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The Source of Abnormal Returns from Strategic Alliance Announcements

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Abstract

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Despite the rapid growth in the formation of alliances, event studies of stock returns surrounding the announcement of strategic alliances are not common. This study seeks to add value to the existing literature by linking together theoretical models of strategic alliances with an empirical examination of stock returns on the announcement of strategic alliances.

Using a sample of 123 strategic alliance announcements the results find strong support for the hypothesis that strategic alliance announcements generate significant positive abnormal returns on the announcement day. Although strategic alliances are more prevalent in the higher technology industries the source of the abnormal stock returns is a sub-sample of firms with lower market to book values. This is found to be supportive of the hypothesis that the announcement of a strategic alliance is additional information for firms with lower growth. There is no empirical support for the knowledge, flexibility and the hubris hypotheses.

Key words:
Strategic Alliance; Firm Value

JEL Classification: G14

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1. Introduction

An alliance is an agreement between parties that is formed to advance common interests or causes in an attempt to achieve a particular aim. Alliances between firms can be used to avoid the rigidity of some organisational forms such as mergers and takeovers and to gain access to knowledge and skills otherwise not available. Alliances are generally cooperative associations between two or more firms to share their knowledge, experience and assets and to potentially create greater value. They can take many forms from simple agreements with no equity ties to more formal agreements involving equity ownership and share managerial control over joint activities. This study focuses on alliances that agree to pool resources and documents results of analysis of the stock market response to a sample of strategic alliance announcements. Furthermore, the study identifies the source of abnormal returns that accompany such announcements.

Three main theoretical arguments are suggested for the source of abnormal share price reaction when a firm announces a strategic alliance. Strategic alliances may be more cost effective than other organisational re-structures in obtaining access to specialised knowledge. Strategic alliances may improve organisational flexibility and/or signal to the market improved investment opportunities. Although the existing literature provides theoretical support for the source of abnormal returns, very little evidence has been documented on whether abnormal returns occur on the announcement of a strategic alliance and the source of those abnormal returns. The aim of this paper is to help fill that void. This study seeks to add value to the existing literature by linking together theoretical models of alliances with an empirical examination of stock returns surrounding strategic alliance announcements.

The remainder of this paper is as follows. The next section reviews the literature and develops the hypotheses that will be tested. Section three overviews the data collection process and the characteristics of that data and outlines the methods used to test the data. The results of the tests are documented in section four and section five summarises the manuscript.

2. Hypothesis Development

The main hypothesis is whether the announcement of a strategic alliance generates positive abnormal returns to shareholders. In other words, is the announcement of strategic alliances regarded as unexpected good news for shareholders?

Chan et al (1997) in a study of strategic alliance announcements in the US report significant announcement day abnormal returns of 0.64% and Gleason, Mathur and Wiggins (2003) report significant announcement day abnormal returns of 0.66% for strategic alliance in the US financial services industry. These studies suggest that the announcement of a strategic alliance is unexpected good news.

The source of the abnormal returns from strategic alliance announcements is difficult to identify due to the interaction of many explanatory variables and to date there has not been any theoretical model that completely explains the origin of the abnormal returns. There are at least three possible sources of these abnormal gains; increased knowledge, increased flexibility and improved investment opportunities. These are discussed below.

a. Knowledge Hypothesis

According to the theory of optimal application of knowledge within organisations (Jensen and Meckling 1991), strategic alliances can be more cost

effective than mergers and acquisitions in knowledge transfer (Chan et. al, 1997). Knowledge can be classified as general or specific (Jensen and Meckling, 1991, Chesbrough and Teece, 1996).[1] General knowledge is easier to transfer than specific knowledge. For example, the knowledge of a specialist is more difficult to transfer than knowledge of a non-specialist. Strategic alliances are a natural response to the difficulties faced when attempting to transfer specific knowledge (Jensen, 1993). The costs of knowledge transfer can be particularly high for projects involving new product creation, new technology development, or other highly innovative endeavours which often require substantial specialised knowledge (Chan et. al, 1997). Pisano (1989) considers alliances that involve research and development to involve a greater degree of transaction specific know-how than other alliances. Therefore, these types of alliances may offer participants greater value than other types of alliances that do not involve either specific or proprietary information.

This suggests that a source of gains is the increased specialised knowledge that the alliance will bring to the firm and this will be most evident in alliances that involve research and development.

b. Flexibility Hypothesis

Strategic alliances can add value to a firm through improved organisational flexibility. Chan et al. (1997, p.203) explains:

> *"Since alliances do not create a new organisational entity they avoid the agency costs associated with managements reluctance to release resources under their control once the need for those resources has gone away."*

[1] Chesbrough and Teece (1996) use the terms 'tacit' and 'codified' to classify knowledge.

The flexibility to release resources has the direct result of more informed decisions being made more dynamically. Mody (1993) suggests that flexibility inherent in strategic alliances facilitates experimentation with new combinations of participants in the pursuit of new technologies or marketing strategies. The ability to experiment should be particularly valuable to rapidly growing firms and those in the higher technology industries where there is likely to be rapid changes. Studies on alliances by Mariti and Smiley (1983), TASC (1990) and Chan et al. (1997) have found a significant proportion of alliances are higher technology in nature.

An alliance has the characteristics of a call option, the option price is the initial outlay and the exercise price is the future investment required to advance the alliance. Should the alliance prove to be unsuccessful, the option does not have to be exercised. In more volatile markets an alliance, like an option, is more valuable. Therefore, strategic alliances should be more valuable in higher technology industries where future demand is uncertain.

Chan et al. (1997) test high-tech alliances versus low-tech alliances and show that announcement day returns for alliances that relate to new technology create significant positive returns of 1.12% while announcements for low-tech alliances do not generate any significant announcement day returns. This implies alliances add more value when the risks are higher. Therefore, the source of gains to shareholders from strategic alliances accrue from the flexibility that the alliances provides and that this flexibility would be most evident for higher technology alliances.

c. Investment Opportunity Hypothesis

A firm with a good investment opportunity set is a firm with positive net present value projects available. To measure the ex-ante investment opportunities, ex post, the

ratio of market value (MV) to book value (BV) of the firm is often used. Firms with a high MV/BV are regarded as growth firms. Growth firms are firms where the market considers the firm to have positive net present value projects or growth opportunities.

If a higher growth firm forms a strategic alliance then the market may see this as confirmation of the projects the firm is expected to have available. This may not be regarded by the market as more information relative to a strategic alliance announced by a lower growth firm. If a lower growth firm announces a strategic alliance then this may signal to the market that the firm actually has growth opportunities, which have been previously undervalued. This is referred to here as the *new information* hypothesis.

However, Roll (1986) proposes that managers of past good performing firms suffer from over confidence or 'hubris' and over value potential investments. The good past performance endows management with cash and with 'hubris'. Burdened with overconfidence, management selects target investments (Roll suggests a target firm) and over estimates the value created investing in projects that are not value maximising. The market is aware of this potential for over-investment and discounts the information. Therefore, if the *hubris* hypothesis holds a negative relationship between growth and returns to strategic alliance announcements is expected.

If strategic alliance abnormal returns are smaller for high growth firms relative to low growth firms, then it is evidence that the alliance is new information rather than confirmation of existing information. However, if a smaller return for growth firms is found then this also supports the hubris hypothesis. A way of isolating out these two effects is to consider the level of free cash flow available to the firm. Firms that have higher levels of free cash flow will be more susceptible to hubris than firms with lower levels of free cash flow. The managers of the higher free cash flow firms

will be more likely to utilise those free cash flows in a non-maximising way. Firms that have higher levels of free cash flow and are higher growth firms are more likely to suffer from hubris relative to higher growth firms with lower levels of free cash flow. Lower growth firms with lower levels of free cash flows are least likely to suffer from hubris. Therefore, if strategic alliance announcement day returns are due to new information then controlling for free cash flow will isolate the effect of hubris. If the returns are due to hubris, then controlling for growth will isolate the effect of new information.

3. Data and Method

a. Data

The initial data set of strategic alliance announcements was obtained from the Aspect Financial Dat Analysis database. A 'quick search' was used to identify all companies making announcements containing the words 'strategic' and 'alliance' from June, 1994 to June 2001. This search retrieved 580 companies making 1,325 strategic alliance announcements.

To avoid price sensitive confounding events all strategic alliance announcements involving annual reports and half yearly summaries and other announcements within 60 days of the strategic alliance announcement were removed. This resulted in 579 announcements remaining. Of the remaining announcements each was carefully scrutinised and those not containing sufficient information on the formation of a strategic alliance were also removed, leaving 281 announcements. Further, 127 strategic alliances relating to subsidiaries were removed as the relationship between the parent and the subsidiary was available to the market and this is likely to be already regarded as an alliance. Twenty eight announcements

relating to firms that were listed within the last 12 months were also excluded because of lack of sufficient data for beta estimation.

A further removal of data points arose from a test of the daily returns surrounding the remaining 126 announcements. If the returns were greater than two standard deviations from the mean, the returns were verified using historical copies of the Australian Financial Review and historical charts from Commonwealth Securities (www.comsec.com.au). The returns surrounding three announcements could not be confirmed from these additional sources and were removed from the sample. The final filtered sample comprises 123 strategic alliance announcements. Table 1 Panel A reports the filtering process detailed above.

[Table 1 in here]

Panel B of Table 1 provides a brief overview of the size (total assets) and market-to-book value of the firms in the sample. The average firm size is $4.3 billion, the smallest firm having $1.2million in total assets.

Growth (G) is approximated as:

$$G=\frac{MV_e+BV_{tl}}{BV_{ta}}$$

Where:
MV_e = the market value of equity;
BV_{tl} = the book value of total liabilities; and
BV_{ta} = the book value of total assets.

Generally, firms in the sample are growth firms with an average G of 1.911. There is one firm with a relatively very high G of 13.2, this firm is a high technology firm.

The stated motivations of each company contained in the announcement were classified according to the type of alliance (Chan et al. 1997).[2] Table 2 Panel B shows the distribution of alliance type across the sample.[3] The different types of alliances are generally equally distributed across technology, marketing and R&D.

[Table 2 in here]

Daily share price data were obtained from Thompson's Financial Data Stream. In this study the ASX 300 Accumulation index is used as a proxy for the market.[4]

b. Method

Event study methodology of Brown and Warner (1980 and 1985) and MacKinlay (1997) is used to analyse the effect of strategic alliances on stock prices. To obtain expected returns Bollen, Brooks and Faff (2001) beta estimates are based on a 250-day period beginning 20 days prior to each announcement.[5] Cumulative average abnormal returns (CAARs) are computed across 3-day and 5-day event windows surrounding the announcement as well as announcement day abnormal returns. CAARs for the 3-day event window comprise stock returns for announcement day t, t-1 and t+1. CAARs for the 5-day event window comprise stock returns for the announcement day, and two days either side of the announcement day.

[2] Although classification error is possible, generally each alliance announcement gave sufficient information to determine which type it belonged.

[3] Appendix A provides examples of each different type of alliance.

[4] This index makes up over 90% of the Australian stock market (Australian Stock Exchange, 2002).

[5] A range of different leads and lags were used to calculate beta and abnormal returns. The results are insensitive to the different methods used.

4. Results

a. The Value Maximisation Hypothesis

The value maximisation hypothesis predicts that the market response to the announcement of a strategic alliance will be significantly positive. This study finds support for the value maximisation hypothesis. Table 3 shows the descriptive statistics and results of tests of significance of the CAARs and the announcement day abnormal returns from zero. Using the t-test, as defined in Brown and Warner (1985), the significant average announcement day abnormal return (BBF0) is 1.4% and the significant 3-day CAAR (BBF3) is 1.6%. The cumulative average abnormal return for 5 days surrounding the announcement (BBF5) is insignificant. The announcement day abnormal return (BBF0) is considerably higher than Chan et al (1997) and Gleason et al (2003). They both report an announcement day abnormal return of approximately 0.64%.

[Table 3 here]

b. The Knowledge Hypothesis

To test the knowledge hypothesis a classification of research and development alliances is required. As shown in Table 2, a distribution of the different types of alliances in the sample is provided. To test whether the average abnormal returns for these groups differ an ANOVA test (and Kruskal-Wallis on the median abnormal returns) is used. Based on the results there is no significant difference in the mean or median announcement day abnormal returns for the different types of alliances (F-stat = 0.688 (prob=0.601); z-Stat=2.543 (prob=0.637)).[6] These results indicate that the

[6] Furthermore, average (median) BBF0s from product development or research alliance announcements were compared to average (median) BBF0s from the remaining alliances and no significant difference was detected. Appendix B provides details of OLS regression results.

abnormal returns on the announcement of a strategic alliance are not due to the increased knowledge that is expected to accompany them.

c. The Flexibility Hypothesis

To test the flexibility hypothesis a classification of high-technology/low-technology is required. There are two elements for this classification. Either the firm is from a high technology (high-tech) or low technology (low-tech) industry or the alliance is high technology (high-tech) or low technology (low-tech) in nature. Chan et al (1997) classify their sample on industry codes. Firms in information technology and telecommunications are classified as high-tech and consumer discretionary, consumer staple, energy, financials, industrials and utilities are classified as low-tech. Finally, the healthcare classification is broken up by its GICS industry group. Firms who manufacture healthcare equipment and supplies or provide health care services are classified as low-tech. Those firms in healthcare research development or biotechnology are classified as high-tech.

An alliance is classified as a high-tech alliance if it is a research and development alliance, where a new innovation or product is being developed. Other alliances are classified as low-tech.

This study views a high-tech project as a project that involves new, advanced methods and outputs. A strategic alliance can be classified as high-tech in two ways:

1. The announcing firm is in a high-tech industry. A high-tech industry includes information technology, biotechnology and telecommunications.
2. The alliance is of a high-tech nature by developing new innovative products and processes. For example, an alliance for research and development.

The distribution between high/low-tech industry and high/low-tech alliance is detailed in Table 4.

[Table 4 in here]

From Table 4, using the high-tech/low-tech industry and high-tech/low-tech alliance 31 of the 119 announcements are classified as in the high-tech industry. Of the 119 announcements 36 are classified as high-tech alliances.

Table 4 indicates that there are not an equal number of alliances across the two industry groups. Furthermore, high-tech firms make up approximately 10% of the ASX 300 (Standard and Poor's, 2002), however 26% (31/119) of the sample of announcements is from firms in high technology industry. This suggests that strategic alliances are more likely from high technology firms. This provides little support for the flexibility hypothesis.

Chan et al (1997) find high-tech alliances earn abnormal returns significantly greater than low-tech alliances providing better support for the flexibility hypothesis. Tests of the mean and median BBF0s fail to find any significant difference between high/low tech industry and high/low tech alliance groups. The results of the ANOVA and Kruskal-Wallis tests are provided in Table 5. Table 5 shows that the difference in the median announcement day abnormal returns for high-tech and low-tech firms has a p-value of 0.093 but this is not regarded as significant. No support is provided from the ANOVA tests.[7] Generally, these results do not support the view that the driver of the announcement day abnormal returns is improved organisational flexibility, even though a higher proportion of alliance announcements are from high technology firms.

[7] Appendix B provides details of OLS regressions. These confirm the lack of support for the flexibility hypothesis.

[Table 5 in here]

c. The Investment Opportunity Hypothesis

If a firm faces positive (negative) net present value projects then the firm has a good (bad) opportunity set. If a firm has a good opportunity set it is regarded as a growth firm and has a higher market to book value.

As shown in Panel B of Table 1 sampled firms have an average growth measure of 1.911. To determine if the abnormal returns to strategic alliance announcements are different for firms with higher growth relative to firms with lower growth, the sample is stratified on the growth measure (G). The results of tests of the difference in BBF0 for firms in the top decile and bottom deciles of growth are shown in Table 6.

[Table 6 in here]

From Table 6 the highest decile of growth firms has a mean growth value of just over 5, while the lowest decile of growth firms has a mean growth value of just over 0.5. Also shown in Table 6 is the result of tests of difference in mean and median BBF0 for the highest and lowest decile growth firms. The difference between mean (and median) abnormal announcement day returns for the two groups is significant (t-stat=5.864; prob-value=0.024). The mean announcement day return for the highest decile growth firms is 0.7% (which is insignificantly different from zero) while the lowest decile growth firms have a mean announcement day abnormal day return of 7.3% (which is significantly different from zero). This result shows that low growth firms announcing strategic alliances send significant more valuable information to the market than high growth firms. Furthermore, the insignificant announcement day abnormal return for the higher growth firms implies that the source of abnormal

returns from strategic alliance announcements is originating from the lower growth firms.[8]

As discussed in the literature review the higher (lower) abnormal returns to the lower (higher) growth firms may be due to either the hubris or the additional information hypotheses. If hubris is the source of the lower abnormal returns to the higher growth firms, then firms that have higher free cash flows are expected to have lower returns, particularly if they are also higher growth firms. If hubris is not the source of the lower returns to the higher growth firms, then free cash flow will not be an explanatory factor.

To test these two hypotheses the sample is initially divided into high and low free cash flow firms. The announcement day abnormal returns to the top decile of high free cash flow firms are compared to the bottom decile.[9] Based on both ANOVA and Kruskal-Wallis tests there is no significant difference in mean or median abnormal returns for these two groups ((t-stat= 0.039 (p-value=0.968); z-stat= 0.403 (p-value=0.524)). To further test these hypotheses the top 30 high and bottom 30 low growth firms were divided into high and low free cash flow groups. The announcement day returns for the top and bottom deciles of highest and lowest free cash flow firms are compared for both the high and low growth firm groups. No significant difference in announcement day returns for these groups was found. From these results the additional information hypothesis is accepted. The significant abnormal day returns observed in the sample of firms announcing strategic alliances is

[8] Appendix B provides OLS regression results supporting this conclusion.

[9] To reduce problems of scale, free cash flow is divided by total assets.

due to additional information on the growth potential of lower growth firms that is released to the market on the announcement of a strategic alliance.[10]

5. Summary

This study documents that for a sample of firms announcing strategic alliances a significant average abnormal stock return occurs. A significant cumulative average abnormal return persists for three days surrounding the announcement but not for five days surrounding the announcement.

To identify the source of the announcement day abnormal returns a number of hypotheses are tested. The knowledge hypothesis predicts that the source of the gains in a strategic alliance announcement is the improved knowledge transfer that accompanies them. There was no evidence from the sample to support the knowledge hypothesis.

The flexibility hypothesis predicts that the gains from strategic alliances are due to the improved management flexibility and this should be most evident for firms in the higher technology industries. The sample of strategic alliance announcements did show a greater number of strategic alliances in the higher technology industries. However, analysis of the abnormal returns did not provide sufficient evidence to support this hypothesis.

The investment opportunity hypothesis incorporates two competing hypotheses. The hubris hypothesis predicts that firms with a higher market to book value (growth firms) will be discounted on the announcement of a strategic alliance because the market believes that the managers of these firms are endowed with excess cash and the strategic alliance is not a shareholder wealth maximising decision. This

[10] Table B7 in Appendix B provides OLS regression results. These results provide further support for the additional information hypothesis.

hypothesis is not supported. There is no significant difference in announcement day abnormal returns for higher free cash flow firms relative to lower free cash flow firms even after controlling for growth. The additional information hypothesis predicts that the higher growth firms have already signalled to the market their growth potential and that the announcement of a strategic alliance is of less value, relative to lower growth firms. For lower growth firms their potential has not been released to the market and the announcement of a strategic alliance has additional information value. The sample of firms in this study showed that the source of significant abnormal announcement day returns for strategic alliances originates from lower growth firms. In particular, the average announcement day abnormal return for the sample decile of higher growth firms is insignificantly from zero.

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Table 1 The Final Sample of Announcements
Panel A of this table shows the data filtering criteria for strategic alliance announcements. Stategic alliance announcements were collected from the Aspect Financial Dat Analysis database via a word search for 'strategic' and 'alliance' over the period June 1994 to June 2001. Stock price data was obtained from Datastream.

Panel B of this table shows descriptive statistics for the firms in the sample.

Panel A

Filtering Process	*Number of Announcements*	*Remaining Sample*
Observations in initial search	1325	
Less: other announcements within 60 days of strategic alliance announcement.[a]	-746	579
Less: announcements containing insufficient information on strategic alliances	-298	281
Less: announcements pertaining to subsidiaries	-127	154
Less: announcements by firms that were publicly listed within the prior 12 months	-28	126
Less: Return errors	-7	119

[a.] *Additional information not related to the alliance may be price sensitive and thus bias results*

Panel B

Summary statistics of firms in sample.

Statistic	Total Asstets ($m)	MV/BV
Mean	4,276.6	1.9
Median	227.5	1.6
Maximum	53,972.0	13.2
Minimum	1.2	0.1
Std. Dev.	9,279.6	1.5
Skewness	2.7	3.9
Kurtosis	11.1	27.9

Table 2 The Distribution of Alliance Types
This table presents the distribution of alliance types across the sample. Announcements are classified into the following groups; technology transfer or systems integration, marketing or distribution, product development or research, licensing, and other (Chan et al, 1997).

Alliance Type	*Number of Announcements*	*Percentage of Sample*
Technology transfer or systems integration	39	33%
Marketing or distribution	35	29%
Product development or research	34	29%
Licensing	4	3%
Other [a]	7	6%
Total	119	100%

[a] The classification 'other' refers to announcements from which the type was unidentifiable and also includes combinations of the other types.

Table 3 Cumulative Average Abnormal Returns (CAAR)

This Table shows the descriptive statistics for announcement day abnormal returns and the cumulative average abnormal returns from strategic alliance announcements over the following periods:

- Announcement day abnormal returns (BBF0);
- Cumulative abnormal returns for the day before, announcement day and day after (BBF3); and
- Cumulative abnormal returns for five days surrounding announcement day (BBF5).

The Bollen, Brookes and Faff (2001) method is used to calculate expected returns and uses daily data, with the market led by 2 days and lagged by 1 to estimate beta.

The t-statistic for the cumulative average abnormal returns is calculated as:

$$t_{BW} = \frac{CAAR_{t,T}}{\sqrt{\sum_{t}^{T} \sigma_t^2 / n}}$$ [Brown and Warner (1985)]

where

$CAAR_{t,T}$ = The cumulative (or announcement day) average abnormal return over the event window from day t to T;

σ^2_t = the variance of the daily abnormal return over the event window from day t to T; and

n = the number of announcement observations in the sample.

A Jacque-Bera test for normality rejected normality in the CAARs. A Wilcoxon signed-rank test rejected medians from zero with similar p-values as the t-test.

CAAR	*BBF(0)*	*BBF(3)*	*BBF(5)*
Mean	0.014	0.016	0.007
Median	0.004	0.011	0.007
Maximum	0.240	0.258	0.315
Minimum	-0.133	-0.297	-0.299
Std. Dev.	0.056	0.084	0.089
Skewness	1.118	-0.033	-0.001
Kurtosis	7.082	5.223	5.393
Jarque-Bera	107.457	24.527	28.411
Probability	0.000	0.000	0.000
t_{BW}-stat	2.791	2.121	0.800
p-value	0.006	0.036	0.425

Table 4 Announcement Distribution by High-Technology and Low-Technology

This table shows the sample size for each announcement as classified as one of four combinations of technological nature. High-technology/low-technology industry or high-technology/low-technology alliance.

		Industry		
		High Tech	Low Tech	Total
Alliance	High Tech	10	26	36
	Low Tech	21	62	83
	Total	31	88	119

Table 5 ANOVA Test Results

This table shows the results of tests of equality of mean (ANOVA) and median (Kruskal-Wallis) for different industry/alliance high-tech/low-tech groups.
Sample size = 119.

Industry group	ANOVA F-stat (p-value)	Kruskal Wallis Z-stat (p-value)
High tech industry v low tech industry (n=31,88)	2.537 (0.114)	2.812 (0.093)
High tech alliance v low tech alliance (n=36,83)	0.021 (0.885)	0.070 (0.790)
High tech industry and high tech alliance v High tech industry and low tech alliance v Low tech industry and high tech alliance v Low tech industry and low tech alliance (n=10, 21,26,62)	0.870 (0.459)	3.060 (0.382)

Table 6 Test of abnormal announcement day returns for highest and lowest growth firms

This table reports the results of tests of the investment opportunity hypothesis. Investment opportunity is proxied by G where G is defined as:

$$G = \frac{MV_e + BV_{tl}}{BV_{ta}}$$

where:
MV_e = the market value of equity;
BV_{tl} = the book value of total liabilities; and
BV_{ta} = the book value of total assets.

Growth	*Statistic*	*Value*
Highest decile G	Mean G	5.096
	Mean (BBF0)	0.007
	Median (BBF0)	0.000
	Std dev (BBF0)	0.027
Lowest decile G	Mean G	0.547
	Mean (BBF0)	0.073
	Median (BBF0)	0.030
	Std dev (BBF0)	0.090
t-stat (prob value)		5.864 (0.024)
Chi-square stat (prob value)		6.000 (0.014)

Appendix A: Examples of Strategic Alliance Announcements

This appendix provides examples of each alliance classification. The classifications are made in line with Chan et al (1997) as marketing or distribution, technology transfer or systems integration, product development or research, licensing and other/unknown/combination.

Table A-1 Examples of announcements

	Marketing or Distribution	***2-Aug-2000***
Avatar Industries Limited ("Avatar") announces that its wholly owned subsidiary Arlec Australia Limited ("Arlec") has entered into a series of agreements establishing **strategic alliance** with PDL Industries Limited ("PDL") one of Australasia's leading manufacturers of electrical products and accessories. Under the terms of the alliance PDL will take over distribution of Arlec branded products in New Zealand and the South Pacific and Arlec will source and supply PDL with products which it does not manufacture for distribution under the PDL brand. PDL will also supply Arlec with a range of high quality electrical products and accessories manufactured by PDL for distribution under the Arlec brand in the Australian retail and hardware market.		

	Technology Transfer or Systems Integration	***30-Sep-1999***
ANZ and E*TRADE Australia today announced the formation of a **strategic alliance** to develop Australia's leading on-line share trading and investment service. Part of ANZ's strategy to build a leading position in e-commerce, the strategic alliance will involve ANZ and E*TRADE Australia offering on-line share trading services to ANZ's 4 million customers in Australia and New Zealand. Under an exclusive arrangement, ANZ and E*TRADE Australia will establish a co-branded on-line share trading service to be managed by E*TRADE Australia. The ANZ-E*TRADE co-branded service will be accessible from ANZ's Internet site, and ANZ will become the preferred supplier of banking products and other financial services to E*TRADE Australia customers.		

	Product Development or Research	***17/1/2001***

Ainsworth Game Technology (AGI) and PBL Gaming today announced they had reached an agreement for Ainsworth Game Technology to develop exclusive games for PBL's Vanuatu-based Internet casino, crowngames.com.

Ainsworth Game Technology Chief Executive Officer, Mr Jim O'Mahony, said he was pleased with the agreement which provides a **strategic alliance** with PBL's Online gaming arm.

"This agreement allows Ainsworth Game Technology to enter the international Internet gaming market through the development of exclusive online games for PBL's Internet-based casino," Mr O'Mahony said.

	Licensing	***20/2/1996***

Tele-IP (ASX:TEE) is pleased to announce the creation of a **strategic alliance** with Riverstone Networks Inc (NASDAQ:RSTN) in which;

1. Riverstone will acquire patents held by Tele-IP covering global positioning by satellite for event timing (GPS Event Timing), Address Masquerading and Latency Routing for a consideration of US$2.5M.

2. Riverstone will grant Tele-IP an unrestricted, exclusive and irrevocable licence to the above patents except for their application in Riverstone Networks manufactured products and products that compete with Riverstone Networks manufactured products.

	Other	***09/02/2001***

Leading Australian Internet security providers - SecureNet Limited (SNX.AX) and eSign Australia Limited - have formed a **strategic alliance**. The alliance will address the burgeoning market demand for highly trusted and internationally certified security services, which are now increasingly stipulated for government and finance sectors e-commerce applications globally.

The two companies will work together on a number of initiatives that will concentrate on the technical integration and co-marketing of SecureNet's smart card and security server technologies with eSign's Certification Authority (CA) services. Initially, in order to provide an end-to-end solution with full gatekeeper accreditation, the companies will develop full interoperability, between their public key infrastructure (PKI) products.

Appendix B: Univariate and Multivariate Regression Analysis

This appendix documents regression results for analyses of strategic alliance announcement day abnormal returns with a range of different variables. The purpose is to test the knowledge, flexibility and investment opportunity hypotheses.

Knowledge hypothesis:

$$BBF(0) = \alpha + \beta_0 RD_i + e_i \quad (1)$$

where
BBF(0) = announcement day abnormal return for firm, i; and
RD = dummy variable equal to 1 if the alliance is product development or research, and 0 otherwise.

Table B1 Results of tests of the knowledge hypothesis

Variable	Estimates	White's t-statistic	Prob-value
Constant	0.010	2.096	0.038
RD	0.012	0.92	0.358
F-Statistic	1.217		0.272
Adjusted R^2	0.002		

Flexibility hypothesis:

$$BBF(0) = \alpha + \beta_0 HTA_i + e_i \quad (2)$$

where
HTA = dummy variable equal to 1 if the alliance is high tech in nature, and 0 otherwise;
Other variable as previously defined.

Table B2 Results of tests of the flexibility hypothesis

Variable	Estimates	White's t-statistic	Prob-value
Constant	0.013	2.400	0.893
HTA	0.001	0.134	0.018
F-Statistic	0.021		0.885
Adjusted R^2	-0.008		

$$BBF(0) = \alpha + \beta_0 HTI_i + e_i \quad (3)$$

where

HTI = dummy variable equal to 1 if the alliance is announced by a firm in a high tech industry, and 0 otherwise.

Other variable as previously defined.

Table B3 Results of further tests of the flexibility hypothesis

Variable	Estimates	White's t-statistic	Prob-value
Constant	0.009	1.757	0.081
HTI	0.018	1.392	0.166
F-Statistic	2.537		0.114
Adjusted R^2	0.012		

$$BBF(0) = \alpha + \beta_1 HILA_i + \beta_2 LIHA_i + \beta_3 LL_i + e_i \quad (4)$$

where

HILA = dummy variable equal to 1 if the alliance is a low tech alliance announced by a firm in a high tech industry and 0 otherwise;

LIHA = dummy variable equal to 1 if the alliance is a high tech alliance announced by a firm in a low tech industry and 0 otherwise; and

LL = dummy variable equal to 1 if the alliance is a low tech alliance announced by a firm in a low tech industry and 0 otherwise.

Other variable as previously defined.

Table B4 Results of further tests of the flexibility hypothesis

Variable	Estimates	White's t-statistic	Prob-value
Constant	0.032	1.204	0.231
HILA	-0.007	-0.236	0.813
LIHA	-0.024	-0.824	0.411
LL	-0.023	-0.821	0.413
F-Statistic	0.870		0.458
Adjusted R^2	-0.003		

Investment opportunity hypothesis:

$$BBF(0) = \alpha + \beta_1 LOWG_i + \beta_2 HIG_i + e_i \quad (5)$$

where

LOWG = dummy variable equal to 1 if the announcing firm is in the lowest decile of growth firms and 0 otherwise; and

HIG = dummy variable equal to 1 if the announcing firm is in the highest decile of growth firms and 0 otherwise.

Other variable as previously defined.

Table B5 Results of tests of the investment opportunity hypothesis

Variable	Estimates	White's t-statistic	Prob-value
Constant	0.007	1.443	0.151
LOWG	**0.065**	**4.028**	**0.000**
HIG	-0.001	-0.046	0.963
F-Statistic	**8.237**		**0.000**
Adjusted R^2	0.109		

$$BBF(0) = \alpha + \beta_1 LGHF_i + \beta_2 LGLF_i + \beta_3 HGHF_i + \beta_4 HGLF_i + e_i \quad (6)$$

where

LGHF = dummy variable equal to 1 if the announcing firm has low growth and highest decile of free cash flow and zero otherwise;

LGLF = dummy variable equal to 1 if the announcing firm has low growth and lowest decile of free cash flow and zero otherwise;

HGHF = dummy variable equal to 1 if the announcing firm has high growth and highest decile of free cash flow and zero otherwise;

HGLF = dummy variable equal to 1 if the announcing firm has high growth and lowest decile of free cash flow and zero otherwise; and

Other variable as previously defined.

Table B6 Results of tests of the hubris and additional information hypotheses

Variable	Estimates	White's t-statistic	Prob-value
Constant	0.012	2.010	0.046
LGHF	0.008	0.306	0.760
LGLF	-0.000	-0.001	0.998
HGHF	0.007	0.636	0.525
HGLF	-0.002	-0.251	0.801
F-Statistic	0.117		0.976
Adjusted R^2	-0.030		

Knowledge, flexibility and investment opportunity hypotheses:

$$\begin{aligned} BBF(0) = \alpha + \beta_0 RD_i + \\ + \beta_1 HILA_i + \beta_2 LIHA_i + \beta_3 LL_i + \\ + \beta_4 LOWG_i + \beta_5 HIG_i + \\ + \beta_6 LGHF_i + \beta_7 LGLF_i + \beta_8 HGHF_i + \beta_9 HGLF_i + e_i \end{aligned} \quad (7)$$

where
Variables as previously defined.

Table B7 Results of tests of the knowledge, flexibility and investment opportunity (hubris and additional information) hypotheses

Variable	Estimates	White's t-statistic	Prob-value
Constant	0.004	0.159	0.873
RD	0.027	1.376	0.171
HILA	0.010	0.381	0.703
LIHA	-0.020	-0.774	0.440
LL	0.000	0.022	0.981
LOWG	**0.080**	**3.000**	**0.003**
HIG	-0.018	-1.382	0.169
LGHF	-0.029	-1.215	0.227
LGLF	-0.014	-0.904	0.367
HGHF	0.019	1.287	0.200
HGLF	0.008	0.721	0.472
F-Statistic	**2.526**		**0.008**
Adjusted R^2	0.114		

Table B8 Correlation matrix of independent variables in equation (7)

	RD	HILA	LIHA	LL	LOWG	HIG	LGHF	LGLF	HGHF	HGLF
RD	1.000									
HILA	-0.244	1.000								
t-stat	-2.721									
p-value	**0.007**									
LIHA	0.611	-0.245	1.000							
t-stat	8.347	-2.731								
p-value	**0.000**	**0.007**								
LL	-0.511	-0.483	-0.551	1.000						
t-stat	-6.425	-5.963	-7.150							
p-value	**0.000**	**0.000**	**0.000**							
LOWG	-0.026	0.138	-0.042	-0.070	1.000					
t-stat	-0.286	1.505	-0.455	-0.758						
p-value	0.775	0.135	0.650	0.450						
HIG	0.035	0.065	0.026	-0.070	-0.112	1.000				
t-stat	0.382	0.700	0.276	-0.758	-1.221					
p-value	0.703	0.485	0.783	0.450	0.225					
LGHF	-0.026	0.138	-0.042	-0.070	0.444	-0.112	1.000			
t-stat	-0.286	1.505	-0.455	-0.758	5.359	-1.221				
p-value	0.775	0.135	0.650	0.450	**0.000**	0.225				
LGLF	-0.026	-0.082	0.026	0.098	0.166	-0.112	-0.112	1.000		
t-stat	-0.286	-0.888	0.276	1.061	1.820	-1.221	-1.221			
p-value	0.775	0.376	0.783	0.291	0.071	0.225	0.225			
HGHF	0.035	-0.009	0.026	-0.014	-0.112	0.444	-0.112	-0.112	1.000	
t-stat	0.382	-0.093	0.276	-0.152	-1.221	5.359	-1.221	-1.221		
p-value	0.703	0.926	0.783	0.879	0.225	**0.000**	0.225	0.225		
HGLF	-0.026	0.065	-0.042	-0.070	-0.112	0.444	-0.112	-0.112	-0.112	1.000
t-stat	-0.286	0.700	-0.455	-0.758	-1.221	5.359	-1.221	-1.221	-1.221	
p-value	0.775	0.485	0.650	0.450	0.225	**0.000**	0.225	0.225	0.225	

Due to the highly significant correlations (and potential multicollinearity) between variable *RD* and *HILA*, *LIHA* and *LL*, regression equation (7) was re-run excluding variables *HILA*, *LIHA* and *LL*. The low growth variable (*LOWG*) remained highly significant. As results are not sufficiently different from that reported in Table B7 they are not reported again. The regression was also re-run excluding the variables *LGHF* and *HGHF*. The low growth variable (*LOWG*) again remained highly significant. Similarly these results are not reported.