THE AUSTRALIAN NATIONAL UNIVERSITY

Working Paper Series in Finance 01-04

THE MARKET VALUE OF DIVERSIFIED FIRMS IN AUSTRALIA

Grant Fleming
Australian National University

Barry Oliver
Australian National University

Steven Skourakis
Deloitte Touche Tohmatsu

JEL Classification G31
Keywords Ownership structure; Diversification
Last revision date: 08/ 08 / 2001
Contact author: Grant Fleming
School of Finance and Applied Statistics
The Australian National University
Canberra ACT 0200 AUSTRALIA
Telephone: 02 6125 2269 (International +61 2 6125 2269)
Facsimile: 02 6125 0087 (International +61 2 6125 0087)
Email: Grant.Fleming@anu.edu.au

THE MARKET VALUE OF DIVERSIFIED FIRMS IN AUSTRALIA

Grant Fleming
Australian National University

Barry Oliver
Australian National University

Steven Skourakis
Deloitte Touche Tohmatsu

Abstract

This paper refines the Berger and Ofek (1995) methodology to approximate the market value of diversified firms in Australia between 1988 and 1998. Mixed evidence is found for the diversification discount, with diversified firms trading at a discount to single segment firms using an earnings-based excess value measure and at a premium employing an assets excess value measure. Measurement errors are identified with the earning-based excess value measure and refinements are presented. Ordinary Least Squares (OLS) regression models are applied to explain the variations in the diversification results. There is strong evidence for differential pricing of diversified firms in Australia with high performing diversified firms trading at a premium to single segment firms.

Acknowledgements: We would like to thank Mitch Previtt for excellent research assistance, Michael Martin for comments on statistical techniques, and the Australian Research Council for research funding (Grant #F01118). The views in this paper do not represent those of Deloitte Touche Tohmatsu. All errors remain the authors.

1. Introduction

The perception of corporate diversification held by market participants has changed significantly over the past four decades. From the favourable valuation premiums experienced by diversified firms during the 1960s, more recent research has identified the existence of significant valuation discounts associated with corporate diversification since the 1980s. Seminal work by Lang and Stulz (1994), Berger and Ofek (1995) and Servaes (1996) showed that a diversified firm – a firm with two or more segments in unrelated industries - creates potential benefits and costs for shareholders. If the costs outweigh the benefits then the market will discount the share price of diversified firms relative to the value of non-diversified firms. Subsequent research, however, has questioned these findings (see for example, Graham, Lemmon and Wolf 2001; Maksimovic and Phillips 2001; Whited 2001) and international evidence on the diversification discount is mixed (Khanna and Palepu 1997, 2000; Fauver, Houston and Naranjo 1998; Lins and Servaes 2000).

The international research suggests that diversified firms may be priced differently depending upon the type and size of the economy. Studies of emerging economies show that a diversified corporate structure may enhance rather than destroy value. Further, there is a strong positive relationship between the diversification discount and poorly developed capital markets. The relative smallness of an economy may present conditions where corporate growth is limited unless the firm diversifies into unrelated markets. In these circumstances diversification may be an optimal structural choice by firms to maintain competitive advantage. While there is no empirical research to date supporting such a proposition, the history of Australian corporate development in the twentieth century certainly shows that most of our corporate leaders were diversified firms until at least the 1980s (Ville and Merrett 2000). Given the mixed empirical evidence on the diversification discount and potential

for differential pricing of diversified firms across countries, analysis of Australian firms is warranted. This paper measures the value of corporate diversification for Australian firms and examines the explanatory strength of various firm specific financial factors that may shed light on unresolved questions. The paper is divided into 7 sections. Section 2 reviews literature on the benefits and costs of diversification, and the value of diversified firms. Section 3 explains the Berger and Ofek (1995) method which is used to value diversified firms. Section 4 outlines the sample selection procedure and data collection. Sections 5 and 6 presents empirical results and section 7 offers conclusions.

2. Literature Review

The market value of corporate diversification in Australia will depend crucially upon the extent to which firms are able to balance the benefits and costs of operating a diversified organization. Benefits involve the ability of the firm to diversify cash flows, extract operational efficiencies from segments and allocate capital within the firm. Costs are related to the extent to which over-investment occurs, operational inefficiencies arise and cross-subsidization supports inefficient operations. This section reviews theory on these relative costs and benefits, and the empirical literature on the value of corporate diversification.

2.1 Benefits: Co-insurance, operational efficiencies and internal capital markets

The first benefit of diversification draws upon portfolio theory which states that benefits accrue from the aggregation of less than perfectly correlated cash flow streams from different business segments within a diversified firm's portfolio of operations. The inclusion of less than perfectly correlated cash flows allow the diversified firm to significantly reduce the variability of its cash flows over time which facilitates some fundamental capital budgeting objectives. Managers are able to make better-informed

capital budgeting decisions as firm cash flows are subject to less variability since the effects of cyclical industry downturns are partially mitigated by the presence of different industry exposures, which are not perfectly correlated.

Theoretically, the total variance of the diversified firm's cash flows will be less than the variance of cash flows of the separate divisions standing alone. This decrease in total variance, *ceteris paribus* culminates in the systematic risk of shareholders increasing whilst bondholder risk decreases due to reduction in the probability of default upon debt. Consequently, the market value of conglomerate debt will be greater and so greater amounts of lower cost debt capital can be obtained (Lewellen, 1971). The notional increase in debt capacity provides the diversified firm with the opportunity to take advantage of increased tax deductions of interest payments.[1] Extending the issue of taxation further, diversified firms are able to exploit tax advantages by allowing financial losses of poorly performing divisions of the firm to offset potentially high tax liabilities of other profitable divisions. As a result of the reduced tax liability the diversified firm's profitability can be increased.

The multidivisional corporate structure is also able to extract benefits from an increase in the operational efficiency of the firm. Chandler (1977) concluded that multidivisional firms could increase operational efficiency through the establishment of a specialised level of management, which was able to focus their entire attention to the operation of their division. This focus by a divisional stratum of management would provide increased efficiency and subsequently higher profitability. Indeed, Diamond (1984) and Aron (1988) argue that diversification may assist in reducing managerial

[1] Berger and Ofek (1995) find that although diversified firms held greater debt levels the increased tax shields were not economically significant. Under the Australian imputation system increased benefits from debt shields may also be insignificant.

agency problems by allowing shareholders to obtain better information about managers by comparing divisional performance.

Penrose (1959), Caves (1981) and Teece (1980, 1982) discuss the benefits that could be extracted from the transfer of excess capacity of productive factors if they could not be sold efficiently in external factor markets. Diversification can increase the value of a firm through generating economies of scope, so that the firm can reallocate the use of firm-specific and rent-bearing assets from one line of business into another. Factors of production held by one division in excess of efficient amounts could be transferred across to other industry operations held within the diversified firm's portfolio of operations. However transfer costs would reduce these efficiency gains as factors of production are transferred further from their original environment where they provided their greatest added value to the diversified firm.

The diverse scope of the diversified firm's portfolio of operations also suggests that diversified firms are less likely than focussed firms to forgo positive net present value investment projects. Diversified firms have less incentive to sacrifice positive net present value investment projects due to the project residing outside the firm's core operations. Hence, diversified firms can select profit-maximising projects regardless of industry specification, rather than being constrained to positive net present value investment projects in a specific industry, which may be lower than net present value projects in other industries. Evidence that conglomerates efficiently buy and sell divisions across industries has been recently noted by Chevalier (2000), Campa and Kedia (2000), Graham, Lemmon and Wolf (2001), and Maksimovic and Phillips (2001).

The third benefit of diversification relates to the integration of multiple divisional cash flow streams to form an internal capital market. According to Weston (1970), Williamson (1975) and Stein (1997) internal capital markets provide value for shareholders through the allocation of capital resources from poorly performing

divisions, which may be cash-rich, to more efficient divisions when external capital market imperfections exist. The establishment of such an internal capital market allows the diversified firm to overcome imperfections and transaction costs from sourcing finance from external capital markets (Alchian 1969; Weston 1970; Williamson 1970; Hubbard 1998).

Myers and Majluf (1984) show that if the information asymmetry between the internal managers and external managers became too great, positive net present value investment projects might be forgone. Hence using internally generated cash flows pooled from the diversified firm's portfolio of operations allow the diversified firm to avoid imperfections associated with external financing. Later work by Stein (1997) and Fluck and Lynch (1999) demonstrates that the internal capital market can be efficient when centralised headquarters is financially constrained. The financial constraint condition ensures that management will allocate more capital expenditure to divisions with the best growth opportunities. Consequently, management must accept the role of 'picking winners' as the scarce financial resources will dictate that only the most efficient projects will be supported. Whited (2001) finds no evidence of inefficient allocation of investment, and attributes alternative results (for example, Lamont and Polk 2001b) to measurement error.

2.2 Costs: Over-investment, operational inefficiencies and cross-subsidization

Free cash flow theory states that managers are motivated to over-invest in poor investment opportunities rather than return unused borrowings or large free cash flows to stakeholders (Jensen 1986; Stulz 1990). By returning unused borrowings and free cash flows to stakeholders, managers reduce the resources under their control. Subsequently, when the firm requires further capital to undertake new investment projects, management are more likely to incur greater monitoring by external capital

markets (Rozeff 1982; Easterbrook 1984). Internally financed investment projects avoid monitoring by external capital markets.

The motivation by managers to over-invest is driven by agency costs that arise from the separation of ownership and control creating an agent-principal relationship between manager and stakeholders. Mueller (1969), Jensen (1986) and Shleifer and Vishny (1989) discuss the implications of the agency problems resulting from contracts not being costlessly written and enforced, thus providing the opportunity for managers to act in their own self-interest rather than maximising shareholder wealth. Consequently, managers may invest in negative NPV projects in order to extract some psychological benefits associated with power and prestige attached to 'empire-building' (Jensen 1989; Stulz 1990) or in positive (non-maximizing) NPV projects to entrench themselves in the firm (Ahimud and Lev 1981; Shleifer and Vishny 1989; Morck, Shleifer and Vishny 1990). Empirically, Berger and Ofek (1995) report that diversified firms tend to invest more into low growth (low Tobin's q) industries and that the over-investment is positively related to the diversification discount.[2]

The second cost of diversification arises from the fact that the structure of diversified firms may exacerbate operational inefficiencies through information asymmetry costs, and agency costs between divisional managers and/or divisional and central management. Thus, diversification represents a sub-optimal managerial strategy, as the presence of internal (costly) controls does not guarantee that managers will not destroy shareholder's wealth. The reduction in divisional managerial discretion due to control rights flowing to central headquarters management creates a disincentive for divisional management to maximize divisional operational efficiency (Myerson 1982;

[2] Scharfstein (1998) supported the over-investment findings of Berger and Ofek (1995) using a smaller sample yet more detailed relatedness measure of diversification. Scharfstein and Stein (2000) find that internal capital market inefficiency leads to over-investment in smaller segments.

Harris, Kriebel and Raviv 1982; Gertner, Scharfstein and Stein 1994; Rajan and Zingales 1998). Furthermore, the larger the number of projects headquarters must oversee and monitor, the greater the agency costs which decreases operational efficiency (Rajan, Servaes and Zingales 2000).

The economic theoretic arguments on the operating inefficiencies resulting from diversification have been examined empirically by several researchers. Wernerfelt and Montgomery (1988) and Schmalensee (1985) find that narrowly diversified firms earn higher levels of profits than widely diversified firms. Ravenscraft and Scherer (1987) investigated mergers in the manufacturing sector during the 1960s and early 1970s and find a decrease in the post-acquisition profitability of firms acquired in pure conglomerate acquisitions. John and Ofek (1995) finds that firms which increase their focus through assets sales (as measured by the sales-based Herfindahl index) experience a significant improvement in operating performance in their remaining asset base during the next three-years after the divestiture (see also Klein 1997).

Thirdly, internal capital markets have been found to not allocate as efficiently as expected. Market participants during the 1970s postulated that the operation of an efficient internal capital market, which allocated internally generated cash flows into the most profitable segments of the diversified firm, was the fundamental basis for creating value through corporate diversification. Indeed, a common feature of studies is the consensus that significant cross-subsidization of divisions is present within the diversified firm's portfolio of operations (see Meyer, Milgrom and Roberts 1992; Berger and Ofek 1995; Shin and Stulz 1996, 1998; Lamont 1997; Stein 1997; Scharfstein 1998; and Schlingemann, Stulz and Walkling 1999).

Berger and Ofek (1995) reaffirmed market participants' opinions that cross-subsidisation reduced shareholder wealth by showing that cross-subsidization accounted for 2.9% to 3% of the average value loss in unrelated multi-segment firms. Shin and

Stulz (1998) find that segment investment allocation is relatively insensitive to segment performance and growth opportunities. Rather the effects of cash flow shortfalls are not equally distributed across segments and it is usually the case that segment investment budgets are determined by own-segment cash flows regardless of its investment opportunities (see also Lamont 1997). More recently, Lamont and Polk (2001b) show that diversity in investment opportunities is negatively related to excess value: that diversity creates a situation where capital is inefficiently allocated within the firm.

2.3 Empirical evidence of the value of corporate diversification

The literature on the value of corporate diversification in the 1960s supported empirically the benefit arguments presented above. Matsusaka (1993) found that firms that undertook diversifying acquisitions (and retained the target's management) during 1968, 1971 and 1974, were rewarded with positive abnormal returns (see also Elgers and Clark 1980).[3] Hubbard and Palia (1999) also observe positive abnormal returns for diversifying acquisitions, particularly for financially unconstrained buyers of financially constrained targets.

The valuation of diversified firms as compared to single segment firms also demonstrated benefits to diversification in the 1960s. Utilizing a sample of twenty-five companies, Klein (1997) found that the U.S. conglomerates were valued at a 9% premium to comparable portfolios of single segment firms during 1966-68.[4] However, his evidence also pointed to the now well-established idea that the late 1960s and early 1970s marked a break point in the market valuation of diversified firms. Time variation in the discount was evident with a discount of 21% from 1966-72, and 36% between

[3] The retention of target management aided the diversifying acquirer in extracting managerial synergies between the two firms due to target managers holding valuable company specific information.

[4] Klein (1997) reported the diversification premium rising to 19% after controlling for operating efficiency and leverage.

1969-72. Similarly, Servaes (1996) found an average industry adjusted Tobin's q ratio discount of 14% between 1961 and 1970.[5]

The evidence on the value of corporate diversification for the 1980s and 1990s indicates that conglomerate mergers are not beneficial to shareholders. Rumelt (1974, 1982), Ravenscraft and Scherer (1987), Bhagat, Shleifer and Vishny (1990) and Kaplan and Weisbach (1992) argue that unrelated diversification brought no long-term benefits to shareholders or the national economy. Indeed, academics characterized the corporate restructuring of the 1980s as an unravelling of the inefficiencies introduced through the merger wave of the 1960s and early 1970s. Jensen (1989) suggested that diversified firms continued to survive only because of the high costs involved with corporate control transaction costs for these large diversified firms, which inhibited active investors from purchasing and then breaking up the diversified firm.

Wernerfelt and Montgomery (1988) and Comment and Jarrell (1995) find a positive relationship between corporate focus and shareholder wealth due to negative economies of scope through the 1980's. Berger and Ofek (1995) report a significant average diversification discount of between 13% and 15% upon diversified firm valuations compared to a portfolio of comparable single industry focussed firms during 1986 to 1991 (see also Servaes 1996). They find evidence to suggest that the discount is caused by costs associated with over-investment and cross-subsidisation within diversified firms. Alternatively, Lang and Stulz (1994) compare diversified firms to single industry firms through an analysis of their respective Tobin's q ratios. The Lang

[5] Klein identifies a combination of structural changes in the US economy to explain the change from diversification premium to discount after 1969: the introduction of the Williams Act (1969), removal of tax deductibility of convertible bonds and the 1969 anti-trust proceedings against various conglomerates contributed to the structural change in the valuation of diversified firms. The deregulation of broking houses which was hypothesized to improve the effective monitoring on conglomerate performance, was also cited as another explanatory factor.

and Stulz (1994) results suggest that highly diversified firms have significantly lower average and median Tobin's q ratios than single segment firms.[6]

The international evidence on the value of diversified firms is less clear cut than the US findings. Khanna and Palepu (1997, 2000) examine the existence of large diversified conglomerates in India, concluding that conglomerate internal capital markets add value to shareholders in emerging markets. Firm involvement in large, diversified business groupings provided access to international capital markets not available otherwise due to substantial information asymmetry between external lenders and internal managers (2000, p. 886). Fauver, Houston and Naranjo (1998) study the diversification discount across thirty-five countries (developed and developing) between 1991 and 1995, and conclude that the institutional environment affects the costs and benefits of diversification. Specifically, they argue that low income countries present conditions for a diversified corporate strategy to benefit shareholders. At odds with these two studies is Lins and Servaes (2000) who examine firms from seven emerging markets in 1995 (Hong Kong, India, Indonesia, Malaysia, Singapore, South Korea, and Thailand), and show that expropriation of resources in industrial groups (and when ownership is relatively concentrated) does lead to a diversification discount. Their results also support the argument that institutions and stage of development matter: the diversification discount is significantly larger in countries with poorly developed capital markets (pp. 19-20).

The non-US developed economy findings largely support Berger and Ofek (1995). Lins and Servaes (1999) investigate diversified firms in the developed economies of Germany, Japan and the United Kingdom. Their study found that

[6] Furthermore, Lang and Stulz (1994) find that highly diversified firms have mean and median Tobin's q ratios below one and below the sample mean and median of single segment firms every year from 1978 to 1990.

Japanese diversified firms sold at a discount of approximately 8.35 - 10% compared to 15.5–15.4% in the United Kingdom during the years 1992 and 1994. The diversification discounts for German diversified firms were statistically insignificant. The Lins and Servaes (1999) results for the United Kingdom diversified firms is similar to that reported by Berger and Ofek (1995) of 13–15% for United States and is perhaps explained by similar institutional market characteristics. Lins and Servaes (1999) argued that concentrated ownership structures increased the benefits of diversification in Germany but not in Japan or the UK. Taken together with the emerging economy research, the literature to date suggests that the stage of economic development, and other country factors may lead to different results on valuing diversified firms. This paper therefore contributes to the valuation literature by providing a study of a small open, developed economy to test the robustness of previous US and international evidence.

3. Method

3.1 Excess value measures

This paper adopts the valuation methodology developed by Berger and Ofek (1995) to value diversified firms. Firstly, each business segment of the diversified firm is matched with an ASX Industry Classification index according to the ASX Industry Classification index definition and the description of the segment's operations and product detailed in the company's annual report. Three imputed values for each diversified firms segment are then calculated by multiplying the segment's matched single-segment firm average industry multiplier with the diversified firm's segment accounting items; Total Assets, Earnings before Tax (EBT), and Total Sales.[7]

[7] The use of EBT differs from Berger and Ofek (1995) who employ earnings before interest and tax (EBIT). The use of EBT was primarily due to its availability across all ASX listed company annual

There are three single-segment firm average industry multipliers calculated. Each multiplier is constructed by dividing each single segment firm's total capital in the matched industry by three of the single firm's accounting items: Total Assets, EBT, and Total Sales and then calculating the average for the industry. The sum of the imputed values of each diversified firm's segments provides a theoretical value for the firm if all of its segments were operated as stand-alone firms. The natural logarithm of the ratio of a diversified firm's total capital to the sum of each segment's imputed value provides the excess value measure. A negative excess value measure indicates a diversification discount, whilst a positive excess value measure verifies the existence of a premia upon the valuation of the diversified firm.

In equation form,

$$I(V_j) = \sum_{i=1}^{n} AI_{ij}(IND_k) \qquad (1)$$

$$\text{Excess Value} = \ln\left[\frac{V_j}{I(V_j)}\right]$$

where,

V_j = the *j*th firm's total capital (market value of all firm equity plus book value of firm debt);

$I(V_j)$ = imputed value of the sum of firm *j*'s segments;

AI_{ij} = segment *i*'s value of the accounting items (eg. Sales, Earnings before Tax and Assets) used in the valuation multiple for firm *j*;

IND_k = multiple of total capital to an accounting item AI_k (eg. Sales, Earnings before Tax and Assets) for the average or median single segment firm *k* in segment *i*'s industry.

reports whilst EBIT was only obtainable in a smaller number of ASX listed company annual reports, therefore to retain consistency through the study, EBT was used. Unfortunately, interest expense could not be added back to EBT because segmental interest expense allocations are not required under AASB 1005 and therefore Australian listed firms do not disclose this information.

Consistent with Berger and Ofek (1995), extreme outlier single segment sales, EBT and assets multipliers are excluded from the calculation of average and median industry ratios so as not to distort the imputed valuations of the diversified firms.[8] In this study an extreme value is defined as multiples that were located in the upper and lower 2.5% of the data (that is, a 5%-trimmed data set).[9]

3.2 Matching firms using the Australian industry classification system

ASX Industry Classification indices are equivalent to U.S two-digit Securities Industry Classification (SIC) groupings. Unfortunately, ASX Industry Classification sub-groupings equivalent to three-digit SIC groupings were only introduced in 1994. Further, in order to obtain industry groupings with at least five firms of sufficient size (generating sales revenue greater than $20 million), two-digit SIC were used for the full sample period 1988-98.[10] Each diversified firm segment was matched to single segment firms in the same classification.[11]

3.3 Regression models

[8] Berger and Ofek (1995) define extreme values in arbitrary fashion as those observations for which actual value of a firm is four times the imputed value or less than one-fourth the imputed value.

[9] All regressions were run with the full data set and no discernible difference in results was obtained.

[10] A minimum $20 million sales revenue is set as a size benchmark in order to eliminate small firms which may distort valuation multiples (see Berger and Ofek 1995 for a similar technique).

[11] Although the use of industry classification codes are standard in the literature, there are two generally accepted limitations (see Scharfstein 1998). Firstly, even though two separate segments of a diversified firm may be in two different two-digit SIC indices they can still both produce related products and provide related services in the same industries. Secondly, vertical connections/integration between two segments within a diversified firm diminish the ability of two-digit SIC groupings to distinguish different industry exposures. See also Chevalier (2000, pp. 3-4). During 1997, the ASX restructured the ASX Industry Classification indices by introducing three new industry groups (Infrastructure and Utilities, Telecommunications and Healthcare and Biotechnology) and subsequently reassigning listed companies into these new industry groups. The Oil and Gas ASX Industry group was also renamed Energy. Restructuring of the ASX Industry Classification indices have been incorporated into the matching of diversified firm segments and ASX Industry Classification groupings. Thus the restructuring has no effect upon the imputed values of the segments.

Once an industry multiplier is calculated and each segment is matched by ASX industry code, the imputed value for the diversified firm is calculated. An imputed value of each single segment firm is also calculated. In order to identify a diversification discount or premium the Berger and Ofek (1995, pp. 49-52) OLS regression model is estimated:

$$\text{Ln}(V_j / I(V_j)) = a + ß_1(\text{Diversified}) + ß_2(\text{Ln}(TA_j)) + ß_3(\text{Earnings}_j) + ß_4(\text{CapExp}_j) + e_j \quad (2)$$

where,

$\text{Ln}(V_j / I(V_j))$ = excess value measure for firm *j*;

Diversified = a dummy variable with value 1 for a diversified firm, 0 otherwise;

$\text{Ln}(TA_j)$ = the natural logarithm of total assets for firm *j*;

Earnings_j = earnings before tax scaled by total sales for firm *j*;

CapExp_j = capital expenditure scaled by total sales for firm *j*.

A significant $ß_1$ coefficient in equation (2) indicates that diversified firms are valued differently to single segment firms: a negative value indicates a discount, and a positive value a premium. Note that equation (2) also controls for firm size (natural logarithm of total assets), profitability (earnings before tax to sales) and growth opportunities (capital expenditure to sales) which may be associated with firms trading at values different from their imputed value (whether single segment or diversified) (Berger and Ofek 1995; Lins and Servaes 1999; 2000).

4. Sample

4.1 Sample selection procedure

In order to investigate the market value of diversified firms and allow for the possibility of time variation, a sample of ASX listed companies was selected that comprised firms that had maintained a diversified multi-segment corporate structure over the sample period of 1988-98. Specifically, every sample company had to operate a segment in at

least two industries with different 2-digit ASX Industry Classification codes during the ten-year sample period.

The following procedures were involved in selecting the sample of diversified firms:

1. Examination of all company annual report segmental information within the Australian Graduate School of Management (AGSM) Annual Report Microfiche File in 1988 to identify firms that qualified under the definition of a diversified firm;
2. Examination of the annual report segmental information for qualifying companies over the sample period from 1988 to 1998, to determine whether the firm retained their diversified multi-segment structure over the sample period. Only diversified firms which remained listed over the entire sample period were selected.

Inclusion in the final sample was dependent upon the diversified firms providing a complete financial information set including complete and reliable segmental financial information, all profit and loss statements, and balance sheet information used to construct the independent and excess value variables. To ensure data integrity, and to be consistent with Berger and Ofek (1995), the sum of segment sales must be within 1% of total sales and segment allocated assets must comprise 75% of the diversified firms total assets. The sample selection procedure resulted in 24 diversified firms and 221 single segment firms, and a cross-section and time series pooled data set of 1615 observations.[12] This data set was then used to calculate excess value measures and to identify extreme values. The removal of extreme values provides 1137 data points on 226 companies (including all 24 diversified firms) for analysis.[13]

[12] The number of single segment firms varies during the period as firms enter and exit the single segment control portfolio. A list of the diversified firms matched to industry segments, and the firms in the control portfolios, is available from the authors upon request.

[13] As stated in section 3.1, extreme values are defined as the upper and lower 2.5% of the distribution. This procedure is more consistent than the *ad hoc* approach adopted by Berger and Ofek (1995, p. 61).

4.2 Data sources

Fundamental to the investigation of diversified firm valuations was the availability of segmental information for all diversified firms in the sample. The introduction of Australian Accounting Standard "AASB 1005 – Financial Reporting by Segments" for the financial years that ended on or after 30th June 1986, provided for the disclosure of segmental financial information by Australian listed companies and subsidiaries of foreign listed companies in their annual reports. Companies subject to AASB 1005 are required to report segment Sales Revenues, Total Assets and EBT for all material segments under the company's control.[14] Segmental financial information was obtained from the AGSM Annual Report Microfiche File (1988-1992) and Connect 4 Annual Report Collection (1993-1998).[15]

The construction of comparable portfolios of stand-alone single segment firms required financial statement information for all industry matched single-segment ASX listed companies during the period 1988 to 1998. The information set included the profit and loss statement items of sales, operating profit before taxation as well as the balance sheet items of total assets, non-current borrowings and current borrowings. This financial information data set was obtained through the AGSM and Connect 4. Datastream was used for market values for all single segment and diversified firms.

---

[14] The materiality of a segment to the company or group of companies as a whole can be measured in terms of revenue, profits or losses generated, or assets employed. In the absence of other factors, a segment would be considered material if one or more of the following conditions applied:- (a) its revenue is 10 per cent or more of the total segment revenue of all segments (including inter-segment sales and transfers); (b) the absolute amount of its segment result is 10 per cent or more of the greater, in absolute amount, of: (i) the total segment result of all segments that earned a profit; and, (ii) the total segment result of all segments that incurred a loss; and/or, (c) its segment assets are 10 per cent or more of the total segment assets of all segments. [AASB 1005.10, Commentary - paragraph (ix), 29th April 1986].

[15] Both the AGSM and the CONNECT4 data were used as neither database covered the entire sample period from 1988 to 1998.

4.3 Sample Characteristics

Table 1 provides descriptive statistics for the whole sample and the single and diversified firm samples. The average firm size (market capitalisation of equity) is $1.3 billion.

Table 1

Sample characteristics

About here

Table 1 also indicates that the average diversified firm is approximately 4 times larger than single segment firms in terms of market capitalisation, and 3.5 times larger in terms of total assets. However, median data and skewness and kurtosis values indicate that the single segment firm data is influenced heavily by outliers. Comparison of median data shows that diversified firms are approximately 13 times larger in terms of market capitalisation and total assets. Sales data reinforce these relativities.

Diversified firms generate an average (median) earnings before tax 6 (14) times greater than single segment firms, or $456.7 ($195.7) million pa compared to $75.6 ($14.3) million pa. The average return on equity before tax (EBT divided by market value of equity) for single segment firms was 8.8% pa compared to diversified firms with 13.5% pa. Again this data is influenced by outlier values, and the median ten-year return on equity of 10.7% pa for single segments and 10.9% pa for diversified firms shows little difference between the two sub-samples. Return on assets provide similar results: diversified firms generate a ten-year median return of 8.7% pa compared to the 8.6% pa of single segment firms. Such data is not consistent with recent literature by

Comment and Jarrell (1995) and Berger and Ofek (1995) which show that focussed firms are generally more profitable.

Growth measures such as median capital expenditure-to-sales (or total assets) indicate that single segment firms have higher capital expenditures (capital expenditure-to-sales of 0.6% pa compared to 0.02% pa, and capital expenditure-to-total assets of 0.7% pa compared to 0.02% pa). Median market-to-book (market value of equity to total assets) ratios are similar for the two types of firm (singles = 0.8039; diversified = 0.7972). Finally, the diversified firms have on average (median) 3.9 (4) segments.

5. Results

This section presents the valuation of diversified firms and tests for the existence of a diversification discount or premium after controlling for size, profitability and growth. The valuation of diversified firms is measured using three excess value measures which were obtained using three multipliers (Sales revenue, Earnings before Tax (EBT), and Total Assets). In addition, we calculate excess value measures for each single segment firm and use this data in regression models.

5.1 Excess value results

Table 2 reports univariate excess value results for diversified and single segment firms for the full data set 1988-98. As in Berger and Ofek (1995, p. 48), single segment firm excess values are used to check the distributional properties of the multipliers. It is expected that the excess value measures for single segment firms are relatively symmetrical around zero. Examination of the results shows that median excess values behave more consistently than average excess values, with single segment values having a median close to zero with lighter tails than a normal distribution. Indeed, it is possible to show that average excess values for single segment firms should always by negative

and that medians are a better locator for the excess value calculations.[16] Median excess values are used in all subsequent analysis.

Table 2

Excess value summary statistics

About here

From Table 2 the median excess value of diversified firms is higher (more positive) than single segments for sales and assets multipliers, and lower for the EBT multiplier. This is consistent with international evidence that suggests that diversified firms are just as likely to trade at premiums as discounts, but that diversified firms are more likely to perform poorly as compared to single segment firms (this is captured in the EBT multiplier). Indeed, many diversification studies focus only on the assets and sales multipliers (for example, Lins and Servaes 1999, 2000; Campa and Kedia 2000; Graham, Lemmon and Wolf 2001) and use relative earnings as a variable in explaining the cross sectional variation in discounts. Given the lack of studies on diversification for Australia, this paper has erred on the side of caution and documents all three excess value measures in the first instance. By definition, the EBT multiplier uses earnings as the basis for calculating excess value, so that if diversified firms are also poor performers then the excess value measure will be negatively biased. Thus any regression with the EBT excess value will not tell us if it is diversified firms per se or

[16] Berger and Ofek (1995) use multipliers from median single segment firm data, with no justification for the choice of median over average. Other researchers have solved the negative bias of the average multiplier by using weights (for example, total assets or total sales; see Lamont and Polk 2001a, pp. 5-6). Given the calculation method for determining excess value it is possible to show that the average industry multipliers for single segment firms should always be negative.

poor performing diversified firms that leads to a discount. This problem is examined in more detail in section 6.

5.2 Cross-sectional regressions

The regression estimation (equation 2; p. 15) is a replication of Berger and Ofek (1995, pp. 47-52) and is reported in Table 3. Each regression uses a different excess value measures as the dependent variable. In cases where assets and EBT are used in the excess value measures, the related explanatory variable (for assets: the natural logarithm of total assets, and for EBT: earnings-to-sales) is removed from the model to avoid model misspecification.

Table 3

Regression results for the market value of diversified firms

About here

The regression results in Table 3 are in conflict on the excess value of diversified firms. While all models are highly significant they do not explain a large amount of the variation in excess value. The *Diversified* indicator variable is significantly positive for the assets multiplier, insignificant for the sales multiplier and significantly negative for the EBT multiplier. The best performing model (in terms of R^2) is from the sales excess value multiplier (R^2» 13% and *F*-statistic = 41.86). This indicates that diversified firms are trading at approximately their imputed value (the diversification indicator variable equals zero) – firms with higher earnings (*Earnings*) and more growth opportunities (*CapExp*) are more likely to have higher excess values.

Table 3 shows that the other variables used in the regressions have consistent signs and are consistent with Berger and Ofek (1995) and subsequent studies (for

example, Lins and Servaes 1999). The intercepts are on average zero for the single segment firms (with the except of a marginally significant negative intercept for EBT). *Ln(TA)* (Size) is positive in the sales and EBT regressions, and *Earnings* is positive and significant in the assets and sales regressions.

One reason for the inconsistent coefficients on the diversified variable across the regressions could be time variation in the value of diversified firms. To consider the effect of pooling the time series data three different approaches are employed.[17] The first is to run regressions with dummy variables on each year. If any year shows a significant result it indicates that the imputed value for single segment firms in that year is different from other years, implying the year is different from others and a potential time-varying effect is present. For the asset excess value and sales excess value none of the year dummies were significant, suggesting that no one year is driving the results for the imputed values of single segment firms. With the EBT excess value regression only 1992 and 1997 showed significant coefficients, (and then only at the 10% level). This suggests that the EBT excess value measure is affected, albeit only slightly, by time variation. The second approach is to run each regression each year. As expected the results for any one particular year are not as strong as the results for the pooled sample. However, there was only one variable (the *diversified* indicator variable) in one year (1990) where the coefficient was significantly different and opposite in sign to the pooled result. The coefficients for each year on all variables were either the same sign and significant as the pooled result or insignificant. This indicates that no one particular year is necessarily driving the results for the pooled data. The third approach is to fit a regression for each of the excess value multipliers with year dummies which are interacted with each of the predictors in the model. This will show if the year dummies

[17] Results from all three approaches are available on request.

are having any significant effect on the response excess values (as with the first approach) and also if the predictors are varying significantly from year to year. The results for the asset excess value and the sales excess value regressions indicate that none of the individual year dummies are significant (as expected from the results of the first approach) and none of the interaction terms are significant. This indicates that none of the assets excess values and sales excess values for each year and for the single and diversified firms, are significantly different from any other year. The regression for the EBT excess value model indicates that diversified firms in 1996 have a significant effect on the pooled regression. Data for 1996 was removed from the sample and the regressions re-run but the effect of 1996 was not sufficient to change the sign or significance of the coefficient of the diversified EBT model. Therefore, the effect of time variation was not considered sufficient to explain the inconsistent results across the three different models.

The consistent relationship between size and excess value, and earnings and excess value, provides another potential explanation for the inconsistent results in Table 3. If the diversified firms in this sample are also likely to be poor performers then the results of the EBT excess value multiplier are mis-specified. This proposition is examined in the next section.

6. The diversification discount and the performance of diversified firms

Recent research on the diversification discount has pointed to a sample bias problem that is caused by the coincidence of firms with a diversified corporate structure and poor performance. Such a relationship leads to difficulties in interpreting the diversification discount, especially when using the EBT multiplier. Lang and Stulz (1994) and Campa and Kedia (2000) show that diversified firms are poor performers prior to

diversification. Lamont and Polk (2001a) document a negative relationship between excess value and subsequent returns; the discount merely "reflects the well-known value effect in stocks" rather than a valuation of the diversification strategy (p. 27). Similarly, Campa and Kedia (2000) argue that the observed correlation between diversification and negative excess value is not casual once the choice to diversify is controlled for (see also Chevalier 2000; Graham, Lemmon and Wolf 2001). Poor performance leads to firms trading at a discount relative to other firms regardless of corporate structure. Finally, Lins and Servaes (2000) control for the profitability of diversified firms in cross-sectional analysis of excess value and find that there is a significant positive relationship between excess value and diversified firm profitability.

Given the research reviewed above, we expect that diversification and profitability are both important explanatory variables in any excess value calculations. In order to disentangle these influences, we re-estimate a multiple regression model using an excess profitability measure and interaction terms as variables to explain the variation in the asset and sales excess values (see equation 3 below). The definition of excess profitability used by Lins and Servaes (2000) is adopted, although we provide a more robust interaction model than those authors in the regression analysis. First, the excess profitability of each single segment and diversified firm is calculated as the difference between actual profitability (EBT-to-sales ratio) and implied profitability. For single segment firms implied profitability is taken as the median industry EBT-to-sales ratio. Implied profitability for each diversified firms is determined as the sum of each matched median industry portfolio profitability weighted by the proportion of sales in each segment. This definition controls for differences in industry profitability. Firms performing better than the industry median will have positive excess profitability, and firms below the industry median will have negative profitability.

Regression (3) is defined as follows:

$$\text{Ln}(V_j/I(V_j)) = a + ß_1(\text{Excess Profit}_j) + ß_2(\text{Diversified}) + ß_3(\text{EP*Div}) + ß_4(\text{Ln}(TA_j)) + ß_5(\text{CapExp}_j) + e \quad (3)$$

where,

Excess Profit_j = actual minus implied profitability;

EP*Div = an interaction term capturing the excess profitability of diversified firms;

Ln $(V_j /I(V_j))$, Diversified, $\text{Ln}(TA_j)$, Earnings_j, and CapExp_j are as defined in equation (2) above.

If profitability tempers the diversification discount then it is expected that good performing diversified firms should be valued at a higher premium or a lower discount than poor performing diversified firms ($ß_1 + ß_3 > 0$). In addition, as seen in the results for regressions (2) and (3), $ß_1$ should be positive indicating that more profitable firms trade at a higher excess value than less profitable firms. The expected signs for $ß_4$ and $ß_5$ are also positive.

Table 4

Regressions for the relationship between the diversification discount and profitability

About here

Table 4 reports results of two estimations of regression (3). Models 1 and 2 estimate the main effect and interaction term and include control variables for firm size and growth opportunities. Both models are significant at the 1% level, and provide consistent results. The market values for diversified firms are higher than imputed values for the assets multiplier and equal to imputed values for the sales multiplier. Excess profit is an

important determinant of the excess value for single segment firms, with excess profitability firms having a higher excess value. Further, $ß_2$ is significantly positive in Model 1 and insignificant in Model 2 reinforcing our results for assets and sales excess values in the previous section.

The signs of the coefficients are as expected and two issues are worth noting. First, diversified firms that are high performers also have a higher diversification premium than other diversified firms given that $ß_1 + ß_3 > 0$. However, using the sales excess value variable $ß_1 + ß_3 < 0$ (marginally). Combined with no significant difference between single segment and diversified firms we are not concerned with this counter-intuitive result. Second, there is a negative relationship between size and the excess value measure due to the construction of the assets multiplier (where total asset appear on the denominator of the multiplier). The results of Model 1 are robust to the exclusion of this variable.[18]

[18] Coefficients and t-statistics in brackets as follows: a=0.0093 (0.65); $ß_1$=1.4052 (7.83**); $ß_2$=0.1523 (4.41**); $ß_3$= -1.1238 (-3.02**); $ß_5$=-0.0001 (-0.97); R^2=0.0684, F-statistic=20.77**).

6. Conclusions

Berger and Ofek (1995) is a commonly cited paper for assessing the effect of diversification on firm value. This current paper begins with their method using Australian data from 1988 until 1998. Mixed evidence is found for the diversification discount. Using three measures in the calculation of the excess value (assets, sales and earnings before tax) we find that diversified firms are just as likely to trade at premiums as discounts, but that diversified firms are more likely to perform poorly relative to single segment firms. To disentangle performance and diversification we construct a regression model using an excess profitability measure and interaction terms as variables to explain the inconsistencies. If profitability tempers the diversification discount then it is expected that good performing diversified firms should be valued at a higher premium or a lower discount than poor performing diversified firms. Indeed we find that diversified firms that are high performers also have a higher diversification premium than other diversified firms and we also find that excess profit is an important determinant of the excess value for single segment firms.

References

Alchian, A.A., 1969, Corporate management and property rights, in: H. Manne, ed., *Economic policy and the regulation of corporate securities* (American Enterprise Institute, Washington D.C.) 337-60.

Aron, D., 1988, Ability, moral hazard, firm size and diversification, *RAND Journal of Economics* 19, 72-87.

Berger, P. and E. Ofek, 1995, Diversification's effect on firm value, *Journal of Financial Economics* 37, 39-66.

Bhagat, S., A. Shleifer, and R. Vishny, 1990, Hostile takeovers in the 1980s: The return of corporate specialisation, *Brookings Papers on Economic Activity: Microeconomics*, 1-72.

Campa, J., and S. Kedia, 2000, Explaining the diversification discount, Working paper (New York University).

Caves, R.E., 1981, Diversification and seller concentration: Evidence from changes, 1963-72, *Review of Economics and Statistics* 63, 289-93.

Chandler, A.D., 1977, *The visible hand* (Belknap Press, Cambridge, Mass).

Chevalier, J., 2000, What do we know about cross-subsidization? Evidence from the investment policies of merging firms, Working paper (University of Chicago).

Comment, R., and G.A. Jarrell, 1995, Corporate focus and stock returns, *Journal of Financial Economics* 37, 67-87.

Diamond, D., 1984, Financial intermediation and delegated monitoring, *Review of Economic Studies* 51, 393-414.

Easterbrook, F.H., 1984, Two agency-cost explanations of dividends, *American Economic Review* 74, 650-59.

Elgers, P.T., and J.J. Clark, 1980, Merger types and shareholder returns: Additional evidence, *Financial Management* 9, 66-72.

Fluck, Z., and A. Lynch, 1999, Why do firms merge and then divest? A theory of financial synergy, *Journal of Business* 72, 319-46.

Gertner, R.H., D. Scharfstein, and J.C. Stein, 1994, Internal versus external capital markets, *Quarterly Journal of Economics* 109, 1211-30.

Graham, J., M. Lemmon, and J. Wolf, 2001, Does corporate diversification destroy value?, Working paper (Duke University).

Harris, M.C., H. Kriebel, and A. Raviv, 1982, Asymmetric information, incentives, and intrafirm resource allocation, *Management Science* 28, 604-20.

Hubbard R.G., 1998, Capital-market imperfections and investment, *Journal of Economic Literature* 36, 193-225.

Hubbard R.G., and D. Palia, 1999, A re-examination of the conglomerate merger wave in the 1960s: An internal capital markets view, *Journal of Finance* 54(3), 1131-51.

Jensen, M.C., 1986, Agency costs of free cash flow, corporate finance and takeovers, *American Economic Review* 76, 323-29.

Jensen, M.C., 1989, The eclipse of the public corporation, *Harvard Business Review* 67, 61-74.

John, K., and E. Ofek, 1995, Asset sales and increase in focus, *Journal of Financial Economics* 37, 105-26.

Kaplan, S.N., and M.S. Weisbach, 1992, The success of acquisitions: Evidence from divestitures, *Journal of Finance* 47, 107-38.

Khanna, T., and K.G. Palepu, 1997, Why focused strategies may be wrong for emerging markets, *Harvard Business Review* July-August, 41-51.

Khanna, T., and K.G. Palepu, 2000, Is group affiliation profitable in emerging markets? An analysis of diversified Indian business groups, *Journal of Finance* 55, 867-91.

Klein, P.G., 1997, Were the conglomerates inefficient? A reconsideration, Working paper (Department of Economics, University of Georgia).

Lamont, O., 1997, Cashflow and investment: Evidence from internal capital markets, *Journal of Finance* 52, 83-109.

Lamont, O., and C. Polk, 2001a, The diversification discount: Case flows vs. returns, *Journal of Finance* October, forthcoming.

Lamont, O., and C. Polk, 2001b, Does diversification destroy value? Evidence from industry stocks, *Journal of Financial Economics* forthcoming.

Lang, L.H. P., and R.M. Stulz, 1994, Tobin's Q, corporate diversification, and firm performance, *Journal of Political Economy* 102, 1248-80.

Lewellen, W.G., 1971, A pure financial rationale for the conglomerate merger, *Journal of Finance* 26, 521-37.

Lins, K., and H. Servaes, 1999, International evidence on the value of corporate diversification, *Journal of Finance* 54, 2215-39 .

Lins, K., and H. Servaes, 2000, Is corporate diversification beneficial in emerging markets?, Working paper (London Business School).

Maksimovic, V., and G. Phillips, 2001, The market for corporate assets: Who engages in mergers and asset sales and are there efficiency gains? *Journal of Finance* December, forthcoming.

Matsusaka, J.G., 1993, Takeover motives during the conglomerate merger wave, *RAND Journal of Economics* 24, 357-79.

Meyer, M., P. Milgrom, and J. Roberts, 1992, Organisations' prospects, influence costs, and ownership changes, *Journal of Economics and Management Strategy* 1, 9-35.

Morck, R., A. Shleifer, and R. Vishny, 1990, Do managerial motives drive bad acquisitions?, *Journal of Finance* 45, 31-48.

Mueller, D.C., 1969, A theory of conglomerate mergers, *Quarterly Journal of Economics* 83, 643-59.

Myers, S.C., and N.S. Majluf, 1984, Corporate financing and investment decisions when firms have information that investors do not have, *Journal of Financial Economics* 13, 187-221.

Myerson, R.B., 1982, Optimal coordination mechanisms in generalised principal-agent problems, *Journal of Mathematical Economics* 10, 67-81.

Penrose, E.T., 1959, *The theory of the growth of the firm* (Basil Blackwell, Oxford).

Ravenscraft, D.J. and F.M. Scherer, 1987, *Mergers, sell-offs, and economic efficiency* (The Brookings Institution, Washington D.C.).

Rajan, R., and L. Zingales, 1998, The tyranny of the inefficient: An enquiry into the adverse consequences of power struggles, Working paper (University of Chicago).

Rajan, R., H. Servaes, and L. Zingales, 2000, The diversification discount and inefficient investment, *Journal of Finance* 55, pp.35-80.

Rozeff, M., 1982, Growth, beta and agency costs as determinants of dividend payout ratios, *Journal of Financial Research* 5, 249-59.

Rumelt, R.P., 1974, *Strategy, structure and economic performance* (Graduate School of Business Administration, Harvard University, Boston).

Rumelt, R.P., 1982, Diversification strategy and profitability, *Strategic Management Journal* 3, 359-69.

Scharfstein, D.S., 1998, The dark side of internal capital markets II: Evidence from diversified conglomerates, NBER Working Paper 6352.

Scharfstein, D.S., and J. Stein, 2000, The dark side of internal capital markets: Divisional rent-seeking and inefficient investment, *Journal of Finance* 55, 2537-64.

Schlingemann, F.P, R.M. Stulz, and R.A. Walkling, 1999, Corporate focusing and internal capital markets, NBER Working Paper 7175.

Schmalensee, R., 1985, Do markets differ much?, *American Economic Review* 75, 341-51.

Servaes, H., 1996, The value of diversification during the conglomerate merger wave, *Journal of Finance* 51, 1201-25.

Shin, H-H. and R.M. Stulz, 1996, An analysis of divisional investment policies, NBER Working Paper 5639.

Shin, H-H. and R.M. Stulz, 1998, Are internal capital markets efficient?, *Quarterly Journal of Economics* 113, 531-52.

Shleifer, A., and R.W. Vishny, 1989, Management entrenchment: The case of manager-specific investments, *Journal of Financial Economics* 25, 123-40.

Stein, J.C., 1997, Internal capital markets and the competition for corporate resources, *Journal of Finance* 52, 111-33.

Stulz, R.M., 1990, Managerial discretion and optimal financing policies, *Journal of Financial Economics* 26, 3-27.

Teece, D.J., 1980, Economies of scope and the scope of the enterprise, *Journal of Economic Behaviour and Organisation* 1, 223-47.

Teece, D.J., 1982, Towards an economic theory of the multi-product firm, *Journal of Economic Behaviour and Organisation* 3, 39-64.

Ville, S. and D. Merrett, D. 2000, The development of large scale enterprise in Australia, 1910-64, *Business History* 42, 13-46.

Wernerfelt, B. and C.A. Montgomery, 1988, Tobin's Q and the importance of focus in firm performance, *American Economic Review* 78, 246-250.

Weston, J.F., 1970, The nature and significance of conglomerate firms, *St. John's Law Review* 44, 66-80.

Whited, T., 2001, Is it inefficient investment that causes the diversification discount? *Journal of Finance* October, forthcoming.

Williamson, O.E., 1970, *Corporate control and business behaviour: An inquiry into the effects of organisational form on enterprise behaviour* (Prentice Hall, Englewood Cliffs, New Jersey).

Williamson, O.E., 1975, *Markets and hierarchies: Analysis and anti-trust implications* (Collier Macmillan Publishers Inc, New York).

Table 1

Sample characteristics

This table reports sample characteristics for the whole sample (*N*=1137), and the single segment (*N*=924) and diversified (*N*=213) firm samples. Financial information was obtained from the AGSM Annual Report Microfiche File (1988-1992) and Connect 4 Annual Report Collection (1993-1998).

		Total Assets ($m)	MV of equity ($m)	CapExp ($m)	Total Sales ($m)	EBT ($m)	Number Segments
Whole sample	Mean	1715.77	1331.84	25.60	1380.17	146.96	1.55
	Median	249.01	194.77	0.46	255.00	21.66	1
	Std Dev	4518.84	4331.36	113.67	2900.94	596.06	1.29
	Skewness	5.80	12.17	9.30	3.81	15.18	2.42
	Kurtosis	41.69	225.46	108.40	16.33	288.81	5.04
	Min	7.60	0.02	0	18.80	-101.70	1
	Max	54484.00	97142.75	1678.00	21189.00	12824.30	7
	N	1137	1137	1137	1137	1137	1137
Single Firms	Mean	1146.46	857.49	31.47	1012.09	75.55	1
	Median	166.13	133.56	1.15	190.45	14.30	1
	Std Dev	3676.20	3782.01	125.37	2523.67	233.86	0
	Skewness	8.03	18.98	8.40	4.41	10.24	N.A.
	Kurtosis	83.05	460.68	88.17	21.35	155.09	N.A.
	Min	7.60	0.02	0	20.09	-60.60	1
	Max	54484.00	97142.75	1678.00	19224.80	4468.00	1
	N	924	924	924	924	924	924
Diversified	Mean	4185.44	3389.60	0.13	2976.92	456.74	3.94
	Median	2238.20	1784.38	0.36	1907.00	195.70	4
	Std Dev	6560.52	5746.24	0.30	3770.04	1243.80	1.37
	Skewness	3.20	3.76	3.66	2.79	7.98	0.54
	Kurtosis	10.69	15.80	13.85	8.60	72.04	-0.54
	Min	15.55	4.48	0	18.80	-101.70	2
	Max	37082.00	37039.01	1.70	21189.00	12824.30	7
	N	213	213	213	213	213	213

Table 2

Excess value summary statistics

This table shows the summary statistics for the excess value measures for the whole sample, and the single segment and diversified firm samples.

Excess Value = $\ln\left[\frac{V_j}{I(V_j)}\right]$ and $I(V_j) = \sum_{i=1}^{n} AI_{ij}(IND_k)$

where,

V_j = the *j*th firm's total capital (market value of all firm equity plus book value of firm debt);

$I(V_j)$ = imputed value of the sum of firm *j*'s segments;

AI_{ij} = segment *i*'s value of the accounting items (eg. Sales, Earnings before Tax and Assets) used in the valuation multiple for firm *j*;

IND_k = multiple of total capital to an accounting item AI_k (eg. Sales, Earnings before Tax and Assets) for the average or median single segment firm *k* in segment *i*'s industry.

		Average			Median		
		EBT	Assets	Sales	EBT	Assets	Sales
Whole sample	Mean	-0.2067	-0.0408	-0.2003	0.0524	0.0602	0.0431
	Median	-0.2102	-0.0484	-0.1483	0.0000	0.0119	0.0184
	Std Dev	0.7506	0.4166	0.6268	0.5493	0.4197	0.6135
	Skewness	0.1717	-0.1878	-0.3233	0.5304	0.1380	0.0105
	Kurtosis	0.0219	0.8525	0.0195	1.3749	1.2367	0.4842
	Min	-1.9067	-1.7045	-1.9567	-1.8573	-1.5838	-1.8907
	Max	1.9024	1.3824	1.3711	1.9345	1.8355	1.8695
	N	1137	1137	1137	1137	1137	1137
Single Firms	Mean	-0.1672	-0.0657	-0.1887	0.0921	0.0339	0.0407
	Median	-0.1692	-0.0597	-0.1493	0.0000	0.0000	0.0000
	Std Dev	0.7465	0.4174	0.6317	0.5624	0.4187	0.6208
	Skewness	0.0906	-0.2922	-0.3403	0.4786	0.0795	0.0094
	Kurtosis	-0.0297	0.8529	0.0594	1.3251	1.4001	0.4969
	Min	-1.9067	-1.7045	-1.9567	-1.8573	-1.5838	-1.8907
	Max	1.9024	1.3824	1.3711	1.9345	1.8355	1.8695
	N	924	924	924	924	924	924
Diversified	Mean	-0.3782	0.0674	-0.2505	-0.1199	0.1743	0.0534
	Median	-0.4697	-0.0046	-0.1483	-0.1830	0.1042	0.0920
	Std Dev	0.7460	0.3964	0.6039	0.4503	0.4057	0.5822
	Skewness	0.5543	0.3921	-0.2680	0.5068	0.4791	0.0237
	Kurtosis	0.7180	0.2552	-0.1407	1.2874	0.2935	0.3954
	Min	-1.8864	-0.8880	-1.8567	-1.5190	-0.7834	-1.6245
	Max	1.8806	1.3126	1.2862	1.5803	1.3743	1.7919
	N	213	213	213	213	213	213

Table 3

Regression results for the market value of diversified firms

This table reports OLS regression results for:

$$\text{Ln}\,(V_j / I(V_j)) = a + ß_1(\text{Diversified}) + ß_2(\text{Ln}(TA_j)) + ß_3(\text{Earnings}_j) + ß_4(\text{CapExp}_j) + e_j.$$

where

$\text{Ln}\,(V_j / I(V_j))$ = the Assets, Sales and EBT excess value measures for firm *j* respectively;
Diversified = a dummy variable with value 1 for a diversified firm, 0 otherwise;
$\text{Ln}(TA_j)$ = the natural logarithm of total assets for firm *j*;
Earnings_j = earnings before tax scaled by total sales for firm *j*;
CapExp_j = capital expenditure scaled by total sales for firm *j*.

Standard errors are reported in parentheses. * and ** indicate significance at the 10% and 5% respectively.

	Assets excess value		Sales excess value		EBT excess value	
Variable	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat
Intercept	-0.0246	-1.36	-0.3775	-2.85	-0.2228	-1.78*
	(0.0180)		(0.1327)		(0.1254)	
Diversified	0.1285	4.05**	-0.0276	-0.56	-0.2599	-5.60**
	(0.0317)		(0.0491)		(0.0464)	
Ln(TA)			0.0173	1.61	0.0253	2.51**
			(0.0108)		(0.0101)	
Earnings	0.5891	5.05**	1.7576	10.72**		
	(0.1168)		(0.1639)			
CapExp	-0.0001	-0.57	0.0007	3.92**	0.0001	0.47
	(0.0001)		(0.0002)		(0.0002)	
R^2	0.0389		0.1289		0.0286	
F-statistic	15.28**		41.86**		11.12**	

Table 4

Regressions for the relationship between the diversification discount and profitability

This table reports OLS regression results for:

$$\text{Ln}\,(V_j / I(V_j)) = a + ß_1(\text{Excess Profit}_j) + ß_2(\text{Diversified}) + ß_3(\text{EP*Div}) + ß_4(\text{Ln}(TA_j)) + ß_5(\text{CapExp}_j) + e$$

where

$\text{Ln}\,(V_j / I(V_j))$	= the Assets, Sales and EBT excess value measures for firm *j* respectively;
Excess Profit_j	= the difference between actual and implied profit for firm *j*;
Diversified	= a dummy variable with value 1 for a diversified firm, 0 otherwise;
EP*Div	= an interaction term capturing the excess profitability of diversified firms;
$\text{Ln}(TA_j)$	= the natural logarithm of total assets for firm *j*;
Earnings_j	= earnings before tax scaled by total sales for firm *j*;
CapExp_j	= capital expenditure scaled by total sales for firm *j*.

Standard errors are reported in parentheses. * and ** indicate significance at the 10% and 5% respectively.

		Model 1 Assets EV		Model 2 Sales EV	
Variable		Coeff	t-stat	Coeff	t-stat
Intercept		0.2407	2.55**	-0.4575	-3.67**
		(0.0942)		(0.1248)	
Excess Profit	($ß_1$)	1.4053	7.85**	4.0746	17.18**
		(0.1790)		(0.2372)	
Diversified	($ß_2$)	0.1869	5.03**	0.0502	1.02
		(0.0372)		(0.0492)	
EP*Div	($ß_3$)	-1.0353	-2.77**	-4.0997	-8.29**
		(0.3734)		(0.4947)	
Ln(TA)	($ß_4$)	-0.0188	-2.48**	0.0322	3.21**
		(0.0076)		(0.0100)	
CapExp	($ß_5$)	-0.0001	-0.69	0.0005	3.25**
		(0.0001)		(0.0002)	
R^2		0.0734		0.2390	
F-statistic		17.92**		71.03**	