

Grant Assistance and Small Firm Development in Northern Ireland and The Republic Of Ireland

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Abstract - Small business support is an important element of industrial development policy in both Northern Ireland and the Republic of Ireland. This paper examines the effect of grant support on small business performance from 1991-95. Around 50 per cent of small businesses in Northern Ireland and 30 per cent of small businesses in the Republic of Ireland received support over this period. In Northern Ireland, three clusters of assisted companies were identified who received support for marketing, training and capital investments. In the Republic of Ireland, two assisted clusters of firms were identified who received marketing and training grants. In each case firms in the assisted clusters grow faster, tend to be more profitable, are more active in terms of sales and market development and adopt more ambitious strategic directions than those in the non-assisted clusters.

Selection models are used to explore whether these differences are due to differences in the characteristics of the assisted and non-assisted groups or can be directly attributed to the effects of assistance. In the Republic of Ireland there is no evidence of any targeting of assistance at better performing firms. In Northern Ireland, there is some evidence that assistance was targeted at firms with higher productivity growth. Grant aid had no effect on either the turnover growth or profitability of small businesses in either area. It did, however, boost employment growth. This is good-news for job creation but has potentially worrying implications for firms' longer-term competitive position through its effect on productivity.

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1. Introduction

Over the last decade small business development has moved to the top of the industrial policy agenda in both Northern Ireland and the Republic of Ireland. Both areas have been marked by high and sustained levels of public support for both start-ups and small business development. In Northern Ireland, the Local Enterprise Development Unit (LEDU) spends more than £20m a year assisting small firms in manufacturing and tradable services, while in the Republic of Ireland substantial grant support for small manufacturing businesses is provided through the Small Business Programme augmented with loan guarantees and interest subsidies¹.

The primary *economic* rationale for this small business support relates to market failure. Because of transaction costs, for example, market failures may exist in the availability of investment capital to small businesses (Small Firm Task Force Report, 1995). Alternatively, imperfect capital and insurance markets may mean that small firms are reluctant to invest in either training or R&D. Other justifications for small business support in Ireland relate either to the relative importance of small firms or the wider industrial policy context. In 1993-94, businesses with less than 100 employees provided 39.2 per cent of manufacturing employment in the Republic of Ireland and 38.8 per cent in Northern Ireland². Given the relatively high rates of unemployment in both areas, the scale of the small business sector alone may provide some justification for public support. It is also clear, however, that employment in small businesses has some intrinsic characteristics that may be desirable from a regional development

¹ The Small Business Programme (formerly Small Industries Programme) for manufacturing companies is operated by Forbairt, Shannon Development and Undras na Gaeltachta. A separate programme (the International Services Programme) covers small tradable services companies in the Republic of Ireland. From published sources the budget for the SBP is difficult to assess directly. In 1995, however, Forbairt's total grant support to industry was £39.0m, of which £19.4m was capital grant. Share purchases by Forbairt during 1995 totalled an additional £14.7m (Annual Report and Accounts, 1995, p.23). In Northern Ireland, in addition to the assistance provided by LEDU support is also available to small businesses for training (through the T&EA), and R&D (through IRTU). See Cromie and Birley (1994) for an overview of small business support institutions in Northern Ireland.

² Sources: Northern Ireland, Size Analysis of UK Businesses, Table 10, page 102; Republic of Ireland, Census of Industrial Production, 1994, Table 4, p.79.

standpoint³. First, employment in small firms tends to be less cyclical than that in larger firms (Clay et al, 1996). Secondly, jobs in small firms are less likely than those created by inward investment to be affected by capital withdrawal, and thirdly job creation in small businesses is typically more cost-effective than other forms of industrial development assistance, i.e. cost per job figures tend to be lower than those associated with other industrial development measures⁴.

Despite its importance there has been relatively little systematic evaluation of the effectiveness of small business support in the Republic of Ireland (although see Kennedy and Healy, 1985). More extensive evaluation has been conducted in Northern Ireland, based largely on comparisons of the performance of groups of assisted and non-assisted companies (Gudgin et al, 1989; Hart, 1989; Hart and Hanvey, 1995; Buckland 1996; Hart and Scott, 1994; see also Clay et al, 1996). Typically, these comparisons have identified a substantial employment growth differential between assisted and non-assisted small businesses although the studies have a number of important limitations⁵:

- (a) Although sizeable differences in employment growth rates between assisted and non-assisted groups have sometimes been identified, the statistical significance of these differentials has not generally been established.
- (b) Studies have tended to focus on employment growth paying less attention to other important indicators of business performance such as turnover growth or profitability (although see Hart and Scott, 1994).

³ These advantages are offset by the difficulty of targeting support at those firms with the greatest growth potential. This is important because a very large proportion of the jobs created by any cohort of small companies will be in a relatively small proportion of fast growing firms. For example, Hogan and Foley (1996) indicate that even among 'high potential' start-ups in Ireland 62 per cent of job creation was accounted for by only 9 per cent of firms.

See Hart and Scott (1994) on Northern Ireland and DKM Consultants Ltd (1992), Table 6, p. 5 for the Republic of Ireland).

⁵ For example, from 1989-93 there was net employment growth of 31.6 per cent in assisted small firms in the Republic of Ireland compared to a fall of 10.4 per cent in non-assisted companies. In Northern Ireland, over the same period, employment in assisted small firms

- (c) Where it is found that assisted small businesses grew faster than non-assisted businesses it is not clear whether their faster growth reflects: the benefits of assistance; a tendency for faster growing firms to be keener to apply for assistance; or, whether assistance was successfully targeted on faster growing firms (Bates, 1995).
- (d) Typically no differentiation is made between the types of assistance which firms in the assisted group may have received. It is therefore not possible from these studies to compare the *relative* benefits of different types of assistance.
- (e) Finally, comparisons of the performance of the assisted and non-assisted groups provide little information on the quality of jobs promoted.

In this paper we use detailed firm-level information taken from the Competitive Analysis Model (CAM) project database to overcome some of these limitations, and examine the impact on business performance of different types of grant support. In particular, we are able to examine the effect of business support on a range of performance indicators and, using an approach adopted by Bates (1995), to identify separately the ‘selection’ and ‘assistance’ elements of the performance differential between assisted and non-assisted firms.

Section 2 of the paper describes the data used in the analysis and gives an overview of the characteristics of the sample. Section 3 uses cluster analysis to identify the most common combinations of grant support given to small firms in Northern Ireland and the Republic of Ireland, and compares the performance of firms in each cluster. Section 4 then uses sample selection models to isolate the ‘selection’ and ‘assistance’ effects.

grew 29.3 per cent but rose only 0.5 per cent in non-assisted firms (Buckland, 1996, Table 4, p. 20).

2. Data Sources

The empirical analysis is based on the CAM project database for 1995 (McFerran et al, 1996). This was compiled from interviews with small firms conducted between April and September 1995. The target population for the survey was manufacturing companies with 10 to 100 employees which had been trading for at least four years *and* which were considered to have significant growth potential. To achieve this sampling objective, relevant groups of companies were identified with the assistance of the development agencies in Northern Ireland and the Republic of Ireland. The final sample consisted of 1853 companies, of which 785 were in Northern Ireland. An overall survey response rate of 38 per cent was achieved giving a final set of 703 useable responses (Table 1).

The sectoral and sizeband composition of the final Northern Ireland and Republic of Ireland samples differ significantly reflecting differences in the underlying populations. For example, a larger proportion of the Republic of Ireland sample was in engineering and food and drink (Table 1). Sample firms in the Republic of Ireland also tended to be larger in terms of both employment and turnover and more dependent on their home market than Northern Ireland firms. Firms in both areas, however, sold only a small proportion of their output (4 -7 per cent) in other EU areas and outside the EU. In terms of their market environment, the average number of competitors for their main products of firms in each area was very similar firms in both areas identified similar numbers of competitors and suppliers of raw materials was very similar in each area. Firms in the Republic of Ireland, however, tended to have a larger number of customers and were less dependent on their three largest customers than the Northern Ireland firms.

Significant differences were also evident in the proportion of firms in Northern Ireland and the Republic of Ireland which had received each type of government assistance from 1993-95 (Table 2)⁶. In the Northern Ireland sample, marketing grants were the most common form of assistance having been received by 132 firms (32.8 per cent)

with 121 firms (30.1 per cent) having received capital assistance for plant, machinery and equipment (PME). In the Republic of Ireland sample, grants for workforce training had been received by 80 firms (26.8 per cent) while 74 firms had received assistance for export development (24.7 per cent). Differences between Northern Ireland and the Republic of Ireland also existed in terms of the packages or combinations of grant support which firms received. For example, among those firms receiving PME grants the probability of also receiving product or process development grants in the Republic of Ireland was 45.6 per cent compared to 22.4 per cent in Northern Ireland. Other combinations of grants (e.g. marketing and export development grants, product and process development and product testing) were strongly related in both Northern Ireland and the Republic of Ireland⁷.

3. Cluster Analysis of Support Packages

Using cluster analysis it is possible to identify groups of firms which received similar packages of assistance over the 1993-95 period. In Northern Ireland, we were able to identify four meaningful clusters but found only three in the Republic of Ireland data. In both areas, the largest cluster of companies consisted of firms who had received little or no assistance over the 1993-95 period (Table 3). In Northern Ireland, the other three clusters related to firms that had received different combinations of grant support dominated by marketing grants, training grants or support for investment in PME or buildings (Figure 1). In the Republic of Ireland the two clusters of firms which had received assistance were dominated by training grants and marketing grants (Figure 2).

From the CAM survey data it is not possible to quantify the actual amount of money received by individual companies by way of grant support. What is clear from the data, however, is that there are marked differences between the *number* of different types of grant which firms in each cluster received. In Northern Ireland, firms in the PME

⁶ Note that in the CAM survey firms were asked to indicate that they had received grant support only where this exceeded £5,000.

⁷ The Pearson correlation coefficient between 0/1 dummy variables indicating the receipt of marketing and export grants was 0.431 in Northern Ireland and 0.583 ($p=0.01$) in the Republic of Ireland. The same test of the link between product and process development grants and those for product testing produced correlation coefficients of 0.537 ($p=0.01$) in Northern Ireland and 0.462 ($p=0.01$) in the Republic of Ireland.

cluster received on average the lowest number of different types of grant (1.8) followed by those in the marketing and consultancy (4.7) and training clusters (6.9). Among Republic of Ireland firms, the number of different types of grant received was greatest in the training cluster (7.2), with firms in the marketing cluster receiving a similar number of different types of grant to firms in the Northern Ireland marketing cluster (4.1).

These differences in both the character and intensity of grant support will be reflected in the comparative performance of businesses in each cluster. Relative performance will also be influenced, however, by differences in the characteristics of firms in each cluster (Table 4)⁸. Key differences were:

- In the Republic of Ireland, assisted companies tended to be younger than non-assisted firms. In Northern Ireland, firms in the non-assisted, PME and training clusters were of similar average age, considerably younger on average than firms in the marketing cluster.
- In both Northern Ireland and the Republic of Ireland, assistance tended to be targeted at larger firms reflecting the findings of similar US studies (eg. Bates, 1995).
- Sectoral differences in the composition of the assisted and non-assisted clusters were also evident although these differences were more marked in the Republic of Ireland. In Northern Ireland, assistance was concentrated on food companies, with these firms being particularly common in the PME cluster. In the Republic of Ireland, non-manufacturing and other manufacturing companies were more likely to receive assistance than firms in other sectors.
- Little consistent difference was evident between the market position of firms in the assisted and non-assisted clusters in terms of firms' concentration of sales or the number of competitors.

- In both Northern Ireland and the Republic of Ireland, the owner-managers of assisted firms were more likely to be graduates and had a greater willingness to share power than equity than the owner-managers of non-assisted companies.

The net effect of these differences on the relative performance of the assisted and non-assisted clusters is difficult to assess *a priori*. On the one hand, the tendency for the owner-managers of assisted companies to be better educated, and to be more willing to share power/ownership, is likely to be having a positive effect on the growth of assisted firms (see, for example, the studies reviewed by Storey (1994), pp127-128). In the Republic of Ireland, these owner-manager effects are reinforced by the tendency for assisted firms to be younger (see CSBRC, 1992, Hakim, 1989) and more concentrated in relatively attractive sectors than firms in the non-assisted clusters. Counteracting these positive ‘selection’ effects is the tendency for the larger size of assisted companies to be associated with a slower rate of growth (eg. CSBRC, 1992; Jones, 1991; Barkham et al., 1996; Hakim, 1989).

Performance differences between the assisted and non-assisted clusters are summarised in Table 5. Excepting the PME cluster in Northern Ireland, average turnover and employment growth rates in the assisted clusters were above those of the non-assisted clusters in both Northern Ireland and the Republic of Ireland. It is also notable that the highest average growth rates - and therefore the greatest differentials between the assisted and non-assisted clusters - were associated with the most heavily assisted groups and those where revenue grants predominated (i.e. the training clusters). In terms of profitability, however, a less straightforward picture emerges with assisted firms in the Northern Ireland marketing cluster and the Republic of Ireland training cluster having lower median profit rates than non-assisted firms. In clusters where capital support was important, however, (eg the PME cluster in Northern Ireland and the marketing cluster in the Republic of Ireland) the median profit rates of assisted firms exceeded those of non-assisted companies. At face value these comparisons suggest that grant packages based purely on revenue assistance were most effective at

⁸ Previous studies, surveyed extensively in Storey (1994), suggest a number of key performance

boosting business growth but were likely to have less significant effects on profitability. Similarly, grant packages including capital assistance have smaller growth effects but are likely to improve profit rates. In each case, however, the differences observed between the non-assisted and assisted clusters reflect both the 'selection' and 'assistance' effects. It may be, for example, that, on balance, differences between the characteristics of firms in the non-assisted and assisted clusters would have led to the assisted clusters growing faster even without grant support.

By providing grant support the development agencies not only aim to improve firms' short-term performance but also to contribute to their long-term competitive position, with particular emphasis being given to export market and product development. To illustrate these effects Table 5 gives the proportion of firms' sales in export markets and products which were new to the firm over the 1991-95 period. As expected, the average percentage of sales in new export markets was higher for each of the assisted clusters in both Northern Ireland and the Republic of Ireland. Moreover, the average proportion of sales in such markets was higher among those firms which received assistance specifically for export or market development (i.e. the marketing clusters in Northern Ireland the Republic of Ireland). Similarly, in those clusters where product development assistance was significant, sales of new products were greater in the assisted clusters in both Northern Ireland and the Republic of Ireland (Table 5). The impact of grant support to assist firms with quality assurance or quality certification schemes follows a similar pattern to that for product development: where grants of this type were paid the proportion of assisted firms with quality assurance certification was significantly higher than that among non-assisted firms.

Government assistance might also be expected to impact on firms' stock of capital equipment and its utilisation (see Hitchens et al., 1990; Harris, 1991 for a discussion in a Northern Ireland context). Capital grants intended to support investment in PME or buildings, for example, will have a direct impact on capital vintage, while revenue grants - for training, product development etc. - might have an indirect effect by releasing financial resource. As Table 5 indicates there is evidence of both direct and

drivers in small firms. See also Roper (1997) for an eclectic analysis using CAM data.

indirect effects in Northern Ireland and the Republic of Ireland as the average age of capital in *each* of the assisted clusters is below that of non-assisted firms. Capital utilisation also differs systematically between the assisted and non-assisted clusters regardless of the nature of the assistance being provided.

Finally, it is also possible that grant support changes the nature of the strategic planning process within companies or changes their strategic direction. Two mechanisms might be envisaged: first, it may simply be that having a formal strategic plan is a precondition for obtaining grant support: alternatively, it may be that the availability of grant support for the formulation of strategic plans or other activities may have encouraged firms to adopt more formal planning procedures. Using the CAM data we cannot distinguish between these two possibilities. It is clear, however, that formal strategic planning procedures were significantly more common in the assisted clusters, particularly those associated with revenue grant support (e.g. the training cluster in Northern Ireland).

Just as grant support may encourage firms to adopt more formal strategic planning procedures, it may also encourage firms to be more ambitious in setting strategic goals or determining their strategic direction. Evidence on firms' strategic priorities in the CAM data comes from a question in which firms were asked to indicate on a scale from 1 (not important) to 5 (very important) the importance of different business strategies. Four strategic directions were considered: consolidation (present product, present market), market expansion (present product, new market), product expansion (present market, new product), and product and market expansion (new market, new product). Table 5 reports the mean ranking which firms in each cluster gave to each business strategy, providing some evidence that firms in the assisted clusters were adopting more ambitious strategic directions than non-assisted firms. This is most evident from the greater importance attached by non-assisted firms to 'consolidation' and by firms in the assisted clusters to 'product and market expansion'. Again, however, these differences in firms' strategic priorities will reflect both 'selection' and 'assistance' effects.

To summarise, we find that firms in the assisted clusters in both Northern Ireland and the Republic of Ireland grow faster, tend to be more profitable, are more active in terms of sales and market development and adopt more ambitious strategic directions than those in the non-assisted clusters. There are also, however, some significant differences between the underlying characteristics of firms in the assisted and non-assisted groups. In the next section we use an econometric approach to standardise for these differences in characteristics and to identify separately the ‘assistance’ and ‘selection’ effects.

4. Identifying the Selection and Assistance Effects

Differences between the performance of the assisted and non-assisted clusters of firms will reflect the characteristics of the companies in each group as well as the effect of assistance. If π is an indicator of business performance a basic model which encapsulates these effects for Northern Ireland can be defined as follows:

$$p_i = \mathbf{b}'x_i + \mathbf{a}_1 z_{1i} + \mathbf{a}_2 z_{2i} + \mathbf{a}_3 z_{3i} + \mathbf{e}_i \quad (1)$$

where: x is a vector of firm characteristics (see, for example, Table 4), and z is a vector of binary variables taking value 1 if a firm is in a particular cluster, i.e. is receiving a particular combination of grants⁹. In this model the size, sign and significance of the coefficients on the ‘treatment’ terms (i.e. δ) give an indication of the impact on business performance of receiving grant support. Other studies have shown, however, that such coefficients give an unbiased indication of the effect of grant support only if support is randomly distributed across the population of small firms. Where there is any element of selection in the award of grants the coefficients will reflect the combination of ‘assistance’ and ‘selection’ effects. For example, a development agency may wish to target its assistance at firms which had performed well in the past, i.e. it may wish to ‘back winners’. In this case, if the selection effect was positive (i.e. the agency succeeded targeting faster growing firms), direct estimation of the coefficients on the dummy variables would over-estimate the true assistance effect (Greene, 1997, p. 982).

⁹ This type of model is known as a treatment effects model and has been used widely in the literature which attempts to measure the returns to alternative forms of education (see the references in Maddala, 1983, p. 289-90).

Rather than direct estimation of equation (1) a preferable approach is therefore to allow explicitly for this type of selection bias (see Maddala, 1993, pp 257-290 for a general discussion). Specifically, we assume that the likelihood or probability of receiving assistance (z^*) is itself related to a set of business and owner-manager characteristics v . This suggests a model of the form (Greene, 1995, p. 642):

$$\begin{aligned}
 p_i &= \mathbf{b}'x_i + \mathbf{a}_1 z_{1i} + \mathbf{a}_2 z_{2i} + \mathbf{a}_3 z_{3i} + \mathbf{e}_i \\
 z^* &= \gamma'v + w \\
 w_i, \mathbf{e}_i &\sim N(0,0, \mathbf{s}_e^2, \mathbf{s}_w^2, \mathbf{r})
 \end{aligned}
 \tag{2}$$

What is observed, however, is not the probability of receiving assistance (z_i^*) but a binary variable (z) that indicates whether a firm did or did not receive assistance. That is:

$$\begin{aligned}
 z &= 1 \text{ if } z^* > 0 \\
 z &= 0 \text{ if } z^* \leq 0
 \end{aligned}
 \tag{3}$$

The appropriate estimation method for this type of model is the two-stage procedure outlined in Heckman (1979). This involves the estimation of a Probit model to estimate γ and the incorporation of a selection parameter in the treatments model for business performance (see Greene, 1995, pp 639 for details).

Tables 6 and 7 report Probit equations for the probability of receiving grant support in the Republic of Ireland and Northern Ireland respectively. The coefficients in these equations provide an indication of the type of factors that, either explicitly or implicitly through the actions of Client Executives etc., were important in determining which companies received assistance. For example, as Table 4 indicated, firms were more likely to receive assistance the larger their employment and if they were selling some of their output outside their home region. In the Republic of Ireland, the probability of receiving assistance increased further where firms had a relatively small number of customers none of whom was of dominant importance (Table 6). The sector in which firms were operating was also an important factor in determining whether they received grant support. In Northern Ireland, firms in the food sector had an above probability of receiving assistance; in the Republic of Ireland assistance was concentrated away from engineering, food and wood products sectors towards firms in

textiles, other manufacturing and non-manufacturing (Table 6). Other significant determinants of the probability of receiving assistance relate primarily to the characteristics of the owner-manager. There was, however, little consistency between the type of factors that were important in the Republic of Ireland and Northern Ireland. In the Republic of Ireland, firms were more likely to receive assistance if their owner-manager was a new entrant to an industry, or at least had only a relatively short attachment to the sector. In Northern Ireland, industry experience – or lack of it – was not an important factor. Instead, age and other business experience were seen as more important as was the individual's personal stake in the business.

Based on the Probit models, Tables 8 and 9 report selection models for turnover growth, employment growth and return on assets for firms in the Republic of Ireland and Northern Ireland. The basic formulation of the models is that of equation (1) and includes; a set of conditioning variables (x) which determine performance regardless of assistance; a dummy variable to indicate whether or not the firm was in the assisted clusters (z); and, the selection indicator derived from the Probit models (λ)¹⁰. Our choice of conditioning variables was made on the basis of earlier work using the CAM data and included indicators of previous business performance, the characteristics of the firm, the markets in which it is operating, and the characteristics of the owner-manager (see Roper, 1997). The effect of these conditioning variables on small business performance has been discussed extensively elsewhere (e.g. Storey, 1994; Barkham et al, 1996; Roper, 1997 and 1997a) and we therefore focus primarily on the signs and significance of the coefficients on the assistance dummies and selection indicators.

In the equations for the Republic of Ireland, none of the selection indicators proved statistically significant at either the 5 per cent or 10 per cent level (Table 8). This implies that there was no statistically significant difference between the performance measures among those firms selected and not-selected to receive assistance. This might simply reflect the fact that grant assistance was being provided to firms regardless of

¹⁰ A single assisted/non-assisted dummy variable is used here in preference to separate dummies denoting membership of each cluster. This is allowable as we could not identify any significant difference between the performance impact of the different types of assistance.

their characteristics etc. Alternatively, however, if some attempt was being made to identify and assist better performing firms, the insignificant coefficients suggest that this attempt was failing. It is also not clear from the equations that grant support was having any very significant effects on business performance. In the turnover growth equation, for example, the negative and insignificant coefficient on the assistance dummy suggests that grant support was having little effect on sales growth. Similarly, an insignificant coefficient was also found in the return on assets equation, suggesting that grant support was having little effect on profitability. In terms of employment growth, more positive results were evident with the assistance dummy having a positive and weakly significant coefficient. Overall, these results for the Republic of Ireland are disappointing from a policy standpoint. There is little evidence of the effectiveness of attempts either to target assistance at stronger firms or to promote turnover growth or higher profitability. Grants support did, however, have a significantly positive effect on employment growth.

For Northern Ireland, the estimation results for both turnover growth and profitability closely reflect those in the Republic of Ireland, i.e. any attempt to select faster growing or more profitable firms was ineffective and grant support was having no significant effect on either sales growth or profitability (Table 9). These results contrast sharply with those for employment growth, where there were both significant selection and assistance effects. The negative and significant coefficient on the selection term suggests that assistance was effectively being targeted at firms which – without help – would have had below average employment growth. This may come about for a number of reasons. For example, it may simply be that a firm has slow-growing output and employment. Alternatively, a firm may have fast growing sales but slow growing employment due to rapid increases in productivity. A similar result might also be observed if firms were increasing their level of sub-contracting or factoring. In this case, sales may rise but few jobs would be created in the firm itself. From the evidence of the employment growth equation alone it is not possible to distinguish between these alternatives. The insignificant selection parameter in the turnover growth equation, however, suggests that there was no important difference between the turnover growth rates of assisted and non-assisted companies. As the employment growth rates of those firms selected to receive assistance were below average, this

implies that they had higher than average labour productivity growth, at least as measured by turnover per employee.

The effect of grant support on this group of companies is, as in the Republic of Ireland equations, suggested by the coefficient on the assistance dummy. As indicated above there was no evidence of any significant assistance effect on either turnover growth or profitability in Northern Ireland (Table 9). A significant and positive assistance dummy in the employment growth equation, however, suggests that grant support was having a positive employment growth effect. In terms of job creation, this is a strong positive result, however, allied with the limited effect of grant support on turnover growth there are more worrying implications for productivity. To see these effects more clearly it is useful to estimate an additional equation for labour productivity or turnover per employee in Northern Ireland (Table 10). Here, the positive and significant coefficient on the selection indicator suggests that the group of assisted companies had above average productivity growth. The significant negative coefficient on the assistance dummy, however, suggests that grant support was effectively slowing this productivity improvement.

5. Conclusions

Because of their importance as a provider of manufacturing employment, small firms continue to receive considerable public support in both Northern Ireland and the Republic of Ireland. Our objective in this paper has been to examine the structure of grant-support for small firms over the 1991-95 period and to assess its impact on small business performance. Central to the analysis has been the desire to distinguish between 'selection' and 'assistance' effects, i.e. to identify whether faster growth among assisted firms was due simply to the selection by an agency of inherently faster growing firms or whether providing grant support had increased business growth. We also wished to explore whether grant aid aimed at different functional areas had a differential impact on business performance. Cluster analysis was used to profile the type of grant aid that firms were receiving and selection models were used to distinguish between the selection and assistance effects. Data for small firms in Northern Ireland and the Republic of Ireland was taken from the Competitive Analysis Project database and relates to the period 1991-95. The analysis suggests a number of key findings.

First, slightly less than half of all small firms in Northern Ireland and 29 per cent of firms in the Republic of Ireland received some grant support over the 1991-95 period. Cluster analysis suggested a number of groups of companies, each distinguished by the type of grants which firms' received and the number of such grants. In Northern Ireland, three 'assisted' clusters were distinguished: the most strongly assisted group, of around 13 per cent of companies who, received a wide range of support for managerial and workforce training; an intermediate group who received assistance primarily for marketing and export development; and, a larger group of 22 per cent of firms assisted primarily with capital grants. In the Republic of Ireland, two 'assisted' clusters were identified: a heavily assisted group of 17 per cent of companies who received assistance for training, export development etc.; and a less heavily assisted group who received help primarily with marketing and export development.

Comparison of the characteristics of assisted and non-assisted firms suggests that there were some systematic differences between the two groups relating to size, industry and

business age. It was also clear that firms in the assisted clusters tended to grow faster, be more profitable and more active in terms of sales, market and strategy development than non-assisted firms.

The question this raises is whether the improved performance of the assisted firms is due to their underlying characteristics and their selection as members of the 'assisted' group or whether the assistance they were receiving is making the difference. To separate these 'selection' and 'assistance' effects we estimate selection models for turnover growth, employment growth and return on assets. In the models, with the exception of that for employment growth in Northern Ireland, the selection terms were insignificant. This suggests either that no attempt was being made to target assistance or that such targeting was largely ineffective. The exception is Northern Ireland, where assistance was focussed on firms with above average productivity growth that in turn was due to below average employment growth.

The effects of assistance on turnover growth and profitability were also insignificant in both Northern Ireland and the Republic of Ireland. For these performance measures the difference noted between assisted and non-assisted firms were therefore due to differences in business characteristics rather than any assistance they received. More positive results were obtained in terms of employment growth, with grant support in the Republic of Ireland and in Northern Ireland having a significantly positive effect. This evidence is consistent with earlier studies which have suggested that employment growth is more rapid among assisted businesses (e.g. Buckland, 1996; Hart and Scott, 1994). Allied with the lack of any impact on turnover growth and profitability, however, this boost to employment growth has some worrying implications for productivity. The seriousness of this effect depends largely on what is happening in the firms themselves. One possible scenario is that assisted companies are taking on additional workers to do non-essential work. In this situation, productivity (i.e. turnover per employee) will fall but there will be no important effect on either the efficiency or cost-effectiveness of the firm's 'core' activities, and no lasting effect on the firm's competitive position. A potentially more worrying scenario is where grant support encourages firms to accept a degree of over-manning in their core activities. In this situation, there would again be a decrease in productivity, which may be more

difficult to eliminate if grant support is reduced or curtailed. From the CAM data it is not possible to distinguish between these two alternatives. Our econometric results, however, do suggest the potential value for the design of future policy of examining the impact of grant support on individual small firms in more detail. This is likely to require a case-study approach that could take account of the individual firm's business circumstances as well as their internal structure and the type of grant support they received.

Table 1: Sample Characteristics

	Northern Ireland	Republic of Ireland
Sample Size (No of firms)	404	299
Industrial Composition (%)		
Engineering	18.3	22.9
Food, Drink	9.3	9.5
Textiles, Clothing	19.0	22.2
Wood, Paper, Printing	16.7	14.4
Other Manufacturing	23.4	10.9
Non-manufacturing	13.4	20.1
2. Company Size (1995)		
Turnover (£000stg)	1,559**	3,252
Employment (Mean)	27**	35
3. Market Profile (% of 1995 sales)		
Northern Ireland	62.5**	5.6
Republic of Ireland	12.8**	72.5
Great Britain	18.3*	11.6
Other EU	3.7**	6.8
Non-EU Countries	3.7**	3.5
4. Market Environment		
Number of Competitors (Median)	8	8
Number of Suppliers (Median)	15*	20
Number of Customers (Median)	90**	150

Notes:

1. Differences between the Northern Ireland and Republic of Ireland samples were tested using the Mann-Whitney Test. * denotes non-rejection of the hypothesis of independence at the 10 per cent level, and ** denotes non-rejection at the 5 per cent level.
2. Sectoral definitions are as follows (sic 80): Engineering, 31-37; Food, Drink, 41-42; Textiles, Clothing, 43-45; Wood Paper, Printing etc., 46-47; Other manufacturing includes chemicals and mineral fibres, rubber and plastics, 25-26, 48-49; non-manufacturing includes primary industry, mining and quarrying, mineral products, construction, distribution and hotels, transport and communications, financial and business services and personal services, 23-24 and divisions 5-9).

Source: CAM (1995) Survey Data.

Table 2: Proportion of Small Firms Receiving Grant Assistance: 1993-1995

	Northern Ireland	Republic of Ireland
	% of firms	
Buildings and Equipment		
Plant, Machinery & Equipment	30.1	19.6**
Buildings	24.7	14.4**
Training Grants		
Managerial Training	21.2	23.0
Supervisory Training	14.2	21.0**
Workforce Training	15.2	26.8**
Apprentice Training	10.6	16.2**
Market and Product Development		
Export Development	12.1	24.7**
Marketing	32.8	22.7**
Product & Process Development	17.0	16.6
Product Testing	6.7	6.2
Other Grants		
Quality Assurance	15.5	12.4
Strategic Planning	8.8	10.3
Consultancy Services	19.4	16.5
Interest Rate Subsidies	11.1	7.9
Loans or Equity	5.4	9.7**
Start-up Employment	9.1	4.8**
Expansion Employment	12.9	12.8

Note: Differences in the proportion of firms receiving each type of grant in each area were tested using a Pearson $\chi^2(1)$ test. * denotes a significant difference in the assisted proportion at the 10 per cent level, and ** denotes a significant difference at the 5 per cent level.

Source: CAM (1995) Survey Data.

Table 3: Cluster Profiles And The Probability of Grant Receipt

Cluster Labels	Number of Firms		Types of Grant Received (Probability of Receipt)
	n	%	
Northern Ireland			
Non-Assisted	199	51.9	Marketing (0.13), expansion (0.07)
Marketing	49	12.8	marketing grants (0.86), consultancy (0.80), product and process development grants (0.47), quality assurance grants (0.47)
Training	49	12.8	managerial training (0.90), supervisory training (0.90), workforce training (0.90), marketing grants (0.76), PME grants (0.61).
PME	86	22.4	PME grants (0.83), buildings (0.62), marketing assistance (0.23), expansion (0.15).
Republic of Ireland			
Non-Assisted	204	70.5	Workforce training (0.11), apprentice training (0.08).
Training	51	17.6	Managerial training (0.86), supervisory training (0.86), workforce training (0.86), export development (0.65), consultancy (0.63), marketing (0.61).
Marketing	34	11.7	Export grants (0.76), marketing grants (0.74), PME (0.59).

Notes:

1. The cluster analysis uses a k-means method to co-ordinate the data. The analysis was based on 383 observations and 17 variables for Northern Ireland and 289 observations and 17 variables for the Republic of Ireland.
2. Figures in parenthesis give the proportion of firms in the cluster in receipt of each type of grant.

Source: CAM (1995) Survey Data.

Table 4: Characteristics Of Small Firms In Assisted And Non-Assisted Clusters

	Northern Ireland				Republic of Ireland		
	Non-Assisted	PME Cluster	Marketing Cluster	Training Cluster	Non-Assisted	Marketing Cluster	Training Cluster
Establishment Date	1975	1977	1963	1979	1963	1976	1971
Employment (1994)	23.6	36.7	40.6	43.6	40.7	49.6	56.5
Sectoral Split (%)							
Engineering	12.8	8.5	16.3	19.1	22.1	9.1	18.8
Food and Drink	12.2	34.1	18.4	17.0	23.1	24.2	18.8
Textiles, Clothing	11.7	3.7	10.2	8.5	8.2	18.2	10.4
Wood, Paper, Printing	20.2	17.1	24.5	12.8	26.7	6.1	16.7
Other Manufacturing	16.5	14.6	18.4	21.3	10.3	24.2	22.9
Non-manufacturing	26.6	22.0	12.2	21.3	9.7	18.2	12.5
Market Position							
Concentration of sales (%)	41	39	42	46	37	35	34
Number of competitors	33	17	39	31	30	31	24
Owner-Manager Characteristics							
Age (Years)	45	45	46	44	45	43	43
Years In Industry	21	18	21	16	20	16	16
Company Founder Still Involved (% of owners)	66	69	73	57	44	44	53
Degree Or HND Equivalent (% of owners)	40	48	43	61	55	68	73
Only Business (% of owners)	74	82	76	75	74	74	59

Experience In Large Firms (% of owners)	32	30	33	47	23	29	39
Willing To Share Power (% of owners)	61	62	73	69	60	61	65
Willing To Share Ownership (% of owners)	51	51	63	56	50	61	58

Source: CAM (1995) Survey Data.

Table 5: Performance Indicators For Assisted And Non-Assisted Clusters

	Northern Ireland				Republic of Ireland		
	Non-Assisted	PME Cluster	Marketing Cluster	Training Cluster	Non-Assisted	Marketing Cluster	Training Cluster
Business Growth							
Employment (% pa)	4.5	7.3*	7.9	9.4	4.4	6.6	7.7
Sales Volume (% pa)	10.1	7.7	14.1	17.3	8.4	9	10.6
Profitability							
Average Return on Assets (%)	21.5	30.7	14.8	30.5	13.5	18.5	12.7
Average Return on Turnover (%)	4.8	5.7	3.7	7.0	4.9	6.4	4.7
Average Profit per Employee (£000)	1.7	2.5	2.2	2.5	3.0	4.0	2.5
Market and Product Development							
Sales in New Export markets (%)	26.4	28.1	33	27	8.7	19.6	17.4
Sales in New Product Groups (%)	9.2	13.6	9.1	19.9**	9.3	19.1	9.2
Sales of New Products (%)	12.9	12.4	23.8	21.1**	12.5	21	16.6
Sales of Improved Products (%)	13	8.2	11.8	18.1	22.3	22.8	20.1
Capacity Indicators							
Average age of Capital (yrs)	5.4	4.3	5	4	6.2	5.1	4.9
Capacity Utilisation (%)	88.0	85	78.7**	84**	86.6	83.1	83.9*
Documented Strategic Plan (%)	36.4	37.2	65.3	85.7	46.1	73.5**	72.5**

Quality Certification (ISO 9000)	27.6	17.6	29.2	44.9*	26.1	32.4	51**
Strategic Direction							
Consolidation	4.7	4.6	4.6	4.5	4.7	4.6	4.6
Market Expansion	4.1	4.2	4.4	4.2	4.0	4.3	4.5**
Product Expansion	3.7	3.7	3.9	4.1*	3.9	4.1	4.4**
Product & Market Expansion	3.3	3.6	3.4	3.8*	3.4	3.6	3.7

Notes

1. Pearson $\chi^2(1)$ tests were used to compare variable means in each assisted cluster to those in the non-assisted cluster. ** denotes a significant difference at the 5 per cent level and * at the 10 per cent level.
2. Significant differences also existed between the assisted clusters for Northern Ireland. Employment (1994) in both the PME and Marketing clusters was significantly different from the Training cluster; Average return on assets differed significantly between the PME and Marketing clusters; and, average return on turnover differed significantly between the marketing and training clusters.

Source: CAM (1995) Survey Data.

Table 6: Probit Equation For The Probability Of Receiving Grant Support In The Republic Of Ireland

	Equation Coefficients		Marginal Values	
	Coeff	SE	Coeff	SE
Constant	0.085	0.844	0.027	0.267
Firm Characteristics				
Employment (log)	0.406	0.190 **	0.129	0.060 **
Sales concentration	-0.017	0.006 **	-0.005	0.002 **
Export sales	0.443	0.261 *	0.140	0.082 *
No of customers (log)	-0.268	0.090 **	-0.085	0.028 **
Prodn manager	0.308	0.306	0.098	0.097
Sector Dummies				
Engineering	-0.656	0.269 **	-0.208	0.085 **
Food, drink	-0.654	0.288 **	-0.207	0.091 **
Wood, Paper etc	-0.768	0.271 **	-0.243	0.086 **
Owner-Manager				
Years in Industry	-0.016	0.009 *	-0.005	0.003 *
Other business	-0.227	0.214	-0.072	0.068
Apprenticeship Qualification	0.430	0.399	0.136	0.126
Number of Observations		224		
Log likelihood		-112.4		
$\chi^2(11)$		43.2		
Percentage correct		77.7		

Note: Variable definitions are included in the data appendix. ** indicates that the coefficient was significant at the 5 per cent level ; * indicates significance at the 10 per cent level.

Source: CAM Project Database

Table 7: Probit Equation For The Probability of Receiving Grant Support In Northern Ireland

	Equation Coefficients		Marginal Values	
	Coeff	SE	Coeff	SE
Constant	-1.307	0.612 **	-0.521	0.244 **
Firm Characteristics				
Firm age (log)	-0.257	0.108 **	-0.102	0.043 **
Employment (log)	0.188	0.124	0.075	0.049
Export sales	0.393	0.208 *	0.156	0.083 *
Production manager	0.502	0.164 **	0.200	0.065 **
Marketing manager	0.420	0.170 **	0.167	0.068 **
Partnership	0.356	0.233	0.142	0.093
Industry Dummies				
Food, drink	0.469	0.208 **	0.187	0.083 **
Owner-Manager				
Other business	0.335	0.178 *	0.133	0.071 *
Equity stake	-0.561	0.194 **	-0.224	0.077 **
Turnover growth aim	-0.139	0.153	-0.055	0.061
Employ Growth aim	0.397	0.247	0.158	0.098
30-40 years	0.860	0.341 **	0.343	0.136 **
40-50 years	0.738	0.332 **	0.294	0.132 **
50-60 years	0.792	0.343 **	0.316	0.137 **
60 plus	0.571	0.460	0.228	0.183
Number of Observations		333		
Log likelihood		-197.3		
$\chi^2(15)$		65.7		
Percentage correct		66.1		

Note: Variable definitions are included in the data appendix. ** indicates that the coefficient was significant at the 5 per cent level ; * indicates significance at the 10 per cent level.

Source: CAM Project Database

Table 8: Selection Models For Business Performance Indicators In The Republic Of Ireland

	Turnover Growth			Employment Growth			Profit to Assets	
	Coeff	SE		Coeff	SE		Coeff	SE
Constant	0.070	0.043	*	-0.171	0.111		41.807	16.057 **
Firm Characteristics								
Sales growth 1991 (log)	0.344	0.026	**					
Export sales							-22.091	5.984 **
No of customers (log)				0.023	0.011	**		
Firm age (log)				-0.019	0.015		-11.449	4.572 **
Powerful customers				-0.019	0.015			
Limited company				0.056	0.024	**		
Founder still involved	0.003	0.020		0.032	0.018	*	-11.034	6.423
Prodn manager				-0.064	0.026	**		
No of competitors (log)	0.008	0.009		0.010	0.007		1.694	2.087
Sales Concentration				0.001	0.000	**		
Industry Dummies								
Engineering				0.057	0.029	**	-3.078	6.021
Food, drink				0.037	0.029		-8.393	6.999
Wood, paper etc				0.039	0.030		1.135	7.103
Other manufacturing				0.013	0.024			
Owner-Manager								
20-30 years	0.070	0.040	*	0.040	0.040			
40-50 years	0.005	0.018		0.022	0.016		7.437	4.550 **
60 plus	-0.034	0.045		-0.044	0.038			

A level	-0.049	0.031					8.100	6.689
HND or equivalent	-0.081	0.041	**				13.794	9.664
Degree	-0.058	0.025	**	0.026	0.016	*	16.447	6.166 **
Years in industry	-0.000	0.001					0.615	0.252 **
Willing to share power				-0.056	0.022	**	3.489	4.525
Willing to share ownership				0.053	0.021	**		
Assistance Indicator	-0.015	0.035		0.106	0.056	*	-3.571	10.560
Selection parameter	0.025	0.024		-0.054	0.034		2.787	6.961
Number of Observations	109			131			99	
Equation SE	0.088			0.087			20.21	
F(,)	15.87			1.96			1.53	
ρ	0.000			0.014			0.110	
Log likelihood	119.43			156.75			-428.37	

Note: Variable definitions are included in the data appendix. ** indicates that the coefficient was significant at the 5 per cent level ; * indicates significance at the 10 per cent level.

Source: CAM Project Database

Table 9: Selection Models For Business Performance Indicators In Northern Ireland

	Turnover Growth			Employment Growth			Profit to Assets		
	Coeff	SE		Coeff	SE		Coeff	SE	
Constant	0.042	0.044		0.080	0.070		16.510	9.856	*
Firm Characteristics									
Sales growth 1991 (log)	0.317	0.018	**						
No of competitors (log)	-0.009	0.005	*						
No of customers (log)	0.013	0.004	**						
Firm age (log)	-0.029	0.010	**	-0.042	0.016	**			
Sales Concentration							0.053	0.094	
Limited company							-7.519	5.304	
Powerful customers	0.022	0.012	*	0.023	0.019				
Export sales	0.028	0.017	*				0.583	6.454	
Industry Dummies									
Engineering				-0.039	0.029		4.187	6.451	
Food, drink				-0.056	0.032	*	7.369	6.445	
Wood, paper etc				-0.034	0.022				
Owner-Manager									
20-30 years	0.032	0.026		0.059	0.048		22.602	9.571	**
GCSE level							12.597	6.266	**
A level	-0.022	0.019		-0.029	0.030		7.782	7.059	
HND				-0.056	0.027	**			
Degree	-0.025	0.014	*						
Years in industry				-0.003	0.001	**			
Equity stake	0.023	0.018		0.099	0.031	**	-5.849	4.309	

Willing to share power	-0.028	0.016	*				
Willing to share ownership	0.019	0.015					
Assistance Indicator	-0.000	0.029		0.201	0.063	**	10.213 10.773
Selection parameter	-0.003	0.019		-0.107	0.039	**	-6.875 7.083
Number of Observations	167			207			185
Equation SE	0.074			0.147			28.9
F(,)	26.70			5.05			1.95
ρ	0.000			0.000			0.036
Log likelihood	205.29			145.96			-875.58

Note: Variable definitions are included in the data appendix. ** indicates that the coefficient was significant at the 5 per cent level ; * indicates significance at the 10 per cent level.

Source: CAM Project Database

Table 10: Sample Selection Model For Northern Ireland Productivity Growth

	Coefficient	SE
Constant	0.193	0.069 **
Firm Characteristics		
No of competitors (log)	-0.009	0.008
Export sales	0.040	0.027
No of customers (log)	0.007	0.006
Firm age (log)	-0.037	0.015 **
Industry Dummies		
Engineering	0.033	0.029
Wood, paper etc	0.015	0.022
Owner-Manager		
Equity stake	-0.071	0.028 **
Years in industry	0.002	0.001 *
Willing to share power	-0.052	0.024 **
Willing to share ownership	0.048	0.023 **
Assistance Indicator	-0.147	0.048 **
Selection parameter	0.072	0.031 **
Number of Observations	204	
Equation SE	0.137	
F(,)	2.41	
ρ	0.006	
Log Likelihood	140.44	

Note: Variable definitions are included in the data appendix. ** indicates that the coefficient was significant at the 5 per cent level ; * indicates significance at the 10 per cent level.

Source: CAM Project Database

Data Appendix

Description	Definition
1. Profitability and Growth	
Real Sales Growth (% pa, 1991-94)	Sales volume is defined as turnover (less any discounts given) deflated by the national rate of producer price growth taken from Economic Trends, Table 3.1 for Northern Ireland and, for example, the Economic Series, Nov 95, p 15 for the Republic of Ireland.
Employment Growth (% pa, 1991-94)	Employment growth % pa.
Return on Assets (% , 1991-94)	Average net profit as a percentage of net worth. Net profit was measured before bank interest and tax and excluding all extraordinary items (e.g. the sale of capital items). Figures were converted into 1994 prices using the producer price index, and converted to Sterling using an exchange rate of 1.0233 (Source: Financial Statistics, CSO, Dec 1995, Table 7.1A).
Return on Sales (% , 1991-94)	Average net profit as a percentage of sales.
Profit per employee (£000, 1991-94)	Average net profit per employee.
2. Market Position	
Firm Age (years)	The age of the firm in years.
Firm Size (employment)	Number of employees in 1994-95.
Founder still involved	A 0/1 dummy taking value 1 if the founder of the firm is still involved in the day to day running of the firm and 0 otherwise.
Concentration of sales (%)	Percentage of sales to the firm's three largest customers, 1995.
Number of competitors	The number of competitor companies.
Number of customers	Number of customers which the firm would usually deal with.
Production manager	A 0/1 dummy taking value 1 if the firm has a specialist production manager and 0 otherwise.
Marketing manager	A 0/1 dummy taking value 1 if the firm has a specialist marketing manager and 0 otherwise.

Average age of capital (yrs)	Average age of production machinery at replacement values, 1995.
Capacity Utilisation (%)	Utilisation rate of capital equipment, 1995.
Export sales	A 0/1 dummy taking value 1 if the firm is making sales outside the UK and Ireland and 0 otherwise.
Limited dummy	A 0/1 dummy taking value 1 if the firm is a limited company and 0 otherwise.
Partnership	A 0/1 dummy taking value 1 if the firm is a legal partnership and 0 otherwise.
Customer Power	An intensity index ranging from 0 if customer power was 'unimportant' to 100 if customer power was 'very important'.
Sales in New Product Groups (%)	Percentage of 1995 sales in new product groups defined by customer, geographical market of product type.
Sales of New Products (%)	Percentage of 1995 sales in products newly introduced since 1993.
Sales of Improved Products (%)	Percentage of 1995 sales in products improved or modified since 1993.
Sales in New Export Markets (%)	Percentage of 1995 sales in export markets newly entered since 1993.

3. Strategic Initiatives

ISO 9000 Quality Certification	A 0/1 dummy variable taking value 1 if the firm is ISO 9000 certified, zero otherwise.
Strategic Plan	A 0/1 dummy variable taking value 1 if the firm has a formal strategic plan, zero otherwise.
Employment Growth Aim	A 0/1 dummy variable; 1 if employment growth was an 'important' or 'very important' business objective, zero otherwise.
Specified Sales Growth Target	A 0/1 dummy variable; 1 if the firm had a formal turnover target specified in its strategic plan, zero otherwise.
Strategic Direction	Four 0/1 dummy variables reflecting firms' strategic priorities in terms of consolidation (maintaining sales of present products in present markets), expansion (increasing sales of present products in present markets), product expansion (new products for existing markets) or product and market expansion (new products for new markets).

4. Entrepreneurial Characteristics

Equity Stake	A 0/1 dummy taking value 1 if the entrepreneur had a significant equity stake (20 per cent or more) in the business, zero otherwise.
Education	A series of 0/1 dummies reflecting the highest qualification of the entrepreneur or owner-manager.
Willing to Share Power	A 0/1 dummy variable; 1 if the entrepreneur was willing to share power to achieve an expansion of the business, zero otherwise.
Willing to Share Equity	A 0/1 dummy variable; 1 if the entrepreneur was willing to share equity to achieve an expansion of the business, zero otherwise.
Entrepreneur's Age (years)	Entrepreneur's age in years or in the regression analysis as a series of 0/1 dummies for different age bands.
Large Firm Experience	A 0/1 dummy variable; 1 if the entrepreneur had previous experience in firms with 500 or more employees, zero otherwise.
Only Business	A 0/1 dummy variable; 1 if the entrepreneur had no other business interests, zero otherwise.
Industry Experience (years)	The entrepreneur's number of years in the current industry.

References

- Barkham, R Gudgin, G Hart, M and Hanvey, E (1996) *'The Determinants of Small Firm Growth - An Inter-Regional Study in the UK: 1986-90'*, Jessica Kingsley, London.
- Bates, T (1995) 'Small Businesses Appear to Benefit From State Or Local Government's Economic Development Assistance', *Urban Affairs Review*, 31,2, 206-225.
- Buckland, C (1996) 'The Small Firm Sector North and South: The Influence of Public Policy', *Irish Banking Review*, Autumn, 14-23.
- Clay, N Creightyte, S and Storey, D (1996) 'Public Policy Towards Small Firms', *Journal of European Public Policy*, 3,2, 253-271.
- Cromie, S and Birley, S (1994) 'Relationships Among Small Business Support Agencies', *Entrepreneurship and Regional Development*, 6, 301-314.
- Cambridge Small Business Research Centre (1992) *'The State of British Enterprise: Growth, Innovation and Competitive Advantage in Small and Medium-Sized Firms'*, University of Cambridge, Small Business Research Centre.
- DKM Consultants Ltd (1992) 'Industrial Policy and the Industrial Promotion Agencies', Dublin.
- Greene, W H (1995) *'Limdep – Version 7'*, Econometric Software Inc, New York.
- Greene, W H (1997) *'Econometric Analysis'*, Macmillan, New York.
- Gudgin, G Hart, M Fagg, J D'Arcy, E and Keegan, R (1989) 'Job Generation in Manufacturing Industry 1973-86', NIERC, Belfast.
- Hakim, C (1989) 'Identifying Fast Growth Small Firms', *Employment Gazette*, January, 29-41.
- Harris, R I D (1991) *'Regional Economic Policy in Northern Ireland – 1945-88'*, Avebury, Aldershot.
- Hart, M and Hanvey, E (1995) 'Job Generation and New and Small Firms: Some Evidence from the Late 1980s', *Small Business Economics*, 7, 97-109.

Hart, M and Scott, R (1994) 'Measuring the Effectiveness of Small Firm Policy; Some Lessons from Northern Ireland', *Regional Studies*, 28,8, 849-858.

Hart, M (1989) 'Entrepreneurship in Ireland: A Comparative Study of Northern Ireland and the Republic of Ireland', *Entrepreneurship and Regional Development*, 1, 129-140.

Heckman, J (1979) 'Sample Selection Bias as a Specification Error', *Econometrica*, 47, 153-161.

Hitchens, D M K W Wagner, K and Birnie, J E (1990) '*Closing the Productivity Gap*', Avebury, Aldershot.

Hogan and Foley (1996) 'The Survival and Growth of High Potential Firms in Ireland', *Irish Banking Review*, Spring, 2-11.

Jones, M (1991) 'Employment Change in Small Firms: A Cohort Analysis from 1985, 1988 and 1991 Survey Findings', paper presented at the Small Firms Policy and Research Conference, Blackpool.

Kennedy, K A and Healy, T (1985) 'Small Scale Manufacturing Industry in Ireland', ESRI, Dublin, General Research Series, No 125.

Maddala, G (1993) 'Limited Dependent and Qualitative Variables in Econometrics', Cambridge University Press, New York.

Mc Ferran, B Hewitt-Dundas, M N and Roper, S (1996) '*Performance Benchmarks for Developing Firms*', The CAM Project, Belfast.

Roper, S (1997) 'Modelling Small Business Growth and Profitability', Working Paper 32, Northern Ireland Economic Research Centre, Belfast.

Roper, S (1997a) 'Strategic Choice and Small Business Performance - An Exploratory Analysis', forthcoming in *Small Business Economics*.

Small Firm Task Force Report (1995), '*Task Force on Small Business*', Government of Ireland, Stationary Office, Dublin.

Storey, D (1994) '*Understanding the Small Business Sector*', Routledge, London.