Company Investment Announcements and the Market Value of the Firm

Edward Jones*, Jo Danbolt and Ian Hirst***

* School of Management, Heriot-Watt University, Edinburgh.

** Department of Accounting and Finance, University of Glasgow.

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Correspondence: Edward Jones, School of Management, Heriot-Watt University, Riccarton, Edinburgh, EH14 4AS. Telephone +44 (0) 131 451 3905, Fax +44 (0) 131 451 3008, E-mail: E.A.E.Jones@hw.ac.uk

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Abstract

This paper examines the stock market reaction to 402 company investment announcements made by UK companies during the 1991-1996 period. The market-adjusted abnormal returns are generally positive but small. Investment announcements are classified according to functional categories, and we find the level of abnormal returns to vary according to the type of capital investment being announced. In particular, we find the market to react more favourably to investments which 'create' future investment opportunities, than to investments which can be categorised as 'exercising' investment opportunities. The market reaction also varies with firm size, with large companies tending to experience smaller responses to announcements than do smaller firms. Chung *et al*. (1998) reported that the quality of a company's investment opportunities is the primary determinant of market reactions to capital expenditure decisions. Our findings lend some support to a role for investment opportunities in market valuations. We also find project size to have a significant positive impact on the level of abnormal returns.

1. Introduction

Capital expenditure decisions can be expected to affect the long-term performance of the firm. If stock markets are efficient (Fama, 1970 and 1991), one would expect the stock market to react quickly to the announcement of new capital expenditure, adjusting the market capitalisation of the firm by the change in the expected net present value of the proposed investment. However, while previous US research indicates that the stock market reacts quickly to announcements of capital expenditure decisions (McConnell & Muscarella, 1985; Chan *et al*., 1990; Woolridge & Snow, 1990; Al-Qudah, 1991; Chan *et al*., 1995), the limited UK evidence has so far failed to find a strong relationship between a company's share price and the announcement of investment decisions (Burton et al., 1999).

This paper substantially extends the range of investment proposals analysed compared to prior UK studies, allowing us to test whether the market reaction to investment announcements varies with the type of project proposed, as well as on the characteristics of the specific projects. Based on a sample of 402 capital investment announcements by listed UK companies made through the London Stock Exchange regulatory News Service, we find at the aggregate level we find similar abnormal returns to those identified by previous studies (Burton *et al*., 1999; Woolridge and Snow, 1990). However, more detailed analysis reveals that the market reacts more favourably to the announcement of investments that can be expected to create future investment opportunities than to investments that can be deemed to exercise investment opportunities. We find no evidence to suggest the UK stock market discourages strategic investment where returns are likely to be realised over a longer time horizon.

The remainder of the paper is organised as follows: Section 2 contains a discussion of the prior literature on the relationship between company value and capital investment announcements. Section 3 contains a discussion of the choice of categories of investment. Section 4 describes the data and methodology used and the empirical results are presented in section 5. Finally, section 6 contains our conclusions.

2. Previous Studies of Capital Investment Announcements

McConnell and Muscarella (1985) investigated announced changes in the level of capital expenditure by US firms, and concluded that the announcement of an increase (decrease) in the capital budget from the previous year resulted in positive (negative) announcement period returns. Wherever possible their data was categorised by the intended use of funds, but specific individual projects were excluded from the sample. Since different types of projects carry different signals about the future direction of the company, McConnell and Muscarella (1985) speculated that information about future investment opportunities was an important factor in determining the market response to announcements of capital expenditure plans.

McConnell and Muscarella (1985) examined changes in the capital budget, but investment decisions may involve the commitment of resources to a specific project or activity. Different types of activity have different implications for current and future earnings. For example, Chan *et al*. (1990) found significant positive abnormal returns for a sample of 95 announcements of increased R&D expenditure by US companies. However, increased R&D expenditure was found to have a negative effect on stock

prices for announcements made by low technology firms.[1] This evidence indicates "the market is able to distinguish between good and poor investment prospects and, on average, only rewards firms that make good investments" (Chan *et al*., 1995, p81).

Investment in projects that reduce operating costs may also provide signals regarding the firm's investment opportunities. For example, Chan *et al*. (1995) identified positive abnormal returns earned by US firms announcing headquarters relocation decisions but negative abnormal returns for plant relocation announcements. However, where relocation was motivated by business expansion or cost savings the market reacted positively whilst the market reacted negatively to decisions which would result in reduced capacity.

One way to enter new markets, reduce production costs or share R&D costs is to form a joint venture. McConnell and Nantell (1985) found that the announcement of domestic US joint ventures resulted in significant positive announcement day returns. McConnell and Nantell speculated that the similarity between the market reaction to mergers and joint ventures may indicate an inter-corporate synergy effect as the source of the gains to shareholders, although they did not test this proposition.

On the other hand, Chung *et al*. (1993) found announcements of international joint ventures by US firms had a negative effect on US firm values. Possible explanations for the negative wealth effect are fears regarding victimisation by hostile partners, diffusion of high-technologies and management conflicts (Chung *et al*., 1993).

Burton *et al*. (1999) examined UK announcements of joint ventures, immediately cash-generating and non-immediately cash-generating investments. They found significant positive returns for joint ventures but not for either of the other single company categories. Their cross-sectional regressions examined whether a dummy variable for the availability of prior funding, announcement size, company size and market-to-book ratio were significant determinants of the market reaction to individual capital expenditure projects. The only significant variable was the announcement size for immediately cash generating investments. Burton *et al.* do not fully explore the cause of the higher abnormal returns associated with joint ventures than with individual firm investment announcements, but suggest that it may be associated with synergistic gains, possibly associated with reduction in costs, spreading of risks, and the cross-fertilisation of ideas. This is consistent with the findings of Johnson and Houston (2000), who found joint ventures being used for risky and complex transactions and for spreading costs. Fröhls *et al*. (1998) similarly found joint ventures to be particularly beneficial when entering emerging markets, which may be riskier (for US companies) than transactions in other industrialised markets. Analysing strategic alliances rather than joint ventures *per se*, Chan *et al.* (1997) found higher wealth creation where there was a transfer or pooling of technical knowledge.

Another study bringing together various types of investment projects was undertaken by Woolridge and Snow (1990). They found that market reactions to strategic investment announcements by US firms, which were generally significant and positive, were more consistent with shareholder wealth maximisation than either short-termism imposed by institutional shareholders or their no-reaction 'rational expectations' hypothesis. Four

types of capital investment announcements were analysed and significant abnormal returns were identified for each type: joint ventures (two-day cumulative market-adjusted return of 0.80%); R&D (1.13%); capital expenditure (0.36%), and product/market diversification (0.69%). The results of the Woolridge and Snow study suggest that not only are abnormal returns likely to be positive (0.64% overall), but that there may be identifiable differences in the level of abnormal returns for different types of capital investment announcement.

Woolridge and Snow also examined whether project size (relative to the size of the firm) or project duration were important determinants of abnormal returns. They found the market reaction to be almost identical for small and large projects, although they noted that the sub-sample for which classification was possible was mainly comprised of plant or equipment expenditures. The market reaction to projects of short-term (less than 3 years) or long-term duration was also virtually identical, thus rejecting the hypothesis that the market discouraged firms from making long-term investments. However, it should be noted that the sample of projects which provided information about size were simply dichotomised at the median value and the distinction between short- and long-term investments was similarly constructed.

3. Classification of Capital Investment Decisions

Financial management textbooks and academic journals provide various systems for classifying capital investment decisions for project appraisal (Dean, 1951; Merrett and Sykes, 1973; Weaver, 1975; Piper, 1980; Kester, 1984). Since we attempt to appraise

projects in this paper, albeit from a different perspective, categories of investment decision were selected from this literature.

By classifying investments according to the primary activity or function, it is possible to examine the underlying value creation characteristics. These characteristics are indicative of the level of follow-on investment opportunities which are provided by a capital investment decision. Kester (1984) argued that the firm must have an appropriate mix of two types of investment as part of its investment strategy - compound 'growth options' and simple 'growth options'. The compound 'growth options' category includes those investments, such as R&D and product/market diversification, which are expected to *create* 'growth options' and generate revenue in the longer term (Dixit and Pindyck, 1995). The investments included in the simple 'growth options' category, such as new plant investments or cost reduction investments, involve a decision to *exercise* an option (Kester, 1984).[2] We aggregate the R&D and product/market diversification categories to provide the 'create' category and the asset expenditure and cost reduction categories to provide the 'exercise' projects.

Following the various studies cited above, the investment categories used here are as follows:

Cost Reduction projects involve the commitment of resources to programmes in which the costs of operating the current line of business are reduced. These are recognised as being low risk projects (Merrett and Sykes, 1973). However, such projects would not be expected to create follow-on investment opportunities.[3]

Asset expenditure projects involve expenditure on plant, equipment and machinery for the expansion or maintenance of the current line of business. The level of risk associated with replacement projects is similar to that of current production whilst investments which require an increased market share would have a level of risk greater than that of current production. Asset expenditure might be considered as the exercise of a 'growth option' which was previously created.

Product/Market Diversification projects involve the commitment of resources in an attempt to increase market share in new markets or in new product areas. This category includes new product launches and the marketing of current products in new markets overseas. Diversification into new markets and new product areas is likely to have a relatively high level of risk. These investment may also be expected to 'create' follow-on investment opportunities.

Research and Development (R&D) projects involve the commitment of resources to "work directed towards the innovation, introduction and improvement of products and processes."[4] Such projects involve very little certainty about where and when the returns will occur and consequently a large proportion of the value of an R&D project is determined by the ability to defer the follow-on investment and the exclusiveness of rights to research discoveries.

The classification of a project may depend on the corporate environment in which it is undertaken. A company which undertakes a cost reduction project or expands within its

existing line of business is exercising an option. The opportunity to invest in this way will have been apparent to investors and will have been included in the firm's market value. Cost reduction and asset expenditure projects thus involve the *exercise* of investment opportunities. If a company jumps to a new line of business, we suggest that this is less likely to have been anticipated by the market. Entry into the new line will carry with it options to grow and expand the new operation, as will R&D projects. Such investments may thus *create* follow-on investment opportunities. Our categorisation of investment projects therefore depends partly on the character of the investment project considered in isolation, but also, to some extent, on the relationship between the project and the existing operations of the firm.

4. Data and Methodology

The initial dataset was made up of 584 capital investment announcements from the Extel News cards for the five-year period from September 1991 to September 1996.[5] The Financial Times Extel database records all official announcements of company news released through the Stock Exchange Regulatory News Service. Returns data was obtained from Datastream. Missing returns data reduced the sample to 562 cases, of which 160 were contaminated by other announcements in the period from day t-1 to day t+1. While there are no significant differences in the abnormal returns including or excluding contaminated announcements, in keeping with previous studies and in order to preserve the integrity of the dataset, we exclude all announcements which are contaminated. The final sample therefore comprised of 402 company investment announcements.

We report the results using the market-adjusted returns model (assuming β of one and an α of zero) to estimate abnormal performance (Brown and Warner, 1985), although we have tested the robustness of our results to various model specifications.[6] The market-adjusted abnormal returns (ε) are calculated as follows:

$$\varepsilon_{it} = R_{it} - R_{mt} \qquad (1)$$

where

ε_{it} = abnormal return on share i on day t.

R_{it} = return on share i on day t.

R_{mt} = return on the FT All Share Index on day t.

Table 1 provides descriptive statistics for the 402 announcements included in the dataset. The 402 announcements were made by 241 companies. The average number of announcements made by each company was 1.7 with seven announcements being the most made by any particular company (British Petroleum plc). On average, cost reduction projects were made by the largest companies and asset expenditures by the smallest. The largest projects as a proportion of the total capitalisation of the company were on average undertaken by companies announcing product/market diversification projects whilst the smallest projects relative to firm size were the cost reduction projects. However, only 227 of the 402 announcements report a value for project size. Table 1 also shows the number of projects within each category that was undertaken as a joint venture.

Insert Table 1 here

5. Results

5.1. Analysis of Announcement Day Returns by Investment Class

The mean abnormal return for the overall dataset and each investment class is given in Table 2. The overall mean abnormal return of 0.87% is similar to that reported by previous studies. The median is lower (0.26%), though still highly significant.[7]

Insert Table 2 here

The null hypothesis that abnormal returns are zero when company investment news is announced can be rejected for the dataset as a whole. For all categories of investments except cost reduction projects, the median abnormal return is significantly different to zero at the 1% confidence level.

Dixit and Pindyck (1995) have suggested that managers should consider the implications of capital investment for the investment opportunities of the firm when making decisions regarding the financing of capital projects. If the market understands these implications, it would be expected that investments which create 'growth options' would be valued more highly than investments which do not. The mean abnormal return for the set of announcements which *ceteris paribus* would be expected to create 'growth options' was 2.01% compared with 0.23% for investments which exercise 'growth options'. Both the mean and median abnormal returns were significant for the 'create' investments whilst only the median value was significant for the set of 'exercise'

investments. The market-adjusted returns for the investments which 'create' growth options are significantly greater than the market-adjusted returns for investments which 'exercise' investment options according to a Mann-Whitney test and an independent samples t-test at the 1% level.

The larger standard deviation for the set of investments that create investment opportunities is indicative of a larger information flow. The difference in the variance between the categories was tested and found to be significant at the 1% level using an F-test. These findings are consistent with the hypothesis that the market valuation of capital investment is to some extent determined by the value of follow-on investment opportunities. Furthermore, the commonly expressed hypothesis that the stock market is myopic (Woolridge and Snow, 1990) and prefers short-term returns can be questioned in the light of these results.

Various studies have provided evidence of differential stock price performance for different types of capital investment announcements. For example, Chan *et al*. (1990) found a two-day cumulative abnormal return of 1.38% for a sample of R&D announcements, Chaney and Devinney (1992) found a three-day excess return of 0.6% for new product innovations and Woolridge and Snow (1990) report two-day cumulative abnormal returns of 1.13% for R&D announcements, 0.69% for product or market diversification and 0.36% for capital expenditures. The mean return for each of the categories obtained in this paper are consistent with the previous studies and support the hypothesis that investments that create investment opportunities result in higher mean abnormal returns than investments that exercise 'growth options'. The category of

R&D exhibited the largest mean abnormal return (2.20%) followed by product/market diversification (1.90%) and asset expenditure (0.34%). The mean abnormal return for cost reduction projects was –0.57%. The category of asset expenditures has a low mean and standard deviation, which perhaps indicates that the information had already been impounded into the share price as part of its investment opportunities or that such capital expenditure is long anticipated as part of the on-going maintenance of existing production.

Of the 402 investments announced, 167 were undertaken as joint ventures. The mean abnormal return for the set of joint ventures (1.35%) is higher than that for the sample as a whole (0.87%).[8] This is consistent with the findings of e.g., Burton *et al.* (1999) for the UK and Woolridge and Snow (1990) for the US, who also found the abnormal returns from investment announcements to be higher for joint ventures than for the sample as a whole.

5.2. Cross-sectional Analysis

So far we have established a positive and significant abnormal return when capital investments are announced. We have also seen that certain categories of investment decisions have a higher average abnormal return. In this section we use regression analysis to explain the magnitude and sign of abnormal returns. Using cross-sectional regressions we can examine the relationship between abnormal returns and a number of contingent variables. The regression analysis was conducted according to the formula (2) as follows:

$$\varepsilon_i = \alpha + \beta_1 logs + \beta_2 jv + \beta_3 i + \beta_4 cp + \beta_5 ps + \beta_6 D_1 + \beta_7 D_2 + \beta_8 D_3 + e \quad (2)$$

where:

ε_i	= abnormal returns on share i
α	= constant
logs	= log of firm size
jv	= dummy variable for joint venture projects
i	= interest rate variable
cp	= company performance variable
ps	= project size
D_1, D_2, D_3,	= dummy variables representing each project type, where D_1 refers to R&D projects, D_2 to product/market diversification projects, and D_3 to cost reduction projects. (Asset expenditure projects are captured by the intercept α)
e	= error term
β	= regression coefficients.

We include relative project size because we hypothesise that projects which are large in relation to the size of the company will have a greater impact on the share price. We include firm size because large companies may use different methods to communicate with the market (Holland 1997) from small ones. Formal announcements may be less significant for large companies. We use company performance because rising earnings are likely to indicate the presence of investment opportunities. The reaction to an investment announcement might be stronger if these opportunities are already perceived by the market. Finally, we include interest rates. For any given set of investment cash flows, there is an inverse relationship between interest rates and value for shareholders. Interest rates are a policy variable used to slow the economy and reduce the profitability

of investment. We therefore believe that the level of interest rates might affect the market's reaction to investment announcements.

The rate of interest used was the UK 1-year inter-bank middle rate for the announcement day. Firm size and interest rates were collected from Datastream. The variable for recent company performance (cp) was taken as the percentage change in earnings per share between the last reported earnings per share and the forecast earnings per share for the current year. A similar method of examining the influence of recent performance was used by Chan et al. (1990). The relative project size (ps) was calculated as the size of the project divided by the market capitalisation of the company. The size of the project was taken to be the figure announced (wherever given).

The regression analysis is first undertaken for the dataset as a whole, with dummy variables for the various project categories. Secondly, the analysis is undertaken for each project category separately. Thirdly, the independent variables were also tested against the abnormal returns for the category of joint ventures. Table 3 shows the output from the regression analysis. It is not necessary or practical to include all combinations of dependent and independent variables in the reported findings of this paper. The models were selected on the basis of the significance of correlations and on the basis of the results of prior regressions. There were no significant relationships between the independent variables and the abnormal returns for the category of cost reduction projects.

Insert table 3 here

The principal finding that emerges from an inspection of Table 3 is that although the relative size variable reduces the number of observations available, it has a significant impact on the regressions in which it is included. It has a significant and positive impact on the abnormal returns for the dataset as a whole and also when regressed on the abnormal returns for the product/market diversification category (although it should be noted that the number of observations is very small for the product/market diversification category when regressed against relative project size) and the joint venture category. The adjusted R^2 for the model of the joint venture category (8) shows that relative project size, when available, explains over 60% of the variation in abnormal returns. These findings agree, to some extent, with those of Burton *et al*. (1999) who identified a similar positive significant relationship between abnormal returns when income-generating projects were announced and the relative size of a capital expenditure. However, we do not find that the relative size of a project significantly affects the abnormal return to our category of asset expenditures.[9]

The dummy variables for project categories used in model 2 are significant at the 1% confidence level. Only R&D (D_1) and product/market diversification (D_2) are included as dummy variables in the table since the cost reduction dummy variable is insignificant in all cases. This suggests that the type of project announced is an important determinant of abnormal returns and the evidence of Table 2 shows that the reaction is different depending on the type of project.

Model 3 comprises of all the observations in the dataset and provides evidence that joint ventures are more positively received by financial markets than single ventures,

consistent with prior evidence by e.g., Burton *et al.* (1999). The coefficient for the joint ventures dummy variable is significant at the 1% level and the model predicts that the abnormal return is 1.16 percentage points higher for joint ventures than for single ventures. Further research might consider the specific characteristics of these projects which make them more attractive to financial markets.

The rate of interest proved to be significant in the regressions of the abnormal returns for the whole dataset and for the category of asset expenditure decisions. It was significant in three models and was the only variable which was significant for these announcements. The coefficient was negative in each case and significant at the 5% level. In the models of asset expenditure decisions it should be noted that the explanatory power was very low. Any relationship between interest rates and asset expenditures would be likely to result from the timing of the commitment of resources such that when the cost of borrowing is high, decisions to invest in projects which create investment options are preferred by investors (Dixit and Pindyck, 1994).

The effect of the size of the firm on security returns has been extensively studied (e.g., Banz, 1981; Reinganum, 1981; Keim, 1983; Blume and Stambaugh, 1983; Dimson and Marsh, 1986; Fama and French, 1996). “In the presence of a size effect, event studies that focus on smaller firms are likely to register positive abnormal returns relative to the market index, even in the absence of an event; the opposite result would hold for larger firms” (Strong, 1992, p.548). Furthermore, the amount of information disclosed by a company to market participants and the extent to which a company is followed by information analysts has been found to be related to firm size (Al-Qudah, 1991).

Dimson and Marsh (1986) note that when the event window is small, any bias introduced (due to misspecification of the benchmark) as a result of the size effect is likely to be small relative to any event return and noise. It is also important to distinguish between a market-wide size effect on returns in the absence of an event and the effect of company size on the way in which the market reacts to any given type of corporate news. In this study we use a small event window and consequently we reject the necessity to control for size in abnormal returns. We also hypothesise that due to the nature of capital investment projects, the market reaction to capital investment news will be greater for smaller firms. This reflects the relative significance of such projects in creating future investment opportunities.

The coefficient for the log of company size is negative in all models in which it is included. There was no model for either cost reduction projects or for R&D projects where the log of company size was found to be significant. Company size was however found to be significant in models of the dataset as a whole, product/market diversification, and asset expenditure, as well as for the joint ventures. It is also notable that there was no model in which project size and company size were both significant. It would appear that in cases where project size is announced, it dominates other forms of information about the project. However, there was a significant correlation between the relative project size variable and the log of company size (-0.367) which indicates that there may be some overlap in the information provided by these variables.

The log of the market capitalisation is significant at the 1% level in models 2, 3 and 9 and at the 5% level in models 6 and 7, although the coefficients are small. This finding may be attributed to the size effect although the small impact of company size suggests that the size effect is not the major factor driving the results for the dataset as a whole. Capital investment announcements may also be more important for smaller firms and represent a more significant addition to the company's stock of investment opportunities. Hence it might be expected that markets would react more positively to such an announcement by a small firm than by a larger firm.

The proxy variable for company performance gives a significant coefficient at the 1% level in model 4 of R&D projects and at the 5% level in model 9 of joint ventures. In both cases the coefficient is positive and notably in model 4, a simple regression of abnormal returns for R&D projects against corporate performance gives an R^2 of 14%. There would appear to be some evidence here that recent earnings performance is an indicator of how the market will react to R&D announcements.

6. Conclusions

In this paper, market-adjusted returns have been analysed for a set of 402 announcements of capital investments by UK listed companies during the 1991-1996 period. Investment classifications are chosen from the literature on investment appraisal and a set of announcements chosen for each of the selected categories. Each of the categories chosen would be expected to exhibit a different pattern of cash flows and different levels of future investment opportunities.

The mean abnormal return of 0.87% for the set as a whole is consistent with previous studies and support the findings of McConnell and Muscarella (1985) who argue that the market response to changes in the capital expenditure budget is the result of new information about the firm's investment opportunities. The relative magnitudes of the abnormal returns for the investment classes analysed in this paper indicate that the market reaction to capital investment announcements may be driven by the underlying potential for creating follow-on investment opportunities. Classes of investments which are expected to create 'growth options' led, on average, to higher market-adjusted returns (2.01%) than investment in projects which exercised 'growth options' (0.23%). The conjecture that investment opportunities are an important determinant of market reactions to investment decisions is supported by evidence from cross-sectional regressions which suggest that abnormal returns are positively related to relative project size for projects that create new investment opportunities and negatively related to interest rates for projects that exercise existing options.

The cross-sectional analysis identified a number of significant influences on the market reaction to our announcements. The company size variable was found to be negatively related to abnormal returns and project size was found to be positively related to abnormal returns in a number of models. We also find significant relationships between abnormal returns and the market rate of interest and recent corporate performance.

In contrast to previous studies which have examined the shareholder wealth maximisation hypothesis (McConnell and Muscarella, 1985; Woolridge and Snow, 1990) or the institutional shareholders hypothesis (Woolridge and Snow, 1990), the

evidence presented here is more supportive of a wide range of market responses to capital investment. It is more credible that the market attempts to distinguish between good and poor investment decisions (Chan *et al*., 1995).

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Table 1

Sample characteristics

Project category	No. of announcements	No. of companies	Average (Maximum) no. of announcements per company	Average market capitalisation (£m)	Average project size (%)	No. reporting project value	Joint ventures
R&D	54	39	1.4 (5)	2383.2	6	12	47
Product/Market	92	75	1.2 (4)	2937.0	18	21	49
Asset Expenditure	225	143	1.6 (5)	2177.8	5	177	68
Cost Reduction	31	29	1.1 (2)	3574.1	4	17	3
Dataset	402	241	1.7 (7)	2486.8	6	227	167

This table shows the descriptive statistics for companies making investment announcements as reported on the London Stock Exchange Regulatory News Service. As discussed in Section 3, we classify the investment announcements into four mutually exclusive categories, based on the primary function of the project. These are: research & development (R&D); project or market diversification; asset expenditure to maintain or expand current line of business; and cost reduction projects. From left to right the table shows the project category, the number of announcements of company investment projects; the number of companies which made announcements; the average number of announcements per company (with the maximum number made by any one company in parentheses); the average market capitalisation of companies making investment announcements; the average size of the project as a percentage of the market capitalisation of the company; the number of companies reporting the value of the investment project and the number of projects within each category which were undertaken as joint ventures.

Table 2

Abnormal returns for investment announcements

Class	Cases	Mean	Median	StDev	Pos/neg	Min.	Max.
Dataset	402	0.0087**	0.0026**	0.0430	232/170**	-0.3020	0.3527
Create	146	0.0201**	0.0044**	0.0552	91/55**	-0.0708	0.3527
Exercise	256	0.0023	0.0013*	0.0327	141/115	-0.3020	0.2506
R&D	54	0.0220**	0.0057**	0.0582	35/19*	-0.0343	0.2626
Product/Market	92	0.0190**	0.0044**	0.0536	56/36*	-0.0708	0.3527
Asset Expenditure	225	0.0034	0.0014**	0.0331	125/100	-0.3020	0.2506
Cost Reduction	31	-0.0057	0.0009	0.0287	16/15	-0.1153	0.0257
Joint Ventures	167	0.0138**	0.0027**	0.0517	96/71	-0.0987	0.3527

This table shows (from left to right) the investment categories (including 'Create' which comprises the R&D and the Product market diversification categories combined and 'Exercise' which is the combination of the Asset Expenditure and Cost Reduction categories), the number of investments in each category; the mean abnormal return for each category of investment; the median abnormal return by category; the standard deviation of abnormal return; the number of positive and negative cases of abnormal returns; the minimum and maximum abnormal return. The Joint Ventures category consists of those projects (of all types) from the whole sample which were undertaken with one or more partners. ** denotes significance at the 1% level, * denotes significance at the 5% level. The two-tailed significance levels reported are for a t-test of the mean, a Wilcoxon test of the median, and a sign test of the proportion of positive vs negative abnormal returns.

Table 3

Regressions of abnormal returns

Model	Project category	Constant	LogS	JV	I	CP	PS	D1	D2	Adj r^2	F	n
1	total	0.0180			-0.1290*		0.4352**			0.1842	26.5134**	226
2	total	0.0256**	-0.0038**					0.0178**	0.0166**	0.0665	10.4796**	399
3	total	0.0308**	-0.0044**	0.0116**						0.0517	11.9238**	401
4	rd	0.0182*				0.0152**				0.1210	8.2951**	53
5	pm	-0.0007					0.1018**			0.7899	76.2128**	20
6	pm	0.0728**	-0.0087**							0.1211	13.2669**	89
7	ae	0.0383**	-0.0022*		-0.0030*					0.0348	5.0370**	224
8	jv	-0.0019					0.1028**			0.6345	125.9702**	72
9	jv	0.0560**	-0.0067**			0.0050*				0.0914	9.2446**	164

This table represents the results obtained from regressing event day abnormal returns on the log of firm size (LogS), a dummy variable if the project is a joint venture (JV), the UK 1 year inter-bank middle rate (I), recent company performance proxy (CP), relative project size (PS) and dummy variables for research and development (D1) and product/market diversification (D2). The dependent variable is noted as total (whole dataset), rd (research and development), pm (product/market diversification), ae (asset expenditure) or jv (joint ventures) alongside the model number. ** denotes two-tailed significance of a t-test at the 1% level, * denotes two-tailed significance of a t-test at the 5% level.

Notes

[1] Chan *et al*. (1990) dichotomised their sample such that low technology firms were those firms which compete in industries in which innovation and R&D investment are less important.

[2] The categories selected may contain an implied difference in the duration of the investment. Revenues are likely to be generated more quickly by the projects which provide simple 'growth options'. However, the actual time-scale of project returns is not observable.

[3] In order for a project to be included in the study there must be evidence of an expenditure or commitment of resources to a particular undertaking. In the case of cost reduction projects this meant that the simply cutting costs by means of job losses did not qualify as a cost reduction project.

[4] Oxford Dictionary of Current English, 1994.

[5] The dataset was identified from various categories in the Extel database. The Extel categories selected were activities, assets, commercial operations, diversification, exploration findings, joint ventures and operations. Each announcement normally offers at least a paragraph of information which represents the whole text provided to the Stock Exchange Regulatory News Service by each company.

[6] The results of the market adjusted returns method were compared with the results of several other models including the market model using a beta calculated by making trade-to-trade adjustments. This method was not reported due to the large amount of data which is lost due to the limited observations available to estimate alphas and betas. There was no significant difference between the results of the various models except in cases where alphas and betas were estimated from very few observations. Abnormal returns and significance tests calculated using the market model, a trade-to-trade adjusted market model and a trade-to-trade adjusted index model are available on request from the author.

[7] The Kolmogorov-Smirnov Goodness of Fit Test which showed that the distributions of the dataset as a whole and each investment class does not conform to a normal distribution. Examination of a histogram suggests that the distribution is leptokurtic (clustered around the mean with long tails). Thus the use of the t-test alone might result in misleading significance levels. However, Dyckman *et al*. (1984) report that t-tests are unlikely to lead to the rejection of the null hypothesis for leptokurtic distributions when it is true (Type 1 error). Consequently, in addition to the conventional t-test, a non-parametric Wilcoxon test of the median was used to determine the significance of abnormal returns.

[8] The set of joint venture announcements comprised of announcements from each of the four categories used in the data selection process. The number of announcements from each category is given in Table 1.

[9] The Burton *et al.* (1999) study, which uses a sample comprised almost entirely of asset purchases, divides the investments into joint ventures, immediately cash generating and non-immediately cash generating. This categorisation which Burton *et al.* describe as 'admittedly arbitrary' may contain announcements which would be classified as asset expenditure or product/market diversification. This difference in categorisation between this study and that of Burton *et al.* may account for some of the differences in cross-sectional significance.