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

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Abstract: We examine the impact of the December 2012 NZX listing rule change that introduced compulsory disclosure about gender diversity on NZ boards. Although criticised for its timidity, 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 responded most strongly to the listing rule change fared, on average, no better or worse than those that stuck closer to the status quo.

Keywords: Female directors; listing rules; firm performance

JEL Classifications: G34, G38

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

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 on board composition and company performance.

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 is important to investors and hence should be disclosed.¹ 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.

The listing rule change implemented by NZX can best be described as a gentle nudge towards greater board diversity, being considerably weaker than requirements in place at the time in some other countries, including NZ's closest neighbour Australia. This raises an obvious question about the potential effectiveness of such a rule, given that firms could comply without making any changes to the gender diversity of their boards.

¹Section 2 describes these claims in more detail.

At the same time, firms that do respond would be able to gradually appoint more female directors as and when suitably qualified candidates become available, rather than being forced to hurriedly appoint unqualified aspirants.² This could be expected to have positive implications for the financial performance of such firms.

Motivated by this background, we address two questions in this paper. First, did the new listing rule result in greater gender diversity on NZX-listed company boards, or did firms simply ignore it? Second, to the extent that firms differed in their response to the rule change, did this bear any relationship to post-change company performance? That is, did the firms that added the most female directors after the listing rule change (relative to expectations) subsequently out-perform?

With regard to the first question, we find that the rate of growth in female-held directorships increased significantly after the introduction of the new listing rule, resulting in, by 2016, average female board representation being approximately double what it had been in 2012. On the second, however, we find no relationship between this response and company performance. Across six measures of operating and financial performance, firms that responded most strongly to the listing rule change (i.e., appointed unexpectedly high numbers of female directors after 2012) fared, on average, no better or worse than those that stuck closer to the status quo.

Although we know of no prior work that considers the kind of rule change implemented by NZX, there is, of course, an extensive literature on the relationship between board gender diversity and firm performance. Early United States work by, for example, Erhardt et al. (2003) and Carter et al. (2003), reports a positive relationship between female director representation and various measures of company performance, but more nuanced subsequent studies find no relationship (Carter et al., 2010) or a negative relationship (Adams and Ferreira, 2009). Meta-studies by Post and Byron (2015) and Pletzer et al. (2015) that incorporate evidence from multiple countries arrive at similar

²As would be the case with, for example, quotas: see Ahern and Dittmar (2012).

conclusions: either a zero relationship (Pletzer et al.) or an economically insignificant positive relationship (Post and Byron). Klein (2017, p2) summarises this literature in the following way: “Rigorous, peer-reviewed studies suggest that companies do not perform better when they have women on the board. Nor do they perform worse.”

Our paper thus makes two principal contributions. First, we find that a gentle regulatory nudge, such as that adopted by NZX, can have a significant effect on board diversity. Second, contrary to the claimed rationale for such a nudge, this greater diversity has no positive association with company performance, but nor does it seem to have any adverse effect. Such a finding is consistent with the extensive literature on the relationship between board gender diversity and firm performance described above. Our results thus add further weight to the prevailing consensus on this relationship, but in a quasi-natural experiment setting with a clearly identifiable exogenous event.

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 Issuer’s 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.³ 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).⁴

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 Issuer’s Directors and Officers as at the Issuer’s 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

³See, for example, Chalkie (2012).

⁴Although this recommendation did not succeed at the time, it was subsequently adopted by NZX in 2017.

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)

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 Issuer’s Board...(as such) information will allow investors to maintain an informed view of diversity as a factor relevant to an Issuer’s 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 (2011), 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. As Eagly (2016, p201) points out, such reports would “certainly not be publishable in academic journals because of the elementary form of their data presentations.” Far more rigorous academic research (e.g.,

Adams and Ferreira, 2009) that arrives at very different conclusions was, apparently, ignored by NZX.⁵

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 desired ex-post outcomes. Whether or not this was the case is the subject of the rest of this paper.

3 Data

Although our setting contains obvious features of a natural experiment, it lacks one crucial ingredient: because all NZX-listed firms were required to comply with the rule change, no control sample is available.⁶ Instead, we adopt a “before-and-after” approach that compares changes in board diversity and firm performance prior to 2012 with those that occurred afterwards. Such an approach ensures that causality can only flow in one direction and for this reason, as discussed by Leatherdale (2019), is favoured by medical researchers when a fully-randomised control trial is not possible.⁷

To implement this approach, we focus on the four-year periods either side of the listing rule change on 31 December 2012. Extending the evaluation period beyond four years would create complications, e.g., NZX adopted a stronger diversity policy in 2017.

⁵Nor does NZX appear to have updated its views in the years since. The 2019 version of their Corporate Governance Code (NZX, 2019) contains (p12) the statement: “Authoritative research concludes that increased gender diversity on boards is associated with better financial performance.”, citing a McKinsey report as the sole example of authoritative research.

⁶In 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 at any time), so any results would be highly idiosyncratic.

⁷For an example of this approach, see Grijalva et al (2007).

Although the inclusion of intermediate years would provide additional observations, they would also introduce independence problems as board structure is likely to be relatively persistent (see Linck et al., 2008). Moreover, they would also introduce considerable noise as any effect on firm performance is likely to be observed only slowly. Thus, a four-year evaluation period seems to offer the best available compromise between the competing claims of sufficient observations, time-to-observe, and confounding effects.

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 (x100); 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.⁸ The typical firm

⁸As per usual, ROA is defined as net income divided by book value of total assets (x100) and Tobin's Q as the sum of common stock market value, total liabilities, preferred equity and minority

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.

4 Female Director Representation

We first address the question: did the 2012 listing rule change have an effect on the number of female directors represented 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 3 synthesises the inter-firm variation in the appointment of female directors. 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). Overall, the 2012-16 period saw a net addition of 36 new female directorships compared with 9 during the 2008-12 period.⁹

interests, all divided by book value of total assets.

⁹Most, although not all, of this reflects an increase in the number of female *directors*. In 2016, there were 76 female directorships occupied by 62 individual female directors, compared with figures of 40 and 34 respectively in 2012, i.e., 28 of the 36 new female directorships were filled by females who

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 refers to the *number* of female directors on the firm's board; the second row refers to the *proportion* of female directors on the firm's board, i.e., the number of female directors divided by the total number of directors. 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: Change in Female Representation on Boards of NZX-Listed Firms

Δ Female Directors is the 4-year 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 period with one less female director than they started it with.

Δ Female Directors	2008-12	2012-16
-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. To address

had not been directors of listed firms in 2012.

these issues simultaneously, we turn to multiple regression methods.

Because our focus is on company responses to a single regulatory event, the natural choice of dependent variable in regression models is the change in female director numbers during the four-year periods preceding and following the listing rule change.¹⁰ To the extent that underlying determinants of female director numbers are time-invariant or move only slowly over time, this approach also helps mitigate statistical problems such as omitted variables bias (see Wooldridge, 2001). To control for other factors that might affect gender diversity, we include company fixed effects and, in case there are industry-specific factors contributing to female director numbers, industry fixed effects.¹¹ Of course, since all firms are assigned to a particular industry, avoiding multicollinearity means that only one of industry and firm fixed effects can be included in any model. Finally, we include in all specifications the beginning-of-period number of female directors (*Female Directors*₋₁) as an additional control, since firms that start with a high number of female directors have less flexibility to appoint more, and vice versa.

We therefore estimate the following models:

$$\Delta FD = \alpha + \gamma Rule + \delta FemaleDirectors_{-1} + \theta Firm + \epsilon \quad (1a)$$

$$\Delta FD = \alpha + \gamma Rule + \delta FemaleDirectors_{-1} + \lambda Industry + \epsilon \quad (1b)$$

and:

$$\Delta FDP = \alpha' + \gamma' Rule + \delta' FemaleDirectors_{-1} + \theta' Firm + \mu \quad (2a)$$

$$\Delta FDP = \alpha' + \gamma' Rule + \delta' FemaleDirectors_{-1} + \lambda' Industry + \mu \quad (2b)$$

¹⁰By contrast, Hillman et al. (2007) and Hutchinson et al. (2015) investigate female director levels.

Our principal results remain the same if we use this alternative specification, but the regressions have weaker statistical properties — see section 4.1.

¹¹The industry 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.

where ΔFD is the change in the number of female directors on the firm's board (between 2008 and 2012 or between 2012 and 2016); ΔFDP is the corresponding change in the ratio of female directors to total directors; and $Rule = 1$ when the observation is from 2012-16 and zero otherwise. The coefficients of primary interest in equations (1) and (2) are γ and γ' — the estimated average change (after controlling for other relevant 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). In all specifications, we report robust standard errors clustered at the firm level in order to account for possible dependence induced by the presence of repeated observations from the same firms in our data (see, for example, Petersen, 2009).

The principal 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 ΔFD of 0.12 for the 2008-2012 sub-period and of 0.49 for the 2012-2016 sub-period. That is, the average number of new female director appointments per firm was 300% higher following the listing rule change. Similar-sized effects are also apparent in the models that employ ΔFDP as the dependent variable.

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 2012-16 (after the listing-rule change), so each model contains 148 observations. ΔFD is the sub-period change in the number of female directors on the firm's board; ΔFDP is the sub-period change in the ratio of female directors to total directors. Rule = 1 if the sub-period is 2012-16 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>	ΔFD			ΔFDP		
	(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**

4.1 Robustness issues

The Table 4 results suggest that, despite being only a gentle nudge, the 2012 listing rule change is associated with a significant upsurge in the appointment of female directors. This sub-section considers some obvious questions about the robustness of this result.¹²

First, as pointed out to us by a referee, there is a nearly six month gap between announcement of the listing rule change in July 2012 and the implementation date of 31 December. Some firms, perhaps in an attempt to signal greater gender diversity, may

¹²As these additional results are very similar to those appearing in Table 4, they are not tabulated in this paper. They are, however, available on request from the authors.

have reacted promptly to the announcement by appointing additional female directors *prior* to the implementation date. As a result, firms with balance dates later in the 2012 year that appear in our data as pre-change may, in some cases, be mis-classified. To address this issue, we re-estimate equations (1) and (2) excluding firms with December-year balance dates. This eliminates 10 companies from our data, but has no effect on the results: the γ estimates corresponding to columns (1)-(3) of Table 4 are 0.40, 0.39 and 0.52 respectively (all significant at the 1% level), while the γ' estimates corresponding to columns (4)-(6) are 0.07, 0.07 and 0.08 (again all significant at the 1% level). All of these estimates are economically indistinguishable from those appearing in Table 4.

Second, notwithstanding our use of first-difference and fixed estimators to counter omitted-variable bias, it is possible there remain sources of variation in board gender diversity that systematically differ between the pre-change and post-change periods. For example, suppose a variable X has a systematic effect on board gender diversity and that X was high on average during the 2012-16 period. Then excluding X from our regressions will load its effect onto *Rule* and hence over-estimate the latter's impact on diversity.

The work of Hillman et al. (2007) and Hutchinson et al. (2015) suggests that likely candidates for X are firm size, risk and financial position. We therefore re-estimate equations (1) and (2) including end-of-period sales, risk (annualised daily stock return volatility), and Tobin's Q in all models. Although volatility often shows up as statistically significant when firm fixed effects are excluded (as do, occasionally, sales and Q), all are indistinguishable from zero when the fixed effects are included. This supports our prior assumption that the effect of such variables on gender diversity is captured by firm fixed effects. More importantly, the estimates of γ and γ' are barely affected: the γ estimates corresponding to columns (1)-(3) of Table 4 are 0.34, 0.34 and 0.48 respectively (all significant at the 1% level), while the γ' estimates corresponding to columns (4)-(6) are 0.06, 0.06 and 0.08 (again all significant at the 1% level). These outcomes reflect

the very low correlations between *Rule* and the three covariates (ranging in absolute value from 0.01 to 0.15).

A third possibility is that comparing 2012-16 with 2008-12 creates an inflated picture of the growth in board diversity during the former period because the latter period experienced unusually low growth for some reason. That is, strong post-2012 growth was simply a return to the trend in operation prior to 2008. To investigate this possibility, we collect 2004 data for all of our sample companies and re-estimate equations (1) and (2) including an additional dummy variable set equal to 1 for observations occurring during 2008-12 and 0 otherwise.¹³ If the 2008-12 period was an aberration, then we should observe significantly negative coefficient estimates for this new variable and significantly reduced estimates of γ and γ' . However, this turns out to not be the case. The estimated coefficient for the 2008-12 dummy variable is always positive and sometimes statistically significant, while the estimates of γ and γ' , and their standard errors are unchanged. For example, the γ estimate corresponding to column (1) of Table 4 is 0.402 (compared with 0.397 in Table 4) while that corresponding to column (3) is 0.497 (compared with 0.512).

A final matter of obvious interest is whether the estimated impact of the listing rule change differs between male- and female-dominated industries.¹⁴ Unfortunately, we are not aware of a data source that provides NZ employment figures broken down by gender for the industry categories used in this paper. Nevertheless, as a rough approximation, we split our sample into two industry groups: those in three traditionally male-dominated sectors (financials, industrials, and information technology) and the rest. We then re-estimate equations (1) and (2) for these two groups separately. Interestingly, and perhaps surprisingly, the estimates of γ and γ' are in all cases higher for the male-dominated group, although the difference is insignificant at conventional

¹³This results in the loss of eight firms that did not list on NZX until after 2004.

¹⁴For suggesting this line of enquiry, we are grateful to a referee.

levels.¹⁵ For example, in the specification including firm fixed effects (column (3) of Table 4), the estimate of γ for the male-dominated group is 0.721 (standard error = 0.243) and 0.420 (0.112) for the other group. Overall, we find no evidence of significant inter-industry differences in response to the listing rule change.

4.2 Summary

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 change, a result that is robust to balance date, time period, omitted variables, and industry.. Can we therefore attribute this jump to the rule change itself? Unfortunately not. To do so would require a difference-in-differences approach (see Angrist and Pischke, 2009) applied to a sample that contains firms subject to the new listing rule and other firms not subject to the new listing rule. In this case, however, because all NZX firms were required to comply with the new rule, no “control sample” of exempt firms is available. Thus, our results may, for example, simply 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 2004-08 and 2008-2012 periods. Thus, while we cannot directly attribute causality, the most plausible explanation for the difference between the 2008-12 and 2012-16 periods is that

¹⁵Standard error estimates are also higher for the male-dominated group, although this may reflect the smaller number of firms (23 versus 51).

NZ firms were encouraged 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 perform better during the 2012-16 period 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 (EPS) growth, growth in Tobin's Q, annualised shareholder return, and excess shareholder return.¹⁶ 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 2012-2016 period, mean company performance was robust. For example, mean ROA (defined as net income divided by

¹⁶Excess shareholder return equals annualised shareholder return minus the market model's prediction 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 2012-16 period.

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. In Panel A, Δ ROA is the change in firm ROA during the 4-year period; Δ Sales is the log change in company sales during the period; Δ EPS is the log change in earnings per share (57 observations in panel A and 47 in panel B); Δ Tobin's Q 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. Panel B reports the improvement in 2012-16 performance relative to 2008-12 performance. For example, Δ^2 ROA is the difference between 2012-16 ROA growth and 2008-12 ROA growth.

<i>Panel A: Performance during the 2012-16 period</i>						
	Δ ROA	Δ Sales	Δ EPS	Δ Tobin's Q	Stock Return	Excess Return
Mean	3.57	0.54	0.44	0.11	0.12	-0.03
Standard Dev	16.0	1.00	1.06	0.39	0.20	0.22
Median	1.18	0.25	0.47	0.08	0.10	-0.03
Minimum	-32.3	-0.86	-2.27	-1.17	-0.36	-0.58
Maximum	111.3	5.83	3.42	1.20	0.58	0.50
<i>Panel B: Inter-period performance improvement</i>						
	Δ^2 ROA	Δ^2 Sales	Δ^2 EPS	Δ^2 Tobin's Q	Δ Stock Return	Δ Excess Return
Mean	0.73	0.35	0.72	0.18	0.13	0.02
Standard Dev	45.7	1.86	1.66	0.72	0.25	0.27
Median	2.39	0.06	0.31	0.06	0.12	-0.02
Minimum	-282.6	-4.07	-1.61	-1.90	-0.54	-0.67
Maximum	214.4	12.1	7.14	3.16	0.77	0.73

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.¹⁷ Turning to market performance measures, the mean shareholder return was 12% on an annualised basis while Q grew by slightly less than 3% per annum (thus illustrating the importance of dividends in the NZ sharemarket).¹⁸ Nevertheless, Table 5 also reveals considerable variation in performance: the question of interest is whether

¹⁷ Because of negative EPS values in our data, EPS growth estimates are based on 57 observations.

¹⁸ Although the excess return point estimate is negative, this is insignificantly different from zero: unsurprisingly, the average firm performs on a par with the market.

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, and been anticipated, 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 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.^{19,20} For convenience, we henceforth refer to this as “responsiveness”.

We first sort our sample of firms into quartiles based on the responsiveness measure (Q1 = the weakest response to the listing rule change; Q4 = the strongest) and then calculate the mean 2012-16 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 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 additional female directors leading to better performance, none of the differences is statistically significant at conventional levels: as can be seen in the last row of Table 6, the Q4-Q1 *p*-values 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 ob-

¹⁹For similar approaches, see, for example, Core et al. (1999) and Perotti and Wagenhofer (2014).

²⁰If instead we proxy responsiveness by using the residuals from other models appearing in Table 4, we obtain virtually identical results.

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 (2012-2016) 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. $p(Q4 - Q1)$ is the p -value associated with the mean difference between Q4 and Q1.

	ΔROA	$\Delta Sales$	ΔEPS	$\Delta \text{Tobin's Q}$	Stock Return	Excess Return
Q1	-0.509	0.385	0.238	0.086	0.100	-0.031
Q2	6.860	0.735	0.393	0.029	0.090	-0.086
Q3	4.222	0.492	0.219	0.197	0.092	-0.032
Q4	3.066	0.533	0.882	0.122	0.190	0.040
$p(Q4 - Q1)$	0.28	0.48	0.11	0.74	0.15	0.31

scured by the presence of other factors, both observable and unobservable. To address this, we estimate multiple regression models of the form:

$$\text{Performance} = a + b\hat{\epsilon} + cSales_{-1} + dIndustry + \eta \quad (3)$$

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 that controls for industry-specific risks.²¹ 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.

Table 7 reports OLS estimates of equation (3). For each performance measure, we

²¹Obviously, since the data used to estimate this model is a simple cross-section rather than a panel, firm fixed effects cannot be included.

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

This table estimates the cross-sectional relationship between 2012-16 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 (except for EPS, which has 57 observations). Numbers in parentheses are heteroscedasticity-robust standard errors. ***, **, * and * denote significance at the 1%, 5%, and 10% levels respectively.

	<i>Dependent variable</i>											
	Δ ROA	Δ Sales	Δ EPS	Δ Tobin's Q	Stock return	Excess return						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Constant	4.297* (2.24)		0.633*** (0.14)		0.395** (0.15)		0.100* (0.05)		0.117*** (0.02)		-0.019 (0.03)	
Listing Rule	0.379 (1.92)	-0.164 (2.18)	-0.031 (0.12)	-0.092 (0.12)	0.245* (0.14)	0.244* (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)	0.067 (0.05)	0.120 (0.09)	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	0.05	0.51	0.01	0.21	0.03	0.37	0.03	0.28
F-statistic	0.38	0.82	1.21	1.65*	1.29	3.86***	0.45	1.38	1.12	2.66***	1.13	2.02**

estimate the model both with and without industry fixed effects and, in all specifications, report heteroskedasticity-robust standard errors. The principal result is that, with the exception of the two coefficients for EPS growth (which are significant at the 10% level), no estimate of b is statistically distinguishable from zero.²² And while the inclusion of industry fixed effects substantially increases the model R^2 values, it has no positive effect on the estimates of b .

We also consider several robustness issues. First, because our performance variables contain some extreme values, raising the possibility of undue outlier influence, we eliminate the top and bottom 10% of observations from each performance measure. Second, we include stock return volatility and Tobin’s Q as additional explanatory variables. Third, we consider separately male-dominated and other industries.

None of these extensions has any effect on the principal result — that post-2012 company performance is independent of unexpected growth in female director representation. For example, although volatility and Q often show up as statistically significant determinants of performance, the estimates of b remain indistinguishable from zero (or, in the case of EPS growth, become indistinguishable from zero). Removing outliers has the same (non-)effect: performance is independent of listing rule responsiveness except in the case of EPS growth (which, as noted in footnote 22, suffers from sample bias that overstates its relationship with listing rule responsiveness).²³

²² The estimates for EPS growth are, moreover, almost certainly upwardly biased. By definition (see footnote 17), the deleted firms for this performance measure are likely to be poorer performers, but almost all of them appear in the top three responsiveness quartiles. Thus, observations that imply a negative or zero relationship between performance and responsiveness are disproportionately excluded.

²³Moreover, the statistical significance in the case of EPS growth disappears when the volatility and Q covariates are included in the regression equation.

5.1 Did greater gender diversity lead to *improved* firm performance?

To the extent that company performance is persistent, identifying gender-related differences in inter-firm performance, even if they exist, is likely to be difficult. For example, a firm that performs poorly during the 2008-12 period, which subsequently appoints additional female directors and improves its performance may still not be a strong performer in the cross-section of companies (because it started from a low base). Thus, we would fail to observe any relationship between 2012-16 firm performance and responsiveness to the 2012 listing rule change even though greater responsiveness did in fact have a positive impact on performance. On the other hand, if performance is mean-reverting then the reverse would be true. Put another way, lagged performance is a missing explanatory variable when estimating equation (3).

To allow for this possibility, we consider an alternative performance metric: the *improvement* in performance following the listing rule change relative to that which occurred prior. Specifically, for each performance variable, we calculate the *difference* between 2012-16 and 2008-12 company performance. A positive value indicates that the firm improved its performance after 2012 while a negative value indicates that performance fell. If gender diversity is associated with better firm performance, then we should observe a positive relationship between performance improvement and responsiveness to the 2012 listing rule change.

Panel B of Table 5 reports summary statistics for performance improvement during 2012-16 relative to 2008-12. On average, all measures show improvement during the later period, e.g., ROA (EPS) grew by 0.73 (0.64) percentage points more during 2012-16 than during 2008-12.²⁴

²⁴In this case, negative EPS values reduce the sample size for EPS growth improvement to 47 observations.

Tables 8 and 9 repeat the analysis of Tables 6 and 7 respectively, but using this alternative *improvement* measure of performance. However, the results are very similar. In Table 8, performance improvement is not only never monotonic in listing rule responsiveness, but also the most responsive quartile is frequently associated with the *lowest* level of improvement. None of the performance improvement differences between the most and least responsive quartiles is close to being statistically significant.

Table 8: Inter-Period Performance Improvement and Responsiveness to the 2012 Listing Rule Change: Quartile Analysis

This table repeats the inter-quartile analysis of Table 4, but focuses on the *difference* between 2012-16 and 2008-12 company performance. For example, Δ^2 ROA is the difference between mean ROA growth in 2012-16 and mean ROA growth in 2008-12. $p(Q4 - Q1)$ is the p -value associated with the mean difference between Q4 and Q1.

	Δ^2 ROA	Δ^2 Sales	Δ^2 EPS	Δ^2 Tobin's Q	Δ Stock Return	Δ Excess Return
Q1	-5.801	-0.059	0.552	0.075	0.058	-0.051
Q2	14.20	1.098	0.534	0.140	0.190	0.089
Q3	6.651	0.548	0.866	0.424	0.162	0.077
Q4	-14.30	-0.288	0.949	0.051	0.082	-0.051
$p(Q4 - Q1)$	0.63	0.52	0.64	0.89	0.76	0.99

After accounting for firm size and unobserved industry effects, Table 9 paints the same picture. Regardless of performance measure, performance improvement is unrelated to listing rule responsiveness; indeed, most of the responsiveness coefficient estimates are negative. Overall, we find no evidence that the appointment of additional female directors following the 2012 listing rule change was associated with improved company performance.

Table 9: Inter-Period Performance Improvement and Responsiveness to the 2012 Listing Rule Change: Regression Models

This table repeats the regression models of Table 7, but uses the *difference* between 2012-16 and 2008-12 company performance as the dependent variable. The sample size for all models is 74, except for EPS where it is 47. Numbers in parentheses are heteroscedasticity-robust standard errors. . ***, ** and * denote significance at the 1%, 5%, and 10% levels respectively.

	<i>Dependent variable</i>											
	$\Delta^2\text{ROA}$	$\Delta^2\text{Sales}$	$\Delta^2\text{EPS}$	$\Delta^2\text{Tobin's Q}$	$\Delta\text{Stock return}$	$\Delta\text{Excess return}$						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Constant	0.801 (6.37)		0.443* (0.26)		0.611** (0.28)		0.170* (0.10)		0.126*** (0.03)		0.034 (0.04)	
Listing Rule	-2.893 (5.10)	-3.085 (5.86)	-0.150 (0.22)	-0.231 (0.24)	0.158 (0.28)	0.222 (0.29)	-0.001 (0.11)	-0.027 (0.11)	0.006 (0.05)	-0.002 (0.06)	-0.013 (0.05)	-0.026 (0.06)
Responsiveness												
Lagged Sales	-0.116 (2.14)	0.983 (1.50)	-0.153 (0.09)	-0.039 (0.08)	0.143 (0.09)	0.210 (0.02)	0.016 (0.03)	0.040 (0.03)	-0.001 (0.01)	-0.011 (0.02)	-0.025** (0.01)	-0.006 (0.02)
Industry FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
R^2	0.01	0.02	0.02	0.14	0.02	0.46	0.01	0.21	0.01	0.15	0.02	0.21
F-statistic	0.08	0.12	0.55	0.80	0.52	2.41**	0.45	1.40	0.01	0.93	0.58	1.32

6 Concluding Remarks

We obtain 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 at least partly causal. Thus, despite its low-key nature, the new listing rule appears to have had a positive impact on the gender diversity of NZ boards.

Second, this positive impact did not translate into superior financial performance by the firms that responded most strongly. 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 on average than firms that failed to respond at all. Nor is there any relationship between listing rule responsiveness and performance *improvement* following the listing rule change. Such findings are consistent with the bulk of the literature on the relationship between company performance and female board representation: meta-studies of this relationship conclude that there is essentially zero relationship between these two variables. Our work provides further support for this view, in a NZ context.

Our results are also consistent with an efficient director appointment process in NZ. If, following the 2012 listing rule change, NZ firms had over-reacted by appointing unqualified female directors, then we would expect to see a relative deterioration in performance among the firms that responded most strongly to the rule change. Similarly, if prior to 2012 NZ firms had been under-utilising available female talent, then we would expect to see a relative improvement in performance among the firms that responded most strongly to the rule change. However, we observe neither such effect, suggesting

that NZ firms applied, at least on average, meritocratic principles in appointing directors prior to 2012 and have continued to do so since.

This leads to one final implication of our results. Despite the meta-study evidence, NZ commentators (e.g., Meier, 2014; Parker, 2018) and politicians (Lambert, 2018) periodically call for the imposition of female quotas on boards. Our study suggests such claims should be treated with caution: if a voluntary increase in female directors (which is likely to consist of mainly well-qualified appointees) has no impact on firm performance, then a further enforced increase (regardless of ability and qualifications) could potentially have a negative impact, similar to that observed by Ahern and Dittmar (2012).

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		

References

- Adams, R. and D. Ferreira, 2009. Women in the boardroom and their impact on governance and performance. *Journal of Financial Economics* 94, 291-309.
- Ahern, K. and A. Dittmar, 2012. The changing of the boards: the impact on firm valuation of mandated female board representation. *Quarterly Journal of Economics* 127, 137-197.
- Angrist, J., and J. Pischke, 2009. *Mostly Harmless Econometrics*. Princeton University Press.
- Carter, D., B. Simkins, and W. Simpson, 2003. Corporate governance, board diversity, and firm value. *Financial Review* 38, 33-53.
- Carter, D., F. DSouza, B. Simkins, and W. Simpson, 2010. The gender and ethnic diversity of us boards and board committees and firm financial performance. *Corporate Governance: An International Review* 18, 396-414.
- Chalkie, 2012. NZX opens ‘diversity’ can of worms. Available at <http://www.stuff.co.nz/business/opinion-analysis/6794835/NZX-opens-diversity-can-of-worms> (accessed 23 October 2018).
- Chapman Tripp, 2012. Submissions on NZX Listing Rules Consultation. Available at <https://www.chapmantripp.com/Publication%20PDFs/2012%20Chapman%20Tripp%20Submission%20on%20NZX%20Listing%20Rules%20Consultation.pdf> (accessed 22 October 2018).
- Core, J., R. Holthausen, and D. Larcker, 1999. Corporate governance, chief executive officer compensation, and firm performance. *Journal of Financial Economics* 51, 371-406.

- Deloitte, 2011. Only skin deep? Re-examining the business case for diversity. Available at https://www.ced.org/pdf/Deloitte_-_Only_Skin_Deep.pdf (accessed 22 October 2018).
- Eagly, A., 2016. When passionate advocates meet research on diversity, does the honest broker stand a chance? *Journal of Social Issues*, 72, 199-222.
- Erhardt, N., J. Werbel and C. Shrader, 2003. Board of director diversity and firm financial performance. *Corporate Governance* 11, 102-111.
- Eversheds, 2011. Measuring the impact of board composition on company performance. Available at <http://www.balcarpolansky.cz/files/91/Board%20Report%20Exec%20Summary.pdf> (accessed 22 October 2018).
- Grijalva, C., J. Pekka Nuorti, P. Arbogast, S. Martin, K. Edwards and M. Griffin, 2007. Decline in pneumonia admissions after routine childhood immunisation. *The Lancet* 369, 1179-1186.
- Hillman, A., C. Shropshire and A. Cannella Jr., 2007. Organizational predictors of women on corporate boards. *Academy of Management Journal* 50, 941-952.
- Hutchinson, M., J. Mack, and K. Plastow, 2015. Who selects the 'right' directors? An examination of the association between board selection, gender diversity and outcomes. *Accounting and Finance* 55, 1071-1103.
- Institute of Directors, 2012. Submission of the Institute of Directors. Available at https://www.iod.org.nz/Portals/0/News/Submissions/IoD_NZX_diversity_submission.pdf (accessed 22 October 2018).
- Klein, K., 2017. Does gender diversity on boards really boost company performance? Knowledge@Wharton. Available at <http://knowledge.wharton.upenn.edu/article/>

- will-gender-diversity-boards-really-boost-company-performance/ (accessed 21 October 2018).
- Lambert, T., 2018. New Zealand prepared to mandate female board directors within private companies. Available at <https://womensagenda.com.au/politics/new-zealand-prepared-to-mandate-female-board-directors-within-private-companies/> (accessed 5 February 2019).
- Leatherdale, S., 2019. Natural experiment methodology for research: a review of how different methods can support real-world research, *International Journal of Social Research Methodology* 22, 19-35.
- Linck, J., J. Netter and T. Yang, 2008. The determinants of board structure. *Journal of Financial Economics* 87, 308-328.
- McKinsey & Company, 2007. Women Matter. Available at <https://www.mckinsey.com/business-functions/organization/our-insights/gender-diversity-a-corporate-performance-driver> (accessed 22 October 2018).
- Meier, C., 2014. NZX 'has duty' to impose gender quotas in NZ boardrooms. Available at <http://www.stuff.co.nz/business/9963956/NZX-has-duty-to-impose-gender-quotas-in-NZ-boardrooms> (accessed 5 February 2019).
- Ministry of Women's Affairs, 2012. Submission on NZX Proposed Diversity Listing Rule. Available at http://women.govt.nz/sites/public_files/NZX\%20Submission.pdf (accessed 22 October 2018).
- NZ Human Rights Commission, 2010. New Zealand Census of Women's Participation. Available at <https://www.hrc.co.nz/files/5914/3823/4345/HRC-Womens-Census2010.pdf> (accessed 21 October 2018).

- NZX Limited, 2012a. Consultation on Market Rules for the Main Board/Debt Market. Available at https://s3-ap-southeast-2.amazonaws.com/nzx-prod-c84t3un4/comfy/cms/files/files/000/000/813/original/Consultation_Doc_300312.pdf (accessed 21 October 2018).
- , 2012b. NZX Diversity Rule and its Implementation. Available at https://www.nzx.com/files/static/NZX_Diversity_Rule_and_its_Implementation.pdf (accessed 21 October 2018).
- , 2012c. Guidance Note - Diversity Policies and Disclosure. Available at <https://www.nzx.com/files/static/cms-documents/FINAL%20Diversity%20Guidance%20Note.pdf> (accessed 21 October 2018).
- , 2019. NZX Corporate Governance Code. Available at <https://www.nzx.com/regulation/nzx-rules-guidance/corporate-governance-code> (accessed 6 July 2019).
- Parker, T., 2018. Susan Peterson: Quotas need to be considered. Available at https://www.nzherald.co.nz/business/news/article.cfm?c_id=3&objectid=12122465 (accessed 5 February 2019).
- Perotti, P. and A. Wagenhofer, 2014. Earnings Quality Measures and Excess Returns. *Journal of Business Finance and Accounting* 41, 545-571.
- Petersen, M., 2009. Estimating standard errors in finance panel data sets: comparing approaches. *Review of Financial Studies* 22, 435-480.
- Pletzer, J., R. Nikolova, K. Kedzior, and S. Voelpel, 2015. Does gender matter? Female representation on corporate boards and firm financial performance—A meta-analysis. *PloS one*, 10, e0130005.

- Post, C. and K. Byron, K, 2015. Women on boards and firm financial performance: A meta-analysis. *Academy of Management Journal*, 58, 1546-1571.
- Shilton, J., McGregor, J., and Tremaine, M., 1996. Feminizing the boardroom: a study of the effects of corporatization on the number and status of women directors in New Zealand companies. *Women in Management Review*, 11, 20-26.
- Wooldridge, J., 2001. *Econometric Analysis of Cross Section and Panel Data*. MIT Press.