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Dishant Pandya, AFC, DBA & Ian A. Van Deventer, CPA, PhD

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The Effect of Board Composition on Long-Term Firm Performance: NASDAQ versus NYSE

[1]Dishant Pandya, AFC, DBA
Bellevue University, Bellevue, Nebraska

[*2]Ian A. Van Deventer, CPA, PhD
Spalding University, Louisville, Kentucky

*Corresponding Author: ivandeventer@spalding.edu

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Abstract

In response to multiple corporate scandals in the closing years of the 20th century, the SEC implemented board-independence requirements in 2003 for companies listed on NASDAQ and NYSE. According to the prior research on principal-agent theory and the effects of board composition on financial performance, increased monitoring and improved oversight mechanisms stemming from board independence enhance the long-term success of publicly traded companies. This study aims to determine whether the 2003 independent-board mandate affected the performance of U.S. companies traded on NASDAQ differently from those traded on NYSE. We expected the more stringent measures adopted for NYSE firms to have a greater effect on long-term firm performance than the less stringent measures adopted for NASDAQ firms. We conducted the study using a sample of 381 U.S. companies traded on NASDAQ and 857 U.S. companies traded on NYSE over the period from 1997 to 2012. We examined the information utilizing a difference-in-difference-in-difference research design and assessed company performance using Tobin's Q. Our findings indicate that independent boards significantly improved the long-term financial performance of companies listed on NYSE but had no impact on companies traded on NASDAQ. Our contribution to the body of research is the discovery that the 2003 board-independence standards adopted by NASDAQ impacted long-term firm performance differently than those adopted by NYSE.

Keywords: *board composition, financial performance, firm performance, independent boards, NASDAQ, NYSE, Tobin's Q*

1.0 Introduction

Following a series of accounting scandals that included Enron, Tyco, and WorldCom, among others, legislators swiftly passed the Sarbanes-Oxley Act in July of 2002, significantly altering corporate monitoring and oversight measures. In November, 2003, the Securities and Exchange

Commission (SEC) implemented changes to board-composition and executive-committee requirements. Companies trading on NASDAQ are required to: 1) establish a majority of independent directors, 2) adhere to a strict definition of independence for board members, and 3) hold regular meetings of independent directors without management present (Chhaochharia & Grinstein, 2007). Additionally, public companies must: 4) form audit committees composed entirely of independent directors, and 5) establish nominating and compensation committees that include a majority of independent directors (Chhaochharia & Grinstein, 2007).

Similarly, companies trading on the NYSE must: 1) establish a majority of independent directors, 2) adhere to a strict definition of independence for board members, and 3) hold regular meetings of independent directors without management present (Chhaochharia & Grinstein, 2007). Public companies on the NYSE must also: 4) form nominating, compensation, and audit committees composed solely of independent board members (Chhaochharia & Grinstein, 2007). Additionally, the audit committee must 5) possess financial literacy with at least one member serving as an expert in finance (Chhaochharia & Grinstein, 2007). The SEC implemented these rules to improve corporate structure and governance standards, with the goal of restoring investor trust in the stock market (Bhagat & Bolton, 2008, as cited in Rutledge, Karim, and Lu, 2016).

The primary differences between the two sets of rules involve the executive committees. According to NASDAQ regulations, the audit committee must consist solely of independent board members, whereas the compensation and nominating committees could include a majority of independent directors. Per NYSE regulations, the audit, compensation, and nominating committees must be comprised exclusively of independent board members. We considered the two sets of rules to be similar and anticipated significant long-term performance improvements for companies traded on either of the exchanges.

We were surprised to learn, as a result of our previous work published in 2021a and 2021b, that NASDAQ firms experienced some positive yet immaterial gains in long-term performance while NYSE firms experienced significant and positive gains in long-term performance as a result of the 2003 changes to board composition. A study is needed to confirm whether NYSE firms benefitted more from the rule changes compared to NASDAQ firms. We hypothesize that rules adopted by the SEC for NASDAQ firms were not stringent enough to cause real change in leadership behavior and, consequently, company performance.

In this study, we employed a difference-in-difference-in-difference (DDD) methodology as modeled by Roberts and Whited (2013) to compare the two groups. Our findings demonstrated a strong and positive relationship between independent boards and sustained company performance for NYSE companies, in contrast to those listed on NASDAQ. The difference in performance indicates that the 2003 exchange rules adopted by the SEC for NASDAQ firms were not stringent enough to achieve the same results as companies listed on NYSE. Our study enhances the current body of research by analyzing corporate performance over a sustained period of time, spanning from 1997 to 2012. We conclude that monitoring and oversight regulations are most effective when executed by fully independent committees, devoid of influence from internal board members.

2.0 Literature Review

After the SEC implemented stronger board-independence measures in 2003, a fresh body of research began to develop. Cheng (2008) and Faleye, Hoitash, and Hoitash (2011, 2018) discovered that an increase in the number of independent directors within a company was linked to a decline in company performance. Faleye et al. (2011) contended that independent boards

offered weaker strategic guidance, which progressively diminished the company's competitive edge. In contrast, Pandya and Bathala (2013) did not find any significant impact of independent boards on firm performance. Coles, Daniel, and Naveen (2008), along with Duchin, Matsusaka, and Ozbas (2010), and Linck, Netter, and Yang (2008) concluded that enhanced monitoring and oversight benefited only certain companies. On the other hand, Chen, Cheng, and Wang (2011), as well as Wang, Xie, and Zhu (2015), endorsed the traditional belief that independent boards successfully mitigated agency problems. Despite the unique opportunity to study a naturally occurring experiment, the literature related to corporate governance and company performance remains inconclusive.

We believe previous researchers focused on the difference between compliant and noncompliant companies, ignoring that the rules imposed on NASDAQ firms were different from the rules imposed on NYSE firms. As a consequence, previous researchers overlooked a potential difference in the effects of the two sets of SEC measures. In 2021, Pandya and Van Deventer published two papers in which they examined the effects of the SEC changes to board-composition and executive-committee rules. In one paper, they examined the effect of the SEC changes on firms traded on NASDAQ and found a small and insignificant increase in long-term firm performance. In another paper, they examined the effects of the SEC changes on companies traded on NYSE and found a positive and significant increase in long-term company performance. We believe it is necessary to compare the results for two groups in order to find the magnitude of the difference in firm performance and to explain why the difference occurred.

2.1 Hypothesis

We expect the more stringent regulations imposed by the SEC on NYSE firms will provide better results for firm performance than the less stringent rules imposed by the SEC on NASDAQ firms. *H1: The enhanced corporate governance measures adopted by the SEC in 2003 for U.S. companies traded on NYSE are expected to have a greater impact on long-term firm performance than those implemented for U.S. companies traded on NASDAQ.*

3.0 Research Methodology

Our study focuses exclusively on publicly traded U.S. companies traded on NASDAQ and NYSE. We sourced the data for our research from two primary databases. Information about board composition was obtained from Institutional Shareholder Services (ISS, previously known as RiskMetrics), which maintained the records of S&P 1500 companies from 1996 to 2009. This data was then combined with financial information from CompuStat for the period 1997 to 2012.

We applied the difference-in-difference-in-difference (DDD) estimation method to simulate the effects of an external shock. This technique involved contrasting the performance of companies with insider-controlled boards (control group) with companies that had outsider-controlled or independent boards (treatment group). The hypothesis is represented by the following equation: $\text{Firm Performance}_{it} = \beta 0 + \beta 1\ (\text{Board Composition}_i * \text{Post Regulation Period}_t * \text{Exchange}) + \Gamma X_{it} + \delta_i + \Upsilon_t + \varepsilon_{it}$.

We used Tobin's Q as a proxy for Firm Performance, the primary dependent variable, because the market-based measure is forward looking while reflecting the effects of current decisions (Al-Matari, Al-Swidi, & Fadzil, 2014; Panya & Van Deventer, 2021a). We calculated Tobin's Q by deducting total debt from the market value of outstanding shares and then dividing the result by the total assets. As an alternative to Tobin's Q, we utilized operating return on assets (OROA) as a

proxy for Firm Performance, calculated by dividing operating income before depreciation by total assets, in line with the methodology of Hermalin and Weisbach (1991), Bhagat and Black (2002), Bhagat and Bolton (2008), and Pandya and Van Deventer (2021a, 2021b). Both computations assess how effectively companies utilized their assets to generate returns for shareholders.

Following Guo, Lach, and Mobbs (2015), we defined Board Composition as a majority of inside directors or a majority of outside directors. We assigned a code of 0 to Board Composition when the ratio of outside (independent) directors to total directors exceeded 0.5, and a code of 1 when the ratio was 0.5 or less. The new board-composition and executive-committee rules were introduced in 2002 and became effective in 2003. Some companies adopted these rules preemptively in 2002; consequently, 2002 was designated as the year when the new rules were effectively implemented. We assigned a value of 1 to the Post Regulation Period for the year 2002 and all subsequent years. For the Exchange variable, we assigned a code of 0 to NASDAQ companies and a code of 1 to NYSE companies.

The key variable of interest is the coefficient β1 of the interaction term Board Composition*Post Regulation Period*Exchange. This interaction term assesses the impact of the 2003 changes to board-composition and executive-committee rules on the performance of companies with independent boards listed on both exchanges. If the 2003 changes in board-composition and executive-committee rules are sufficiently similar, we expect the three-term interaction variable to be statistically insignificant.

Following Pandya and Van Deventer (2021a, 2021b), we used the natural logarithm of the Debt Ratio, the Price Ratio, and Total Assets to denote the control variables. X, employed to restore randomness. The Debt Ratio compares the long-term debt to total assets and signifies a company's risk profile. The Price Ratio (aka Market-to-Book Ratio) compares the market price of equity to the book value of equity and signifies the company's growth potential. We use Total Assets as an indication the company's size. Delta (δ) represents company fixed effects, while Upsilon (ϒ) represents year fixed effects. The coefficients for Board Composition, Post Regulation Period, and Exchange were incorporated into the company and year fixed effects, respectively. The constant term (β0) was suppressed to avoid the dummy variable trap, and Epsilon (ε) denotes the error term. To mitigate the effect of outliers in our data, we applied winsorization to company-specific variables at both the upper and lower percentiles.

4.0 Results and Discussion

In Table 1, we provide the descriptive statistics for U.S. companies traded on NASDAQ, which consists of 381 U.S. exchange-listed companies and 5,005 unique annual observations. The sample exhibits an average OROA of 13.80%, an average debt ratio of 16.38%, an average price ratio of 3.46, average total assets of $6.5 billion, and an average Tobin's Q of 2.36 (Pandya & Van Deventer, 2021a).

Table 1: Descriptive Statistics for Companies Traded on NASDAQ

Variable	Firms	Obs.	Mean	Std. Dev.	Min	Max
OROA	381	5,005	13.79847	11.57062	-166.6316	38.69322
Debt Ratio	381	5,005	16.38025	19.40709	0	94.36789
Price Ratio	381	5,005	3.456712	3.890984	-8.769362	22.53574
Total Assets	381	5,005	6460.742	23324.3	19.474	247816
Tobin's Q	381	5,005	2.364644	1.757538	0.7519326	9.21591

In Table 2, we provide the descriptive statistics for U.S. companies traded on NYSE, which consists of 857 U.S. exchange-listed companies and 11,632 unique annual observations. The sample exhibits an average OROA of 14.91%, an average debt ratio of 25.54%, a price ratio of 2.84, average total assets amounting to $15.3 billion, and an average Tobin's Q of 1.74 (Pandya & Van Deventer, 2021b).

Table 2: Descriptive Statistics for Companies Traded on NYSE

Variable	Firms	Obs.	Mean	Std. Dev.	Min	Max
OROA	857	11,632	14.90699	7.907632	-21.50504	38.69322
Debt Ratio	857	11,632	25.54124	16.73104	0	94.63789
Price Ratio	857	11,632	2.841865	3.278911	-8.769362	22.53574
Total Assets	857	11,632	15310.97	37648.18	26.313	247816
Tobin's Q	857	11,632	1.741461	1.008354	0.7519326	9.21591

Table 3 presents the descriptive statistics for the complete sample, which includes 1,238 U.S. exchange-listed companies and 16,637 unique annual observations. The sample shows an average OROA of 14.57%, an average debt ratio of 22.79%, a price ratio of 3.03, average total assets of $12.6 billion, and an average Tobin's Q of 1.93. Additionally, Table 3 provides the t-value and P-value for comparing companies listed on NASDAQ and NYSE. On average, NASDAQ firms exhibited a significantly lower OROA, had considerably less book leverage, and were significantly smaller in terms of total assets compared to NYSE firms. Moreover, NASDAQ firms had significantly higher market values, as indicated by the price ratio, than NYSE firms.

Table 3: Full Sample Descriptive Statistics for Companies Traded on NASDAQ and NYSE

Variable	Firms	Obs.	Mean	t	P
OROA	1,238	16,637	14.5735	-2.4244	0.0155
Debt Ratio	1,238	16,637	22.7853	-9.7695	0.0000
Price Ratio	1,238	16,637	3.0268	4.6512	0.0000
Total Assets	1,238	16,637	12587.273	-4.4055	0.0000
Tobin's Q	1,238	16,637	1.9289	10.3568	0.0000

Table 4 presents data from our multiple regression analyses, comparing the effects of the 2003 mandate on U.S. companies traded on NASDAQ and NYSE over the timeframe 1997–2012 employing the DDD methodology. The R^2 value for the model is 80.50%. The interaction coefficient for Board Composition*Post Regulation Period*Exchange (0.102) is positive and significant (t = 2.08, P = 0.038), suggesting that NYSE firms benefitted more from the 2003 mandate than NASDAQ firms over the long run. This is consistent with Pandya and Van Deventer (2021a, 2021b) who suggested that NASDAQ firms experienced a positive yet immaterial benefit from the 2003 mandate and NYSE firms experienced a positive and significant benefit from the 2003 mandate.

Table 4: Multiple Regression with DDD using Tobin's Q as the Dependent Variable

Variable	Firms	Obs.	Coefficient	Std. Error	t	P
Board Composition*Post Regulation Period*Exchange (Tobin's Q)	1,238	16,637	0.1023533	0.0493223	2.08	0.038
ln (Debt Ratio)	1,238	16,637	-0.2511139	0.014878	-16.88	0.000
ln (Price Ratio)	1,238	16,637	1.680493	0.0658597	25.52	0.000
ln (Total Assets)	1,238	16,637	-0.0448033	0.0171856	-2.61	0.009

Examining the control variables, both Debt Ratio and Total Assets exhibit a negative association with company performance as indicated by Tobin's Q. This suggests that increasing debt to acquire assets had a materially negative impact on Tobin's Q. In contrast, Price is positively associated with Tobin's Q.

To further substantiate our findings, we performed the DDD analyses utilizing OROA as an alternate metric for company performance. The results, presented in Table 5, show an R^2 value of 66.86%. The DDD method produced a positive interaction coefficient for Board Composition*Post Regulation Period*Exchange (0.74) that is statistically significant (t = 1.87, P = 0.062) at the 10% significance level. Like Tobin's Q, the results indicate that NYSE firms achieved a materially significant benefit over NASDAQ firms as measured by OROA. This is consistent with Pandya and Van Deventer (2021a, 2021b) who suggested that the 2003 mandate provided a significant benefit to NYSE firms and little benefit to NASDAQ firms.

Table 5: Multiple Regression with DDD using OROA as the Dependent Variable

Variable	Firms	Obs.	Coefficient	Std. Error	t	P
Board Composition*Post Regulation Period*Exchange (OROA)	1,238	16,637	0.7400165	0.3964596	1.87	0.062
ln (Debt Ratio)	1,238	16,637	-1.197201	0.1493865	-8.01	0.000
ln (Price Ratio)	1,238	16,637	4.761573	0.3120218	15.26	0.000
ln (Total Assets)	1,238	16,637	0.7876581	0.1900187	4.15	0.000

Examining the control variables, the Debt Ratio is negatively associated with company performance as measured by OROA. Conversely, both the Price ratio and Total Assets are positively associated with OROA. Because the impact of increased debt is felt twice as hard as increased assets, the overall impact of acquiring assets with debt is materially negative for large companies as measured by OROA. Overall, the results in Table 5 support the perspective that enhanced corporate governance measures enforced by independent boards improve long-term firm performance for NYSE firms but not for NASDAQ firms.

Lastly, we conducted a falsification test by repeating the DDD analyses on pre-event years (1997-2003) and substituting 2000 for the year the board-independence rules took effect, instead of the actual event in 2002, to demonstrate that companies adopted independent boards due to the 2003 exchange mandate rather than some other factor. The results are presented in Table 6, with the model's R^2 at 86.81%. As anticipated, the DDD method yielded a positive interaction coefficient for Board Composition*Post Regulation Period*Exchange (0.065), which lacks statistical

significance (t = 1.55, P = 0.122). This indicates that no event before the 2003 mandate could have impacted company performance.

Table 6: FALSIFICATION TEST: Multiple Regression with DDD using Tobin's Q as the Dependent Variable and 2000 as the Event Year

Variable	Firms	Obs.	Coefficient	Std. Error	t	P
Board Composition*Post Regulation Period*Exchange (OROA)	1,230	8,146	0.0649564	0.0420307	1.55	0.122
ln (Debt Ratio)	1,230	8,146	-0.3064292	0.0221813	-13.81	0.000
ln (Price Ratio)	1,230	8,146	2.046851	0.0847008	24.17	0.000
ln (Total Assets)	1,230	8,146	-0.0312053	0.0156641	-1.99	0.047

5.0 Conclusion

Consistent with principal-agent theory, the findings in Tables 1-5 indicate that enhanced monitoring and oversight mechanisms implemented by independent boards positively affected long-term company performance, but exclusively for companies listed on the NYSE. Our results complement the findings of Pandya and Van Deventer (2021a, 2021b), indicating that NYSE firms benefitted significantly from independent boards while NASDAQ firms did not. Our contribution to the research literature is finding that the 2003 mandated change in board composition had differing impacts on firm performance for NYSE and NASDAQ firms. We suggest further research on the impact of board composition on CEO compensation and CEO tenure, and whether there are differences between NASDAQ and NYSE firms following the 2003 mandate.

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