find that these effects are greater among firms with higher R&D, plausibly offering more information asymmetry and opportunities of profitable informed trades. I further find that UD laws predict increases in the dollar volumes of shares sold per trade, but not the numbers of shares sold. This finding supports the view that the reduction of litigation risk encourages insiders to time their sales more opportunistically: they are more likely to sell when prices are inflated, and large price declines are likely. Moreover, following Ali and Hirshleifer (2017), I

analyze trading patterns prior to quarterly earnings announcement events (pre-QEA). I find that pre-QEA insider trades - both purchases and sales - become more profitable after the adoption of UD laws. These results suggest that shareholders' litigation risk deters arguably more serious types of insider trades: opportunistic sales and trades before major corporate events.

Additional tests find that after UD laws, insider sales become more profitable in treatment firms which face less monitoring by institutional blockholders.

I conduct a rich set of robustness checks for my main analysis. I do not find any pre-trend in the profitability of insider trades before the UD laws. My results remain intact when I control for potential confounding effects of many other state and federal laws important for corporate governance and litigation. In another robustness test, I drop all firms located in 9th circuit court states to disentangle the effect of a court decision of 1999, which restricted shareholders' ability to bring security class action lawsuits. I also redefine my treatment firms as those incorporated in Pennsylvania, where UD Law was mandated by the state supreme court. Results from both specifications remain qualitatively similar.

This study makes several contributions to the literature. First, it contributes to the literature on the efficacy of regulations in deterring opportunistic insider trades. My novel contribution is that unlike most previous studies, which rely on federal laws or court decisions specifically targeted at insider trading, my study examines the effect of state laws affecting shareholders' ability to sue insiders. Staggered adoption of UD laws by states offers significant cross-sectional and time-series variation in regulatory shocks to the riskiness of informed insider trades. Moreover, UD laws are plausibly exogenous to pre-existing intensity of insider trading. Therefore, my identification strategy is more suitable for establishing causality than those of many previous studies.

Second, my study contributes to an important but often overlooked issue of public vs. private enforcement of opportunistic insider trading. Most prior studies focus on public enforcement of illegal insider trading, i.e. prosecution by regulators such as the SEC and the Justice Department, based on, for example, Section 10(b) of Securities Exchange Act, SEC rule 10b-5 and ITSA 1984. An exception is Agrawal and Jaffe (1995), who examine SEC rule Section 16b concerning the short-swing rule, which can only be enforced by shareholders, i.e., by private prosecution. Agrawal and Nasser (2012) conjecture that private enforcement may sometimes be more effective than public enforcement in deterring opportunistic insider trading. This is plausible because, for insiders of most firms, the risk of being sued by shareholders is higher than the risk of being sued by regulators, which may have incentives to focus on a few high-profile and visible cases only. Derivative lawsuits are also enforced privately by shareholders, so my evidence also speaks for the efficacy of private enforcement.

Finally, I contribute to the corporate governance literature. Specifically, my study complements more recent studies that exploit exogenous shocks to establish causal effects of governance on firm policies and value (e.g., Bertrand and Mullainathan, 2003; Gormley and Matsa, 2011, 2016; Appel 2016). In a related concurrent study, Boone, Fich and Griffin (2018) find that UD laws lead to opaquer financial statements, greater analyst dispersions and forecast errors, and worse information environments as manifested in higher bid-ask spreads and probabilities of informed trading (PIN). Boone et al. show overall more profitable insider trading as one of the incentives for managers to make the information environment opaquer. My analysis of insider trading goes much deeper and establishes increased informed insider trading, primarily sales, as a direct consequence of reduced litigation risk due to UD laws.[4]

[4] I analyze purchases and sales separately and find that insider sales, which are more litigation-prone, become more opportunistic after UD laws. I further show that trading before quarterly earnings announcements, which are much

The remainder of the chapter is organized as follows: Section 2.2 discusses legal background, reviews related literature, and develops hypotheses. Section 2.3 presents data and summary statistics. Section 2.4 discusses empirical methodology and results. Section 2.5 concludes.

2.2 Background, Literature Review and Hypothesis Development

2.2.1 Derivative Lawsuit, UD Laws and Insider Trading

A derivative lawsuit is filed by a shareholder (or shareholders) against corporate directors and officers on behalf of the company to address a breach of fiduciary duty such as fraud, mismanagement, self-dealing and dishonesty. An important difference between shareholders' class action lawsuits and derivative lawsuits is that any financial recovery obtained from a derivative lawsuit goes to the company's treasury. However, in most securities class action lawsuits, it goes directly to the shareholders. Shareholders can earn attorney's fees by being a part of derivative lawsuits.

In initiating derivative lawsuits, most states require an eligible shareholder to file a demand on the board (known as "demand requirement") to sue the alleged wrongdoers. Shareholders can initiate derivative suits themselves only if the board refuses the demand or does not act on it. However, many jurisdictions allow an exception to the demand rule, known as futility exception. The standards for determining the futility vary from jurisdiction to jurisdiction (Swanson, 1992). For example, Delaware Supreme Court has a two-prong test requiring shareholders to allege "particularized facts" that create a reasonable doubt that: 1) the directors

more subject to litigation, become more profitable after UD laws. Overall, my results from many cross-sectional tests suggest that increased opportunistic trades after UD laws do not necessarily stem from opaquer information environments but likely are standalone decisions incentivized by lower overall risks of being sued.

are disinterested and independent, and 2) the challenged transaction was a product of a valid exercise of business judgement (Kinney, 1994).

The critics of the demand futility argue that demand requirement gives management an opportunity to address the shareholders allegations, and a chance to either take a corrective action or reject the proposed action. Besides, demand requirement helps to resolve the disputes without costly litigation (Swanson, 1992). American Law Institute (ALI) and American Bar Association (ABA) advocated the need for ending the futility exception. ABA proposed demand requirement in all derivative actions (Universal Demand) in the Model Business Corporation Act (MBCA). In response to MBCA, 23 states have adopted universal demand (UD) Law till 2005 (Appel, 2016). Under the MBCA, shareholders must wait for 90 days after making a written demand to file a derivative lawsuit. Exceptions include corporations that refuse the demand within 90 days, and corporations that will suffer irreparable injury if suit is not brought earlier (Kinney, 1994).

Thus, the variation in UD laws leads to the variation in the shareholders' ability to bring derivative lawsuits against insiders for the breach of their fiduciary duties (Davis, 2008; Appel, 2016). Appel (2016) shows that the number of derivate lawsuits indeed decreases after a state adopts UD law.

Derivative lawsuits do encompass allegations of insider trading.[5] However, these lawsuits are much wider in scope. The most common type of settlement on a derivative lawsuit is governance reform, not monetary compensation (Erickson, 2009). Different states have adopted

[5] For instance, a recent derivative lawsuit filed against *Chipotle* includes an allegation that "… *a majority of the board of directors (and a supermajority of the Individual Defendants) engaged in lucrative insider sales, reaping millions of dollars in net proceeds*." https://www.cpr.org/sites/default/files/chipotle-complaint.pdf
Another example is *In re Oracle Corp. Derivative Litigation. Oracle* alleged that CEO and board Chairman Larry Ellison sold nearly $900 million of Oracle stock in the days before the company's announcement of missing quarterly earnings target. Ellison paid back $100 million worth of profit from these allegedly unlawful stock sales. https://www.ktmc.com/files/522_Primer.pdf

UD laws primarily to discourage frivolous lawsuits and to allow boards to take corrective actions instead of immediately facing lawsuits. Importantly, states' decision to adopt UD laws appears largely unrelated to concerns about insider trading. This feature makes the adoption of UD Law an ideal quasi-natural setting to test the effect of shareholders' litigation risk on insider trading patterns because UD laws are plausibly free from the concerns of reverse causality with respect to insider trading. Thus, my approach contrasts with those of most previous studies, which rely on federal laws or court decisions specifically designed for addressing, and often followed by, heightened concerns of opportunistic insider trading.

2.2.2 Literature Review and Hypothesis Development

A line of literature argues that most corporate litigations are frivolous, and mostly benefit corporate insiders, lawyers, and the insurance companies. Therefore, litigation threat does not really deter managers' misconducts (e.g., Weiss and Beckerman, 1995; Baker and Griffth, 2008; Coffee, 2006). Moreover, directors' and officers' (D&O) liability insurance covers most of the financial liabilities from an alleged misconduct. So, corporate insiders do not bear much financial risk for their misconducts (Baker and Griffth, 2008). Therefore, corporate insiders do not face any actual threat of litigation.

However, a bigger strand of literature finds that corporate insiders do face real litigation risk and take actions to circumvent such risk, especially in the context of insider trading. For example, Cheng and Lo (2006) find that insiders strategically time firm policies to maximize the profits from insider trades. Lee et al. (2014) suggest that firms that put voluntary restriction on illegal insider trading continuously take advantage of private information while being more cautious with exploiting negative private information. Dai, Kang, and Lee (2016) suggest that insiders deliberately use their information advantage to avoid litigation risk.

The corporate governance literature finds that shareholders use three broad mechanisms to discipline corporate insiders: voice, threat of exit and litigation.[6] So, a reduction in shareholders' litigation right plausibly makes overall corporate governance weaker. Consistent with this prediction, studies show that a reduction in shareholders litigation threat leads to less institutional blockholding and weaker internal governance provisions (e.g., Crane and Koch, 2016; Appel, 2016; Huang et al., 2017). A weakened corporate governance, in turn, leads to an increase in corporate misconducts such as hoarding of negative news, earnings management (Houston et al., 2015; Huang et al., 2017) and a deterioration in firms' information environment (Boone et al. (2018)).

Overall, evidence from the existing literature leads us to hypothesize that a decrease in shareholders' litigation risk due to UD laws encourages corporate insiders for more opportunistic insider trading, which are previously more litigation prone or riskier and abusive to uninformed investors of the firms.

2.3 Data, Variables, and Summary Statistics

2.3.1 Sample and Data

My main explanatory variable (*UD Law*) is an indicator variable which takes the value of 1 if a firm's state of incorporation has adopted UD law in a given year, and 0 otherwise.[7] Following prior literature, I define UD Law based on firms' historical states of incorporation.[8]

[6] See for example, Thompson (1999), Ferreira and Matos (2008); Brav, Jiang and Kim (2015) and Appeal et al. (2016)

[7] Table A.6 presents the timeline of states' adoption of UD Laws.

[8] I follow Cohen (2012), Gormley and Matsa (2016), and Appel (2016) to obtain historical states of incorporation from SEC filings. I use the oldest state of incorporation for backfilling the incorporation state before 1994 when online filing was not mandatory. I drop observations where state of incorporation is not correctly reported. Cohen (2012), Gormley and Matsa (2016), and Appel (2016) use historical state of incorporation to define UD law. Previous studies exclude the firms that reincorporated during the sample period. However, Appel (2016) mentions that there is little effect on the main results from this adjustment. Besides, current state of incorporation differs only for less than 5% of the sample.

My main sample of insider trades from January 1985 to December 2013 comes from Thomson Reuters Insider Filing data. This data includes all open market trades reported by corporate insiders (directors, officers, and beneficial owners of more than 10% of company's stock) through SEC Forms 3, 4 and 5. I aggregate these insiders' open market purchases and sales by firm trade-day to calculate a firm's net purchases or net sales days, and to estimate the abnormal returns earned by the insiders in a firm from each trading day to a certain holding period. Following contemporary literature[9], I count one trade per firm if a firm has insider trading in a given day regardless of how many insiders are trading that day. Therefore, all insider trades (purchases or sales) on same day in the same direction are cumulated to give a single daily buy or sale in a firm. I count multiple trades performed by multiple insiders just one trade that day because these multiple trades on same day might have occurred based on the same information and counting them as multiple trades will give correlation problem in estimating abnormal returns. Thus, counting them as one single event will solve the correlation problem in estimating abnormal return in post-trade period. Similarly, I exclude the returns of 50 days before an insider trading day in estimating abnormal returns to avoid the price run up effects. I analyze insider purchases and sales samples separately. I keep transactions of common stock only (share codes 10 and 11), and exclude observations from financial, utilities, and public administration firms.

I obtain firm level financials and stock price data from Compustat and CRSP databases. My main dependent variables, all at the firm level, include buy-and-hold abnormal returns (BHARs), total number and dollar value of shares traded, and total dollar of abnormal profits. I calculate BHARs for 6 months (bhar6m), 3 months (bhar3m) and 1 month (bhar1m) from each

[9] Such as, Huddart and Ke (2007), Khan, Mozaffar, and Hai Lu (2013), Gao et al. (2014), Hillier et al. (2015), Kallunki et al. (2018), and Wu (2018).

trading day using Carhart's four factor model.[10] My results are generally similar when I use cumulative abnormal returns (CARs). I winsorize all continuous variables at their 1st and 99th percentiles.

For additional analysis, I obtain institutional ownership variables from Thomson Reuters institutional holding (13f) filings. I define higher ownership based on whether a firm's largest institutional investor owns at least 5% (alternatively, 10%) of the firm's stock.

I obtain quarterly earnings announcement (QEA) data from Compustat Fundamentals Quarterly. Following Ali and Hirshleifer (2017), I use pre-QEA insider trading profitability as an alternative measure to examine opportunistic insider trading. I define pre-QEA trades as open market purchases and sales performed by corporate insiders from 23 days to 2 days prior to the QEA dates. I examine CARs within three alternative six-day windows around QEA dates, [-2 to +2], [-1 to +4], and [0 to +5], as a measure of pre-QEA insider trading profitability.

2.3.2 Summary Statistics

Table 2.1 reports the summary statistics of my main variables of interest for sales and purchases samples separately. My full sample includes 374,311 firm-sale days and 142,830 firm-purchase days, suggesting that insider sales are about 1.6 times more frequent than insider purchases. Average BHARs are negative for the sales and mostly positive for the purchases, findings that are consistent with prior studies that average stock price declines after insiders sell and increases after insiders buy stocks. Unconditionally, insider sales have average BHARs [CARs] of -3%, -9%, and -22% [-2%, -6% and -12%] in 1, 3, and 6 months respectively. Insider buyers on average earn BHARs [CARs] of 3%, 2% and -2% [4%, 7%, and 11%] in 1, 3, and 6

[10] The parameter estimation window is from -250 days to -50 days. I calculate bhar6m, bhar3m and bhar1m over 126, 63, and 21 calendar days from each insider trading day per firm.

months respectively. On average, total shares traded and total dollar values of the trades are higher for sales than for purchases. On average, insiders avoid about $28,000 abnormal loss per month by selling their shares and make about $5,000 in abnormal profits by buying their shares.

The average market capitalization (size) of buyers' firms (4.97) is about 20% smaller than sellers' firms (6.44). The sellers' firms on average have higher leverage, higher cash holding and higher tangibility (PPENT) than the buyers' firms. On average, buyers' firms are not profitable. They have negative returns on assets (ROA), negative one-month raw return, Ret(t-1), and negative one-year cumulative returns, Ret (t-12, t-1). Sellers' firms are more profitable than buyers'. Sellers' average ROA is 0.01, Ret (t-1) is 0.04 and Ret (t-12, t-1) is 0.18. The firms are similar in terms of research and development (R&D) expenses to total asset ratio (R&D intensity), and institutional ownership size. Finally, the average bid-ask spread, or liquidity is 0.25 for sellers' stocks and 0.77 for buyers' stocks. Average bid-ask spread has a huge difference, suggesting more liquidity in sellers' stock than in buyers' stock.

2.4 Empirical Methodology and Main Results

I use the following difference-in-differences (DiD) regression model to examine the effect of UD Law on the opportunistic insider trading:[11]

$$y_{ijkst} = \beta UDLaw_{st} + \omega X_{i(t-1)} + \theta_i + \gamma_{jt} + \delta_{kt} + u_{ijkst} \quad (2.1)$$

The dependent variable (y) measures either abnormal returns or dollar profits earned by insiders in different holding periods, or the number or volume of shares traded. $ijkst$ indicates firm *i*, in industry *j*, state of headquarter *k*, state of incorporation *s*, and year, month or time *t*. $UDLaw_{st}$ is an indicator variable for a firm that is incorporated in a state that has UD Law in a

[11] This methodology follows on recent studies that deal with identification issues using exogenous shocks, especially those which vary by time and locations (e.g., Bertrand and Mullainathan (2003), Gormley and Matsa (2011), Karpoff and Wittry (2018), and Appel (2016)).

given year. Following previous studies (e.g., Gormley and Matsa, 2016), I also include firm (θ_i), industry-time (γ_{jt}), and state-time (δ_{kt}) fixed effects to control for time varying unobserved heterogeneity within and across firms, industries and states. Time is defined as the year and month of the trades. Industry is defined by 3-digit SIC codes. State fixed effects control for firms' states of headquarter location. β is the difference-in-differences (DiD) parameter measuring the treatment effect of *UD Law* on my outcome variables of interest. In some specifications, I also use a set of continuous control variables ($X_{i(t-1)}$) that may have effects on my dependent variables.

2.4.1 UD Laws and Opportunistic Insider Trading: Baseline Results

Table 2.2 reports results from DiD regressions of insider trading profitability measured by buy-and-hold abnormal returns (BHARs) for three holding periods: 6, 3, and 1 months. Table A.2 in the Appendix shows a similar set of results using cumulative abnormal returns (CARs) as dependent variables. Columns (1), (2), and (3) are my baseline models, which control for firm, industry-time and state-time fixed effects only. In panel A, *UD Law* obtains negative and statistically significant (at a 5% or better levels) coefficient in explaining buy and hold returns after an insider sale. These results suggest that insiders of treatment firms avoid about -2%, -3% and -5% BHARs in 1, 3, and 6 months from their open market sales. These returns are economically large too; they roughly equal to 63%, 34%, and 20% of their unconditional averages. These results are consistent with my hypothesis that insiders' sales become more opportunistic after the passage of UD laws, which made it difficult for shareholders to sue the insiders for trading on private information.

Appel (2016) finds that UD laws decrease the quality of corporate governance and lead to decreased profitability and, in some cases, declines in firm values. My main variables of interest

are abnormal stock returns followed by insider trades. So, one concern is that the negative abnormal return I observed after UD laws is unrelated to insider trades but is a general effect of this law on depressing stock prices across the board. To address this issue, I re-estimate my regressions by including many additional control variables important for asset pricing (such as size, book-to-market, past returns) and firm-specific variables that Appel (2016) finds to be affected by UD laws (such as profitability). As presented in columns (4), (5), and (6), the coefficient estimates on *UD Law* remains largely unchanged even with the addition of these endogenous control variables. These findings strongly suggest that the observed results are driven by opportunistic insider sales.

Panel B shows a similar set of results related to the profitability of insider purchases. In the full sample, I find that most coefficient estimates on *UD Law* are positive but all of them are statistically insignificant in predicting BHARs following insider purchases.[12]

I find that *UD Law* predicts negative BHARs following insiders' sales only, but not insider purchases. First, this result is consistent with the notion that UD Law affects more serious and more litigation-prone insider trading: sales based on private information. Moreover, these results provide further assurance that negative coefficient on *UD Law* in predicting BHARs is not driven by general shifts in asset prices due to the UD Law, but are attributable to more informed trading (particularly sales) by insiders. A general shift would predict no difference in the effect of *UD Law* on future returns between the sales and the purchase samples.

Gormley and Matsa (2016), who use a similar empirical setting, make a strong case that when natural experiments such as changes in state laws are available, it is best not to include time-varying endogenous control variables. They argue that including potentially endogenous

[12] I find similar results with CARs as presented in Table A.2 in the Appendix.

control variables increases the risk that the estimate of treatment effects will be inconsistent. Therefore, following Gormley and Matsa (2016) and Appel (2016), my subsequent analysis will be based on regression models that include all my fixed effects, but exclude endogenous controls of columns of 4, 5 and 6.[13]

2.4.2 Dynamic Effects

The validity of DiD model largely rests on parallel trend assumption. For this study, parallel trend assumption requires that there should not be any differences in the trend of insider trading profitability before the adoption of UD laws. I follow Bertrand and Mullainathan's (2003) dynamic regression framework to examine parallel trend assumption. Specifically, I create dummy variables indicating a year before ($UD\ Law^{-1}$), the year of ($UD\ Law^{0}$), a year after ($UD\ Law^{+1}$) and two-plus years after ($UD\ Law^{+2+}$) the adoption of UD laws in a state. Table 2.3 reports the results. Each column of Panel A of Table 2.3 shows that the coefficients on $UD\ Law^{-1}$ and $UD\ Law^{0}$ are insignificant. So, there is no pre-trend in the profitability of insider sales in my sample prior to the adoption of the UD Law. Insider sales become more profitable and significant mostly after one year of the adoption of the UD Law ($UD\ Law^{+1}$). Similarly, Panel B shows that there is generally no pre-trend in the profitability of insiders' purchase. As before, the evidence of difference in profitability of insiders' purchase after UD Law remains weak.

The validity of parallel-trend assumption provides further assurance that the observed association of UD Law and profitability of insider trades is causal.

2.4.3 Size vs. Timing of Insider Trades

The next sets of tests are aimed at more cleanly isolating the source of increased profitability of insiders' trades after UD laws. Given a set of profitable trade opportunities,

[13] However, I find consistent results while including all endogenous controls in my analysis not reported here.

insiders exploit their private information to increase their profits by either 1) increasing the size of trades or 2) by timing the trades more opportunistically, or 3) by combining these two strategies. My hypothesis of "litigation risk" channel implies that a reduction in litigation risk after UD laws should have a greater effect on the timing of insiders' transactions than on its volume because the risk of being sued largely depends on *when* insiders trade.

To isolate these channels, I examine the effect of UD Law on the number of shares traded (*lnshares*) and total dollar value of trade (*lndolvol*) by insiders in each trade. Table 2.4 reports the results. Column 1 of Panel A shows that average number of shares sold by insiders per firm per trading day (*lnshares)* does not change after the UD Law. However, column 2 shows that total dollar value of insider sale (*lndolvol*) increases by about 16% in the treatment firms compared to the control firms. This finding supports my hypothesis that after the UD law, insiders are more likely to sell their holdings using their private information that stock prices are inflated and a price decline is likely.

However, results in Panel B show that insiders in treatment firms reduce both number of shares purchased and dollar volume of purchase, although the coefficient on dollar volume is noisier. These results further support that litigation threat deters more serious types of insider trade: sales based on private information. Overall, after the passage of UD laws, insiders seem to partly substitute opportunistic purchases, which tend to be less risky, with more serious and otherwise more litigation-prone form of trading: sales.

2.4.4 Information Asymmetry

I dig deeper into the merit of "opportunism" channel as the underlying cause for increased profitability of insider sales after the UD laws. Insiders' opportunity to trade on private information should be greater among firms with higher information asymmetry. To test this

conjecture, I build on Aboody and Lev (2000), who show that R&D is a potential source of information asymmetry, which provides a greater opportunity to profit from insider trading. I define high (low) R&D based on above- (below-) median R&D intensity of a firm in a given year.[14]

Table 2.5 reports the results. Columns (1), (2), and (3) of panel A show that compared to those in control firms, insider sales in more R&D-intense treatment firms avoid statistically significant additional loss of 2.2%, 4% and 7% in terms of BHARs in 1, 3, and 6 months (coefficient on the interaction UD Law*High R&D). This difference is insignificant between control firms and less R&D-intensive treatment firms (UD Law *Low R&D). The increase in trade volume due to UD Law is also concentrated among more R&D-intensive treatment firms. These results suggest that the reduction in litigation threat provides insiders opportunities to trade more opportunistically when firms also have higher level of information asymmetry.

Results for insider purchases stay mostly insignificant with some evidence of more profitable trading in R&D-intensive treatment firms.

2.4.5 More on Opportunistic Trades: Pre-QEA profitability

My analysis so far, specifically section 4.3, suggests that after the adoption of UD laws, insiders make more profits by timing their trades, particularly sales, more opportunistically. So, it appears that because of the reduction in risk of shareholder-initiated lawsuits due to UD laws, insiders become more willing to push the boundaries of the law in their trading. To further explore this possibility, I examine the effect of UD laws on an arguably perilous and litigation-prone insider trading: trading before Quarterly Earnings Announcements.

[14] Table A.3 of Appendix presents results using bid-ask spread as a measure of information asymmetry and finds similar results.

In a recent article, Ali and Hirshleifer (2017) show that despite heavy scrutiny from authorities and their high risks, insider trades before quarterly earnings announcements (pre-QEA) are common. The authors show that pre-QEA trades tend to be among the most profitable trades and, in fact, the profitability of such trades can be used to identify the most opportunistic insider traders. I ask whether UD laws encourage insiders to profit more from pre-QEA trades.

I follow Ali and Hirshleifer (2017) to identify pre-QEA trades and to calculate their profitability. I define pre-QEA period as the 21-day period ending two days before a quarterly earnings announcement date. I measure the profitability of such trades using cumulative abnormal returns (CARs) and cumulative total returns (CRET) for three alternative 6-day windows around QEA: (-2, +2), (-1, +4), and (0, +5).

Table 2.6 reports the results. Panel A shows the results of pre-QEA sales. I find that insiders sales avoid significant losses of 2.3% to 3.0% CAR and CRET during (-1, +4) and (0, +5) days around QEA. The results of profitability using (-2, +2) window is insignificant for sales probably because there is not much revelation of bad information before QEA (-2, 0). Strikingly, the effect of UD Law on pre-QEA sales' profitability in six-day windows (2.3% - 3.0% CAR) is larger than UD Law's effect on one- and three-month returns in the full sample (1.6%-2.5%) (see Table A.2 of the Appendix). This result further supports my hypothesis that insiders are less hesitant to sell on private information after the passage of UD laws.

I find, rather interestingly, that after the adoption of UD laws insiders also buy stocks pre-QEA more profitably. As shown in panel B, UD Law positively predicts the profitability of pre-QEA insider purchase in all three alternative windows around QEA and with both CAR and CRET.

Overall, these results consistently support the notion that insiders become less hesitant to engage in riskier and more opportunistic trades after the adoption of UD laws.

2.4.6 Insiders' Dollar Profits

I next estimate the impact of UD laws on dollar volume of insiders' profits as an alternative way to understand economic significance of UD Law. Moreover, comparing profits in terms of percentage abnormal returns and dollar volume also potentially helps us to isolate the role of opportunistic timing.

I estimate buy and hold abnormal dollar profit and cumulative abnormal dollar profit of each trade (profit6m, profit3m and profit1m) by multiplying total dollar value of a trade and its BHAR or CAR for different periods. Table 2.7 reports the results. Columns (1) - (3) of panel A show that sales by treatment firms' insiders avoid abnormal losses of $119,631, $66,059, and $23,800, respectively in 6 months, 3 months and 1 month of assumed holding periods. Columns (4) – (6) show qualitatively similar results for cumulative abnormal profits, which are smaller in magnitude.

Quite interestingly, Panel B shows that for some holding periods, UD Law also predicts dollar profits of insiders' purchases in a statistically significant way. This result is rather surprising because in the full sample (Table 2.2, panel B), I find generally positive, but statistically insignificant effect of UD Law on % BHARs. However, this difference can be explained by the fact that BHARs are equally-weighted averages, but dollar profits are averages weighted by trading volumes. Therefore, this result is consistent with my earlier findings that after UD laws, insiders time their trades more opportunistically: they increase the trading volume when expected profit is higher (e.g., pre-QEA).

2.4.7 Institutional Ownership

Davis (2008) finds that the importance of derivative lawsuits has diminished for highly visible large corporations, which are subject to many other governance mechanisms that can substitute the effects of derivative lawsuits. This finding implies that the effect of UD laws on insider trading profitability should be greater for small firms which tend to have fewer alternative mechanisms in place.

I test this prediction first by defining the sample firms as large and small based on the median of their market capitalizations. Second, I consider institutional blockholders as a specific example of an alternative mechanism because prior literature suggests that institutional blockholders monitor corporate insiders, improve corporate governance, and disciple managers.[15] Accordingly, I define higher (lower) institutional ownership based on the ownership size of the largest institutional owner. Higher ownership is an indicator variable that equals one if a firm's largest institutional investor owns at least 5% ownership in the company (alternatively, 10%), and zero otherwise. Low ownership indicates the rest of the sample.

Table 2.8 reports the results. Columns (1) – (3) of Panel A1 shows that insiders in the smaller treatment firms avoid about -3%, -5%, and -7% BHARs in 1, 3, and 6 months respectively. The magnitude of such loss avoidance much smaller and often statistically insignificant for insiders of larger treatment firms. Columns (1) – (3) of Panel A2 show results based 5% ownership and (4) – (6) results based on 10% ownership. Columns (1) – (3) shows that insiders in the treatment firms avoid about -4%, -8%, and -12.5% BHARs in 1, 3, and 6 months respectively when the institutional ownership is low. The magnitude of such loss is about half as much for insiders when institutional ownership is high. Results using 10% institutional

[15] For example, see, Ferreira and Matos, 2008; Brav, Jiang and Kim, 2015 and Appel et al., 2016

ownership ((4) – (6)) are also similar. Overall, results show that insiders in the treatment firms sell more opportunistically if they face less monitoring by institutional blockholders. Similar set of analyses for insider purchases (Panels B1, B2) do not obtain much strong results.

2.4.8 Other Robustness Tests

I conduct a rich set of tests to check the robustness of my main results. Most of these results are presented in the Appendix and are briefly described below. Karpoff and Wittry (2018) argue that pre-existing legal environment of a firm can confound effects of new law change. So, I control for potential confounding effects of other state and federal laws that may have coincided with or affected the states' adoption of UD laws. Following Karpoff and Wittry (2018), I control for control share acquisition law (CS), business combination law (BC), fair price law (FP), directors' duties law (DD), and poison pill law (PP) that were adopted by different states at different times during 1985-2013. I show my results with *bhar3m* as the dependent variable in Table A.4. I find that that effect of UD Law stays significant even after controlling for other state laws. I obtain similar results after controlling for passage of Sarbanes-Oxley act (SOX).

Prior studies show that the 9th Circuit Court Ruling of 1999 affected the ownership structure, litigation filing, and corporate governance for the firms located in 9th circuit district (e.g. Crane and Koch (2016)). I check the robustness of my results by excluding firms incorporated in the 9th Circuit Court districts (e.g, Alaska, Arizona, California, Hawaii, Idaho, Nevada, Oregon, and Washington). In another test, I redefine my treatment sample as firms incorporated in Pennsylvania only, where UD law was mandated by the state supreme court, which plausibly was not influenced by corporate lobbying. As shown in Table A.5, my results remain qualitatively unchanged with these checks.

2.5 Conclusion

Despite a large literature (e.g. Agrawal and Jaffe 1995; Garfinkel 1997; Xu 2008; Seyhun 1992 and Jaffe 1974) the issue of whether stricter regulations deter opportunistic insider trading has not been settled. The possible reason behind the lack of strong evidence for the effectiveness of regulation on insider trading is the lack of perfect identification technique as discussed by Bhattachary (2014). I fill that gap in the literature and provide robust evidence that *ex-ante* litigation threat deters more litigation prone and riskier insider trading. I employ states' adoption of Universal Demand laws, which significantly decreased shareholders' ability to sue corporate insiders, as a natural experiment to examine the relation between litigation risk and insider trading pattern. I find that reduction in shareholder-initiated litigation risk caused by UD laws leads insiders to trade more profitably. My evidence suggests that with a decrease in litigation risk, insiders engage in otherwise riskier and more litigation-prone and profitable trades. Thus, my results offer unique contribute to the literature that *ex-ante* litigation threat of shareholders-initiated lawsuits and private enforcement play a vital role in deterring opportunistic insider trading. However, an open question is 'do insiders find other alternative ways that are less obvious to shareholders to earn private benefits when they face a higher litigation risk from the shareholders?'

Table 2.1: Summary Statistics

This table reports summary statistics of the main variables used in this study. The sample starts in 1985 and ends in 2013. Observations are at firm-trade day level. All variables are winsorized at their 1st and 99th percentiles. Table A.1 provides variable definitions and sources of data.

Panel A: Insider Sale

Variable	Mean	SD	25%	50%	75%	Observations
bhar6m	-0.22	0.58	-0.43	-0.13	0.09	374311
bhar3m	-0.09	0.31	-0.23	-0.07	0.07	374311
bhar1m	-0.03	0.18	-0.10	-0.02	0.05	374311
car6m	-0.12	0.51	-0.34	-0.08	0.13	374311
car3m	-0.06	0.33	-0.20	-0.04	0.09	374311
car1m	-0.02	0.17	-0.09	-0.02	0.05	374311
lnshare	9.09	1.55	8.01	9.15	10.13	368865
lndolvol	12.09	1.84	10.82	12.13	13.39	367138
profit6m $ (BHAR)	-221,558	988,719	-104,978	-10,734	7,360	374262
profit3m $ (BHAR)	-95,380	489,471	-52,239	-4,764	6,996	374262
profit1m $ (BHAR)	-28,046	214,409	-19,708	-1,278	6,015	374262
profit6m $ (CAR)	-148,702	752,894	-77,290	-5,707	12,904	374262
profit3m $ (CAR)	-71,849	428,205	-42,362	-2,763	10,022	374262
profit1m $ (CAR)	-23,209	204,570	-17,680	-832	7,099	374262
Size	6.44	1.81	5.20	6.38	7.62	359605
BEME	-1.14	0.78	-1.61	-1.08	-0.60	352954
Leverage	0.18	0.22	0.00	0.11	0.29	362944
Ret (t-1)	0.04	0.15	-0.04	0.03	0.11	365819
Ret (t-12, t-1)	0.18	0.53	-0.07	0.18	0.45	357075
ROA	0.01	0.18	-0.01	0.05	0.09	366289
PPENT	0.21	0.19	0.07	0.15	0.30	366261
Cash	0.16	0.16	0.04	0.11	0.23	364265
Dividend	0.01	0.02	0.00	0.00	0.01	369689
Institutional Ownership Size	0.09	0.10	0.06	0.09	0.12	314475
R&D	0.06	0.09	0.00	0.02	0.09	374311
Spread	0.25	0.62	0.02	0.06	0.26	369145
Pre-QEA Summary:						
CAR [-2, +2]	0.00	0.08	-0.03	0.00	0.03	51107
CRET [-2, +2]	0.01	0.08	-0.03	0.01	0.04	51107
CAR [-1, +4]	0.00	0.09	-0.04	0.00	0.04	51107
CRET [-1, +4]	0.01	0.10	-0.04	0.01	0.05	51107
CAR [0, +5]	0.00	0.09	-0.04	0.00	0.04	51107
CRET [0, +5]	0.01	0.10	-0.04	0.00	0.05	51107

Panel B: Insider Purchase

Variable	Mean	SD	25%	50%	75%	Observations
bhar6m	-0.02	0.69	-0.33	-0.03	0.27	142830
bhar3m	0.02	0.39	-0.19	0.00	0.19	142830
bhar1m	0.03	0.24	-0.08	0.01	0.11	142830
car6m	0.11	0.61	-0.22	0.07	0.39	142830
car3m	0.07	0.39	-0.13	0.04	0.25	142830
car1m	0.04	0.22	-0.07	0.02	0.13	142830
lnshare	8.27	1.82	6.91	8.29	9.39	140263
lndolvol	10.14	1.90	8.88	10.08	11.37	140076
profit6m $ (BHAR)	-12,679	208,641	-7874	-161	5,518	142795
profit3m $ (BHAR)	-1,204	124,139	-3879	-11	4,305	142795
profit1m $ (BHAR)	4,936	65,137	-1558	41	2,850	142795
profit6m $ (CAR)	2,672	182,571	-4309	460	8,707	142795
profit3m $ (CAR)	4,438	116,357	-2428	308	5,875	142795
profit1m $ (CAR)	6,162	63,969	-1185	164	3,383	142795
Size	4.97	1.75	3.68	4.82	6.12	136942
BEME	-0.74	0.85	-1.26	-0.70	-0.15	131378
Leverage	0.25	0.26	0.02	0.19	0.38	138294
Ret (t-1)	-0.03	0.17	-0.13	-0.03	0.05	138973
Ret (t-12, t-1)	-0.18	0.63	-0.52	-0.12	0.21	136694
ROA	-0.08	0.26	-0.11	0.01	0.06	139337
PPENT	0.24	0.21	0.08	0.18	0.34	139490
Cash	0.14	0.16	0.02	0.07	0.20	140237
Dividend	0.01	0.02	0.00	0.00	0.00	140912
Institutional Ownership Size	0.09	0.07	0.04	0.08	0.12	114921
R&D	0.07	0.13	0.00	0.01	0.08	142830
Spread	0.77	1.24	0.11	0.39	0.97	137997
Pre-QEA Summary:						
CAR [-2, +2]	0.01	0.10	-0.04	0.00	0.05	22436
CRET [-2, +2]	0.01	0.11	-0.04	0.00	0.05	22436
CAR [-1, +4]	0.01	0.11	-0.04	0.00	0.06	22436
CRET [-1, +4]	0.01	0.12	-0.04	0.00	0.06	22436
CAR [0, +5]	0.01	0.12	-0.04	0.00	0.06	22436
CRET [0, +5]	0.01	0.13	-0.04	0.00	0.06	22436

Table 2.2: Universal Demand Laws and Profitability of Insider Trading

This table reports my baseline regression results. The dependent variables are buy-and-hold abnormal returns (BHARs) over 6 months (bhar6m), 3 months (bhar3m) and 1 month (bhar1m) after the insider trading events. BHARs are calculated using Carhart's four factor model. All variables are winsorized at their 1st and 99th percentiles. *UD Law* is an indicator variable that equals one if a firm is incorporated in a state that has adopted a UD Law and zero otherwise. Control variables are defined in Appendix Table A.1. Robust standard errors, clustered within states of incorporation, are reported in the parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Insider Sale

	(1) bhar6m	(2) bhar3m	(3) bhar1m	(4) bhar6m	(5) bhar3m	(6) bhar1m
UD Law	-0.043**	-0.031***	-0.019***	-0.059***	-0.037***	-0.018***
	(0.019)	(0.008)	(0.004)	(0.024)	(0.010)	(0.007)
Size				-0.115***	-0.068***	-0.027***
				(0.005)	(0.002)	(0.001)
BEME				0.034***	0.012***	0.002
				(0.007)	(0.002)	(0.001)
Leverage				-0.035***	-0.012*	-0.002
				(0.010)	(0.006)	(0.002)
Ret (t-1)				-0.148***	-0.076***	-0.017***
				(0.008)	(0.005)	(0.005)
Ret (t-12, t-1)				-0.610***	-0.269***	-0.091***
				(0.005)	(0.003)	(0.002)
ROA				0.059***	0.020**	0.009**
				(0.017)	(0.010)	(0.004)
PPENT				0.062**	0.030**	0.031**
				(0.028)	(0.013)	(0.015)
Cash				-0.070***	-0.006	0.004
				(0.012)	(0.013)	(0.008)
Spread				0.014*	0.007**	0.007**
				(0.007)	(0.003)	(0.003)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
State*Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry* Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	365,962	365,962	365,962	300,275	300,275	300,275
R-squared	0.515	0.456	0.342	0.666	0.569	0.417

Panel B: Insider Purchase

	(1) bhar6m	(2) bhar3m	(3) bhar1m	(4) bhar6m	(5) bhar3m	(6) bhar1m
UD Law	0.050	0.047	0.021	-0.031	0.023	0.004
	(0.057)	(0.029)	(0.023)	(0.067)	(0.039)	(0.023)
Size				-0.135***	-0.063***	-0.019***
				(0.008)	(0.005)	(0.002)
BEME				0.061***	0.028***	0.003
				(0.010)	(0.007)	(0.002)
Leverage				-0.059	-0.010	-0.007
				(0.041)	(0.018)	(0.008)
Ret (t-1)				-0.208***	-0.126***	-0.083***
				(0.025)	(0.013)	(0.008)
Ret (t-12, t-1)				-0.569***	-0.266***	-0.102***
				(0.005)	(0.006)	(0.004)
ROA				0.059*	0.024	-0.004
				(0.034)	(0.014)	(0.010)
PPENT				0.112*	0.083*	-0.007
				(0.058)	(0.044)	(0.015)
Cash				0.018	0.018	0.007
				(0.052)	(0.016)	(0.008)
Spread				0.017***	0.001	-0.002
				(0.004)	(0.002)	(0.002)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
State*Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry*Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	133,360	133,360	133,360	104,407	104,407	104,407
R-squared	0.609	0.570	0.459	0.732	0.673	0.542

Table 2.3: Dynamic Effect

This table reports regression results of dynamic effects. The dependent variables are buy-and-hold abnormal returns (BHARs) over 6 months (bhar6m), 3 months (bhar3m) and 1 month (bhar1m) after the insider trading events. BHARs are calculated using Carhart's four factor model. All variables are winsorized at their 1st and 99th percentiles. *UD Law*$^{-1}$ is an indicator variable that equals one if a firm is incorporated in a state that adopt UD Law in one year and zero otherwise. *UD Law*^{0} is an indicator variable that equals one if a firm is incorporated in a state that adopts UD Law in that year and zero otherwise. *UD Law*$^{+1}$ is an indicator variable that equals one if a firm is incorporated in a state that has adopted UD Law one year before and zero otherwise. *UD Law*$^{+2+}$ is an indicator variable that equals one if a firm is incorporated in a state that has adopted UD Law for two or more year and zero otherwise. Robust standard errors clustered at state-of-incorporation level are reported in the parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Insider Sale

	(1) bhar6m	(2) bhar3m	(3) bhar1m
UD Law^{-1}	0.008	-0.023	-0.012
	(0.036)	(0.022)	(0.010)
UD Law^{0}	0.061	0.006	-0.002
	(0.056)	(0.024)	(0.007)
UD Law^{+1}	-0.068	-0.056***	-0.034***
	(0.044)	(0.020)	(0.009)
UD Law^{+2+}	-0.053*	-0.036***	-0.020***
	(0.028)	(0.012)	(0.007)
Firm FE	Yes	Yes	Yes
State*Time FE	Yes	Yes	Yes
Industry*Time FE	Yes	Yes	Yes
Observations	371,975	371,975	371,975
R-squared	0.349	0.260	0.150

Panel B: Insider Purchase

	(1) bhar6m	(2) bhar3m	(3) bhar1m
UD Law^{-1}	-0.026	-0.035	-0.017
	(0.065)	(0.029)	(0.031)
UD Law^{0}	-0.082*	-0.012	-0.006
	(0.047)	(0.018)	(0.022)
UD Law^{+1}	0.027	0.016	0.034
	(0.053)	(0.031)	(0.022)
UD Law^{+2+}	0.032	0.055**	0.016
	(0.042)	(0.023)	(0.021)
Firm FE	Yes	Yes	Yes
State*Time FE	Yes	Yes	Yes
Industry*Time FE	Yes	Yes	Yes
Observations	140,963	140,963	140,963
R-squared	0.358	0.291	0.198

Table 2.4: Total Shares and Dollar Value of Insider Trade

This table reports regression results based on insiders' trading behavior. The dependent variables are *lnshares* (natural log of total shares traded) and *lndolvol* (natural log of total dollar value of trade) of each insider trading day per firm. Total dollar value is the product of transaction price per share and number of total shares traded on an insider trading day in a firm. All continuous variables are winsorized at their 1st and 99th percentiles. *UD Law* is an indicator variable that equals one if a firm is incorporated in a state that has adopts a UD Law and zero otherwise. Robust standard errors clustered at state-of-incorporation level are reported in the parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Insider Sale

	(1) lnshare	(2) lndolvol
UD Law	-0.005	0.164***
	(0.035)	(0.041)
Firm FE	Yes	Yes
State*Time FE	Yes	Yes
Industry*Time FE	Yes	Yes
Observations	360,612	358,857
R-squared	0.386	0.527

Panel A: Insider Purchase

	(1) Lnshare	(2) Lndolvol
UD Law	-0.190**	-0.137*
	(0.088)	(0.079)
Firm FE	Yes	Yes
State*Time FE	Yes	Yes
Industry*Time FE	Yes	Yes
Observations	130,954	130,657
R-squared	0.550	0.589

Table 2.5: Role of Information Asymmetries

This table reports regression results based on information asymmetries. The dependent variables are buy-and-hold abnormal returns (BHARs) over 6 months (bhar6m), 3 months (bhar3m) and 1 month (bhar1m) after the insider trading events. BHARs are calculated using Carhart's four factor model. All variables are winsorized at their 1st and 99th percentiles. *UD Law* is an indicator variable that equals one if a firm is incorporated in a state that has adopted a UD Law and zero otherwise. High (low) R&D is the indicator variable that equals one if firms have greater (less) than median R&D expenses to total assets ratio and zero otherwise. Robust standard errors clustered at state-of-incorporation level are reported in the parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Insider Sale

	R&D Intensity				
	(1)	(2)	(3)	(5)	(6)
	bhar6m	bhar3m	bhar1m	Lnshare	Lndolvol
UD Law*High R&D	-0.071***	-0.043***	-0.022***	0.030	0.213***
	(0.023)	(0.010)	(0.004)	(0.040)	(0.049)
UD Law *Low R&D	0.038	0.004	-0.009	-0.107	0.019
	(0.031)	(0.011)	(0.006)	(0.072)	(0.087)
High R&D	0.081***	0.023***	0.007***	-0.154***	-0.301***
	(0.011)	(0.004)	(0.002)	(0.015)	(0.030)
Firm FE	Yes	Yes	Yes	Yes	Yes
State*Time FE	Yes	Yes	Yes	Yes	Yes
Industry*Time FE	Yes	Yes	Yes	Yes	Yes
Observations	326,523	326,523	326,523	322,605	321,422
R-squared	0.546	0.486	0.373	0.395	0.537
Test: UD Law*High R&D - UD Law*Low R&D = 0					
F-statistics	8.73***	16.22***	5.02**	2.81	3.50*

Panel B: Insider Purchase

	R&D Intensity				
	(1)	(2)	(3)	(5)	(6)
	bhar6m	bhar3m	bhar1m	Lnshare	Lndolvol
UD Law*High R&D	0.083	0.080**	0.037	-0.205**	-0.187**
	(0.070)	(0.035)	(0.027)	(0.084)	(0.075)
UD Law *Low R&D	-0.002	-0.010	-0.008	-0.160	-0.051
	(0.069)	(0.040)	(0.023)	(0.127)	(0.118)
High R&D	0.075***	0.032**	0.010***	0.007	-0.063*
	(0.024)	(0.014)	(0.004)	(0.032)	(0.036)
Firm FE	Yes	Yes	Yes	Yes	Yes
State*Time FE	Yes	Yes	Yes	Yes	Yes
Industry*Time FE	Yes	Yes	Yes	Yes	Yes
Observations	114,196	114,196	114,196	130,954	130,657
R-squared	0.651	0.611	0.502	0.550	0.589
Test: UD Law*High R&D - UD Law*Low R&D = 0					
F-statistics	1.11	4.62**	4.33**	0.18	1.85

Table 2.6: UD Law and Profitability of Insider Trading before Quarterly Earnings Announcements

This table reports regression results for Pre-QEA insider trading. Pre-QEA period is defined as 23-days before to 2-days before quarterly earnings announcement (QEA) dates. The dependent variables are cumulative abnormal returns (CARs) and cumulative total returns (CRETs) over 5-days (-2 to +2), and 6-days (-1 to +4), and (0 to +5) windows centered QEA dates. CARs and CRETs are calculated using market adjusted model. All variables are winsorized at their 1st and 99th percentiles. *UD Law* is an indicator variable that equals one if a firm is incorporated in a state that has adopted a UD Law and zero otherwise. Robust standard errors clustered at state-of-incorporation level are reported in the parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Insider Sale

	(1) CAR [-2 +2]	(2) CRET [-2 +2]	(3) CAR [-1 +4]	(4) CRET [-1 +4]	(5) CAR [0 +5]	(6) CRET [0 +5]
UD Law	0.004	0.005	-0.023***	-0.024***	-0.030***	-0.030***
	(0.006)	(0.006)	(0.007)	(0.007)	(0.008)	(0.008)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
State*Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry*Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	47,589	47,589	47,589	47,589	47,589	47,589
R-squared	0.728	0.773	0.734	0.774	0.731	0.766

Panel B: Insider Purchase

	(1) CAR [-2 +2]	(2) CRET [-2 +2]	(3) CAR [-1 +4]	(4) CRET [-1 +4]	(5) CAR [0 +5]	(6) CRET [0 +5]
UD Law	0.087***	0.088***	0.088***	0.084***	0.059*	0.058**
	(0.025)	(0.025)	(0.028)	(0.030)	(0.030)	(0.027)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
State*Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry*Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	18,945	18,945	18,945	18,945	18,945	18,945
R-squared	0.845	0.850	0.842	0.852	0.845	0.857

Table 2.7: Insiders' Abnormal Profits

This table reports regression results of insiders' abnormal profits. The dependent variables are buy-and-hold abnormal profits and cumulative abnormal profits over 6 months (profit6m), 3 months (profit3m) and 1 month (profit1m) after the insider trading events. BHARs and CARs are calculated using Carhart's four factor model. All variables are winsorized at their 1st and 99th percentiles. *UD Law* is an indicator variable that equals one if a firm is incorporated in a state that has adopted a UD Law and zero otherwise. Robust standard errors clustered at state-of-incorporation level are reported in the parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Insider Sale

	Buy and hold abnormal profits			Cumulative abnormal profits		
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	profit6m	profit3m	profit1m	profit6m	profit3m	profit1m
UD Law	-119,631***	-66,059***	-23,800***	-64,898***	-42,863***	-21,231***
	(24,198.10)	(12,088.35)	(4,116.36)	(14,362.03)	(9,079.42)	(3,693.63)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
State*Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry*Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	365,912	365,912	365,912	365,912	365,912	365,912
R-squared	0.313	0.292	0.245	0.301	0.277	0.238

Panel A: Insider Purchase

	Buy and hold abnormal profits			Cumulative abnormal profits		
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	profit6m	profit3m	profit1m	profit6m	profit3m	profit1m
UD Law	9,374	8,802**	2,884	10,721**	9,578***	2,244
	(6,349.83)	(3,509.08)	(2,546.44)	(4,860.93)	(3,539.23)	(2,435.51)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
State*Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry*Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	133,318	133,318	133,318	133,318	133,318	133,318
R-squared	0.483	0.467	0.415	0.488	0.471	0.420

Table 2.8: Firm Size, Institutional Ownership, and Insiders' Profitability

This table reports regression results for the effect of firm size and institutional ownership on insiders' profitability. The dependent variables are buy-and-hold abnormal returns (BHARs) over 6 months (bhar6m), 3 months (bhar3m) and 1 month (bhar1m) after the insider trading events. BHARs are calculated using Carhart's four factor model. All variables are winsorized at their 1st and 99th percentiles. *UD Law* is an indicator variable that equals one if a firm is incorporated in a state that has adopted a UD Law and zero otherwise. Large (small) market cap is an indicator variable for firms with above- (below-) median market capitalization in the sample. Higher ownership is an indicator variable that equals one if a firm's largest institutional investor owns at least 5% ownership in the company (alternatively, 10%), and zero otherwise (Low ownership indicates the rest of the sample). Robust standard errors clustered at state-of-incorporation level are reported in the parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A1: Insider sale based on firm size

	(1)	(2)	(3)
VARIABLES	bhar6m	bhar3m	bhar1m
UD Law*large market cap	-0.003	-0.010	-0.008*
	(0.027)	(0.013)	(0.005)
UD Law*small market cap	-0.073***	-0.047***	-0.027***
	(0.020)	(0.010)	(0.005)
Small market cap	0.124***	0.064***	0.027***
	(0.010)	(0.004)	(0.001)
Firm FE	Yes	Yes	Yes
State* time FE	Yes	Yes	Yes
Industry*time FE	Yes	Yes	Yes
Observations	365,962	365,962	365,962
R-squared	0.516	0.458	0.343
Test: UD Law*large market cap - UD Law*small market cap = 0			
F-statistics	7.81***	4.89**	10.37***

Panel A2: Insider sale based on institutional ownership

	5% ownership			10% ownership		
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	bhar6m	bhar3m	bhar1m	bhar6m	bhar3m	bhar1m
UD Law*High ownership	-0.035*	-0.026***	-0.016***	-0.021	-0.021**	-0.016***
	(0.019)	(0.008)	(0.004)	(0.017)	(0.008)	(0.003)
UD Law*Low ownership	-0.125***	-0.083***	-0.042***	-0.061***	-0.040***	-0.020***
	(0.046)	(0.024)	(0.009)	(0.023)	(0.010)	(0.005)
Higher ownership	-0.000	-0.001	-0.002	-0.001	0.001	0.001
	(0.014)	(0.005)	(0.004)	(0.004)	(0.002)	(0.002)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
State*Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry*Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	365,962	365,962	365,962	365,962	365,962	365,962
R-squared	0.515	0.456	0.342	0.515	0.456	0.342
Test: UD Law*High Ownership - UD Law*Low ownership = 0						
F-statistics	4.18**	5.12**	7.49***	5.76**	5.49**	1.63

Panel B1: Insider purchase based on firm size

VARIABLES	(1) bhar6m	(2) bhar3m	(3) bhar1m
UD Law* large market cap	-0.007	0.020	0.012
	(0.065)	(0.034)	(0.024)
UD Law*small market cap	0.081	0.064*	0.028
	(0.064)	(0.038)	(0.026)
Small market cap	0.179***	0.066***	0.015***
	(0.009)	(0.005)	(0.004)
Firm FE	Yes	Yes	Yes
State* time FE	Yes	Yes	Yes
Industry*time FE	Yes	Yes	Yes
Observations	133,360	133,360	133,360
R-squared	0.611	0.571	0.460
Test: UD Law*large market cap - UD Law*small market cap = 0			
F-statistics	1.61	0.93	0.75

Panel B2: Insider purchase based on institutional ownership

	5% ownership			10% ownership		
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	bhar6m	bhar3m	bhar1m	bhar6m	bhar3m	bhar1m
UD Law* Higher ownership	0.059	0.049	0.025	0.050	0.028	0.024
	(0.063)	(0.032)	(0.024)	(0.064)	(0.034)	(0.024)
UD Law*Lower ownership	0.000	0.036	0.001	0.050	0.061**	0.019
	(0.053)	(0.041)	(0.023)	(0.054)	(0.028)	(0.023)
Higher ownership	-0.009	0.001	-0.006	-0.010	0.001	-0.001
	(0.027)	(0.009)	(0.005)	(0.012)	(0.005)	(0.003)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
State*Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry*Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	133,360	133,360	133,360	133,360	133,360	133,360
R-squared	0.609	0.570	0.460	0.609	0.570	0.459
Test: UD Law*High Ownership - UD Law*Low ownership = 0						
F-statistics	1.04	0.09	1.77	0.00	2.13	0.19

CHAPTER III

DOES THE CONCERN OF CREDIT RATING AFFECT FIRMS' PAYOUT POLICIES? EVIDENCE FROM THE PROXIMITY TO RATING CHANGES

3.1 Introduction

Credit ratings appear to be important for firms' payout policies. For example, on February 27, 2009, GE announced that it will cut its quarterly dividend by 68% for the second half of the year aiming to protect the company's top credit rating.[16] Brav et al.'s (2005) survey of about 400 financial executives also suggests that credit rating matter for firms' payout policies. They find that some firms even consider cutting dividend to prevent a rating downgrade or are reluctant to increase dividends and repurchase shares if that would reduce their debt ratings. Using a large sample of rated firms, I find that firms that are close to a rating change (upgrade/downgrade) are less likely to pay dividends and pay less dividends than other firms regardless of their underlying credit quality. My novel contribution is predicting dividend policies with an *ex-ante* measure of credit rating risk. On the other hand, I do not find a significant effect of credit rating risk on share repurchases.

My empirical design follows Kisgen's (2006). I define the concern of credit rating as the situation where firms face additional threat of future downgrade or threat of missing a possible

[16] https://dealbook.nytimes.com/2009/02/27/ge-cuts-its-quarterly-dividend-by-68/

upgrade. Following Kisgen (2006), I group firms into high and low risk of credit rating change based on their micro-rating within the broad rating categories. For example, A and BBB are two broad ratings where A+, A, A-, and BBB+, BBB, BBB- are the notches or micro-ratings within each broad rating. Kisgen (2006) finds that firms near a broad rating change or on the border face a higher threat of future rating change than those not near a broad rating change. For example, A+ and BBB+ can be upgraded to AA- and A- respectively if they implement the right policies. Similarly, A- and BBB- can be downgraded to BBB+ and BB+ respectively if they fail to implement the right decision. However, the firms in the middle of their broad rating (A and BBB) face a lower threat of such rating changes. A major challenge in credit rating studies is how to separate a firm's credit quality from its credit rating risk. However, grouping firms into "Plus" and "Minus" or "POM" firms and "non-POM" firms solves this problem to a large extent. For example, a group of A+ and A- firms should have an equal average credit quality to another group of A rated firms. Similarly, BBB+, and BBB- firms should have an equal average credit quality to BBB rated firms. Therefore, any additional risk borne by POM firms comes from the pure credit rating risks that are not incorporated in (or determined by) their firm level characteristics. Likewise, firms that are at the border of investment and speculative groups face a greater risk of the rating change. For example, BBB- rated firms can be downgraded to the speculative group (BB+), and BB+ rated firms can be upgraded to the investment group (BBB-) just by one notch. However, this upgrading/downgrading exposes these firms to different regulatory risks and costs of financing.[17] Therefore, I group BBB-, BB+, and BB firms as

[17] Studies show that speculative grade firms face the most significant liquidity issues because regulations prohibit may institutional investors from investing in their bonds. Similarly, they face higher regulatory scrutiny and uncertainty than investment grade firms. For more detail, see Katz (1974), Griffin and Sanvicente (1982), Hull, Predescu and White (2004), Jorion, Liu and Shi (2005), May (2010), and Lemmon and Roberts (2010)).

investment-junk group (IG/SG) firms that have a higher *ex-ante* risk of rating change because of their current rating positions.

I find that POM and IG/SG firms on average pay 0.09% and 0.20% less dividend yields respectively in the next quarter than non-POM firms after controlling for several determinants of dividend payouts. I control several firm specific covariates, stock return volatilities, and industry median dividend yields (based on 3-digit SIC) following prior literature to cleanly disentangle the confounding effects of other variables and credit rating risk on payout policies.[18]

Furthermore, I analyze the probabilities of future dividend initiations of past nonpayers and future dividend increase of past dividend payers separately. I find that POM firms are less likely to initiate dividends and increase dividends compared to other firms. Next, I analyze firms' dividend pattern each year over the 30 years, and across five industries. My results indicate that POM and IG/SG firms pay less dividends each year and across all industries. As a final step, I use a propensity score matched sample for the robustness check of my results. I find qualitatively similar results in each test.

My findings are consistent with Kisgen's (2006) credit-rating capital structure (CR-CS) theory, which postulates that firms which are worried about credit rating downgrades maintain a lower debt to equity ratio than what traditional trade-off theory would suggest. My results support the notion that firms' concern of credit ratings incentivizes them to cut dividends as a way to maintain higher equity ratios. In most analyses, I also examine investment and speculative grade firms separately. My results suggest that rating concerns impact dividend policies of investment grade firms more than that of speculative grade firms. This result deviates

[18] I control for stock return volatility following Leary and Roberts (2014), Hoberg and Prabhala (2009) and Grennan (2019), who use stock return volatility as an important instrument in determining peer's influence on a firm's leverage and dividend policies.

from previous studies, which show a higher impact of rating risk on the speculative grade firms on their debt-equity choices and investment decisions.[19] Perhaps, this happens because only the topmost-rated firms even within the investment grade firms have access to the highly lucrative commercial paper market (see e.g., Hurley (1982), Nayar and Rozeff (1994)). My results are also aligned with the findings of Jung et al. (2013) who show that firms in top notch have a higher likelihood of subsequent upgrading after earning smoothing activities.

I also conduct a similar set of tests for firms' stock repurchase decisions. However, my results from stock repurchase are not statistically significant, although they show a negative relation between future repurchase yields and *ex-ante* risk of the rating change. These findings are consistent with the view that, unlike the dividends, stock repurchases are not perceived as a permanent commitment by a firm, and are paid from temporary, non-operating cash flows (Jagannathan et al., 2000).

This paper contributes to the literature in several ways. First, it supplements Kisgen (2006) and provides evidence that *ex-ante* risks of credit rating change affect firms' dividend policies. These results are novel and are not obvious predictions of traditional theories of dividends. For example, tradeoff and pecking order theories predict that firms' dividend policies are determined by their earnings and investment opportunities (Fama and French, 2002). I show that firms' concerns of credit rating matter for firms' dividend payouts after controlling for their profitability, retained earnings, growth opportunity, cash flows to capital, and several other fundamentals. Second, this study complements Brav et al. (2005), Kisgen and Strahan (2010), and Jung et al. (2013), which provide some evidence that concern of credit ratings affects some

[19] For example, Kisgen (2006) and Sharma et al. (2018) show that below-investment grade firms respond more severely than investment grade firms in their financing and investment decisions when they face a similar level of risk of rating change.

firms' financing, investment, dividend policies, and management behavior. Therefore, my findings can be important additions to their studies.

Next, this study contributes to the recent trend of determining the factors that affect a firm's payout policies. For example, Chay and Suh (2009) determine cash flow uncertainty, Floyd, Li, and Skinner (2015) find signaling and agency costs, and Adhikari and Agrawal (2018) find peer's effect as important factors for firms' dividend policies. However, no studies focus on the effect of credit rating risk in determining firms' payout policies, despite its long-established importance in capital structure and investment policies.

Finally, this study contributes to the literature that examines the asymmetric effects of the credit rating on corporate policies.[20] My novel finding is that, unlike most previous studies, I find that investment grade firms have the higher impact of rating risk than speculative grade firms in their dividend policies.

The remainder of the chapter is organized as follows: Section 3.2 reviews related literature and develops hypotheses of credit rating risk and dividend policies. Section 3.3 presents data and summary statistics. Section 3.4 discusses empirical methodology and results of dividend and analyzes stock repurchase. Section 3.5 concludes.

[20] Such as, Hand et al. (1992), Kisgen (2006), Jorion and Zhang (2007), and May (2010) provide evidence that speculative firms face higher risk of rating change on their capital structure decisions because further downgrade indicate a significant increase in their default probability and hence, the cost of capital. Supporting their findings, Damodaran (2013) suggests that A rated borrower pays only 15 basis points more than A+ rated borrowers in default spreads on average whereas B rated borrowers pay about 100 basis points more than B+ rated borrowers, which shows that below-investment grade firms should have higher need for protecting or upgrading their ratings in term of saving financing costs than investment grade firms. Source: Professor Aswath Damodaran's website: http://www.stern.nyu.edu/~adamodar/pc/archives/bondspreads13.xls

3.2 Literature Review and Hypothesis Development

In Modigliani and Miller's perfect capital market, firms' dividend policies are irrelevant to their firm values (Miller and Modigliani, 1961). However, in the imperfect world of information asymmetries, tax incentives, and agency problems, firms' payout policies are viewed with great importance. Therefore, since Lintner's (1956) survey, researchers are extensively trying to determine the factors that affect firms' dividend and stock repurchase policies. Lintner (1956) suggests that corporate dividend policies are determined by their target payout-to-earnings ratio and the speed at which the current dividends adjust to the target. He further suggests that managers do not view cutting dividends unless they have no other choices. Myers (1984) suggest that information asymmetry and costs of financial distress make dividends sticky. Therefore, managers on average are reluctant to change dividends. Likewise, confirming the prediction of trade-off and pecking order hypotheses, Fama and French (2002) suggest that firms' profitability and investment opportunity determine their dividend decisions. They show that more profitable firms with fewer investments pay higher dividends, and firms' dividend payout policies remain unaffected by their short-term investment variability.

Similarly, La Porta et al. (2000) argue that effective pressure by minority shareholders force managers to pay a dividend which mitigates agency problem among shareholders. Brockman and Unlu (2009) show that agency costs of debt play a more decisive role in determining a firm's dividend policy than the agency costs of equity as previously documented. Brav et al. (2005) suggest that payout policies have little impact on firms' investor clientele, and tax considerations play a secondary role. Adhikari and Agrawal (2018) show that firms' dividend and stock repurchases are affected by their industry peers' dividend policies. Also, Grennan

(2019) shows that firms' cash dividends and timing of dividend changes are affected by their industry peers' policies.

Several studies on credit rating examine the information content of ratings and their impact on firms' capital structure decisions. For instance, Hand et al. (1992) show that indicated downgrades or upgrades are associated with negative or positive bond returns respectively when such bonds are listed on Standard and Poor's Credit Watch List. Similarly, Ederington and Goh (1998) find that credit rating downgrades also result in negative equity returns. Kisgen (2006) reveals that firms near credit rating change are more likely to undertake leverage reducing activity, regardless of the actual change in their credit quality. Kisgen (2009) finds that after a firm is downgraded, a firm is more likely to reduce leverage, presumably to regain a previous rating target. These effects are shown to be stronger at the investment grade cutoff. Similarly, Kisgen and Strahan (2010) show that ratings-based regulations on bond investment affect a firm's cost of capital and the effect will be larger among bonds rated near the investment grade cutoff.

Overall, contemporary studies in dividend policies suggest that firms' payout policies are important and can be affected by several firm and industry specific factors. However, they do not explain much about firms' exposure to rating risk and their payout policies. Therefore, I attempt to fill this gap in the literature. Two studies that are close to mine are Shah (2008) and Khieu and Pyles (2016). Shah (2008) investigates whether credit rating concerns affect firms' capital investment decisions. He suggests that firms that are near a credit rating downgrade spend significantly less on capital expenditure compared to those not near a rating change. He also provides some evidences that firms that are near rating changes pay less dividends.[21] Similarly,

[21] However, his study does not provide any further investigations on dividend and stock repurchase policies. In this study, I analyze dividend initiation, dividend increase, and stock repurchases and provide robust evidences to

Khieu and Pyles (2016) examine firms' dividend and investment activities following their credit rating changes and suggest that only downgraded firms reduce dividends, whereas upgraded firms do not change their dividend payouts. My study is fundamentally different from Khieu and Pyles' (2016) study because I examine the effects of firms' *ex-ante* threat of rating change but not the actual rating change per se on their dividend and stock repurchase decisions. Similarly, the literature on credit rating (discussed above) suggests that firms, in general, have the greater motivation for protecting their current credit ratings. Kisgen's (2009) findings suggest that firms on average target to maintain a credit rating level and do not want to be downgraded from this target rating.

Thus, based on my literature review of dividend and credit ratings, I hypothesize that *firms near a credit rating change pay less dividends than firms that are not near a rating change.*

A counter argument of this hypothesis would be that firms that are near credit rating changes have more incentives of paying higher dividends than other firms. As dividend reductions or omissions convey negative information to the investors[22], firms near credit rating changes will be reluctant to reduce their dividends. Therefore, the risk of future rating changes will be irrelevant to firms' dividend policies after controlling their underlying credit quality or fundamental characteristics.

establish a causal relation between credit rating risk and dividend policy. My study is significantly different from Shah (2008) in terms of data formation, model design and empirical analysis.

[22] For example, Healy and Palepu (1988), DeAngelo and DeAngelo (1990), DeAngelo et al. (1992) and other contemporary studies show that dividend cuts are viewed as financial hardship of the firms and are associated with negative announcement returns. Brav, Graham, Harvey, and Michaely (2005) report that managers are willing to sell assets, layoff employees, raise external funds, or even bypass positive-NPV projects before cutting dividends.

3.3 Data and Summary Statistics

3.3.1 Sample Description

I use dividend and share price data from CRSP, accounting data from CRSP-Compustat merged quarterly database and credit rating data from Compustat monthly rating database. The sample covers all U.S. firms publicly traded on New York Stock Exchange (NYSE), American Stock Exchange (AMEX) and NASDAQ and have credit ratings at the beginning of a given year from 1986 to 2016 (as credit rating is available in Compustat from 1985, observation starts from 1986). I analyze dividends of common stocks (CRSP share code 10 or 11) and excluded financial and utility related firms (SIC 6000-6999, and 4900-4949) from the sample because their payout decisions are affected by regulations. I collect institutional ownership data from Thomson-Reuters. I winsorize all continuous variables at the 1^{st} and 99^{th} percentile levels to minimize the influence of outliers. Firms are defined as rated or unrated based on Standard & Poor's Long-Term Domestic Issuer Credit Rating. Credit rating scales and definitions of all variables used in the study are reported in the Appendix Tables A.7 and A.8 respectively.

3.3.2 Summary Statistics

Table 3.1 summarizes all variables used in the study for rated, unrated, POM, non-POM, investment and speculative grade firms. Panel A of Table 3.1 shows that I have 82,034 firm-quarter observations of all rated firms (including AAA) which represents 2,382 unique firms. We can see from Panel A that many firms choose to acquire no credit ratings or do not have credit ratings. Further, we can see that rated firms have higher dividend yields and higher stock repurchase yields than unrated firms. Rated firms are also better in terms of profitability, lifecycle stage, and are bigger in market capital than unrated firms. However, I exclude unrated firms from my study

sample because they do not face any credit rating risk. Thus, my study sample covers only rated firms.

Panel B of Table 3.1 shows that I have 80,924 firm-quarter observations of all rated firms excluding AAA rated firms. I exclude triple-A rated firms in most of my analysis because triple-A has no equivalent counterparts of "Plus" or "Minus". My study focuses on the differences between POM and non-POM firms. We can see that POM firms have lower mean and median of dividend yields (DY%) and repurchase yields (RPY%) than non-POM firms. Most importantly, these two groups have the same level of profitability (0.03) and market-to-book equity ratio (1.32). They are also very similar in terms of other firm-level covariates and stock return volatility (idiosyncratic risk). These similarities in firm-level covariates make POM and non-POM firms good counterparts for my study.

Additionally, I report a summary of investment and below-investment (speculative) grade firms in Panel C of Table 3.1. Investment and below-investment grade firms represent 39,357 and 41,567 firm-quarter observations respectively. Investment grade firms have higher average and median dividend yields (1.87%, 1.78%) per quarter compared to below-investment grade firms (0.48%, 0.00%). Investment grade firms also have a higher repurchase yield than below-investment grade firms. Likewise, half of the below-investment grade firms in my sample neither pay dividends nor buy-back stocks. Investment and below-investment grade firms are also different in their firm level covariates. Below-investment grade firms are less profitable, smaller in market capital, highly leveraged, and have negative lifecycle stage than investment grade firms consistent with previous literature. Most importantly, however, POM and non-POM firms (reported in Panel B above) have similar characteristics on average.

3.3.3 Univariate Analysis

In this section, I conduct a univariate analysis of dividend yields between POM and non-POM firms by year. Table 3.1 reports the mean dividend yields, mean differences and statistical significance from 1987 to 2016 (1986 is excluded because of no comparing groups). We can see that from 1987 to 2016, POM firms pay less dividends than non-POM firms except in two occasions. In 30 years, POM firms have significantly less dividend yields than non-POM firms in 22 times. The mean differences are big and statistically significant before 2007. From 2007 to 2016 the differences are negative but are mostly insignificance. As the years after 2007 are suffered from the financial crisis and some new regulations, firms' policies may have suffered from other unobserved factors during this period, which is an area of research I could not cover in this study.

We can also visualize the mean differences of dividend yields between POM and non-POM firms from Figure 1. Graph supports the notion that– on average POM firms pay less dividends to their stockholders than non-POM firms each year.

3.4 Empirical Methodology and Main Results

I use the following two models to examine the effect of credit rating risk on firms' dividend policies:[23]

$$y_{i(t+1)} = \alpha + \beta_1 POM_{it} + \beta_2 IG/SG_{it} + \gamma X_{it} + \theta_i + \lambda_t + \varepsilon_{it} \quad (3.1)$$

$$y_{i(t+1)} = \alpha + \beta_1 Plus_{it} + \beta_2 Minus_{it} + \beta_3 IG/SG_{it} + \gamma X_{it} + \theta_i + \lambda_t + \varepsilon_{it} \quad (3.2)$$

The dependent variable ($y_{i(t+1)}$) measures either dividend yield or dividend change or dividend initiation. *i* indicates a firm and *t* indicates a time (quarter in a fiscal year). Therefore, my

[23] This methodology follows the model used by Kisgen (2006) with modification. Kisgen (2006) do not control all covariates and do not use industry or time fixed effects.

dependent variable measures dividend activities of a firm for one-quarter ahead period. *y* also indicates a binary variable which takes a value of 1 if a firm *i* pays a dividend in the next quarter and 0 otherwise in the logistic regression analysis. POM_{it} is an indicator variable that equals 1 if a firm *i* has a "Plus" or a "Minus" sign in its credit rating in a given quarter, and 0 otherwise. $Plus_{it}$, and $Minus_{it}$ are indicator variables that equal to 1 if a firm has a "Plus" or a "Minus" sign in its credit rating, respectively, in a given quarter, and 0 otherwise. IG/SG_{it} is an indicator variable that equals 1 if a firm has either BBB- or BB+ or BB rating in a given quarter, and 0 otherwise. IG/SG_{it} indicates a position on the border of investment-speculative cutoffs. X_{it} includes firm level covariates lagged by one quarter, stock return volatility, and industry median dividend yields[24] as reported in Table 3.1. θ_i indicates industry, defined by 3-digit SIC, and λ_t indicates time (quarters in fiscal years) fixed effects. Robust standard errors clustered at the firm level are used in both equations.

3.4.1 Credit Rating Risk and Dividend Yields: Baseline Results

Table 3.3 reports the baseline regression results. Columns (1) – (2) reports results for all firms including triple-A firms. Columns (3) – (5) reports results for all firms excluding triple-A firms. We can see that POM, Plus, Minus, and IG/SG firms have negative yields for one-quarter ahead dividends. In the full sample, that includes triple-A, POM firms pay 0.09% less dividend yields than all other firms. Similarly, Plus, Minus and IG/SG firms pay 0.10%, 0.08% and 0.21% less dividend yields respectively than the rest of the firms. My results remain consistent when I exclude "AAA" firms from the sample. Excluding triple-A firms is necessary for this study because triple-A firms do not have Pluses and Minuses in the group. Results of IG/SG firms

[24] I have controlled a set of variables that previous studies such as Grullon and Michaely (2002), Fama and French (2002), Grullon et al. (2011), and Adhikari and Agrawal (2018) etc. have shown as influential in firms' dividend payout decisions.

show that at the investment-speculative cut-offs firms face a higher risk of rating change and pay less dividends than rest of the rated firms.

Overall, these results reveal that POM, Plus, Minus, and IG/SG firms pay about 7% – 17% less dividends than the unconditional sample means of all rated firms (excluding triple-A firms) and about 18% to 41% less dividends than their industry median[25], which indicate big economic impacts for dividend dependent clientele and tax authority. One interesting finding here is that firms in Pluses are paying less dividends than firms in Minuses after controlling for IG/SG firms. Thus, my baseline results indicate that the threat of rating change, regardless of firms' underlying credit quality, negatively affects firms' dividend payouts.

Next, to cleanly visualize the effect of rating risk on dividend yields, I graph the residual dividend yields that are not explained by other determinants of dividend in Figure 2. For this analysis, I first run my models (1) and (2) using all control variables except my explanatory variables. Then, I predict the estimated value of dividend yields (y-hats) and the residuals. These residuals represent the portion of dividend yields that are not explained by all control variables used in the models together. Then, I calculate the mean of residuals that correspond to non-POM, Plus, and Minus firms.

Figure 2 shows that Non-POM firms have positive, and Plus and Minus firms have negative residual yields that are related to these firms' credit rating risks.

3.4.2 Firms' Rating Risk and Likelihood of Paying Dividends

In this section, I test the firms' probability of paying dividends based on their rating risk. My dependent variable is a binary variable, which takes a value of 1 if a firm pays dividends, and 0 otherwise. If firms are less likely to pay dividends, then I find negative coefficients for my

[25] 0.085/1.16 = 7%, 0.197/1.16 = 17%, 0.085/0.48 = 18%, and 0.197/0.48 = 41% respectively.

explanatory variables. Table 3.4 reports the results. Panel A reports logistic regression results without industry and time fixed effects. Panel B reports OLS regression results like the baseline regressions. Results show that POM, Plus, Minus and IG/SG firms are negatively associated with my binary dependent variable– dividend payers, which indicates these firms' negative likelihood of paying dividends compared to other firms. Results also show that Plus firms have the more negative propensity of paying dividends than Minus firms. Similarly, results of IG/SG firms lose statistical significance in OLS regressions though provide qualitatively consistent results. Overall, these results are consistent with my baseline regression results.

3.4.3 Rating Risk and Dividend Initiations

In this section, I analyze the effects of rating risk on firms' propensity to initiate or start dividend payments. Dividends are sticky in nature. Therefore a dividend initiation indicates a firm's commitment to pay future dividends, unlike the repurchase decisions which do not show any commitment of future repurchases. Thus, if the risk of rating change affects firms' dividends, then it can also affect firms' dividend initiations to begin with. However, I cannot examine this notion in my full sample because I cannot analyze the dividend initiations of past dividend payers. Therefore, for this analysis, I keep firms that are past nonpayers– firms that did not pay any dividends in two consecutive quarters and drop all past dividend payers. Next, I define a dividend initiation when a past nonpayer starts paying a dividend in the current quarter. Therefore, dividend initiation is an indicator variable that takes a value of 1 if a past nonpayer initiates a dividend, and zero otherwise. These criteria give me 33,440 firm-quarters of past nonpayers which represent 6,081 and 27,359 firms-quarters of investment and below-investment grade firms respectively. There are 561 firm-quarters of dividend initiations, which represent 360 unique firms. I run regressions on all, investment and speculative grade firms separately.

Table 3.5 reports the results. Panel A of Table 3.5 reports logistic regression results without industry and time fixed effects. The logistic regression results reveal that on average POM, Plus, and Minus past nonpayers are less likely to initiate a dividend in the current quarter. Results are stronger for below-investment grade firms than investment grade firms, which are consistent with the summary of the full sample that on average about 50% of below-investment grade firms do not pay dividends. Panel B of Table 3.5 reports OLS regression results, which are consistent with logistic regression results. Overall, these results suggest that there are more past nonpayers in low-rated firms than in high-rated firms. Among the past non-payers, POM, Plus, and Minus rated firms, particularly among below-investment grade firms, are less likely to start paying a dividend in the current quarter.

3.4.4 Rating Risk on Dividend Increase

In this section, I examine whether the risk of rating change affects firms' propensity of increasing dividends in the next quarter among the past dividend payers. I keep firms that pay dividends in the current and past quarter consecutively. This gives me 42,011 firm-quarters of past dividend payers, which represent 1,060 unique firms. There are 32,468 and 9,543 firm-quarters of past dividend payers of investment and below-investment grade firms respectively. I define dividend increase in two ways: if current dividend amount is greater than last quarter's dividend amount, it is defined as increase within a quarter; and if current dividend amount is greater than the last fourth quarter's dividend, it is defined as dividend increase within a year. There are 18,416 firm-quarters of dividend increase within a year, and 6,563 firm-quarters of dividend increase within a quarter.

Table 3.6 reports the results for the dividend increase within a year. Both, logistic and OLS regression results show that mostly Minus and IG/SG firms are negatively associated with

the future dividend increase. These relationships are stronger for investment grade firms than below-investment grade firms. Column (1) & (2) of Panel B shows that on average IG/SG firms reduce the current quarter's dividend than last year by 0.06%. Similarly, POM and Minus firms reduce their current quarter's dividend than last year by 0.03% and 0.04% respectively among the investment grade firms. I find qualitatively similar results for dividend increase within a quarter (untabulated). These results support my findings of summary statistics that investment grade firms are more dividends payers than speculative grade firms, and they also have a higher propensity of dividend decrease given the risk of the rating change.

3.4.5 Rating Risk and Dividend yields by Year and Industry

In this section, I analyze the effect of credit rating risk on firms' dividends by year and industry groups. Table 3.7 reports regression results for each year from 1987 to 2016. These yearly regression results show that POM, Plus, Minus, and IG/SG rated firms on average are negatively associated with one-quarter ahead dividend yields. Results are generally stronger for the years from 1988 to 2006 than from 2007 to 2016. In some early years, such as 1988 – 1991, Plus firms paid 0.25% – 0.51% less dividends than other firms. From 2004 – 2006, Plus firms paid 0.19% – 0.24% less dividends than other firms. Similarly, from 1999 to 2004, Minus firms paid on average 0.16% – 0.31% less dividends than other firms. In some years the coefficients of IG/SG are significantly big. Such as, in 1995 and 2012, IG/SG firms paid 0.60% and 0.42% less dividends respectively than the rest of the firms. Overall, in 30 years of observations, POM, Plus, Minus or IG/SG indicator is statistically significant and negative for 21 times and provide additional evidence that on average firms with the higher risk of rating change pay less dividends all time.

Next, I divided my sample into five industry groups following the Fama-French industry classification[26] and test whether firms in different industries behave according to my hypothesis. Several studies in corporate finance show that firms try to mimic their industry peers' policies on their corporate decisions. As the industry peers must compete for the same customers, products, and investors in the market, it looks natural that firms watch their industry peers' policies and try to copy them to some extent[27]. For example, Leary and Robert (2014) show that firms financing decisions are affected by their peers' policies. Similarly, Grennan (2019) and Adhikari and Agrawal (2018) show that firms dividend decisions are affected by their industry peers' dividend policies. Therefore, in this study, I control for industry median dividend yields in all regressions to cleanly determine the effect of credit rating risk on firms' dividend decisions. In this section, I examine the effect of firms' credit rating risk in five industries separately. Table 3.8 reports the results. We can see that four out of five industries provide supports on credit ratings' effect on firms' dividend policies. Results are stronger for Manufacturing and Energy industry, where being on POM indicates 0.15% less dividend for next quarter. Similarly, Plus, Minus, and IG/SG indicate 0.19%, 0.11% and 0.21% less dividend yields for the next quarter respectively. In all industries except other, being in IG/SG indicates about 0.19%–0.50% less dividend yields in next quarter. Overall, results from five industry classifications also provide support on my hypothesis.

3.4.6 Robustness check

I conduct a propensity score match sample test to check the robustness of my findings. My summary statistics in Table 3.1 Panel B shows that POM and Non-POM firms are similar in several firm level characteristics. Such as, they have the same average profitability, market-to-

[26] http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

[27] For example, Lieberman and Asaba (2006) show that firms learn new information and try to maintain competitive ability by following industry peers' policies.

book equity, and cash flow-to-capital ratio. However, on average POM firms are smaller in size, highly leveraged, and have higher institutional ownership than non-POM firms. Thus, there is a chance that these differences make POM firms less likely to pay dividends than non-POM firms on average. Therefore, as a robustness check, I match POM and non-POM firms using propensity score matching procedure and re-run my baseline regressions on the matched sample. I include all firm level covariates reported in Table 3.3, indicator variable for the listing in NYSE (following Faulkender and Patersen, 2005), and the percentage of institutional blockholding to perfectly match my POM and non-POM firms. Studies show that institutional ownership can affect firms' credit ratings and quality of corporate governance[28]. However, the effect of institutional blockholding on corporate dividend policy remains contradictory in the literature[29]. Therefore, I do not control institutional ownership in my main analyses but use it as one of the matching variables in my propensity score matching. I also use industry fixed effect (3-digit SIC) and run probit regression with a caliber of 0.0001 on a common support and no replacement to obtain a sample of matched firms. This procedure gives me a matched sample of 23,290 firm-quarter observations with 11,645 POM and non-POM observations each. POM and non-POM also represent 1,262 and 1,058 unique firms respectively. In untabulated results, I find that after the matching, these firms are not significantly different in any of their firm level characteristics.

Table 3.9 reports the results from the propensity score matched sample. Results are consistent with my baseline regression results. POM firms pay about 0.14% less dividends than their matched counterpart of non-POM firms. Similarly, in all firms, Plus, Minus, and IG/SG firms pay 0.12%, 0.15%, and 0.28% less dividends respectively than other matched firms. The

[28] For detail, Ashbaugh-Skaife et al. (2006)

[29] Grinstein and Michaely (2005) show that institutional owners avoid firms that do not pay dividends. However, Barclay et al. (2008) show that many firms that have institutional holding do not pay dividends. They also argue that financial investors are not attracted by dividend paying firms and tend to be passive.

effect of rating risk is stronger for investment grade firms than below-investment grade firms. These results support my earlier findings. I get qualitatively similar results without controls. Overall, these results suggest that POM and non-POM firms that are similar in every observable characteristic can have different dividend policies influenced by their credit rating risk. My results are consistent with Kisgen's (2006) predictions that because of credit rating shock, firms that are at the margins of their rating categories behave differently than firms that are in the middle. These results are different from what their fundamental credit quality would suggest.

3.4.7 Repurchases

In this section, I examine whether firms' stock repurchase decisions are also affected by firms' risk of the rating change. Stock repurchase is an indirect way of distributing firms' earnings to its stockholders. Additionally, stock repurchase is viewed as a close but imperfect substitute for cash dividends[30]. Studies show that firms' stock repurchase policies can be different from their dividend policies because repurchase has flexibility in terms of time and commitment, and managers can use repurchase to time the market and increase earnings per share. From the survey of financial managers, Brav et al. (2005) conclude that maintaining the dividend level is on par with investment decisions, however, repurchases are made from the residual cash-flow after dividend and investment decisions are made. Likewise, Guay and Harford (2000) find that dividends are paid from more permanent earnings whereas repurchases are made mostly form transient income. Studies also show that some managers prefer repurchases to cash dividends because stock repurchases can be used strategically for short-term benefits. For instance, Grullon and Michaely (2002) argue that large established firms do not cut dividends, but they also have a gradual favor in distributing cash through repurchase. The

[30] For detail see, Guay and Harford (2000), and Grullon and Michaely (2002)

literature further suggests that unlike the dividend cuts, a decrease in repurchases have no negative market reactions. For instance, Guay and Harford (2000) show that change in repurchase does not have similar stock market reactions as the change in dividends. Overall, the literature suggests that dividend and stock repurchase decisions may be determined differently.

Thus, I hypothesize that *the risk of rating change would have no or less effect on firms' stock repurchase decisions*. As firms' stock repurchase decisions are made after the dividend decisions, any effect of rating risk will be reflected on dividend decisions. I test this hypothesis using equations (1) and (2) of section 4 where I change my dependent variable to one-quarter ahead Repurchase Yields.

Table 3.10 reports the results of stock repurchase. I use all control variables as mentioned in Table 3.3. Results of Table 3.10 show that firms' stock repurchases are not significantly affected by their credit rating risk. The coefficients of POM, Plus, Minus and IG/SG are negative but statistically insignificant in all regressions. Thus, my results suggest that firms' risk of rating change does not affect their stock repurchase decisions.

3.4.8 Why POM firms reduce Dividends?

My empirical analysis suggests that firms that have a higher risk of rating change pay significantly less dividends than other firms. Now one important question is "why firms pay less dividends when they face a higher risk of rating change?"

Kisgen (2006) suggests that firms face higher (lower) financing costs by rating downgrades (upgrades), therefore, they try to avoid downgrades by reducing net debt financing. Tang (2009) suggests that improving credit rating scales, regardless of their underlying credit quality, decreases firms' borrowing costs, and increases investments. Similarly, Kisgen and Strahan's (2010) study regarding the use of bond investment regulations suggests that one notch

better rating by Dominion Bond Rating Service corresponds to a 39-basis point reduction in a firm's cost of debt capital. Similarly, Jung et al. (2013) provide evidence that firms that are in Plus or Minus notch of their broad ratings show greater incentives of earning smoothing activities. They find that increased earnings smoothness has a favorable impact on the likelihood of a rating upgrade in the subsequent period.

Overall, literature suggests that firms try to avoid downgrades or improve current credit ratings to lower the financing costs. Therefore, firms that have a higher risk of rating change have a higher motivation for avoiding downgrades or improving current ratings than other firms. Simply, they have a higher risk of a downgrade when they are in Minus, and a higher probability of upgrade when they are in Plus. Thus, both positions influence them to behave differently than the rest of the firms. My study provides new evidence that firms manage dividends in response to credit rating risks, which is consistent with the view provided by some financial managers –they consider cutting dividends if it improves their credit ratings (Brav et al., 2005).

3.5 Conclusion

I investigate whether the *ex-ante* risk of credit rating change affects firms' payout policies. Following the identification strategy similar to Kisgen (2006), I group firms into high risk of credit rating change if they are on "Plus", "Minus", "Plus or Minus" (or "POM") or on the investment-speculative grades cutoffs (IG/SG), and low risk of credit rating change if they are in the middle of their rating categories. My results suggest that firms with similar underlying credit quality and ability to pay dividends can have significantly different dividend payouts in response to their risks of the rating change. I show that firms that have a higher risk of rating change pay less dividends, are less likely to pay dividends, and less likely to initiate or increase dividends

compared to other firms. However, I do not find any significant effect of credit rating risk on firms' stock repurchases.

Overall, my study provides new evidence to the literature that *ex-ante* risk of credit rating change affects firms' dividend policy. My results supplement Kisgen's (2006) CR-CS theory and contemporary studies such as, Brav et al. (2005), Kisgen and Strahan (2010), and Jung et al. (2013) and advance the knowledge that firms' concerns of credit rating are important in their policy makings. However, one important question which I do not address in this study is 'does risk of rating change also affect firms' stock split and stock dividend decisions?'. Studies show that managers use stock split and stock dividend to signal private information about future earnings (McNichols and Dravid 1990) and reduce information asymmetry (Easley et al. 2001). Thus, it would be an important extension of my study.

Table 3.1
Summary Statistics

This table reports descriptive statistics for the all rated firms and unrated firms, POM and non-POM firms, and investment and below-investment grade firms. Data are from COMPUSTAT and CRSP merged quarterly database from 1986 to 2016. Firms are defined as rated (POM or non-POM) and unrated based on S&P domestic long-term issuer debt ratings from COMPUSTAT monthly credit rating database. POM (non-POM) indicates a rated firm that has (does not have) a Plus or a Minus sign in its micro rating. All continuous variables are winsorized at their 1st and 99th percentiles. Table A.7 in the Appendix shows credit rating scales and Table A.8 defines the variables.

Panel A: Rated versus Non-Rated Firms

	All Rated Firm			All Non-Rated Firm		
Variables	Mean	Median	SD	Mean	Median	SD
Dividend Yield %	1.18	0.45	1.47	0.50	0.00	1.13
Repurchase Yield %	2.91	0.30	5.17	1.93	0.00	4.62
Profitability	0.03	0.03	0.02	0.02	0.03	0.05
Lifecycle stage	0.11	0.17	0.48	-0.38	0.13	1.55
Market-to-Book	1.34	1.08	0.88	1.69	1.19	1.44
Book Leverage	0.32	0.28	0.21	0.17	0.09	0.21
Tangibility	0.33	0.28	0.23	0.24	0.18	0.20
Cashflow-to-Capital	0.11	0.07	0.33	-0.07	0.08	0.99
Market Equity (mil. $)	9,706.20	1,902.00	29,943.17	691.42	116.11	5,575.43
Log (Market Equity)	7.36	7.47	1.71	4.84	4.79	1.75
Institutional Ownership	0.65	0.68	0.23	0.43	0.38	2.96
Idiosyncratic risk	0.11	0.09	0.07	0.15	0.13	0.09
Industry Median DY%	0.48	0.00	0.82	0.23	0.00	0.60
Observation		82,034			211,925	
Unique Firms		2,382			7,274	

Panel B: POM versus Non-POM (Excluding Triple A)

	Rated Firms			POM			Non-POM		
Variables	Mean	Median	SD	Mean	Median	SD	Mean	Median	SD
Dividend Yield %	1.16	0.40	1.45	1.07	0.00	1.42	1.30	0.77	1.50
Repurchase Yield %	2.91	0.28	5.19	2.90	0.22	5.23	2.93	0.41	5.12
Profitability	0.03	0.03	0.02	0.03	0.03	0.02	0.03	0.03	0.02
Lifecycle stage	0.11	0.17	0.48	0.10	0.16	0.48	0.12	0.19	0.48
Market-to-Book	1.32	1.07	0.87	1.32	1.07	0.87	1.32	1.08	0.86
Book Leverage	0.32	0.28	0.21	0.33	0.29	0.21	0.31	0.27	0.21
Tangibility	0.33	0.28	0.22	0.32	0.27	0.22	0.34	0.29	0.22
Cashflow-to-Capital	0.11	0.07	0.33	0.11	0.07	0.33	0.10	0.07	0.32
Market Equity (mil. $)	8438.92	1854.01	24738.59	7594.72	1684.77	23106.52	9854.70	2168.20	27198.82
Log (Market Equity)	7.35	7.46	1.70	7.26	7.37	1.68	7.49	7.61	1.72
Institutional Ownership	0.65	0.68	0.23	0.66	0.69	0.24	0.64	0.67	0.23
Idiosyncratic risk	0.11	0.10	0.07	0.12	0.10	0.07	0.11	0.09	0.07
Industry Median DY%	0.48	0.00	0.82	0.46	0.00	0.81	0.50	0.00	0.84
Observation		80,924			50,694			30,230	
Unique Firms		2,379			2,113			1,760	

Panel C: Investment versus Below-investment grade firms (Excluding Triple A)

	Investment grade firms			Below-investment grade firms		
	Mean	Median	SD	Mean	Median	SD
Dividend Yield %	1.87	1.78	1.46	0.48	0.00	1.08
Repurchase Yield %	3.82	1.80	5.37	2.04	0.00	4.86
Profitability	0.04	0.04	0.02	0.03	0.03	0.03
Lifecycle stage	0.31	0.30	0.22	-0.08	0.04	0.57
Market-to-Book	1.50	1.22	0.97	1.17	0.98	0.73
Book Leverage	0.23	0.20	0.15	0.42	0.40	0.22
Tangibility	0.33	0.28	0.21	0.33	0.27	0.24
Cashflow-to-Capital	0.14	0.09	0.23	0.07	0.05	0.39
Market Equity (mil. $)	15418.46	4725.27	33855.69	1830.80	700.07	4054.73
Log (Market Equity)	8.35	8.34	1.26	6.46	6.55	1.53
Institutional Ownership	0.67	0.68	0.18	0.64	0.68	0.27
Idiosyncratic Risk	0.09	0.08	0.04	0.14	0.12	0.07
Industry Median DY%	0.67	0.00	0.93	0.29	0.00	0.65
Observation		39,357			41,567	
Unique Firms		878			1,913	

Table 3.2
Univariate Analysis of Dividend Yield

This table reports univariate analysis of dividend yield between POM and non-POM firms by years. Sample represents all rated firms except AAA rated. Data are from COMPUSTAT and CRSP merged quarterly database from 1986 to 2016. Firms are defined as rated (POM or non-POM) and unrated based on S&P domestic long-term issuer debt ratings from COMPUSTAT monthly credit rating database. POM (non-POM) indicates a rated firm that has (does not have) a Plus or a Minus sign in its micro rating. All continuous variables are winsorized at their 1st and 99th percentiles. Table A.7 in the Appendix shows credit rating scales and Table A.8 defines the variables.

Year	(1) POM Firms Mean DY%	(2) Non-POM Mean DY%	(3) = (1)-(2) Difference	*t-statistics*
1987	1.53	2.08	-0.55	7.12***
1988	1.34	1.83	-0.50	7.13***
1989	1.62	2.14	-0.52	6.48***
1990	1.68	2.05	-0.37	4.69***
1991	1.88	2.25	-0.37	4.19***
1992	1.77	2.18	-0.41	4.95***
1993	1.48	2.02	-0.54	7.23***
1994	1.25	1.78	-0.53	8.05***
1995	1.27	1.62	-0.35	5.22***
1996	1.16	1.39	-0.23	3.78***
1997	1.00	1.18	-0.18	3.50***
1998	0.82	1.01	-0.19	4.32***
1999	0.75	0.97	-0.22	5.20***
2000	0.76	0.97	-0.21	4.36***
2001	0.76	0.99	-0.22	4.51***
2002	0.69	0.92	-0.23	4.93***
2003	0.72	0.92	-0.20	4.25***
2004	0.85	1.10	-0.25	4.69***
2005	0.83	0.99	-0.16	3.56***
2006	0.84	1.01	-0.17	3.58***
2007	0.91	0.91	0.00	0.08
2008	0.84	0.92	-0.08	1.75
2009	0.88	1.08	-0.20	3.93***
2010	1.08	1.32	-0.24	3.68***
2011	1.08	1.12	-0.04	0.66
2012	1.16	1.29	-0.13	2.11
2013	1.25	1.35	-0.10	1.88
2014	1.22	1.20	0.02	0.27
2015	1.15	1.20	-0.05	0.96
2016	1.21	1.28	-0.07	1.28

Table 3.3
Effect of credit rating risk on dividend: Baseline Results

This table reports the baseline regression results. The dependent variable is one-quarter ahead Dividend Yield (DY %). Main explanatory variables are POM, Plus, Minus, and IG/SG. POM is an indicator variable that takes a value of 1 if a rated firm has a plus or minus sign on its rating, and zero otherwise. Plus (Minus) is an indicator variable that takes a value of 1 if a firm has a plus (minus) in its rating and zero otherwise. *IG/SG* is an indicator variable that takes a value of 1 if a firm has BBB-, BB, or BB+ rating, and zero for the rest of the sample. Data are from COMPUSTAT and CRSP merged quarterly database from 1986 to 2016. Firms are defined as rated (POM or non-POM) and unrated based on S&P domestic long-term issuer debt ratings from COMPUSTAT monthly credit rating database. All continuous variables are winsorized at their 1st and 99th percentiles. Table A.7 in the Appendix shows credit rating scales and Table A.8 defines the variables. Robust standard errors, clustered at firm level, are reported in the parentheses. Industry (defined by 3-digit SIC) and Time (defined by fiscal year and quarter) fixed effects are used in all regression analysis. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)
	All Firms		All Firms Excluding "AAA"		
VARIABLES	One-quarter ahead DY%				
POM	-0.091***		-0.085***		
	(0.027)		(0.027)		
Plus		-0.104***		-0.098***	
		(0.033)		(0.033)	
Minus		-0.079**		-0.073**	
		(0.031)		(0.031)	
IG/SG	-0.206***	-0.207***	-0.202***	-0.202***	-0.197***
	(0.039)	(0.039)	(0.039)	(0.039)	(0.039)
Firm size	0.240***	0.240***	0.236***	0.236***	0.238***
	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)
Profitability	2.454***	2.463***	2.393***	2.401***	2.392***
	(0.530)	(0.530)	(0.527)	(0.527)	(0.528)
Market-to-Book	-0.251***	-0.251***	-0.245***	-0.245***	-0.245***
	(0.026)	(0.026)	(0.026)	(0.026)	(0.026)
Lifecycle Stage	0.228***	0.228***	0.227***	0.227***	0.226***
	(0.051)	(0.051)	(0.051)	(0.051)	(0.051)
Book Leverage	0.316**	0.317**	0.320**	0.320**	0.328**
	(0.136)	(0.136)	(0.137)	(0.137)	(0.137)
Tangibility	0.210	0.209	0.202	0.201	0.204
	(0.151)	(0.151)	(0.151)	(0.151)	(0.151)
Cash flow-to-Capital	-0.058*	-0.057*	-0.058*	-0.057*	-0.058*
	(0.030)	(0.030)	(0.030)	(0.030)	(0.030)
Industry Median DY%	0.533***	0.532***	0.532***	0.532***	0.532***
	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)
Idiosyncratic Risk	-3.399***	-3.400***	-3.399***	-3.400***	-3.411***
	(0.324)	(0.324)	(0.324)	(0.324)	(0.327)
Industry FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Observations	50,936	50,936	50,642	50,642	50,642
Adjusted R-squared	0.467	0.467	0.462	0.462	0.461

Table 3.4
Likelihood of Paying Dividend

This table reports the probability of dividend payment based on firms' credit rating. Sample represents all rated firms (excluding AAA rated firms). The dependent variable is a binary variable that takes a value of 1 if a firm pays dividend, and 0 otherwise. Main explanatory variables are POM, Plus, Minus, and IG/SG. *POM* is an indicator variable that takes a value of 1 if a rated firm has a plus or minus sign on its rating, and zero otherwise. *Plus* (*Minus*) is an indicator variable that takes a value of 1 if a firm has a plus (minus) in its rating and zero otherwise. *IG/SG* is an indicator variable that takes a value of 1 if a firm has BBB-, BB, or BB+ rating, and zero for the rest of the sample. Data are from COMPUSTAT and CRSP merged quarterly database from 1986 to 2016. Firms are defined as rated (POM or non-POM) and unrated based on S&P domestic long-term issuer debt ratings from COMPUSTAT monthly credit rating database. All continuous variables are winsorized at their 1st and 99th percentiles. Table A.7 in the Appendix shows credit rating scales and Table A.8 defines the variables. Robust standard errors, clustered at firm level, are reported in the parentheses. Industry (defined by 3-digit SIC) and Time (defined by fiscal year and quarter) fixed effects are used in all regression analysis where indicated. In logistic regression results heteroskedasticity robust standard errors are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
	Logistic Regression		OLS Regression	
VARIABLES	Dividend Payers=1			
POM	-0.159***		-0.031***	
	(0.023)		(0.010)	
Plus		-0.180***		-0.036***
		(0.027)		(0.012)
Minus		-0.140***		-0.026**
		(0.027)		(0.012)
IG/SG	-0.150***	-0.151***	-0.022	-0.023
	(0.025)	(0.025)	(0.016)	(0.016)
Firm Level Controls	Yes	Yes	Yes	Yes
Industry FE	No	No	Yes	Yes
Time FE	No	No	Yes	Yes
Observations	55,231	55,231	53,059	53,059
Pseudo/Adjusted R-Squared	0.347	0.347	0.472	0.472

Table 3.5
Credit Ratings and Dividend Initiation

This table reports the effects of firms' credit rating on their decisions of dividend initiation. Sample represents firms who start paying a cash dividend in the current quarter but did not pay a cash dividend in two-quarters (6 months) before. Therefore, the dependent variable is a binary variable that takes a value of 1 if a firm who is a past non-payer starts paying a cash dividend and 0 otherwise. All past payers (who paid a cash dividend in the two quarters) and AAA rated firms are excluded from the sample. Main explanatory variables are POM, Plus, Minus, and IG/SG. *POM* is an indicator variable that takes a value of 1 if a rated firm has a plus or minus sign on its rating, and zero otherwise. *Plus* (*Minus*) is an indicator variable that takes a value of 1 if a firm has a plus (minus) in its rating and zero otherwise. *IG/SG* is an indicator variable that takes a value of 1 if a firm has BBB-, BB, or BB+ rating, and zero for the rest of the sample. Data are from COMPUSTAT and CRSP merged quarterly database from 1986 to 2016. Firms are defined as rated (POM or non-POM) and unrated based on S&P domestic long-term issuer debt ratings from COMPUSTAT monthly credit rating database. All continuous variables are winsorized at their 1st and 99th percentiles. Table A.7 in the Appendix shows credit rating scales and Table A.8 defines the variables. Robust standard errors, clustered at firm level, are reported in the parentheses. Industry (defined by 3-digit SIC) and Time (defined by fiscal year and quarter) fixed effects are used in all regression analysis where mentioned. In logistic regressions heteroskedasticity robust standard errors are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Logistic Regression Results

	(1)	(2)	(3)	(4)	(5)	(6)
	All Firms		Investment grade		Below-investment grade	
VARIABLES	Dividend Initiation =1					
POM	-0.342***		-0.358*		-0.373**	
	(0.115)		(0.194)		(0.149)	
Plus		-0.354**		-0.453*		-0.293*
		(0.139)		(0.265)		(0.169)
Minus		-0.331**		-0.315		-0.474**
		(0.136)		(0.217)		(0.188)
IG/SG	0.041	0.041				
	(0.123)	(0.124)				
Firm Level Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	No	No	No	No	No	No
Time FE	No	No	No	No	No	No
Observations	22,746	22,746	3,614	3,614	19,132	19,132
Pseudo R-squared	0.105	0.105	0.085	0.085	0.080	0.082

Panel B: OLS Regression Results

	(1)	(2)	(3)	(1)	(2)	(3)
	All Firms		Investment grade		Below-investment grade	
VARIABLES	Dividend Initiation = 1					
POM	-0.004*		-0.008		-0.005**	
	(0.002)		(0.008)		(0.002)	
Plus		-0.005*		-0.013		-0.006***
		(0.003)		(0.010)		(0.002)
Minus		-0.004		-0.006		-0.005*
		(0.003)		(0.010)		(0.003)
IG/SG	-0.001	-0.001				
	(0.005)	(0.005)				
Firm Level Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	22,348	22,348	3,547	3,547	17,169	17,169
Adjusted R-squared	0.065	0.065	0.266	0.266	0.036	0.036

Table 3.6
Effect of Rating on firms' Dividend Increase

This table reports effect of firms' credit rating on their decision to increase dividend. Sample represents all rated firms (excluding AAA rated firms) that pay dividends in two consecutive quarters. All other firms that do not pay dividend for the two consecutive quarters are excluded. The dependent variable takes a value of 1 if there is an increase in the dividend in the current quarter and 0 otherwise. Main explanatory variables are POM, Plus, and Minus. *POM* is an indicator variable that takes a value of 1 if a rated firm has a plus or minus sign on its rating, and zero otherwise. *Plus* (*Minus*) is an indicator variable that takes a value of 1 if a firm has a plus (minus) in its rating and zero otherwise. *IG/SG* is an indicator variable that takes a value of 1 if a firm has BBB-, BB, or BB+ rating, and zero for the rest of the sample. Data are from COMPUSTAT and CRSP merged quarterly database from 1986 to 2016. Firms are defined as rated (POM or non-POM) and unrated based on S&P domestic long-term issuer debt ratings from COMPUSTAT monthly credit rating database. All continuous variables are winsorized at their 1st and 99th percentiles. Table A.7 in the Appendix shows credit rating scales and Table A.8 defines the variables. Robust standard errors, clustered at firm level, are reported in the parentheses. Industry (defined by 3-digit SIC) and Time (defined by fiscal year and quarter) fixed effects are used in all regression analysis where indicated. In logistic regressions heteroskedasticity robust standard errors are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Logistic Regression Results

	(1)	(2)	(3)	(4)	(5)	(6)
	All Firms		Investment grade		Below-investment grade	
VARIABLES	Dividend increase=1					
POM	-0.068**		-0.090***		-0.021	
	(0.028)		(0.031)		(0.065)	
Plus		-0.007		0.024		-0.067
		(0.033)		(0.039)		(0.071)
Minus		-0.134***		-0.189***		0.057
		(0.035)		(0.037)		(0.082)
IG/SG	-0.097***	-0.083**				
	(0.035)	(0.036)				
Firm Level Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	No	No	No	No	No	No
Time FE	No	No	No	No	No	No
Observations	25,477	25,477	19,156	19,156	6,321	6,321
Pseudo R-squared	0.126	0.126	0.106	0.107	0.105	0.105

Panel B: OLS Regression Results

	(1)	(2)	(3)	(4)	(5)	(6)
	All Firms		Investment grade		Below-investment grade	
VARIABLES			Dividend increase=1			
POM	-0.014		-0.027*		-0.030	
	(0.013)		(0.015)		(0.026)	
Plus		-0.004		-0.008		-0.041
		(0.016)		(0.019)		(0.032)
Minus		-0.023		-0.043**		-0.025
		(0.015)		(0.018)		(0.028)
IG/SG	-0.058***	-0.055***				
	(0.018)	(0.018)				
Firm Level Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	25,107	25,107	18,933	18,933	4,533	4,533
Adjusted R-squared	0.250	0.251	0.256	0.256	0.224	0.224

Table 3.7
Credit Ratings and Dividend Yield by Year

This table reports the effects of firms' credit rating on their dividend yield by year. Sample represents all rated firms (excluding AAA rated firms). The dependent variable is one-quarter ahead DY%. Main explanatory variables are POM, Plus, and Minus. *POM* is an indicator variable that takes a value of 1 if a rated firm has a plus or minus sign on its rating, and zero otherwise. *Plus* (*Minus*) is an indicator variable that takes a value of 1 if a firm has a plus (minus) in its rating and zero otherwise. *IG/SG* is an indicator variable that takes a value of 1 if a firm has BBB-, BB, or BB+ rating, and zero for the rest of the sample. Data are from COMPUSTAT and CRSP merged quarterly database from 1986 to 2016. Firms are defined as rated (POM or non-POM) and unrated based on S&P domestic long-term issuer debt ratings from COMPUSTAT monthly credit rating database. All continuous variables are winsorized at their 1st and 99th percentiles. Table A.7 in the Appendix shows credit rating scales and Table A.8 defines the variables. Robust standard errors, clustered at firm level, are reported in the parentheses. Industry (defined by 3-digit SIC) and Time (defined by fiscal year and quarter) fixed effects are used in all regression analysis. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	DV= One-quarter ahead DY%									
VARIABLES	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Regression 1										
POM	-0.062	-0.288**	-0.403***	-0.172	-0.298**	0.039	-0.162	-0.177	-0.078	-0.016
	(0.155)	(0.126)	(0.124)	(0.132)	(0.142)	(0.135)	(0.123)	(0.119)	(0.113)	(0.092)
IG/SG	0.158	-0.056	-0.270	-0.022	-0.139	-0.252	-0.484***	-0.476***	-0.606***	-0.468***
	(0.203)	(0.184)	(0.167)	(0.163)	(0.173)	(0.180)	(0.154)	(0.146)	(0.127)	(0.120)
Regression 2										
Plus	-0.223	-0.390**	-0.510***	-0.258*	-0.355**	-0.071	-0.262*	-0.236*	-0.047	-0.009
	(0.186)	(0.152)	(0.145)	(0.145)	(0.151)	(0.158)	(0.148)	(0.132)	(0.135)	(0.114)
Minus	0.102	-0.172	-0.281*	-0.080	-0.242	0.135	-0.073	-0.116	-0.111	-0.023
	(0.182)	(0.145)	(0.145)	(0.152)	(0.167)	(0.157)	(0.138)	(0.146)	(0.128)	(0.106)
IG/SG	0.129	-0.067	-0.289*	-0.025	-0.143	-0.277	-0.478***	-0.474***	-0.604***	-0.467***
	(0.201)	(0.185)	(0.166)	(0.162)	(0.173)	(0.178)	(0.153)	(0.146)	(0.128)	(0.121)
Observations	711	1,238	1,223	1,179	1,166	1,229	1,323	1,513	1,637	1,711
Adj. R-squared	0.631	0.542	0.628	0.602	0.564	0.583	0.541	0.555	0.559	0.576

VARIABLES	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Regression 1										
POM	-0.117	-0.091	-0.184**	-0.264***	-0.168**	-0.173**	-0.208**	-0.179**	-0.111	-0.074
	(0.096)	(0.077)	(0.089)	(0.086)	(0.076)	(0.073)	(0.092)	(0.085)	(0.071)	(0.074)
IG/SG	-0.276**	-0.187**	-0.166*	-0.194**	-0.366***	-0.302***	-0.255**	-0.159	-0.109	-0.113
	(0.111)	(0.079)	(0.096)	(0.089)	(0.093)	(0.088)	(0.116)	(0.104)	(0.086)	(0.090)
Regression 2										
Plus	-0.138	-0.068	-0.104	-0.223**	-0.157*	-0.147*	-0.146	-0.199**	-0.237***	-0.191**
	(0.105)	(0.085)	(0.099)	(0.098)	(0.087)	(0.086)	(0.103)	(0.099)	(0.083)	(0.079)
Minus	-0.096	-0.115	-0.266***	-0.307***	-0.179**	-0.196**	-0.275***	-0.160*	-0.011	0.021
	(0.108)	(0.088)	(0.100)	(0.094)	(0.087)	(0.082)	(0.106)	(0.095)	(0.082)	(0.089)
IG/SG	-0.280**	-0.183**	-0.145	-0.188**	-0.365***	-0.300***	-0.257**	-0.159	-0.115	-0.126
	(0.112)	(0.079)	(0.096)	(0.089)	(0.092)	(0.088)	(0.117)	(0.104)	(0.086)	(0.089)
Observations	1,810	1,920	1,961	1,988	1,920	2,020	2,069	2,056	1,965	1,950
Adj. R-squared	0.535	0.504	0.482	0.499	0.528	0.472	0.439	0.475	0.457	0.446
VARIABLES	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Regression 1										
POM	0.079	0.013	-0.028	-0.102	-0.064	-0.068	-0.073	-0.101	-0.038	0.070
	(0.070)	(0.070)	(0.099)	(0.089)	(0.081)	(0.110)	(0.101)	(0.096)	(0.101)	(0.113)
IG/SG	-0.130	-0.080	-0.126	-0.301***	-0.293***	-0.423***	-0.176	-0.091	-0.008	-0.059
	(0.095)	(0.092)	(0.114)	(0.113)	(0.099)	(0.118)	(0.130)	(0.118)	(0.115)	(0.135)
Regression 2										
Plus	0.034	0.013	0.006	-0.033	-0.126	-0.116	-0.069	-0.018	-0.058	0.002
	(0.084)	(0.083)	(0.114)	(0.109)	(0.095)	(0.120)	(0.122)	(0.114)	(0.116)	(0.132)
Minus	0.114	0.013	-0.057	-0.155	-0.012	-0.015	-0.076	-0.180	-0.014	0.139
	(0.081)	(0.083)	(0.114)	(0.103)	(0.101)	(0.151)	(0.128)	(0.110)	(0.119)	(0.136)
IG/SG	-0.130	-0.080	-0.123	-0.294***	-0.290***	-0.420***	-0.176	-0.099	-0.006	-0.054
	(0.094)	(0.092)	(0.115)	(0.113)	(0.099)	(0.118)	(0.131)	(0.117)	(0.115)	(0.135)
Observations	1,959	1,980	1,787	2,069	1,938	1,883	1,912	1,961	1,982	1,439
Adj. R-squared	0.474	0.456	0.444	0.414	0.448	0.375	0.404	0.400	0.381	0.376
Firm Level Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 3.8
Credit Ratings and Dividend Yield by Industry

This table reports the effects of firms' credit rating on their dividend yield by industry. Firms are grouped in Fama-French five industries. Sample represents all rated firms (excluding AAA rated firms). The dependent variable is one-quarter ahead DY%. Main explanatory variables are POM, Plus, and Minus. *POM* is an indicator variable that takes a value of 1 if a rated firm has a plus or minus sign on its rating, and zero otherwise. *Plus* (*Minus*) is an indicator variable that takes a value of 1 if a firm has a plus (minus) in its rating and zero otherwise *IG/SG* is an indicator variable that takes a value of 1 if a firm has BBB-, BB, or BB+ rating, and zero for the rest of the sample. Data are from COMPUSTAT and CRSP merged quarterly database from 1986 to 2016. Firms are defined as rated (POM or non-POM) and unrated based on S&P domestic long-term issuer debt ratings from COMPUSTAT monthly credit rating database. All continuous variables are winsorized at their 1st and 99th percentiles. Table A.7 in the Appendix shows credit rating scales and Table A.8 defines the variables. Robust standard errors, clustered at firm level, are reported in the parentheses. Industry (defined by 3-digit SIC) and Time (defined by fiscal year and quarter) fixed effects are used in all regression analysis. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Consumer durable, nondurable, and service		Manufacturing and Energy		Business equipment, Telephone, Television		Healthcare, Medical equipment, Drugs		Other	
VARIABLES	One-quarter ahead DY%									
POM	-0.080		-0.149***		-0.042		-0.113		-0.055	
	(0.050)		(0.050)		(0.075)		(0.074)		(0.055)	
Plus		-0.098*		-0.194***		-0.034		-0.093		-0.017
		(0.056)		(0.064)		(0.083)		(0.088)		(0.065)
Minus		-0.063		-0.106*		-0.049		-0.131*		-0.088
		(0.059)		(0.057)		(0.089)		(0.079)		(0.059)
IG/SG	-0.189**	-0.190**	-0.211***	-0.213***	-0.308***	-0.308***	-0.505***	-0.501***	-0.056	-0.055
	(0.076)	(0.076)	(0.069)	(0.069)	(0.095)	(0.095)	(0.095)	(0.094)	(0.085)	(0.084)
Firm Level Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	13,066	13,066	17,337	17,337	8,963	8,963	3,254	3,254	9,146	9,146
Adjusted R-squared	0.447	0.447	0.487	0.487	0.371	0.371	0.542	0.542	0.449	0.450

Table 3.9
Results from Propensity Score Matched Sample

This table reports results from Propensity Score Matched Sample. POM and non-POM firms are matched based on all firm level covariates used in Table 3.3, indicator of NYSE, percentage of institutional ownership and 3-digit SIC. The dependent variable is one-quarter ahead Dividend Yield (DY %). Main explanatory variables are POM, Plus, and Minus. POM is an indicator variable that takes a value of 1 if a rated firm has a plus or minus sign on its rating, and zero otherwise. Plus (Minus) is an indicator variable that takes a value of 1 if a firm has a plus (minus) in its rating and zero otherwise. IG/SG is an indicator variable that takes a value of 1 if a firm has BBB-, BB, or BB+ rating, and zero for the rest of the sample. Data are from COMPUSTAT and CRSP merged quarterly database from 1986 to 2016. Firms are defined as rated (POM or non-POM) and unrated based on S&P domestic long-term issuer debt ratings from COMPUSTAT monthly credit rating database. All continuous variables are winsorized at their 1st and 99th percentiles. Table A.7 in the Appendix shows credit rating scales and Table A.8 defines the variables. Robust standard errors, clustered at firm level, are reported in the parentheses. Industry (defined by 3-digit SIC) and Time (defined by fiscal year and quarter) fixed effects are used in all regression analysis. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	All Firms		Investment grade		Below-investment grade	
VARIABLES	One-quarter ahead DY%					
POM	-0.136***		-0.151**		-0.045	
	(0.041)		(0.062)		(0.043)	
Plus		-0.124**		0.027		-0.048
		(0.051)		(0.082)		(0.050)
Minus		-0.146***		-0.269***		-0.041
		(0.046)		(0.073)		(0.052)
IG/SG	-0.278***	-0.278***				
	(0.056)	(0.056)				
Firm Level Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	14,818	14,818	7,086	7,086	7,723	7,723
Adjusted R-squared	0.458	0.458	0.481	0.485	0.342	0.342

Table 3.10
Credit Ratings and Firms' Stock Repurchase Decisions

This table reports the effects of firms' credit rating on their stock repurchase decisions. Sample represents all rated firms except AAA. The dependent variable is one-quarter head Repurchase Yield (RPY%). Main explanatory variables are POM, Plus, and Minus. *POM* is an indicator variable that takes a value of 1 if a rated firm has a plus or minus sign on its rating, and zero otherwise. *Plus* (*Minus*) is an indicator variable that takes a value of 1 if a firm has a plus (minus) in its rating and zero otherwise. *IG/SG* is an indicator variable that takes a value of 1 if a firm has BBB-, BB, or BB+ rating, and zero for the rest of the sample. Data are from COMPUSTAT and CRSP merged quarterly database from 1986 to 2016. Firms are defined as rated (POM or non-POM) and unrated based on S&P domestic long-term issuer debt ratings from COMPUSTAT monthly credit rating database. All continuous variables are winsorized at their 1st and 99th percentiles. Table A.7 in the Appendix shows credit rating scales and Table A.8 defines the variables. Robust standard errors, clustered at firm level, are reported in the parentheses. Industry (defined by 3-digit SIC) and Time (defined by fiscal year and quarter) fixed effects are used in all regression analysis. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	All Firms		Investment grade		Below-investment grade	
VARIABLES	One-quarter ahead RPY%					
POM	-0.117		-0.055		-0.055	
	(0.106)		(0.168)		(0.127)	
Plus		-0.091		0.092		-0.007
		(0.124)		(0.224)		(0.145)
Minus		-0.142		-0.158		-0.112
		(0.121)		(0.191)		(0.146)
IG/SG	-0.007	-0.005				
	(0.138)	(0.138)				
Firm Level Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	50,422	50,422	23,080	23,080	27,340	27,340
Adjusted R-squared	0.121	0.121	0.149	0.149	0.100	0.100

Figure 1:
Average Dividend Yield of POM and Non-POM Firms

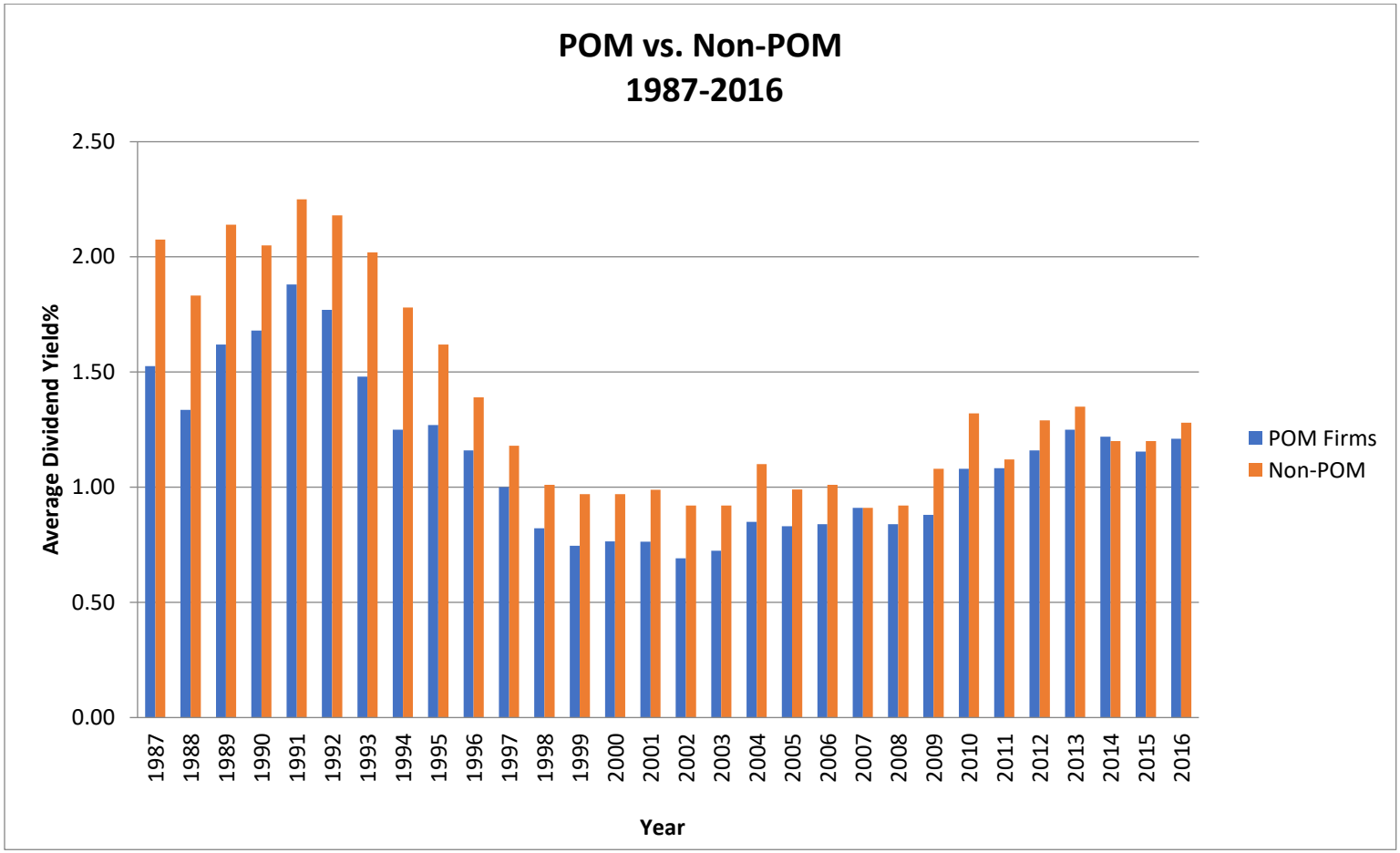
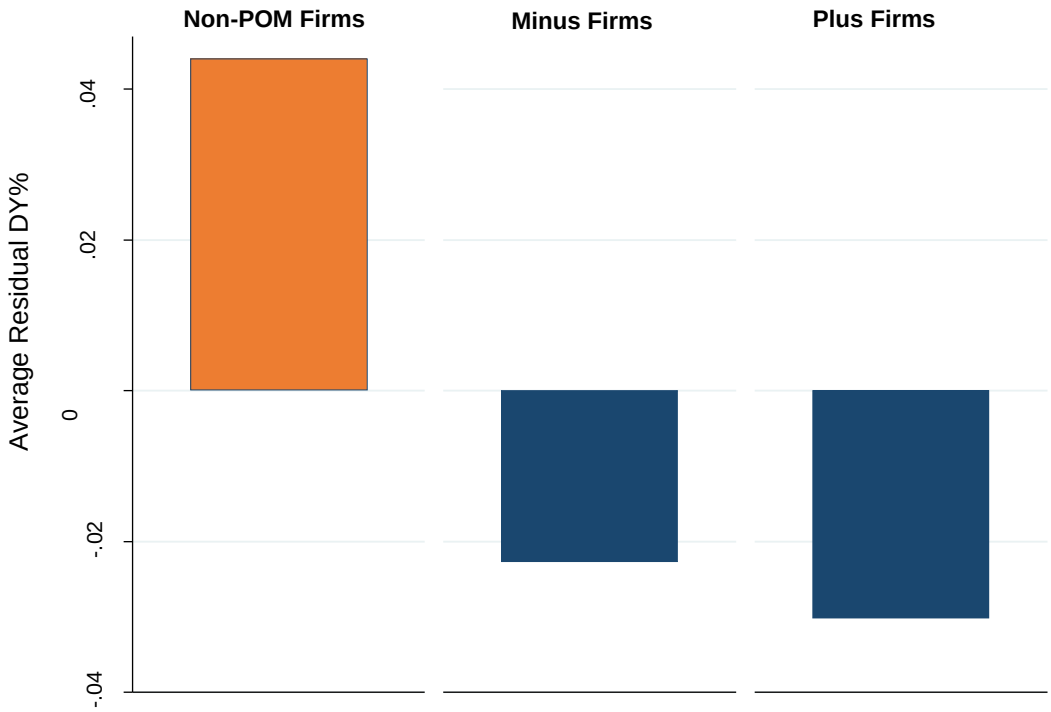


Figure 2:
Residual of Dividend Yield Explained by Credit Rating Risk



CHAPTER IV

SUMMARY AND CONCLUSION

In this dissertation, I examine how firms and their managers respond to varying legal and financial market environment. In the first essay, I explore the role of shareholder-initiated litigation risk on opportunistic insider trading and in the second essay, I examine the effect of *ex-ante* risk of credit rating change on firms' dividend and share repurchase policies.

My results in the first essay show that the *ex-ante* reduction in shareholder-initiated litigation threat leads to significantly more profitable insider trading, especially insider sales. My results suggest that private litigation such as derivative lawsuits can be effective in discouraging the opportunistic and litigation prone insider trading. My results in the second essay suggest that firms near a credit rating change pay less dividends and are less likely to pay dividends compared to other firms. My results indicate that firms with similar underlying credit quality can have significantly different dividend payouts in response to their risks of the rating change.

Overall, my two essays provide novel pieces of evidence and contribute to the various strands of literature. For example, my first essay uses a natural experiment setting and presents robust evidences to establish a causal relation between regulation and insider trading pattern. Similarly, my second essay examines the effects of credit rating risk on firms' payout policies and provides strong evidence that firms manage their dividends in response to their risk of credit rating change, which is not an obvious prediction of trade-off and pecking order theories.

Thus, findings of this dissertation can be used by the researchers, policy makers, and various market participants to understand and expand future studies on firms' and corporate insiders' behavior under various legal and financial market environments.

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Appendix

Appendix

Table A.1: Variable definitions

This table provides the definition and data source for all variables.

UD Law	An indicator variable that equals to one if a firm's state of incorporation has adopted Universal Demand (UD) laws in a given year t. I use firms' historical states of incorporation obtained from SEC online filing from 1994 to 2013.
BHARs (CARs) (e.g., bhar6m, car6m)	A buy and hold abnormal return (BHAR) between any two periods T1 and T2 is the compounded realized daily stock returns minus compounded daily expected returns from a risk model for the same period. $BHAR_{jt} = \prod_{t=T_1}^{T_2}(1+R_{jt}) - \prod_{t=T_1}^{T_2}(1+R_{RiskModel})$ I use Carhart's four factor model as the risk model and estimate parameters over the window from -250 days to -50 days. bhar1m, bhar3m and bhar6m are calculated based on 21, 63, and 126 calendar days from the insider trading day respectively. Cumulative abnormal returns (CARs) are defined similarly by adding daily abnormal returns ($R_{jt} - R_{RiskModel}$) over the same calendar-day windows starting from the insider trading day.
Total shares traded (lnshares), and total dollar value of trade (lndolvol)	Calculated from Thomson Reuters insider trading data. Total shares traded is the total number of shares traded (bought or sold) by corporate insiders (directors, officers, and beneficial owners of more than 10% of company's stock) in the open market in each insider trading day per firm. Total dollar value of trade is the product of transaction price per share (tprice) and the total number of shares traded. I take natural log for both variables.
Total abnormal profits (profits1m, profits3m, profits6m)	Product of abnormal returns (BHARs or CARs) and total dollar value of trade. I calculate total abnormal profits for 1, 3, and 6 months holding periods.
Size, and large and small market cap	Refers to natural log of market capitalization, calculated from Compustat using ln(csho*PRCC_C), lagged for one year. Large market cap indicates bigger and small market cap indicates smaller than median market capitalization.
BEME	Refers to natural log of book to market ratio, calculated from Compustat using ln[ceq/(csho*PRCC_C)], lagged for one year.
Leverage	Refers to total debt to total assets ratio, calculated from Compustat using (dltt+dlc)/at, lagged for one year.
Ret (t-1)	Refers to past month's raw return, calculated from CRSP.
Ret (t-12, t-1)	Refers to cumulative total return for past twelve months, calculated from CRSP.
Spread	Calculated from CRSP using [(Ask-Bid)/(Ask+Bid)/2]. I use spread to measure the liquidity of firm's stock. Liquidity indicates smaller and illiquidity indicates greater than median spread respectively.
ROA	Refers to net income to total assets ratio, calculated from Compustat using (ni/at).
PPENT	Refers to property, plant, and equipment total (net) to total assets ratio, calculated from Compustat using (ppent/at).
Cash	Refers to cash to total assets ratio, calculated from Compustat using (ch/at).

High and low R&D	Calculated from Compustat using research and development expenses to total assets ratio (xrd/at). High R&D indicates greater and low R&D indicates lower than median xrd/at ratio.
Pre-QEA CAR and CRET	Market-adjusted CARs and cumulative total returns (CRETs) for the sample of insiders trades within 21 to 2 days before quarterly earnings announcement using (pre-QEA).
Institutional ownership	Refers to ownership size by the largest institutional investor of the firm, calculated from Thomson Reuters institutional holding (13F) file using (maxinstown/csho). Higher ownership indicates greater and lower ownership indicates lower, than 5% (alternatively 10%) ownership size in the firm.

Table A.2: UD Law and Insiders' Profitability using Cumulative Abnormal Returns (CARs)

This table reports my baseline regression results with and without firm level controls. The dependent variables are cumulative abnormal returns (CARs) over 6 months (car6m), 3 months (car3m) and 1 month (car1m) after the insider trading events. CARs are calculated using Carhart's four factor model. All variables are winsorized at their 1st and 99th percentiles. *UD Law* is an indicator variable that equals one if a firm is incorporated in a state that has adopted a UD Law and zero otherwise. Control variables include Size, BEME, leverage, Ret (t-1), Past Ret (t-12, t-1), ROA, PPENT, Cash, and Spread, which are defined in Table A.1. Robust standard errors clustered at state-of-incorporation level are reported in the parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Insider Sale

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	car6m	car3m	car1m	car6m	car3m	car1m
UD Law	-0.004	-0.016*	-0.016***	-0.011	-0.025**	-0.017**
	(0.015)	(0.009)	(0.004)	(0.020)	(0.010)	(0.006)
Size				-0.147***	-0.083***	-0.029***
				(0.003)	(0.002)	(0.001)
BEME				0.016**	0.007**	0.001
				(0.006)	(0.003)	(0.001)
Leverage				-0.059***	-0.016***	-0.003*
				(0.009)	(0.006)	(0.002)
Ret (t-1)				-0.162***	-0.079***	-0.019***
				(0.008)	(0.005)	(0.006)
Ret (t-12, t-1)				-0.501***	-0.252***	-0.086***
				(0.005)	(0.003)	(0.002)
ROA				-0.016*	-0.004	0.005
				(0.010)	(0.009)	(0.004)
PPENT				0.092**	0.035**	0.034***
				(0.034)	(0.014)	(0.012)
Cash				-0.027*	-0.005	0.008
				(0.014)	(0.012)	(0.007)
Spread				0.024**	0.017**	0.006**
				(0.010)	(0.008)	(0.003)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
State*Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry*Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	365,962	365,962	365,962	295,532	295,532	295,532
R-squared	0.482	0.421	0.346	0.637	0.541	0.418

Panel B: Insider Purchase

VARIABLES	(1) car6m	(2) car3m	(3) car1m	(4) car6m	(5) car3m	(6) car1m
UD Law	0.067	0.043*	0.024	0.025	0.035	0.012
	(0.040)	(0.022)	(0.018)	(0.043)	(0.027)	(0.020)
Size				-0.146***	-0.074***	-0.025***
				(0.006)	(0.004)	(0.002)
BEME				0.034***	0.019***	0.002
				(0.009)	(0.006)	(0.003)
Leverage				-0.070***	-0.011	-0.004
				(0.025)	(0.012)	(0.007)
Ret (t-1)				-0.254***	-0.166***	-0.088***
				(0.018)	(0.014)	(0.008)
Ret (t-12, t-1)				-0.529***	-0.275***	-0.103***
				(0.004)	(0.006)	(0.004)
ROA				-0.052**	-0.032**	-0.015
				(0.021)	(0.012)	(0.009)
PPENT				-0.005	0.040	-0.008
				(0.059)	(0.052)	(0.019)
Cash				0.007	0.025	0.022**
				(0.042)	(0.015)	(0.008)
Spread				0.037***	0.016***	0.002
				(0.005)	(0.003)	(0.003)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
State*Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry*Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	133,360	133,360	133,360	101,689	101,689	101,689
R-squared	0.617	0.570	0.477	0.755	0.685	0.564

Table A.3: Profitability and Trade Size of Liquid versus Illiquid Stocks

This table reports regression results based on liquidity of the stock. Liquid (illiquid) is defined as the percentage of bid-ask spread that is smaller (bigger) than the median. The dependent variables are buy-and-hold abnormal returns (BHARs) over 6 months (bhar6m), 3 months (bhar3m) and 1 month (bhar1m) after the insider trading events, and lnshare (natural log of total shares traded) and lndolvol (natural log of total dollar value of trade) of each insider transaction. BHARs are calculated using Carhart's four factor model. All variables are winsorized at their 1st and 99th percentiles. *UD Law* is an indicator variable that equals one if a firm is incorporated in a state that has adopted a UD Law and zero otherwise. Robust standard errors clustered at state-of-incorporation level are reported in the parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Insider Sale

	(1)	(2)	(3)	(4)	(5)
VARIABLES	bhar6m	bhar3m	bhar1m	lnshare	lndolvol
UD Law*Liquid	-0.026	-0.024***	-0.015***	0.018	0.158***
	(0.019)	(0.008)	(0.004)	(0.044)	(0.050)
UD Law*Illiquid	-0.053**	-0.035***	-0.020***	-0.043	0.133**
	(0.023)	(0.010)	(0.006)	(0.046)	(0.053)
Illiquid	0.118***	0.057***	0.023***	-0.070***	-0.336***
	(0.009)	(0.005)	(0.002)	(0.012)	(0.012)
Firm FE	Yes	Yes	Yes	Yes	Yes
State*Time FE	Yes	Yes	Yes	Yes	Yes
Industry*Time FE	Yes	Yes	Yes	Yes	Yes
Observations	365,962	365,962	365,962	360,612	358,857
R-squared	0.517	0.459	0.343	0.386	0.529
Test: UD Law*Liquid - UD Law*Illiquid=0					
F-statistics	5.04**	2.72	1.51	1.13	0.16

Panel B: Insider Purchase

	(1)	(2)	(3)	(4)	(5)
VARIABLES	bhar6m	bhar3m	bhar1m	lnshare	lndolvol
UD Law*Liquid	0.041	0.035	0.001	-0.212**	-0.156**
	(0.053)	(0.027)	(0.019)	(0.087)	(0.076)
UD Law*Illiquid	0.052	0.056*	0.032	-0.169*	-0.112
	(0.061)	(0.033)	(0.026)	(0.089)	(0.079)
Illiquid	0.236***	0.097***	0.033***	0.042***	-0.318***
	(0.009)	(0.006)	(0.002)	(0.011)	(0.014)
Firm FE	Yes	Yes	Yes	Yes	Yes
State*Time FE	Yes	Yes	Yes	Yes	Yes
Industry*Time FE	Yes	Yes	Yes	Yes	Yes
Observations	133,360	133,360	133,360	130,954	130,657
R-squared	0.615	0.573	0.460	0.550	0.590
Test: UD Law*Liquid - UD Law*Illiquid=0					
F-statistics	0.14	0.59	2.56	1.01	1.48

Table A.4: Confounding Effect of Other Laws

This table reports regression results for controlling compounding effect of other state laws. The dependent variables are buy-and-hold abnormal returns (BHARs) over 6 months (bhar6m), 3 months (bhar3m) and 1 month (bhar1m) after the insider trading events. BHARs are calculated using Carhart's four factor model. All variables are winsorized at their 1st and 99th percentiles. *UD Law* is an indicator variable that equals one if a firm is incorporated in a state that has adopted a UD Law and zero otherwise. DD Law is an indicator variable that equals one if a firm is incorporated in a state that has adopted a Directors Duty Law and zero otherwise. PP Law is an indicator variable that equals one if a firm is incorporated in a state that has adopted a Poison Pills Law and zero otherwise. CS Law is an indicator variable that equals one if a firm is incorporated in a state that has adopted a Control Shares Law and zero otherwise. BC Law is an indicator variable that equals one if a firm is incorporated in a state that has adopted a Business Combination Law and zero otherwise. FP Law is an indicator variable that equals one if a firm is incorporated in a state that has adopted a Fair Price Law and zero otherwise. SOX is an indicator variable that equals one for year after 2002 and zero otherwise. Robust standard errors clustered at state-of-incorporation level are reported in the parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Insider Sale

VARIABLES	(1) bhar3m	(2) bhar3m	(3) bhar3m	(4) bhar3m	(5) bhar3m	(6) bhar3m	(7) bhar3m
UD Law	-0.035***	-0.035***	-0.035***	-0.031***	-0.034***	-0.034***	-0.023***
	(0.009)	(0.009)	(0.010)	(0.008)	(0.009)	(0.010)	(0.007)
DD Law	0.027**					0.031	
	(0.013)					(0.025)	
PP Law		0.017				-0.007	
		(0.013)				(0.025)	
CS Law			0.018			-0.006	
			(0.027)			(0.024)	
BC Law				-0.003		-0.004	
				(0.008)		(0.007)	
FP Law					0.026	0.013	
					(0.021)	(0.017)	
SOX							-0.034**
							(0.014)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State*Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry*Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	365,962	365,962	365,962	365,962	365,962	365,962	371,975
R-squared	0.456	0.456	0.456	0.456	0.456	0.456	0.260

Panel B: Insider Purchase

VARIABLES	(1) bhar3m	(2) bhar3m	(3) bhar3m	(4) bhar3m	(5) bhar3m	(6) bhar3m	(7) bhar3m
UD Law	0.053*	0.053*	0.040	0.047	0.045	0.030	0.052***
	(0.030)	(0.031)	(0.028)	(0.029)	(0.032)	(0.032)	(0.018)
DD Law	-0.023					-0.045	
	(0.016)					(0.049)	
PP Law		-0.021				-0.026	
		(0.013)				(0.035)	
CS Law			0.023			0.061**	
			(0.020)			(0.028)	
BC Law				0.017		0.015	
				(0.023)		(0.015)	
FP Law					0.009	0.019	
					(0.024)	(0.047)	
SOX							-0.036**
							(0.013)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State*Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry*Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	133,360	133,360	133,360	133,360	133,360	130,771	140,963
R-squared	0.570	0.570	0.570	0.570	0.570	0.580	0.291

Table A.5: Excluding 9th Circuit Firms and Restricting Treatment Firms to Pennsylvania

This table reports regression results after excluding firms incorporated in 9th circuit and restricting treatment firms to Pennsylvania. The dependent variables are buy-and-hold abnormal returns (BHARs) over 6 months (bhar6m), 3 months (bhar3m) and 1 month (bhar1m) after the insider trading events. BHARs are calculated using Carhart's four factor model. All variables are winsorized at their 1st and 99th percentiles. *UD Law* is an indicator variable that equals one if a firm is incorporated in a state that has adopted a UD Law and zero otherwise. Robust standard errors clustered at state-of-incorporation level are reported in the parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Insider Sale

	Dropping Ninth Circuit Firms			Pennsylvania Firms		
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	bhar6m	bhar3m	bhar1m	bhar6m	bhar3m	bhar1m
UD Law	-0.054***	-0.037***	-0.021***	0.055	-0.041***	-0.024**
	(0.013)	(0.006)	(0.004)	(0.043)	(0.013)	(0.010)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
State*Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry*Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	328,224	328,224	328,224	320,944	320,944	320,944
R-squared	0.524	0.468	0.352	0.528	0.469	0.351

Panel B: Insider Purchase

	Dropping Ninth Circuit Firms			Pennsylvania Firms		
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	bhar6m	bhar3m	bhar1m	bhar6m	bhar3m	bhar1m
UD Law	0.059	0.054	0.023	0.118	0.064*	0.046**
	(0.067)	(0.035)	(0.026)	(0.074)	(0.037)	(0.018)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
State*Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry*Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	119,694	119,694	119,694	116,119	116,119	116,119
R-squared	0.619	0.584	0.471	0.633	0.595	0.480

Table A.6: Timeline of the Adoption of UD Laws

This table reports the timeline of the adoption of the UD laws by 23 states from 1989 to 2005.
Source: Appel (2016)

Year	State
1989	GA
	MI
1990	FL
1991	WI
1992	MT
	VA
	UT
1993	NH
	MS
1995	NC
1996	AZ
	NE
1997	CT
	ME
	PA
	TX
	WY
1998	ID
2001	HI
2003	IA
2004	MA
2005	RI
	SD

Table A.7: Credit Rating Scale

This table provides credit rating scale as per S&P domestic long-term issuer debt ratings from Compustat database. Investment grade and below-investment grade refer to firms with AAA to BBB- and BB+ to CCC- ratings, respectively. We drop all firms that are rated CC or below for this study.

Numerical Rating Scale	S&P domestic long-term issuer debt rating
1	AAA
2	AA+
3	AA
4	AA-
5	A+
6	A
7	A-
8	BBB+
9	BBB
10	BBB-
11	BB+
12	BB
13	BB-
14	B+
15	B
16	B-
17	CCC+
18	CCC
19	CCC-
20	CC
21	C
22	D
23	SD

Table A.8: Variable Definition

Payout Variables	
Cash Dividend	$\text{DIVAMT} \times \text{CSHOQ}$
Dividend Yield (DY)	$\frac{Cash\ Dividend_t \times 4}{\text{CSHOQ}_{t-4} \times\ PRCCQ_{t-4}}$
Repurchase (RP)	$\text{CSHOPQ} \times \text{PRCRAQ}$
Repurchase Yield (RPY)	$\frac{\text{RPY}_t + \text{RPY}_{t-1} + \text{RPY}_{t-2} + \text{RPY}_{t-3}}{\text{CSHOQ}_{t-4} \times\ PRCCQ_{t-4}}$
Dividend Increase	An indicator variable that equals 1 if a dividend payer firm pays more dividend in the current quarter than in previous quarter ($DIVAMT_t > DIVAMT_{t-1}$), and zero otherwise
Dividend Initiation	An indicator variable that equals 1 if a dividend non-payer firm starts paying a cash dividend from the current quarter
Dividend Payer (non-payer)	A firm who pays (does not pay) a cash dividend for the past two quarters consecutively
Explanatory Variables	
POM	An indicator variable that equals 1 if a firm has Plus or Minus sign in its credit rating, and zero otherwise
Plus	An indicator variable that equals 1 if a firm has Plus sign in its credit rating, and zero otherwise
Minus	An indicator variable that equals 1 if a firm has Minus sign in its credit rating, and zero otherwise
IG/SG	An indicator variable that equals 1 if a firm has BBB- or BB+ or BB ratings, and zero otherwise
Other Explanatory Variables	
Market Equity (mil. $)	CSHOQ×PRCCQ
Firm size	log (Market Equity)
Profitability	$\frac{OIBDPQ}{ATQ}$
Market-to-Book	$\frac{CSHOQ\ \times PRCCQ + DLCQ + DLTTQ + PSTKQ - TXDITCQ}{ATQ}$
Lifecycle Stage	$\frac{REQ}{ATQ}$
Book Leverage	$\frac{DLCQ + DLTTQ}{CSHOQ\ \times PRCCQ + DLCQ + DLTTQ}$
Tangibility	$\frac{PPENTQ}{ATQ}$
Cashflow-to-Capital	$\frac{\text{IBQ} + \text{DPQ}}{\text{PPENTQ}_{t-1}}$
Industry Median DY	MEDIAN(DY), by 3-digit SIC and Fiscal Year
Idiosyncratic Risk	Standard Deviation of a firm's Excess Return for a given Fiscal Year
Institutional Ownership	INSTOWN_PERC
NYSE	An indicator variable that equals 1 if a firm is listed in New York Stock Exchange (NYSE), and zero otherwise

BIOGRAPHICAL SKETCH

Bina Sharma was born in Nepal in 1974. She received Bachelor of Business Administration from Tribhuvan University (TU), Nepal in 1997. She received gold medal in 1997 from then queen Aishwarya Rajya Laxmi Devi Shah for scoring first place in her bachelor's degree. She received her degrees of Master's in Business Administration in 1999 from TU and in 2014 from University of Texas Permian Basin. In August 2015, she entered the doctoral program in finance at the Robert C. Vackar College of Business & Entrepreneurship at the University of Texas Rio Grande Valley (UTRGV). She received Outstanding Finance PhD student award from UTRGV in 2017. She earned Doctor of Philosophy in Business Administration with Finance concentration in May 2019.

She can be reached through bina.sharma923@gmail.com.