Diversification and Firm Value in New Zealand

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This version: July 6, 2007

*Corresponding author. This paper is based on a research project completed by André Bate as a requirement for the Master of Business (Finance) degree at the University of Otago, Dunedin, New Zealand. We wish to thank Timothy Crack, Scott Smart, Vivien Pullar and seminar participants in the Department of Finance and Quantitative Analysis at the University of Otago for helpful suggestions. We take responsibility for all remaining errors.

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Abstract

We find that diversified firms in New Zealand are associated with a value discount of 35% and that such firms also perform poorly relative to single-segment undiversified firms. However, we find no link between the lower value of diversified firms and either their poor performance or to the presence of agency conflicts. After controlling for endogeneity in the relationship between diversification and firm value, diversification does not explain the cross-sectional variation in the value discount. These findings suggest that performance and value discounts observed for diversified companies in our sample may be related to unobserved firm and industry attributes that are systematically related to the firms' decision to diversify rather than to diversification itself.

JEL Classification: G34
Key Words: *Diversification, firm performance, value discount, New Zealand*

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1. Introduction

We compare value and performance differences between diversified and single-segment listed New Zealand (NZ) companies and find that diversified firms are associated with a significant value discount relative to single-segment firms. While this result concurs with extant evidence that markets value conglomerates differently, we however fail to observe a direct link between the diversified organizational form and the valuation differential. This latter result adds to a very recent but growing body of literature that relates the observed valuation and performance discount not to diversification but to firm and industry attributes that encourage firms to seek growth outside their industries.

Finance theory stresses that both costs and benefits can result from operating as a conglomerate. Diversification can be beneficial if it leads to lower bankruptcy costs (Shleifer and Vishny, 1992), lower taxes through increased debt capacity (Majd and Myers, 1987; Lewellen, 1971), or when it leads to more efficient resource allocation (Myers, 1977; Stulz, 1990; Khanna and Tice, 2001). Conversely, diversification can be costly if it leads to cross-subsidization of unprofitable units (Meyer, Milgrom and Roberts, 1992; Rajan, Servaes and Zingales, 2000). Additionally, agency conflicts may lead managers to diversify for non-value maximizing reasons, such as rent seeking (Scharfstein and Stein, 2000) or by engaging in value-destroying investments to enhance personal compensation (Murphy, 1985; Denis, Denis and Sarin, 1997; Rose and Shepard, 1997).

Despite theoretical ambiguity regarding diversification's effects, there is an emerging consensus among researchers that diversified firms, on average, are

associated with lower firm value and poorer performance. Berger and Ofek (1995), for example, find that diversified firms in the US suffer a value discount of 13-15%, and that such firms perform poorly relative to single-segment firms. Similar results are reported in Lang and Stulz (1994), Servaes (1996) and Campa and Kedia (2002). In addition, studies examining major international and emerging markets also report a value discount for diversified firms. However, international evidence suggests that the effects of diversification differ across markets. For example, Lins and Servaes (1999) find that while the diversification discount of UK firms (around 15%) is similar to that in the US, such firms in Japan display a discount of only 10% and most of this is limited to firms with a Keiretsu group affiliation. Interestingly, diversified firms in Germany display no discount at all. Additionally, evidence in Lins and Servaes (2002) documents poorer performance and an average discount of 7% for seven emerging markets.[1]

Given that theory does not make unambiguous predictions regarding diversification's effect on firm value, the widespread interpretation of the observed valuation discount as evidence that diversification destroys value is disturbing. Recent studies argue that diversified firms have lower value and performance not because diversification is inefficient but because firms choose to diversify if either gains from operating as a conglomerate outweigh costs (Matsusaka, 2001; Maksimovic and Phillips, 2002), or if growth opportunities exhaust in their primary industries (Campa and Kedia, 2002). A lack of profit potential and growth opportunities is likely to depress firm value even before firms choose to diversify. This establishes an endogenous relationship between diversification and firm value, and failure to account for this endogeneity may lead to erroneous conclusions regarding

[1] See Martin and Sayrak (2003) for an excellent review of recent literature on corporate diversification.

diversification's effect on value and performance. In fact, Campa and Kedia (2002) show that the computed discount drops, or even turns into a premium, once endogeneity is controlled for.

We seek to extend this literature by examining listed firms in NZ, a market very different from those that have been the subjects of prior studies. Our interest in NZ stems primarily from the fact that given its small size, NZ poses a natural barrier to growth in any one industry while its geographical isolation renders international diversification costly. Such conditions, therefore, are conducive to firms adopting diversification strategies very different to those of firms that operate in larger and less isolated markets. Specifically, we address two issues regarding value and performance of diversified firms in NZ. First, by examining a sample of diversified and single-segment firms we test whether the international evidence on the existence of a value and performance discount also exists in NZ. Second, and more importantly, we analyze whether the existence of such a discount or premium is a consequence of diversification or is it driven by unobserved firm-specific attributes systematically related to the firm's decision to diversify. To the best of our knowledge, this is the first study outside of the US, which controls for endogeneity in the relationship between diversification and firm value.

Using the methodology in Berger and Ofek (1995), we find that diversified firms in New Zealand not only trade at a discount of 35% but that such firms also perform poorly relative to single-segment undiversified firms.[2] These findings

[2] The diversification discount is 39.1%, 32.7%, and 115.1% when firm value is industry-adjusted using sales, assets, and EBIT, respectively. We place greater emphasis on the results obtained using sales and assets based measures. The diversification discount using EBIT to industry-adjust is less reliable, since managers have more discretion over how EBIT is reported. Berger and Ofek (1995) also find that industry-adjustment using EBIT is noisy.

corroborate results in studies examining other markets.[3] Potential endogeneity in this relationship can however cloud the causal link between diversification and firm value/performance. In sharp contrast to findings using the simple OLS formulation, we fail to observe a systematic relationship between measures of diversification and the computed discount in value/performance when the two-way fixed-effects regressions methodology suggested in Campa and Kedia (2002), is used. These findings disprove the notion that a diversified organizational form results in value loss. In fact, these results can be interpreted to suggest that diversified firms in NZ may have been performing poorly even before they chose to diversify. In other words, lower value and poor performance among diversified firms in NZ may be driven by characteristics that affect their decision to diversify, rather than by diversification itself. In addition, we cannot unequivocally establish that agency conflicts cause firms to diversify at the expense of shareholders as suggested in Dennis, Dennis and Sarin (1997). All our findings are robust to alternative measures of diversification and to the industry-adjustment methodology employed to compute excess value and performance.

The remainder of this paper is organised as follows. Section 2 summarises the literature on corporate diversification. In Section 3 we describe the data on diversified and single-segment firms that form our sample. Section 4 contains the empirical methodology employed. In this section we primarily lay out the steps to compute the differential values of diversified and single-segment firms and specify the cross-sectional models to examine the effect of diversification on value/performance. Section 5 presents our main findings and a brief Section 6 concludes the paper.

[3] Lang and Stulz (1994) find a diversification discount of 23%-48% for US firms throughout the 1980s. Berger and Ofek (1995) find a discount of 13-15% for US firms over 1986-1991. Examining major international markets, Lins and Servaes (1999) find a discount of 15%, 10%, 5% for the UK, Japan, and German markets, respectively, in 1992 and 1994. In addition, Lins and Servaes (2002) find a discount of 7% for seven Asian emerging markets in 1995.

2. Review of related literature

2.1. Costs and benefits of corporate diversification

Shleifer and Vishny (1992) present a model in which diversified firms benefit from lower bankruptcy costs since imperfect correlation between divisional cash flows reduces default probability. Such firms are also likely to encounter lower bankruptcy costs because lower synergies among assets reduce value loss in the event of liquidation. Moreover, such firms have the ability to liquidate assets in industries that offer the best price. In addition, Lewellen (1971) and Majd and Myers (1987) suggest that diversified firms have increased debt capacity resulting from their lower bankruptcy costs. A number of studies have developed models that predict increased investment efficiency by diversified firms. Stein (1997), for example, presents a model in which diversified firms make more efficient investments given their ability to transfer resources from less profitable to more profitable projects. Shin and Stulz (1997) and Khanna and Tice (2001) find evidence consistent with this hypothesis.

On the other hand, diversification may be costly if agency conflicts lead firms to diversify for reasons other than value maximization. For example, given their undiversified human and financial capital tied to firm prospects, managers benefit from less volatile cash flows in diversified firms. Findings in May (1995) suggest that acquisitions with potential to reduce the variance of equity returns are positively related to managerial ownership, a result consistent with the view that managers may act in ways that will reduce their own risk exposure regardless of wealth consequences for shareholders. Likewise, Mansi and Reeb (2002) find that diversification transfers wealth from shareholders to bondholders due to the reduced volatility of cash flows. Managers also benefit if diversification results in greater

prestige and compensation. Higher compensation can result if diversification increases assets under management control (Murphy, 1985), if it leads to greater manager entrenchment (Dennis, Dennis and Sarin, 1997), or if managing a diversified firm demands a high quality manager (Rose and Shepard, 1997). In fact, findings in Denis, Denis, and Sarin (1997) show that firms are less likely to diversify if they have better governance through high managerial and block-holder ownership.

2.2. Diversification, firm value and performance

Servaes (1996) was among the first set of studies to report a large diversification discount for US firms. Similar results are reported in Lang and Stulz (1994) (diversification discount of 23%-48%) and Berger and Ofek (1995) (diversification discount of 13-15%). Furthermore, these studies find that the diversification discount is positively correlated with the extent of diversity among the various business segments. In addition to the value discount, these studies also document that diversified firms perform poorly. For example, Berger and Ofek (1995) find that, although diversified firms benefit from tax savings, those in low growth industries make inefficient investments. Burch and Nanda (2001), on the other hand, analyse spin-offs which remove the need to industry-adjust firm value. By comparing the combined market values of the segments post spin-off with the firm pre spin-off, they show that spin-offs lead to value creation and that the value created is positively related to the diversity of the spun-off business from the remaining firm.

International studies on diversification suggest that differences in ownership patterns may influence the effects of diversification. Lins and Servaes (1999) examine the effects of diversification in the British, Japanese, and German markets. Japan and Germany are characterized by a high concentration of shareholder and bank

ownership. Moreover, ownership patterns get significantly concentrated through group affiliation such as the Keiretsu group structure in Japan. They find that while the diversification discount of UK firms (around 15%) is similar to that in the US, such firms in Japan display a discount of only 10% and most of this is driven by firms with a Keiretsu group affiliation. Interestingly, diversified firms in Germany display no discount at all and this is especially true for those with an insider ownership of at least 5%.[4] Additional international evidence contained in Lins and Servaes (2002) documents poorer performance and a diversification discount of 7% for seven emerging markets.

2.3. Alternative explanations for the diversification discount

Recent studies question whether the widely documented diversification discount can be interpreted as evidence that diversification destroys value. Diversification might not be the cause of discounted valuation if firms become diversified through the acquisition of divisions that have already been deeply discounted or if firms diversify when growth opportunities in their industries deplete. Graham, Lemmon, and Wolf (2002), for example, report that half the value discount in their sample is caused by diversifying mergers involving targets that were already discounted. Likewise, Campa and Kedia (2002) argue that firms might be driven to diversify when growth opportunities in their industries deplete. If characteristics that cause firms to diversify are systematically related to value and discount, then diversification will be endogeneously related to value. Much of the reported discount reduces significantly or turns into a premium upon controlling for this endogeneity. Maksimovic and Phillips (2002) show that firms with a strong competitive advantage

[4] The insignificant discount in the German market for the full sample may partly be driven by the small sample size.

in a particular industry invest more in that industry and begin diversifying when returns in that industry diminish.

Yet, others argue that the diversification discount may be generated by problems with the data or the methodology employed to measure the discount. Villalonga (2004), for example, argues that the value discount may be driven by biases in the COMPUSTAT segment data, which is widely used to industry-adjust firm value. Segment data may be biased given the discretion managers enjoy in reporting data for segments. She argues that accounting information from the Business Information Tracking Series (BITS) is more consistent and that value discounts computed using COMPUSTAT segment data are completely reversed when BITS data are used.

Collectively, extant evidence suggests that diversified firms generally are valued lower and perform poorly compared to single-segment undiversified firms. However, notwithstanding conclusions in prior studies, alternative interpretations are possible. For example, the computed discount could either result from the acquisition of already discounted targets or may be driven by a lack of growth opportunities in existing lines of business. In the context of NZ, a non-existent takeover market coupled with its small size and geographical isolation suggests that a strong motivation for firms to diversify may be the latter i.e., firms in NZ are more likely to diversify once growth opportunities in their primary areas of business deplete. In this study, we therefore employ the methodologies in Berger and Ofek (1995) and Campa and Kedia (2002) to generate our primary results.

3. Sample Description

Every New Zealand Exchange listed firm that had segments reported in its financial statements was included in the sample. A subset of firms with no segments disclosed but which were nevertheless widely covered in the popular press was also included. The final sample includes 70 firms with 411 firm-years of data over the period 1993-2005.[5,6] This sample of 70 firms includes 56 undiversified (single-segment) firms with 325 single-segment firm-years and 14 diversified (multi-segment) firms with 86 multi-segment firm-years. Although the sample size seems small relative to those examined in other studies (for e.g., Campa and Kedia, 2002, examine 8,815 firms over 1978-1996) it should be emphasized that our sample of 70 firms constitutes more than half of all listed firms on the New Zealand Exchange. Firms are defined as multi-segment if they report segments that are in more than one adjusted Australia New Zealand Standard Industry Classification (ANZSIC) division level classification, and are classified single-segment otherwise. Many firms that operate in the retail and wholesale sectors disclose their wholesale and retail divisions as one segment and hence ANZSIC division level classification is accordingly

[5] The sample includes firms listed on the NZX main board (NZSX) and those listed on the alternative board, NZAX. It includes firms that were listed only on the NZX as well as firms that were cross-listed on foreign exchanges. The sample excludes banks and firms that had a finance division, because a firm's EBIT is used to industry-adjust its firm value and EBIT has a different meaning for such firms. We exclude firm-years when there were fewer than two firms for a given year, or if there were fewer than two years of data for a given firm. This is required in order to permit estimation by the fixed-effects regression models. We also exclude firm-years with incomplete data, if the value of sales for the firm was zero, or if the firm-year was not 12 months long (due to a change in balance date). Finally, we exclude firm-years if the firm's shares traded on fewer than eight days out of the 30 trading days prior to balance date.

[6] We tested the effects of the sample selection method used for firms that had no segments to report by comparing the characteristics of these firms with those of a random sample of single-segment firms. This random sample of single-segment firms contained firms that had segments to report, but were defined as single-segment firms. We find that firms with no segments to disclose had significantly lower median leverage and higher median operating margin compared to the random sample of single-segment firms. This could partly be driven by profitable firms having lower leverage (Myers and Majluf (1984)) and also enjoying wider coverage by the popular press. However, their median sales and median assets are insignificantly different.

adjusted. This adjustment also ensures that firms with both retail and wholesale segments are not excluded from the sample.

Table 1 about here

Table I reports firm and segment characteristics of the sample firms. Results in Panel A show that median sales and assets of multi-segment firms are significantly higher than those for single-segment firms while median leverage is significantly lower, albeit at the 15% level. This provides weak evidence against Shleifer and Vishny's (1992) model, which predicts that multi-segment firms find debt cheaper. However, as reported in Panel B, median sales and assets of single segment firms are higher than those of segments that are part of conglomerates. The median operating margin and percentage of firms that paid a dividend is insignificantly different between single and multi-segment firms. The median number of segments for multi-segment firms is two. Although not reported, the maximum number of segments for a multi-segment firm was three, but only two firms had three segments.

4. Methodology

We initially employ the standard OLS formulation to examine the effect of diversification on firm value and performance. Multivariate regressions (1) and (2) specified below are designed to capture this effect. Variables other than the diversification dummy are included to control for attributes that can potentially affect value and performance. We are primarily interested in the sign and significance of the coefficient (β_1) of the diversification dummy.

$$\text{Excess value}_i = \beta_0 + \beta_1(\text{Diversification dummy})_i + \beta_2(\text{Size})_i + \beta_{3i}(\text{Leverage}) + \beta_4(\text{Dividend dummy})_i + \beta_5(\text{Proportion of intangible assets})_i + \beta_5(\text{Operating margin})_i + \varepsilon_i \quad (1)$$

$$\text{Excess performance}_i = \beta_0 + \beta_1(\text{Diversification dummy})_i + \beta_2(\text{Size})_i + \beta_{3i}(\text{Leverage}) + \beta_4(\text{Dividend dummy})_i + \beta_5(\text{Proportion of intangible assets})_i + \varepsilon_i \quad (2)$$

Excess value is the deviation of a firm's actual value from imputed value when all of its segments are priced at median market value of single-segment firms in the industry (see, for e.g., Berger and Ofek, 1995).[7] Imputed value is computed by multiplying segment sales by the median firm value to sales ratio of single-segment and summing across segments.[8] In addition to sales, earnings before interest and taxes (EBIT) and assets are also used to compute excess value. Thus, regression model (1) above is estimated with three different measures of excess value for each firm.[9,10]

Excess performance is a firm's actual EBIT less imputed EBIT divided by sales. Imputed EBIT is computed by multiplying sales for each segment by the median EBIT to sales ratio of single-segment firms in the industry and summing across all

[7] Excess value = ln(firm value/imputed firm value)

Firm value = (book value of short-term debt + book value of long-term debt + book value of preferred equity + market value of equity*)

$$\text{Imputed Firm Value} = \sum_{n}^{N} \text{Segment}_{n,i}\text{accounting variable} \times \text{Industry}_i \text{ firm value multiple}$$

Industry_i firm value multiple = industry_i median (firm value/accounting variable)

*The market value of equity was computed using the number of shares outstanding at balance date and the average share price over the 30 trading days prior to balance date (if a firm's shares did not trade on a trading day then that day's share price was not included in the average).

[8] In the cases where a firm reported segment revenue but not segment sales, we used segment revenue to create excess value and excess performance, then scaled these down by a fraction of firm revenue that came from sales.

[9] Firms in our sample did not report a consistent profitability variable for their segments; firms disclosed either Net Profit After Tax (NPAT), Earnings Before Tax (EBT), EBIT, or Earnings Before Interest, Tax, Depreciation and Amortization (EBITDA). A consistent segment accounting variable for profitability was required in order to industry-adjust firm value. All firms reported NPAT, EBT, EBIT, and EBITDA at the firm level. This enabled segment-level EBIT to be estimated for every segment, through scaling of the reported segment-level profitability measure by firm-level profitability measures.

[10] Where the sum of the segment accounting variables did not sum up to the corresponding firm-level accounting variable, excess value was scaled up or down by the fraction of the accounting variable which was unallocated. Where the accounting variable had an unallocated component greater than 10%, 15%, and 30%, for sales, EBIT, or assets, respectively, we excluded the firm-year for accounting variable that was unallocated. No distinct industry patterns were observed in unallocated segment accounting variables.

segments.[11] In addition to sales, assets are also used to normalize and compute excess performance. Thus, regression model (2) is estimated with two different measures of excess performance for each firm. [12]

Firm segments are industry-classified and single-segment firms within the same industry are pooled to afford industry-adjustment. Names of segments reported in a firm's financial statements are used to industry-classify segments into an adjusted-ANZSIC division level classification.[13] The number of single-segment firms in each industry pool is maximized by using a broad divisional level classification scheme and by including firm-years across time within the same industry pool.[14,15,16]

Diversification dummy is assigned a value of 1 if a firm reports segments in its financial statements that are in different adjusted-ANZSIC division classifications and is set equal to 0 otherwise. Alternative measures of diversification such as sales and asset based Herfindahl indices are also used to test for the robustness of our results.

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[11] Excess performance = (Firm EBIT – Imputed EBIT/Accounting variable)

$$\text{Imputed EBIT} = \sum_{n}^{N} \text{Segment}_{n,i}\text{accounting variable} \times \text{Industry}_i \text{ EBIT multiple}$$

Industry_i EBIT multiple = industry_i median (EBIT/accounting variable)

[12] Excess value or excess performance measures that were greater than 2.33 standard errors from their mean were winsorized at the 98% level.

[13] If a segment could not be reliably classified from the name of the segment shown in the segmental information section of the financial statements, the firm's website was checked and if the segment could still not reliably be classified, the firm was excluded from the sample.

[14] Computation of excess value required both the segment accounting variables and the industry multiples to be positive. Where the industry multiple from an industry pool that used an EBIT firm value multiple is negative an industry multiple from a pool that used an EBITDA firm value multiple was multiplied by segment EBITDA. Where a segment had a negative EBIT, and where EBITDA was positive, EBITDA was used as the segment accounting variable and the industry multiple comes from an industry pool that used an EBITDA firm value multiple. Where segment EBIT and EBITDA were both negative, sales was used as the segment accounting variable and the industry multiple came from an industry pool that used a sales firm value multiple.

[15] If an industry pool had less than five single-segment firms, both single-segment and multi-segment firms operating in this industry were removed from the sample.

[16] See the Appendix for industry patterns in the sample.

Size is measured as the natural log of sales or assets.[17] Previous diversification studies (for e.g., Berger and Ofek, 1995) find that size is positively-related to excess value. This is possible if larger firms benefit from economies of scale or from better governance as a result of greater investor attention and institutional ownership.

Leverage is defined as the book value of short-term plus long-term debt over total assets. Leverage may be positively related to value and performance discounts if higher leverage reduces a manager's propensity to invest free cash flow in value-destroying projects (Jensen, 1986) or if profitable firms reduce leverage as predicted by the pecking order hypothesis (Myers and Majluf, 1984). Conversely, the debt overhang problem for growth firms (Myers, 1977) or lack of sufficient tangible assets (Scott, 1976) could result in a negative association between leverage and value/ performance discounts.

Dividend dummy is assigned a value of 1 if a firm pays a dividend during the year and is set equal to 0 otherwise. Dividend paying firms are assumed to possess better access to capital markets (Easterbrook, 1984). Also, Lang and Stulz (1994) argue that firms with poor access to capital markets will have higher future growth opportunities if inability to raise capital delays investment. If this holds, then the dividend dummy may be negatively related to excess value and excess performance. This negative relationship may also occur if companies with more growth opportunities retain cash in order to finance growth instead of paying it out as a dividend now only to raise funds from capital markets in the future (Myers and Majluf, 1984). Conversely, the

[17] The natural log of assets (sales) was used as the variable for size when sales (assets) was used as the accounting variable to compute excess value and excess performance to prevent a spurious regression resulting from the same accounting variable being used in the measure for the independent and dependent variables.

dividend dummy may be positively related, if dividends reduce a manager's ability to invest free cash flow in value-destroying projects (Jensen, 1986).

Proportion of intangible assets is computed as intangible assets divided by the book value of total assets. Intangible assets capture the net effect of firm attributes not reflected in financial statements such as the quality of management, value of growth opportunities, brand equity, market power etc. Capital markets recognize the value of such assets and hence, such firms trade at a premium. This variable may be positively related to excess value and performance if a firm's investment in intangible assets leads to higher returns.

Operating margin is defined as EBIT over sales. Operating margin is expected to be positively related to excess value since firms with higher profitability are valued at a premium. Previous diversification studies find that this variable is positively related to excess value.[18]

5. Results and discussion

5.1. Univariate results

Table 2 presents results for excess value measures of single and multi-segment firms over different time periods. Over the full period as well as over the two sub-periods, 1993-1999 and 2000-2005, we find that single-segment firms possess significantly higher excess values than multi-segment firms.[19] Specifically, while the average single-segment firm trades at a premium of 17% (sales based measure),

[18] Operating margin was truncated at one (negative one) in cases where it is greater than (less than) one (negative one).
[19] One exception is for the sales based measure of excess value during 1993-1999 when single-segment firms had higher excess value measures compared to multi-segment firms although weakly significant.

multi-segment firms are discounted by 37%. Similar results (12% versus -35%) are obtained using the asset based measure. This suggests that diversification in New Zealand is associated with lower firm value, a result consistent with findings reported for other markets. Results also show that the magnitude of excess values for single-segment firms is significantly higher over the more recent sub-period (2000-2005) than during the earlier sub-period. By contrast, excess value measures for multi-segment firms are insignificantly different across the two time periods.

Table 2 about here

Notwithstanding these univariate results, there is reason however, to suspect that factors other than diversification could cause the value differential between single and multi-segment firms. For example, results in Table 1 show that the characteristics of single and multi-segment firms can differ significantly. We, therefore, examine the association between diversification and excess value in a multivariate setting after controlling for factors other than diversification which could potentially affect excess value.

5.2. Multivariate regression results

Results in Table 3 examine the association between diversification and excess value after controlling for factors not directly related to diversification but which nevertheless may influence excess values. Variations of regression equation (1) described in Section 4, are estimated using the simple OLS formulation.[20] The dependent variable is excess value using sales as the accounting variable in model (1), excess value using assets as the accounting variable in model (2), and excess value using EBIT as the accounting variable in model (3). Consistent with the univariate

[20] The model was tested and found to be free from multicollinearity problems.

results, we obtain a significantly negative coefficient for the diversification dummy in all the models estimated. Specifically, the coefficient of the diversification dummy is -0.39 in model (1), -0.33 in model (2), and -1.15 in model (3).[21] These values are larger than those of between -0.13 and -0.15 reported for US firms in Berger and Ofek (1995) but similar to the -0.34 reported in Lang and Stulz (1995). The signs of several of the control variables are as expected, except for the counter-intuitive sign for the operating margin in all of the models. These results imply that diversified firms are valued at a significant discount relative to single-segment firms in their industries even after controlling for other factors that could potentially influence excess value.

Table 3 about here

Similar to results in Table 3, Table 4 contains results that examine the association between diversification and excess performance (rather than excess value) after controlling for other factors. Variations of regression model (2) (described in Section 4), are estimated using the simple OLS formulation. The dependent variable is excess performance using sales as the accounting variable in model (1) and excess performance using assets as the accounting variable in model (2). Similar to our results for excess value and consistent with findings reported in the literature, the coefficient of the diversification dummy is negative and significant in both models. Specifically, the coefficient estimate is -0.41 and statistically significant at the 1% level in model (1) and -0.04 in model (2) but insignificantly different from zero. Although these results show that diversified firms are less profitable than single-segment firms, the results do not appear to be robust to the accounting variable used to industry-adjust profitability. However, given the discretion managers enjoy over reporting of segment results particularly for measures of profitability, these

[21] The larger diversification discount for model (3) is consistent with the larger differential in excess value for multi-segment firms vis-à-vis single segment firms with the EBIT measure than the sales or asset-based measures, as reported in Table 2.

differences are not entirely unexpected. Except for leverage, the signs of the control variables are generally as expected.

Table 4 about here

Lins and Servaes (2002) examine firms in emerging markets and find that the value discount for diversified firms is partially explained by their lower excess performance. Therefore, given our findings that diversified firms are associated with lower firm value and performance, we next examine whether the observed value discount can be explained by their poor performance. Results are presented in Table 5. For the first two estimations where excess values are computed using sales and assets as the accounting variables, the coefficient for the excess performance variables are insignificantly different from zero. Once again, the diversification dummy retains strong significance. However, in the final estimation that uses EBIT to compute excess values, excess performance is highly significant at less than the 1% level of significance. Moreover, the adjusted R-squares are almost twice those in the earlier two estimations. Results in estimation (3) are therefore consistent with those reported in Lins and Servaes (2002). However, despite this significance of the excess performance variable, the diversification dummy remains strongly. These results show that the diversification discount persists even when excess performance is included as a regressor and that the diversified firms whose value is discounted the most are not those who have the worst excess performance. Our findings from Table 3 continue to hold i.e., the lower firm value for diversified firms is not explained by their poor performance.

Table 5 about here

5.3. Controlling for endogeneity

Results so far provide unequivocal evidence that diversified firms in New Zealand are associated with a discount in value and generally perform poorly relative to single-segment firms. However, given the inherent endogeneity in the relationship between diversification and these metrics of value and performance, it is not clear whether the observed results are caused by diversification or whether such firms traded at a discount even before they chose to diversify. In other words, unobserved firm specific attributes could systematically be related to the value/performance of the firm and their decision to diversify, and this could render the relationship between diversification and value/performance endogenous. In the remainder of this paper, we account for this endogeneity and conduct several robustness checks. Specifically, we first estimate equations (1) and (2) after correcting for potential endogeneity between diversification and firm value/performance and then examine whether (i) the diversification discount can be explained by agency conflicts that could potentially lead firms to diversify at the expense of shareholders, (ii) whether the results are robust to the measures of diversification and (iii) whether the results are robust to the measures of firm value employed.

To test whether diversification is the cause for the observed discount, we use a two-way fixed-effects regression model (see, for e.g., Campa and Kedia, 2002; Denis, Denis, and Yost, 2002).[22] The two-way fixed-effects model controls for unobserved firm attributes that emerge across years and across firms. Controlling for such unobserved firm-fixed effects controls for diversification's endogeneity because it

[22] Campa and Kedia (2002) also use probit and simultaneous equations models to control for endogeneity. These models could not be implemented in this study since too few firms in the sample changed their degree of diversification.

controls for unobserved firm attributes that influence its decision to diversify.[23] This approach recognises that differences in firm value and performance could be due to differences in firm characteristics which induce firms to diversify or remain focussed.

Table 6 about here

Table 6 contains results of the two-way fixed effects regressions that examine whether diversification's effect on excess value persists after controlling for potential endogeneity. Consistent with results reported in Campa and Kedia (2002), we find that the diversification discount is much smaller than that reported in earlier tables but more importantly it is not significantly different from zero. Diversification is no longer significant in explaining cross-sectional variation in excess value after controlling for unobserved firm attributes likely to influence the firm's decision to diversify. Thus, diversified firms appear to have lower values, not because of being diversified, but because of the characteristics associated with firms that choose to diversify. Similarly, Table 7 depicts results for tests that examine the effect of diversification on excess performance after controlling for potential endogeneity. While the coefficient of the diversification dummy is -0.60 in model (1) and 0.08 in model (2), neither coefficient is significantly different from zero. As with firm value, these results also suggest that diversified firms perform poorly not because of diversification per se, but because firm characteristics that prompt firms to diversify also cause them to perform poorly.[24]

Table 7 about here

[23] The differences in years need to be controlled, since firms are included in the sample from different years and since results in Table 2 show patterns in excess value across different time periods.

[24] The regression models that control for diversification's endogeneity in Tables 6 and 7 were also estimated using the one-way fixed-effects model, which controlled only for the patterns in the sample across firms. In unreported results, this approach produces similar coefficients and significance levels for the diversification dummy as those that use the two-way fixed-effects model.

5.4. Effect of agency conflicts

Mansi and Reeb (2002) argue that agency problems may motivate managers to pursue diversification if doing so benefits them at the expense of shareholders. Diversification could benefit risk-averse managers by reducing the variance of cash flows, regardless of whether or not this adds value to shareholders. Lins and Servaes (2002) report that the diversification discount can partially be explained due to the existence of such agency costs. Similarly, Cronqvist, Hogfeldt and Nilsson (2001) find that diversified firms trade at a discount not because of differences in profitability but because of agency problems. In addition, a transfer of wealth to bondholders could result in a value discount if firm values are computed as the sum of the market value of equity and book value of debt. This is because losses in shareholder value that are transferred to bondholders get reflected in firm value, whereas the corresponding gains to bondholders are not. The discount in value, therefore, will be larger for diversified firms with a greater degree of financial leverage.

Table 8 about here

Table 8 presents the results of a two-way fixed-effects regression of excess value on an interaction variable (diversification dummy*leverage) along with the control variables. This regression model is essentially similar to the one in Table 6 except that the interaction variable replaces the diversification dummy. In the presence of agency conflict we would expect the coefficient of the interaction term to be less than the coefficient on the diversification dummy from the corresponding model in Table 6. We find that, although not statistically significant, the coefficient on the interaction term is marginally less than the corresponding diversification dummy in model (1), marginally more in model (2) but, contrary to expectation, considerably more in model (3). These findings, therefore, fail to support our conjecture that the

reported diversification discount could be driven by the existence of agency conflicts between managers and shareholders.

5.4. Robustness to an alternative measure of diversification

It is entirely possible that our results are driven by the methodology employed to construct our diversification dummy. We, therefore, next examine whether the association between diversification and firm value/performance is sensitive to the diversification measure or the classification method employed. Instead of using a dummy variable to classify firms, we next measure the degree of diversification using a sales/asset based Herfindahl index computed as the sum of the square of each segment's share of firm-sales or assets.[25] By construction, this index equals one for single-segment firms and decreases towards zero as the distribution of a firm's sales or assets becomes more dispersed across segments.

Table 9 about here

Tables 9 and 10 contain results for firm value and performance, respectively, using Herfindahl index as the diversification measure. Each of these tables contains results for the two-way fixed-effects regression of excess value and excess performance respectively, on the Herfindahl index and controls. We find that the coefficients of the Herfindahl index correspond closely to those found with our earlier measure of diversification in Tables 6 and 7. Therefore, our findings regarding the

[25] The Herfindahl index using assets is used when the dependent variable uses sales as the accounting variable. For all other regressions, the Herfindahl index using sales is used. This is done to prevent the spurious regression that would result if the same accounting variable was used both in the measure for the dependent and independent variables.

association between the measures of diversification and firm value/performance, after controlling for endogeneity, are robust to the diversification measure employed.[26]

Table 10 about here

5.5. Robustness to an alternative firm value measure

One final possibility is that, since all the results so far have been generated using the Berger and Ofek (1995) methodology of computing excess value and performance, our results could be driven by the methodology used to compute firm value. Graham, Lemmon and Wolf (2002), for example, report that half the diversification discount in their sample was caused by diversifying mergers involving targets that were already discounted. They argue that the widely used Berger and Ofek (1995) methodology of industry-adjusting firm value and performance by comparing firms to the median undiversified firm in the industry, could induce a discount if diversified firms systematically acquire targets with growth opportunities below industry median (see, e.g., Palepu, 1986). In fact, Berger and Ofek themselves offer a caveat that their way of computing excess value and performance relies heavily on the veracity of segment data reported. Given the discretion managers enjoy in reporting such data, suspicion regarding the accuracy of the computed excess value and performance is not without reason. Therefore, to test whether diversification's effect on firm value is sensitive to the industry-adjustment methodology employed, we use a modified version of Tobin's Q as our dependent variable instead of the excess value measure computed using the Berger and Ofek (1995) methodology.[27]

[26] We continue to control for the endogeneity of diversification by using a two-way fixed-effects model. We also perform this test using an OLS model and find that the results are robust to the use of an alternative firm-value measure.

[27] This modified version of Tobin's Q is computed by dividing the sum of the book value of preferred equity, the book value of long-term debt, and the market value of equity by total assets. This is the same as Chung and Pruitt (1994)'s version of Tobin's Q, except that the numerator does not include short-term debt less short-term marketable securities. Chung and Pruitt (1994)'s version of Tobin's Q is shown to have a 97% correlation with a Tobin's Q computed using the Lindberg and Ross (1981) algorithm.

Table 11 about here

Table 11 presents the results from a two-way fixed-effects regression of Tobin's Q on the diversification dummy along with other control variables. Once again, however, the coefficient and significance of the diversification dummy, using Tobin's Q as the dependent variable, is similar to those obtained in regressions that use the standard measure of excess value as in Table 6. Therefore, in addition to the measure of diversification employed, the effect of diversification on firm value, after controlling for endogeneity in the relationship, is also robust to the measure of firm value employed.[28]

6. Conclusions

We compare value and performance differences between diversified and single-segment listed New Zealand (NZ) companies and find that diversified firms are associated with a value discount relative to single-segment firms. Specifically, we find that, consistent with results from other markets, diversified firms in NZ trade at a discount of around 35% relative to undiversified single-segment firms. This discount, however, is larger than that reported in the literature especially among firms in larger markets. We also find that conglomerates in NZ perform poorly compared to undiversified firms. However, this lower level of firm performance does not explain the diversification discount in such firms. Moreover, cross-sectional variation in the value discount does not appear to be driven by potential agency problems.

While this result concurs with extant evidence that markets value conglomerates differently, we however fail to observe a direct link between diversification and the valuation differential. Employing a two-way fixed effects

[28] We continue to control for the endogeneity of diversification by using a two-way fixed-effects model. We also perform this test using an OLS model, and also find that the results are robust to an alternative firm value measure.

regression methodology that controls for possible endogeneity in the relationship, we fail to find a systematic relationship between measures of diversification and excess value. This suggests that the diversification discount may not be a result of diversification but may more likely be driven by unobserved firm attributes that are systematically related to value and the firm's decision to diversify. Given the geographic isolation and the small size of the NZ market, this interpretation is consistent with the conjecture that a significant proportion of New Zealand companies diversify after they have exhausted growth opportunities in their own industry. All our findings are robust to the measure of diversification and the industry-adjustment methodology employed.

Findings in this study extend the literature on the association between diversification, firm value and performance in several ways. First, we contribute to the existing body of 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 with ample growth opportunities. Second, as reported in Campa and Kedia (2002) for US firms, we add to a growing body of literature which suggests that, although diversification is associated with lower value and performance, diversification itself may not be the cause. Finally, our findings support the conjecture that differences in a country's economy and financial markets can influence the causes and effects of corporate diversification.

Appendix Table about here

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Table 1
Firm and Segment Characteristics

Descriptive statistics are shown for single-segment and multi-segment firms and their segments. The sample includes 411 firm-years from 1993-2005. Firms are defined as multi-segment if they report segments that are in more than one adjusted ANZSIC division level classification and single-segment otherwise. Leverage is defined as the book value of short-term plus long-term debt over total assets. The dividend dummy is assigned a value 1 if a firm paid a dividend and 0 otherwise. The proportion of intangible assets is defined as intangible assets over total assets and operating margin is defined as EBIT over sales. P-values test for the difference between single-segment and multi-segment firms or segments. P-values reported for means are based on a two-tailed t-test with unequal variance among the two groups and p-values reported for medians are based on the Wilcoxon sign-rank test.

	Single-segment Firms		Multisegment Firms		P-values	
Characteristics	Mean	Median	Mean	Median	Mean	Median
Panel A: Firm Characteristics						
Total sales ($m)	273,577	72,860	302,004	164,507	0.695	0.000
Total assets ($m)	457,266	115,510	498,927	193,261	0.743	0.037
Leverage	0.400	0.396	0.442	0.387	0.140	0.109
Proportion paying dividend	0.674	1.000	0.756	1.000	0.127	0.158
Proportion of intangible assets	0.076	0.004	0.057	0.000	0.243	0.091
Operating margin	0.035	0.060	0.058	0.042	0.506	0.382
Number of segments	1	1	2.023	2.000		
Number of observations	325	325	86	86		
Panel B: Segment Characteristics						
Total Sales ($m)	273,577	72,860	150,244	37,913	0.011	0.878
Total Assets ($m)	457,266	115,510	248,729	76,410	0.008	0.192

Table 2
Univariate Excess Value Measures

The sample includes 411 firm-years from 1993-2005. Firms are defined as multi-segment if they report segments that are in more than one adjusted ANZSIC division level classification and single-segment otherwise. Excess value is the deviation of a firm's actual value from imputed value. Imputed value is computed by multiplying sales for each segment by the industry median firm value to sales ratio and summing across segments. The industry median firm value to sales ratio is the median firm value over sales from single-segment firms in the same industry. In addition to sales, EBIT and assets were also used to compute excess value. This gave three measures of excess value for each firm. The p-values reported are based on a two-tailed t-test that assumes unequal variance among the two groups.

	Single-segment firms				Multisegment firms				P-values for the difference between single-segment and multisegment firms		
	Average Excess value			Number of firm-years	Average Excess value			Number of firm-years			
Year	Sales	Assets	EBIT		Sales	Assets	EBIT		Sales	Assets	EBIT
2005	0.401	0.372	0.635	21	-0.177	1.004	1.352	1			
2004	0.284	0.186	0.299	49	-0.247	-0.340	-0.884	8			
2003	0.159	0.087	0.147	44	-0.389	-0.448	-0.696	9			
2002	0.126	0.089	0.342	40	-0.562	-0.372	-0.752	11			
2001	0.032	0.054	0.282	40	-0.403	-0.296	-1.152	11			
2000	0.079	0.013	0.338	34	-0.223	-0.415	-0.978	11			
1999	0.191	-0.028	0.538	32	-0.209	-0.377	-0.937	10			
1998	-0.191	-0.257	0.368	13	-0.108	-0.317	-0.774	6			
1997	-0.175	-0.188	0.433	12	-0.154	-0.056	-1.199	6			
1996	-0.193	-0.175	0.369	11	-0.241	-0.069	-0.438	5			
1995	-0.184	0.004	0.343	11	-0.530	-0.330	-1.061	3			
1994	-0.150	0.120	0.219	10	-0.441	-0.279	-0.949	3			
1993	0.138	0.054	0.108	8	-0.909	-0.512	-1.024	2			
2000-2005	0.168	0.118	0.311	228	-0.367	-0.346	-0.857	51	0.000	0.000	0.000
1991-1999	-0.031	-0.069	0.393	97	-0.274	-0.263	-0.899	35	0.160	0.045	0.000
P-values for the difference between the above year groups	0.096	0.001	0.500		0.630	0.433	0.598				
1993-2005	0.109	0.062	0.335	325	-0.323	-0.307	-0.825	86	0.000	0.000	0.000

Table 3
Excess Value Regression

Results from OLS regression of excess value on the diversification dummy and control variables are reported. The dependent variable is excess value using sales as the accounting variable in model (1), excess value using assets as the accounting variable in model (2) and excess value using EBIT as the accounting variable in model (3). Excess value is the deviation of a firm's actual value from imputed firm value. Imputed value was computed by multiplying sales for each segment by the industry median firm value to sales ratio and summing across segments. The industry median firm value to sales ratio is the median firm value over sales from single-segment firms in the same industry. In addition to sales, EBIT and assets were also used to compute excess value. The diversification dummy is assigned a value 1 if the firm reports segments in its financial statements that are in different adjusted ANZSIC division classifications and 0 otherwise. Leverage is defined as the book value of short-term plus long-term debt over total assets. The dividend dummy is assigned a value 1 if a firm paid a dividend and 0 otherwise. The proportion of intangible assets is defined as intangible assets over total assets and operating margin is defined as EBIT over sales. The sample includes 411 firm-years from 1993-2005. P-values are reported in parentheses.

Independent variables	(1)	(2)	(3)
Intercept	0.091	0.721	0.297
	(0.803)	(0.000)	(0.375)
Diversification dummy	-0.391	-0.327	-1.151
	(0.001)	(0.000)	(0.000)
Log of total sales		-0.078	
		(0.000)	
Log of total assets	0.046		0.061
	(0.133)		(0.031)
Leverage	-1.367	0.305	-1.123
	(0.000)	(0.003)	(0.000)
Dividend dummy	-0.027	0.101	-0.378
	(0.816)	(0.093)	(0.000)
Proportion of intangible assets	0.172	0.303	0.689
	(0.601)	(0.066)	(0.019)
Operating margin	-0.106	-0.141	-0.694
	(0.532)	(0.083)	(0.000)
R-squared	14.2%	19.9%	34.2%
Adjusted R-squared	12.9%	18.7%	33.1%
Number of observations	402	402	367

Table 4
Excess Performance Regression

Results for OLS regression of excess performance on the diversification dummy and control variables are reported. The dependent variable is excess performance using sales as the accounting variable in model (1), and excess performance using assets as the accounting variable in model (2). Excess performance is a firm's actual EBIT less imputed EBIT divided by sales. Imputed EBIT was computed by multiplying sales for each segment by the industry median EBIT to sales ratio and summing across segments. The industry median EBIT to sales ratio is the median EBIT over sales from single-segment firms in the same industry. In addition to sales, assets were also used to compute excess value. The diversification dummy is assigned a value 1 if the firm reports segments in its financial statements that are in different adjusted ANZSIC division classifications and 0 otherwise. Leverage is defined as the book value of short-term plus long-term debt over total assets. The dividend dummy is assigned the value 1 if a firm paid a dividend and 0 otherwise. The proportion of intangible assets is defined as intangible assets over total assets. The sample includes 411 firm-years from 1993-2005. P-values are reported in parentheses.

Independent variables	(1)	(2)
Intercept	-4.705	-0.989
	(0.000)	(0.000)
Diversification dummy	-0.414	-0.037
	(0.005)	(0.531)
Log of total sales		0.070
		(0.000)
Log of total assets	0.330	
	(0.000)	
Leverage	0.138	-0.315
	(0.575)	(0.002)
Dividend dummy	-0.167	0.280
	(0.214)	(0.000)
Proportion of intangible assets	-0.340	0.188
	(0.325)	(0.238)
R-square	19.9%	19.1%
Adjusted R-square	18.9%	18.1%
Number of observations	402	402

Table 5
Excess Value Regression Controlling for Excess Performance

Results for OLS regression of excess value on the diversification dummy and control variables, including excess performance, are reported. The dependent variable is excess value using sales as the accounting variable in model (1), excess value using assets as the accounting variable in model (2) and excess value using EBIT as the accounting variable in model (3). Excess value is the deviation of a firm's actual value from imputed firm value. Imputed value was computed by multiplying sales for each segment by the industry median firm value to sales ratio and summing across segments. The industry median firm value to sales ratio is the median firm value over sales from single-segment firms in the same industry. In addition to sales, EBIT and assets were also used to compute excess value. Excess performance is a firm's actual EBIT less imputed EBIT divided by sales. Imputed EBIT was computed by multiplying sales for each segment by the industry median EBIT to sales ratio and summing across segments. The industry median EBIT to sales ratio is the median EBIT over sales from single-segment firms in the same industry. In addition to sales, assets were also used to compute excess value. The diversification dummy is assigned a value 1 if the firm reports segments in its financial statements that are in different adjusted ANZSIC division classifications and 0 otherwise. Leverage is defined as the book value of short-term plus long-term debt over total assets. The dividend dummy is assigned the value 1 if a firm paid a dividend and 0 otherwise. The proportion of intangible assets is defined as intangible assets over total assets. The sample includes 411 firm-years from 1993-2005. P-values are reported in parentheses.

Independent variables	(1)	(2)	(3)
Intercept	0.022	0.731	-0.149
	(0.952)	(0.000)	(0.676)
Excess performance	-0.119	-0.018	-0.195
	(0.247)	(0.330)	(0.000)
Diversification dummy	-0.390	-0.329	-1.215
	(0.001)	(0.000)	(0.000)
Log of total sales		-0.080	
		(0.000)	
Log of total assets	0.049		0.082
	(0.100)		(0.004)
Leverage	-1.373	0.333	-0.991
	(0.000)	(0.001)	(0.000)
Dividend dummy	0.039	0.065	-0.550
	(0.728)	(0.256)	(0.000)
Proportion of intangible assets	0.239	0.350	0.935
	(0.460)	(0.031)	(0.001)
R-square	14.4%	19.5%	35.6%
Adjusted R-square	13.1%	18.3%	34.5%
Number of observations	402	402	367

Table 6
Excess Value Regression Controlling for Endogeneity

Results for two-way fixed-effects regression of excess value on a diversification dummy and control variables are reported. The dependent variable is excess value using sales as the accounting variable in model (1), excess value using assets as the accounting variable in model (2) and excess value using EBIT as the accounting variable in model (3). Excess value is the deviation of a firm's actual value from imputed firm value. Imputed value was computed by multiplying sales for each segment by the industry median firm value to sales ratio and summing across segments. The industry median firm value to sales ratio is the median firm value over sales from single-segment firms in the same industry. In addition to sales, EBIT and assets were also used to compute excess value. The diversification dummy is assigned a value 1 if the firm reports segments in its financial statements that are in different adjusted ANZSIC division classifications and 0 otherwise. Leverage is defined as the book value of short-term plus long-term debt over total assets. The dividend dummy is assigned a value 1 if a firm paid a dividend and 0 otherwise. The proportion of intangible assets is defined as intangible assets over total assets and operating margin is defined as EBIT over sales. The sample includes 411 firm-years from 1993-2005. P-values are reported in parentheses.

Independent variables	(1)	(2)	(3)
Intercept	-0.182	1.115	-2.572
	(0.801)	(0.000)	(0.019)
Diversification dummy	-0.066	-0.220	-1.087
	(0.843)	(0.215)	(0.190)
Log of total sales		-0.072	
		(0.003)	
Log of total assets	0.052		0.306
	(0.450)		(0.004)
Leverage	-0.639	0.234	-0.452
	(0.001)	(0.020)	(0.087)
Dividend dummy	0.130	0.136	0.132
	(0.241)	(0.020)	(0.411)
Proportion of intangible assets	1.011	-0.271	1.487
	(0.000)	(0.072)	(0.000)
Operating margin	0.148	0.095	0.027
	(0.246)	(0.156)	(0.881)
R-square	81%	80.0%	65.1%
Number of observations	402	402	367

Table 7
Excess Performance Regression Controlling for Endogeneity

Results for two-way fixed-effects regression of excess performance on a diversification dummy and control are reported variables. The dependent variable is excess performance using sales as the accounting variable in model (1), and excess performance using assets as the accounting variable in model (2). Excess performance is a firm's actual EBIT less imputed EBIT divided by sales. Imputed EBIT was computed by multiplying sales for each segment by the industry median EBIT to sales ratio and summing across segments. The industry median EBIT to sales ratio is the median EBIT over sales from single-segment firms in the same industry. In addition to sales, assets were also used to compute excess value. The diversification dummy is assigned a value 1 if the firm reports segments in its financial statements that are in different adjusted ANZSIC division classifications and 0 otherwise. Leverage is defined as the book value of short-term plus long-term debt over total assets. The dividend dummy is assigned the value 1 if a firm paid a dividend and 0 otherwise. The proportion of intangible assets is defined as intangible assets over total assets. The sample includes 411 firm-years from 1993-2005. P-values are reported in parentheses.

Independent variables	(1)	(2)
Intercept	-3.572	-0.505
	(0.001)	(0.209)
Diversification dummy	-0.599	0.081
	(0.218)	(0.843)
Log of total sales		0.030
		(0.330)
Log of total assets	0.067	
	(0.504)	
Leverage	0.947	0.729
	(0.000)	(0.000)
Dividend dummy	0.057	0.151
	(0.722)	(0.058)
Proportion of intangible assets	-0.583	1.201
	(0.149)	(0.000)
R-squared	76.5%	81.5%
Number of observations	402	402

Table 8
Test for an Agency Cost Explanation

Results for two-way fixed-effects regression of excess value on a diversification dummy and control variables are reported. The dependent variable is excess value using sales as the accounting variable in model (1), excess value using assets as the accounting variable in model (2) and excess value using EBIT as the accounting variable in model (3). Excess value is the deviation of a firm's actual value from imputed firm value. Imputed value was computed by multiplying sales for each segment by the industry median firm value to sales ratio and summing across segments. The industry median firm value to sales ratio is the median firm value over sales from single-segment firms in the same industry. In addition to sales, EBIT and assets were also used to compute excess value. The diversification leverage interaction variable is the product of leverage and the diversification dummy (which takes the value 1 if a firm reports segments in its financial statements that are in different adjusted ANZSIC division level classifications and 0 otherwise). Leverage is defined as the book value of short-term plus long-term debt over total assets. The dividend dummy is assigned a value 1 if a firm paid a dividend and 0 otherwise. The proportion of intangible assets is defined as intangible assets over total assets and operating margin is defined as EBIT over sales. The sample includes 411 firm-years from 1993-2005. P-values are reported in parentheses.

Independent variables	(1)	(2)	(3)
Intercept	-0.001	1.045	-2.371
	(0.999)	(0.001)	(0.031)
Diversification leverage interaction	-0.120	-0.017	-0.138
	(0.536)	(0.918)	(0.908)
Log of total sales		-0.054	
		(0.017)	
Log of total assets	-0.003		0.261
	(0.967)		(0.013)
Dividend dummy	0.143	0.136	0.130
	(0.207)	(0.021)	(0.421)
Proportion of intangible assets	0.161	-0.292	1.582
	(0.000)	(0.055)	(0.000)
Operating margin	0.180	0.086	0.052
	(0.165)	(0.206)	(0.772)
R-square	80.3%	79.6%	64.6%
Number of observations	402	402	367

Table 9
Excess Value Regression using an Alternative Diversification Measure

Results of two-way fixed-effects regressions of excess value on the Herfindahl index and control variables are reported. The dependent variable is excess value using sales as the accounting variable in model (1), excess value using assets as the accounting variable in model (2) and excess value using EBIT as the accounting variable in model (3). Excess value is the deviation of a firm's actual value from imputed firm value. Imputed value was computed by multiplying sales for each segment by the industry median firm value to sales ratio and summing across segments. The industry median firm value to sales ratio is the median firm value over sales from single-segment firms in the same industry. In addition to sales, EBIT and assets were also used to compute excess value. The Herfindahl index is defined as the sum of the square of each segment's share of firm sales, or assets. The Herfindahl index is based on sales in model (1) and on assets for model (2) and model (3). Leverage is defined as the book value of short-term plus long-term debt over total assets. The dividend dummy is assigned a value 1 if a firm paid a dividend and 0 otherwise. The proportion of intangible assets is defined as intangible assets over total assets and operating margin is defined as EBIT over sales. The sample includes 411 firm-years from 1993-2005. P-values are reported in parentheses.

Independent variables	(1)	(2)	(3)
Intercept	-0.154	0.777	-4.182
	(0.867)	(0.084)	(0.007)
Diversification index	-0.038	0.350	1.553
	(0.951)	(0.287)	(0.136)
Log of total sales	0.054	-0.073	
	(0.442)	(0.002)	
Log of total assets			0.313
			(0.004)
Leverage	-0.645	0.224	-0.458
	(0.000)	(0.025)	(0.083)
Dividend dummy	0.132	0.139	0.126
	(0.232)	(0.017)	(0.432)
Proportion of intangible assets	1.009	-0.272	1.471
	(0.000)	(0.072)	(0.000)
Operating margin	0.148	0.093	0.001
	(0.245)	(0.167)	(0.995)
R-square	81.0%	80.0%	65.0%
Number of observations	402	402	367

Table 10
Excess Performance Regression using an Alternative Diversification Measure

Results for Two-way fixed-effects regressions of excess performance on the Herfindahl index and control variables are reported. The dependent variable is excess performance using sales as the accounting variable in model (1), and excess performance using assets as the accounting variable in model (2). Excess performance is a firm's actual EBIT less imputed EBIT divided by sales. Imputed EBIT was computed by multiplying sales for each segment by the industry median EBIT to sales ratio and summing across segments. The industry median EBIT to sales ratio is the median EBIT over sales from single-segment firms in the same industry. In addition to sales, assets were also used to compute excess value. The Herfindahl index is defined as the sum of the square of each segment's share of firm sales, or assets. The Herfindahl index is based on sales in model (1) and on assets in model (2) and model (3). Leverage is defined as the book value of short-term plus long-term debt over total assets. The dividend dummy is assigned a value 1 if a firm paid a dividend and 0 otherwise. The proportion of intangible assets is defined as intangible assets over total assets. The sample includes 411 firm-years from 1993-2005. P-values are reported in parentheses.

Independent variables	(1)	(2)
Intercept	1.326	-0.356
	(0.002)	(0.596)
Diversification index	0.899	-0.148
	(0.478)	(0.778)
Log of total sales		0.030
		(0.333)
Log of total assets	0.101	
	(0.504)	
Leverage	0.261	0.730
	(0.001)	(0.000)
Dividend dummy	0.159	0.151
	(0.664)	(0.057)
Proportion of intangible assets	0.404	1.201
	(0.154)	(0.000)
R-square	76.4%	81.5%
Number of observations	402	402

Table 11
Excess Value Regression using an Alternative Firm Value Measure

Results for two-way fixed-effects regressions of Tobin's Q on a diversification dummy and control variables are reported. The Tobin's Q measure is computed by dividing the sum of the book value of preferred equity, book value of long-term debt, and the market value of equity by total assets. The diversification dummy is assigned a value 1 if the firm reports segments in its financial statements that are in different adjusted ANZSIC division classifications and 0 otherwise. Leverage is defined as the book value of short-term plus long-term debt over total assets. The dividend dummy is assigned a value 1 if a firm paid a dividend and 0 otherwise. The proportion of intangible assets is defined as intangible assets over total assets and operating margin is defined as EBIT over sales. The sample includes 411 firm-years from 1993-2005. P-values are reported in parentheses.

Independent variables	Tobins Q
Intercept	16.406
	(0.000)
Diversification dummy variable	-0.345
	(0.580)
Log of total sales	
Log of total assets	-1.251
	(0.000)
Leverage	0.836
	(0.014)
Dividend dummy	0.386
	(0.060)
Proportion of intangible assets	-2.565
	(0.000)
Operating margin	0.033
	(0.885)
R-square	71.1%
Number of observations	402

Appendix: Supplementary Tables

Distribution of Firm-years and Segment-years across Industry Classifications

The sample included 411 firm-years from 1993-2005. Firms are defined as multi-segment if they report segments that are in more than one adjusted ANZSIC division level classification and single-segment otherwise. The row titled 'number (percentage) of single-segment firm-years' refers to the number (percentage) of single-segment firm-years that belong to a particular industry classification. The row titled 'number (percentage) of multi-segment firm-years' refers to the number (percentage) of multi-segment firm-years with their largest revenue coming from a particular industry classification. The row titled 'number (percentage) of multi-segment firm-years' refers to the number (percentage) of segments from multi-segment firms that belong to a particular industry classification. Industry classifications are based on the adjusted ANZSIC divisional level industry classification. Industry classifications with no firm-years or segment years are excluded from the table.

Panel A: Number of Firm-years or Segment-years per Industry Classification										
30	21	60	21	41	12	40	7	53	18	22
8	0	28	2	17	0	17	5	7	2	0
14	0	35	11	34	8	17	7	40	2	6
Panel B: Percentage of Firm-years or Segment-years per Industry Classification										
9%	6%	18%	6%	13%	4%	12%	2%	16%	6%	7%
9%	0%	33%	2%	20%	0%	20%	6%	8%	2%	0%
8%	0%	20%	6%	20%	5%	10%	4%	23%	1%	3%