

The Impact of the 2012 NZX Listing Rule Change on Board Diversity and Company Performance*

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Abstract

We investigate the impact of the December 2012 NZX listing rule change mandating disclosure about gender diversity on NZ boards. Consistent with the stated intent of the change, the rate of growth in female-held directorships increased significantly after the introduction of the new rule, resulting in, by 2016, average female board representation being approximately double what it had been in 2012. However, we find no relationship between this response and company performance. Across six measures of operating and financial performance, firms that appointed the greatest number of females to their boards after 2012 fared, on average, no better than those who made fewer such appointments.

JEL classification: G34, G38

Keywords: gender diversity; listing rules; firm performance

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The company has no diversity policy, it has a meritocracy policy.

Chalkie (2012)

1 Introduction

In July 2012, the New Zealand (NZ) stock exchange operator (NZX) announced new listing rules concerning the representation of female directors on NZ boards. From 31 December of that year, all annual reports issued by listed firms would be required to (i) provide a breakdown of the gender composition of their directors and officers (listing rule 10.4.5(j)), and (ii) evaluate the firm's performance with respect to any diversity policy it had in place (listing rule 10.4.5(k)). In this paper, we investigate the impact of these rules.

The NZX business case for the listing rule change revolved around evidence showing that gender diversity is associated with improved company performance. As a result, the reasoning went, information on gender diversity will be important to investors and hence should be disclosed. In addition, NZX felt that the rule change should lead to more female directors being appointed and thus, over time, result in greater firm profitability. However, no attention was apparently paid to studies disputing the link between gender diversity and firm performance.

Motivated by this background, we address two questions in this paper. First, has the new listing rule worked as intended? That is, has its introduction resulted in greater gender diversity on NZX-listed company boards. Second, to the extent that greater gender diversity has occurred, has it had a positive impact on company performance? That is, have the firms that added the most female directors after the listing rule change subsequently out-performed?

Consistent with the objective of the new rule, we find that the rate of growth in

female-held directorships increased significantly after its introduction, resulting in, by 2016, average female board representation being approximately double what it had been in 2012. However, we also find no relationship between this response and company performance. Across six measures of operating and financial performance, firms that appointed the greatest number of females to their boards after 2012 fared no better or worse on average than those who made fewer such appointments.

In the next section, we review the events surrounding, and leading up to, the introduction of the new listing rule. Section 3 describes our data. In section 4, we examine the effectiveness of the new listing rule in encouraging new female directorships, while in section 5 we analyse the impact on company performance. Section 6 offers some concluding remarks.

2 Background

The primary impetus for the revised listing rule appears to have come from a 2010 report issued by the New Zealand Human Rights Commission which recommended (p.87) that “(NZX) monitor the Australian Stock Exchange’s new gender diversity reporting regime with the aim of following suit in 2012.”

In March 2012, NZX issued a consultation document (2012a) that proposed the following paragraph be added to listing rule 10.5.5:

The annual report of an Issuer shall contain:

(j) a quantitative breakdown in a tabular format, as to the gender composition of each of the Issuers Board, senior management team and any Subsidiary board; and

(k) a statement from the Board of the Issuer providing its evaluation of the Issuers performance with respect to its diversity policy (if applicable).

A two month consultation period then followed. The majority of submissions were in

favour, although not all media commentators agreed.¹ Some submitters argued that the proposal was too weak and should be strengthened to match Australian requirements — see, for example, law firm Chapman Tripp (2012), the Institute of Directors (2012), and the Ministry of Women’s Affairs (2012).²

Following the consultation period, NZX (2012b) confirmed the original proposal, subject to two changes. First, “senior management team” was replaced by “officer” (as defined in the Securities Market Act 1988). Second, the requirement to provide a breakdown for subsidiary boards was removed. The final revised listing rule, to apply from 31 December 2012, thus read:

The annual report of an Issuer shall contain:

(j) a quantitative breakdown, as to the gender composition of the Issuers Directors and Officers as at the Issuers balance date and including comparative figures for the prior balance date of the Issuer. Comparative figures are not required to be provided in respect of balance dates falling in periods before the effective date of this Rule; and

(k) a statement from the Board of the Issuer providing its evaluation of the Issuers performance with respect to its diversity policy (if applicable).

Throughout the proposal, consultation and confirmation process, the justification used by NZX for the revised listing rule was three-fold. First, greater gender diversity on boards enhances company performance:

“There is credible research based evidence which suggests that diversity in a variety of forms, and gender diversity in particular, contributes to improved performance at both Board and senior management level...” (NZX, 2012a, p5)

¹See, for example, Chalkie (2012).

²Although this recommendation did not succeed at the time, it was subsequently adopted by NZX in 2017.

Second, information about gender diversity is therefore relevant to investors:

“NZX therefore considers it appropriate that Issuers provide an annual disclosure of information as to the gender composition of an Issuers Board...(as such) information will allow investors to maintain an informed view of diversity as a factor relevant to an Issuers expected performance.” (NZX, 2012a, p5)

Third, firms will be encouraged to increase the number of female directors they appoint:

“NZX also anticipates that over time the proposed reporting requirement may lead to broader participation in markets, enable Issuers to better engage and fully utilise the available talent pool, and so to build and maintain a competitive edge in local and global markets.” (NZX, 2012a, p5)

The “credible research” cited by NZX (2012a, 2012c) consisted of just three studies — Eversheds (2012), Deloitte (2011), and McKinsey (2007), all of which report a positive association between company performance and the number of female directors. All three are consulting firm reports and none attempts to distinguish between correlation and causation, or even allow for elementary controls. Far more rigorous academic research (e.g., Adams and Ferreira, 2009) that arrives at very different conclusions was, apparently, ignored by NZX.

The business case employed by NZX to justify the listing rule change thus seems, at least to academic eyes, highly suspect: low-quality work that supported the proposal was highlighted, while high-quality work that did not was ignored. Nevertheless, poor ex-ante decision-making does not necessarily preclude good ex-post outcomes. Whether or not this was the case is the subject of the rest of this paper.

3 Data

To identify any impact of the 2012 listing rule change, we need to be able to track firms over a period that both pre- and post-dates its introduction on 31 December 2012. We focus on the four-year period either side of that date. Our starting sample therefore comprises all companies with equity securities listed on the NZX Main Board at 31 December in each of 2008, 2012 and 2016. From this, we exclude exchange-traded funds, investment trusts, companies with ownership restrictions (e.g., Fonterra), and companies reporting zero or negative sales at one or more of the three dates. The final sample consists of a balanced panel of the 74 firms listed in the Appendix.

Table 1: Sample Summary Statistics

Descriptive statistics summarising the characteristics of 74 NZX-listed firms for three years during the 2008-16 period (2008, 2012, 2016). Sales is firm revenue denoted in \$ million; board size is the number of directors on the firm's board; ROA is net income divided by book value of total assets; Tobin's Q is the sum of common stock market value, total liabilities, preferred equity and minority interests, all divided by book value of total assets.

	Sales (\$mill)	Board Size (number)	ROA	Tobin's Q
Mean	600.9	6.10	-0.36	1.89
Standard Deviation	1321.2	1.44	25.84	2.41
Median	192.0	6.00	4.75	1.21
Minimum	0.015	3.00	-281.6	0.33
Maximum	9004.0	11.00	24.20	25.36

Table 1 provides some summary information on firm size, board size, accounting profitability and market valuation for this sample of 222 firm-years. The typical firm has six directors and annual sales of just over \$600 million, although the latter metric is both highly variable and right-skewed (the median is only \$192 million). The average firm has negative ROA, although in this case the distribution is strongly left-skewed (the median is 4.75). Finally, firms in our sample tend to have market values that are well above their book values (mean Tobin's Q = 1.89), although there is again some

evidence of right-skewness.³

4 Female Director Representation

We first address the question: did the 2012 listing rule change achieve its objective of increasing the number of female directors on the boards of NZX-listed firms? Table 2 summarises the position over the eight years covered by our data. Between 2008 and 2012, the mean number of female directors per firm rose slightly from 0.42 in 2008 to 0.54 in 2012, and then more strongly to 1.03 in 2016. As a proportion of total directors, the corresponding changes were 0.07 to 0.08 to 0.17. Median female director representation progressed in a similar fashion: zero in both 2008 and 2012 rising to one in 2016.

Table 2: Female Representation on Boards of NZX-Listed Firms

Summary statistics for female representation on the boards of 74 NZX-listed firms for three years during the 2008-16 period (2008, 2012, 2016). For each statistic, the first row of numbers denotes the number of female directors on the firm's board; the second row (in parentheses) denotes the number of female directors on the firm's board divided by the total number of directors on the board. For example, in 2016 the average firm had 1.03 female directors comprising 17% of the firm's board.

	2008	2012	2016
Mean	0.42 (0.07)	0.54 (0.08)	1.03 (0.17)
Standard Deviation	0.64 (0.10)	0.73 (0.11)	0.92 (0.15)
Median	0.00 (0.00)	0.00 (0.00)	1.00 (0.17)
Minimum	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Maximum	2.00 (0.40)	2.00 (0.40)	3.00 (0.60)

Table 3 synthesises the inter-firm variation in the appointment of female directors.

³As per usual, ROA is defined as net income divided by book value of total assets and Tobin's Q as the sum of common stock market value, total liabilities, preferred equity and minority interests, all divided by book value of total assets.

Between 2008 and 2012, 11 of the 74 firms in our sample increased the number of female directors on their respective boards; between 2012 and 2016, 29 did. Moreover, the latter period was characterised by more substantive increases in female director representation. For example, seven firms appointed two new female directors (compared to one in the 2008-2012 period) and two firms made three such appointments (zero did so during 2008-2012).

Table 3: Change in Female Representation on Boards of NZX-Listed Firms

Δ Female Directors is the sub-period change in the number of female directors on the firm's board, so each cell represents the number of firms that changed their female director representation by the corresponding number in the first column. For example, 3 of the 74 sample firms ended the 2008-12 sub-period with one less female director than they started it with.

Δ Female Directors	2008-12	2013-16
-1	3	4
0	60	41
1	10	20
2	1	7
3	0	2

Both Tables 2 and 3 are consistent with the view that the 2012 listing rule change encouraged firms to appoint more female directors. However, neither controls for other factors that could potentially affect the appointment of female directors, or distinguishes between true economic impact and random variation. To address these issues simultaneously, we turn to multiple regression methods and estimate the following two models using our panel data:

$$\Delta\text{Female Directors} = \alpha + \gamma\text{Rule} + \delta\text{Female Directors}_{-1} + \lambda\text{Industry} + \theta\text{Firm} + \epsilon \quad (1)$$

$$\Delta\text{Female Director Proportion} = \alpha' + \gamma'\text{Rule} + \delta'\text{Female Directors}_{-1} + \lambda\text{Industry} + \theta'\text{Firm} + \mu \quad (2)$$

where Δ Female Directors is the change in the number of female directors on the firm's board (between 2008 and 2012 or between 2012 and 2016); Δ Female Director Proportion

is the corresponding change in the ratio of female directors to total directors; and Rule = 1 when the observation is from 2013-16 and zero otherwise. We include the beginning-of-period number of female directors ($\text{Female Directors}_{-1}$) as a control, since firms that start with a high number of female directors have less ability to appoint more, and vice versa. Finally, to control for unobservable firm- and industry-specific factors, we include vectors of company and industry dummy variables (Firm and Industry respectively).⁴ The coefficients of primary interest in equations (1) and (2) are γ and γ' — the estimated average change (after controlling for other factors) in female director representation following the introduction of the new listing rule on 31 December 2012.

Table 4 contains the results from OLS estimation of equations (1) and (2).⁵ In all specifications, we report robust standard errors clustered at the firm level in order to account for possible clustering induced by the presence of multiple observations from the same firms in our data (see, for example, Petersen, 2009).

The principle finding in Table 4 is that the estimates of γ and γ' are strongly and significantly positive. When firm fixed effects are excluded, the number of new female director appointments per firm is approximately 0.4 higher on average after the new listing rule is introduced than before it, an effect that is significant at the 1% level. When firm fixed effects are included, the average incremental impact associated with the post-rule change rises to over 0.5, again significant at the 1% level.

To obtain some idea of the quantitative magnitude of this impact, note that evaluating the model in column (1) of Table 4 at variable sample means yields an expected value for $\Delta\text{Female Directors}$ of 0.12 for the 2008-2012 sub-period and of 0.49 for the 2013-2016 sub-period. That is, the average number of new female director appointments

⁴The industry dummy variable categories are based on the Global Industry Classification Standard assigned by Bloomberg. The categories are health care, industrials, consumer staples, financials, real estate, consumer discretionary, utilities, materials, information technology, energy and telecommunication services.

⁵Since all firms are assigned to an industry, avoiding multicollinearity means that only one of industry and firm fixed effects can be included in any model.

Table 4: Female Director Representation and the 2012 NZX Listing Rule: Regression Models

Panel regression models of the relationship between female representation on the boards of 74 NZX-listed firms and the December 2012 listing rule change. Each observation comes from one of two 4-year sub-periods: 2008-12 (before the listing rule change) and 2013-16 (after the listing-rule change), so each model contains 148 observations. Δ Female Directors is the sub-period change in the number of female directors on the firm's board; Δ Female Director Proportion is the sub-period change in the ratio of female directors to total directors. Rule = 1 if the sub-period is 2013-16 and zero otherwise. Lagged Female Directors is the number of female directors on the firm's board at the beginning of each sub-period. Numbers in parentheses are robust standard errors clustered at the firm level. ***, ** and * denote significance at the 1%, 5%, and 10% levels respectively.

<i>Dependent Variable:</i>	Δ Female Directors			Δ Female Director Proportion		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	0.233*** (0.06)			0.035*** (0.01)		
Rule	0.397*** (0.11)	0.395*** (0.12)	0.512*** (0.11)	0.070*** (0.02)	0.069*** (0.02)	0.083*** (0.02)
Lagged Female Directors	-0.267*** (0.07)	-0.249*** (0.07)	-1.212*** (0.19)	-0.039*** (0.01)	-0.036*** (0.01)	-0.147*** (0.04)
Industry FE	No	Yes	No	No	Yes	No
Firm FE	No	No	Yes	No	No	Yes
R^2	0.13	0.18	0.24	0.13	0.18	0.18
F-statistic	11.17***	2.49***	1.76***	10.78***	2.42***	1.49**

per firm was 300% higher following the listing rule change. Similar-sized effects are also apparent in the models that employ Δ Female Director Proportion as the dependent variable.

Relative to the four-year period immediately prior to the listing rule change, female director appointments rose significantly in the four-year period immediately following the listing rule change. Can we attribute this jump to the rule change itself? Unfortunately not. To do so would require a difference-in-differences approach applied to a sample that contains firms subject to the new listing rule and other firms not subject to the new listing rule.⁶ In this case, however, because all NZX firms were required

⁶See, for example, Angrist and Pischke (2009).

to comply with the new rule, no “control sample” of exempt firms is available.⁷ Thus, our results may just reflect “societal pressure” that had a simultaneous impact on both the NZX and listed NZ companies, i.e., the increase in female director appointments post-2012 would have occurred even if the listing rule change had not taken place.

Nevertheless, in our view, it would be dangerous to push this argument too far. After all, recognition of female directors (or the dearth thereof) had been an issue in NZ since at least the mid-1990s (Shilton et al., 1996). And international concern was extensive and widespread, e.g., quotas had operated in Norway since 2003. So NZ companies could hardly have been unaware of societal pressure for more female directors during the 2008-2012 period. Thus, while we cannot directly attribute causality, the most plausible explanation for the difference between the 2008-12 and 2013-16 periods is that NZ firms were galvanised into action in the latter period by the 31 December 2012 listing rule change.

5 Female Director Appointments and Subsequent Firm Performance

We now turn to the second question: did the new listing rule have an impact on company performance? Specifically, did the firms that responded most strongly to the listing rule change improve their financial performance by more than those that responded in a weaker fashion?

To address this question, we consider six measures of financial performance over the four-year period following the introduction of the new rule (i.e., between 31 December 2016 and 31 December 2012): ROA growth, sales growth, earnings-per-share

⁷In principle, it might be possible to construct a control sample from firms listed on the Unlisted Securities Exchange (<https://www.usx.co.nz/agreement>), since these firms are not subject to NZX listing rules. However, the number of such firms is small (less than 20), so any results would be highly idiosyncratic.

(EPS) growth, growth in Tobin's Q, annual shareholder return, and excess shareholder return.⁸ All are either directly available from Bloomberg, or are readily calculated from Bloomberg data; in the case of excess shareholder return, we obtain data on the 5-year government bond return from the Reserve Bank of NZ website (<https://www.rbnz.govt.nz/>).

Table 5 summarises the properties of these variables in our data. Unsurprisingly, given that the NZ economy grew strongly over the 2013-2016 period, mean company performance was robust. For example, mean ROA (defined as net income divided by total assets multiplied by 100) grew from -0.60 in 2012 to 2.96 in 2016. Other accounting-based measures of performance (sales and EPS growth) showed similarly impressive growth. Turning to market performance measures, the mean shareholder return was 12% per annum while Q grew by slightly less than 3% per annum (thus illustrating the importance of dividends in the NZ sharemarket).⁹ Nevertheless, Table 5 also reveals considerable variation in performance: the question of interest is whether any of this variation is attributable to differing responses to the listing rule change.

Addressing this question requires a measure of company responsiveness to the listing rule change. Using the actual change in the number (or proportion) of female directors is unsatisfactory, since some of the change is likely to have occurred regardless of the rule change. To proxy for the change in female director representation attributable to the listing rule change, and to minimise the potential for endogeneity problems, we

⁸The latter equals annual shareholder return minus the CAPM-based rational expectation of annual shareholder return at 31 December 2012. The latter is given by:

$$E[R] = R_f + \beta \text{MRP}$$

where R_f is the 5-year government bond rate as of 31 December 2012, β is the company beta at the same date, and MRP is the difference between the (annualised) return on the NZX 50 gross index over the 2013-16 period and R_f .

⁹Although the excess return point estimate is negative, this is insignificantly different from zero: unsurprisingly, the average firm performs on a par with the market.

Table 5: Performance Summary Statistics

Descriptive statistics summarising the operating and financial performance of 74 NZX-listed firms for the 4-year period following the December 2012 listing rule change. ROA growth is the change in firm ROA during the period; Sales growth is the log change in company sales during the period; EPS growth is the log change in earnings per share; Q growth is the log change in Tobin's Q; Raw return is the annualised total shareholder return; Excess return is the difference between the raw return and the beginning-of-period expected return.

	ROA growth	Sales growth	EPS growth	Q growth	Raw return	Excess return
Mean	3.57	0.54	0.39	0.11	0.12	-0.03
Standard Dev	16.0	1.04	1.06	0.39	0.20	0.22
Median	1.18	0.25	0.46	0.08	0.10	-0.03
Minimum	-32.3	-0.86	-2.64	-1.17	-0.36	-0.58
Maximum	111.3	5.83	3.42	1.20	0.58	0.50

use the residual from the model appearing in column (2) of Table 4: the firm-specific *unexpected*, or excess, change in the number of female directors.^{10,11}

We first sort our sample of firms into quartiles based on this residual (Q1 = the weakest response to the listing rule change; Q4 = the strongest) and then calculate the mean 2013-16 performance for each quartile. The results from this exercise appear in Table 6. The most notable feature is that none of the columns increase monotonically. For example, although mean ROA growth among the firms in Q4 exceeds that of the firms in Q1, it is higher still in the intermediate quartiles (Q2 and Q3). Similarly, although Q4 has easily the highest mean EPS growth, Q3 has easily the lowest.

As both the performance and responsiveness measures are likely to contain significant noise, we also focus on the differences between the extreme quartiles (Q1 and Q4). Although, for every performance measure, mean performance is greater in Q4 than Q1, consistent with the appointment of female directors leading to better performance, none of the differences is statistically significant at conventional levels: as can be seen in the

¹⁰For similar approaches, see, for example, Core et al. (1999) and Perotti and Wagenhofer (2014).

¹¹We use the Table 4 column (2) residual because this produces the strongest relationships between performance and listing rule responsiveness. That is, using the residuals from other models appearing in Table 4 results in even weaker links between performance and listing rule responsiveness.

Table 6: Firm Performance and Responsiveness to the 2012 Listing Rule Change: Quartile Analysis

This table investigates the relationship between firm performance in the 4-year period following the December 2012 listing rule change (2013-2016) and the extent to which the firm responded to the rule change by appointing more female directors. Responsiveness is estimated using the residual from model (2) of Table 4 and then split into quartiles: Q4 denotes firms in the top responsiveness quartile; Q1 denotes firms in the bottom quartile. Other variables are defined in Table 5. For each measure of performance, mean performance is estimated and reported for all responsiveness quartiles. SL is the significance level associated with the mean difference between the Q4 and Q1.

	ROA growth	Sales growth	EPS growth	Q growth	Raw return	Excess return
Q1	-0.509	0.385	0.238	0.086	0.100	-0.031
Q2	6.860	0.735	0.387	0.029	0.090	-0.086
Q3	4.222	0.492	0.028	0.197	0.092	-0.032
Q4	3.066	0.533	0.882	0.122	0.190	0.040
SL (Q4 - Q1)	0.28	0.48	0.11	0.74	0.15	0.31

last row of Table 6, the $Q4 - Q1$ significance levels are all well above 0.05.

Of course, simple inter-quartile comparisons ignore potential effects from other variables; it may be that the relationship between performance and responsiveness is obscured by the presence of other factors, both observable and unobservable. To address this, we estimate multiple regression models of the form:

$$\text{Performance} = a + b\hat{\epsilon} + c\text{Sales}_{-1} + d\text{Industry} + \eta \quad (3)$$

where $\hat{\epsilon}$ is the residual from the model appearing in column (2) of Table 4 (i.e., the responsiveness proxy), Sales_{-1} is beginning-of-period sales (as a proxy for firm size), and, as before, Industry is the vector of industry dummy variables.¹² The coefficient of primary interest in equation (3) is b — the estimated average impact (after controlling for other factors) on company performance of the change in female director representation attributable to the 2012 listing rule change. If, as argued in NZX (2012a, 2012b, 2012c), greater gender diversity has a beneficial effect on firm performance, then estimates of b should be positive and statistically significant.

¹²Obviously, since the data used to estimate this model is a simple cross-section rather than a panel, firm fixed effects cannot be estimated.

Table 7 reports the results from OLS estimation of equation (3). For each performance measure, we estimate the model both with and without industry fixed effects. In all specifications, we estimate heteroskedasticity-robust standard errors. The principal result is that, although generally positive, no estimate of b is statistically significant at conventional levels. And while the inclusion of industry fixed effects substantially increases the model R^2 values, it has no effect on the estimates of b .¹³

Despite being statistically insignificant, several of the estimated values of b are economically quite large. For example, a 1-standard deviation increase in $\hat{\epsilon}$ (equal to 0.767) is associated with higher mean EPS growth over the 2013-16 period of approximately 18 percentage points (0.767×0.235), relative to the overall mean of 39% (from Table 5). This could mean that the increase in female directors attributable to the 2012 listing rule change *did* improve average company performance, but that this effect is obscured by noise in our data. Or it could mean that the increase in female directors attributable to the 2012 listing rule change had no overall effect on company performance, but a few anomalous observations in a small data sample result in a high estimated effect. Without considerably more data, it is impossible to distinguish between these two explanations. With the data we do have, the best that can be said is that the estimated relationship between company performance and the number of post-2012 female director appointments is frequently positive, but not statistically robust.

6 Concluding Remarks

We have obtained two principal results in this paper. First, NZ companies significantly increased their rate of female director appointments following the 31 December 2012 listing rule change that required all NZX-listed firms to disclose more information about the level of gender diversity on their boards. Although we cannot totally rule out the possibility that this relationship is merely coincidental, it seems more likely to have been

¹³In fact, the inclusion of industry fixed effects typically lowers the estimate of b .

Table 7: Firm Performance and Responsiveness to the 2012 Listing Rule Change: Regression Models

This table estimates the cross-sectional relationship between 2013-16 company performance and responsiveness to the 31 December 2012 listing rule change — as measured by the residuals from model (2) in Table 4. Lagged Sales is firm revenue (in \$ billion) in 2012. Other variables are defined in Table 5. Each model contains 74 observations. Numbers in parentheses are heteroscedasticity-robust standard errors. ***, ** and * denote significance at the 1%, 5%, and 10% levels respectively.

	<i>Dependent variable</i>											
	ROA growth (1)	(2)	Sales growth (3)	(4)	EPS growth (5)	(6)	Q growth (7)	(8)	Raw return (9)	(10)	Excess return (11)	(12)
Constant	4.297* (2.24)	-11.33*** (2.13)	0.633*** (0.14)	-0.040 (0.15)	0.337*** (0.16)	-0.430 (0.31)	0.100* (0.05)	-0.150 (0.30)	0.117*** (0.02)	-0.153 (0.13)	-0.019 (0.03)	-0.329* (0.17)
Listing Rule Responsiveness	0.379 (1.92)	-0.164 (2.18)	-0.031 (0.12)	-0.092 (0.12)	0.229 (0.14)	0.235 (0.14)	0.050 (0.06)	0.027 (0.07)	0.045 (0.03)	0.026 (0.03)	0.041 (0.04)	0.019 (0.04)
Lagged Sales	-1.259 (1.05)	-0.027 (0.86)	-0.154 (0.07)	-0.061 (0.06)	0.085 (0.05)	0.138 (0.10)	0.016 (0.02)	0.032 (0.03)	-0.001 (0.02)	0.019 (0.02)	-0.016* (0.01)	0.007 (0.02)
Industry FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
R^2	0.01	0.14	0.04	0.25	0.04	0.43	0.01	0.21	0.03	0.37	0.03	0.28
F-statistic	0.38	0.82	1.21	1.65*	1.21	2.97***	0.45	1.38	1.12	2.66***	1.13	2.02**

at least partly causal. Thus, consistent with its objective, the new listing rule appears to have had a positive impact on the gender diversity of NZ boards.

Second, however, this positive impact has not translated into better firm performance. Although post-2012 NZ company performance was generally strong, inter-firm variation appears to have been independent of changes in gender diversity: on average, firms that responded most strongly to the listing rule change subsequently performed no better than firms that failed to respond at all. Such a finding is consistent with the bulk of the literature on the relationship between company performance and female board representation: as Klein (2017) has noted, meta-studies of this relationship conclude that there is essentially zero relationship between these two variables. Our work provides further support for this view.

Appendix

Table A1: NZX Firms Included in the Sample

a2 Milk Co	Abano Healthcare	Air New Zealand	Argosy Property
Auckland Airport	Augusta Capital	AWF Madison Group	BLIS Technologies
Briscoe Group	Cavalier Corp	CDL Investments	Colonial Motor
Comvita	Contact Energy	Delegat Group	EBOS Group
Finzsoft Solutions	Fisher & Paykel Healthcare	Fletcher Building	Freightways
Future Mobility Solutions	Goodman Property Trust	Green Cross Health	Hallenstein Glasson
Hellaby	Infratil	Kiwi Property Group	Mainfreight
Marsden Maritime	Mercer Group	Methven	Metlifecare
Millennium & Copthorne	New Zealand Oil & Gas	New Zealand Refining	NPT
NZ Windfarms	NZX	Opus International	Pacific Edge
PGG Wrightson	Port of Tauranga	Precinct Properties	Promisia Integrative
Property for Industry	Pyne Gould Corp	Rakon	Restaurant Brands
Rubicon	Ryman Healthcare	Sanford	Scott Technology
SeaDragon	Seeka	Skellerup	Sky Network Television
Skycity Entertainment	Smartpay	Smiths City Group	South Port
Spark	Steel & Tube	T&G Global	Team Talk
Tenon	Tourism Holdings	Tower	TrustPower
Turners Automotive	Vector	Vital Healthcare Prop	The Warehouse
Wellington Drive Tech	Xero Ltd		

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