
Good Monitoring, Bad Monitoring*

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Abstract

Are courts effective monitors of corporate decisions? In a controversial landmark case, the Delaware Supreme Court held directors personally liable for breaching their fiduciary duties, signaling a sharp increase in Delaware's scrutiny over corporate decisions. In our event study, low-growth Delaware firms outperformed matched non-Delaware firms by 1% in the three day event window. In contrast, high-growth Delaware firms under-performed by 1%. Contrary to previous literature, we conclude that court decisions can have large, significant and heterogeneous effects on firm value, and that rules insulating directors from court scrutiny benefit the fastest growing sectors of the economy.

JEL classification: G32, G34, G38

1. Introduction

One of the most striking features of US corporate governance is the little involvement of courts in monitoring business decisions. In principle, directors owe a duty of care and a duty of loyalty to their shareholders, who can in turn seek remedy from courts whenever they believe that directors have not fulfilled their duties. This role of fiduciary duties would seem to imply a prominent role of courts in corporate governance. In practice, however, courts almost never hold directors liable for gross negligence in the exercise of their duties, and routinely apply instead the *business judgment rule*, namely the common law “presumption that in making a business decision the directors of a corporation acted on an informed basis, in good faith, and

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in the honest belief that the action was in the best interest of the company".¹ As a result, courts have largely avoided second-guessing the merits of business decisions, provided there is no evidence of self-dealing or fraud, effectively making shareholder litigation for breach of fiduciary duties a rather weak corporate governance mechanism (e.g., Romano, 1991).

Whether shareholders should value stricter court scrutiny of business decisions is an important yet open question. In a Coasian world with perfect court enforcement, it is puzzling why the business judgment rule should exist at all, as it effectively prevents courts from enforcing a host of state-contingent provisions that could be introduced in the corporate charter in the interest of shareholders. Traditional explanations, which to the best of our knowledge have yet to be evaluated empirically, justify the business judgment rule on the grounds that judges lack competence to make business decisions, that a fear of personal liability will reduce managerial risk-taking and deter talented people from serving as directors, and that liability rules alone are a poor governance mechanism for publicly held firms.² We note that these arguments assume a uniform effect of courts' scrutiny on firms. In this study, we argue that this view is incomplete, as the effect of courts on firm performance can be heterogeneous. Indeed, courts' scrutiny and the business judgment rule are likely to have different effects on different firms, depending on their characteristics.

Designing an empirical test to establish the desirable level of court scrutiny over business decisions is challenging. A correlation between the existence of monitoring mechanisms and shareholder value is, in general, not enough to establish a causal relation between the two. The identification problem is even more severe because courts provide an out-of-equilibrium threat to a large population of firms, typically without generating observable variation in the extent of court scrutiny across firms.

In this article, we meet these challenges by exploiting a sharp, unexpected, and—we argue—exogenous change in the Delaware courts' scrutiny over business decisions, and by allowing such a change to affect different firms in a different manner. In the landmark 1985 *Smith v. Van Gorkom* decision, the Delaware Supreme Court held the directors of Trans Union grossly negligent and liable for monetary damages for breach of fiduciary duties for having agreed to sell their firm in a leveraged buyout (LBO) without investigating enough about alternative bids, despite the LBO price being 48% higher than the highest stock market price of Trans Union during the previous year.

The Delaware Supreme Court's decision was unexpected and represented a significant departure from previous doctrine, signaling a sharp increase in the scope of court scrutiny over business decisions. Crucially, the court's decision was taken to signify a departure from the business judgment rule. Furthermore, the decision was immediately binding, but only for Delaware-incorporated firms. These features allow us to employ matching and differences-in-differences techniques to study the effect of the Delaware Supreme Court decision on the stock prices of Delaware-incorporated firms relative to the stock prices of appropriately matched non-Delaware firms. By studying an event in which stock market

1 *Aronson v. Lewis*, 473 A.2d 805, 812 (1984).

2 The traditional explanations are also puzzling on theoretical grounds. As Easterbrook and Fischel (1991, p. 94) put it: "why [do] the same judges who decide whether engineers have designed the compressors on jet engines properly, whether the farmer delivered pomegranates conforming to the industry's specifications, and whether the prison system adversely affects the mental states of prisoners cannot decide whether a manager negligently failed to sack a subordinate who made improvident loans [?]"

participants perceived the business judgment rule to have been redefined, we can thus test empirically the proposition put forward by Easterbrook and Fischel (1991, p. 93) that “behind the business judgment rule lies recognition that [shareholders’] wealth would be lower if managers’ decisions were routinely subjected to strict judicial review”.

Since firms face different costs and benefits from tighter scrutiny, however, we should not expect all Delaware firms to react in the same way to the court decision. We argue that the intended effect of increased scrutiny, namely to deter boards from breaching their duty of care, can be hampered by the unintended consequence of making directors too conservative in their business decisions. Directors who face tighter scrutiny over their decisions are more likely to act conservatively and avoid actions that would expose them to potential second-guessing by courts and ultimately to an increased risk of litigation, even if these actions maximize shareholder value.

We hypothesize that firms in low-growth industries benefit more from the court decision because, in these industries, investment opportunities are scarce, ambiguity over corporate decisions is low, the free cash flow problem is more severe, and conservatism in investment decisions is warranted (Jensen, 1986). Thus, the benefit of increased court scrutiny in these firms is likely to be higher than the cost, resulting in net benefits to the shareholders. In contrast, in high-growth industries, where the free cash flow problem is not severe and management needs more freedom to pursue growth opportunities, increased court scrutiny is likely to result in over-conservatism over investment decisions, and is likely to result in net costs to the shareholders.

We find that firms in high-growth industries lost significantly as a result of the Delaware Supreme Court decision. In the 10-day window starting from the day of the announcement, Delaware-incorporated firms in high-growth industries have equally weighted cumulative abnormal returns (CARs) of -2.10% compared with appropriately matched non-Delaware firms. The results are also significant in value-weighted terms, suggesting that the supreme court decision was bad for these firms, small and large ones alike. Too much judicial scrutiny over business decisions stifles growth in industries with high-growth opportunities.

Conversely, firms in low-growth industries gained significantly. In the same 10-day window, Delaware-incorporated firms in low-growth industries have CARs of 1.40% compared with matched non-Delaware ones. The value-weighted returns are also positive, but the economic magnitude is lower and the statistical significance is much reduced. We also sort firms in these low-growth industries based on whether they have high or low cash flow. The hypothesis is that firms in low-growth industries with high cash flow should benefit from tightened scrutiny because, in these firms, the overinvestment problem is expected to be more severe. We find results consistent with this idea, but sample size and statistical power are reduced, and we still find stronger results for equally weighted returns than value-weighted ones. These results suggest that the supreme court decision was beneficial for firms in low-growth industries, particularly for smaller ones.

We perform several tests to ensure that the results are not driven by peculiarities in the composition of the control group, by outliers, or by fundamental differences in firm risk across portfolios. First, we perform Wilcoxon rank tests for differences in the distribution of returns between Delaware and non-Delaware portfolios around the *Smith v. Van Gorkom* decision. The tests confirm and reinforce the results of the traditional *t*-tests. Second, we perform a non-parametric, “placebo” test, which compares the size of the abnormal returns in the 3 days around the *Smith v. Van Gorkom* decision to any 3-day abnormal returns of the same portfolio in the prior year, (i.e., all non-event windows). We find

that the abnormal returns in the 3 days around the *Smith v. Van Gorkom* decision are indeed in the top (bottom) 5% of the distribution of realized returns for firms in low-growth (high-growth) industries. Third, we perform a *bootstrap* test to compare the 3-day returns around the *Smith v. Van Gorkom* decision with the abnormal returns over three random days in the previous year, and again we find that the returns around *Smith v. Van Gorkom* are in the top (bottom) 5% of the distribution of realized returns for firms in low-growth (high-growth) industries. Fourth, we acknowledge that the Delaware ruling might in principle affect also firms incorporated in some other states whose corporate law is known in the legal literature to mimic Delaware law (e.g., Barzuza, 2012; Dammann, 2012). We thus redefine our control group as composed by firms incorporated only in states that are known to compete with Delaware in terms of their corporate law, and our results, if anything, are even stronger in magnitude than compared with the baseline case in which the control group has only firms incorporated in Delaware. These findings corroborate our main findings that the *Smith v. Van Gorkom* decision had a large economic impact on firm value.

To examine the source of the effect of the *Smith v. Van Gorkom* decision on shareholder value, we examine the investment and capital structure policies in Delaware and non-Delaware firms in the 2 years around the supreme court's decision. We acknowledge the fact that such a test is unlikely to yield economically significant results, since investment decisions are often planned ahead a long time in advance, and, as we mention in the next paragraph, the Delaware legislator was quite fast in reversing the ruling event. Nevertheless, we find that Delaware-incorporated firms in low-growth industries cut capital expenditures and acquisition activity relative to low-growth non-Delaware firms in the year after of the decision. This result is consistent with the hypothesized effect of the ruling—that firms in low-growth industries became more conservative and reduced corporate investment and acquisition activity. Delaware-incorporated firms in high-growth industries did not decrease investment, but they raised less capital relative to non-Delaware firms in the aftermath of the decision. To the extent that capital issuance is associated with the propensity of management to pursue future investment opportunities, this result can be interpreted as consistent with the hypothesized effect of the rule that firms in high-growth industries would reduce corporate investments.³

Finally, to further corroborate our results, we perform an additional test. One-and-a-half years after the *Smith v. Van Gorkom* decision, a regulatory reform to the Delaware code known as section 102(b)7 essentially reversed the effects of the supreme court decision. This reform allowed shareholders to include in the articles of incorporation an exculpatory clause, so that managers would no longer be liable for monetary damages. This reform was introduced because regulators were concerned that many capable managers and directors would not find it worthwhile to serve in the aftermath of *Smith v. Van Gorkom*. The nature of regulatory reforms, with rumors and leaks of the draft of a law before its approval and enactment, implies that it is impossible to determine a clear-cut “announcement date”; however, we still find strong and significant results. In the 2 months around the enactment of the law, we find that the reform had an opposite effect on Delaware firms than that of the supreme court decision. In high-growth industries, a portfolio that is long on Delaware-incorporated firms and short on appropriately matched non-Delaware ones now has positive CARs of about 1%. Conversely, in low-growth industries

3 We also examine board structure and compensation around the supreme court decision, and we find that board size and compensation of board members are unaffected by the *Smith v. Van Gorkom* ruling.

a portfolio that is long on Delaware-incorporated firms and short on non-Delaware ones now has negative CARs of about 3.5%.

We examine several alternative interpretations of our findings. One such alternative interpretation is that our findings reflect a reduced probability hypothesis, either because the legal content of *Smith v. Van Gorkom* was primarily about takeover law rather than the business judgment rule, or because of the concurrent effects of a ruling by the lower Chancery Court of Delaware on a case that ruled takeover defenses such as poison pills admissible. The reduced takeover probability view implies that firms are both less likely to be takeover acquirers as well as targets. A reduced probability of being a takeover acquirer is indeed consistent with some of our findings. Clearly, as takeovers are a specific investment decision, conservatism in investment does imply also conservatism in takeover decisions, and we do find some evidence of reduced acquisition activity following the decision.⁴ In addition, the reduced takeover probability hypothesis also implies that firms are less likely to be takeover targets, so that the expected takeover premium that minority shareholders would earn in case of a takeover becomes less likely and firm value is expected to decrease as a result. This view could explain some of our findings (although not, among other things, why firms in low-growth industries gain following *Smith v. Van Gorkom*), thereby clouding our inference. To disentangle the conservatism hypothesis from the reduced takeover probability hypothesis, we repeat our analysis in a subsample of firms with high managerial ownership, whereby the *ex ante* probability of becoming takeover targets is thus zero or very low. Intuitively, high managerial ownership is a strong takeover defense, and accordingly Shivdasani (1993) and Weisbach (1993) find that firms with high managerial ownership are less likely to become targets of hostile takeover; and Malatesta and Walkling (1988) find that firms with high managerial ownership are less likely to adopt poison pills. Therefore, any result we should find in such a sample cannot be explained by the reduced takeover probability hypothesis, as such probability is already zero or very low to begin with. Strikingly, in this sample with low *ex ante* takeover probability we find very similar results to those of the main sample, both in terms of magnitude and even of statistical significance, despite the much reduced sample size and statistical power. We conclude that the reduced takeover probability hypothesis cannot explain our results.⁵

Taken together, these findings are thus consistent with the view the *Smith v. Van Gorkom* decision was perceived to heighten Delaware courts' scrutiny over business decisions for all firms, which resulted in Delaware firms reducing corporate investment. Reduced investment proved beneficial for firms in low-growth industries, suggesting that these firms were, on average, overinvesting before *Smith v. Van Gorkom* and that the supreme court decision brought about a better alignment of managerial incentives with those

4 On the contrary, the reduced probability of being takeover acquirer cannot explain why firms in low-growth industries reduce capital expenditures, which are by definition non-takeover related.

5 Another alternative interpretation is that our results are attributed to a change in the risk profile of Delaware firms compared to non-Delaware firms. To the extent that the *Smith v. Van Gorkom* decision led to an increase in uncertainty over courts' attitude toward boards, the risk profile of Delaware firms could have changed, driving the abnormal returns around the announcement of the court decision. We control for changes in the risk profile of Delaware firms by testing whether loadings on Fama-French market, size, book-to-market, and momentum factors have changed around the announcement of the ruling and therefore can explain our results. We find that neither factor loadings nor their changes explain the abnormal returns around the *Smith v. Van Gorkom* decision.

of shareholders in low-growth industries. At the same time, reduced investment proved harmful for firms in high-growth industries, suggesting the *Smith v. Van Gorkom* decision brought about underinvestment in these industries. Our results thus indicate that tightening scrutiny over business decisions in industries with high-growth opportunities may stifle growth and decrease shareholder value (“bad monitoring”), whereas tightening scrutiny over business decisions in industries with low-growth opportunities may curb managerial excesses and boost shareholder value (“good monitoring”).

Our results thus shed light on the economic role of the business judgment rule. Our results are consistent with the view that the business judgment rule prevents courts from making poor business decisions, that idiosyncratic judicial decisions affect different sectors in different manners, and that uncertainty about judicial scrutiny and personal liability will induce conservatism in corporate policies, which can be value reducing, especially in the fastest growing sectors of the economy. Therefore, the traditional explanations of the role of the business judgment rule turn out to be incomplete, as they do not account for the heterogeneous effects of court rulings across firms and industries.

The article proceeds as follows. Section 2 discusses the related literature. Section 3 discusses the *Smith v. Van Gorkom* decision, the regulatory change that followed, and the related legal literature. Section 4 formulates the testable hypotheses and describes our empirical strategy. Section 5 presents our data, and Section 6 reports our results. Section 7 discusses alternative interpretations of our findings, and Section 8 concludes.

2. Literature

Our study is related to a large body of prior work on monitoring mechanisms and firm value. While relatively little attention has been given to empirical studies of courts’ scrutiny (e.g., [Shleifer and Vishny, 1997](#)), more attention has been given to the effects of monitoring by boards on firm value (for a review of the early evidence, see [Hermalin and Weisbach, 2003](#)).

Recently, a growing body of literature has been examining the effect of changes in governance-related regulation on shareholder value and corporate policies (e.g., [Garvey and Hanka, 1999](#); [Dahya, McConnell, and Travlos, 2002](#); [Bertrand and Mullainathan, 2003](#); [Greenstone, Oyer, and Vissing-Jorgensen, 2006](#); [Chhaochharia and Grinstein, 2007](#); [Giroud and Mueller, 2010](#); [Ahern and Dittmar, 2012](#)). One concern with examining an effect of governance regulation on shareholder value is that the regulation process is often long and the market reaction to the rule crucially depends on the market expectations about the regulation eventuality before the regulation takes place. In this study, we examine the effect of an unexpected court decision on shareholder value. Evidently, the market and the legal community were surprised by this event—making inferences about the effect of the event on firm value more precise.

Our study also relates to a stream of literature on state competition in corporate law and on its effect on firm value. Particular attention is given to the value effect of Delaware law, as most firms choose to (re)incorporate there (e.g., [Daines, 2001](#); [Subramanian, 2004](#)). As pointed out in a survey by [Bebchuk, Cohen, and Ferrell \(2002\)](#), this literature, which often compares returns or valuations between Delaware and non-Delaware firms, faces the challenge of properly controlling for the fact that the decision to incorporate is endogenously determined. Crucially, this literature generally does not allow for case law and state law to affect different firms differently. In fact, treating all Delaware firms alike, many authors have recently come to the conclusion that Delaware law has little or no effect on

shareholder value. We show that economic theory may predict heterogeneous, indeed opposite, effects of certain legal rulings. Recognizing this heterogeneity will lead to the conclusion that law does indeed matter for shareholder value. Moreover, we show that not only laws, but also court decisions can have large effects on the market valuation of companies, delineating the economic importance of case law in the US judicial system.

Our study also relates to a large body of law and economics literature on case law and state law. [Johnson et al. \(2000\)](#) examine shareholders' legal protection from tunneling. They argue that the superiority of common law relative to civil law stems from the fact that common law courts better apply laws related to directors' fiduciary duties and the business judgment rule. Indeed, common law courts use a standard of proof based on whether a transaction is "fair to minorities", which better protects shareholders from tunneling than simple statutory law. Yet as we have pointed out, even within a common law country such as the USA, the business judgment rule seems to imply that courts have a minor role in corporate governance, as opposed to, say, regulation such as section 102(b)7. Our results are thus consistent with the view that regulation remedies the failure of courts to solve contract and tort disputes cheaply, predictably, and impartially ([Shleifer, 2010](#)). While our data cannot fully address welfare-related questions, our results do suggest that regulatory reforms can indeed succeed in undoing the adverse effects of idiosyncratic court rulings. In addition, our results show that, by doing so, regulation may also generate significant costs as some firms are set to lose when the same regulation is applied to a large and heterogeneous set of firms.⁶

3. *Smith v. Van Gorkom* and section 102(b)7 of the Delaware Code

In this section, we review the significance of the *Smith v. Van Gorkom* Delaware Supreme Court decision and section 102(b)7 of the Delaware Code for the business judgment rule and for corporate directors' fiduciary duties, to motivate our empirical analysis. We argue that the supreme court decision in *Smith v. Van Gorkom* represents an exogenous, significant, and unexpected increase in the extent of judicial monitoring of Delaware-incorporated firms as opposed to firms incorporated elsewhere. As a result, the Delaware Supreme Court decision qualifies as a "quasi-natural experiment", lending itself to differences-in-differences and event-study techniques for estimating the effect of judicial monitoring on firm value. Subsequently, the enactment of section 102(b)7 of the Delaware Code reversed the *Smith v. Van Gorkom* decision, providing a natural experiment to further examine our hypotheses. In what follows we corroborate these arguments with an analysis of the legal aspects of the case. Readers who are already familiar with the case can skip to Section 3 with little loss of continuity.

3.1 The Delaware Supreme Court Decision in *Smith v. Van Gorkom*

In a historical and highly controversial decision on the *Smith v. Van Gorkom* case, on January 29 1985, the Supreme Court of Delaware ruled that directors are liable for monetary damages for breach of the duty of care. Here we briefly review the facts that led to the

6 In a similar vein, it is possible to argue that the Sarbanes–Oxley Act was introduced to remedy the failure of courts to monitor and avert corporate scandals such as Enron and WorldCom; and that the Dodd–Frank Act was introduced to remedy the failure of courts to avoid the scandals that triggered and surrounded the downfall of securitization. At the same time, both Sarbanes–Oxley and Dodd–Frank have been associated with unintended adverse consequences on the economy. On the costs and benefits of Sarbanes–Oxley see, for example, [Chhaochharia and Grinstein \(2007\)](#), [Coates \(2007\)](#), [Iliev \(2009\)](#), and [Romano \(2005\)](#).

decision and we illustrate why the decision was highly important. The decision came as a surprise to both legal academics and professionals, making it a suitable setting to apply differences-in-differences and event-study techniques.

On September 13 1980, the CEO of Trans Union Corporation, Jerome Van Gorkom, and raider Jay A. Pritzker discussed a potential leveraged buyout of Trans Union for a share price of \$55 (a 48% premium over the highest market price of Trans Union shares over the previous year). Van Gorkom disclosed the offer to the board of Trans Union on September 20 over the objections of senior management, who disagreed based on a report that specified that the correct price should be as high as \$65. Nonetheless, Van Gorkom went ahead with the meeting and with a 20-min oral presentation outlining the terms of the Pritzker offer, which among other things included that the offer had to be acted upon within 24 h of the board meeting and that Trans Union could only supply published, as opposed to proprietary, information to any competing bidders yet to be identified. An attorney hired by Van Gorkom advised board members that they might be subject to suit if they rejected Pritzker's offer. Based on this oral information and without seeing the proposed agreement in writing, the board approved the merger. On December 19 1980, shareholder Alden Smith filed suit. At a further board meeting on January 26 1980, the board decided to continue to recommend the proposed merger to the shareholders.

The suit became a class action and ended up in court. Two lower court hearings, including the Delaware Chancery Court, ruled that the directors had acted well within the boundaries of the business judgment rule, dismissing the plaintiffs' claims. Upon appeal by the shareholders, the case went to the Delaware Supreme Court, which decided on January 29 1985 that the board's decision to approve the merger was not a product of an informed business judgment, that the subsequent amendments to the merger agreement were ineffectual, and that the board did not deal candidly with the shareholders. The Delaware Supreme Court decided that the business judgment rule did not apply because the directors did not fully inform themselves before making the merger decision. Also, the court found the proxy statement to the shareholders to be misleading. The supreme court rejected the defendant's argument that the substantial premium paid over the market price indicated that it was a good deal, and therefore held the directors to be grossly negligent and liable for monetary damages. A lower court later set the monetary damages at \$33.5 million: \$10.0 million of which was covered by insurance, and the remaining \$23.5 million was assessed against the directors.

The decision shocked the business community because it was taken to signify a shift in the behavior of the courts toward a more interventionist approach to corporate affairs. Furthermore, the fact that it was handed down by the Delaware Supreme Court made the decision even more significant, because a large number of firms are incorporated in Delaware and so it was taken to be binding to all of them. In addition, the outcome was unexpected. Two lower courts had already ruled in the opposite direction. As Macey and Miller (1988, p. 131) put it, "The outcome of the case was exactly opposite to what virtually every observer of Delaware law would have predicted" (see also Honabach, 2005).

The Delaware Supreme Court decision was also immediately controversial. To begin, it was a 3-2 split decision, which by itself was an exceptional event, because in Delaware, supreme court decisions were usually adopted unanimously. In his dissenting opinion, Judge John J. McNeilly, Jr. reviewed the facts as being perfectly consistent with the business judgment rule and went on to call the majority decision "a comedy of errors". Other commentators went further. Professor Daniel Fischel of the Chicago Law School famously called it "surely one of the worst decisions in the history of corporate law" (Fischel, 1985, p. 1455).

Manning (1985, p. 1) reported that the corporate bar considered the decision “atrocious” and stated that “[t]he Delaware Supreme Court in *Van Gorkom* exploded a bomb.” With hindsight, these views have not shifted and the relevance of the *Smith v. Van Gorkom* has not diminished. McChesney (2002, p. 631) notes “time has not dimmed the initial luster of the *Van Gorkom* decision. Considered a legal disaster in 1985, it is judged no less disastrous today”. Hamermesh (2002, p. 59) stated “damages actions premised solely upon an alleged lack of director care are a poor, even destructive, corporate governance tool”. The case is now taught in almost all corporate law courses across the country.⁷

The economic effect of the *Smith v. Van Gorkom* decision on investors’ expectations and on financial markets was to signal a tightened scrutiny over business decisions in all Delaware-incorporated firms, implying a perceived relaxation of the business judgment rule. Managers and directors suddenly realized it was not enough to secure their shareholders a deal at a 50% premium over the stock price to escape the courts second-guessing potentially available (but not documented) better deals, and ultimately imposing monetary liability. This interpretation is consistent with the stance taken by commentators at the time of the decision. For example, on January 31 1985, Fred Bleakley wrote in the *New York Times*: “In a major legal decision with broad implications for corporate directors, the Supreme Court of Delaware has found that directors of the Trans Union Corporation breached their fiduciary duty to shareholders when they agreed in 1980 to sell the company to the Marmon Corporation for \$688 million. . . . This is one of the few times in modern corporate law history, according to law experts, that directors have been found liable for not living up to the standards of the business judgment rule. . . . The decision, said Kenneth J. Bialkin of the law firm of Willkie Farr & Gallagher, ‘raises significant concerns about the reach and applicability of the business judgment rule.’”

Crucially, the *Smith v. Van Gorkom* decision is also exogenous from the point of view of firms and shareholders. Indeed, as explained in Justice Horsey’s majority opinion (Horsey, 1985), the Supreme Court took strictly into account only the case facts, the appropriate scope of the business judgment rule, and the appropriate definition of gross negligence. From Justice Horsey’s majority opinion and from the above-mentioned literature it appears that in the judges’ objective function there were no concerns for shareholders’ wealth or corporate growth opportunities. These implications were never mentioned nor implied. As a result, the decision can be used as an instrument to examine the effect of court scrutiny on shareholder returns and firms’ corporate policies.

The above discussion implies that the supreme court decision in the *Smith v. Van Gorkom* case represents a “quasi-natural experiment” suited for an econometric study of the impact of judicial monitoring on shareholder value. It is one of the few cases (if not the only case) of breach of fiduciary duties where company directors were held liable for monetary damages for breach of the duty of care. As such, it has redefined the very content of the business judgment rule (Macey and Miller, 1988), which is the legal counterpart to the economic concepts of monitoring and managerial discretion. Furthermore, the case unexpectedly tightened the

7 Sharfman (2008, p. 288) writes, “It is hard to envision an introductory corporate law course that does not devote at least one or two classes to the study of *Van Gorkom*.” One prominent corporate law commentator has likened the failure to teach *Van Gorkom* to the omission of *Brown v. Board of Education*—declaring state laws establishing separate public schools for black and white students unconstitutional—in a first year constitutional law course (Hamermesh, 2002, referring to remarks made by John Olson).

monitoring of firms incorporated in Delaware, as compared to those incorporated outside Delaware. As a result, the case lends itself to an examination using differences-in-differences techniques. Finally, because the case was both unexpected and represented a significant shift from the previously held doctrine, it is suited for event-study methodologies.

3.2 Section 102(B)7 of Title 8 of the Delaware Code

Among the immediate effects of the increased fear of litigation following the supreme court decision in *Smith v. Van Gorkom*, the market for director and officer liability insurance dried up and available insurance became very expensive (Hartmann and Rogers, 1991). While the Delaware Supreme Court imposed personal liability on directors in a very specific takeover context, its widespread impact on directors' liability insurance suggested that the market perceived it as a more general shift in court attitude toward the business judgment rule. The quotes above from the *New York Times* and from legal scholars suggest that they perceived it this way as well.⁸ Ultimately, the supreme court decision in *Smith v. Van Gorkom* generated such an outcry in both the legal profession and the business world at large that the state of Delaware decided to overturn it by means of regulation.

One primary concern of legislators, as referred to in the Synopsis to Senate Bill 533, was that the crisis in the market for directors' liability insurance would keep many qualified individuals from being willing to serve as directors (see also Blank, 1987; Lee, 1987). Indeed, in the aftermath of *Smith v. Van Gorkom*, the market for director and officer liability insurance dried up, and insurance premiums skyrocketed by more than 900% (191% in the quarter of the *Smith v. Van Gorkom* decision, e.g., Hartmann and Rogers, 1991; see also Bhagat, Brickley, and Coles, 1987; Netter and Poulsen, 1989; Romano, 1990; Brook and Rao, 1994). Therefore, on July 1, 1986 the Delaware legislature passed an amendment to the Delaware General Corporation Law known as section 102(b)7.⁹ The amendment allowed corporations to relieve directors of financial liability for breaches of fiduciary duties by having shareholders

- 8 The 1980s were a period of such intense litigation in Delaware that one might wonder whether our empirical tests also pick up the effects of other supreme court decisions. Famous Delaware Supreme Court decisions in those years include three major takeover cases: *Unocal v. Mesa Petroleum*, *Moran v. Household* in 1985, and *Revlon v. MacAndrews & Forbes Holdings* in 1986. For two main reasons, however, it is highly unlikely that any of those supreme court decisions drive our results. First, the Delaware Supreme Court ruled on those cases several months after *Smith v. Van Gorkom*. Second, Ryngaert (1989) examined the stock price reaction of Delaware firms to the Delaware Supreme Court decisions in *Moran v. Household* and *Unocal v. Mesa*, and found insignificant effects, economically small even for firms potentially strongly affected by the rulings. We replicate these findings with our data, and in addition we find no effects using our methodology. This suggests that these three Delaware Supreme Court decisions were not perceived by the stock market to be very important for the population of Delaware firms. We discuss the impact of rulings by lower courts, such as for example the Delaware Chancery Court, in Section 6.
- 9 The legislative synopsis of the 1986 amendment stated: "Section 102(b)(7) and the amendments in Section 145 represent a legislative response to recent changes in the market for directors' liability insurance . . . Recent changes in that market, including the unavailability of the traditional policies . . . have threatened the quality and stability of the governance of Delaware corporations because directors have become unwilling, and in many instances, may be deterred by the unavailability of insurance from making entrepreneurial decisions. The amendments are intended to allow Delaware corporations to provide substitute protection, in various forms, to their directors and to limit director liability under certain circumstances."

vote an exonerating provision into the articles of incorporation.¹⁰ As a result, 94% of Delaware firms elected to amend their charters in immediate response to section 102(b)7 (Bradley and Schipani, 1989), implying that *Smith v. Van Gorkom* was widely felt to be binding and regulation 102(b)7 was taken to be an opportunity to bypass its implications by virtually every Delaware firm. Writing in 1989, Bradley and Schipani argue: “If the court were to decide Trans Union today, and if the company had amended its articles of incorporation to eliminate liability in accordance with Section 102(b)(7), it is likely the court would exonerate the directors from monetary liability to the shareholders” (p. 43). Most other states followed and adopted similar provisions shortly thereafter (e.g., DeMott, 1988; Bailey and Knepper, 1989; Hartmann and Rogers, 1991).¹¹

We believe the enactment of section 102(b)7 provides a useful additional experiment to test for the impact of court scrutiny on stock prices, as it represented a large exogenous shift, essentially reversing the decision in *Smith v. Van Gorkom*. As a result, we expect the opposite effect on the stock prices of Delaware firms than the effect of *Smith v. Van Gorkom*. At the same time, we note that legislation, and in particular Delaware legislation, can hardly be seen as a surprise event for stock market participants. Indeed, the lag between the first drafts of the new law and its actual enactment raises the question as to when exactly the news of the bill reached financial market participants, as leaks and rumors may trickle out well in advance of the days the law is voted upon or enacted. Given these features of the legislative process, particularly so in Delaware (see Kahan and Rock, 2005 for details), we also examine stock returns in the weeks before the vote and the enactment of the law.¹²

- 10 Section 102(b)7 permitted corporations to include the following provision in their articles of incorporation: “A provision eliminating or limiting the personal liability of a director to the corporation or its stockholders for monetary damages for breach of fiduciary duty as a director, provided that such provision shall not eliminate or limit the liability of a director (i) for any breach of the director’s duty of loyalty to the corporation or its stockholders; (ii) for acts or omissions not in good faith or which involve intentional misconduct or a knowing violation of law; (iii) under section 174 of this Title; or (iv) for any transaction from which the director derived an improper personal benefit. No such provision shall eliminate or limit the liability of a director for any act or omission occurring prior to the date when such provision becomes effective.”
- 11 To further highlight the impact of the decision, Black, Cheffins, and Klausner (2006) report that since 1980 there is only one case where outside directors have made personal payments after a trial—the *Smith v. Van Gorkom* case. Nevertheless, in thirteen cases, ten of which involving public companies, directors had to pay out of pocket to plaintiffs through a settlement. Three of them—Enron, Worldcom and Tyco—are worth mentioning since they were associated with the accounting scandals in 2001–2002. In the cases of Enron and Worldcom, allegations against the directors were around oversight failure (duty of care). In the case of Worldcom, the company’s outside directors personally paid \$24.75 million as part of a settlement with a plaintiff class led by the New York State Common Retirement Fund (NYSCRF). In the Enron securities class action, ten outside directors paid \$13 million out of their own pockets to settle claims against them. In addition, the Enron outside directors paid \$1.5 million to settle a suit by the US Department of Labor. The case of Tyco was a case of breach of duty of loyalty by an outside director, making personal gains from accounting misconduct, and it was settled for \$22.5 million.
- 12 As Kahan and Rock (2005, p. 1600) note, “It is the Council of the Corporation Law Section of the Delaware Bar Association, rather than a legislative committee, that prepares drafts of proposed amendments to the General Corporation Law. These proposals are often instigated by lawyers who have encountered an ambiguity or a technical problem in the statute that they want to have

4. Hypotheses Development and Empirical Strategy

In this section we discuss our methodology. In Section 4.1 we develop the testable hypotheses and in Section 4.2 we describe the empirical strategy.

4.1 Testable Hypotheses

This section details our formulation of the hypotheses about the effect of exogenous changes in judicial monitoring (the “treatment”) on managerial decisions and stock prices. We use a framework that is standard in corporate finance (e.g., Jensen and Meckling, 1976) where managerial incentives to invest are not fully aligned with value maximization. In this framework, increased judicial scrutiny over business decisions induces conservatism in investment activity. In turn, conservatism is beneficial in industries with low-growth opportunities, as the agency problem implies the firm was overinvesting, so that conservatism aligns the incentives of managers with those of the shareholders. On the contrary, in industries with high-growth opportunities, conservatism has a negative effect as it induces underinvestment. We illustrate these two forces in a framework with an empire-building type agency conflict, which lends itself nicely to different effects of judicial scrutiny on firm value in high- and low-growth industries. In addition to reduced investment, we note that other consequences of over-conservatism may be particularly relevant in high-growth industries (such as increased procedural costs associated with investment decisions, avoidance of particular types of investments where litigation risk is high) and would generate similar results to the ones reported here. In the empirical part, we will thus examine the source of these costs more specifically.

Consider a one-period agency model where a manager of a firm needs to make a decision $\varphi \in R_+$ on behalf of the shareholders.¹³ The incremental value to the shareholders from this decision is $V(\varphi) - \varphi$. For concreteness, we will interpret φ as the decision regarding the level of investment that will generate net present value $V(\varphi) - \varphi$, where:

$$V(\varphi) = (g + 1)\varphi - \frac{c}{2}\varphi^2.$$

and in which the parameter $g > 0$ represents the growth opportunities associated with the investment and c is a monetary cost parameter. Since $V(\varphi)$ is strictly concave, the optimal investment strategy that maximizes $V(\varphi) - \varphi$ solves the first-order condition $g - c\varphi = 0$, which implies that the optimal investment strategy for shareholders is $\varphi^s = \frac{g}{c}$. Firm value given optimal investment is thus $V^* = \frac{g^2}{2c}$. Note that both optimal investment strategy and

clarified or corrected. After the Corporation Law Section has developed a proposal, it is submitted to the legislature. Delaware’s legislature then typically adopts the proposed amendments. Neither a legislative committee nor the legislature as a body changes the proposal or debates its merits, and the vote on the proposed amendment tends to be unanimous.

Even within the Delaware bar, proposed amendments hardly ever generate controversy. One reason is that the Corporation Law Section endeavors to make the necessary compromises to reach a consensus. For example, a significant amount of bargaining took place within the Council over the precise scope of Section 102(b)(7) in order to generate an unanimous proposal for the legislature to act upon.”

13 For our purposes, “manager” means both directors and managers in the sense that they represent the shareholders and their incentives are not necessarily aligned with value maximization (e.g., Jensen, 1993).

firm value increase with g . This result is consistent with the notion that the larger the growth opportunities, the larger the investment and the larger is the value of the firm.

To capture the agency conflict between management and shareholders, we assume that management gains utility not only from increased firm value but also from running a larger firm (e.g., Jensen, 1986; Stulz, 1990). Specifically, managerial utility is as follows:

$$U(\varphi) = V(\varphi) - \varphi + b\varphi,$$

where b captures the utility benefits for management of an investment of size φ .

Management investment decision will then solve the first-order condition, $g + b - c\varphi = 0$, implying that managerial preferred investment will be $\varphi^A = \frac{g+b}{c}$. Therefore, management overinvests relative to the shareholders' optimal policy because it extracts extra benefits from investing more than optimally. Firm value under this managerial overinvestment strategy is thus $V(\varphi^A) - \varphi^A = g\frac{g+b}{c} - \frac{c}{2}\left(\frac{g+b}{c}\right)^2 = \frac{g^2-b^2}{2c}$. As a result, the loss in value for shareholder from the suboptimal managerial investment strategy is $\frac{b^2}{2c}$.

Assumption 1: $g > b$.

Assumption 1 ensures that firm value is positive even when management faces an agency conflict. Put differently, the agency conflict is not so severe as to prevent investment in the firm altogether.

Now consider an exogenous increase in court scrutiny over managerial decisions, including the risk of personal liability for managers and directors following managerial decision φ , such as the one implemented by the decision of the Trans Union case.¹⁴ The effect of such increased scrutiny is two-fold. First, it enables shareholders to sue directors for breaches of fiduciary duty—an action which was not possible before the decision. This effect can be captured by assuming that such increase in the risk of litigation generates a deadweight loss. Second, it effectively ties the hands of managers by exogenously increasing the level of judicial scrutiny over business decisions. This effect can be captured by assuming that the Delaware court sets a new cost on managers and directors to deviate from the shareholders' preferred decision. The cost is in the amount $\frac{m}{2}(\varphi - \varphi^s)^2$. For $m = 0$, we are in the previous case in which the business judgment rule is in place, pre-*Smith van Gorkom*. For $m > 0$, we are in the post-*Smith van Gorkom* regime with managers personally liable. This discussion implies that while shareholders are still interested in maximizing $V(\varphi) - \varphi$, the manager is now maximizing

$$U(\varphi) = \gamma(V(\varphi) - \varphi) + b\varphi - \frac{m}{2}(\varphi - \varphi^s)^2,$$

where $m > 0$, and $0 < \gamma < 1$. The parameter γ thus captures the deadweight loss in firm value due to increased litigation following *Smith v Van Gorkom*. The parameter m captures the liability for managers if they invest suboptimally and are then found guilty in court.

Assumption 2: $c(1 - \gamma) < m$.

This is a technical assumption that makes sure that deadweight losses from increased litigation are not so large that optimal firm value is negative, which would discourage investment in the firm altogether. Now, denote with φ^m the optimal managerial investment

14 We assume that this cost imposition technology cannot be implemented by shareholders themselves because it involves coordination costs (Grossman and Hart, 1980).

following *Smith v Van Gorkom*, which solves the program $\max_{\varphi} U = \gamma(V(\varphi) - \varphi) + b\varphi - \frac{m}{2}(\varphi - \varphi^*)^2$. We then obtain:

Lemma 1

- The investment φ^m decreases with m .
- When $m = 0$, $\varphi^m = \frac{g}{c} + \frac{b}{\gamma c^2}$, implying a larger overinvestment relative to the case without court intervention.
- $\lim_{m \rightarrow \infty} \varphi^m = \frac{g}{c}$.

Proof See Appendix.

Lemma 1 implies that court intervention alleviates the agency conflict. As courts impose higher penalties on management (captured by the parameter m), management will reduce overinvestment. In the limit, when penalties are very large, management will invest optimally.

We are now ready to derive the key results on the effect of court scrutiny on firm value.

Proposition 1 The relative change in firm value following *Smith v Van Gorkom*, $\frac{\gamma(V(\varphi^m) - \varphi^m)}{V(\varphi^A) - \varphi^A}$, is decreasing in g .

Proof See Appendix.

An immediate consequence of Proposition 1 is the following Corollary.

Corollary 1 There exists g^* such that for all $g < g^*$, $\frac{\gamma(V(\varphi^m) - \varphi^m)}{V(\varphi^A) - \varphi^A} \geq 1$, and for all $g \geq g^*$ $\frac{\gamma(V(\varphi^m) - \varphi^m)}{V(\varphi^A) - \varphi^A} < 1$.

Proof See Appendix.

Corollary 1 is the basis of our empirical analysis. The interpretation of this result is as follows. When g is relatively large (high-growth opportunities), the managerial incentives are more aligned with those of the shareholders because high investment is optimal for both the manager and the firm, and the differences in values between the decision φ^s and φ^* are not very large. In such cases, the deadweight loss of an increased litigation is more likely to lead to underinvestment and to further reduction in firm value compared to the original investment strategy. However, when growth opportunities are low, the propensity to overinvest is larger, and adding a negative externality is likely to move investment closer to the first best without imposing too much underinvestment.

The fact that judicial monitoring m is independent of the type of firm (captured by g) implies in our formulation that judicial monitoring is more detrimental for high-growth sectors relative to low-growth ones. Absent an agency problem, judicial monitoring would have a negative effect for all firms, with the magnitude of the loss increasing with growth opportunities. Adding an agency problem whereby managerial incentives are not perfectly aligned with those of the shareholders introduces the possibility of heterogeneous effects of the opposite sign for high- versus low-growth firms, whereby firms in low-growth industries may actually benefit from increased judicial scrutiny.

Consider now a move back toward the business judgment rule, as occurred with the enactment of section 102(b)7 of the Delaware Code. This move entirely reversed the effects of the *Trans Union* decision, implying a move back to a level $m = 0$ and $\gamma = 1$. By replicating the analysis above, we would expect section 102(b)7 to have effects opposite those of the *Smith v. Van Gorkom* decision. In particular, firms facing low-growth opportunities that were expected to benefit from the decision in *Smith v. Van Gorkom* are now expected to

lose from section 102(b)7. Conversely, firms facing high-growth opportunities that were expected to lose from the *Smith v. Van Gorkom* decision are now expected to benefit from section 102(b)7.

4.2 Empirical Strategy

The *Smith v. Van Gorkom* case changed the perception of financial markets regarding the Delaware Supreme Court's view of the business judgment rule (Fischel, 1985), and substantially increased legal uncertainty. The personal liability that the court imposed on the directors of Trans Union for breaching their duty of care was taken to imply that the court was now viewing active engagement into business decisions as quite important.

As shown above, higher legal uncertainty and more active court engagement could have a negative effect on some firms and a positive effect on others. While active court engagement could alleviate the CEO moral hazard problem (e.g., Jensen, 1993; Bebchuk and Fried, 2003), it is also likely to entail costs for shareholders. Such costs could include too much conservatism by management who could, for example, forgo good projects for fear that these decisions could lead to litigation if the outcome is not good enough. It could also slow down the management response to new investment opportunities, which could be particularly costly in circumstances in which time is of the essence.

We expect the benefits of active court engagement to be larger than the costs when the firm does not have good investment opportunities. In these cases, management incentives to grow will not be aligned with value maximization (Jensen, 1986; Stulz, 1990; Harris and Raviv, 1996), and more active engagement is likely to enhance shareholder value. However, when the firm faces large growth opportunities, managerial incentives are naturally more aligned with those of the shareholders (Harris and Raviv, 1996), and shareholders are likely to value CEO investment discretion and less judicial scrutiny over investment policy. We, therefore, hypothesize that the ruling should have a positive effect on firms with few growth opportunities and should have a negative effect on firms with high-growth opportunities.

To test this hypothesis, we compare stock returns of Delaware firms (the treated sample of firms that are affected by the ruling) to the returns of non-Delaware firms (the control group of firms that are not affected by the ruling). We compare separately firms that have high-growth opportunities and firms that have low-growth opportunities. To the extent that the rule has an effect on the Delaware firms, we should observe differences in the returns between Delaware firms and non-Delaware firms.

In analyzing aggregated abnormal returns associated with the announcement of the decision, we face a clustering problem. Since the firms under consideration are affected by the same event, the covariance among their abnormal returns differs from zero, and a simple event study test where the abnormal returns of individual stocks are aggregated (or regressed against explanatory variables) will be biased and will lead to erroneous inferences. To mitigate the clustering problem, we adopt the portfolio approach advocated by Schwert (1981) and Campbell, Lo, and MacKinlay (1997), where firms under consideration are formed into portfolios and the return of these portfolios is compared against a benchmark return.

We acknowledge the fact that firms that choose to incorporate in Delaware have different characteristics than firms that do not incorporate in Delaware. This difference could lead to several potential biases. First, to the extent that macro-economic news or events during the period may have had a different effect on different industries or different firms,

one might find an abnormal return irrespective of the supreme court decision. To assess the importance of the macro-economic news or idiosyncratic industry shocks, we read the *Wall Street Journal* during the period January 27, 1985–January 31, 1985 and examined the macro and industry news. One important piece of news was the change in oil prices resulting from a new pact that was signed by OPEC on January 30. Consistent with this effect, there was a surge in the stock price of oil companies during that time. To adjust for this and other idiosyncratic industry shocks, we need to match Delaware firms to non-Delaware firms by industry.

Second, to the extent that certain firm characteristics imply exposure to more risk, one could find a relation between return and the choice to incorporate in Delaware regardless of the *Smith v. Van Gorkom* event. For example, one well-known trait of Delaware firms is that they are larger. Since larger firms face a different level of risk than smaller firms (Banz, 1981; Fama and French, 1993), one would also need to make sure that Delaware firms are similar to non-Delaware firms in terms of size.

We, therefore, perform the following matching procedure. We first match non-Delaware firms to the Delaware firms by industry and then by size. Specifically, for every Delaware firm in our sample we match all the non-Delaware firms that belong to the same 4-digit SIC code.¹⁵ Once we have all the non-Delaware firms that belong to the same SIC code as the Delaware firm, we pick the firm that is closest in size (market cap as of January 1985) to the Delaware firm within the same SIC code. We repeat the same procedure across all Delaware firms in our sample.

We prefer this matching procedure over other procedures (such as score-matching) because our evidence shows that industry shocks over the period indeed exist. As a result, relaxing matching by industry is likely to lead to biases. Once we match over industry, we choose matching over size because Delaware firms are known to be systematically larger than non-Delaware firms (e.g., Daines, 2001).

We define R_{iND}^M as the buy-and-hold return over the event period of firm i that is incorporated in Delaware (D) and R_{iND}^M as the buy-and-hold of its matched firm that is not incorporated in Delaware. We define $R_g^M = \frac{1}{N} \sum_{i=1}^N R_{ig}^M$ as the buy-and-hold return of the portfolio of firms that are $g = \{D, ND\}$, and $\hat{\Delta} = R_D^M - R_{ND}^M$ as the difference in returns between portfolios D and ND . Since, by assumption, the matching portfolios should have similar risk, we expect $E(\Delta) = 0$.¹⁶ We can, therefore, form the t -statistic $\hat{\Delta}/\hat{\sigma}_\Delta$, where $\hat{\sigma}_\Delta^2$ is the variance of the returns of a portfolio that goes long D and short ND , measured over the month before the event month.

5. Data Description and Variables

Our data universe includes all Compustat firms that existed as of fiscal year 1984. We note that Compustat does not have historical incorporation codes and historical SIC codes. We,

15 If we cannot find any non-Delaware firm that has the same four-digit SIC code as the Delaware firm, then we match a non-Delaware firm that belongs to the same three-digit SIC code as the Delaware firm. If we do not find such a firm, then we drop the Delaware firm from the sample. Using this procedure we are able to match 352 firms out of the 388 Delaware firms (90.7%).

16 We focus on equally weighted portfolios because we are interested in the average effect of monitoring across different firms. In the analysis we also consider value-weighted portfolios to capture the economic magnitude of the ruling's effect across firms in the sample.

therefore, retrieve this data from other sources. Data on historical incorporation codes is retrieved manually from Moody's 1985 annual book. We retrieve data on historical SIC codes from the Center for Research in Securities Prices (CRSP) database. We remove regulated industries (SIC code 4xxx) and firms from the financial sector (SIC code 6xxx) from the sample because investment decisions of these firms in the 1980s were regulated by other authorities.¹⁷ We further restrict ourselves to firms whose market cap as of fiscal year 1984 was larger than \$100 million (data24*data25 in Compustat) and for which relevant financial data is available, because we want to restrict ourselves to firms that were heavily traded so that prices reflect the relevant change in information in the market (Table I).

Table II reports the number of firms incorporated in Delaware according to our data sources. Strikingly, this exercise reveals that relying uniquely on Compustat data for information on the state of incorporation of our 1984 sample would lead to misclassification of about 40% of the Delaware firms. Indeed, taking as a starting point the 831 firms with Compustat information on the state of incorporation in 1984, we find that Compustat misclassifies 138 of these as non-Delaware, though they were actually incorporated in Delaware at the time. Thus, out of the 469 firms that are reported by Compustat as Delaware firms, only 331 (469–138, i.e. 60%) were incorporated in Delaware as of 1985. In addition, eighteen firms are misclassified as non-Delaware though they were actually incorporated in Delaware at the time. Our exercise thus shows that relying uniquely on Compustat information on the state of incorporation can lead to significant misclassification.

5.1 Summary Statistics

Table III shows summary statistics of firms in our sample. Panel A shows the distribution of firms across industry sectors, defined at the 1-digit SIC code (0 = agriculture, 1 = Mining and construction, 2 = Manufacturing_A, 3 = Manufacturing_B, 5 = Trade, 7 = Services, 8 = Health). The table shows that most firms in the sample are from the Manufacturing_B sector (40.6%). The majority of firms in this sector come from the electronic industry (SIC code 36xx), the computer hardware industry (SIC code 35xx), and the auto industry (SIC code 37xx).

Panel A also shows significant differences in the distribution of firms across industry sectors between Delaware firms and non-Delaware firms. There is a significantly larger proportion of Delaware firms in the Manufacturing A sector and in the Services sector than non-Delaware firms (28.9% versus 25.2% and 11.3% versus 6.8%, respectively).¹⁸ At the same time, there is a significantly smaller proportion of Delaware firms in the Manufacturing B sector and in the trade sector.

Panel B shows a summary of the financial characteristics. The average market capitalization of firms in the sample is a little over \$1 billion, and the median market capitalization is \$342 million. The average book value of assets is \$1.7 billion, and the median is \$454

17 Regulated industries (SIC code 4xxx) include both firms that were regulated at the time (65% electric and gas services (49xx), 13% communication services (48xx)), and firms that were transitioning toward deregulation at the time (10% transportation by air (45xx), 4% railroad transportation (41xx), 3% water transportation (44xx), 2% motor freight transportation (43xx), 2% transportation services (47xx)).

18 The Manufacturing A sector is represented mostly by the food industry (SIC 20xx) and the chemical industry (SIC 28xx).

Table I. Sample construction

Selection criterion	Number of firms
Compustat firms with market capitalization larger than \$100 million as of fiscal 1984 and historical SIC codes from CRSP as of February 1, 1985. Excluding firms that do not have relevant data for the financial variables (assets, book leverage, and cash flow).	1,284
Excluding financials (SIC 6xxx)	103
Excluding regulated industries (SIC 4xxx)	209
Excluding firms with missing incorporation data	12
Final sample	960

Table II. Delaware versus non-Delaware firms—comparing Compustat data with Moody's data

	Compustat	Moody's
Number of non-missing observations	831	960
Number of firms incorporated in Delaware	469	388
Compustat misclassifying non-Delaware as Delaware	138	
Compustat misclassifying Delaware as non-Delaware	18	

million. Book leverage, defined as book liabilities divided by book assets, is 0.48 on average and the average Tobin's Q is 1.55. Panel B also shows summary statistics of financial characteristics across Delaware and non-Delaware firms. The panel shows that Delaware firms are larger than non-Delaware firms (average market capitalization of \$1.17 billion compared to \$1.0 billion and average book value of assets of \$2.2 billion compared to \$1.48 billion). Wilcoxon tests of differences in the market capitalization and in the book value of assets across Delaware and non-Delaware firms show statistically significant differences at the 1% level. Differences exist also in leverage and in Tobin's Q across the two samples. Book leverage is higher in Delaware firms, and Tobin's Q is lower. A Wilcoxon test of this difference between the samples shows significance at the 5% level.

5.2 Unmatched Cumulative Abnormal Returns

We first examine the cumulative abnormal returns of Delaware and non-Delaware firms around the *Smith v. Van Gorkom* decision absent matching. We examine separately firms that belong to high-growth industries and firms that belong to low-growth industries. Our proxy for growth opportunities is industry Q, defined as the sum of the market value of equity and book value of liabilities of all firms in the same industry divided by the sum of all book value of assets of firms within the same industry. The analysis in Section 3.1 implies that firms whose growth opportunities are above a threshold (denoted g^* in Section 3.1) should react negatively to the announcement of *Smith v. Van Gorkom*, while those below the same threshold should react positively to the same announcement. One question is thus, how is the breakpoint g^* determined in our sample? We take g^* to equal the median of the distribution of industry Q, that is, we define high-growth industries as industries at the 3-digit SIC code level that have above-median industry Q among all industries in our sample, and low-growth industries as those that have below-median Q. In Table IX, we present a sensitivity analysis to different values of the threshold.

Table III. Summary statistics

The sample consists of Compustat firms as of the end of fiscal year 1984, with market cap (data24*data25) larger than \$100 million. The sample is further restricted to include firms that have historical SIC codes from the CRSP database and historical state of incorporation data from Moody's. Financial companies (SIC 6xxx) and regulated companies (SIC 4xxx) are excluded from the sample. Industry sectors are defined at the 1-digit SIC code (0 = Agriculture, 1 = Mining and construction, 2 = Manufacturing_A, 3 = Manufacturing_B, 5 = Trade, 7 = Services, 8 = Health). Tobin's Q is market cap (data24*data25) plus book value of assets (data6) minus book value of equity (data216), all divided by the book value of assets (data6). Leverage is the book value of total liabilities (data6–data216) divided by the book value of total assets (data6). Cash flow to assets is Operating Income Before Depreciation (data13) minus interest expenses (data14), taxes (data16–data74), and capital expenditure (data128), all divided by assets. *, **, *** indicate significance at the 10, 5, and 1% levels, respectively. In Panel B, sector is defined at the 1-digit SIC code.

Panel A: Industry distribution

Sector	All (<i>n</i> = 960) (%)	Delaware (<i>n</i> = 388) (%)	Non-Delaware (<i>n</i> = 572) (%)	Difference
Agriculture	0.5	0.5	0.5	
Mining and construction	7.8	8.8	7.2	*
Manufacturing A	26.7	28.9	25.2	**
Manufacturing B	40.6	36.3	43.5	***
Wholesale and retail trade	13.5	11.6	14.9	***
Services	8.6	11.3	6.8	***
Health	2.2	2.6	1.9	***

Manufacturing A: concentration in food (20xx) and chemicals (28xx)

Manufacturing B: concentration in electronics (36xx), computer equipment (35xx), and auto manufacturing (37xx)

Panel B: Financial variables

	All (<i>n</i> = 960)		Delaware (<i>n</i> = 388)		Non-Delaware (<i>n</i> = 572)		Difference	
	Mean	Median	Mean	Median	Mean	Median	<i>t</i> -test	Wilcoxon
Market cap (\$m)	1,098	342	1174	420	1,047	306		***
Assets (\$m)	1,777	454	2206	557	1,486	385	**	***
Leverage	0.48	0.49	0.5	0.51	0.47	0.48	***	***
Tobin's Q	1.55	1.29	1.48	1.24	1.59	1.32	**	**
Cash flow to assets	0.05	0.07	0.05	0.06	0.05	0.07		

Panel A of Figure 1 plots cumulative abnormal returns to Delaware and non-Delaware firms in low-growth industries without matching. It shows that non-Delaware firms underperform Delaware firms. The differences are large, for example, 0.8% in the [0,6] and [0,10] windows, and go in the direction predicted by our hypotheses in Section 3.

Panel B of Figure 1 plots cumulative abnormal returns to Delaware and non-Delaware firms in high-growth industries without matching. It shows that Delaware firms

underperform non-Delaware firms over the windows [0,3] – [0,10]. As we will see below, the [0,3] window corresponds to the first coverage of the outcome of the case in the national press. These differences are large, 0.7% at various windows, and go in the direction predicted by our hypotheses in Section 3.

While the patterns depicted in Figure 1 are economically large and go in the directions predicted by our theory, they cannot per se provide conclusive statistical evidence. In fact, designing an appropriate statistical test is challenging, for two reasons. First, as shown in Table III Panel A, the industry composition of Delaware firms differs remarkably from that of non-Delaware firms. In the presence of industry-specific shocks, such as for example the oil shock of January 30, 1985, mentioned above, an unmatched statistical comparison will lead to biases. Second, as shown in Table III Panel B, the firm characteristics of Delaware-incorporated firms differ remarkably from those of non-Delaware firms. If these differences in characteristics correlate with cumulative abnormal returns in a systematic manner, a naïve comparison of CARs of Delaware and non-Delaware firms will again lead to biases. We address these in the next section.

5.3. Matching Procedure

As mentioned earlier, the differences in industry distribution and financial characteristics between Delaware and non-Delaware firms imply that a simple examination of the abnormal returns between the two groups around the announcement of the *Smith v. Van Gorkom* ruling could lead to biased results. As explained above, we therefore match by industry and then by size.

Table IV shows summary statistics of firms in the high- and low-growth industries after matching. Out of the 960 firms in the sample, 479 firms belong to the high-growth industry. Out of these firms, 191 are incorporated in Delaware and 288 are incorporated elsewhere. We find a match to 174 out of the 191 firms—128 are matched by 4-digit SIC code and 46 are matched by 3-digit SIC code. The table shows that except for assets (significance at the 10% level in the Wilcoxon test), there are no statistical differences in the summary statistics between Delaware and matched non-Delaware firms. This suggests that industry is the main driver of the differences in other characteristics across the two groups.

Table IV also shows that 178 out of the 197 Delaware firms that belong to the low-growth industries are matched to non-Delaware firms. Of these, 139 are matched by the 4-digit SIC code and 39 are matched by the 3-digit SIC code. The table shows that even after the matching procedure there are some differences between the two groups—mainly in size and in Tobin's Q. We acknowledge that these differences could potentially lead to differences in risk profile across the two groups and could lead to differences in returns. We, therefore, compare the robustness of this matching procedure to that of a more refined matching in which we eliminate cases where industry-size matches lead to size differences that are too far apart (not shown). Eliminating these extreme cases does not alter any of the results. In robustness tests presented in Table XII, we also control for size and book-to-market factors and find that our results are unaffected by these controls.

6. Results

In this section, we present our results. In Section 6.1, we examine returns following the *Smith v. Van Gorkom* decision. In Section 6.2, we examine corporate investment, financing policies, as well as board structure, compensation and turnover following the *Smith v. Van*

Table IV. Matching procedure

High-growth industries are 3-digit SIC code industries whose ratio of total market value of their assets (summed over all firms in the sample with similar 3-digit SIC code) to total book value of their assets is ranked above sample median. Low-growth industries are defined similarly except that the ratio of their market value of assets to book value of assets is ranked below sample median. Variable definitions appear in Table III. *, **, *** indicate significance at the 10, 5, and 1% levels, respectively. The matching procedure is as follows: for each firm that is incorporated in Delaware, we match a firm that is not incorporated in Delaware but belongs to the same 4-digit SIC code and which has market cap that is closest to that of the Delaware firm. If no match is found, we match by the same 3-digit SIC code. If no match is found, then we drop the observation.

Panel A: High-growth industries (Matching 174 Delaware firms)

	Delaware		Non-Delaware		Difference	
	Mean	Median	Mean	Median	<i>t</i> -test	Wilcoxon
Market cap (\$m)	1,018	438	805	319		
Assets (\$m)	1,050	412	865	395		*
Leverage	0.48	0.48	0.45	0.47		
Tobin's Q	1.73	1.47	1.76	1.46		
Cash flow to assets	0.04	0.06	0.06	0.06		

Panel B: Low-growth industries (Matching 178 Delaware firms)

	Delaware		Non-Delaware		Difference	
	Mean	Median	Mean	Median	<i>t</i> -test	Wilcoxon
Market cap (\$m)	1,449	468	981	499	***	
Assets (\$m)	3,615	927	1,828	850	***	
Leverage	0.52	0.52	0.52	0.51		
Tobin's Q	1.19	1.06	1.30	1.15	**	**
Cash flow to assets	0.05	0.06	0.06	0.07		

Gorkom decision. In Section 6.3, we examine returns around the passage of section 102(b)7 of the Delaware code, and in Section 6.4 we perform robustness tests.

6.1 Returns from an Exogenous Increase in Monitoring

We examine CARs of Delaware-incorporated firms and of appropriately matched non-Delaware firms following the announcement of the *Smith v. Van Gorkom* decision. We begin by examining in Table V equally weighted CARs.

Panel A of Table V reports results for high-growth industries. We find that a portfolio long on Delaware-incorporated firms and short on matched non-Delaware firms earns negative CARs following the announcement of the *Smith v. Van Gorkom* decision. This result is similar to the result without matching, but the magnitude of the effect is larger. Over 3 days the CAR is -1.0% ; over 8 days it is -2.6% . Furthermore, the CARs are strongly statistically significant, from the [0,3] window onward. Interestingly, this timing coincides

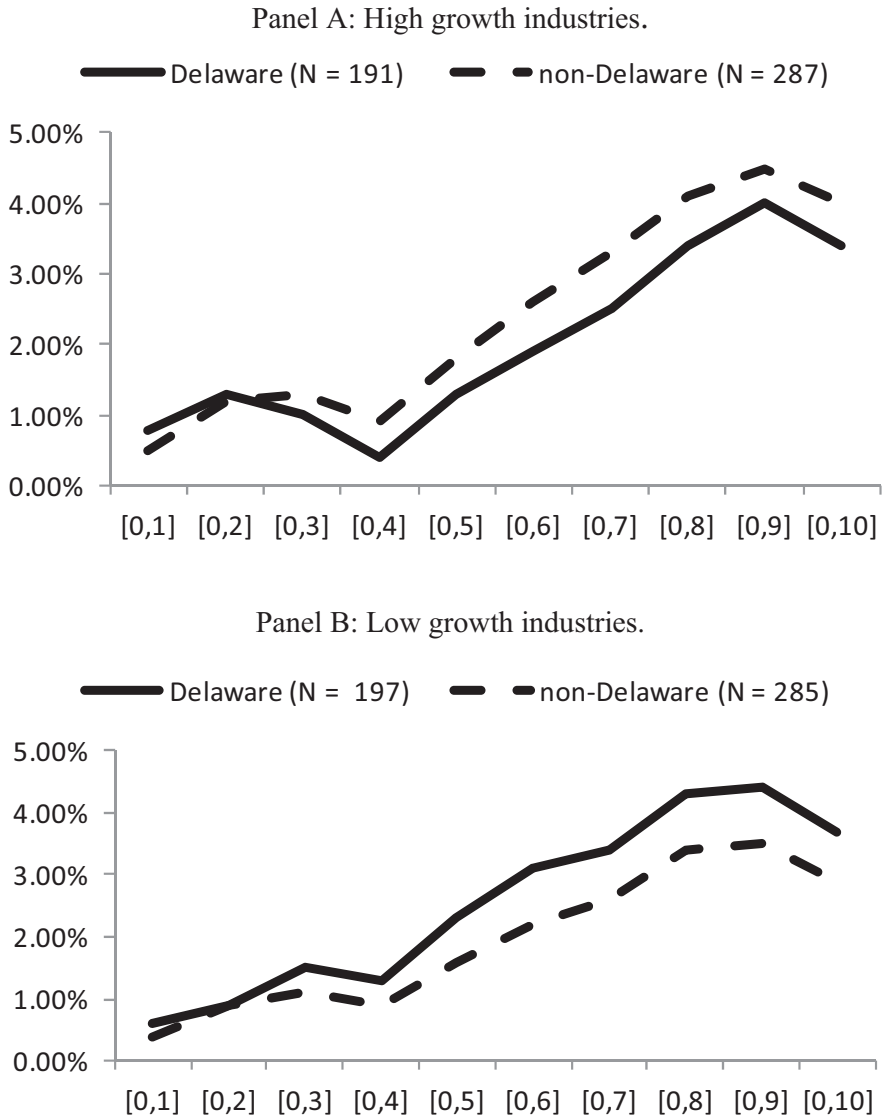


Figure 1. Returns of portfolios of Delaware firms and non-Delaware firms around the *Smith v. Van Gorkom* ruling.

Panel A shows cumulative returns of equally weighted portfolios of Delaware firms and non-Delaware firms for different event windows. Date 0 is January 29, 1985—the ruling date. Panel A shows returns of firms that belong to high-growth industries, and Panel B shows returns of firms that belong to low-growth industries. High-growth industries are 3-digit SIC code industries whose ratio of total market value of their assets (summed over all firms in the sample with similar 3-digit SIC code) to total book value of their assets is ranked above sample median. Low-growth industries are defined similarly except that the ratio of their market value of assets to book value of assets is ranked below sample median.

Table V. Equally weighted CARs—the *Smith v. Van Gorkom* ruling

The table shows cumulative returns of portfolios of Delaware firms and matched portfolios of non-Delaware firms across different event windows. Date 0 refers to the day of the court decision (January 29, 1985). *, **, *** indicate significance at the 10, 5, and 1% levels, respectively.

Panel A: Matching high-growth industries

Event window	Delaware (%)	Non-Delaware (%)	Difference (%)	t-test	Wilcoxon
[0, 1]	0.8	-0.9	-0.1		
[0, 2]	1.3	1.7	-0.4		
[0, 3]	1.0	2.1	-1.0	**	***
[0, 4]	0.4	1.6	-1.2	**	***
[0, 5]	1.3	2.7	-1.4	**	***
[0, 6]	2.0	3.9	-1.9	***	***
[0, 7]	2.4	4.7	-2.3	***	***
[0, 8]	3.3	5.9	-2.6	***	***
[0, 9]	4.0	6.0	-2.1	***	***
[0, 10]	3.2	5.3	-2.1	**	***
No. firms	174	174			

Panel B: Matching low-growth industries

Event window	Delaware (%)	Non-Delaware (%)	Difference (%)	t-test	Wilcoxon
[0, 1]	0.6	-0.1	0.7	***	***
[0, 2]	0.9	0.4	0.5	*	**
[0, 3]	1.4	0.4	1.0	***	***
[0, 4]	1.1	0.2	0.9	**	**
[0, 5]	2.2	0.8	1.3	***	***
[0, 6]	2.8	1.5	1.3	***	***
[0, 7]	3.1	1.9	1.1	**	***
[0, 8]	4.0	2.7	1.3	**	**
[0, 9]	4.1	2.5	1.5	**	**
[0, 10]	3.4	2.0	1.4	**	*
No. firms	178	178			

with the first coverage of the *Smith v. Van Gorkom* ruling in the mainstream national press, which was January 31, 1985 in the *New York Times*, and February 1 in the *Wall Street Journal*. One possibility is thus that it took a few days for financial market participants to “digest” the full extent of the broad implications of the supreme court decision.

Panel B of Table V examines low-growth industries. Strikingly, here the result is the opposite. We find that a portfolio long on Delaware-incorporated firms and short on matched non-Delaware firms earns *positive* CARs following the announcement of the *Smith v. Van Gorkom* decision. The magnitude of this effect is also large. Over 3 days the CAR is 1.0%; over 8 days it is 1.3%. Furthermore, while here CARs are strongly statistically significant throughout, we still observe an increased economic magnitude of the effect from the [0,3] day window onward, consistent with what we saw in high-growth industries.

We note that the differences between the returns in both Panels A and B are strongly significant also when applying the non-parametric Wilcoxon test. The Wilcoxon test is a rank-based test, which does not rely on the assumption of normality. It, therefore, mitigates the concern that the t -stats are biased because of influential outliers or skewness in the distribution.

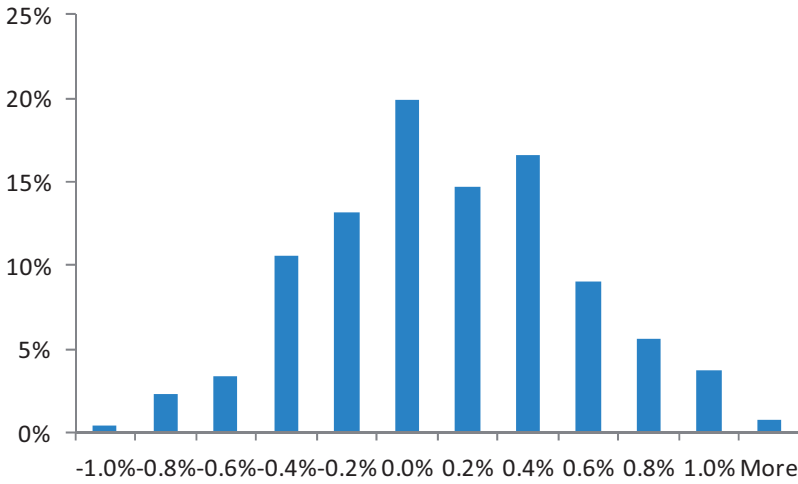
Next, it is useful to compare the unmatched and matched returns. Comparing the patterns in Figure 1 with those in Panels A and B of Table V, we see that while both the matched and the unmatched returns go in the same direction, the differences in matched returns are larger than those in unmatched ones, both in high- and low-growth industries. What drives this difference? It is not the composition of the Delaware portfolios. In fact, we also see that in both high- and low-growth industries the portfolio of Delaware firms that have an industry match (174 firms in high-growth industries, and 178 firms in low-growth industries) earn about the same return as the portfolio of Delaware firms in Figure 1 (191 firms in high-growth industries, and 197 firms in low-growth industries). Therefore, the difference in the magnitudes of the abnormal returns is not due to the reduction in sample size of Delaware firms due to the matching. Rather, it is the matching to the non-Delaware firms that leads to higher return differences across the portfolios. This result delineates the importance of matching in our setting. It may also raise concerns as to whether our matching procedure selects an appropriate control group, and whether the resulting tests are of appropriate size in terms of identifying abnormal returns.

To begin, we reiterate that our results are not driven by extreme observations in the non-Delaware group. Indeed, Wilcoxon rank tests confirm and reinforce the results of our t -tests. Next, we address concerns about our matching procedure in two ways. First, we provide a placebo analysis. One possibility, in fact, is that the size of our tests is such that it generates type-I errors—finding abnormal returns when returns are not significantly different from the non-event benchmark. To address this concern, we compare the abnormal returns surrounding *Smith v. van Gorkom* with the distribution of all 3-day returns in the year before the supreme court decision, January 1, 1984 to January 22, 1985. If the returns around the event are indeed abnormal, then we would expect the abnormal returns around *Smith v. Van Gorkom* to be in the tails of the distribution. This procedure can be seen as a placebo analysis of replicating our methodology on a large sample of non-event (i.e., placebo) days, expecting the returns around the event to be extreme with respect to the distribution of returns in placebo days.

Figure 2 presents the results. We find that the 3-day abnormal return around the supreme court decision is at the top 1% of the distribution of returns for the low-growth portfolio (Panel A) and is at the bottom 3% of the distribution of returns for the high-growth portfolio (Panel B). We conclude that our results are not driven by fundamental differences in returns, not related to the rule, between Delaware and non-Delaware firms.

We perform another test, somewhat similar to the placebo test, except that we randomly pick 3 days during the period January 1, 1984 to January 22, 1985 and compare the 3-day return of the portfolio of the Delaware-incorporated firms to the portfolio of the non-Delaware-incorporated firms. The advantage of this procedure over the previous procedure, is that we can increase the power of the test by repeating the analysis over a large set of samplings (Bootstrap). We repeat this random assignment 1,000 times and plot the distribution of the 3-day returns. We do this exercise once for firms in low-growth industries and once for firms in high-growth industries.

Panel A: Distribution of 3-days returns – low-growth industries



Panel B: Distribution of 3-days returns – high-growth industries

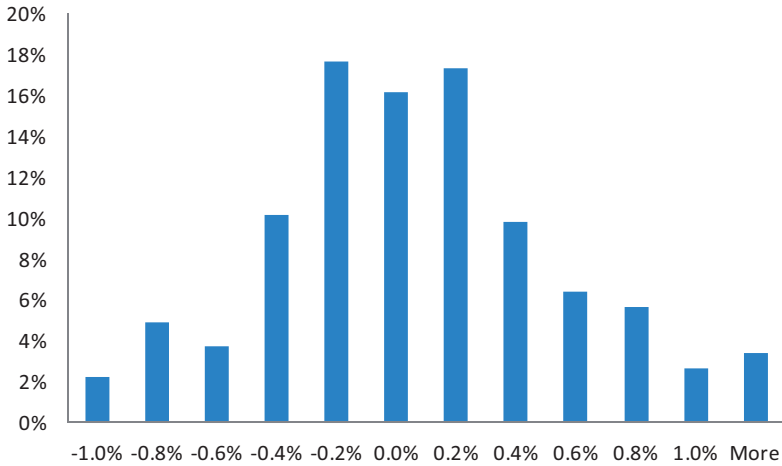


Figure 2. Distribution of 3-day returns of high- and low-growth matching portfolios.

The figure shows distribution of 3-day returns (consecutive days) of equally weighted portfolios that long Delaware-firms and short non-Delaware firms across all days in the period January 1, 1984 to January 22, 1985. Panel A shows the distribution of returns for firms that belong to low-growth industries. Panel B shows the distribution of returns for firms that belong to high-growth industries. High-growth industries are 3-digit SIC code industries whose ratio of total market value of their assets (summed over all firms in the sample with similar 3-digit SIC code) to total book value of their assets is ranked above sample median. Low-growth industries are defined similarly except that the ratio of their market value of assets to book value of assets is ranked below sample median.

Figure 3 Panel A plots the distribution of 3-day returns (long-Delaware short non-Delaware) for the portfolios of firms that belong to low-growth industries.

Table V Panel A shows that during the 3-day event window January 29, 1985 to January 31, 1985 the portfolio long-Delaware short non-Delaware earned a return of 1%. Comparing this return to the distribution of returns in Figure 3 Panel A, we see that achieving such a return using a random assignment of 3 days occurs with probability 0.01 (10 draws out of the 1,000 have a return higher than 1%). This result reinforces our previous result and suggests that indeed the returns obtained around the supreme court decision are abnormal.

We repeat this exercise for the high-growth portfolios. Figure 5 Panel B shows the distribution of these returns.

Table V Panel B shows that during the 3-day event window January 29, 1985 to January 31, 1985 the portfolio long-Delaware short non-Delaware earned a return of -1%. Comparing this return to the distribution of returns in Figure 5 Panel B, we see that achieving such a return using a random assignment of 3 days occurs with probability 0.03 (30 draws out of the 1,000 have a return lower than -1%). Again, this result reinforces our previous result and suggests that indeed the returns obtained are abnormal.

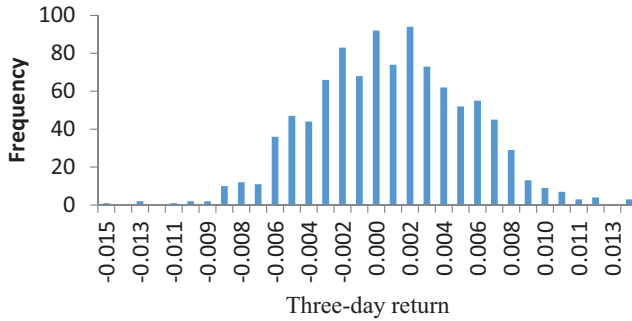
Finally, we consider the possibility that our control group might be mis-specified, in that Delaware law might affect also some firms incorporated outside of Delaware. Indeed, the legal literature documents that several states, such as Massachusetts and Illinois among others, follow quite closely Delaware law, for example, by copying Delaware's approach to preclude any attempt to limit the personal liability of directors for transactions from which the director derived an improper personal benefit. On the contrary, other states such as New York and California, tend to try and compete with Delaware by offering firms the possibility to choose different menus of articles of incorporation from those available under Delaware law (see Barzuza, 2012; Dammann, 2012 for a discussion). Therefore, we repeat our tests by re-defining our control group as being composed only by firms incorporated in states whose corporate law does not mimic Delaware law, and discarding firms incorporated in states that mimic Delaware law.¹⁹ We present the results in the Appendix Table AI. We find that our results are confirmed, in that low-growth firms gain and high-growth firms lose from *Smith v. Van Gorkom*, and if anything the economic magnitude of the results is somewhat stronger under the alternative definition of the control group.

We conclude that our matching procedure is unlikely to produce tests of incorrect size, or inappropriate control groups. Rather, we conclude that our results reflect indeed the economic impact of the *Smith v. Van Gorkom* decision rather than some statistical artifact. Furthermore, our results are in line with the theoretical predictions of Section 4. Firms in low-growth industries gain from an increase in court scrutiny, and firms in high-growth industries lose from an increase in court scrutiny.

Next, we examine portfolio returns from the point of view of diversified investors who hold value-weighted portfolios. Examination of value-weighted returns can also shed light on whether the impact of the ruling was stronger on large or small firms. Panel A of Table VI shows that in high-growth industries the results are even stronger than in the equally weighted case. A portfolio long on Delaware-incorporated firms and short on

19 Dammann (2012, p. 6, footnote 21) indicates that states that copy Delaware law are Alaska, Arkansas, Colorado, Illinois, Kansas, Kentucky, Louisiana, Massachusetts, Minnesota, Montana, New Jersey, North Dakota, Oklahoma, Oregon, Rhode Island, South Carolina, and Texas.

Panel A: Bootstrapping 3-days returns – low-growth industries



Panel B: Bootstrapping 3-days returns – high-growth industries

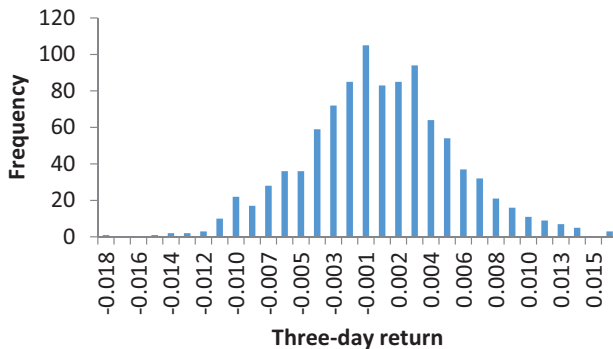


Figure 3. Distribution of 3-day Bootstrap returns of high- and low-growth matching portfolios.

The figure shows distribution of 3-day returns of equally weighted portfolios that long Delaware-firms and short non-Delaware firms across three random days in the period January 1, 1984 to January 22, 1985. Panel A shows the distribution of returns for firms that belong to low-growth industries. Panel B shows the distribution of returns for firms that belong to high-growth industries. High-growth industries are 3-digit SIC code industries whose ratio of total market value of their assets (summed over all firms in the sample with similar 3-digit SIC code) to total book value of their assets is ranked above sample median. Low-growth industries are defined similarly except that the ratio of their market value of assets to book value of assets is ranked below sample median.

matched non-Delaware firms earns CARs of -1.5% over 3-day window, of -2.6% over 8 days, and of -2.5% over 10 days. Furthermore, the CARs are strongly statistically significant throughout, and again with an increased magnitude from the [0,3] window onward. These results, together with those in Panel A of Table V, indicate that in high-growth industries the impact of the ruling was felt by all firms, with a slightly larger economic magnitude for larger ones.

In Panel B, we examine low-growth industries. Here the magnitude of the results is different. We still find that a portfolio of Delaware-incorporated firms outperforms a matched portfolio of non-Delaware firms, and we still observe a somewhat larger magnitude after the [0,3] window; however, the statistical significance is much weaker than in the equally weighted case. Except a statistically significant CAR of 0.6% in the [0,1] day window, results are not significant from the [0,2] window onward. Also, the economic magnitude of

Table VI. Value-weighted CARs—the *Smith v. Van Gorkom* ruling

The table shows cumulative returns of portfolios of Delaware firms and matched portfolios of non-Delaware firms across different event windows. Portfolios are weighted by the market cap of each firm. Date 0 refers to the day of the court decision (January 29, 1985). *, **, *** indicate significance at the 10, 5, and 1% levels, respectively.

Panel A: High-growth industries

Event window	Delaware (%)	Non-Delaware (%)	Difference (%)	t-test
[0, 1]	0.9	1.4	-0.5%	*
[0, 2]	1.0	2.0	-1.0%	**
[0, 3]	0.6	2.1	-1.5%	***
[0, 4]	0.0	1.5	-1.6%	***
[0, 5]	1.3	2.9	-1.5%	**
[0, 6]	1.5	3.6	-2.0%	***
[0, 7]	1.4	4.0	-2.6%	***
[0, 8]	2.3	4.9	-2.6%	***
[0, 9]	2.9	5.3	-2.4%	***
[0, 10]	2.1	4.6	-2.5%	***
No. firms	174	174		

Panel B: Low-growth industries

Event window	Delaware (%)	Non-Delaware (%)	Difference (%)	t-test
[0, 1]	0.8	0.2	0.6	**
[0, 2]	1.0	1.0	0.0	
[0, 3]	1.6	1.0	0.6	
[0, 4]	1.1	0.6	0.5	
[0, 5]	1.9	1.3	0.7	
[0, 6]	2.7	1.9	0.8	
[0, 7]	2.5	2.5	0.0	
[0, 8]	3.3	3.2	0.2	
[0, 9]	3.4	3.3	0.2	
[0, 10]	2.7	2.6	0.2	
No. firms	178	178		

the results here is generally weaker. These findings, together with those in Panel B of Table V, indicate that in low-growth industries the impact of the ruling was felt primarily by smaller firms.

To probe deeper into this issue, we further examine whether these results conceal more variation. Jensen (1986) argues that firms with high cash flows and low-growth opportunities face an agency problem. Managers in these firms are prone to keeping the cash in the firm and reinvesting it in value-destroying acquisitions rather than giving the money back to the shareholders. It is thus possible that these types of firms would benefit more from the *Smith v. Van Gorkom* decision. Therefore, we further restrict the sample of firms in low-growth industries by looking at those with high cash flows. These firms are sometimes referred to in the literature as “Jensen-type” firms (e.g., Jensen, 1986; Morck, Shleifer, and Vishny, 1988; Rajan and Wulf, 2007).

Table VII reports the results of this exercise. We find that equally weighted CARs of a portfolio long Delaware-incorporated Jensen-type firms and short non-Delaware Jensen-type firms are positive, and the magnitude is large and similar to what we found in Table V Panel B. Two main points stand out. First, by further cutting our sample, we end up with a much reduced statistical power to detect abnormal returns—none of the CARs are statistically significant at standard levels. Second, by examining value-weighted returns, we find a similar picture as in Table VI Panel B, in that the magnitude is much smaller than that of equally weighted returns. In sum, we conclude that while there seems to be some effect on Jensen-type firms consistent with the hypothesis, the effect of the *Smith v. Van Gorkom* decision was felt more across the board in industries with low-growth opportunities, and within those, more by small firms than by larger ones.

Next, we contrast the results with the unconditional CARs on the full sample. We first examine equally weighted returns. Table VIII reports that Delaware firms earn returns essentially identical to those of non-Delaware firms over the 3-day window after the announcement, and negative returns over the windows $[0, 4]$ to $[0, 10]$. The magnitude is between -0.4% and -0.6% , and it is statistically insignificant. These results on equally weighted returns are consistent with the findings of Bradley and Schipani (1989), who compute equally weighted CARs of Delaware firms relative to (unmatched) non-Delaware firms and conclude, “the decision had no real impact on the way United States corporations was managed or the way the common stock of these firms were being priced by the market” (p. 73). Crucially, our study fleshes out the complex effects of the supreme court decision on the shareholder value of different firms. Indeed, we show that economically large and statistically strong heterogeneous effects across firms can go unnoticed when expecting all firms to react homogeneously to the same legal event. In addition, Table VIII also reports value-weighted returns on the full sample, which are in general negative and around -1.00% over the $[0, 7]$ to $[0, 10]$ window. While both equally weighted and value-weighted results on the full sample are not statistically significant, they do point in the same direction and suggest that the Delaware Supreme Court decision was not beneficial, on average, for Delaware corporations.

Finally, we examine the sensitivity of our results to the choice of different cutoff values for g^* . Table IX presents results for different cutoffs, whereby the sample is partitioned into high- and low-growth industries based on different percentiles of the distribution of Tobin’s Q. A cutoff of 0% implies that all firms are classified as belonging to a high-growth industry; conversely, a cutoff of 100% implies that all firms are classified as low growth. For each cutoff, the table presents the return to high- and low-growth portfolios of Delaware firms minus matched non-Delaware firms. The table shows that for high-growth industries, both the economic magnitude and the statistical significance of returns are maximized for a cutoff between the 50th and the 70th percentile of the distribution, for every event window. For low-growth industries, economic magnitude and statistical significance of returns are maximized for a cutoff between the 50th and the 60th percentile.

The analysis in Section 3.1 implies that the absolute value of total announcement returns (returns of firms in low-growth industries minus returns of firms in high-growth industries) should be maximized at g^* , increasing monotonically for g going from the 1st percentile of the distribution of industry Q to the g^* th, and then decreasing monotonically from the g^* th to the 99th percentile. This is consistent with what we see in the data. Figure 4 shows the announcement returns of a portfolio that is long firms in low-growth industries and short firms in high-growth industries, for several thresholds of the distribution of industry Q.

Table VII. The *Smith v. Van Gorkom* ruling: CARs of low-growth, high cash flow firms

The table shows cumulative returns of portfolios of low-growth/high cash flow Delaware firms and matched portfolios of non-Delaware firms across different event windows. Date 0 refers to the day of the court decision (January 29, 1985). *, **, *** indicate significance at the 10, 5, and 1% levels, respectively.

Event window	Equally weighted (%)	<i>t</i> -test	Value weighted (%)	<i>t</i> -test
[0, 1]	0.4		0.3	
[0, 2]	0.5		-0.7	
[0, 3]	1.0		-0.2	
[0, 4]	0.9		-0.5	
[0, 5]	1.1		-0.5	
[0, 6]	1.0		1.0	
[0, 7]	1.2		0.6	
[0, 8]	1.2		0.3	
[0, 9]	1.4		0.0	
[0, 10]	1.6		0.2	
No. firms	74		74	

Table VIII. The *Smith v. Van Gorkom* ruling: unconditional CARs on the full sample

The table shows cumulative returns of portfolios of Delaware firms and matched portfolios of non-Delaware firms across different event windows. Date 0 refers to the day of the court decision (January 29, 1985). *, **, *** indicate significance at the 10, 5, and 1% levels, respectively.

Event window	Equally weighted (%)	<i>t</i> -test	Value weighted (%)	<i>t</i> -test
[0, 1]	0.29		0.08	
[0, 2]	0.04		-0.47	
[0, 3]	0.00		-0.32	
[0, 4]	-0.10		-0.37	
[0, 5]	-0.04		-0.29	
[0, 6]	-0.28		-0.40	
[0, 7]	-0.55		-1.14	
[0, 8]	-0.61		-1.04	
[0, 9]	-0.23		-0.96	
[0, 10]	-0.32		-0.99	
No. firms	352		352	

Our findings show that the pattern of announcement returns is roughly monotonic and consistent with theory, and that the empirically “true” value of g^* , that is, the one that maximizes the returns to the low-high portfolio, lies somewhere between the 50th and the 60th percentile of the distribution of industry Q .

We conclude this section by summing up our main results so far. A high level of judicial scrutiny over business decisions is bad for firms in high-growth industries, both small and large. Conversely, a high level of scrutiny is good for firms in low-growth industries, particularly small ones. On average, the increased scrutiny does not benefit Delaware corporations relative to non-Delaware ones. We now turn to an examination of the channels of the value effects documented so far.

Table IX. Sensitivity of results to different cutoffs g^*

The table shows equally weighted cumulative returns of portfolios of Delaware firms minus matched portfolios of non-Delaware firms across different event windows, for different cutoffs of the distribution of Q . Date 0 refers to the day of the court decision (January 29, 1985). *, **, *** indicate significance at the 10, 5, and 1 levels, respectively.

Panel A: High-growth industries							
Event window	0	30	40	50	60	70	100
[0, 1]	0.29	0.06	0.00	-0.14	-0.21	-0.25	.
[0, 2]	0.04	-0.01	-0.20	-0.45	-0.47	-0.48	.
[0, 3]	0.00	-0.13	-0.56	-1.01**	-1.16**	-0.92	.
[0, 4]	-0.10	-0.23	-0.69	-1.18**	-1.31**	-1.01	.
[0, 5]	-0.04	-0.33	-0.88**	-1.43**	-1.53**	-1.32	.
[0, 6]	-0.28	-0.79	-1.33**	-1.93***	-2.35***	-2.23*	.
[0, 7]	-0.55	-1.19**	-1.66***	-2.34***	-3.01***	-2.97**	.
[0, 8]	-0.61	-1.33**	-1.85***	-2.66***	-3.31***	-3.27**	.
[0, 9]	-0.23	-0.99	-1.38**	-2.10***	-2.74***	-2.70*	.
[0, 10]	-0.32	-1.02	-1.39**	-2.09**	-2.94***	-2.73*	.
No. firms	352	238	206	174	132	99	0

Panel B: Low-growth industries							
Event Window	0	30	40	50	60	70	100
[0, 1]	.	0.76**	0.69***	0.70***	0.59***	0.49**	0.29
[0, 2]	.	0.14	0.37	0.51*	0.34	0.24	0.04
[0, 3]	.	0.27	0.79*	0.99***	0.70**	0.36	0.00
[0, 4]	.	0.17	0.74	0.96**	0.63*	0.26	-0.10
[0, 5]	.	0.56	1.14**	1.33***	0.86**	0.46	-0.04
[0, 6]	.	0.75	1.18**	1.32***	0.95**	0.47	-0.28
[0, 7]	.	0.77	0.99	1.19**	0.91*	0.39	-0.55
[0, 8]	.	0.87	1.10	1.38**	0.98*	0.42	-0.61
[0, 9]	.	1.34	1.37**	1.58**	1.26**	0.73	-0.23
[0, 10]	.	1.11	1.17	1.40**	1.23**	0.62	-0.32
No. firms	0	114	146	178	220	253	352

6.2 Corporate Investment, Financial Policies, and Board Structure Around the Rule

We begin by examining whether investment and financial policies changed around the announcement of the *Smith v. Van Gorkom* ruling. Based on the analysis in Section 3.1, our hypothesis is that after the ruling, Delaware firms will adopt more conservative corporate policies.

In Table X, we examine the change between firm policies in fiscal year 1984 (before *Smith v. Van Gorkom*) and fiscal year 1985 (after).²⁰ We examine three investment

20 We acknowledge that the fiscal-years of these firms might end at different times, which will affect the number of months that these firms operate after the ruling. For example, a firm whose

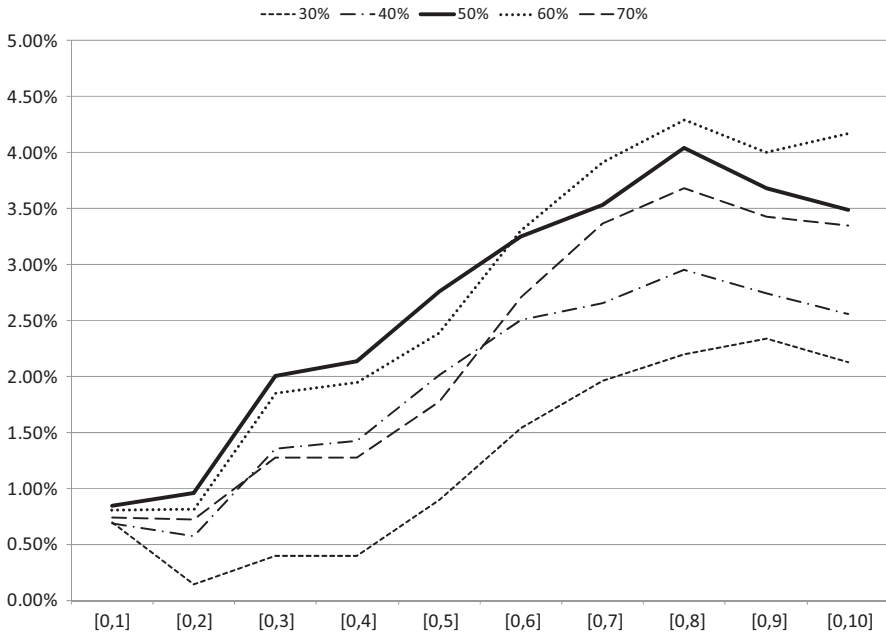


Figure 4. Announcement returns of matching portfolios that long low-growth industries and short high-growth industries, for several thresholds of the distribution of industry Q.

The figure shows announcement returns (over event windows (0, 1) – (0, 10)), of matching portfolios that long firms in low-growth industries and short firms in high-growth industries, for several cutoffs of industry Q. For each cutoff in the distribution of Q (ranging from 30% cutoff to 70% cutoff of the industries in the sample), we form one low-growth portfolio that long Delaware and short non-Delaware, and one high-growth portfolio that long-Delaware and short non-Delaware. We then calculate the return of a portfolio that long the low-growth portfolio and short the high-growth portfolio. We repeat this calculation for different event windows and plot the returns.

variables (Capital Expenditures, Acquisitions, and R&D) and two financial variables (Leverage and Cash Holdings). We perform firm fixed-effect regressions with year dummies and an interaction of the Delaware firm dummy with the year-1985 dummy (representing the period after the rule).

Panel A of Table X shows that Delaware firms in high-growth industries have lower cash reserves and debt following *Smith v. Van Gorkom* as compared with non-Delaware firms in the same industries. We interpret these findings as suggestive that Delaware firms in high-growth industries raised less capital following *Smith v. Van Gorkom*. To the extent that reduced capital issuance is associated with reduced propensity to undertake investment

fiscal-year ends in August will have its 1985 fiscal-year between September 1984 and August 1985. For firms whose fiscal-year ends in June through December, fiscal-year 1985 will still have several months of the year after the announcement of the rule, and fiscal-year 1984 will have no months after the announcement of the rule. Therefore, differences in fiscal-year end might reduce the magnitude of our findings but will not alter the direction of the findings. Firms with fiscal-year end January–May will have the 1985 fiscal year start in February–June 1985 and end in January–May 1986. For these firms, fiscal-year 1984 will have few months carrying over after the rule, but the 1985 fiscal-year will have 12 months after the rule.

Table X. Investment and capital structure around *Smith v. Van Gorkom*

The table shows panel regression results of firms in the sample. The panel includes firms in the years 1984 and 1985. CapEx is capital expenditure (data128) divided by total assets (data6). Acquisition is cash from acquisitions (data129) divided by total assets (data6). R&D is research and development expenses (data46) divided by total assets (data6). Debt is book value of long-term debt (data9) divided by assets (data6). Cash holdings is total cash (data1) divided by assets (data6). High- and low-growth industries are defined in Table IV.

Panel A: High-growth industries

Dependent variable:	CapEx	Acquisitions	R&D	Debt	Cash holdings
Delaware * After	0.0008 (.0053)	0.0029 (.0078)	0.0027 (.0025)	-0.0222* (.0130)	-0.0136* (.0074)
Firm dummies?	Y	Y	Y	Y	Y
Time dummies?	Y	Y	Y	Y	Y
Adjusted R ²	0.87	0.57	0.93	0.83	0.92
No. firms	479	479	479	479	479

Panel B: Low-growth industries

Dependent variable:	CapEx	Acquisitions	R&D	Debt	Cash holdings
Delaware * After	-0.0090* (.0049)	-0.0128* (.0077)	-0.0003 (.0006)	0.0003 (.0083)	0.0092 (.0060)
Firm dummies?	Y	Y	Y	Y	Y
Time dummies?	Y	Y	Y	Y	Y
Adjusted R ²	0.88	0.53	0.99	0.90	0.90
No. firms	481	481	481	481	481

projects, this pattern is consistent with the monitoring hypothesis for high-growth firms, which posits an underinvestment problem following tightened monitoring. Despite facing high-growth opportunities, Delaware firms do not increase their capital issuance to pursue additional growth. Panel B of Table X shows that Delaware firms in low-growth industries cut capital expenditures and acquisitions following *Smith v. Van Gorkom* as compared with non-Delaware firms in the same industries. This pattern is consistent with the monitoring hypothesis for low-growth firms, which posits a reduction in overinvestment.

We then examine changes in board structure and compensation around the announcement of the *Smith v. Van Gorkom* ruling. We obtain data on board structure and compensation from Yermack (1996), who collected this information from the proxy statements of the S&P 500 corporations. For this reason, merging our data with Yermack's reduces the sample size. Table XI shows that there is no change in board size and no change in the compensation of board members around *Smith v. Van Gorkom*, neither in high-growth industries nor in low-growth ones. These results do not appear to be an artifact of sample size since the economic magnitude of the results is minuscule. (e.g., Panel A of Table XI shows that annual fees for directors in Delaware firms in high-growth industries increased between 1984 and 1985 by \$49 relative to those of non-Delaware firms, and board size and composition were effectively unchanged). These findings suggest that the impact of the

Table XI. Board structure and compensation around *Smith v. Van Gorkom*

The table shows panel regression results of firms in the sample that have available board data. The panel includes firms in the years 1984 and 1985. Data is provided by Professor David Yermack. Board Size is number of directors on the board. % turnover (total) is number of new directors divided by total number of directors (in %). % Turnover (outsiders) is number of new outsider directors divided by total number of directors. Meeting Fees are director fees per board meeting. Annual Fees are director fees per year. High- and low-growth industries are defined in Table IV.

Panel A: High-growth industries

Dependent variable	Board size	% Turnover (overall)	% Turnover (outsiders)	Meeting fees (\$)	Annual fees (\$)
Delaware * After	-0.2 (0.3)	-0.1 (1.6)	0.2 (1.2)	-31.2 (52.0)	48.8 (864.4)
Firm dummies?	Y	Y	Y	Y	Y
Time dummies?	Y	Y	Y	Y	Y
Adjusted R ²	0.71	0.25	0.31	0.74	0.71
No. firms	139	139	139	139	139

Panel B: Low-growth industries

Dependent variable	Board size	% Turnover (overall)	% Turnover (outsiders)	Meeting fees (\$)	Annual fees (\$)
Delaware * After	0.1 (0.4)	-1.5 (1.9)	0.2 (1.2)	18.2 (39.4)	-54.8 (657.2)
Firm dummies?	Y	Y	Y	Y	Y
Time dummies?	Y	Y	Y	Y	Y
Adjusted R ²	0.86	0.37	0.37	0.81	0.78
No. firms	163	163	163	163	163

Smith v. Van Gorkom ruling on firm value and corporate policies were not the result of changes in board structure and compensation.

6.3 Returns from an Exogenous Decrease in Monitoring

On July 1, 1986, the Delaware legislature enacted section 102(b)7, which essentially reversed the effects of *Smith v. Van Gorkom* by allowing shareholders to vote on exculpatory clauses that would make managers and directors no longer liable for monetary damages. In the following months, 94% of Delaware firms quickly took advantage of section 102(b)7 and amended their charters accordingly (Bradley and Schipani, 1989). By reducing the costs of discretion, this regulation is expected to have effects opposite to those of *Smith* on Delaware-incorporated firms. In particular, firms facing high investment opportunities are now expected to gain from the legislation, whereas firms facing low investment opportunities are expected to lose.²¹

21 The fact that managers in almost all firms amended their charters according to section 102(b)7 is consistent with our model of Section 3.1 where managerial utility, $U(\varphi)$, decreases in m for $m > 1$.

At the same time, the nature of legislative activities does not lend itself easily to event study analysis, because legislation is usually anticipated by financial market participants, as drafts of the law are circulated and rumors start to leak. In this case, the bill was introduced into the Delaware Senate on June 9 where it was voted on June 12. It then went to the Delaware House, where it was voted on June 17. The bill was then signed by Governor Michael Castle of Delaware on June 18, and enacted on July 1. It is unclear to what extent the general public was aware of these dates, and we are unable to find in the mainstream press any mention of dates when the draft was circulated or approved. Absent a clear-cut “announcement date”, therefore, we simply plot the CARs of firms in the 2 months around July 1, 1986, from June 1 until July 31.

Figure 5 Panel A shows CARs in high-growth industries. As expected, these firms now gain from the enactment of section 102(b)7. Over the 2 months around July 1, 1986, a high-growth portfolio that is long Delaware-incorporated firms and short non-Delaware ones earns a CAR of about 1%. Interestingly, consistent with the idea that legislation changes are often anticipated, the largest increase in stock prices is observed two-to-three weeks before the enactment of the legislation, around the time of the discussion in the Delaware Senate. To assess statistical significance, one obviously needs to take a stand as to when financial market participants become first aware of the new law. We were unable to find in the mainstream press mentions of the draft of the law or of the Delaware Senate activity. If one were to compute CARs over the period June 9–18, straddling the introduction into Senate until the eventual approval by the Governor, one would find economically large and statistically significant results consistent with the monitoring hypothesis. Alternatively, if one were to compute statistical significance around the date of the actual enactment, July 1, then no statistical significance would be detected.

Figure 5 Panel B shows CARs in low-growth industries. As expected, these firms now lose from a decrease in monitoring. Over the 2 months around July 1, 1986, a low-growth portfolio that is long Delaware-incorporated firms and short non-Delaware ones earns a CAR of -3% to -3.5% . Again, we observe a large decrease in stock prices two to three weeks before the enactment of the legislation. Due to the larger magnitude of the CARs, this time it is actually possible to detect statistical significance around the enactment date.

These results are compared with Janjigian and Bolster (1990) and Bradley and Schipani (1989), where both studied the returns of Delaware firms relative to (un-matched) non-Delaware ones around several dates relevant to the enactment of Delaware section 102(b)7. Neither of them condition their event studies on high- or low-growth industries. Janjigian and Bolster find no statistically significant results around the dates of the Delaware vote and enactment and conclude that “liability elimination does not have a significant impact upon shareholder wealth” (p. 60). Bradley and Schipani examine a larger sample over a longer period of 2 months around the enactment of section 102(b)7 and find a statistically significant CAR of -2.96% . They conclude that “the provisions of this legislation reduced the liability of corporate officials and that this resulted in a decrease in the value of Delaware corporations” (p. 74). Our (unreported) full sample results are consistent with those of Bradley and Schipani, but our conclusions differ remarkably once it is recognized that only firms in low-growth industries have lost from section 102(b)7, up to CARs of

In words, all managers wish to decrease courts’ scrutiny, which is bad for shareholders in low-growth firms, but turns out to be good for shareholders in high-growth firms as in those firms managerial incentives are naturally more aligned with theirs.

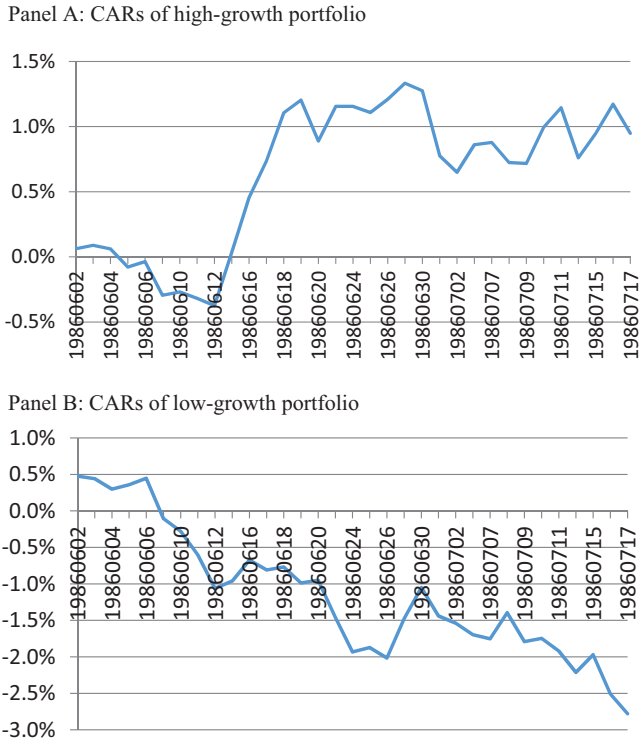


Figure 5. Cumulative returns of a portfolio that long Delaware and short non-Delaware around the passage of the Delaware section 102(b)7 law.

The figure shows cumulative returns of equally weighted portfolios that long Delaware firms and short non-Delaware firms around the date of the passing of the 102(b)7 law (July 1, 1986) across three random days in the period January 1, 1984 to January 22, 1985. Panel A shows the distribution of returns for firms that belong to low-growth industries. Panel B shows the distribution of returns for firms that belong to high-growth industries. High-growth industries are 3-digit SIC code industries whose ratio of total market value of their assets (summed over all firms in the sample with similar 3-digit SIC code) to total book value of their assets is ranked above sample median. Low-growth industries are defined similarly except that the ratio of their market value of assets to book value of assets is ranked below sample median.

-3.5%, and that firms in high-growth industries have actually *benefited* from section 102(b)7. Once again, we underscore that recognizing the possibility of heterogeneous impacts of legal provisions is a crucial component of the economic analysis of the law, which can lead at the very least to more nuanced insights and at best to significantly different conclusions about the effect of legal provisions on shareholder value.

Finally, in Figure 6 we report the CARs of a triple differences-in-differences exercise, namely of a portfolio that is long the high-growth portfolio and short the low-growth portfolio examined above. This portfolio earns more than a 4% CAR over the 2-month period, and again visual inspection of the figure confirms the impression that leaks and rumors of the legislation have reached financial market participants well before the enactment of the law.

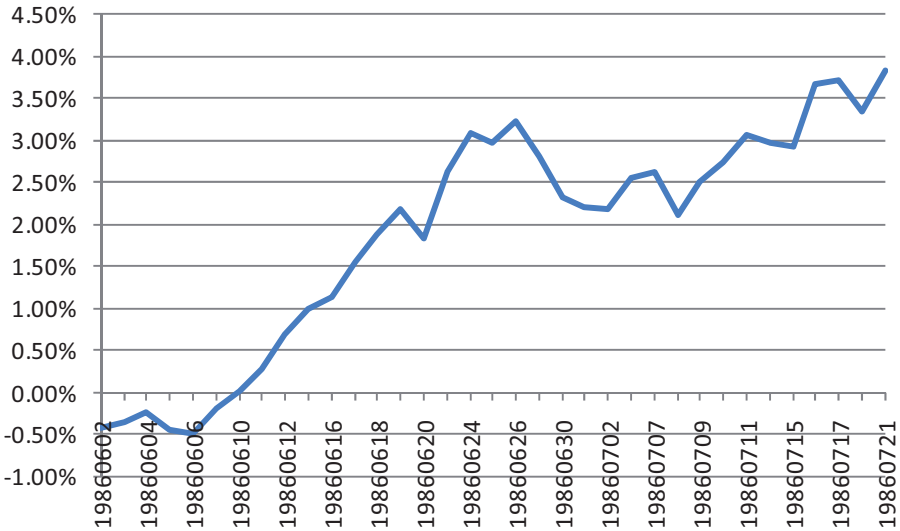


Figure 6. Cumulative returns of triple diff-in-diff long high-growth portfolio and short low-growth portfolio.

The figure shows the cumulative returns of a portfolio that long the portfolio in Figure 7 Panel A and short the portfolio in Figure 7 Panel B.

In sum, the enactment of section 102(b)7 of the Delaware Code provides a natural exercise to gauge the value of monitoring for publicly traded corporations and further check the scope of our monitoring hypothesis. Firms in high-growth industries that lost from the tightened monitoring brought about by *Smith v. Van Gorkom* now gain around the passage of the Delaware law 102(b)7. Conversely, firms in low-growth industries that gained from the tightened monitoring now lose around the passage of the Delaware law. These findings further corroborate our main conclusions from the previous section, namely that tightening monitoring in high-growth industries can stifle growth and thus can be detrimental to shareholder value; in contrast, tightening monitoring in low-growth industries can curb managerial excesses and thus boost shareholder value.

6.4 Additional Robustness

Our main hypothesis is that the *Smith v. Van Gorkom* decision tightened monitoring in Delaware-incorporated firms as opposed to non-Delaware firms. In turn, tightened monitoring was beneficial for firms in low-growth industries as it reduced overinvestment, whereas it was detrimental for firms in high-growth industries as it induced underinvestment. An alternative explanation is that the Delaware Supreme Court sentence changed the risk profile of these firms, and this in turn affected their expected returns. It is also possible that differences in the risk profile even after the matching could account for the difference in returns.

To address this possibility, we present time series regressions of daily returns (a month before and a month after the *Smith v. Van Gorkom* case ruling) of the high- and low-growth portfolios (long Delaware, short matched non-Delaware). Explanatory factors include the market (RMRF), the Fama–French size (SMB), and value (HML) factors, as well as

Table XII. Performance attribution regressions

The table shows results of four-factor model around the announcement of the *Smith v. Van Gorkom* ruling. Dependent variable is the daily return on the high- and low-growth portfolios. Factor regressions of equally weighted daily returns are estimated and the results reported below. The table reports the intercept α and the coefficients (factor loadings) on the explanatory variables RMRF, SMB, HML, and momentum. These variables are the returns to zero-investment portfolios designed to capture market, size, book-to-market, and momentum effects, respectively. (Consult Fama and French, 1993; and Carhart, 1997 on the construction of these factors.) The sample period is from January 1985 to February 1985 (41 daily observations) for the dependent variable. Standard errors are reported in parentheses.

	High growth (1)	Low growth (2)	High growth (3)	Low growth (4)
α	-0.0013** (0.0006)	0.0008* (0.0005)	-0.0015** (0.0007)	0.0009* (0.0005)
RMRF	-0.1121 (0.1632)	-0.0519 (0.1247)	-0.0080 (0.3349)	-0.0984 (0.2530)
RMRF * After			-0.1166 (0.3819)	0.0828 (0.2885)
SMB	-0.0104 (0.1728)	-0.3891*** (0.1320)	0.1247 (0.3249)	-0.4207 (0.2454)
SMB * After			-0.1957 (0.3754)	-0.0181 (0.2836)
HML	-0.0553 (0.2259)	0.3394** (0.1726)	-0.0593 (0.3973)	0.1841 (0.3001)
HML * After			0.1355 (0.5201)	0.2638 (0.3929)
Momentum	-0.2977 (0.1810)	-0.1248 (0.1383)	-0.2714 (0.3048)	-0.0067 (0.2302)
Momentum * After			0.0859 (0.4282)	-0.3058 (0.3235)
No. observations	41	41	41	41

Carhart's momentum factor. Columns 1 and 2 of Table XII show that—even after controlling for market, size, value, and momentum factors—Delaware firms in high-growth industries have a negative alpha, whereas Delaware firms in low-growth industries have a positive alpha in the months surrounding the *Smith v. Van Gorkom* decision. In columns 3 and 4, we allow the loadings on the four factors to be different following the *Smith v. Van Gorkom* decision. We find that the alphas remain statistically significant (if anything, they are economically larger). We conclude that, even after controlling for changes in factor loadings, the Delaware Supreme Court decision generated abnormal returns to the high- and low-growth portfolios.

7. Alternative Interpretations

In this section, we review the facts we have established so far and we discuss alternative interpretations. First, we find that Delaware firms in low-growth industries gain and Delaware firms in high-growth industries lose in the days surrounding the Delaware

Supreme Court decision on *Smith v. Van Gorkom* of January 29, 1985. Second, we find that these gains and losses were reversed by the Delaware legislature decision to overturn *Smith v. Van Gorkom* by passing section 102(b)7 in July 1, 1986, so that firms in low-growth industries lose and firms in high-growth industries gain around July 1, 1986. Third, we find that in 1985, relative to 1984, Delaware firms in low-growth industries cut capital expenditures and acquisition activity, whereas Delaware firms in high-growth industries raise less capital. In our view, a plausible and parsimonious explanation that accommodates all of the above findings is that the *Smith v. Van Gorkom* decision increased courts' scrutiny of all Delaware-incorporated firms, which induced the manager of Delaware-incorporated firms to be more conservative in their investment decisions. In turn, consistent with our predictions in Section 4, conservatism is beneficial in industries with few growth opportunities, as conservatism there prevents over-investment, while it is harmful in industries with high-growth opportunities, as conservatism there likely triggers under-investment.

The main alternative interpretation is that, rather than conservatism, our findings reflect a "reduced takeover probability hypothesis", namely the idea that after January 29, 1985, takeovers became less likely. There are two versions of this hypothesis. The first version states that the legal impact of *Smith v. Van Gorkom* was limited to takeover decisions and did not extend to other corporate decisions. The second version states that capital markets and firms were not reacting to the Delaware Supreme Court ruling in *Smith v. Van Gorkom*, but rather to the Delaware Chancery Court decision on the *Moran v. Household* case, which declared the admissibility of using the poison pill as a takeover defense and by chance also took place on January 29, 1985. In Section 7.1, we discuss the two versions of the reduced takeover probability hypothesis and their empirical predictions, and we argue that, to the extent that they apply to our data, they can only explain some pieces of the evidence. Readers who are convinced by Occam's razor type of arguments can thus skip to the conclusions with little loss of continuity. For all others, in Section 7.2, we provide a further empirical test to tell apart the conservatism and the reduced takeover probability hypotheses.

7.1 Reduced Takeover Probability Hypothesis

7.1.a Version 1: *Smith v. Van Gorkom* only affected takeover decisions

To this day, there is a continuing debate in the literature discussing the legal content and impact of the decision in *Smith v. Van Gorkom*. For example, recently [Allen, Kraakman, and Subramanian \(2009\)](#) start from the observation that the *Smith v. Van Gorkom* case was about a takeover bid for Trans Union and argue that *Smith v. Van Gorkom* had a material and lasting effect only on takeover law. At the same time, some critics have even questioned the extent to which the *Smith v. Van Gorkom* ruling actually changed any law (e.g., [Hamermesh, 2002](#)).

We do not believe this version of the reduced takeover probability hypothesis explains our empirical findings, simply because our tests only rely on the perception by financial market participants *at the time of the decision*, and our evidence clearly shows that at the time financial market participants believed the rule to have had a large effect on the business judgment rule with broad implications for court's scrutiny over any business decision. In other words, the only effect of *Smith v. Van Gorkom* that matters for our empirical tests is its impact on financial markets' expectations at the time of the decision. This effect is irrespective of any eventual impact of *Smith v. Van Gorkom* on legal doctrine and practice in the years to follow and even to this day that may have occurred with the benefits of

hindsight and further legal rulings. Even if legal scholars conclude today that the lasting impact of *Smith v. Van Gorkom* is on takeover law, at the time financial market participants believed that *Smith v. Van Gorkom* was binding and with very broad effects on the business judgment rule and on the extent of courts' scrutiny over business decisions.

7.1.b Version 2: the Delaware chancery court decision in *Moran v. Household*

As it turns out, on January 29, 1985, another corporate law decision was rendered, namely, the Delaware Chancery Court ruled in *Moran v. Household International* (490 A. 2nd. 1059) that managers could adopt poison pills even in the absence of a pending takeover bid or actual threat, and reserved the right to later review how the pill was deployed in any particular context. Therefore, to the extent the Delaware Chancery Court affected the expectations of financial market participants regarding the possibility to adopt the poison pill, this event could confound our evidence and the interpretation of our empirical results.

We do not believe the Delaware Chancery Court decision in *Moran v. Household* significantly affected financial markets' expectations, for two reasons. First, the decision was appealed on the same day it was rendered, that is, January 29, 1985, and the appeal itself was widely publicized at the same time as the decision (e.g., Chicago Tribune, January 31, 1985, "Takeover Ruling To Be Appealed"). Second, and most important, US firms by and large did not change their behavior in response to the Delaware Chancery Court decision of January 1985. As Figure 7 shows, using data from Comment and Schwert (1995), adoptions of poison pills were essentially zero and always less than five, each month between 1983 and the final decision by Delaware Supreme Court in November 1985. Only after the supreme court decision of November 1985 did US firms start adopting poison pills in large numbers, that is, thirty firms per month or more started adopting poison pills.

This view is further confirmed by our findings of a reversal in the stock returns around the Delaware legislature decision of July 1, 1986. Importantly, there was no legal ruling about poison pills or about takeovers around that date, neither in the Chancery Court nor in the Delaware Supreme Court. Therefore, if our results around January 29, 1985, only reflected a reduced takeover probability hypothesis due to the poison pill ruling by the Chancery Court, then we would expect to find no result whatsoever around July 1, 1986. Only under the conservatism hypothesis of *Smith v. Van Gorkom* we would expect to find a reversal around July 1, 1986, both for firms in low- and high-growth industries. Therefore, the fact that we do find reversals, and of similar magnitude to those of our original findings around January 29, 1985, does suggest that the results of January 29, 1985, most likely reflect the Delaware Supreme Court decision in *Smith v. Van Gorkom* and not the Chancery Court decision in *Moran*.

In the end, however, we cannot fully exclude that at least some market participant believed in either version of the reduced takeover probability story around January 29, 1985, simply because we do not observe survey data of the expectations that financial market participants held at that time, and we can only gauge such expectations from observed data on prices and returns. As a result, while we find large CARs around January 29, 1985, the interpretation of these results might still reflect, at least in part, some version of the reduced takeover probability hypothesis, and therefore cloud our inference. Therefore, in the next subsection, we will assume that some version of the reduced takeover probability hypothesis holds true in the data around January 29, 1985, and we devise a test to tell apart, as much as possible, the reduced takeover probability hypothesis from the conservatism hypothesis.

Poison Pill Adoptions 1983-1986
(Source: Comment and Schwert 1995)

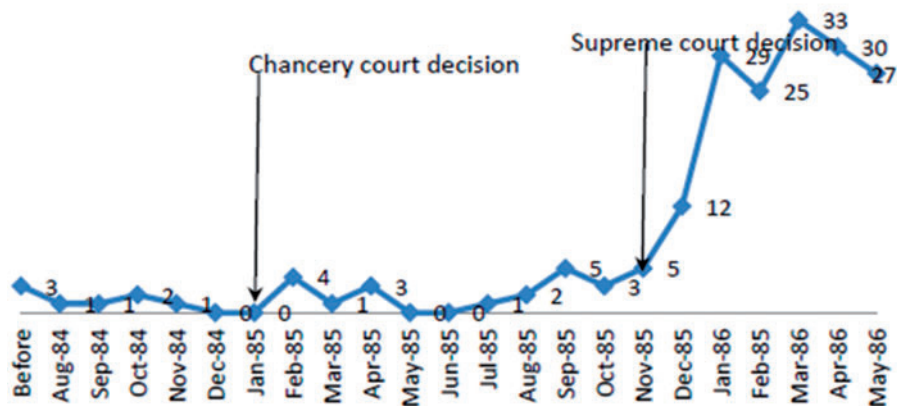


Figure 7. Poison pill adoptions 1983–1986 (Source: Comment and Schwert 1995).

The figure shows the number of firms that adopted poison pill securities every month 1983 and 1986.

7.2 Testing Conservatism Versus Reduced Takeover Probability Hypotheses

We begin by noting that, if takeovers are less likely following January 29, 1985, then firms will be affected in two ways. First, firms will be less likely to be acquirers, and second, they will be less likely to be targets. We discuss the empirical implications of these in Sections 7.2.a and 7.2.b.

7.2.a Reduced probability of being acquirers

There is a significant overlap between the investment conservatism hypothesis and the reduced-probability-of-being-an-acquirer hypothesis, simply because acquiring firms is but one particular type of investment activity. Indeed, it is well known that, by and large, takeover bidders do not gain, and if anything, they lose, particularly in stock-financed deals (e.g., Andrade, Mitchell, and Stafford, 2001). Therefore, from an *ex ante* standpoint, a reduced probability of being acquirers would imply a zero or possibly a positive CAR, as firms are now expected to forego acquisitions that are on average value reducing. This would explain the positive CARs observed around January 29, 1985 for firms in low-growth industries. It would also explain our finding in Table X Panel B that Delaware firms in low-growth industries engage in fewer acquisitions in 1985 relative to 1984, also relative to non-Delaware firms.

At the same time, however, a reduced probability of being an acquirer does not explain our result in Table X Panel B that firms in low-growth industries cut capital expenditures, which by definition are non-takeover related. Such decline in capital expenditures is—however—a natural consequence of conservatism.²²

22 In addition, to rationalize the negative CARs for firms in high-growth industries under a reduced probability of being an acquirer, one would need to assume, counterfactually, that on average firms in high-growth industries engage in acquisitions that are value-enhancing for the acquirers' shareholders.

To conclude, while conservatism explains more pieces of evidence, it is true that there is significant overlap between the conservatism and the reduced takeover probability hypothesis for firms that act as acquirers. Where the conservatism and the reduced takeover probability hypothesis differ more starkly, it is about the probability of firms to become takeover targets. We examine these implications next.

7.2.b Reduced probability of being targets

A firm's value can be expressed as the present value of its standalone cash flows, plus the takeover premium its shareholders would receive conditional on a takeover, times the probability of such takeover. This is true, as long as such probability of being taken over is non-zero. As a result, to distinguish between the conservatism and reduced takeover probability hypothesis, the ideal test is to look at a sample of firms where the *ex ante* takeover probability is essentially zero, or very low. If in such a sample we find results of similar magnitude to the ones that we find in the main sample, then we can safely conclude that our evidence is overall best explained by the conservatism hypothesis.

To identify such a sample, we turn to the existing literature. Both [Shivdasani \(1993\)](#) and [Weisbach \(1993\)](#) find that firms with high inside ownership are less likely to become targets of hostile takeovers. Similarly, [Malatesta and Walkling \(1988\)](#) find that firms with high inside ownership are less likely to adopt poison pills. The general idea surrounding both results is that high inside ownership is a strong takeover defense, and that any change in control in those firms will most likely take the form of block transactions rather than takeover bids, with limited benefits for minority shareholders (e.g., [Barclay and Holderness, 1989](#)).

As a result, by examining the CARs of a sample of firms with high inside ownership around January 29, 1985, we are most likely to identify solely the effects of the *Smith v. Van Gorkom* rather than those of the *Moran* ruling. Furthermore, we are going to identify solely the effects of the *Smith v. Van Gorkom* that apply to Delaware firms for reasons other than mere changes to takeover law affecting the probability of becoming takeover targets or acquirers.

We measure inside ownership with data from the *Value Line Investment Survey*, which covers 1,093 firms in 1986 and was first used in [McConnell and Servaes \(1988\)](#).²³ Consistent with the literature referenced above, we identify firms with high inside ownership as those where management, directors, and officers together own more than 5% of the voting equity.

We present our results in [Table XIII](#). Panel A presents results for firms in high-growth industries. We find that Delaware firms with high inside ownership in high-growth industries lose relative to matched non-Delaware firms around January 29, 1985. The economic magnitude is similar to that found in [Table V](#) for the full sample. Despite the small sample size (72 Delaware and 64 non-Delaware firms) and the consequent low power, we are still able to detect some statistical significance with equally weighted CARs, albeit at later windows of 6–7 days after January 29. With value-weighted CARs on the contrary, we still find the same result and both statistical significance and economic magnitude are very strong, consistent with our findings in [Table XI](#).

23 The leading alternative dataset of managerial ownership is the Fortune 500 list that was used in [Morck, Shleifer, and Vishny \(1988\)](#), which however refers to 1980 and only covers 371 firms.

Table XIII. CARs in firms with high inside managerial ownership—the *Smith v. Van Gorkom* ruling

The table shows cumulative returns of portfolios of Delaware firms with managerial ownership above 5% and matched portfolios of non-Delaware firms, across different event windows. Date 0 refers to the day of the court decision (January 29, 1985). *, **, *** indicate significance at the 10, 5, and 1% levels, respectively.

Panel A: Matching high-growth industries

Event indoww	Equally weighted returns				Value-weighted returns			
	Delaware (%)	Non Delaware (%)	Difference (%)	<i>t</i> -test	Delaware (%)	Non Delaware (%)	Difference (%)	<i>t</i> -test
[0, 1]	0.8	0.8	0.1		0.7	1.4	-0.8	**
[0, 2]	1.7	1.6	0.1		0.9	2.0	-1.1	**
[0, 3]	1.4	1.7	-0.4		0.8	1.9	-1.2	*
[0, 4]	1.0	1.5	-0.4		0.0	1.6	-1.5	**
[0, 5]	1.8	2.5	-0.7		1.4	2.7	-1.4	*
[0, 6]	2.3	3.5	-1.2	*	1.6	3.5	-1.8	**
[0, 7]	2.5	4.1	-1.6	*	1.6	4.0	-2.4	**
[0, 8]	3.7	5.3	-1.6	*	2.5	5.1	-2.6	**
[0, 9]	4.2	5.4	-1.1		3.0	5.3	-2.4	**
[0, 10]	3.6	4.6	-1.0		2.4	4.7	-2.3	**
No. firms	72	64			72	64		

Panel B: Matching low-growth industries

Event window	Equally weighted returns				Value-weighted returns			
	Delaware (%)	Non Delaware (%)	Difference (%)	<i>t</i> -test	Delaware (%)	Non Delaware (%)	Difference (%)	<i>t</i> -test
[0, 1]	0.7	0.1	0.7	**	0.5	0.4	0.1	
[0, 2]	1.0	0.4	0.6		0.3	0.5	-0.2	
[0, 3]	1.6	0.3	1.3	***	0.7	0.4	0.4	
[0, 4]	1.1	0.3	0.8		0.2	0.0	0.1	
[0, 5]	1.9	1.0	1.0		0.8	0.6	0.2	
[0, 6]	2.1	1.6	0.5		1.3	1.3	0.0	
[0, 7]	2.5	1.6	0.8		1.3	1.7	-0.4	
[0, 8]	2.9	2.3	0.6		1.8	2.2	-0.4	
[0, 9]	3.0	2.0	1.0		1.9	2.2	-0.2	
[0, 10]	2.4	1.6	0.8		1.1	1.7	-0.6	
No. firms	55	45			55	45		

Panel B presents results for firms in low-growth industries. We find that Delaware firms with high inside ownership in low-growth industries gain significantly relative to matched non-Delaware firms around January 29, 1985. Again, despite the low sample size (only 55 and 45 Delaware and non-Delaware firms, respectively), we are remarkably able to detect statistical

significance. The equally weighted CARs, particularly in the 1- and 3-day windows following the announcement, are statistically significant and close in magnitude to those of the full sample in Table V. Consistent with Table VI, the value-weighted CARs are not statistically significant.

We conclude that our results in this article reflect solely the economic effects of the *Smith v. Van Gorkom* rather than those of the *Moran* ruling; that *Smith v. Van Gorkom* was believed at the time to be about the business judgment rule rather than takeovers; and that the interpretation of our results is in line with the conservatism hypothesis.

8. Conclusions

We estimate the value of judicial scrutiny over business decisions by exploiting as a “natural experiment” an unexpected and controversial decision of the Delaware Supreme Court that significantly tightened scrutiny over business decisions in Delaware-incorporated firms in 1985. We analyze the impact of the decision on stock returns using matching and differences-in-differences techniques. We find that, compared with appropriately matched non-Delaware firms, Delaware-incorporated firms in high-growth industries lost, whereas firms in low-growth industries gained significantly around the announcement of the decision.

These results are robust and are further corroborated by an additional test. A later regulatory reform to the Delaware code that essentially reversed the effects of the supreme court decision had opposite results: firms in high-growth industries gained and firms in low-growth industries lost significantly. We interpret these results as implying that the economic rationale of the business judgment rule is to prevent courts from making poor business decisions, as these decisions can be most harmful in the fastest growing sectors of the economy.

Our results can also help shed light on the economic role of courts and regulation. A large body of literature has pointed out that judge-made law can, on average, improve the efficiency of common law over time, even if individual judicial decisions sometimes stem from judicial objectives other than maximizing efficiency (e.g., Cardozo, 1921; Posner, 2003; Gennaioli and Shleifer, 2007a). In some cases, though, the idiosyncratic judicial overruling of certain legal precedents can make the legal system steer away from the efficient path (Gennaioli and Shleifer, 2007b). In these circumstances, regulation may be needed to step in and restore stability in the legal system.

The *Smith v. Van Gorkom* supreme court decision and the subsequent section 102(b)7 regulation provide an illustration of these and related issues. In *Smith v. Van Gorkom*, the supreme court overruled the prevalent legal interpretation of the business judgment rule by imposing personal liability on directors. While this decision was beneficial for firms in low-growth industries, this decision had several adverse effects, most notably the stifling of growth in industries with high-growth opportunities. More importantly, though, while the decision centered on a specific takeover case, it generated substantial uncertainty as to the Delaware Supreme Court’s view of the business judgment rule, with the potential to have a long-lasting negative effect on the economy. Against this backdrop of legal uncertainty, the Delaware legislature stepped in with section 102(b)7 to undo most of the effects of *Smith v. Van Gorkom*. In sum, our results are also consistent with the view that regulation remedies the failure of courts to solve contract and tort disputes cheaply, predictably, and impartially (Shleifer, 2010). In addition, our results show that, by doing so, regulation may also generate significant costs as some firms are set to lose when the same regulation is applied to a large and heterogeneous set of firms. The welfare implications of these issues are an exciting topic for future research.

Appendix: Proofs

Proof of Lemma 1: The first order condition of managerial utility is $\gamma g - \gamma c \varphi + b - m \varphi + \frac{mg}{c} = 0$. The investment strategy given the above condition becomes

$$\varphi^m = \frac{(\gamma g + b + \frac{mg}{c})}{\gamma c + m} \tag{A.1}$$

The value of the firm given managerial investment is:

$$\gamma(V(\varphi^m) - \varphi^m) = \gamma g \frac{(\gamma g + b + \frac{mg}{c})}{\gamma c + m} - \frac{\gamma c}{2} \left(\frac{(\gamma g + b + \frac{mg}{c})}{\gamma c + m} \right)^2 = \frac{\gamma(\gamma g + b + \frac{mg}{c})(\frac{\gamma g c}{2} + \frac{mg}{2} - \frac{bc}{2})}{(\gamma c + m)^2}$$

It then follows:

- a. The derivative of I^m with respect to m is $\frac{(\frac{g}{c})(\gamma c + m) - (\gamma g + b + \frac{mg}{c})}{(\gamma c + m)^2}$ which simplifies to $\frac{-b}{(\gamma c + m)^2}$, which is strictly negative;
- b. The result is derived from substituting m in Equation (A.1)
- c. The result is derived from using L'Hopital rule with respect to m in Equation (A.1). ■

Proof of Proposition 1: Proof. $\frac{\gamma(V(\varphi^m) - \varphi^m)}{V(\varphi^A) - \varphi^A} = \frac{\gamma(\gamma g + b + \frac{mg}{c})(\frac{\gamma g c}{2} + \frac{mg}{2} - \frac{bc}{2})}{\frac{g^2}{2c} - \frac{b^2}{2c}}$

Take the derivative with respect to g :

$$\frac{\frac{\gamma(\frac{m}{c} + \gamma)(\frac{\gamma g c}{2} + \frac{mg}{2} - \frac{bc}{2}) + \gamma(\gamma g + b + \frac{mg}{c})(\frac{\gamma c}{2} + \frac{m}{2})}{(\gamma c + m)^2} \left(\frac{g^2}{2c} - \frac{b^2}{2c} \right) - \frac{g}{c} \left(\frac{\gamma(\gamma g + b + \frac{mg}{c})(\frac{\gamma g c}{2} + \frac{mg}{2} - \frac{bc}{2})}{(\gamma c + m)^2} \right)}{\left(\frac{g^2}{2c} - \frac{b^2}{2c} \right)^2}$$

To determine whether the derivative above is positive or negative, we need to determine sign of the numerator:

$$\frac{\gamma(\frac{m}{c} + \gamma)(\frac{\gamma g c}{2} + \frac{mg}{2} - \frac{bc}{2}) + \gamma(\gamma g + b + \frac{mg}{c})(\frac{\gamma c}{2} + \frac{m}{2})}{(\gamma c + m)^2} \left(\frac{g^2}{2c} - \frac{b^2}{2c} \right) - \frac{g}{c} \left(\frac{\gamma(\gamma g + b + \frac{mg}{c})(\frac{\gamma g c}{2} + \frac{mg}{2} - \frac{bc}{2})}{(\gamma c + m)^2} \right)$$

Note that $\frac{\gamma}{(\gamma c + m)^2}$ is a common factor and therefore we need only to determine the sign of:

$$\begin{aligned} & \left(\left(\frac{m}{c} + \gamma \right) \left(\frac{\gamma g c}{2} + \frac{mg}{2} - \frac{bc}{2} \right) + \left(\gamma g + b + \frac{mg}{c} \right) \left(\frac{\gamma c}{2} + \frac{m}{2} \right) \right) \left(\frac{g^2}{2c} - \frac{b^2}{2c} \right) - \frac{g}{c} \left(\gamma g + b + \frac{mg}{c} \right) \left(\frac{\gamma g c}{2} + \frac{mg}{2} - \frac{bc}{2} \right) \\ &= \left(\frac{\gamma^2 g c}{2} + \frac{\gamma m g}{2} - \frac{\gamma b c}{2} + \frac{\gamma g m}{2} + \frac{m^2 g}{2c} - \frac{m b}{2} + \frac{\gamma^2 g c}{2} + \frac{\gamma m g}{2} + \frac{\gamma b c}{2} + \frac{b m}{2} + \frac{\gamma m g}{2} + \frac{m^2 g}{2c} \right) \left(\frac{g^2}{2c} - \frac{b^2}{2c} \right) \\ &\quad - \frac{g}{c} \left(\gamma g + b + \frac{mg}{c} \right) \left(\frac{\gamma g c}{2} + \frac{mg}{2} - \frac{bc}{2} \right) \\ &= \left(\gamma^2 g c + 2\gamma m g + \frac{m^2 g}{c} \right) \left(\frac{g^2}{2c} - \frac{b^2}{2c} \right) - \frac{g}{c} \left(\gamma g + b + \frac{mg}{c} \right) \left(\frac{\gamma g c}{2} + \frac{mg}{2} - \frac{bc}{2} \right) \end{aligned}$$

Table A1. Equally weighted CARs—the *Smith v. Van Gorkom* ruling

The table shows cumulative returns of portfolios of Delaware firms and matched portfolios of non-Delaware firms in states other than the seventeen states that mimic Delaware corporate law (Alaska, Arkansas, Colorado, Illinois, Kansas, Kentucky, Louisiana, Massachusetts, Minnesota, Montana, New Jersey, North Dakota, Oklahoma, Oregon, Rhode Island, South Carolina, and Texas), across different event windows. Date 0 refers to the day of the court decision (January 29, 1985). *, **, *** indicate significance at the 10, 5, and 1% levels, respectively.

Panel A: Matching high-growth industries

Event window	Delaware (%)	Do not mimic Delaware (%)	Difference (%)	t-test
[0, 1]	0.8	0.8	0.0	
[0, 2]	1.3	1.4	-0.1	
[0, 3]	1.0	1.8	-0.8	
[0, 4]	0.5	1.3	-0.8	
[0, 5]	1.3	2.4	-1.1	*
[0, 6]	2.0	3.7	-1.8	***
[0, 7]	2.4	4.4	-2.0	***
[0, 8]	3.3	5.5	-2.1	***
[0, 9]	3.9	5.6	-1.7	***
[0, 10]	3.1	4.8	-1.7	**
No. firms	100	167		

Panel B: Matching low-growth industries

Event window	Delaware (%)	Do not mimic Delaware (%)	Difference (%)	t-test
[0, 1]	0.6	0.1	0.6	***
[0, 2]	0.9	0.6	0.3	
[0, 3]	1.5	0.7	0.8	*
[0, 4]	1.2	0.5	0.7	
[0, 5]	2.2	1.1	1.1	***
[0, 6]	3.0	1.6	1.4	***
[0, 7]	3.3	2.0	1.2	**
[0, 8]	4.2	3.0	1.2	**
[0, 9]	4.3	2.5	1.3	**
[0, 10]	3.7	2.4	1.2	*
No. firms	93	167		

Note that g/c is a common factor, and therefore we need only to determine the sign of:

$$\begin{aligned} & \left(\gamma^2 c + 2\gamma m + \frac{m^2}{c}\right) \left(\frac{g^2}{2} - \frac{b^2}{2}\right) - \left(\gamma g + b + \frac{mg}{c}\right) \left(\frac{\gamma g c}{2} + \frac{mg}{2} - \frac{bc}{2}\right) \\ &= \left(\gamma^2 c + 2\gamma m + \frac{m^2}{c}\right) \left(\frac{g^2}{2} - \frac{b^2}{2}\right) - \left(\frac{\gamma^2 g^2 c}{2} + \frac{\gamma m g^2}{2} - \frac{\gamma g b c}{2} + \frac{b \gamma g c}{2} + \frac{b m g}{2} - \frac{b^2 c}{2} + \frac{\gamma m g^2}{2} + \frac{m^2 g^2}{2c} - \frac{b m g}{2}\right) \\ &= \left(\gamma^2 c + 2\gamma m + \frac{m^2}{c}\right) \left(\frac{g^2}{2} - \frac{b^2}{2}\right) - \left(\frac{\gamma^2 g^2 c}{2} + \gamma m g^2 - \frac{b^2 c}{2} + \frac{m^2 g^2}{2c}\right) \\ &= -\frac{b^2}{2} \left(2\gamma m + \frac{m^2}{c} + c(\gamma^2 - 1)\right) = -\frac{cb^2}{2} \left(\left(\frac{m}{c} + \gamma\right)^2 - 1\right) \end{aligned}$$

The above is strictly negative when $m > (1 - \gamma)c$. This inequality holds by Assumption 2. ■

Proof of Corollary 1

$$\lim_{g \rightarrow b} \frac{\gamma \left(\gamma g + b + \frac{mg}{c}\right) \left(\frac{\gamma g c}{2} + \frac{mg}{2} - \frac{bc}{2}\right)}{(c+m)^2} = \frac{\gamma \left(\gamma b + b + \frac{mb}{c}\right) \left(\frac{mb}{2} - \frac{(1-\gamma)bc}{2}\right)}{(\gamma c + m)^2} = \frac{0}{0}$$

The numerator is positive because $m > (1 - \gamma)c$ by Assumption 2. Therefore the limit above is ∞ .

$$\lim_{g \rightarrow \infty} \frac{\gamma \left(g + b + \frac{mg}{c}\right) \left(\frac{g c}{2} + \frac{mg}{2} - \frac{bc}{2}\right)}{(c+m)^2} = \frac{\gamma \left(c + 2m + \frac{m^2}{c}\right)}{(c+m)^2} = \frac{\frac{\gamma}{c} (c^2 + 2m + m^2)}{(c+m)^2} = \gamma < 1$$

Where the above is derived using the L'Hopital rule. Since the ratio is continuous in g , and as g approaches b it becomes ∞ and as g approaches ∞ it becomes smaller than 1, there exists g^* such that for all $g > g^*$ the ratio is larger than 1 and for all $g < g^*$ the ratio is smaller than one. ■

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