



A comparative review of corporate-governance literature: evidence from NASDAQ and NYSE companies

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Abstract

In this review, we survey the literature on board independence, with particular emphasis on the long-term effects of the United States Securities and Exchange Commission's 2003 board-independence mandate. Grounded in agency theory, the mandate was introduced to strengthen board oversight and improve operating performance following a series of major corporate scandals. Although board independence is widely promoted as a mechanism for aligning managerial behavior with shareholder interests, empirical studies have produced mixed evidence regarding its effectiveness, with outcomes often varying across firms and regulatory environments. To examine these dynamics more closely, we highlight a series of studies that provide a rigorous empirical evaluation of the mandate's impact on firms listed on NASDAQ and NYSE. The review emphasizes the conditional nature of board-independence reforms and the roles of enforcement mechanisms and firm characteristics in shaping governance outcomes. These findings suggest that governance policies may be more effective when they account for institutional differences and firm-specific conditions rather than relying solely on uniform structural mandates.

Keywords: Agency theory; Board-independence mandate; NASDAQ; NYSE; Operating performance.

JEL Classifications: G34, G38, L25, M14

Suggested Citation:

Pandya, D. & Van Deventer, I.A. (2026). A comparative review of corporate-governance literature: evidence from NASDAQ and NYSE companies. *International Journal of Accounting, Business and Finance*, 4(2), 60-77. <https://dx.doi.org/10.55429/ijabf.v4i2.213>

1. Introduction

Despite a strong theoretical foundation, empirical evidence on the effectiveness of board-independence mandates remains mixed. Agency theory suggests that independent boards reduce agency costs by aligning managerial decisions with shareholder interests (Fama & Jensen, 1983; Jensen & Meckling, 1976); however, empirical outcomes vary across firms, enforcement regimes, and market environments.

Prior studies (Adams et al., 2010; Bhagat & Black, 1998; B. Hermalin & Weisbach, 2003) question whether board structure alone can reliably improve governance outcomes. Boivie et al. (2016) emphasize the cognitive and political limitations directors face, suggesting that structural independence may not translate into effective monitoring in practice. Doidge et al. (2007) further argue that institutional capacity, including regulatory strength, enforcement credibility, and market norms, plays a central role in determining whether governance reforms are effective.

Against this backdrop, the SEC's 2003 board-independence mandate represented a major policy shift. Building on the broader reform momentum of the Sarbanes-Oxley Act of 2002, the mandate sought to reduce managerial opportunism by strengthening independent directors' authority. Although agency theory provided the primary justification for the reform, empirical evidence has been mixed. For example, Cohen et al. (2008) find that Sarbanes-Oxley significantly reduced accrual-based earnings management but was accompanied by an increase in real earnings



management, suggesting that governance reforms may alter rather than eliminate opportunistic behavior.

Evidence from other institutional settings further reinforces the importance of contextual governance factors. Studies of emerging and international markets show that board independence often interacts with other governance mechanisms and institutional conditions in shaping firm outcomes (Al Koni et al., 2025; Arora, 2024). Taken together, this evidence highlights the need for context-sensitive analyses that examine how firms respond to governance mandates across different regulatory environments. The studies by Pandya and Van Deventer address this issue by evaluating the long-term effects of the SEC's 2003 reforms using a comparative, exchange-level framework.

The first study (Pandya & Van Deventer, 2021b) analyzes 381 NASDAQ firms across 5,005 firm-year observations and finds no statistically significant post-reform improvement in operating performance (coefficient = 0.497, $p = 0.577$), suggesting that symbolic compliance may have prevailed under weaker enforcement conditions. The second study (Pandya & Van Deventer, 2021a), examining 857 NYSE firms and 11,632 firm-year observations, reports a statistically significant improvement in operating performance (coefficient = 0.8453, $p = 0.030$) as measured by operating return on assets (OROA), consistent with stronger governance expectations and agency theory.

A third study (Pandya & Van Deventer, 2024) applies a triple-difference framework to compare firms across both exchanges. The interaction term for OROA yields a marginally significant coefficient (0.7400, $p = 0.062$), indicating moderate efficiency gains among NYSE firms. In contrast, the Tobin's Q regression yields a statistically significant coefficient of 0.1024 ($p = 0.038$), suggesting stronger market-based valuation effects. Notably, the Tobin's Q effect is more than 35 percent larger than the corresponding OROA coefficient, reinforcing the view that investors responded more positively to reforms in the NYSE environment, where enforcement standards were stronger.

Taken together, these studies complement and extend the board independence literature by demonstrating that the effectiveness of governance reforms depends heavily on institutional context. Their findings show that NYSE firms, subject to stricter board independence requirements and stronger enforcement regimes, experienced measurable improvements in both operating and market-based performance, while NASDAQ firms did not. By combining accounting-based and market-based metrics and extending the post-mandate evaluation period, these studies provide detailed, market-specific evidence on how the regulatory environment influences the outcomes of governance reforms. These results align with broader research suggesting that board independence is most effective when supported by credible enforcement and institutional capacity (Bhagat & Bolton, 2008; Boivie et al., 2016; B. Hermalin & Weisbach, 2003). At the same time, the absence of a consistent relationship between board independence and long-term firm performance, as documented by Bhagat and Black (1998), underscores the limitations of uniform governance mandates across firms with diverse organizational structures and regulatory environments.

The rest of the paper discusses the background (Section 2), theoretical framework and hypotheses (Section 3), literature selection methodology (Section 4), empirical evidence (Section 5), and concludes the findings (Section 6)

2. Background

The concept of board independence has become a central pillar of corporate governance theory and reform. Over time, increasing emphasis has been placed on the role of independent directors in mitigating agency conflicts and strengthening board oversight. This regulatory focus reflects a broader historical evolution in U.S. corporate governance. (Gordon, 2006) traces the rise of independent directors from the 1950s onward, documenting how evolving legal standards and shifting market expectations surrounding shareholder value and stock-market performance created the institutional backdrop for later reforms, including the SEC's 2003 board-independence mandate. Agency theory has long provided the theoretical framework for understanding conflicts between shareholders and managers, and later literature reviews reaffirm its continued relevance in governance research (Panda & Leepsa, 2017).

2.1. Historical foundations

Corporate governance reforms have long been influenced by agency theory, which emphasizes the role of board oversight in mitigating conflicts between managers and shareholders. However, early empirical research raised doubts about the practical impact of structural reforms such as board independence. Bhagat and Black (1998) find no consistent association between board independence and long-term operating performance, suggesting that structural board reforms alone may not reliably predict governance effectiveness. This evidence challenges the assumption that simply increasing the proportion of independent directors enhances oversight or firm outcomes. Building on this debate, Bhagat and Bolton (2008) offer a more nuanced view. They find that governance mechanisms such as director independence, ownership structure, and CEO duality are associated with improved performance when they operate within a broader system of monitoring and incentive alignment. Their analysis suggests that board independence contributes most to firm value when it is integrated with complementary governance practices. Together, these studies underscore the importance of coordinated governance mechanisms in translating board reforms into meaningful performance gains.

Broader evidence highlights the importance of institutional and firm-level context in shaping governance outcomes. Doidge et al. (2007) show that differences in legal systems and investor protections significantly influence the effectiveness of governance across countries. Similarly, Guo et al. (2015) find that regulatory shocks, such as the SEC's 2003 reforms, can either reinforce or displace internal governance mechanisms depending on how firms adapt, illustrating the complex interaction between external mandates and organizational structures. Black et al. (2006) provide international evidence that firm valuation tends to improve under stronger governance systems, particularly when reforms are credibly enforced and consistent with local institutional norms. In contrast, Gupta et al. (2009), analyzing Canadian firms, report no significant association between board independence or overall governance quality and firm value during the early 2000s. Taken together, these studies suggest that the impact of governance reforms depends heavily on ownership structure, enforcement credibility, and the broader institutional environment.

Additional research adds nuance to the discussion of board structure and effectiveness. Cheng (2008), Coles et al. (2008), Duchin et al. (2010) and Linck et al. (2005) examine how board composition, size, and independence influence firm outcomes, often using cross-sectional or short-panel data. Duchin et al. (2010), for example, find that the benefits of board independence are conditional on low information costs. Faleye et al. (2011) argue that excessive independence may reduce managerial flexibility, while Chen et al. (2015) report that increasing board independence

does not consistently reduce earnings management. These findings suggest that structural reforms alone may be insufficient unless they are accompanied by stronger monitoring and more active board engagement.

Director expertise also emerges as an important factor in board effectiveness. Wang et al. (2015) show that independent directors without industry experience are less effective in challenging management decisions. Expanding on this idea, Faleye et al. (2018) find that directors with deep industry expertise strengthen board oversight and are associated with improved financial reporting and firm performance. These findings reinforce the view that independence alone is not sufficient. Cheng (2008) observes that larger boards tend to be associated with lower operating performance variability, while Coles et al. (2008) emphasize that board structure should be aligned with firm complexity. In this context, nominal independence without sufficient expertise may limit boards' ability to provide effective oversight, which may help explain why increased board independence did not translate into improved performance among NASDAQ firms in the post-reform period.

Although these studies provide valuable insights into the relationship between board structure and firm outcomes, many rely on cross-sectional analyses or short time horizons and often do not distinguish between stock exchanges or account for post-reform governance dynamics. These limitations make it difficult to evaluate how regulatory governance mandates affect firms over time.

2.2. The 2003 board-independence mandate

Against this backdrop, the SEC's 2003 regulatory changes represented a major policy shift aimed at restoring investor confidence and strengthening corporate oversight. Grounded in agency theory, the reforms were introduced in response to high-profile corporate scandals and sought to improve operating performance by increasing board independence and strengthening oversight by independent directors (Jensen & Meckling, 1976; Fama & Jensen, 1983). The mandate has since become a central focus of empirical evaluation in corporate governance research.

Pandya and Bathala (2013) examine firms with insider-controlled boards that transitioned to majority-independent boards in response to regulatory pressure and listing requirements. Over the three-year period following the reforms, they find no statistically significant improvement in operating performance, suggesting that compliance-driven changes in board composition did not necessarily translate into stronger oversight or improved outcomes.

Expanding the time horizon, Pandya and Van Deventer (2021a) analyze NASDAQ-listed firms from 1997 to 2012 and similarly find no significant improvements in either accounting-based measures such as OROA or market-based measures such as Tobin's Q. These results support the "window-dressing" hypothesis, which suggests that firms may appoint nominally independent directors to meet formal requirements while retaining managerial control. Consistent with this interpretation, Rutledge et al. (2016) also find no reliable performance gains from board independence among NASDAQ-100 firms after accounting for endogeneity. Together, these studies suggest that structural reforms may not produce substantive governance improvements unless they alter existing power dynamics. The relatively weaker independence requirements for NASDAQ firms during the reform period may partly explain these outcomes.

In contrast, Pandya and Van Deventer (2021b) examine NYSE-listed firms and find a statistically significant positive relationship between increased board independence and operating

performance. Firms with previously insider-dominated boards experienced notable improvements in OROA following the reforms. Their results suggest that NYSE firms benefited more from the mandate, potentially due to stricter exchange-level rules requiring fully independent compensation and nominating committees. These findings are consistent with Chhaochharia and Grinstein (2007), who also document performance improvements among NYSE firms during the early post-SOX period.

Building on these contrasts, Pandya and Van Deventer (2024) conduct a cross-exchange comparison incorporating both accounting-based and market-based performance measures. Their analysis confirms that NYSE firms outperformed their NASDAQ counterparts in the post-reform period, with statistically significant gains in Tobin's Q. These results indicate that governance reforms are more effective in environments with stronger enforcement and higher initial governance standards.

Evidence from other institutional settings further highlights the importance of context in shaping governance outcomes. Abdullah and Tursoy (2023), examining non-financial firms listed on the Frankfurt Stock Exchange between 2002 and 2018, find that several governance characteristics, including audit committee structure and board size, are negatively associated with firm performance, while CEO duality has no statistically significant effect. The authors suggest that larger boards and extensive governance oversight may slow decision-making and create coordination challenges in insider-controlled governance systems.

Additional evidence from emerging markets highlights how board independence may interact with other governance mechanisms. Arora (2024), analyzing Indian firms, finds that CEO duality is negatively associated with firm performance, but that higher levels of board independence mitigate this effect. These findings suggest that independent directors can offset monitoring weaknesses associated with concentrated leadership structures and illustrate how governance mechanisms often operate as complementary components rather than as isolated structural reforms.

More recent research also examines how specific board attributes influence agency costs across different institutional settings. Al Koni et al. (2025) analyze industrial firms listed on the Palestine Exchange and the Amman Stock Exchange and find that board characteristics, such as independence, appropriate size, financial expertise, and diversity, reduce agency costs and improve organizational performance. Their findings indicate that governance mechanisms can mitigate principal-agent conflicts, although their effectiveness depends on regulatory and economic conditions.

Finally, while Pandya and Van Deventer (2021b) provide valuable insights into NYSE-listed firms, their analysis focuses primarily on accounting-based outcomes. Their 2024 study addresses this limitation by incorporating both accounting and market-based performance measures, offering a more comprehensive evaluation of post-reform firm performance.

Despite decades of empirical inquiry, the literature has yet to reach a definitive conclusion on the effectiveness of board independence mandates. Differences in methodology, time horizon, and definitions of independence contribute to the persistence of this debate. Overall, the evidence suggests that while board independence may be a necessary component of effective governance, it is not sufficient on its own. The success of governance reforms depends largely on enforcement strength, institutional context, and firm-specific characteristics.

3. Theoretical framework and hypotheses

Agency theory provides the foundation for understanding the expected benefits of governance reforms. It posits that separating ownership from control can lead managers to pursue self-interest at the expense of shareholders (Jensen & Meckling, 1976). To address this conflict, regulators and scholars have proposed a range of governance mechanisms, including board independence, enhanced oversight, and better alignment between managerial and shareholder interests (Bebchuk & Fried, 2005; Fama & Jensen, 1983)

Nevertheless, prior research indicates that the effectiveness of board independence is not uniform. Adams et al. (2010) argue that although independent directors may enhance monitoring, their impact on firm performance depends heavily on factors such as firm complexity, information asymmetry, and broader contextual influences that shape board effectiveness. Building on this view, Boivie et al. (2016) contend that structural reforms often overlook boards' cognitive and political limitations, making effective oversight difficult even under seemingly ideal conditions. In parallel, Hermalin and Weisbach (2003) emphasize that board structure is often endogenously determined by firm-specific characteristics, suggesting that mandates for independence may fall short of their intended outcomes unless accompanied by a broader organizational commitment to governance quality. This argument builds on their earlier empirical study (B. E. Hermalin & Weisbach, 1991), which finds no consistent relationship between board composition and operating performance, reinforcing the idea that governance structures are shaped by internal dynamics rather than external mandates alone. Consistent with this perspective, Bhagat and Black (2002) find no significant relationship between board independence and long-term operating performance. Their findings highlight the limitations of applying structural board reforms uniformly across firms and underscore the need to consider contextual variation and organizational complexity in governance design.

Consistent with this view, recent empirical evidence suggests that governance mechanisms operate as complementary components rather than isolated structural reforms. For example, board independence can mitigate performance risks associated with CEO duality (Arora, 2024), while board attributes such as expertise, size, and diversity can reduce agency costs and strengthen organizational oversight in emerging markets (Al Koni et al., 2025).

This debate also reflects a broader methodological challenge in corporate finance research, where endogeneity often complicates the interpretation of causal relationships between governance structures and firm outcomes (Roberts & Whited, 2013). Traditional cross-sectional studies may confound the effects of governance reforms with unobserved firm characteristics or reverse causality. To address these limitations, scholars have increasingly turned to quasi-experimental designs, such as difference-in-differences and triple-differences models, which allow for more credible causal inference by exploiting natural variation in policy implementation over time and across groups (Angrist & Pischke, 2009).

Some scholars have taken this critique further, characterizing governance mandates like the SEC's 2003 reforms as overly prescriptive and insufficiently responsive to firm-level variation. For example, Romano (2005) argues that such reforms often reflect political expediency rather than empirical evidence, describing them as "quack corporate governance" that may impose costs without delivering meaningful improvements in oversight or performance. This critique raises an important question: Does the empirical evidence from NYSE and NASDAQ firms validate or refute Romano's argument that board-independence mandates may impose uniform governance

structures without consistently improving firm outcomes?

The SEC's 2003 governance reforms, which applied to both NASDAQ and NYSE firms, imposed differing requirements across exchanges. NYSE-listed firms were required to establish audit, compensation, and nominating committees composed entirely of independent directors, while NASDAQ-listed firms were not required to implement compensation and nominating committees until 2012. These institutional differences created a natural experiment to examine whether regulatory stringency influences operating performance, a central question addressed through the lens of agency theory and the broader governance literature.

To test this framework in a NASDAQ setting, Pandya and Van Deventer (2021a) evaluate the hypothesis that the board-independence mandate would improve the long-term operating performance of NASDAQ-listed firms. This hypothesis (H1) is formalized as: $Operating\ Performance_i = \beta_0 + \beta_1(Inside\ Board_i * Post\ Mandate_i) + \Gamma X_{it} + \delta_i + Y_t + \varepsilon_{it}$. Although the hypothesis posits that NASDAQ firms will eventually align with agency-theory predictions, the findings do not support this assumption. The analysis reveals no statistically significant improvement in operating performance for insider-controlled firms, with a coefficient of 0.497 ($p = 0.577$) for OROA and 0.0058 ($p = 0.782$) for Tobin's Q. These findings suggest that many NASDAQ firms engaged in symbolic rather than substantive compliance with the board-independence mandate. This pattern aligns with prior research showing that firms may adopt governance reforms symbolically to satisfy external expectations while preserving existing power structures (Westphal & Zajac, 1998). Berger et al. (1997), in the same vein, find that entrenched managers often structure capital decisions to reduce external oversight, further illustrating how governance mechanisms can be co-opted to protect managerial interests.

They apply the same approach to NYSE-listed firms in Pandya and Van Deventer (2021b), testing whether stricter governance rules and more robust enforcement would reduce agency costs and improve performance among firms with previously insider-dominated boards. This second hypothesis (H2) uses the identical model specification: $Operating\ Performance_i = \beta_0 + \beta_1(Inside\ Board_i * Post\ Mandate_i) + \Gamma X_{it} + \delta_i + Y_t + \varepsilon_{it}$. The results confirm this hypothesis, revealing a statistically significant increase in operating performance, with a coefficient of 0.8453 ($p = 0.030$) for OROA. These findings support agency theory, suggesting that stronger board oversight contributed to meaningful gains in operating performance. The NYSE case further underscores how regulatory context and enforcement strength shape the outcomes of governance reforms.

Building on this comparison, the third study assesses cross-exchange effects. In their comparative study, Pandya and Van Deventer (2024) test whether the board independence mandate had a more positive effect on NYSE firms than on NASDAQ firms. This third hypothesis (H3) is modeled as: $Operating\ Performance_i = \beta_0 + \beta_1(Board\ Composition_i * Post\ Mandate_i * Exchange) + \Gamma X_{it} + \delta_i + Y_t + \varepsilon_{it}$. Using OROA as the dependent variable, the triple-interaction term in the regression produces a positive coefficient of 0.7400 ($p = 0.062$), which is significant at the 10 percent level and suggests stronger post-reform performance for NYSE firms relative to their NASDAQ counterparts. More notably, the Tobin's Q regression produced a statistically significant coefficient of 0.1024 ($p = 0.038$), indicating that shareholder valuation gains were disproportionately concentrated among NYSE firms. Descriptive statistics further showed that NYSE firms had higher average OROA (14.91% vs. 13.80%), larger average total assets (\$15.3 billion vs. \$6.5 billion), and lower average Tobin's Q values (1.76 vs. 2.25). These results underscore structural and valuation differences between exchanges. They reinforce the role of enforcement rigor and pre-existing governance conditions in shaping reform effectiveness.

Collectively, these hypotheses and empirical results suggest that while governance reforms are broadly intended to realign managerial incentives with shareholder interests, their effectiveness depends heavily on institutional context, enforcement mechanisms, and firm-level characteristics. The studies also underscore the value of rigorous quasi-experimental methods in isolating causal effects and mitigating endogeneity concerns. More broadly, critics have argued that agency theory may oversimplify governance dynamics by focusing narrowly on financial alignment, often neglecting ethical, organizational, or stakeholder considerations (Zogning, 2017). Given these complexities, a closer examination of how governance reforms have performed across distinct regulatory environments offers valuable insight into when and why structural changes yield substantive improvements in firm outcomes.

4. Literature selection methodology

This review focuses on the empirical research of Pandya and Van Deventer examining the long-term effects of the SEC's 2003 board-independence mandate. Supporting literature was identified through searches of EBSCO Academic Search Complete, Google Scholar, and Sage Journals using keywords such as board independence, corporate governance, board composition, and agency theory. We did not restrict the review to a specific publication period; instead, we prioritized studies most germane to the topic and widely recognized seminal contributions in the corporate-governance literature. These sources were selected to provide a theoretical background and to relate the findings of Pandya and Van Deventer (2021b, 2021a, 2024) to the broader corporate governance literature. We excluded studies unrelated to board governance, the role of independent directors, or the evaluation of governance reforms. This focused approach allows us to highlight the empirical contributions of the Pandya and Van Deventer research while linking their findings to the broader scholarly debate on corporate governance and board independence.

5. Empirical evidence

To evaluate the practical impact of the SEC's 2003 board-independence mandate, it is essential to examine firm-level outcomes under real-world regulatory conditions. The empirical studies by Pandya and Van Deventer (2021a, 2021b, 2024) provide a comprehensive, methodologically rigorous assessment of how these reforms affected long-term operating performance across U.S. firms. Employing quasi-experimental designs, specifically difference-in-difference and triple-difference frameworks, these studies aim to isolate the causal effects of the mandate while addressing potential endogeneity, omitted variable bias, and unobserved heterogeneity. Their approach aligns with established best practices in causal inference, as outlined by Angrist and Pischke (2009), and reflects the growing scholarly emphasis on robust empirical identification strategies in governance research.

Collectively, the three companion studies assess the long-term consequences of the 2003 reforms for firms listed on NASDAQ and the NYSE over a 15-year observation window (1997 to 2012), including a 10-year post-mandate period (2002 to 2012). The first two studies analyze each exchange independently, while the third incorporates a triple-difference framework to enable direct cross-exchange comparison. By focusing on insider- versus outsider-controlled boards, the authors offer insights into how enforcement strength, pre-existing governance structures, and exchange-specific norms shape the realized effectiveness of structural reforms.

Across these analyses, operating performance is measured using OROA and Tobin's Q. The findings indicate that insider-controlled firms on NASDAQ experienced no statistically significant change in performance following the mandate, suggesting that weaker enforcement

may have resulted in symbolic compliance. In contrast, NYSE-listed insider-controlled firms exhibited significant long-run performance gains, consistent with agency theory predictions and the exchange's more stringent board-independence requirements. The comparative study further confirms that NYSE firms derived more pronounced benefits from the mandate, both statistically and economically, than their NASDAQ counterparts. Taken together, these results underscore the importance of institutional context and enforcement mechanisms in determining the efficacy of governance reforms and contribute meaningfully to the broader debate over whether structural independence alone enhances firm value.

5.1. Evidence from NASDAQ companies

Table 1 summarizes the descriptive statistics reported by Pandya and Van Deventer (2021a) for 381 U.S. firms listed on NASDAQ, comprising 268 outsider-controlled (compliant) firms and 113 insider-controlled (noncompliant) firms in 2000. Compliant firms had average total assets of approximately \$7.0 billion (standard deviation = \$21.9 billion), an average OROA of 13.09% (standard deviation = 11.96%), and a market-to-book ratio of 3.49 (standard deviation = 3.92). In contrast, noncompliant firms were smaller, with average total assets of \$5.2 billion (standard deviation = \$26.4 billion), but had a higher average OROA of 15.45% (standard deviation = 10.43%) and a slightly lower market-to-book ratio of 3.39 (standard deviation = 3.83). The debt ratio was also lower among noncompliant firms, averaging 14.40% (standard deviation = 18.60%) compared to 17.23% (standard deviation = 19.68%) for compliant firms. These statistics reflect underlying differences in firm size, profitability, and capital structure between compliant and noncompliant NASDAQ firms prior to the implementation of the 2003 corporate-governance reforms.

Table 1. Descriptive Statistics for Compliant and Noncompliant NASDAQ Firms

Variable	Firms	Obs.	Mean	Std. Dev.	Min	Max
OROA	268	3506	13.09	11.96	-166.63	38.69
	113	1499	15.45	10.43	-96.11	38.69
Debt Ratio	268	3506	17.23	19.68	0	94.37
	113	1499	14.40	18.60	0	94.37
Market-to-Book Ratio	268	3506	3.49	3.92	-8.77	22.54
	113	1499	3.39	3.83	-8.77	22.54
Total Assets (in billions)	268	3506	7.009	21.852	0.019	247.816
	113	1499	5.179	26.414	0.043	247.816

Note: From Pandya and Van Deventer (2021a).

Such variation is consistent with Hermalin and Weisbach (2003), who argue that board structures are often endogenously determined by firm-specific conditions rather than imposed externally. These baseline differences also resonate with the observation by Adams et al. (2010) that firm complexity and internal dynamics frequently shape board effectiveness more than structural mandates.

Table 2 provides descriptive statistics from Pandya and Van Deventer (2021a) for the full sample of 381 NASDAQ-listed firms, based on 5,005 firm-year observations. The average OROA across all firms was 13.80%. Insider-controlled firms reported a higher mean OROA of 15.45% compared to 13.09% for outsider-controlled firms; this difference was statistically significant ($t = -2.34$, $p = 0.0199$). However, differences in other financial characteristics, including the debt ratio (16.38% overall; $t = 1.53$, $p = 0.1262$), market-to-book ratio (3.46 overall; $t = 0.36$, $p = 0.7198$), and total assets (average of approximately \$6.46 billion; $t = 0.73$, $p = 0.4662$), were not statistically significant. These results suggest that, aside from a modest difference in operating performance,

insider- and outsider-controlled NASDAQ firms were largely similar in their financial profiles at baseline.

Table 2. Comparison of Compliant and Noncompliant NASDAQ Firms

Variable	Firms	Obs.	Mean	t	p
OROA	381	5005	13.80	-2.34	0.020
Debt Ratio	381	5005	16.38	1.53	0.126
Market-to-Book Ratio	381	5005	3.46	0.36	0.720
Total Assets (in billions)	381	5005	6.461	0.73	0.466

Note: From Pandya and Van Deventer (2021a).

These findings are broadly in line with Bhagat and Black (1998), who found no consistent relationship between board independence and operating performance, challenging the assumption that structural board features can be universally applied to predict outcomes. The absence of strong financial distinctions beyond OROA between compliant and noncompliant firms also aligns with Romano's (2005) criticism of standardized governance reforms, which she describes as "quack corporate governance" when they disregard heterogeneity in firm structure and incentives.

Table 3 presents results from a multiple regression analysis performed by Pandya and Van Deventer (2021a) in which OROA served as the dependent variable to evaluate the long-run impact of NASDAQ's corporate governance reforms. The key interaction term, *Inside Board * Post Mandate*, produced a positive but statistically insignificant coefficient of 0.497 ($p = 0.577$), suggesting that insider-controlled firms did not experience a significant change in performance following the 2003 board-independence mandate. Among the control variables, the debt ratio was significantly and negatively associated with performance (coefficient = -1.0751, $p < 0.001$), while both the market-to-book ratio (coefficient = 4.7057, $p < 0.001$) and total assets (coefficient = 1.5761, $p < 0.001$) were positive and significantly associated with performance. These findings indicate that although firm-specific financial characteristics strongly influenced profitability, the board-independence mandate itself did not have a statistically significant long-run effect on insider-controlled NASDAQ firms.

Table 3. Difference-in-Difference Estimates for NASDAQ Firms

Variable	Firms	Obs.	Coefficient	Std. Error	t	p
Inside Board * Post Mandate	381	5005	0.4970	0.8908	0.56	0.577
ln(Debt Ratio)	381	5005	-1.0751	0.2537	-4.24	0.000
ln(Market-to-Book Ratio)	381	5005	4.7057	0.6859	6.86	0.000
ln(Total Assets)	381	5005	1.5761	0.4134	3.81	0.000

Note: From Pandya and Van Deventer (2021a).

These regression results reinforce the interpretation that symbolic compliance may have been prevalent among NASDAQ firms, particularly in the absence of robust enforcement mechanisms. This pattern echoes the findings of Westphal and Zajac (1998), who argue that firms often adopt formal governance structures to meet regulatory expectations without altering underlying power dynamics. It also supports the view advanced by Doidge et al. (2007), who suggest that institutional capacity, including the stringency of enforcement, shapes the effectiveness of governance reforms in translating into firm-level performance improvements. In this case, the lack of a statistically significant treatment effect suggests that the formal adoption of independent board structures did not meaningfully shift firm behavior or enhance operating performance.

Taken together, the NASDAQ results underscore a key theme in governance scholarship:

structural reforms alone, absent complementary oversight or enforcement, are unlikely to produce uniform performance gains. They highlight the limitations of one-size-fits-all regulatory approaches and support a more contingent view of board effectiveness grounded in firm context and institutional conditions.

5.2. Evidence from NYSE companies

Table 4 summarizes the descriptive statistics reported by Pandya and Van Deventer (2021b) for 857 U.S. firms listed on the NYSE, comprising 692 outsider-controlled (compliant) firms and 165 insider-controlled (noncompliant) firms in 2000. Compliant firms had an average OROA of 14.69% (standard deviation = 7.83%), a debt ratio of 25.73% (standard deviation = 16.16%), a market-to-book ratio of 2.81 (standard deviation = 3.25), and average total assets of approximately \$16.54 billion (standard deviation = \$38.92 billion). In comparison, noncompliant firms reported a slightly higher average OROA of 15.85% (standard deviation = 8.18%), a slightly lower debt ratio of 24.69% (standard deviation = 19.05%), and a higher market-to-book ratio of 2.99 (standard deviation = 3.40). Noncompliant firms were smaller, with average total assets of approximately \$9.86 billion (standard deviation: \$30.86 billion). These figures illustrate clear differences in operating performance, valuation, leverage, and size between compliant and noncompliant NYSE firms prior to the implementation of the 2003 board-independence mandate.

Table 4. Descriptive Statistics for Compliant and Noncompliant NYSE Firms

Variable	Firms	Obs.	Mean	Std. Dev.	Min	Max
OROA	692	9484	14.69	7.83	-21.51	38.69
	165	2148	15.85	8.18	-20.70	38.69
Debt Ratio	692	9484	25.73	16.16	0	94.37
	165	2148	24.69	19.05	0	94.37
Market-to-Book Ratio	692	9484	2.81	3.25	-8.77	22.54
	165	2148	2.99	3.40	-8.77	22.54
Total Assets (in billions)	692	9484	16.545	38.917	0.032	247.816
	165	2148	9.863	30.864	30.864	247.816

Note: From Pandya and Van Deventer (2021b).

These baseline differences reflect firm-specific characteristics that Hermalin and Weisbach (2003) identify as central to board composition decisions. The observed divergence in firm size and leverage is also consistent with Doidge et al. (2007), who argue that differences in institutional environments and governance systems help explain variation in firms' structural attributes, even prior to regulatory mandates. Importantly, these findings suggest that NYSE firms may have had stronger internal governance foundations prior to the mandate, setting the stage for more meaningful compliance with the mandate.

Table 5 provides descriptive statistics from Pandya and Van Deventer (2021b) for the full sample of 857 NYSE-listed firms, based on 11,632 firm-year observations. The average OROA across all firms was 14.91%. Insider-controlled firms reported a higher mean OROA of 15.85%, compared to 14.69% for outsider-controlled firms; this difference was statistically significant ($t = -2.02$, $p = 0.0437$). In parallel, total assets differed significantly between the two groups. Insider-controlled firms reported an average total asset base of \$9.86 billion, whereas outsider-controlled firms had significantly larger average total assets of \$16.54 billion ($t = 2.13$, $p = 0.0333$). These findings indicate that insider-controlled NYSE firms were smaller but generated modestly higher returns on assets. By contrast, differences in debt ratio (25.54% overall; $t = 0.82$, $p = 0.4150$) and market-to-book ratio (2.84 overall; $t = -1.04$, $p = 0.2994$) were not statistically significant. Overall, aside from differences in operating performance and firm size, the financial characteristics of

insider- and outsider-controlled NYSE firms were largely similar at baseline.

Table 5. Comparison of Compliant and Noncompliant NYSE Firms

Variable	Firms	Obs.	Mean	t	p
OROA	857	11632	14.91	-2.02	0.0437
Debt Ratio	857	11632	25.54	0.82	0.4150
Market-to-Book Ratio	857	11632	2.84	-1.04	0.2994
Total Assets (in billions)	857	11632	15.311	2.13	0.0333

Note: From Pandya and Van Deventer (2021b).

The financial similarity between these groups, aside from size and OROA, enhances the internal validity of subsequent causal inferences. Moreover, these patterns resonate with the critique by Bhagat and Black (1998), who emphasized that simple structural differences alone do not consistently explain operating performance. Yet unlike the NASDAQ firms in Pandya and Van Deventer (2021a), where symbolic compliance appears to have dominated, the NYSE sample presents a context where observable performance differences may plausibly reflect substantive change rather than static firm traits.

Table 6. Difference-in-Difference Estimates for NYSE Firms

Variable	Firms	Obs.	Coefficient	Std. Error	t	p
Inside Board * Post Mandate	857	11632	0.8453	0.3560	2.18	0.030
ln(Debt Ratio)	857	11632	-1.3919	0.1509	-9.23	0.000
ln(Market-to- Book Ratio)	857	11632	4.8213	0.2767	17.42	0.000
ln(Total Assets)	857	11632	0.2518	0.1417	1.78	0.076

Note: From Pandya and Van Deventer (2021b).

Table 6 presents the results of a multiple regression analysis performed by Pandya and Van Deventer (2021b) in which OROA served as the dependent variable to evaluate the long-run impact of the NYSE's corporate governance reforms. The key interaction term, *Inside Board * Post Mandate*, yielded a positive and statistically significant coefficient of 0.8453 ($p = 0.030$), indicating that insider-controlled firms experienced a meaningful increase in performance following the implementation of the 2003 board-independence mandate. Among the control variables, the debt ratio was significantly and negatively associated with operating performance (coefficient = -1.3919, $p < 0.001$), whereas the market-to-book ratio was strongly positively associated with performance (coefficient = 4.8213, $p < 0.001$). Total assets also had a positive relationship with OROA, though the result was marginally significant (coefficient = 0.2518, $p = 0.076$). These findings suggest that both firm-specific financial characteristics and the governance reform contributed to improved long-run performance among insider-controlled firms traded on the NYSE.

This evidence stands in contrast to the null results observed among NASDAQ firms and affirms the argument advanced by agency theorists such as Fama and Jensen (1983), who posit that well-designed oversight mechanisms can reduce agency costs and improve firm outcomes when appropriately implemented. It also reflects the more rigorous exchange-level enforcement mechanisms applied to NYSE firms, consistent with Westphal and Zajac's (1998) view that credible enforcement and institutional legitimacy are necessary conditions for reforms to produce substantive change rather than symbolic compliance. In this case, the statistically significant performance gains suggest that board-independence mandates, when credibly imposed in a receptive environment, can fulfill their intended role in enhancing firm oversight and value creation.

5.3. A comparison of NASDAQ and NYSE companies

As previously presented by Pandya and Van Deventer (2024), Table 7 summarizes the full-sample descriptive statistics for 1,238 U.S. publicly traded firms across NASDAQ and NYSE, comprising 16,637 firm-year observations. The firms exhibited an average OROA of 14.57%, an average debt ratio of 22.79%, and a mean market-to-book ratio of 3.03. Average total assets across the sample were approximately \$12.6 billion, while the average Tobin's Q was 1.93. Comparative t-tests reveal statistically significant differences between firms on the two exchanges: NASDAQ firms had a lower average OROA ($t = -2.42$, $p = 0.0155$), significantly lower leverage ($t = -9.77$, $p < 0.0001$), and were markedly smaller in size ($t = -4.41$, $p < 0.0001$). Conversely, NASDAQ firms demonstrated significantly higher market-to-book ratios ($t = 4.65$, $p < 0.0001$) and Tobin's Q values ($t = 10.36$, $p < 0.0001$), indicating stronger market valuations relative to NYSE firms. These findings underscore structural and financial differences between NASDAQ and NYSE firms and provide a foundation for the subsequent triple-difference analysis. The emphasis on institutional context and firm-level heterogeneity aligns with Doidge et al. (2007), who argue that variation in institutional capacity—such as exchange-specific norms and enforcement strength—shapes how governance reforms influence firm behavior.

Table 7. Full-Sample Descriptive Statistics for NASDAQ and NYSE Firms

Variable	Firms	Obs.	Mean	t	p
OROA	1,238	16,637	14.5735	-2.42	0.016
Debt Ratio	1,238	16,637	22.7853	-9.77	0.000
Market-to-Book Ratio	1,238	16,637	3.0268	4.65	0.000
Total Assets (in billions)	1,238	16,637	12.587	-4.41	0.000
Tobin's Q	1,238	16,637	1.9289	10.36	0.000

Note: From Pandya and Van Deventer (2024).

Table 8 summarizes the results of a triple-difference regression analysis using OROA as the dependent variable to assess the long-term effects of the 2003 SEC corporate-governance reforms. As first reported by Pandya and Van Deventer (2024), the three-way interaction term, *Board Composition * Post Mandate * Exchange*, yielded a positive coefficient of 0.7400, which was marginally insignificant at the 10% level ($t = 1.87$, $p = 0.062$), suggesting that NYSE firms may have experienced a more substantial improvement in operating performance compared to NASDAQ firms. This divergence mirrors prior findings by Guo et al. (2015), who emphasize that regulatory shocks such as the SEC reforms can lead to different organizational responses depending on baseline governance conditions and the perceived credibility of enforcement.

Table 8. Triple-Difference Regression using OROA as the Dependent Variable

Variable	Firm s	Obs.	Coefficien t	Std. Error	t	p
Board Composition * Post Mandate * Exchange	1,238	16,637	0.7400	0.3965	1.87	0.062
ln(Debt Ratio)	1,238	16,637	-1.1972	0.1494	-8.01	0.000
ln(Market-to-Book Ratio)	1,238	16,637	4.7616	0.3120	15.26	0.000
ln(Total Assets)	1,238	16,637	0.7877	0.1900	4.15	0.000

Note: From Pandya and Van Deventer (2024).

Among the control variables, the debt ratio showed a strong negative association with operating performance (coefficient = -1.1972, $t = -8.01$, $p < 0.001$), while market-to-book (coefficient = 4.7616, $t = 15.26$, $p < 0.001$) and total assets (coefficient = 0.7877, $t = 4.15$, $p < 0.001$) were both positively associated with OROA. The R-squared value of 66.86% indicated a strong overall model fit. These results reinforce earlier findings that NYSE firms gained more from

the 2003 reforms, while NASDAQ firms did not experience a material improvement in operating efficiency.

Table 9 reports the results of a difference-in-difference-in-difference regression analysis using Tobin's Q as the dependent variable to measure operating performance, as originally presented by Pandya and Van Deventer (2024). The key interaction term, *Board Composition * Post Mandate * Exchange*, yielded a positive, statistically significant coefficient of 0.1024 ($t = 2.08$, $p = 0.038$), indicating that NYSE firms experienced a greater long-run improvement in firm value following the 2003 board-independence mandate than NASDAQ firms. This finding resonates with Black et al. (2006), who demonstrate that firm valuation improves under stronger governance systems, particularly when reforms are credibly implemented and reinforced by institutional norms. Among the control variables, the debt ratio was negatively associated with operating performance (coefficient = -0.2511 , $t = -16.88$, $p < 0.001$), while market-to-book exhibited a strong positive relationship with Tobin's Q (coefficient = 1.6805 , $t = 25.52$, $p < 0.001$). Total assets were negatively related to performance, though the effect was smaller (coefficient = -0.0448 , $t = -2.61$, $p = 0.009$).

Table 9. Triple-Difference Regression using Tobin's Q as the Dependent Variable

Variable	Firms	Obs.	Coefficient	Std. Error	t	p
Board Composition * Post Mandate * Exchange	1,238	16,637	0.1024	0.0493	2.08	0.038
ln(Debt Ratio)	1,238	16,637	-0.2511	0.0149	-16.88	0.000
ln(Market-to-Book Ratio)	1,238	16,637	1.6805	0.0659	25.52	0.000
ln(Total Assets)	1,238	16,637	-0.0448	0.0172	-2.61	0.009

Note: From Pandya and Van Deventer (2024).

The model explained a substantial portion of the variation in firm value, with an R-squared of 80.50%. The results add nuance to Bhagat and Bolton (2008), who argue that the effectiveness of structural governance mechanisms, such as board independence, is significantly enhanced when embedded within a broader system of credible oversight and market expectations.

Table 10. Falsification Test: Triple-Difference Regression using Tobin's Q as the Dependent Variable

Variable	Firms	Obs.	Coefficient	Std. Error	t	p
Board Composition * Post Mandate * Exchange	1,230	8,146	0.0650	0.0420	1.55	0.122
ln(Debt Ratio)	1,230	8,146	-0.3064	0.0222	-13.81	0.000
ln(Market-to-Book Ratio)	1,230	8,146	2.0469	0.0847	24.17	0.000
ln(Total Assets)	1,230	8,146	-0.0312	0.0157	-1.99	0.047

Note: From Pandya and Van Deventer (2024).

Table 10 presents the results of a falsification test using Tobin's Q as the dependent variable, substituting the year 2000 as a pseudo-event year to confirm the validity of the 2003 corporate-governance reforms as the causal factor for changes in operating performance. First introduced by Pandya and Van Deventer (2024), the analysis included 1,230 firms and 8,146 firm-year observations drawn from the pre-event period of 1997 to 2002. The interaction term, *Board Composition * Post Mandate * Exchange*, yielded a small, positive, but statistically insignificant coefficient of 0.0650 ($t = 1.55$, $p = 0.122$), indicating no significant difference in operating performance between NASDAQ and NYSE firms prior to the actual mandate. This result supports the parallel trends assumption and strengthens the causal interpretation of the main DDD findings.

The absence of pre-event divergence aligns with empirical best practices recommended by Angrist and Pischke (2009), reinforcing the internal validity of the observed post-mandate effects.

The results of the falsification test strengthen the causal interpretation of the main findings. Among the control variables, the debt ratio was negatively associated with Tobin's Q (coefficient = -0.3064, $t = -13.81$, $p < 0.001$), while the market-to-book ratio showed a strong positive relationship (coefficient = 2.0469, $t = 24.17$, $p < 0.001$). Total assets exhibited a modest negative effect on firm value (coefficient = -0.0312, $t = -1.99$, $p = 0.047$). The model demonstrated excellent explanatory power, with an R-squared of 86.81%. The falsification test strengthens the causal interpretation of the main findings. They also align with broader international evidence showing that stronger governance systems tend to improve firm valuation when reforms are credibly enforced and responsive to local institutional dynamics, as emphasized by Black et al. (2006) and Doidge et al. (2007).

The cross-exchange comparison conducted by Pandya and Van Deventer (2024) further confirms that structural and financial differences between NASDAQ and NYSE firms played a meaningful role in shaping the impact of the board-independence mandate. NASDAQ firms tended to be smaller, less leveraged, and more highly valued by the market, as reflected in their Tobin's Q ratios. In contrast, NYSE firms were generally larger, exhibited lower market valuations, and demonstrated greater responsiveness to regulatory mandates. These patterns align with the argument advanced by Doidge et al. (2007), who suggest that institutional capacity, as reflected in exchange rules, enforcement practices, and governance traditions, plays a critical role in conditioning the effects of governance reforms.

The triple-difference regression results support this interpretation. Although the interaction term using OROA as the dependent variable was only marginally significant, the corresponding analysis using Tobin's Q yielded statistically significant results, indicating that NYSE firms experienced greater improvements in market valuation than their NASDAQ counterparts. This finding is consistent with Doidge et al. (2007), who argue that institutional and enforcement capacity shape the extent to which governance reforms translate into firm-level valuation gains.

Finally, the falsification test using pre-reform data offers additional reassurance about the credibility of these findings. The absence of statistically significant effects in the placebo model helps rule out reverse causality or coincidental timing, strengthening the claim that the governance reforms were responsible for the observed performance changes. This interpretation aligns with empirical best practices in causal inference, which emphasize testing for pre-trend equivalence to validate quasi-experimental designs (Angrist & Pischke, 2009). More broadly, the uneven effects observed across firms echo findings by Cheng (2008) and Faleye et al. (2011), who demonstrate that governance reforms do not operate uniformly and often interact with firm-specific characteristics such as complexity, board size, and managerial discretion. These studies underscore the limitations of one-size-fits-all mandates and highlight the importance of aligning structural changes with organizational and institutional contexts.

6. Conclusion

The studies conducted by Pandya and Van Deventer (2021a, 2021b, 2024) provide compelling evidence that the effectiveness of corporate-governance reforms is highly contingent upon the stringency of regulatory requirements and the rigor of enforcement mechanisms. While NASDAQ firms exhibited only marginal or immaterial improvements in operating performance following the 2003 SEC mandate, NYSE firms experienced statistically and economically

significant gains in both market valuation and operating efficiency. These findings are consistently supported across multiple regression models using Tobin's Q and OROA, and they are further validated through a falsification test that ruled out pre-existing trends.

This pattern aligns with the broader literature suggesting that the success of board-independence mandates depends not only on formal structural changes but also on institutional capacity and enforcement strength (Doidge et al., 2007; Black et al., 2006). The significant improvements observed among NYSE firms support the argument advanced by Bhagat and Bolton (2008), who find that board independence can enhance operating performance when accompanied by credible oversight and complementary governance practices. Conversely, the weaker results for NASDAQ firms echo concerns raised by Faleye et al. (2011), who caution that structural independence alone may offer limited benefits in the absence of effective implementation and monitoring.

These results reinforce the view that enhanced oversight, when meaningfully enforced through fully independent board committees, can yield substantial improvements in firm outcomes. The findings also contribute to the corporate governance literature by highlighting how board structures vary across firms and how independent committees can strengthen monitoring. This complements prior work by Klein (1998), who shows that audit committee independence is associated with reduced earnings management, and by Linck et al. (2005), who demonstrate that governance structures, such as board size and independence, are shaped by firm size, complexity, and market characteristics.

Ultimately, this review calls for more nuanced governance policies that account for differences in enforcement environments, institutional structures, and firm characteristics. Uniform regulatory mandates, such as requiring specific levels of board independence, may not produce consistent outcomes across firms or markets. The effectiveness of governance reforms often depends on factors such as enforcement credibility, investor protections, ownership structure, and the complexity of a firm's operations. For example, firms with concentrated ownership or complex operations may benefit from governance structures that balance board independence with relevant expertise. These findings suggest that governance reforms may be more effective when they allow firms and regulators to adapt governance practices to their institutional and organizational contexts, rather than relying solely on uniform structural requirements.

Future research may benefit from greater attention to contextual factors that shape governance outcomes, including firm size, ownership concentration, industry dynamics, and board structure, as emphasized by Cheng (2008), Gupta et al. (2009), and Adams et al. (2010). In addition, further examination of the role of institutional investors in monitoring management and reinforcing board independence, as well as differences in regulatory enforcement and exchange-level governance standards, could help clarify the conditions under which governance reforms translate into meaningful improvements in oversight and firm performance.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding Information

The authors declared no financial support for the research, authorship, and/or publication of this article.

Acknowledgements: None

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