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Diversification, corporate governance and firm value in small markets: evidence from New Zealand

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Abstract

We find that diversified firms in New Zealand are associated with a value discount of 19–42 per cent relative to single-segment (undiversified) firms. Although several competing explanations have been offered in the literature, we find that the strength of corporate governance explains between 15–21 per cent of this discount. Specifically, board size, busyness of directors, CEO ownership and whether or not compensation of directors includes equity-based components collectively explain a large part of the reported discount. Our results from companies trading in New Zealand complement recent findings in the US by not only confirming the existence of a diversification discount but also emphasizing the role of poor governance in destroying shareholder wealth by pursuing a value-destroying corporate strategy. All our results hold after controlling for potential endogeneity in the decision to diversify and the choice of corporate governance structure by employing two-way fixed-effects and dynamic-panel generalized method of moments regression techniques.

Key words: Diversification; Corporate governance; Value discount; New Zealand

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1. Introduction

Research spanning the last three decades suggests that markets value conglomerates differently relative to single-segment (undiversified) firms. Finance theory attributes these differences to both costs and benefits that can result from operating as a conglomerate. For example, diversification can be beneficial if it leads to lower bankruptcy costs (Amihud and Lev, 1981), lower taxes through increased debt capacity (Lewellen, 1971), or when it leads to more efficient resource allocation (Myers, 1977). Conversely, diversification can be costly if it leads to cross-subsidization of unprofitable units (Meyer *et al*., 1992; Rajan *et al*., 2000), when agency conflicts induce managers to engage in non-value maximizing diversification such as rent seeking (Scharfstein and Stein, 2000) or when managers engage in value-destroying investments for personal gains (Murphy, 1985; Denis *et al*., 1997; Lins and Servaes, 2002).

Despite the theoretical ambiguity regarding the valuation consequences of a diversified corporate structure, there is an emerging consensus that diversified firms, on average, are associated with lower value and poor performance. Berger and Ofek (1995), for example, find that diversified firms in the US suffer a value discount of 13–15 per cent, and perform poorly relative to single-segment firms. Similar results are reported in Lang and Stulz (1994), Servaes (1996), Denis *et al*. (1997), Campa and Kedia (2002) and Hoechle *et al*. (2012). Studies examining major international and emerging markets also report a value discount for diversified firms but with significant variation across markets. For example, Lins and Servaes (1999) find that while the diversification discount for firms in the UK is similar to that for firms in the US (around 15 per cent), diversified firms in Japan display a discount of only 10 per cent with most of it driven by firms with a Keiretsu group affiliation. Interestingly, diversified firms in Germany display no discount at all. Additionally, Lins and Servaes (2002) provide evidence regarding poor performance and an average diversification discount of 7 per cent for firms in seven emerging markets.

Reasons for the existence of a diversification discount range from inefficient investments (Rajan *et al*., 2000), inefficient internal capital markets (Meyer *et al*., 1992), potential endogeneity issues (Campa and Kedia, 2002), problems with industry classification standards (Villalonga, 2004a), issues with reporting standards (He, 2009) or faulty measurement metrics such as use of book value measures of debt which do not account for the premium added to traded debt as a result of the reduction of risk arising from diversification activities (Mansi and Reeb, 2002). Still others such as Graham *et al*. (2002) ascribe lower valuation to acquisition of already discounted firms and not as an artefact of the diversification decision. Denis *et al*.'s (1997) findings suggest that agency problems within diversified firms play an influential role in establishing and maintaining these value-destroying diversification activities. In a more recent comprehensive study on US diversified companies, Hoechle *et al*. (2012)

document that prevailing governance mechanisms in diversified firms explain a significant proportion of the reported diversification discount.

However, most of the research examining the valuation consequences of a diversified organizational form has focussed on larger markets while smaller markets such as NZ have received limited attention. In this study, we hope to fill this void. Specifically, we address two issues: first, by examining a sample of diversified and single-segment firms we test whether the international evidence on the existence of a value discount for diversified firms also exists in smaller markets such as NZ. Second and more importantly, in line with growing international evidence we examine in detail the role of corporate governance in explaining any valuation differences between diversified and single-segment firms in NZ.

While Hoechle *et al.* (2012) and Denis *et al.* (1997) demonstrate that governance strength has an asymmetric impact on diversified and single-segment firms in the US, such an association is not readily apparent for NZ firms given differences in the prevailing governance structures. First, prior studies have shown that compared to larger markets NZ's economy has a lower degree of financial development (Beck and Levine, 2002) but strong laws and law enforcement (Wurgler, 2000). However, the corporate governance practices in NZ are different to those in larger markets (Aggarwal *et al.*, 2009; Anderson and Gupta, 2009) particularly with respect to board structure. In particular, NZ firms have relatively busier and less independent boards than their US counterparts (Fox *et al.*, 2012). They also have a limited and small pool of director talent which tends to negatively impact on the role of the board as an effective governance mechanism. Moreover, the available evidence in the literature suggests that institutional and blockholding ownership levels do not have the same positive effect in NZ as in other major markets. Foreign institutions and corporations that collectively hold a majority of NZ company stock (54 per cent of NZ equities were held by foreign institutions and companies with local institutions holding a meagre 15 per cent (Healey, 2001)) have shown scant interest in imposing tighter oversight. A geographically-dispersed ownership pattern is not likely to generate significant incentives for effective monitoring. In fact, the popular press is replete with scathing criticism of institutions' lack of shareholder activism in NZ. Furthermore, unlike other major markets, there is no evidence in the literature to support the presence of a relationship between firm performance or value and the compensation of executives in NZ companies. On the other hand, NZ is significantly smaller than other major markets which accords greater transparency of managerial actions and the likelihood for collusion among outside board members given concentration of most corporate headquarters in one major centre (Short and Keasey, 1999). Second, in 1993 the New Zealand Government undertook major reforms of legislation that govern securities. This reform of the Companies Act in 1993 followed by the 2004 NZX mandated changes to listing rules that substantially increased director accountability are likely to strengthen internal

control and prevent managers from pursuing value-destroying policies. Therefore, the role of governance and its value implications for a diversified organizational form in NZ is not readily apparent.

Employing the widely accepted Berger and Ofek (1995) methodology we find that diversified companies in NZ suffer a significant value discount ranging from 19 per cent for the assets-based to 42 per cent for the sales-based measures relative to single-segment firms. Additionally, consistent with Denis *et al.* (1997) and Hoechle *et al.* (2012), there is a strong cross-sectional association between several variables that proxy for the strength of corporate governance and both the level of diversification and the associated discount. When variables that proxy for the strength of corporate governance are introduced into the model, the magnitude of the discount declines by 21 per cent and 15 per cent for the assets and sales based measures respectively. In particular, independence and busyness of the board, CEO ownership as well as whether or not compensation of directors includes equity-based components are major contributors to the reported diversification discount. We recognize the fact that the decision to diversify and the choice of governance structure are endogeneously determined; our results hold after controlling for potential endogeneity by employing two-way fixed effects and dynamic panel generalized method of moments (GMM) estimation techniques. Finally, all our results are robust to alternative methods of constructing the control variables, an alternative method of measuring the degree of diversification and an alternative excess value measure.

2. Corporate governance in New Zealand

Several differences between NZ's market characteristics and firm level corporate governance practices compared to those prevailing in larger markets have potential to impact the valuation of diversified firms differently if poor governance quality drives the decision to diversify. Aggarwal *et al.* (2009) studied the differences between corporate governance practices in different markets, including NZ, the US and the UK and found that the efficiency and strength of corporate governance in the US and the UK ranked significantly higher than NZ. They also show that compared with their US and British rivals, NZ firms are more likely to have less independent boards. However, NZ firms are more likely to separate the chairman and CEO positions compared to those in the larger markets. Additionally, boards in NZ suffer from director busyness represented by the number of other directorships held. Fox *et al.* (2012) report that mean multiple directorships held in NZ is around 2.4, which is significantly higher than the 1.23 average reported in the US (PricewaterhouseCoopers, 2009). They also document that on average only about 59 per cent of board members in NZ firms are considered independent in contrast to more than 80 per cent in the US (Tonello and Torok, 2011). In addition, board size and turnover of directors in NZ firms are on average lower than those in

the US (Tonello and Torok, 2011; Fox *et al*., 2012). Furthermore, Fox *et al*. (2012) pointed out that the existence of a limited and small pool of director talent in NZ tends to negatively impact the role of the board as a strong monitor. Moreover, while only a few firms in NZ include equity-based compensation in their director compensation packages, more than half of US firms use equity-based compensation to further align the incentives of the directors with the shareholders (Tonello and Torok, 2011; Moyle-Consulting, 2012). These differences in the board structures between NZ and US companies indicate that the effect of board structure on firm value and performance in NZ may be quite different from the effect observed in the US.

There are other governance differences as well. With regard to ownership structure, corporate ownership in the US and the UK is significantly more dispersed than in NZ (Fox *et al*., 2012). For instance, Hossain *et al*. (2001) reported that the top 20 shareholders in NZ companies own about 73 per cent of the stock whereas the average reported for US firms is around 37 per cent (Demsetz and Lehn, 1985). Additionally, a report by the NZ Institute of Chartered Accountants (NZICA) in 2003 documented that institutions control around 73 per cent of the total shares of listed firms in NZ. Furthermore, a 2009 report by the Capital Market Development (CMD) Taskforce Secretariat pointed out that a large share of the largest firms in NZ is controlled by offshore owners. The fact that a large portion of these large owners reside offshore may result in impaired monitoring. Also, considering the fact that investments in NZ firms are likely to represent a small portion of these investors' portfolios may further weaken their incentives to monitor. Insider ownership in NZ firms, however, seems to have the same effect on firm value observed in the US and the UK (Bhabra, 2007). Finally, although a significant positive relationship between executive compensation and firm performance is reported for major markets like the UK and Germany (Conyon and Schwalbach, 2000) and the US (Mehran, 1995), Andjelkovic *et al*. (2002) failed to find any relationship between firm performance and executive compensation contracts in NZ. Furthermore, Jiang (2009) suggests that concentrated ownership could explain the poor relationship between executive compensation and performance in NZ firms.

3. Hypotheses development

This study has two primary objectives: (i) to identify the effect of diversification on the value of listed companies in NZ, and (ii) to investigate whether this value differential between diversified and focussed firms can be explained by the strength of the prevailing corporate governance. In this section we develop hypotheses to address each one of these objectives.

While a large body of research confirms the existence of a diversification discount, a few studies have also documented a diversification premium (Villalonga, 2004a; He, 2009). Campa and Kedia (2002), however, argue that

the documented differences in the value of diversified and focused firms may actually be the result of factors not related to the decision to diversify (see also Lang and Stulz, 1994). However, given that the overwhelming evidence points towards a discounted valuation for diversified firms, we test the following hypothesis:

H1: Diversified firms in NZ will trade at a discount relative to single-segment firms.

Cross-sectional variation in this discount has been the subject of intense debate over the last two decades. A relatively new strand of literature associates this value-differential to the strength of corporate governance. In order to associate the lower valuation of diversified firms to poor corporate governance, we need to demonstrate that diversified firms do indeed suffer from elevated agency conflicts. Jensen (1986), Denis *et al.* (1997) and others argue that elevated agency conflicts vis-à-vis use of corporate free cash flow may result in inefficient investments leading to value destroying diversification. In addition, the high internal liquidity in diversified firms may further encourage managers to overinvest and thus destroy rather than create value. Diversification can also result in cross-subsidization of value-losing divisions when such units would discontinue if they were to operate separately (Meyer *et al.*, 1992). In fact, Denis *et al.* show that entrenchment reducing shocks induce refocusing strategies. In addition, Chen and Ho (2000) show that the level of diversification is positively associated with the size of the firm and negatively associated with outside blockholder ownership. Furthermore, Jiraporn *et al.* (2006) report a negative association between the strength of shareholder rights and a firm's propensity to diversify. They also document a strong positive link between the fraction of directors with multiple directorships and the firm's diversification activities. In a closely related study, Chen *et al.* (2009) document the presence of a significant positive association between firm diversification and the proportion of board members who held directorships in firms operating in other industries. Overall, there seems to be sufficient evidence to suggest a potential link between a diversified organizational form and elevated agency conflicts. We therefore test the following hypothesis:

H2: Agency conflicts are higher in diversified firms compared to focused firms.

We next test the hypothesis that the reported diversification discount is a result of the higher agency conflicts in diversified firms. Hoechle *et al.* (2012) examined the interaction between diversification and corporate governance practices and found that proxies for the strength of corporate governance can explain a large portion of the documented diversification discount (see also Lins and Servaes, 1999; Anderson *et al.*, 2000). Following Hoechle *et al.* (2012), we examine cross-sectional association between commonly used proxies

for the strength of corporate governance and the discounted value of diversified firms.

Griffith (1999) documents a significant relationship between CEO ownership and firm value. Furthermore, Amihud and Lev (1999) suggests that although compensation packages tend to align the interests of managers with those of the shareholders they also tend to increase managers' propensity to take risks and hence lead to lower diversification (see also May, 1995). Anderson *et al.* (2000) found that CEOs of diversified firms tend to have lower stock ownership and lower pay-for-performance sensitivities compared to their peers in undiversified firms. Moreover, Abowd (1990) documents the presence of a positive relationship between managerial compensation and firm performance. In NZ, however, no relationship has been documented between executive compensation and firm value (see Andjelkovic *et al.*, 2002). However, extant empirical evidence is dated leaving open the possibility of observing a link using more recent data. Furthermore, no study on NZ firms has discussed the relationship between CEO ownership and firm value although a study on insider ownership confirmed the existence of a largely similar pattern to that observed in US firms (Bhabra, 2007). We expect CEO's ownership to impact the relationship between diversification and firm value.

Denis *et al.* (1997) document a strong negative relationship between the level of diversification and equity ownership of officers, directors and outside blockholders. In NZ, director (Firth, 1997; Bhabra, 2007), blockholder (Boone *et al.*, 2011) and institutional ownership levels are positively related to firm value and performance. Furthermore, Yermack (2004) and Fich and Shivdasani (2005) document that the adoption of equity-based compensation plans for outside directors aligns them with shareholders leading to higher firm value and performance. Pergola and Joseph (2011), however, suggest that a higher level of board equity ownership may cause entrenchment among board members consequently adversely affecting earnings quality. Director ownership has been found to be positively related to firm performance in NZ (Firth, 1997).

Chen *et al.* (2009) report a positive relationship between director busyness and the decision to diversify. Furthermore, Jiraporn *et al.* (2008) and Fich and Shivdasani (2006) confirm that multiple directorships tend to negatively affect firm value. We expect director busyness to be more prevalent in NZ firms especially since NZ has a much smaller pool of director talent.

Numerous studies have documented a positive relationship between board independence and firm value (Chhaochharia and Grinstein, 2009). Furthermore, Kim *et al.* (2009) and others documented that the degree of board independence tends to be positively related to the firm's level of diversification. In NZ, Hossain *et al.* (2001) found that the proportion of outside members is positively related to firm performance. We expect diversified firms to benefit more than focused firms from the presence of outside board members who bring the required expertise and skills needed to monitor the actions of the managers running these relatively complex multi-industry firms. Therefore, we

anticipate that the presence of more outside members on the boards of NZ diversified firms will be associated with higher firm value and performance. With regard to board size, Jensen (1993) and Lipton and Lorsch (1992) argue that the efficacy of boards is a declining function of size. Eisenberg *et al*. (1998) and Yermack (1996) document a negative relationship between the size of the board and a firm's performance. Cheng (2008), however, showed that firms with larger boards tend to experience lower variability in performance. Compared with their US counterparts, NZ firms have smaller, more staggered and less independent boards.

Westphal and Zajac (1995) found that powerful CEOs significantly influence appointment of new directors, which normally results in weaker monitoring by the board and a more generous executive compensation contract compared to firms with powerful boards. In a related study, Vafeas (2003) shows that firms with powerful CEOs and management-friendly directors tend to have inflated CEO compensation contracts. We, therefore, would expect the governance quality of firms to be stronger when a larger fraction of the board predates the appointment of the CEO. Based on the findings of Westphal and Zajac (1995) and Vafeas (2003) in the US and because director turnover in NZ firms is much

Table 1
Distribution of firm and segment-years across industry

Industry classification	Focused firms (firm-years)	Diversified firms (firm-years)	Segments of diversified firms (segment-years)
Agriculture, forestry and fishing	68 (22)	6	40
Mining	27	0	0
Manufacturing	146 (20)	37	57
Construction	42 (8)	0	0
Retail and wholesale trade	138 (24)	22	31
Accommodation	55	5	27
Transport, postal and warehousing	99 (11)	23	23
Information media and telecommunications	97	0	7
Rental, hiring and real estate services	108 (26)	18	51
Professional, scientific and technical services	28	0	11
Administrative and support services	18	0	0
Health care and social assistance	27	0	0
Total	853	111	247

This table contains the distribution of firm-years and segment-years across the different industry classifications employed in this study. The total sample consists of 80 focused firms and 18 diversified firms, giving an overall total of 964 firm-years of which 853 firm-years were for focused firms and 111 firm-years were for diversified firms. The total number of segments is 247. Industry classifications with not enough observations were excluded. Diversified firms were allocated to the industry in which they had the largest presence in terms of proportion of sales in that industry compared to total sales. The numbers in parentheses represent the number of focused firm-years included in the governance subsample.

lower than in the US, we expect this metric to have a strong positive effect on a firm's performance and value (Tonello and Torok, 2011; Fox *et al.*, 2012). In particular, we expect this relationship to be stronger in diversified firms due to the significant role played by CEOs in the diversification process (May, 1995). May (1995) provides evidence that CEOs who own a large fraction of their firms tend to engage in diversifying activities.

H3: Diversification discount is partially explained by the existence of higher agency conflicts in diversified firms compared to their focused counterparts.

4. Data and methodology

Our sample consists of 98 firms (80 focused and 18 diversified firms with 964 firm-years of data: 853 firm-years for focused and 111 firm-years for diversified firms) listed on the NZX in the 14-year period between 1998 and 2011 which includes both current and delisted firms for which we could obtain sufficient information from the NZX Company Research database. Consistent with Berger and Ofek (1995), we did not include firms with segments in regulated industries such as finance, banking or utilities. We define diversified firms as those with segments operating in at least two different industries. Industries were defined as per the broad industrial divisions provided by the 2006 version of the Australian and NZ Standard Industrial Classification (ANZSIC).[1]

Table 1 contains the distribution of firm-years and segment-years across the different industries. Manufacturing and retail/wholesale trade have a significantly larger representation among focused firms, whereas administrative and support services industry has the lowest. Focused firm-years included in the governance subsample are almost equally distributed over the largest four sectors of the economy. With regard to the segment-years, manufacturing and rental, hiring and real estate services are the two industries with the highest

[1] ANZSIC is the Australia New Zealand Standard Industry Classification system. It was published in 1993 as a hierarchical four-level classification. In 1996 New Zealand published ANZSIC 1996, which is a modification of ANZSIC 1993 with another level for additional detail on New Zealand-specific industries. This edition omits Australian industries which do not occur in New Zealand such as sugar cane growing, consolidates clothing manufacture into one industry and brings in some specifically New Zealand industries. ANZSIC is currently being reviewed with a view to harmonising with the North American Industry Classification (Source: *Statistics New Zealand*). Companies in New Zealand do not enjoy the same degree of discretion regarding reporting of operating segments as per the Financial Reporting Standard Board (FRSB) of the New Zealand Institute of Chartered Accountants' requirements for the disclosure of information about a company's operating segments. Segment reporting requirements are intended to reflect information regarding segments along similar lines to that used internally for resource allocation and performance evaluation purposes (Source: *New Zealand Institute of Chartered Accountants*).

representation in the segment-years while professional, scientific and technical services industry is the least represented.

4.1. Computation of excess value

In order to study the effect of diversification on firm value we need to estimate a value for the firm if it *was not* diversified (imputed value) and compare that to its existing value as a diversified firm. In this study we compute imputed values following the algorithm in Berger and Ofek (1995).[2] The imputed value of each segment in a diversified firm is calculated by multiplying the segment's assets (or sales) by the median market value to assets (or sales) ratio for single-segment firms operating in the same broad industrial classification.[3] The total imputed value of the firm is calculated by summing the imputed values across segments as follows:

$$\text{Imputed Value} = \sum_{n}^{N} \text{Segment assets}_{n,i} \times \text{Industry}_i\text{median MV/assets} \tag{1}$$

where MV is median market value of single segment firm. Excess value (defined as the difference between the actual market value and the imputed value) is computed as follows:

$$\text{Excess Value} = \text{Ln}\left[\frac{\text{Firm value (MV Equity + BV Debt + BV Preferred Stock)}}{\text{Imputed Firm Value}}\right]. \tag{2}$$

While studies examining larger markets tend to drop firms with fewer than five focused firms, the size and nature of the NZ economy does not permit implementation of such a restriction on our data.[4] Therefore, we exclude only industries with fewer than three focused firms.

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[2] Market value of equity was computed as the average market price of the stock over the month directly preceding the annual report date multiplied by the number of shares at the end of the year.

[3] Other studies such as Berger and Ofek (1995) use earnings before interest, tax, depreciation and amortisation (EBITDA) and other similar measures. We excluded EBITDA from this study because of data constraints.

[4] Berger and Ofek (1995), for example, classified industries using the narrowest Standard Industrial Classification grouping which includes no less than five single-segment firms with at least $20 million in sales.

4.2. Multivariate regressions

In order to examine diversification's effect on value we regress the excess value computed in (2) above on a dummy variable that takes a value of 1 for diversified firms and 0 otherwise along with control variables with potential to affect the value differential. Following Berger and Ofek (1995), Gleason *et al.* (2012) and Hoechle *et al.* (2012), we estimate the following multi-variate regression model:

$$\begin{aligned}\text{Excess value}_{t,i} = {} & \beta_0 + \beta_1 \text{Diversification dummy}_{t,i} \\ & + \beta_2 \text{Size}_{t,i} + \beta_3 \text{Profitability}_{t,i} \\ & + \beta_4 \text{Growth opportunities}_{t,i} \\ & + \beta_5 \text{Leverage}_{t,i} + \varepsilon_{t,i}\end{aligned} \tag{3}$$

The models are estimated by employing Driscoll and Kraay (1998) and Newey and West (1987) heteroscedasticity and autocorrelation-consistent variance estimates.

4.3. Diversification and governance

In order to test our hypotheses that the value discount of diversified firms is the result of poor corporate governance stemming from the use of corporate free cash flow (e.g., Jensen, 1986; Stulz, 1990), we need to establish the existence of higher agency conflicts in diversified firms relative to focussed firms. Following Mansi and Reeb (2002) and Ruland and Zhou (2005), we re-estimate (3) after adding an interaction variable between the diversification dummy and leverage. If the discounted valuation of diversified firms is caused by the existence of higher agency conflicts we should observe leverage to be positively related to excess value, i.e. firms with higher leverage will have lower agency problems and thus a lower diversification discount. We therefore expect the coefficient of the interaction variable in Equation (4) below to have a positive sign.

$$\begin{aligned}\text{Excess value}_{t,i} = {} & \beta_0 + \beta_1 \text{Diversification dummy}_{t,i} \\ & + \beta_2 \text{Size}_{t,i} + \beta_3 \text{Profitability}_{t,i} \\ & + \beta_4 \text{Growth opportunities}_{t,i} \\ & + \beta_5 \text{Long-term leverage/total assets}_{t,i} \\ & + \beta_6 \text{Interaction between long-term} \\ & \text{leverage and diversification dummy}_{t,i} + \varepsilon_{t,i}\end{aligned} \tag{4}$$

However, Ruland and Zhou (2005) caution that leverage and excess value could be endogenously determined if firms with high excess values have relatively higher growth opportunities and therefore greater capital requirements. They argued that if the pecking order theory explains financing decisions then one could observe a positive relationship between excess value and leverage that may not necessarily be related to agency problems since firms may be undertaking more leverage to finance growth opportunities. Following Ruland and Zhou (2005), we control for potential endogeneity using a two-stage least squares approach by estimating the following simultaneous equations system:

$$\begin{aligned}\text{Excess value}_{t,i} = {} & \beta_0 + \beta_1 \text{Diversification dummy}_{t,i} \\ & + \beta_2 \text{Size}_{t,i} + \beta_3 \text{Profitability}_{t,i} \\ & + \beta_4 \text{Growth opportunities}_{t,i} \\ & + \beta_5 \text{Long-term leverage/total assets}_{t,i} \\ & + \beta_6 \text{Interaction between long-term leverage and diversification dummy}_{t,i} \\ & + \beta_7 \text{Lag of the excess-value}_{t,i} + \varepsilon_{t,i} \end{aligned} \tag{5}$$

$$\begin{aligned}\text{Long-term leverage/total assets}_{t,i} = {} & \theta_0 + \theta_1 \text{Diversification dummy}_{t,i} \\ & + \theta_2 \text{Size}_{t,i} + \theta_3 \text{Profitability}_{t,i} \\ & + \theta_4 \text{Growth opportunities}_{t,i} \\ & + \theta_5 \text{Excess value}_{t,i} + \theta_6 \text{Interaction between excess value and diversification dummy}_{t,i} \\ & + \theta_7 \text{Average value of relevant long-term industry leverage/total assets}_{t,i} + \delta_{t,i} \end{aligned} \tag{6}$$

Equation (6) is estimated using firm fixed effects to obtain fitted values of the dependent variable which are then substituted into Equation (5). The lag of the excess value measure (in Eqn 5) and the average value of long-term industry leverage (in Eqn 6) are the instruments for the excess value and the long-term debt/total assets, respectively.[5]

[5] These two instrumental variables are highly correlated with their corresponding independent variables (Spearman's rank correlation values of 0.76 and 0.63 for the excess value and long-term debt/total assets, respectively) while a very weak correlation exists between each of these instrumental variables and the other non-corresponding independent variable (Spearman's rank correlation values of 0.14 for the excess value and average value of relevant long-term industry leverage/total assets and 0.19 for the lag of excess value and long-term debt/total assets, respectively). This confirms the appropriateness of our choice of the instrumental variables.

Hoechle *et al*. (2012) dictate our choice of governance variables to examine whether the cross-sectional variation in excess values can be explained by the strength of prevailing governance. Using a restricted sample in this part of the analysis due to data constraints we re-estimate the main model after adding the ten governance variables. If corporate governance has the ability to explain variation of excess values cross-sectionally, one or more of our governance variables in model (7) will be significantly different from zero and more importantly the magnitude of the diversification dummy will decrease vis-à-vis its value obtained without the inclusion of the governance variables.

$$\begin{aligned}\text{Excess value}_{t,i} = {} & \beta_0 + \beta_1 \text{Diversification dummy}_{t,i} \\ & + \beta_2 \text{Size}_{t,i} + \beta_3 \text{Profitability}_{t,i} + \beta_4 \text{Growth} \\ & \text{opportunities}_{t,i} + \beta_5 \text{leverage}_{t,i} \\ & + \beta_6 \text{CEO ownership}_{t,i} \\ & + \beta_7 \text{CEO pay-to-performance}_{t,i} + \beta_8 \text{Officers} \\ & \text{and directors ownership}_{t,i} \\ & + \beta_9 \text{Institutional ownership}_{t,i} \\ & + \beta_{10} \text{Blockholder ownership}_{t,i} \\ & + \beta_{11} \text{Equity-based compensation} \\ & \text{for directors}_{t,i} + \beta_{12} \text{Busy directors}_{t,i} \\ & + \beta_{13} \text{Board independence}_{t,i} + \beta_{14} \text{Board size}_{t,i} \\ & + \beta_{15} \text{Director predating CEO}_{t,i} + \varepsilon_{t,i}\end{aligned} \tag{7}$$

5. Results and discussion

Table 2 contains descriptive statistics for all the variables used in the analyses. Both the asset-based and sales-based excess value measures depicted in Panel A are significantly higher for the focused firms suggesting that diversified firms are discounted relative to single-segment firms. In addition, diversified firms in general are larger, have significantly higher leverage, are more profitability, and have higher operating cash flows compared to focused firms. Focused firms, however, seem to have higher growth opportunities measured both as capital expenditures-to-sales ratio and as Tobin's Q. The presence of high free cash flows in a firm with limited growth opportunities has potential for elevated agency conflicts such as overinvestment and cross-subsidization (Jensen, 1986; Meyer *et al*., 1992).

Panel B of Table 2 contains descriptive statistics for the ten corporate governance variables used in this study. While mean CEO ownership appears to be higher in diversified firms there is no difference in median ownership

Table 2
Descriptive statistics for financial and governance variables

	Focused firms		Diversified firms		Difference	
	Mean	Median	Mean	Median	Mean	Median
Panel A: Excess value measures and different firm characteristics						
Excess value (assets)	0.016	0.002	(0.206)	(0.241)	0.222***	0.243***
Excess value (sales)	0.100	0.003	(0.608)	(0.441)	0.708***	0.444***
Assets ($m)	$537	$130	$884	$216	($347)**	($86)***
Sales ($m)	$397	$83	$485	$198	($88)	($115)***
Market value of equity ($m)	$454	$114	$540	$130	($86)	($16)***
Profitability (EBIT/sales)	0.094	0.093	0.166	0.111	(0.072)***	(0.018)
Growth opportunities (capital expenditures/sales)	0.444	0.067	0.147	0.046	0.297	0.021*
Leverage (total debt/total assets)	0.403	0.395	0.457	0.451	(0.055)***	(0.056)***
Tobin's Q	1.850	1.273	1.338	1.128	0.512***	0.145***
EBITDA/sales	0.059	0.128	0.221	0.148	(0.162)***	(0.020)
Long-term debt/total assets	0.172	0.145	0.232	0.244	(0.060)***	(0.099)***
Number of observations	853	853	111	111	964	964
Panel B: Governance variables						
CEO ownership	0.028	0.004	0.052	0.002	(0.024)**	0.002
CEO pay-to-performance	0.382	0.237	0.517	0.300	(0.135)*	(0.063)
Officers and directors ownership	0.117	0.010	0.096	0.012	0.021	(0.002)
Institutional ownership	0.145	0.124	0.139	0.130	0.006	(0.006)
Blockholder ownership	0.355	0.320	0.380	0.265	(0.025)	0.055
Equity-based compensation for directors (indicator)	0.234	0.000	0.225	0.000	0.009	0.000
Busy directors (indicator)	0.802	1.000	0.964	1.000	(0.162)***	0.000***
Board independence	0.602	0.600	0.561	0.570	0.041	0.030
Board size	5.820	6.000	6.910	7.000	(1.090)***	(1.000)***
Directors predating CEO	0.464	0.430	0.361	0.400	0.103**	0.030**
Number of observations	111	111	111	111	222	222

This table presents the mean and median values of firm financial data, governance variables and asset and sales based excess values of focused and diversified firms. The total sample consists of 80 focused and 18 diversified firms, giving us an overall total of 964 firm-years of which 853 firm-years were for focused firms and 111 firm-years were for diversified firms. All the governance variables included in Panel B are ratios except for board size which is the number of board members in any particular year or for when it is explicitly stated otherwise. The definitions and construction method of the different variables is explained in the methodology section. Tobin's Q is the modified version of Tobin's Q (as in Chung and Pruitt, 1994). The test for equality of means uses Welch's (1947) *t*-test which was found by Wilcox (2012) to provide relatively more accurate and conservative test results than the *t*-test or other similar approximation methods when the variances are unequal. The equality of medians is based on the Wilcoxon rank-sum test. ***, ** and * represent significance at the 1, 5 and 10% levels, respectively.

values. Second, diversified firms appear to have significantly more directors as well as larger board sizes compared to focused firms. The results also show that diversified firms have a significantly lower fraction of their board predating the appointment of the CEO. Overall, there appear to be significant governance differences between diversified and focussed firms in NZ with potential to affect values differently.

5.1. Diversification and value

Notwithstanding our univariate tests in Table 2, given the overwhelming international evidence that diversified firms are valued at a discount, we next employ a cross-sectional analysis to test whether diversified and focussed firms are valued differently in NZ also. Table 3 contains results from estimating regression Equation (3) where excess value is regressed on a diversification dummy along with controls with potential to affect value. The results confirm

Table 3
Multivariate regressions of excess value on the diversification dummy

	Assets	Sales
Intercept	0.599***	2.505***
	(10.040)	(7.170)
Diversification dummy	−0.188***	−0.417**
	(−3.250)	(−2.410)
Firm size (log of total assets)	−0.062***	−0.195***
	(−8.390)	(−6.540)
Profitability (EBIT/sales)	0.018	0.004
	(0.260)	(0.040)
Growth opportunities (capital expenditures/sales)	0.000	0.002
	(0.430)	(0.870)
Leverage (total debt/total assets)	0.326***	0.655***
	(5.430)	(4.240)
R^2	0.057	0.242
Adjusted R^2	0.052	0.238
Number of firms	98	98
Number of observations	964	964

This table contains results of two ordinary least squares regressions (controlling for time-effect) with the excess value measure as the dependent variable. 'Assets' and 'Sales' refer to the different accounting measures used to compute the dependent excess value measure in each of these regressions. The diversification dummy measures the diversification effect and takes the value '1' if the firm reports segments operating in two or more different industries according to the modified ANZSIC, or '0' otherwise. The *t*-statistics reported in the parentheses are based on Driscoll and Kraay's (1998) heteroscedasticity- and autocorrelation-consistent variance estimates. *** and ** represent significance at the 1 and 5% levels, respectively.

the existence of a significant diversification discount ranging from 18.8 per cent using the assets-based to 41.7 per cent using the sales-based excess value measures. The range of values are generally consistent with those reported in studies on other markets (Lang and Stulz, 1994; Berger and Ofek, 1995; Lins and Servaes, 1999; Hoechle *et al*., 2012). Our results complement findings from other markets and confirm that the discounted valuation of diversified firms is not limited to larger markets.

Since the decision to diversify is entirely voluntary, it is surprising that managers would even consider adopting a diversified corporate structure given widespread acknowledgement of value discount for diversified firms. While the literature offers several competing explanations for this valuation differential a consensus is clearly lacking. An emerging school of thought pins firms' decision to diversify to unresolved agency conflicts (Denis *et al*., 1997; Hoechle *et al*., 2012). Moreover, Jensen (1986), Meyer *et al*. (1992) and Lins and Servaes (1999) argue that internal capital markets and the high free cash flows that result from the diversification process tend to create higher agency problems within diversified firms which manifest in the form of cross-subsidization and overinvestment leading to value loss. The remainder of this paper examines this issue in considerable depth by first establishing the presence of elevated agency conflicts in diversified firms vis-à-vis single segment firms and then exploring the role of variables that proxy for the strength of corporate governance in explaining the cross-sectional variation in the value differential.

5.2. Diversification, firm value and agency

In this section, we first attempt to establish in a univariate setting that leverage and excess values are positively related. More importantly, we expect such an association to be stronger in diversified firms relative to single segment firms if diversified firms suffer from elevated levels of agency conflicts. For example, Denis *et al*. (1997) document an increased propensity for firms with elevated levels of agency problems to uphold value-destroying diversification policies. Moreover, Jiraporn *et al*. (2006, 2008) and others find that agency conflicts contribute significantly to the diversification discount observed in many markets. Results in panel A of Table 4 show a monotonic increase in excess values with leverage in diversified firms. Interestingly, there is no association between leverage and excess values in single-segment firms (panel B). While results in panels A and B collectively rule out tax as a possible reason for the positive relationship between leverage and excess values, we test this possibility directly. Results in panel C display the mean and median values of tax as a proportion of EBIT and long-term debt as a proportion of total assets for the upper and lower 50 per cent diversified firm-year excess values. These results show that, although firm-years in the lower half of excess values have significantly lower leverage levels, they tend to pay significantly lower taxes (as

Table 4
Leverage and value of diversified firms

	Long-term debt levels		Excess value (assets)	
	Mean	Median	Mean	Median
Panel A: The relationship between long-term debt levels and excess value in diversified firms				
Lower third	0.057	0.030	−0.294	−0.450
Middle third	0.246	0.244	−0.242	−0.323
Higher third	0.392	0.390	−0.033	−0.034
Panel B: The relationship between long-term debt levels and excess value in focused firms				
Lower third	0.004	0.007	0.097	0.015
Middle third	0.142	0.145	−0.018	0.000
Higher third	0.368	0.330	−0.031	0.000

	Lower 50% Excess value (assets)		Upper 50% Excess value (assets)		Difference	
	Mean	Median	Mean	Median	Mean	Median
Panel C: Tax and long-term debt levels in diversified firms						
Tax/EBIT	0.068	0.102	0.214	0.268	(0.146)**	(0.166)***
Long-term debt/total assets	0.184	0.198	0.279	0.295	(0.095)***	(0.097)***

Panel A presents the mean and median values of the long-term debt levels (as a proportion of total assets) and excess value (assets) for three groups of diversified firm-years ranked based on long-term debt levels. Panel B presents the mean and median values of the long-term debt levels (as a proportion of total assets) and excess value (assets) for three groups of focused firm-years ranked based on long-term debt levels. Panel C presents the mean and median values of Tax/EBIT and Long-term debt levels (as a proportion of total assets) in two subsamples. Subsamples are based on the median excess value (assets) (lower 50% and upper 50%). The total sample in Panels A and C consists of 111 diversified firm-years whereas the sample in Panel B consists of 853 focused firm-years. The test for the equality of means uses Welch's (1947) *t*-test which was found by Wilcox (2012) to provide relatively more accurate and conservative test results than the *t*-test or other similar approximation methods when the variances are unequal. Test for the equality of medians is the Wilcoxon rank-sum test. ***, ** and * represent significance at the 1, 5 and 10% levels, respectively.

a proportion of EBIT) whereas the upper-half firm-years have the opposite relationship. Therefore, tax-shield benefits do not seem to cause the observed positive relationship between excess values and leverage (La Rocca *et al*., 2009). Therefore, results in Table 4 suggest that diversified firms in our sample may be afflicted with higher levels of agency conflicts relative to single-segment firms.

However, results in Table 4 are univariate and more importantly do not control for the endogeneity in leverage and diversification decisions. To establish a cross-sectional association between diversification and higher

Table 5
Multivariate regressions to test for agency problems in diversified firms

	Ordinary-least-squares (OLS) regressions (controlling for time-effect)		Two-stage least squares regressions (second stage) to test for endogeneity	
	Assets	Sales	Assets	Sales
Intercept	0.651***	0.102	2.097**	4.816***
	(11.640)	(0.440)	(9.050)	(20.870)
Diversification dummy (D)	−0.360***	−0.844***	−0.276***	−0.304**
	(−4.540)	(−2.980)	(−2.660)	(−2.120)
Firm size (log of total assets)	−0.055***	0.005	−0.172***	−0.428***
	(−10.770)	(0.270)	(−8.640)	(−20.480)
Profitability (EBIT/sales)	0.007	−0.370***	0.137***	0.160***
	(0.110)	(−2.870)	(3.020)	(2.570)
Growth opportunities	−0.000	0.004	−0.000	−0.003***
(capital expenditures/sales)	(−0.360)	(1.270)	(−0.580)	(−4.450)
Long-term debt/total assets	0.047	−0.214*	−0.423**	−0.192
	(0.710)	(0.860)	(−2.540)	(−0.860)
Long-term debt/total assets*D	0.777*	0.773	0.962***	0.926*
	(1.670)	(1.930)	(2.580)	(1.760)
Excess value measure (One lag)			0.336***	0.203***
			(10.880)	(8.900)
R^2	0.050	0.074	0.097	0.278
Adjusted R^2	0.043	0.067	0.090	0.273
Number of firms	98	98	98	98
Number of observations	964	964	964	964

Results of two ordinary least squares regressions (controlling for time-effect) as well as two-two-stage least squares regressions (second stage only) with the excess value measure as the dependent variable are presented. 'Assets' and 'Sales' columns refer to the different accounting measures used to compute the dependent excess value measure. The diversification dummy measures the diversification effect and takes the value '1' if the firm reports segments operating in two or more different industries according to the modified ANZSIC, and '0' otherwise. *t*-Statistics reported in the parentheses are based on Driscoll and Kraay's (1998) heteroscedasticity- and autocorrelation-consistent variance estimates. ***, ** and * represent significance at the 1, 5 and 10% levels, respectively.

agency conflicts we estimate Equation (4) both in an OLS framework and a simultaneous equations framework given potential endogeneity in a firm's choice of leverage and the decision to diversify. Results are presented in Table 5. Results from the two-stage least squares estimation show that the interaction term is positive and significant suggesting that observed excess values are an increasing function of leverage (Jensen, 1986; Stulz, 1990). This is consistent with findings in Ruland and Zhou (2005) that diversification along with low leverage is likely to result in overinvestment especially in unrelated businesses leading to value loss.

5.3. Corporate governance and the level of diversification

Results in the previous section suggest that agency conflicts could explain the discounted valuation of diversified firms. Studies in the past have documented an association between the level of diversification and several governance

Table 6
Multivariate regressions of the degree of diversification on corporate governance variables

	Herfindahl index		Number of segments
	Assets-based	Sales-based	
Intercept	1.315*** (6.800)	1.216*** (12.030)	0.440 (0.850)
Firm size (log of total assets)	0.009 (0.660)	0.017*** (4.680)	0.082 (1.650)
Profitability (EBIT/sales)	0.057 (1.020)	−0.057** (−2.210)	0.445* (2.020)
Growth opportunities (capital expenditures/sales)	0.022*** (3.900)	0.025*** (4.000)	0.030 (0.710)
Leverage (total debt/ total assets)	−0.328*** (−6.670)	−0.324*** (−5.280)	0.793** (2.630)
CEO ownership	−0.417* (−1.880)	−0.468** (−2.380)	3.444*** (8.870)
CEO pay-to-performance	−0.017 (−0.790)	−0.000 (−0.010)	0.029 (0.710)
Officers and directors ownership	0.371*** (3.350)	0.345*** (3.560)	−0.373 (−1.270)
Institutional ownership	0.013 (0.050)	0.078 (0.400)	0.007 (0.020)
Blockholder ownership	0.114 (1.350)	0.141*** (3.160)	−0.237 (−0.760)
Equity-based compensation for directors (indicator)	0.084 (1.310)	−0.013 (−0.250)	−0.069 (−0.710)
Busy directors (indicator)	−0.105** (−2.380)	−0.035 (−1.210)	0.099 (1.110)
Board independence	−0.002 (−0.030)	0.042 (1.220)	0.002 (0.020)
Log (Board size)	−0.249*** (−3.040)	−0.280*** (−5.090)	0.088*** (3.310)
Directors predating CEO	−0.059 (−1.010)	−0.010 (−0.260)	0.081 (0.790)
R^2	0.212	0.254	0.629
Adjusted R^2	0.159	0.204	0.575
Number of firms	36	36	18
Number of observations	222	222	111

This table presents the results of three ordinary least squares regressions (controlling for time-effect) with the Herfindahl index measure as the dependent variable in the first two regressions and the number of segments in diversified firms as the dependent variable in the third regression. 'Assets-based' and 'Sales-based' refer to the different accounting measures used to compute the Herfindahl index in each of these regressions. Ten corporate governance variables were included in all three regressions to test if they can provide an explanation for the observed level of diversification. All of the governance variables are ratios except for log (Board size) which is the natural log of the number of board members in any particular year or for when it is explicitly stated otherwise. The first two regressions include only those firm-years with corporate governance data (222 firm-years), whereas the third regression includes only diversified firms (111 firm-years). The *t*-statistics reported in the parentheses are based on Driscoll and Kraay's (1998) heteroscedasticity- and autocorrelation-consistent variance estimates. ***, ** and * represent significance at the 1, 5 and 10% levels, respectively.

variables such as CEO ownership (May, 1995), outside blockholders (Chen and Ho, 2000), strength of shareholders' rights (Jiraporn *et al*., 2006) and fraction of directors with multiple directorships (Jiraporn *et al*., 2008; Chen *et al*., 2009). In this section, we test weather the strength of corporate governance is associated with the level of diversification in NZ.

Table 6 contains the results of ordinary least squares estimates from regressing two measures of diversification [Herfindahl index (asset and sales-based), and number of business segments] on variables that proxy for the strength of corporate governance. Consistent with expectations, CEO ownership, busy directors and board size in all three regressions are cross-sectionally associated with diversification levels with expected signs. These results are consistent with findings in May (1995) who report that CEOs with a high proportion of their personal wealth invested in a firm's equity tend to diversify.

Chen and Ho (2000) find that the level of diversification in a sample of Singaporean firms is negatively associated with outside blockholder ownership while Kim *et al*. (2009) show that the level of board equity ownership is inversely related to diversification levels. Consistent with these studies, we find that the signs of ownership share of both blockholders and officers and directors suggest that these variables are associated with lower diversification levels in NZ. Results in this section therefore suggest that the level of corporate diversification is associated with variables that proxy for the strength of corporate governance. If diversification is associated with lower firm value, then our results suggest that governance should be associated cross-sectionally with the valuation discount. We next explore this relationship between computed excess values and variables that proxy for the strength of governance.

5.4. Corporate governance and diversification discount

Studies such as Gleason *et al*. (2012) and Hoechle *et al*. (2012) report that diversification discount is related to the strength of corporate governance. In particular, Hoechle *et al*. (2012) find that inclusion of governance variables as explanatory variables explain a portion of the cross-sectional variation in the computed discount while Denis *et al*. (1997) document an increased propensity to refocus following entrenchment reducing shocks.

In this section, we test whether the excess values of firms in NZ are related to variables that proxy for the strength of corporate governance. Results from an ordinary least squares estimation of Equation (7) using a subsample with complete governance data are presented in Table 7. Consistent with evidence in the literature (Jiraporn *et al*., 2006, 2008; Chen *et al*., 2009; Kim *et al*., 2009; Gleason *et al*., 2012; Hoechle *et al*., 2012) inclusion of governance variables cause decreases in the value of the diversification dummy from 24.4 to 19.2 per cent for the assets-based excess value measure and from 50.4 to 42.9 per cent for the sales-based measure which translates into a proportional drop of 21.3

Table 7
Impact of corporate governance on excess values

	Regressions without governance variables		Regressions with governance variables	
	Assets	Sales	Assets	Sales
Intercept	0.603 (1.260)	−0.898** (−2.130)	0.456 (0.840)	−0.928 (−1.460)
Diversification dummy	−0.244*** (−2.830)	−0.504*** (−2.880)	−0.192*** (−3.740)	−0.429*** (−4.620)
Firm size (log of total assets)	−0.033 (−0.870)	0.101*** (3.980)	−0.028 (−0.530)	0.083 (1.260)
Profitability (EBIT/ sales)	0.174** (2.210)	0.173 (0.540)	0.197 (1.640)	0.093 (0.270)
Growth opportunities (capital expenditures/ sales)	−0.007 (−0.330)	0.167* (1.920)	−0.012 (−0.530)	0.137 (1.410)
Leverage (total debt/ total assets)	−0.397*** (−4.690)	−1.131*** (−3.530)	−0.337 (−1.370)	−0.556 (−1.400)
CEO ownership			1.672*** (3.780)	6.452*** (10.150)
CEO pay-to-performance			0.040 (0.860)	0.029 (0.390)
Officers and directors ownership			−0.307* (−1.790)	−0.203 (−0.970)
Institutional ownership			−0.330 (−0.740)	0.938 (1.420)
Blockholder ownership			−0.426 (−1.510)	0.175 (0.500)
Equity-based compensation for directors (indicator)			0.213** (2.230)	0.158 (0.920)
Busy directors (indicator)			−0.213*** (−2.890)	−0.100 (−0.760)
Board independence			0.414 (1.400)	0.062 (0.170)
Log (Board size)			0.148* (1.810)	0.149 (0.620)
Directors predating CEO			−0.116 (−1.510)	−0.410*** (−3.310)

Table 7 (continued)

	Regressions without governance variables		Regressions with governance variables	
	Assets	Sales	Assets	Sales
R^2	0.115	0.223	0.323	0.520
Adjusted R^2	0.095	0.205	0.274	0.485
Number of firms	36	36	36	36
Number of observations	222	222	222	222

This table presents the results of four ordinary least squares regressions (controlling for time-effect) with the excess value measure as the dependent variable. 'Assets' and 'Sales' refer to the different accounting measures used to compute the dependent excess value measure. Ten corporate governance variables were included in the second group of regressions to test if they can provide an explanation for the diversification effect (represented by the diversification dummy) reported in the first group of regressions. All of the governance variables are ratios except log (Board size) which is the natural log of the number of the firm's board members in any particular year or for when it is explicitly stated otherwise. These regressions include only those firm-years with corporate governance data (222 firm-years). The *t*-statistics reported in the parentheses are based on Driscoll and Kraay's (1998) heteroscedasticity- and autocorrelation-consistent variance estimates. ***, ** and *represent significance at the 1, 5 and 10% levels, respectively.

Table 8
Two-way fixed effects models

	Assets	Sales
Intercept	2.877*** (6.530)	1.339 (1.080)
Diversification dummy	−0.248* (−1.700)	−0.193*** (−3.000)
Firm size (log of total assets)	−0.251*** (−7.340)	−0.065 (−0.600)
Profitability (EBIT/sales)	0.189*** (3.130)	−0.163** (−2.210)
Growth opportunities (capital expenditures/sales)	0.000** (2.520)	0.002 (0.860)
Leverage (total debt/total assets)	0.351** (2.510)	−0.769*** (−2.830)
R^2	0.162	0.156
Adjusted R^2	0.048	0.042
Number of firms	98	98
Number of observations	964	964

This table presents the results of two-two-way fixed effects regression models with the excess value measure as the dependent variable. 'Assets' and 'Sales' refer to the different accounting measures used to compute the dependent excess value measure in each of these regressions. The regression models include the diversification dummy and control variables only while controlling for patterns across firms and years. These regressions include the full sample (964 firm-years). The *t*-statistics reported in the parentheses are based on Driscoll and Kraay's (1998) heteroscedasticity- and autocorrelation-consistent variance estimates. ***, ** and * represent significance at the 1, 5 and 10% levels, respectively.

and 14.9 per cent for the assets- and sales-based measures, respectively. In addition, the adjusted R^2s for the regressions with the governance variables are about two to three times higher than those for models without the governance variables, suggesting that governance explains a significant part of the cross-sectional variation of the computed value discount.

All our results so far have implicitly assumed that the decision to diversify, choice of governance structure and other policy choices within firms are entirely independent of each other. Literature, however, cautions that results obtained without correcting for potential endogeneity in corporate policy choices can be misleading. For example, despite a large body of evidence suggesting that diversification causes value loss, Campa and Kedia (2002) found that the diversification discount disappears or even turns into a premium when models are suitably adjusted to account for endogeneity. Villalonga (2004b) also reports that results obtained after controlling for potential endogeneity using several statistical methods suggest that diversification does not destroy value. Hoechle *et al.* (2012), however, finds that the discount persists even after accounting for the endogeneity.

We conduct tests to control for endogeneity in two stages by first re-estimating results reported in Table 3 by recognizing the endogeneity of the diversification decision and next allowing for both diversification and governance quality to be endogeneously determined. Following Campa and Kedia (2002) and Denis

Table 9
Dynamic-panel generalized method of moments estimations

	Full sample	Governance subsample	
	Assets	Assets (without governance)	Assets (with governance)
Intercept	1.139*** (5.980)	0.084 (0.210)	0.345 (1.190)
Diversification dummy	−0.289*** (−3.120)	−0.126** (−2.000)	−0.117* (−1.750)
Excess value measure (One lag)	0.353*** (11.620)	0.598*** (7.860)	0.610*** (8.650)
Excess value measure (Two lags)	0.070*** (2.850)	0.036 (0.550)	0.044 (0.650)
Firm size (log of total assets)	−0.109*** (−6.820)	0.007 (0.230)	−0.049** (−2.030)
Profitability (EBIT/sales)	0.130** (2.250)	0.105 (1.150)	0.207** (2.320)
Growth opportunities (capital expenditures/sales)	−0.001** (−2.050)	−0.036* (−1.780)	−0.026 (−1.270)
Leverage (total debt/total assets)	0.484*** (4.570)	−0.336* (−1.890)	−0.181 (−1.200)
CEO ownership			−0.166 (−0.400)
CEO pay-to-performance			0.014 (0.480)
Officers and directors ownership			0.200 (1.110)
Institutional ownership			0.432 (1.490)
Blockholder ownership			0.250 (1.500)
Equity-based compensation for directors (indicator)			0.119** (2.030)
Busy directors (indicator)			−0.032 (−0.420)
Board independence			0.014 (0.110)
Log (Board size)			0.094 (0.790)
Directors predating CEO			−0.043 (−0.540)
Arellano-Bond test/First order (*p*-value)	0.000	0.007	0.006
Arellano-Bond test/Second order (*p*-value)	0.432	0.270	0.309
Hansen test of over-identification (*p*-value)	0.210	0.114	0.895
Number of firms	98	36	36
Number of observations	964	222	222

This table presents the results of three dynamic-panel generalized method of moments (GMM) estimations with the assets-based excess value measure as the dependent variable. The first regression employed the full sample and included the diversification dummy and the control variables only, whereas the other two regressions employ the governance subsample. The second regression includes the diversification dummy and control variables only, whereas the corporate governance variables were added to the third regression. Arellano-Bond test is a test for first-order and second-order autocorrelation in the first-differenced errors with the null hypothesis of zero autocorrelation. Hansen test of over-identification tests the null hypothesis that all instruments are valid (Arellano and Bond, 1991). The *t*-statistics are reported in the parentheses. ***, ** and *represent significance at the 1, 5 and 10% levels, respectively.

et al. (2002), we re-estimate results reported in Table 3 by now employing a two-way fixed-effects model to account for unobservable firm characteristics that may affect the both a firm's decision to diversify and its value. Results in Table 8

show that the value of the diversification dummy is still negative and significant in both regressions with the magnitude of the discount using the assets-based measure in fact being higher than when the same model is estimated using the simple OLS framework. These results are consistent with those reported in Hoechle *et al*. (2012) confirming the existence of a diversification discount in NZ even after controlling for endogeneity of the diversification decision.

Given that our primary focus is to examine the role of governance in explaining cross-sectional variation of the value-differential between diversified and single-segment firms, we need to estimate our main results reported in Table 7 by recognizing that both corporate governance and diversification could be endogeneously determined. To do this, we employ a dynamic-panel GMM estimator introduced by Arellano and Bover (1995) and adopt a three-step estimation process as in Hoechle *et al*. (2012). First, the original regression is modified to include the first and second lagged excess values in addition to the diversification dummy and the control variables. Second, we take the first-difference of all variables to account for potential unobserved heterogeneity. Finally, we use the dynamic-panel GMM estimator to estimate the final model while specifying the lagged values of the excess value measure, governance variables, diversification dummy and control variables as instruments. Hoechle *et al*. (2012) argue that specifying the lagged variables as instruments for the current values control for possible simultaneity and reverse causality.

Results from the dynamic-panel GMM estimation technique (with and without the governance variables) are reported in Table 9. The full sample results indicate that the diversification discount remains significant although, in contrast to many similar studies, it is now surprisingly higher compared with those obtained before controlling for endogeneity (see Campa and Kedia, 2002; Hoechle *et al*., 2012). However, the GMM estimations for the governance subsample largely correspond to what was documented in prior studies with the diversification discounts for both regressions (with and without governance variables) being significant albeit with a smaller magnitude than those reported in Table 7. Moreover, the reduction in diversification discount resulting from the addition of the governance variables is now much smaller. The absolute and proportional reductions in value are 0.9 per cent and 7.1 per cent, respectively, compared with 3.6 per cent and 21.3 per cent before controlling for endogeneity.[6] Overall, the results of this analysis reaffirm the existence of a significant diversification discount that diminishes with the addition of governance variables.

5.5. *Robustness tests*

We next conduct several robustness tests to ensure that our results are not an artefact of selective measurement methods. In the interest of brevity, we

[6] Hoechle *et al*. (2012) reported a reduction of around 4 per cent in the discount after controlling for endogeneity using the same procedure.

suppress reporting of results in tabular form although all the tables are available upon request.

5.5.1. Robustness to alternative measures of control variables

The control variables in our cross-sectional regressions are chosen because they have been documented in the literature to affect value. Given this crucial role, measurement errors in the control variables have potential to affect our primary results. In this section, we attempt to address this concern by employing the following alternative measures:

Firm size is now measured by the taking the natural log of total sales (rather than assets as in Rajan *et al*., 2000).
Profitability is now measured as the ratio of net income to total value of assets (e.g., Yermack, 1996; Eisenberg *et al*., 1998).
Growth opportunities are now proxied by the ratio of market-to-book value of equity.
Leverage is now measured as the ratio of book value of long-term debt to total assets (e.g., Mansi and Reeb, 2002).

Results from re-estimating the regression results reported in Tables 3 and 7 with the new control variables are not materially affected. For example, for the full sample (without governance variables) the coefficient of the diversification dummy with the new control variables is −0.157 compared to −0.188 in Table 3 for the assets-based measure of excess value. Similarly, for the governance subsample the same coefficient (with the governance variables) is now −0.143 compared to −0.192 reported in Table 7. Therefore, our primary results do not appear to be driven by our method of computing control variables.

5.5.2. Robustness to an alternative diversification measure

Following Berger and Ofek (1995), we test the robustness of our results to using a different measure of diversification. We replicated our main results by using an asset- or a sales-based Herfindahl index rather than the diversification dummy used in previous sections. Herfindahl index is computed as the sum of the square of each segment's proportion of total assets or sales in the firm. This index takes the value one for focused firms and decreases as the firm's assets or sales become more dispersed across segments. Therefore, we expect the coefficient of the Herfindahl index to be significant and *positive* to reflect a higher loss in value as the degree of diversification increases. Re-estimating the results in Tables 3 and 7 by replacing the diversification dummy with the assets-based Herfindahl index measure shows that the new alternative diversification

measure is significant and positive in all regressions, supporting our primary findings.[7] For the regressions using the governance subsample, similar to results reported in Table 7 the magnitude of the coefficient of the Herfindahl index goes down after including the governance variables. Once again, our primary results are robust to our measure of the degree of diversification.

5.5.3. Robustness to an alternative excess value measure

Finally, since the Berger and Ofek (1995) measure of excess values is the dependent variable in our cross-sectional regressions, our results are only as strong as our faith in our measure of the excess value. In this section we re-estimate our primary results by using Tobin's Q as our excess value measure (e.g., Lang and Stulz, 1994). We measure Tobin's Q using the Chung and Pruitt (1994) approximation which is very highly correlated with the theoretically correct Tobin's Q. Once again, consistent with our main findings, we find a diversification discount of 23.7 per cent for the full sample and 32.1 per cent for the subsample before adding the governance variables which drops to 21 per cent after adding the governance variables albeit insignificant.

6. Conclusions

We examine and analyze corporate diversification's impact on firm value and the role of corporate governance in explaining cross-sectional variation in valuation differences between diversified and focussed firms on a recent sample of NZ listed companies. Employing the widely accepted Berger and Ofek (1995) methodology we find that, consistent with international evidence, diversified companies in NZ also suffer a value discount ranging from 19 per cent for the assets-based to 42 per cent for the sales-based measures of excess values relative to single-segment firms. Additionally, consistent with Hoechle *et al.* (2012), there is a strong cross-sectional association between several variables that proxy for the strength of corporate governance and both the level of diversification and the associated discount. When variables that proxy for the strength of corporate governance are introduced into the model, the magnitude of the discount declines by 21 and 15 per cent for the assets and sales based measures respectively. Given the decision to diversify and choice of governance structure could potentially be endogeneously determined, we conduct our analyses to control for endogeneity issues by employing two-way fixed effects and dynamic panel GMM estimation techniques. All our results are robust to alternative methods of constructing the control variables, an alternative measure of the degree of diversification and an alternative excess value measure.

[7] Results with the sales-based measure were quite similar.

We contribute to the existing body of international evidence by documenting a diversification discount in a small, geographically isolated market populated by firms much smaller in size and scope than those in larger markets. Our findings also provide an out-of-sample test regarding the role played by the strength of corporate governance in explaining cross-sectional variation of this discount. Finally, our findings support the conjecture that the discounted valuation of a diversified organizational form is robust to differences in financial markets and corporate governance structures.

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