What Makes a New Business Start-Up Successful?*

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ABSTRACT. This paper seeks a good measure of new business performance, and then explains this measure by various dimensions of business strategy. Three criteria are used to create a one dimensional ordinal ranking of high, medium and low performance for new business starts: employment growth; return on capital employed; and labour productivity. It is shown that statistical cluster analysis provides a convincing separation of a sample of new business starts into high, medium and low performance categories, using a minimum distance criterion for clustering. An ordinal logit model (with selection) is then used to explain this performance ranking. The results indicate that many widely discussed features of small business strategy have little, or even negative, impact on performance. Of the numerous aims that owner managers may adopt (survival, growth etc.), only one appears to have a major impact on performance; the pursuit of the highest rate of return on investment. Many entrepreneurial perceptions of their own capabilities appear false or unimportant, with the exception of organisational features and systems.

1. Introduction

This paper asks how best to measure in a simple fashion the performance of new business starts. It then enquires into those dimensions of business strategy that best explain this performance. It examines ways of gauging the performance of new starts using multiple criteria that are then mapped into a one dimensional ordinal ranking of high, low and medium performance. These multiple criteria are: employment growth; return on capital employed; and labour productivity. It is demonstrated that statistical cluster analysis provides a convincing separation of a sample of new business starts into high, medium and low performing categories, using a minimum distance criterion for clustering.

An ordered logit model (with selection) is then estimated to explain this performance ranking, using data on small business strategies, gathered by face to face interviews with entrepreneurs. The results of this estimation indicate that many widely discussed features of small business strategy have little, or even negative, impact on performance. For example, neither the construction of a business plan, nor having been financed by a grant or subsidy, appear to enhance performance. Of the numerous aims that an owner-manager may adopt (survival, growth, long-term/short-term profit etc.) only one appears to have a major positive impact upon performance, namely the narrowly economic one of the pursuit of the best rate of return on investment. Owner-managers' perceptions of their relative strengths seem to indicate an immaturity of judgement, suggesting entrepreneurial learning is indeed important close to business inception. The most realistic entrepreneurial perception seems to be of the organisational features and systems that have been created in the start-up business.

The overall empirical picture that emerges is that it is certainly possible to provide a coherent one-dimensional yardstick of 'business performance' despite its underlying multi-attribute qual-

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ities. However, few of the business strategies discussed in the literature were found to have a positive impact upon performance. By contrast, the economist's narrow criterion of seeking the best return on investment has a positive and significant impact on performance. This paper develops these conclusions by: (a) discussing the primary source data upon which the analysis is based; (b) considering how cluster analysis can be used to reduce a multi-attribute view of small business performance to a one-dimensional ordinal scale or ranking; and (c) reporting on an ordered logit model with selection which is estimated to explain this derived ranking of businesses by performance.

2. The data

The data used in this study are a subset of a large database being created on the life cycle experience of one hundred and fifty new business starts over a four year period. Data were collected by face to face interviews with owner-managers of small entrepreneurial firms. All were contacted through Directors of Enterprise Trusts in Scotland, and representative samples of contacts were provided from client lists in eighteen areas.[1] Interviews were conducted using an administered questionnaire that covered the agenda of markets, finance, costs, business strategy, human capital, organisation and technical change. This paper largely draws on the business strategy section for the construction of the ordered logit estimates, and the market and financial sections for the cluster analysis.

The areas considered in the section on business strategy included planning, aims, decision-making, strategy formulation, financing, customer relations, trade intelligence, information technology, and quality. A 'strengths, weaknesses, opportunities and threats' (SWOT) analysis, over dimensions like adaptability, foresight, product quality, specialist know-how and innovativeness, was undertaken using entrepreneurial responses. Answers to questions were generally coded as real, binary (0, 1) or categorical (1, 2, 3 . . .) variables.

Table I provides a listing of all the variables used in this article. Most of the variable names are self-explanatory, but detailed definitions are given in the Appendix. The table provides means, standard deviations and the range (min, max) for attributes of the 150 firms in the sample. Some of the variables are binary or categorical variables. If the former, the mean can be taken as a percentage representation in this sample. Thus 70% of the firms advertised (*Advert*), 32% had a bank loan or overdraft (*Bankloan*), 73% had received financial support in terms of a grant or subsidy (*FinGrnt*) at start up and 5% had outside equity participation (*OutsideEquity*). Most of the continuous real variables had distributions with a positive skew. This was true, for example, of size variables, like net fixed assets in year 1 (*Assets1*), and sales in year 1 (*Sales1*). Thus whilst mean net assets in year 1 were £18.8 thousand, the maximum value was £400 thousand; and whilst average sales in year 1 were £23.4 thousand, maximum sales were £9.6 million.

In terms of general features[2] of the database, the firms examined were young (1 1/2 years), small (3 full-time employees), and operated in a local market. The full range of sectors by SIC was represented, running through from domestic services (99) to agriculture and horticulture (01). The best represented SICs were: 49, other manufacturing industries (9%); 50, construction (9%); 64/65, retail distribution (9%); 83, business services (15%); and 96, other services provided to the general public (7%). Thus the modal firm supplied a business service. In terms of the overall split between services (SIC 61–99) and extractive/manufacturers (SIC 01–60) the split is 55% for the former and 45% for the latter, which reflects the balance of services over manufactures in the macro-economy.

There is purpose to be served by exploring the extent to which the sample is representative of Scottish firms in general, and the level of confidence that can be had in the statistical inferences made throughout this work. First of all, 150 firms are certainly a sufficient number to constitute a statistically 'large' sample, as defined, for example, by small sample distribution theory.[3]

Second, recent figures released by Scottish Enterprise (1996) suggest that the sample corresponds very closely to the much larger picture of new Scottish firms in the 1990s. For example, by legal form, the 1993–1994 sample of 150 firms used in this study comprised 26% sole traders

TABLE I
Mean, standard deviation and range of each variable

Variable	Mean	Standard deviation (σ)	Min	Max
Advert	0.7	0.46	0	1
Age	20.79	15.97	0	132
Assets1	18759.24	42485.99	0	400000
Bankloan	0.32	0.47	0	1
Busplan	0.89	0.31	0	1
Employ1	6.4	14.70	1	157
Faith	2.69	0.59	0	3
FinGrnt	0.73	0.45	0	1
Ftime	2.8	6.44	0	46
Gearnow	168.94	388.27	0	2667
Gearst	157.53	334.50	0	1875
Grant	0.79	0.41	0	1
Grfixass	24478.7	45588.2	0	400000
Hrswk	57.85	18.38	0	126
Impact	15.47	18.97	0	120
AltUnemploy	0.26	0.44	0	1
GetRich	0.07	0.25	0	1
FamilyBus	0	0	0	0
ProfitHobby	0.09	0.28	0	1
BeOwnBoss	0.19	0.39	0	1
NeedAchieve	0.26	0.44	0	1
Inbusin	0.81	0.39	0	1
Innovativeness	2.25	0.86	0	3
ITemail	0.12	0.32	0	1
ITCell	0.42	0.50	0	1
AimSurvive	0.17	0.37	0	1
AimHighROR	0.09	0.28	0	1
Managers	1.19	1.27	0	3
Netprof1	13554.98	28879.37	–50000	151000
Organisation	1.59	1.06	0	3
OutsideEquity	0.05	0.23	0	1
Owncash	13013.81	29855.38	0	250000
Plant	1.79	1.01	0	3
Quality	2.79	0.57	0	3
Range	2.37	0.91	0	3
Sales1	233513.4	851644.3	0	9600000
SecondarySchool	4.75	1.14	2	7
SmallerProfits	0.89	0.31	0	1

working from home, 29% sole traders operating from business premises, 19% partnerships and 27% private limited companies. The Scottish Enterprise figures for 23,000 new firms in 1996 give sole proprietorships at 48%, partnerships at 21% and limited companies at 30%.[4] The categories, although slightly different, show clearly that there is a high similarity of breakdown by legal form between the two samples.

The division by sector is a slightly more contentious issue, but is nonetheless still worth addressing. Scottish Enterprise state that 68% of new businesses in Scotland in 1996 were in services, compared to 64% in this study [see Smith (1997, Ch. 4)].[5] Figures from the Department for Education and Employment suggest that, for the UK as a whole, "service sector firms represent just over 70% of all small firms in the economy" [*Labour Market Quarterly Report* (1996, p. 11)].[6] However, it is often very difficult to classify firms by sector, as it is the product, and not the business, to which the SIC applies. Some firms, offering different products or services, may be identified by two or more sectors, and it is not uncommon for

firms to fall into both the services and manufacturing divisions.

The focus of this work is not on identifying individual strategies associated with the many varied sectors into which small firms fall. Indeed, such a task would be time-consuming and arguably futile. Instead, the study aims to identify generic strategies which may be applied equally to any young micro firm. This should prove more useful to policy makers, for example, who cannot possibly afford the time or money required to create policies for each class and type of small firm but, instead, are looking to devise incentives and assistance that can apply to any new young business.

In terms of legal form and industrial classification, there can be relatively high confidence that the sample is representative of Scottish firms, although admittedly there may be slight bias towards firms with greater start-up support. For example, this study uses the Enterprise Trusts for the sampling frame, and the Scottish Enterprise figures are based on bank records, both of which show that the firms in question had either advice or financial support available to them from an early stage. However, it may be that the regime in Scotland is currently very supportive of new businesses generally [see Reid (1999b)], and it is cheering to note the similarities, given the difference in sample size (*viz*. 150 compared to 23,000). It is with some confidence, therefore, that the sample is used to provide a representation of new micro firms in Scotland in the early 1990s.

Turning to the performance variables utilised in the cluster analysis, the relevant variables for constructing various ratios were: total number of employees[7] or 'head count' (*Employ*); net profit (net of taxes, VAT etc.) (*Netprof*); the owner-manager's personal cash injection at start-up (*Owncash*); and the gross annual sales, based on the latest estimates (typically the last tax year) (*Sales1*). Two of the performance variables were constructed using data from a second round of interviews with entrepreneurs, which took place a year after the first round. There was a high survival rate of new starts, with 81% staying in business until the second year. The issue of sample selection bias therefore arises in the estimation of the ordered logits, and we report upon ways of handling this later in the paper.

3. Performance ranking

There is no unique way in which the performance of a business can be evaluated. One approach to performance evaluation is entirely relativist. It asks what goals a firm has set, and then enquires into the extent to which these goals have been achieved. The problem with this approach is that it neglects the important fact that performance evaluation can never be divorced from the market nexus. It is true that a variety of utility-based views of the firm, embracing various types of managerialism, for example, can be construed as underpinning this relativist view of performance.[8] However, ultimately, the firm has to pass the long-run test of economic survival; and bundles of relatively mobile combinations of finance capital and labour will tend to seek best alternatives. Both these factors undermine a more self-referring or relativist view of performance. Even if a life-style based firm fully met its life-style performance goals (e.g., in terms of hours worked, hiring of family members, or adherence to traditional production methods), economic failure of the firm, especially if it involved financial distress or insolvency, would nullify the performance significance of its having fulfilled life-style targets.

For this reason, this paper uses what may be termed 'objective' measures of performance, selecting a trio of measures that are widely used for performance evaluation: employment growth, rate of return, and productivity. This method may be contrasted not only with the relativist method above, but also with the subjectivist method. The latter is based on skilled judgements of performance, with those making the judgements being allowed to appeal to any such evidence, qualitative or quantitative, that they may have at their disposal. This approach is often applied when data are incomplete or subject to considerable measurement error, and are part of a complex and dynamic setting which limits the efficacy of simple numerical indices of performance, because they are unavailable, irrelevant or unimportant. An example of the application of this method is the performance evaluation of joint ventures between Greek and Eastern European partners reported upon by Salavrakos (1996). In this case, subjective evaluations of performance on a five point scale were made by joint venturers during inter-

views because, amongst other things, incomplete, missing, or highly-imperfect markets in these territories ruled out using conventional financial ratio measures of performance, which hinge upon the existence of complete markets which are highly competitive.

For the purposes of this paper, there were many potential performance indicators available; but the problem we confront is not one of paucity of data, but rather of separating the wheat from the chaff. Here we seek a measure of performance after business start-up which is: *objective*, in that it appeals to well-defined measures of performance; *parsimonious*, in that it provides an efficient aggregation of a variety of measures into a simple ordinal rank; and *plausible*, in that the ranking thereby derived bears a credible relationship to the wider body of evidence one gathers by field work methods. Some of the latter evidence is objective, but not reducible to indices, and some is subjective (like perceptions of the morale of the workforce, or the drive of the entrepreneur). Both are, nevertheless, potentially important in reaching a sound judgement about business performance.

4. Cluster analysis

The technique used for developing an ordinal ranking of firms into low, medium and high performance was hierarchical cluster analysis.[9] The data for clustering may be considered to be an $N \times K$ matrix of measurements X with typical element x_{ij}, which is the magnitude of the j'th measurement ($j = 1, \ldots K$), like profitability, on the i'th firm ($i = 1, \ldots N$). The measure of distance d_{ij} between observations i and j is the Euclidean metric:

$$d_{ij} = \left\{ \sum_{k=1}^{K} (x_{ik} - x_{jk})^2 \right\}^{\frac{1}{2}},$$

where x_{ik} is the value of the k'th variable for the i'th firm. As Euclidean distances are very sensitive to scales of measurement, variables are standardised[10] before using the Euclidean distance. The clustering method due to Ward (1963) is adopted, which merges clusters which contribute the least to the overall sum of the squared within-cluster distances. Clustering proceeds by finding the closest pair of clusters, combining them into a new larger cluster, and then computing the distance between this and the other remaining clusters. The process starts with every firm treated as a single cluster, so the first new cluster will be a two-firm cluster, and the next may be a two-firm or a three-firm cluster, and so on. Clustering ceases when the final two clusters have been combined, so all the data are in one cluster.

A variety of performance measures was used in the exploratory cluster analysis,[11] and the finally adopted set of three were: employment growth (*Employment Growth*); profitability (*Profitability*); and productivity (*Productivity*). These three measures of performance were available for all 150 firms in the sample. *Employment Growth* shows the percentage change in total employment from year one to two, which serves to give an indication of the investment by each firm into the tools by which it carries on its trade (*viz.* its workforce). A negative figure for *Employment Growth* would indicate that staff cut-backs had been made, possibly because business was slack; whereas a positive figure would suggest that business was going well, and more people were required to carry out the increased workload.[12] A positive result for this variable therefore suggests good performance because an increase in expenditure on staff generally follows an increase in business (i.e. sales), leading to further expected future growth. Storey (1994, p. 112) points out that small firms that "plan to and achieve rapid growth in employment [are] of interest [because] they are the major providers of new employment within the small firms sector, . . . they are likely to purchase a wide range of financial services, . . . [and] they are much more likely to be seeking a wide range of advisory services than is the case for firms experiencing modest growth or no growth at all".

A further indication of business performance, and one that will be of interest to many small business owner-managers, is one that can assist those who hold a stake in the business in assessing the value and quality of the investment they have made. Ansoff (1965, p. 42), for example, suggests that "rate of return on investment is a common and widely accepted yardstick for measuring business success . . . [and] for comparison of business prospects in different industries". An accounting ratio that measures such a return is the Return on Capital Employed, or ROCE. The variable

Profitability is an approximation of this ratio, and measures the net profit earned by the business divided by the amount of financial capital injected by the owner-manager at the start of trading. A high figure here would represent a high return on the owner-manager's investment, and therefore is taken to be an indication of good performance.

The third and final variable upon which the clusters are based is *Productivity*. Similar to *Profitability* in that it represents a return on inputs to the production function, *Productivity* measures the amount of turnover in year one that can be attributed to each employee; in other words, it is turnover in year one divided by total employment in year one. *Productivity* is one indicator of the efficiency of the business in converting effort (in cooperation with other firm resources) into sales. The higher the value of this variable, the greater the sales attributable to each employee, which may be interpreted as a greater measure of productivity within the business. With the exception of *Productivity*, which is based only on year one data, the other two performance indicators are only defined for surviving firms. Thus *Profitability* and *EmploymentGrowth* are set equal to zero for non-survivors. Thus *Productivity* is the prime performance indicator for non-survivors.

Small firms are very distinct from other organisations. For example, the owner-manager is very personally involved and has often put personal investment/has family employed, so his aims are varied and multiple, rather than the traditional idea of a profit-maximising organisation with one sole objective. So the performance measure was chosen to reflect the (observed) aims/goals of the owner-managers of these firms *viz.* growth in employment (e.g. for family/fulfilment), return on their personal investment, and high productivity per member of staff, given the often necessary requirement to keep down labour costs. We must also stress that the performance index was developed subsequent to the data gathering on behaviour, in order to see how well early behaviour and appraisal was reflected in performance level, and that we have a performance measure which is to some extent dynamic, using growth between years, and return on earlier capital injected.

Other performance measures which were used in trial clusters included staying in business,[13] employment growth, asset growth and the profit to sales ratio. These generally picked out a similar set of high-performing firms, which varied only very slightly as a proportion of the sample (about 7%). There was greater, but still not extensive, variation in the composition of medium and low performing clusters.

Perhaps the main difficulty is in deciding whether or not the clusters obtained do actually describe the relationships desired. Everitt (1974, p. 45) describes clusters as 'continuous regions of . . . space containing a relatively high density of points, separated from other such regions containing a relatively low density of points'. For the firms under investigation in this work, a three-dimensional scatter plot of the clusters showed that the high performers stood out quite clearly from the rest.

Another problem lies with the choice of variables. As was mentioned previously, many different combinations were tried, but the three variables settled upon gave the best and clearest results. For one thing, data were available for each of the 150 cases. For another it was felt that the variables selected gave as good an indication of performance and measurement of growth as it would be possible to obtain using such methods.

Finally, as regards clustering, a simple analysis of the figures is sometimes not enough to assure the investigators of the validity of the clusters. Some element of subjective judgement must also be applied to decide which of the three clusters is indeed the high, or medium or low performance group. Firms from each cluster were identified by name, and the two main investigators who had first-hand knowledge of the businesses through face to face meetings, were agreed that the firms could legitimately be grouped into the three categories given, with no apparent anomalies.

Thus in viewing the rankings generated by the various cluster runs[14] reference was also made to the wider body of field work evidence and experience of the authors (e.g. in face to face interview), for checking that statistical procedures were not at variance with field work judgement.[15]

The conclusion reached was that the clusters which were generated accorded well with more general judgements of performance of the sampled small firms in their start-up phase of the life-cycle. The final set of clusters adopted can be displayed by a dendrogram [Norusis (1994, pp. 91–93)],

where the top three levels of clusters can be identified as high, medium and low performance firms. It was found that the primary split was between high performers and the rest. The rest were then split into medium and low performers. Individual case numbers were then used to refer back to schedules, field notes and other evidence gathered during interviews, for the purpose of confirming the general plausibility of the clusters generated by the dendrogram from the standpoint of richer data.

There are 91 (61%) of firms in the low performance category, 49 (33%) in the medium performance category, and 10 (7%) in the high performance category. It is of interest to examine the performances of each firm group (Low, Medium, High) for the three underlying measures, employment growth (*EmploymentGrowth*), return on capital employed (*Profitability*), and labour productivity (*Productivity*), from which the ranking was produced by cluster analysis.

We chose deliberately to stop the clustering at three groups for several reasons. First, we wanted to leave enough observations in each performance category to allow statistical inferences to be made.[16] Further, a categorical measure was required for the technique employed – we wanted to sift out the 'gazelles' from the pack; and to identify better performers (i.e. medium performers here) as distinct from the 'average' or lower performers (the majority). Our findings too are consistent with other literature that has examined the percentage of very high performers in any sample of small firms [e.g., Storey (1994)]. Finally, the focus of the paper is primarily on the higher performers, and these are clearly distinct from the rest.

The relevant means and standard deviations for each variable are related to performance rank in Table II. On average, the low performers experienced employment contraction. Whilst the shedding of labour might be a sign of searching for efficiency, with a view, for example, to raising labour productivity, this seems not to have been the case here,[17] in that low performing firms also had the lowest labour productivity in terms of sales generated per employee (just £15,000, as compared to £32,000 and £128,000). Viewing the table overall, for each performance measure the magnitudes are ranked according to the general performance ranking generated by cluster analysis. It is to be noted that the high performers are especially impressive in terms of our measure of labour productivity. Here, their performance advantage over both medium and low performers is particularly marked. This accords well with observations recently made by David Birch (1996)[18] that there is a strong tendency for the bulk of small firms to generate similar levels of sales per employee, with a considerably smaller percentage (< 10%), which he called the 'gazelles', generating very much higher sales per employee. It should be noted that the return on the capital employed variable was rather narrowly defined, though certainly in a way that appeals to entrepreneurs. It related the second year's net profit to the entrepreneur's limited financial injection in the first year.[19] Whilst there is a slight average performance advantage of the medium over the low performers, the high performers do remarkably better on this yardstick. In

TABLE II
Mean values for performance variables used in cluster analysis, cross classified by performance rank

		Low performers n = 91 (= 61%)*	Medium performers n = 49 (= 33%)*	High performers n = 10 (= 7%)*
EmploymentGrowth	Mean	–6.04	76.72	97.92
	(St. dev.)	(18.10)	(63.65)	(199.49)
Profitability	Mean	117.47	136.88	1,036.14
	(St. dev.)	(349.93)	(262.79)	(2,236.01)
Productivity	Mean	15,120.70	32,007.52	127,550.30
	(St. dev.)	(9,989.40)	(23,950.07)	(59,272.27)

Note: * There are some small rounding errors in percentages.

interpreting the evidence on this performance variable (*Profitability*), all of which looks favourable, it should be borne in mind that owner-mangers' financial injections are not the only source of finance capital for the small firm (e.g., other sources, like bank finance, are common, and outside equity is not unknown).

In Table III, a wider body of evidence is brought to bear on the performance rankings. It should be made clear that the variables in Table III were not used to construct the performance rankings by cluster analysis *but that nevertheless, using a variety of measures, the performance ranking is consistent*. *Inbusin* is unity if the firm

TABLE III
Mean values for additional descriptive variables, cross classified by performance rank

		Low performers n = 91 (= 61%)*	Medium performers n = 49 (= 33%)*	High performers n = 10 (= 7%)*
Inbusin	Mean	0.75	0.90	1.00
	(Std dev.)	(0.44)	(0.31)	(0.00)
Age	Mean			
	(Std dev.)	20.18	20.37	28.50
		(17.83)	(10.68)	(19.15)
Assets1	Mean	17,154.73	13,891.25	66,017.88
	(Std dev.)	(32,470.95)	(20,636.60)	(135,564.05)
Assets2†	Mean	23,135.19	37,047.56	31,400.75
	(Std dev.)	(46,014.64)	(86,403.83)	(36,172.94)
Employ1	Mean	5.20	8.06	9.20
	(Std dev.)	(6.90)	(23.28)	(13.18)
Employ2†	Mean	3.27	12.63	4.80
	(Std dev.)	(6.20)	(44.34)	(3.61)
Sales1	Mean	94,729.05	192,599.43	1,556,075.00
	(Std dev.)	(180,129.44)	(371,865.10)	(2,892615.86)
Sales2†	Mean	130,902.85	256,321.02	760,475.38
	(Std dev.)	(228,614.09)	(520,141.26)	(721,130.70)
Netprof1	Mean	7,873.29	21,695.11	23,000.00
	(Std dev.)	(15,613.83)	(39,583.89)	(44,774.43)
Netprof2†	Mean	12,802.54	8,559.92	53,050.50
	(Std dev.)	(41,024.27)	(17,832.35)	(50,607.31)
Owncash	Mean	10,817.30	15,309.46	24,250.00
	(Std dev.)	(24,475.76)	(37,650.43)	(34,602.85)
OutsideEquity	Mean	0.04	0.06	0.11
	(Std dev.)	(0.21)	(0.24)	(0.33)
Bankloan	Mean	0.27	0.39	0.44
	(Std dev.)	(0.45)	(0.49)	(0.53)
Grant	Mean	0.78	0.82	0.67
	(Std dev.)	(0.42)	(0.39)	(0.50)
Gearst	Mean	165.92	136.13	188.78
	(Std dev.)	(359.83)	(290.27)	(322.54)
Gearnow	Mean	182.46	167.40	43.33
	(Std dev.)	(371.95)	(450.28)	(77.87)

Note: * There are some small rounding errors in percentages.
† Computed on smaller sample size of 122.

stays in business or zero otherwise (see Appendix for this and other definitions). If survival is to be regarded as a measure of performance, then the twenty-five per cent failure rate of low performers, ten per cent failure rate of medium performers and zero per cent failure rate of high performers is strong corroborative evidence for the performance rankings adopted. However, merely surviving is not necessarily an indicator of good performance, nor is non-surviving necessarily an indicator of poor performance (e.g. if firms had always intended to rapidly exploit a small niche profitably, and then to liquidate). Nevertheless, *on average*, the non-survivors are low performers on other measures such as profitability. The ages of the low, medium and high performers differ by no more that nine months. Low performers and medium performers have almost identical ages on average (20 months), and though the average age of high performers at 8.13 months above medium performers is statistically significantly[20] higher, this effect has doubtful economic significance, certainly not enough to explain the markedly better performance on sales, for example, of high performers.

In the first year, ranking by assets did not quite accord with the performance ranking, though it did in the second year. Size by employment accorded with performance rank in the first year, but not in the second. The second year saw both low and high-performers down-sizing, though presumably for quite different reasons; in the first case to avoid failure, and in the second case to promote efficiency. Sales in the first and second years are ranked according to the performance ranking, with the superiority of the high performers being particularly evident.

Turning to the financial variables at the bottom of Table III, in the first year net profit averages accorded with the performance ranking, though these figures differed little. By the second year, the medium performers appear to have a lower net profit than low performers, though high performers do very much better than both, on average.[21] It may be that there is a measurement problem here, with regard to net profit, arising because medium performers are more likely than low performers to net out salaries (including managerial salaries) from profit.[22]

According to the performance ranking cross classification of Table III, the better the performance, the greater the cash committed by the owner-manager at inception, the greater the access to outside equity, and the greater the access to bank loans. These findings accord well with financial theories of the firm.[23] The greater the prospective value of the enterprise, the more willing is the entrepreneur to commit cash at inception. Further, the greater the availability of cash to commit in this way, the higher is likely to be the human capital embodied in the entrepreneur. A signalling of the quality of new start-ups in this way is more likely to attract outside finance capital in both debt and equity form. Thus, for example, the high performers have 11% outside equity and 44% bank loan involvements, whereas the low performers have just 4% and 27%, respectively.

The interpretation of gearing (i.e. debt/equity) ratios is more troublesome. Whilst gearing is regarded as essentially arbitrary in some traditional areas of large firm finance,[24] in small firm finance, where bankruptcy considerations are distinctly non-trivial, higher gearing is associated with risk exposure and a tendency to debt-servicing crises, especially during downswings of the business cycle. At start-up, low, medium and high performers were all highly geared (*Gearst*), with the highest geared on average (at 189%) being the high performers. However, by the time of the first year interview, gearing (*Gearnow*) had fallen drastically for the high performing group (to an average of just 43%) and had risen for both the medium and low performing group. For *Gearnow* the magnitudes accord with a small firms view of financial performance, with lower gearing being associated with better performance [cf. Reid (1991)]. The fact that, for initial gearing, *Gearst*, all ratios are well above unity (suggesting debt is not fully collateralised) is indicative of a generally perceived high quality of business start-up on the part of lenders. At inception, their willingness to permit very high gearing is both rational and encouraging, in view of previously held opinions that banks are excessively (indeed irrationally) cautious in their approach to small business financing.

Finally, the *Grant* variable denotes whether a firm received a financial grant or subsidy at inception. How grants are awarded, and their aims, do not necessarily tally with the dictates of

the market, or the imperatives of business strategy. However, the assumption is that they are, in some sense, a positive instrument of the social market economy. The evidence here is that the high performers had the least involvement with grant support, on average, though the level of support involvement was generally high, across the board.

To conclude this section, it is apparent that the cluster method of this section, which used just three performance measures (thus satisfying the principle of parsimony), has produced a ranking of businesses which accords well with diverse other attributes of the same businesses which, however, were not themselves used in the cluster analysis itself (thus satisfying the principle of efficacy). Further, the rankings accord well with collateral evidence of both the qualitative and quantitative variety, gathered during field work and interviews with entrepreneurs. Overall, therefore, we have considerable confidence in our performance classification, and the method by which it was derived. The last and most important task remains of explaining the ranking of performance by the business strategies deployed by owner-managers.

5. Explaining performance rank by business strategy

There are two alternatives one can take to explaining performance rankings. The first is to devise some numerical measure which assigns a firm to a particular performance class, and then to seek to explain this measure (i.e. the position of a firm within a rank class) by a set of exogenous variables. The second is to seek to explain the rank class alone, implying a categorical dependent variable of the form (0, 1, 2, . . .). We prefer the latter approach, and it is on this that the latter sections of the paper is based. We observe that whilst the split between high performing and medium/low performing firms is quite sharp and stable using cluster analysis, this is less so of the split between medium and low performers. The composition of firms within these bottom classes do vary slightly, given different cluster methods (e.g. by choice of metric) or different performance variables (e.g., ceasing/continuing trading). Further, the ordering of cases (firms) given in a dendrogram is not necessarily directly mapped into a performance index.

For these reasons, we prefer to take the path of apparently abandoning some relevant sample information in seeking an explanation of performance. An advantage of doing so is that the subsequent statistical analysis has a much stronger bearing on policy issues. In a policy context, a simple trichotomy of low, medium and high performance, which has evidently close links to other features of the firm's behaviour (as is evident from Table III), and is robust under within-cluster ordering, is understandable, appealing, and non-controversial. It immediately invites the question: what explains which new start-up will become a low, medium or high performer? We conclude by offering an answer to this question in terms of the business strategy adopted by the entrepreneur.

It is apparent that two of the performance measures, return on capital employed (*Profitability*) and employment growth (*Employment-Growth*) link time together in a meaningful way. This is a desirable property of a performance measure, introducing as it does a dynamic element. However, as it limits the potential sample size to those that survived into the second period,[25] the base period measure of performance, labour productivity (*Productivity*) allows us, with some adjustment, to construct performance ranks for all 150 firms. In performance evaluation one also has to take into account the problem of selection bias (or, strictly speaking, inconsistency) arising from the fact that the second period survivors are, in at least some senses, the better performers.

Ordered logit model with sample selection

The statistical model appropriate to this combined set of problems, of an ordered dependent variable (performance) and selection bias (caused by survivor superiority), is the ordered logit model with sample selection.[26] Fundamental contributions to selectivity bias are Lee (1982, 1983); and influential papers on ordered logits are Beggs et al. (1981) and Becker and Kennedy (1992). This model has the following form: $z = \beta' x + \varepsilon$, where ε is unit normal, and z is not observed but rather y, which assumes the values 0, 1, 2 according to threshold intervals (determined by a parameter μ) within which the values of z lie. In the current

context, the x are control variables measuring features of small business strategy (like the use of a business plan, and the decision-making time horizon), z ('true' performance) is unobserved, and y is our performance variable, *Perform*, which takes on values 0 for low performance, 1 for medium performance and 2 for high performance. As only some firms survive, and they may be better performers, to this is added a selection mechanism of the form $w_i^* = \alpha' x_{i2} + u_i$ where the cumulative distribution of u_i is logistical and $w_i = 1$ if $w_i^* > 0$, and zero otherwise, this being a univariate logit model. To complete the statistical specification we add that y_i is observed if, and only if, $w_i = 1$; that is, we only know the performance rank of the survivors. The joint distribution of ε and u is assumed to be bivariate standard logistic (mean 0, standard deviation 1.81 approx.) with correlation coefficient ρ. The model is estimated by starting with a first stage logit model, to estimate and hold a correction term, and then the ordered logit is estimated with the selectivity correction included. Final round estimation is by full information maximum likelihood (FIML) using the Davidon-Fletcher-Powell algorithm.[27] The selection model is estimated first by ordinary least squares and then by maximum likelihood. The ordered logit is estimated first as though there were no selection, to generate initialising values, and then by full information maximum likelihood, jointly estimating α, β, ρ and the threshold parameter μ. Examples of such estimates are given in Tables IV and V below. The coefficients are reported along with standard errors, standard normal values, and probability values. As the dependent variable *Perform* is defined as $y = 0$, 1, 2 and the lowest threshold value μ_0 is defined as zero, only one threshold parameter (μ) is to be estimated. The log likelihood for the full model is reported in each table, as is the error correlation.

The performance-strategy relationship

Turning now to the substantive content of the model, the main body of evidence drawn upon for explaining performance was the business strategy section of the administered questionnaire discussed in The Data section above. This part of the questionnaire aimed to take the earlier approach to small business strategy in Reid, Jacobsen and Anderson (1993) a stage further, as reflected in the later work of Smith (1998). In general, data were available for all of the 150 firms in the base period for explaining subsequent performance over the next period. Out method is explicitly econometric, but has its roots in David Hume's first three rules about 'necessary connection'. These are that: cause and effect must be contiguous in time and space; cause must be prior to effect; and there must be a constant conjunction between cause and effect.

Our first interest was in the role of business plans. We asked whether the owner-manager had a business plan (*BusPlan*) and found that 89% did, and that, of these, 79% had a formal, written plan. However, business plans are no longer a filter of ability, as perhaps they were in an earlier policy era of enterprise stimulation, and their construction now often assumes merely ritual status. Furthermore, modern theories of business strategy [cf. Mintzberg (1987, 1994)] emphasise factors like flair, imagination, drive and leadership just as much as formal plans, so this is a variable of interest. More important than the plan itself is the impact it may have in the future. We asked entrepreneurs how far they looked ahead in evaluating the impact that planned decisions might have, and found that this *Impact* variable had a surprisingly long mean value of 15 1/2 months; a much longer time than is suggested by some academic work,[28] and by policy critiques of independent businessmen, emphasising their supposed tendency to 'short-termism'. Why this *Impact* variable should be longer than expected intrigued us, and led us to seek and determine its consequences for performance.

Formal theories of entrepreneurship like Blanchflower and Oswald (1990), emphasise rational goals for establishing a new business, which may go beyond pecuniary considerations to a desire for autonomy or control. We therefore created an *Involve* variable in our questionnaire which was based on responses to a question which asked the entrepreneur for his or her *main* reason for becoming involved in the business, as follows: (a) as an alternative to unemployment; (b) to get rich; (c) to take over the family business; (d) to profit from a hobby; (e) to be your own boss; (f) to satisfy the need for achievement; (g) to exploit

a new market opportunity; and (h) something else. Unfortunately, only 11% said to exploit a new market opportunity and just 6% said to get rich, so the variables *NewOpportunity* and *GetRich* had limited statistical leverage in our sample. The modal choices were: as an alternative to unemployment (25%) (*AltUnemploy*) and to satisfy the need for achievement (25%) (*NeedAchieve*). These are commonly expressed, and widely discussed, reasons for small business involvement, especially in a relative performance framework. But we were enquiring into the consequences of these motives within an objective, absolute performance framework.

In a similar fashion, the entrepreneur was asked for the main single aim of his or her business from the following list: (a) survival; (b) short-term profit; (c) long-term profit; (d) growth; (e) increased sales; (f) increased market share; (g) high rate of return; and (h) other. The modal response for this *Mainaim* variable, which was intended to cast light on managerial theories of the firm as applied to small business enterprises, was long-term profit (30%) (*LongTermProfit*), followed by growth (20%) (*Growth*). Short-term profit (*ShortTermProfit*) was rarely nominated (1%), perhaps not surprisingly, given the doubt already cast on a short-termist view of small business management, but we wondered why high rate of return (*AimHighROR*) was infrequently nominated (8%), and sought to determine just how important this strictly pecuniary aim might be for performance. The results of this enquiry are recorded in Tables IV and V below.

Given the finding in Table III that high performers apparently had lower grant involvement at inception than lower performers, we were interested in more formally testing the significance of our *FinGrnt* variable, which was based on a question which asked whether the firm had previously been financed by a grant or subsidy. As evidence for a growth/profitability trade-off exists, even for small firms,[29] we asked entrepreneurs whether they were willing to accept smaller profits for a while, in order to expand the business (*SmallerProfits* variable). We were also interested, in view of a number of recent research initiatives, in the role of information technology (IT) in small business management, and whether or not its use led to objective, absolute performance enhancement. In view of the emerging importance of the Internet, we wished to examine the impact of email (*ITemail*); and the abundant evidence on increasing use of the cellular telephone (not all of it edifying) led us to ask what performance advantage, if any, it was bestowing on owner-managers (*ITCell*).

Finally, in the context of a SWOT analysis [cf. Johnson and Scholes (1993, Ch. 4)], we enquired into the impact that certain self-rated attributes of the business had on performance, including: faith in the business (*Faith*); plant and resources (*Plant*); managers (*Managers*); product quality (*Quality*); product range (*Range*); organisational structure/systems (*Organisation*); and innovativeness/new ideas (*Innovativeness*). We were aware from theories of entrepreneurship that emphasised the role of market-place experience [cf. Jovanovic (1982), Frank (1988)], especially shortly after inception, that we could not necessarily assume that self-rating by entrepreneurs was accurate or insightful in the early stages of the life cycle.

The estimates

Whilst we have considered above a good twenty or so variables which were included as control variables in an ordered probit, chosen because of their interest from a theoretical or empirical standpoint, they are but a small subset of the business strategy variables available to us, so our approach is highly selective, rather than comprehensive. The specification of the selection equation was based partly on experience with these strategy variables, but also on previous experience [*see* Reid (1999a)] in estimating models of small firm survival.

We may now turn to Table IV which provides estimates, based on an ordered logit model with selection, of the impact of business strategy variables of the sort discussed above on our performance variables (*Perform*). The model is run on a sample size of 150 firms. Typically, all 122 surviving firms made complete returns on data, and at least a partial performance indicator is available for the rest. For specific models which were run, sample sizes vary just slightly because of omissions in a small number of responses. The ordered logit is the key relationship here, being a type of

TABLE IV
Ordered logit model with selection (n = 150)

	Coeff. (b)	Std. error (se)	b/se	Prob.
Ordered logit				
Constant	0.41368E-01	1.5086	0.027	0.97812
Busplan	–0.82729	0.40280	–2.054	0.03999
Impact	0.96481E-02	0.45009E-02	2.144	0.03206
AltUnemploy	–1.3081	0.40940	–3.195	0.00140
GetRich	0.22035	0.47235	0.467	0.64085
ProfitHobby	–1.6967	0.59333	–2.860	0.00424
BeOwnBoss	–1.9715	0.46816	–4.211	0.00003
NeedAchieve	–1.3539	0.39373	–3.439	0.00058
AimSurvive	–1.1290	0.42561	–2.653	0.00798
AimHighROR	1.2705	0.34945	3.636	0.00028
Fingrnt	0.36754	0.32914	1.117	0.26414
SmallerProfits	0.98041	0.69650	1.408	0.15925
ITemail	–0.15094	0.20665	–0.730	0.46513
ITcell	0.15086	0.20661	0.730	0.46530
Faith	0.39466	0.31192	1.265	0.20578
Plant	–0.36002	0.12260	–2.937	0.00332
Managers	0.80463E-02	0.11829	0.068	0.94577
Quality	0.18678	0.26305	0.710	0.47768
Range	–0.13955	0.12835	–1.087	0.27692
Organisation	0.29753	0.11829	2.515	0.01189
Innovativeness	–0.36497	0.15692	–2.326	0.02003
MU(1)	2.7273	0.30181	9.036	0.00000
Selection equation				
Constant	0.45135	1.0637	0.424	0.67133
Impact	0.13260E-02	0.70614E-03	1.878	0.06040
AltUnemploy	–0.50580	0.34614	–1.461	0.14395
NeedAchieve	–0.52743	0.40211	–1.312	0.18963
Ftime	–0.16465E-01	0.71123E-01	–0.231	0.81693
Grsales	0.39356E-06	0.17394E-05	0.226	0.82100
Advert	0.78525	0.31897	2.462	0.01382
Bankloan	–0.37208	0.39021	–0.954	0.34032
Grant	–0.26904	0.41145	–0.654	0.51319
Gearnow	–0.14561E-03	0.34190E-03	–0.426	0.67019
Grfixass	0.10805E-04	0.98901E-05	1.092	0.27463
SecondarySchool	0.77153E-01	0.15526	0.497	0.61923
Hrswk	0.57155E-03	0.12570E-01	0.045	0.96373
Rho(1,2)	–0.15090E-06	0.92539	0.000	1.00000

Log likelihood function = –165.5986.

performance equation. It has a first pass R^2 of 0.21, with a probability value of 0.04.

As in previous work [cf. Reid (1999a)] it is found in the selection equation that advertising and forward planning have major positive effects on small business survival. As regards the ordered logit itself, the use of a business plan (*BusPlan*) seems associated with poor performance, but forward planning (*Impact*) appears to enhance performance, reinforcing the conclusion suggested by the selection equation. We conclude that merely writing a business plan now has little implication for performance. What counts is how you use that plan to look ahead, which may involve modifying actions.[30]

Most of the reasons, largely not market-driven, for getting involved in business have negative impacts on performance, and those that are likely

TABLE V
Parsimonious ordered logit model with selection (n = 150)

	Coeff. (b)	Std. error (se)	b/se	Prob.
Ordered logit				
Constant	2.4267	0.76156	3.186	0.00144
Busplan	–0.66290	0.35691	–1.857	0.06327
Impact	0.99201E-02	0.42364E-02	2.342	0.01920
AltUnemploy	–1.3208	0.32734	–4.035	0.00005
ProfitHobby	–1.7575	0.43364	–4.053	0.00005
BeOwnBoss	–2.0150	0.37167	–5.422	0.00000
NeedAchieve	–1.2842	0.34368	–3.737	0.00019
AimSurvive	–1.1881	0.34517	–3.442	0.00058
AimHighROR	1.2002	0.30482	3.938	0.00008
Plant	–0.38198	0.10073	–3.792	0.00015
Range	–0.14674	0.11766	–1.247	0.21235
Organisation	0.34625	0.11485	3.015	0.00257
Innovativeness	–0.24169	0.13201	–1.831	0.06713
MU(1)	2.6676	0.23862	11.179	0.00000
Selection equation				
Constant	0.45135	1.0552	0.428	0.66883
Impact	0.13260E-02	0.70595E-03	1.878	0.06033
AltUnemploy	–0.50580	0.34270	–1.476	0.13996
NeedAchieve	–0.52743	0.39720	–1.328	0.18422
Ftime	–0.16465E-01	0.70601E-01	–0.233	0.81560
Grsales	0.39125E-06	0.16894E-05	0.232	0.81685
Advert	0.78528	0.31500	2.493	0.01267
Bankloan	–0.37208	0.38009	–0.979	0.32762
Grant	–0.26904	0.40172	–0.670	0.50304
Gearnow	0.14561E-03	0.33954E-03	–0.429	0.66803
Grfixass	0.10803E-04	0.90861E-05	1.189	0.23447
SecondarySchool	0.77153E-01	0.15462	0.499	0.61780
Hrswk	0.57155E-03	0.12354E-01	0.046	0.96310
Rho(1,2)	–0.12697E-08	0.81618	0.000	1.00000

Log likelihood function = –168.7156.

to have a positive effect, like *GetRich* (to get rich), have too few observations and turn out not to be statistically significant. If you aim merely to survive (*AimSurvive*), this has a negative effect upon performance, whereas if you aim to make a high rate of return (*AimHighROR*), this has a significant and positive effect upon performance. The financial grant (*FinGrnt*) and profit trade-off (*SmallerProfits*) variables are insignificant, as are the informational technology variables (*Itemail*, *ITCell*). The self-assessed capabilities variables were insignificant in four out of seven cases, *Faith*, *Managers*, *Quality*, *Range*. The next results suggest that hubris plays a role in forming the judgements that entrepreneurs make about their own plant and resources (*Plant*), and their innovativeness (*Innovativeness*), as very positive self-appraisals do not translate into performance advantage, with the coefficients of these variables being *negative* and significant. However, they have a more accurate sense of the value of their organisation and system (*Organisation*) in delivering good performance, and this variable's coefficient is positive and highly significant (Prob. = 0.01).

Table V presents a more parsimonious ordered logit model that does not modify any of the empirical conclusions drawn from Table IV, but does slightly sharpen up the picture as regards statistical significance. The selection equation is very close to that in Table IV, and bears the same interpretation. In both sets of results the performance

and selection equations appear to have uncorrelated errors. Whilst this suggests caution in our use of a selection equation to correct possible bias, it was thought to be useful to report results in this form, as a reassurance that potential biases have been taken care of, allowing a confident interpretation of the performance equation. A likelihood ratio test applied to a comparison of the model in Table IV with that in Table V produces a χ^2 statistic of 6.234, which is considerably less than the relevant $\chi^2_{0.05}(8)$ significance point of 15.5. By implication, the preferred specification is the parsimonious model of Table V.

6. Conclusions

To use a classical phrase of Binks and Coyne (1983), the general concern of this paper is with "the birth of enterprise". It has had two principal aims: (a) to develop a parsimonious procedure for ranking the performance of start-up firms, that uses just a few key performance indicators, yet captures a broad range of performance attributes; and (b) to estimate a model that explains the contribution that is made to performance after start-up by various elements of business strategy.

The use of cluster analysis enabled us to use three performance indicators to rank firms into low, medium and high performance categories. These indicators reveal further performance attributes. A statistical explanation of the ranking categories was undertaken using an ordered logit model with sample selection. The estimates suggested the importance of two factors, in particular, for performance: long-range planning (rather than plan formalism); and the pursuit of pecuniary goals (rather than lifestyle goals). With the exception of one operational area (*viz.* organisation and systems), estimates cast doubt on the quality of the inexperienced entrepreneur's judgements about the efficacy of his or her firm. Estimates suggest that entrepreneurs may adopt 'wrong' reasons for starting up in business, and are prone to poor self-appraisal. The better performing entrepreneurs are those who initially make realistic appraisals of their abilities. They do not exaggerate their strengths and opportunities, nor do they underestimate their threats and weaknesses [see Smith (1998)].

Appendix

Definition of variables used in main text

Advert	= 1 if the firm advertises, = 0 otherwise
Age	age of the firm at first interview, in months
Assets1	value (£) of net fixed assets in year one
Assets2	value (£) of net fixed assets in year two
Bankloan	= 1 if firm has a bank loan or overdraft, = 0 otherwise
Busplan	= 1 if the firm has a business plan, = 0 otherwise
Employ1	total number of employees in year one
Employ2	total number of employees in year two
Faith	how respondent rates firm in terms of faith in the business; = 0 (not applicable); = 1 (could be better); = 2 (fair); = 3 (good)
FinGrnt	= 1 if grant or subsidy has been received, = 0 otherwise
Ftime	number of full-time employees
Gearnow	= gearing (debt/equity × 100%) at time of first interview
Gearst	= gearing (debt/equity × 100%) at start-up
Grant	= 1 if firm received a grant at start-up, = 0 otherwise
Grfixass	gross value of fixed assets
Hrswk	number of hours a week entrepreneur devotes to the business
Impact	number of months firm looks ahead when evaluating impact of decisions
AltUnemploy	= 1 if involved in business as alternative to unemployment, = 0 otherwise
GetRich	= 1 if involved in business to get rich, = 0 otherwise
FamilyBus	= 1 if respondent took over family business, = 0 otherwise
ProfitHobby	= 1 if involved in business to profit from hobby, = 0 otherwise
BeOwnBoss	= 1 if involved in business to be own boss, = 0 otherwise

Appendix (continued)

NeedAchieve	= 1 if involved in business to satisfy need for achievement, = 0 otherwise
NewOpportunity	= 1 if involved in business to exploit a new market opportunity, = 0 otherwise
Inbusin	= 1 if the firm is in business in year 2, = 0 otherwise
Innovativeness	how respondent rates the firm's innovativeness/new ideas; = 0 (not applicable); = 1 (could be better); = 2 (fair); = 3 (good)
ITemail	= 1 if firm uses electronic mail, = 0 otherwise
ITCell	= 1 if firm uses cellular/mobile phone, = 0 otherwise
AimSurvive	= 1 if main aim of the business is survival, = 0 otherwise
AimHighROR	= 1 if main aim of the business is high rate of return, = 0 otherwise
Managers	how respondent rates managers in the firm; = 0 (not applicable); = 1 (could be better); = 2 (fair); = 3 (good)
Netprof1	net profit (£) in year one
Netprof2	net profit (£) in year two
Organisation	how respondent rates the organisation's structure and/or systems; = 0 (not applicable); = 1 (could be better); = 2 (fair); = 3 (good)
OutsideEquity	= 1 if firm has outside equity investment, = 0 otherwise
Owncash	value (£) of owner-manager's cash injection at start
Plant	how respondent rates the firm's plant and resources; = 0 (not applicable); = 1 (could be better); = 2 (fair); = 3 (good)
Quality	how respondent rates firm's quality of product/service; = 0 (not applicable); = 1 (could be better); = 2 (fair); = 3 (good)
Range	how firm rates firm's product/service range; = 0 (not applicable); = 1 (could be better); = 2 (fair); = 3 (good)
Sales1	value (£) of turnover in year one
Sales2	value (£) of turnover in year two
SecondarySchool	number of years respondent spent at secondary school
SmallerProfits	= 1 if respondent willing to accept smaller profits to help business expand, = 0 otherwise

Notes

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[1] Inverurie, Aberdeen, Dundee, Crossgates, Cupar, Edinburgh, Midlothian, Alloa, Grangemouth, Stirling, Glasgow, Strathkelvin, Govan, Cumnock and Doon, Perth, Hamilton, Lanark and Brechin

[2] Averages are given in brackets.

[3] From the perspective of the student t-distribution sample sizes above 70 are effectively 'large' samples.

[4] Storey (1994) reports on the findings of Bannock and Partners, who calculated that, in 1986, for the U.K. as a whole, 55% of small firms were sole proprietorships, 26% partnerships and 19% limited companies. By 1989, Daly and McCann (1992) found a similar breakdown of U.K. firms by legal form.

[5] Again, the Scottish Enterprise categories vary slightly in definition from those used in this study.

[6] See Reid (1993, Chapter 1) for detailed comparisons of the Scottish small firms sector with that of the U.K.

[7] Measured as Directors + Managers + Full-time employees + Part-time employees + Trainees, this being the total 'head count' for the business.

[8] This includes well known theories due to Baumol and Williamson [cf. Reid (1987, Ch. 9)], but also the satisficing approach of Simon, which has obvious relevance to 'life style' small firms which, provided they reach satisfactory levels of profit (which may be no more than enough to ensure survival), will not be managed to seek greater profit, but rather to pursue other goals.

[9] A procedure that was accomplished using *SPSS (Professional Statistics)*, as described in Norusis (1994). See Manly (1986, Ch. 8) for technical details. See Smith (1997) for application in a business strategy context, and Everitt's (1980) useful text on the subject, *Cluster Analysis*.

[10] Data values are standardised to unit range from –1 to +1. Each value for the item being standardised is divided by the range of the values. If the range is zero, all values are set to zero [Norusis (1994, p. 107)].

[11] Everitt (1980) suggests trying several cluster techniques, based on different assumptions, or using different variables, on the same set of data. Then only clusters which are produced by all or the majority of these methods should be accepted.

[12] In the long-term, a strategy might be to shed ineffective labour, or to 'downsize' the workforce in order to cut costs or because of technological innovations. This would make sense if the retained workforce were enhancing their skills, perhaps through training. However, here, we are observing short-term effects amongst very young firms, so the argument stands.

[13] An element of the 'staying in business' variable (*Inbusin*) was retained in the three measures finally used to create the clusters in that, by their construction, second-year net profit and second year head-count were set equal to zero if the firm did not survive. See footnotes 10 and 12 below.

[14] See Norusis (1994, p. 98) for details on how these runs are performed on *SPSS*.

[15] This is possible because the case numbers provide access to field notes, and other forms of evidence (e.g. brochures, price lists, accounts, advertising material).

[16] Note that clustering only groups together those cases with similar characteristics, and that subjective judgement (based partly on personal knowledge/contact with the firms) had to be used to decide which of the groups were high, medium and low performers.

[17] The effect is partly attributable to the procedure of assigning a zero employment level for the second year if the firm had gone out of business.

[18] At the Jönköping International Business School Conference on 'Entrepreneurship, SMEs and the Macro Economy', 13–14 June 1996, when he reported on general features of his vast database.

[19] If the firm had gone out of business in the second year, net profit was assigned to zero for this year.

[20] A 99% confidence interval for the difference in average age between medium and high performers is Prob ($-12.25 < \mu_1 - \mu_2 < -4.01$) = 0.99 which does not contain the origin, thus rejecting the hypothesis of equality of ages.

[21] It should be noted that the figures for *Profitability* of Table II cannot be derived from ratios of mean values of *Netprof2Equ* and *Owncash* in Table III, as the figure in Table II is the mean of the ratios for all firms, which is not the same as the ratio of the means.

[22] It should be noted that the numerator in the variable *Profitability* is net profit in year two, and the denominator is *Owncash* (as in next line of Table III).

[23] Which emphasises the ability of the entrepreneur to signal the quality of his firm e.g. by a willingness to commit personal equity to the business. Such a positive signal can encourage bankers to advance loans, and business angels to take an equity stake in the business.

[24] In particular, those dominated by the Modigliani-Miller theorem. See Hay and Morris (1991, Ch. 12).

[25] This is not true of the data reported in Section 3, for which nominal second period values (e.g. employment of zero) were imputed to non-survivors for the second year, in order to have complete performance measures for all the 150 firms that initially started.

[26] These problems are discussed, separately, in Chapters 21 and 22 respectively of Greene (1993). So far as we are aware, there is no theoretical discussion in the extant journal literature of the combined occurrence of these problems, although the appropriate software for undertaking this is discussed in the Limdep manual.

[27] Estimation was undertaken using Limdep7 software. The 'ordered probit' command is used [Greene (1992, pp. 527–529)]. This is run in the logit variant by adding the 'logit' command. Sample selection is achieved with the 'select' command [Greene (1992, Ch. 45)].

[28] For example, the paper presented by Robert Cressy (1995) to the 'Risk in Organisational Settings' conference at the White House, London, 16–17 May 1995. Based on a bank loans database, it was suggested that planning time horizons were typically as short as one month.

[29] See Reid (1993), based on an earlier sample of Scottish firms.

[30] See Johnson and Scholes (1993, Ch. 3) on ways of understanding and dealing with the future in a strategy context.

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