Modelling the Effects of Public Support to Small Firms in the UK - Paradise Gained?

Stephen Roper (Aston Business School, Aston University)
and
Mark Hart (SBRC, Kingston University)*,

*** Small Business Research Centre**
Kingston Business School
Kingston University
Kingston-upon-Thames, KT2 7LB, UK
Tel. +44 [0] 20 8547 7247; fax. +44 [0] 20 8547 7140
email: **m.hart@kingston.ac.uk**

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ABSTRACT

This paper describes the methodology employed in a tracker study of businesses that received advice and consultancy from the Business Link network in 1996. The purpose of the study was to assess the impact of Business Link support on productivity compared to a matched comparison group.

Using data from the specially constructed Business Link Impact Indicators Database for the period 1994-2000 together with a survey of assisted firms and non-assisted firms , and adopting an econometric approach designed to make allowance for both *'assistance'* and *'selection'* effects, this study concludes that:

- First, we find no evidence that in 1996 BL assistance was being targeted effectively at faster growing firms.

- Second, we find some, albeit tentative evidence, that BL assistance in 1996 was having a positive effect on productivity growth.

- Third, we identify a positive but statistically insignificant effect of BL assistance on turnover and employment growth.

- Fourth, our analysis has highlighted a number of other factors which contribute to productivity, turnover and employment growth. The range of these factors – embracing market conditions, business strategy, the characteristics of the owner-manager and the firm itself – emphasise the complexity of the process of business growth and the consequent difficulties in both modelling and assisting the process.

INTRODUCTION

Background

The evaluation of the impact of public policies to improve the performance of the small business sector has provoked a great deal of debate and research activity in recent years. The debate can be categorised in two broad ways. First, it can be seen in terms of the actual impact measures and schemes of small business support may have in terms of enhanced growth performance of SMEs. Second, the search for appropriate evaluation methodologies which reflect the range of problems associated with the accurate identification of the true effects of policy support.

The much publicised *"Six Steps to Heaven"* paper by Storey (1998) provided a comprehensive overview of the problems associated with evaluation studies in the realm of the small business sector. Storey argued that the vast majority of assessments of the impact of policy support fall within the category of monitoring rather than true evaluation. The intention in this paper is to undertake an evaluation of Business Links in England adopting a methodology which seeks to avoid the methodological pitfalls articulated by Storey and in so doing achieve the approach.

Business Links (BL) are England's version of the 'one stop shop' approach to supporting SMEs. The origins of the UK model were outlined in government policy statements in the late 1980s and finalised in 1992. Each BL was to be a partnership between TECs, chambers of commerce, local authorities, enterprise agencies and other bodies such as local universities. The object was not only to co-ordinate existing SME support services but to create a fully integrated, local strategy for promoting business and enterprise. In pursuit of this objective the aims of Business Links are to:

- increase the use of business support by small firms,
- rationalise the provision of support to reduce duplication and to make it more coherent, and
- improve the quality of support services.

The main initial target of BLs was to be firms employing between 10 and 200 with growth potential although SMEs in general, including start-ups, would still be helped. BLs would become, through their close involvement with the TECs, the new main vehicle for the delivery of DTI funded SME services. A key innovation in BLs was the 'personal business advisor' (PBA) who was capable of providing SMEs with holistic advice on business problems and signposting to the support services available to solve them.

By January 1997 a total of 89 Business Link partnerships, with 241 outlets covering the whole of England, had come into operation. Each Business Link is based on a partnership between local agencies involved in support for businesses. The composition of the partnerships varies, but typically the partners include the TEC, a Chamber of Commerce, Local Authorities and Enterprise Agencies.

There has been a mix of government sponsored evaluations and research carried out by independent researchers (e.g., Ernst and Young, 1996; 1997; Bryson *et. al*., 1999). While some of the focus has been on particular aspects of the operation of BLs, most notably the work of the Personal Business Advisor (PBA), the overall approach has concentrated on an:

- examination of the rationale and effectiveness of BLs
- assessment of the added value they brought to the provision of business support services

A recent national *"Value for Money"* evaluation of BLs carried out by PACEC (1998) and represented a significant contribution to our understanding of the effects of BLs on the small business community in England. Of particular relevance to this project, the study sought to provide both a qualitative and quantitative assessment of the effects on the performance of users and non-users of BL services for the period 1994-97. However, it should be noted that the PACEC study differed from this BL Tracker Study in that they did not adopt a matched firm methodology but rather relied on an assessment of the macro impact of the impact of BL assistance obtained from large-scale surveys.

PACEC concluded that using BLs had a positive effect, with regression analysis showing that use of Business Links was a significant variable in explaining growth in assisted firms' turnover and employment. The analysis implied that Business Link use *per se* had added nearly £55,000 to the turnover, and 1.63 workers to the employment, of the average firm. From the qualitative analysis the results indicated that business growth can be attributed directly to Business Links. During the three year period covered by the research, the average firm increased its employment by 0.4 jobs, its turnover by £76,000, its profits by £9,000, its net assets by £13,000 and its exports by £6,000 because it had received Business Link support.

The Business Link Tracker Study

Building on earlier evaluations, the opportunity now exists, with more comprehensive data and for a longer time period, to re-visit the key questions concerning the longer term impact of BL assistance. This particular project seeks to establish whether BLs are having the desired impact on assisted firms. This paper presents results of a study, known as the Impact Indicators Project (IIP), commissioned by the Small Business Service (SBS) of the Department of Trade and Industry (DTI) which had two specific aims:

(a) To establish whether small firm support channelled through Business Links is meeting the DTI's objectives, specifically by increasing the capacity of small businesses:

- to grow and improve their productivity;
- to exploit market opportunities abroad;

- to increase economic growth, opportunities and competitiveness in the regions.

(b) To provide a baseline of the impact of Business Link support on the performance of the firms that they assist.

The origins of the project date back to 1996 when it was decided that serious evaluation of the impact of public sector business support to the small firm sector demanded a longitudinal and detailed database in order to overcome many of the well known deficiencies of previous studies (see Storey, 1998). The study is confined to an examination of significant interventions by BLs in small firms in the period January to June 1996.

One way of addressing the methodological concerns associated with previous evaluation studies is to undertake a comparative analysis between assisted and non-assisted firms. However, the necessity here is to construct a methodology which seeks to explore whether any observed differences between these groups are due to differences in the characteristics of the assisted and non-assisted groups or can be directly attributed to the effects of assistance. The chosen methodology will examine the effect of business support on a range of performance indicators and, using an approach to identify separately the *'selection'* and *'assistance'* elements of the performance differential between assisted and non-assisted firms.

This paper can be divided into two halves. The first is the development of an appropriate methodology that is both ambitious in approach and logistically feasible. The second is the reporting of the studies findings on the impact of BL support on SME performance.

METHODOLOGY

The BL Tracker Study, as originally designed by the DTI, was modified towards the end of the research period to draw on methodological developments in measuring the impact of public subsidy on SME performance, mostly notably Roper and Hewitt-Dundas's work on the impact of employment grants (Roper and Hewitt-Dundas, 1998, 2001). What follows is a reporting of the basic, or original, research model and the enhanced model proposed to the DTI by the research team at the Small Business Research Centre (SBRC) and the Northern Ireland Economic Research Centre (NIERC) in association with Prism Research Ltd.

Basic Research Model

As stated above a critical element in any evaluation of the impact of public policy on SME performance is to undertake a comparative analysis between assisted and non-assisted firms. The DTI decided early on in the development of the methodology that the *"Impact Indicators Project"* should be a tracker study so that the medium term rather than just immediate effects of intervention by Business Links (BLs) (mainly advice and consultancy as opposed to grants) could be explored. It was also decided to use administrative data to reduce the level of sample attrition by non-response, drawing on the Inter Departmental Business Register (IDBR) which pulls together

basic information on VAT registered businesses and PAYE returners. The period covered by the study were the financial years 1993/94 to 1999/2000. Business Links located and operational within the three TEC clusters 'Industrial City', 'London and Birmingham' and 'Rural areas' were censured to provide the details of businesses that matched the definition of 'significant assistance'. Advice was sought from both an academic panel and Business Link practitioners on what constituted significant assistance. The definition agreed for the purpose of this study was:

> *Firms that had been assisted for the first time in the period January to May 1996 who minimally had two visits/meetings with an advisor and had a third visit by the November 1996.*

On the basis of a feasibility study (unpublished) it was determined that each business assisted needed a minimum of 12 matched comparators to ensure a viable sample of assisted and unassisted firms at the end of study period. The matching was undertaken on the basis of sector, employment size and geographical cluster.

It was expected there would be a high attrition rate due to comparators disappearing as a result of normal business "events" (failure, takeover) and contamination (receiving assistance from their local Business Link). Firms were matched on the following basis by the Office for National Statistics and were subsequently checked in the field as part of the verification of both assisted and comparator firms.

Enhanced Research Model

The SBRC, NIERC and Prism Research supplemented the basic dataset with survey data to control for firm level factors likely to influence their growth projectory. Without the additional in-company information obtained from the survey of assisted and non-assisted businesses it would not have been possible to accurately isolate the effects of '*selection'* and '*assistance'* on those assisted businesses that had grown faster than non-assisted businesses. For example, 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.

The enhanced methodology examined the effect of business support on a range of performance indicators and, using an approach (using selection models adopted from Bates, 1995) to identify separately the *'selection'* and *'assistance'* elements of the performance differential between assisted and non-assisted firms. Their proposed approach endeavours to address the following two problems associated with the evaluation of the desired impact on assisted firms of BL services:

- 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.

- comparisons of the performance of the assisted and non-assisted groups provide little information on the quality of jobs promoted.

The approach adopted follows that of Roper and Hewitt-Dundas (2001) work on the impact of employment grants in Northern Ireland. It combined the data collected as part of the basic research model with interview survey data on firm characteristics, business performance, market position, strategic development, owner-manager characteristics and external support. Analysis using the basic research model and the original Impact Indicators database would have provided relatively little information on the characteristics of assisted and non-assisted businesses other than their location, broad industrial group, age and initial size. The additional survey, therefore, had two purposes:

(a) To collect information on a range of characteristics which, in addition to BL assistance, might have influenced business performance (see, for example, Storey, 1994; Barkham et al., 1996; Roper and Hewitt-Dundas, 2001). These included, for example, the aspirations and characteristics of the owner-manager and the markets in which the firm was operating.

(b) To collect information on factors thought to influence the probability that a particular firm would have contacted (or been contacted) and received assistance from Business Links (e.g. PACEC, 1998, pp. 9-23). This is important as the sample selection models which are used to identify the *'selection'* and *'assistance'* effects require a set of variables which are thought to influence the selection probability (i.e. the probability of receiving BL assistance) but *not* firm performance (e.g. Cosh et al., 1997).

The survey methodology was also designed to reflect the underlying principle of the Impact Indicators database in that information was only collected from comparator firms when its matching assisted firm had already been interviewed. This gives detailed data on a matched sample of assisted and non-assisted firms, which is used as the basis for the sample selection models.

Interviews were conducted with the owner-manager of each enterprise or another member of the senior management team. The questionnaire covered the following areas

(a) Company background – including legal status, main products, export and domestic sales, innovation and quality certification
(b) Market situation – number of customers and sales concentration, number of suppliers and competitors
(c) Owner-manager – whether the current owner-manager was the company founder, his/her equity share, their attitudes to sharing ownership and their age and qualifications.
(d) Strategic direction – strategic priorities and strategy and degree of formalisation of business plan.
(e) Management – management style, management systems
(f) Sources of External Help – sources of help, types of help, support from other sources, ways of contacting business links.
(g) Company performance – turnover and employment from 1996-2000.

Sections (a) to (e) were included primarily as factors, which might influence business performance. Section (f) related primarily to the probability that firms would have received BL assistance. Section (g) relating company performance was collected largely to verify the information available on the original Impact Indicators database.

Methodological Considerations

There are a number of key methodological issues that need to be investigated before moving to the modelling of *'selection'* and *'assistance'* effects using both the Impact Indicators database and the additional survey of assisted and non-assisted businesses. The most important is the issue of the attrition of the original numbers of assisted and non-assisted businesses which may yield insufficient numbers in the final database to undertake the econometric analysis. The original study aimed to find 12 matched non-assisted businesses per BL assisted businesses, on the basis of the matching criteria used, in order to have available, after attrition effects, at least 3 non-assisted businesses per assisted business by the time of the current study. Second, to what extent the remaining businesses in the database are valid in terms of their compliance to the original definitions of assisted and non-assisted comparators.

Attrition Effects

On the basis of the a preceding feasibility study commissioned by the DTI it was determined that sample attrition would result from the following factors:

- *Increased penetration by BLs of their target market* – comparator non-assisted business at the time of initial checking could be lost through BLs providing significant assistance to them.

- *Inability to match controls on BL databases* The comparator group was therefore to be limited to those businesses which could be located in both databases

- *Closure/acquisition of either Assisted or Comparator non-assisted businesses* – it was recognized that losses of both assisted and non-assisted businesses could arise from the death of or acquisition of businesses in either group.

- *Indirect* losses due to assisted or the non-assisted comparator business dropping out, leading to losses of their associated matched business.

In practice attrition within the Impact Indicators database is presented in Table 1.

Table 1: Attrition Effects within the Impact Indicators Database

Assisted firms:

Initial sample	**892**	
• Not found on IDBR/or present on the IDBR but outside the definition of significantly assisted when checked on the Business Link Client Management Systems	- 497	395
• Firms that should have been excluded when checked	-17	378
• Closed	-55	323
• Too few controls	-76	247
Remained in the analysis		**247**

Matched Comparator Firms:

Initial sample	**9408**	
• Not found on respective BL CMS (excluded as might be known to BL by another name)	-1520	
• Linked to assisted firms that did not meet definition of significantly assisted firm	-5193	2695
• Closed	-224	2471
• Too many visits during study period by their Business Link	-980	1491
• Loss of matched assisted firm	-223	1258
• Matched assisted firm having too few matched comparators	-117	1141
Remained in the analysis		**1141**

Source: Impact Indicators Database/SBRC/NIERC/Prism Consolidated Database

The main implication of the level of attrition is the size of sample that is required even when using administrative data that places no burden on the firms involved in the study. The level of attrition can also to some extent be related to some degree of human error especially in terms of applying the definition of significant assistance. It might be concluded that any future study to this would need a national Client Management System (CMS) for Business Links, which is populated, minimally, with all businesses on the IDBR to be generally practicable.

Validity Checks

It was felt there were minimally three types of validity checks that needed to be investigated before the econometric analysis could be undertaken. These were:

Comparisons with the Wider Business Population:
The sample was compared with the entire IDBR database to test whether the sample of assisted businesses was significantly different from the wider business population. Comparisons were restricted to industrial sector and employment size. The BL client

database was not a representative cross-section of the business community as a whole being, not surprisingly given the focus of the BL initiative, more concentrated in the production sector (e.g., two-fifths compared to 10%) and more likely to employ more people. However, the real issue for the analysis is whether the groups (assisted businesses and their matched comparators) are similar in structure so that robust comparisons can be made.

Comparisons between Assisted and Comparator groups:
Evidence was examined within the Impact Indicators database, as updated and re-checked, whether the Assisted and Comparator groups remained sufficiently similar to each other. Comparison on prior growth, age, sector, and structure including chi-squared-tests showed no major differences between the characteristics of the remaining assisted and non-assisted comparator businesses to render any further survey and subsequent econometric work inappropriate.

Comparison with Wider 'Assisted Business' Population
Unfortunately no suitable database exists to facilitate this comparison, although the Small Business Service plans to introduce a national client database which would prove invaluable to such a comparison.

Overall, the creation and analysis of the of the Impact Indicators database by SBRC/NIERC/Prism Research demonstrated that there is validity in continuing with the study on the grounds that there are:

- sufficient assisted and associated comparator non-assisted businesses in the database to facilitate the construction of a survey sampling frame for the next stage of the study (survey and econometric modelling);

- no major differences between the characteristics of the remaining assisted and comparator non-assisted businesses to render any further survey and subsequent econometric work inappropriate.

THE IMPACT INDICATORS SURVEY

In order to obtain the additional set of 'conditioning' variables necessary for the econometric modelling of *'selection'* and *'assistance'* effects a total of 366 businesses were interviewed either face-to-face or by telephone between October and December 2000. This total included 165 assisted and 201 non-assisted comparator businesses. However, this total includes 33 businesses which did not match the original selection criterion of each assisted business having at least 3 valid comparators in the database. It was, therefore, decided to undertake the econometric analysis with the 333 companies (137 Actions and 196 Controls) which conform to the original selection criterion. The 62.2 per cent response rate among valid assisted firms (i.e., 137 out of a total of 220 businesses) is significantly above that usually expected in this type of interview survey.

Differences between the two groups in respect of 'conditioning' variables

How do the assisted and non-assisted samples differ in respect of the 'conditioning' variables included in the survey? Comparison of those interviewed suggested a number of statistically significant differences between the two groups of businesses:

- Interviewed assisted businesses include a larger proportion of partnerships and a lower proportion of limited companies
- New and improved products are more important for assisted businesses and a larger proportion of assisted businesses have ISO 9000 quality certification.
- Owner-managers of assisted businesses were more likely to have an ownership stake in the business and be more willing to share power and ownership to achieve business growth.
- Assisted businesses were more likely to see export growth as an important business objective than the non-assisted comparators. Joint ventures were seen by assisted businesses as a more important element of business strategy than by comparators.
- Assisted businesses were also more likely than comparators to have a formal written business plan.

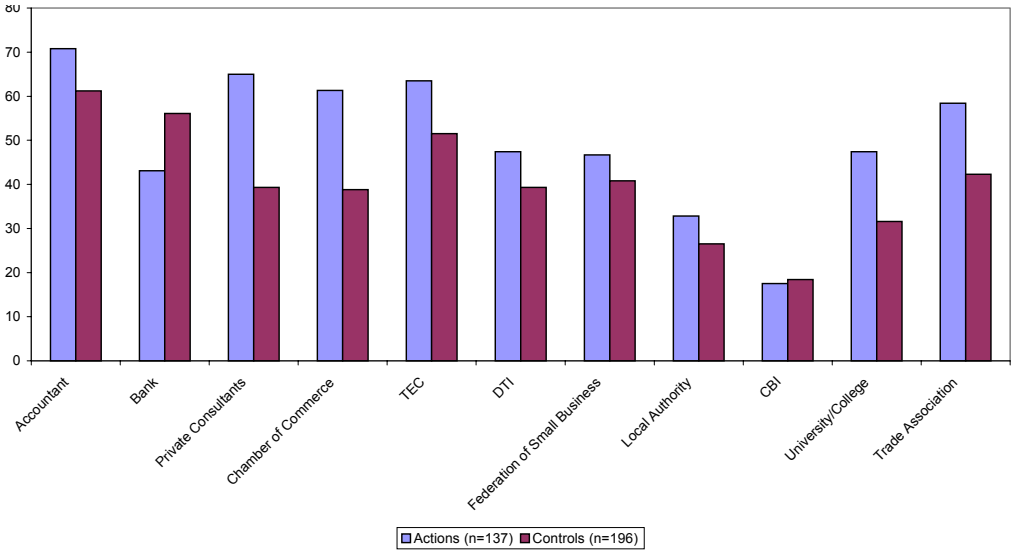

Figure 1: Use of External Advice: Assisted Businesses and Matched Comparators

An illustration of the further differences between assisted and non-assisted businesses is provided in Figure 1 which presents data on the use of external advice by the two groups of businesses. Assisted businesses were more likely to use external consultants and also were more likely to have accessed the Small Firms Loan Guarantee Scheme (although not significant at 0.05 level - see Table 2). These differences – some of which are undoubtedly linked to business performance – highlight the value of the additional survey element of the study. Failing to account

for these differences would have given a false impression of the impact of Business Links support in any subsequent econometric analysis.

Marked differences were also in the potential routes by which assisted and non-assisted businesses in the survey might have come into contact with BL. This will be important in identifying the *'selection'* effect in the econometric analysis.

Table 2: External Financial Supports

	Actions	Controls	All
	N=137	N=196	N=333
Small Firms Loan Guarantee Scheme	29.9	9.2	17.7
A SMART or spur award	12.4	9.7	10.8
Teaching Company Scheme	13.1	5.1	8.4
Assistance from the DTI with exports	24.1	13.8	18.0
Small firm training loan scheme	29.9	7.1	16.5
Regional Selective Assistance	28.5	19.4	23.1

Source: Impact Indicators Survey (2000)

Nature and Intensity of Business Link Support

The primary aim here was to probe the relationship with Business Links. In particular, the questionnaire identified ways in which firms might have come to use BL support services and to profile the type of support received. The first point to emerge was that there was substantial contamination, with both assisted businesses and comparators having received support, or had contact with Business Links since the samples were drawn. This was taken into account in the econometric analysis.

Other key points to emerge concerned the nature and estimated effects of support:

- Assisted businesses were significantly more likely to be familiar with other businesses which had received help from BL, were more likely to be in receipt of BL mailshots and were more likely to have had a direct approach from BL staff.

- Assisted businesses were in receipt of a range of business support from Business Links and it is clear from the analysis that a substantial number were more likely to have used more than one element of the support services on offer in the period from 1996

- Just over two-thirds of assisted businesses (owner-managers self-assessment) reported that in the absence of assistance they would have grown at the same rate over the period 1996-2000. A further 22.4 per cent would have grown more slowly and 2.7 per cent would have declined.

- Of those assisted businesses that stated they would have grown more slowly without assistance 68 per cent employed less than 20 employees in 1996.

MODELLING THE EFFECT OF BUSINESS LINK SUPPORT ON GROWTH

Introduction

This section outlines the results of our econometric analysis based primarily on the interviewed assisted and non-assisted businesses. The analysis presented in this section is in two main stages:

(a) An initial stage looking at those factors which influence the probability that a firm received BL assistance during 1996, i.e. that a firm falls in the assisted rather than the comparator group. This is modelled using a series of probit equations based on the characteristics of firms in 1996, their growth from 1994-96 and the sources of information through which they may have accessed information about BL. These probit models and their implications are described below.

(b) A second stage outlining the estimation of regression models for the productivity (i.e., turnover per employee) growth of assisted businesses and the non-assisted comparator businesses. Key interest here focuses on the potential importance of BL support (the *'assistance'* effect) and whether there is any systematic *'selection'* effect. That is whether the selected assisted businesses were faster or slower growing than the average.

The separation of the *'assistance'* and *'selection'* effects is important in getting a true picture of whether the actual support provided by BL was a significant determinant of productivity and sales growth. As indicated earlier, the econometric approach adopted is intended to correct for any bias induced by the selection of firms to assist by BL. Other forms of bias may occur, however, due to sample attrition, if over the 1996 to 2000 period firms in the assisted and comparator groups fail at different rates. If failure is a random event then this bias will not be important. On the other hand, if the rate of failure is affected by factors which are also linked either to the probability of receiving assistance or business performance this sample attrition bias may be more important. Our analysis suggests, however, that the characteristics of surviving assisted and non-assisted businesses in the sample are essentially similar to those of the firms in the original BL dataset. The implication is, as far as we can tell given the limited information available in the BL dataset, that there is no significant sample attrition bias.

What Factors Influenced the Probability of Receiving BL Assistance?

From the survey and the indicators database a wide range of firm characteristics, owner-manager characteristics and market descriptors are available which might impact on the probability of firms' receipt of BL support. In statistical terms, however, we would want to find a set of explanatory variables for the probit model which are unlikely to influence the level of turnover growth post-1996.

The modelling approach adopted is a 'general to simple' modelling approach where all variables of interest are included in the models and then subsequently eliminated to obtain a more parsimonious representation of the underlying data. The main criteria for elimination of variables is statistical significance although in some cases variables were eliminated or combined because of correlation or the similarity of the estimated coefficients. In the final equations in Table 3 variables were generally left in the equations if they were of particular interest or had a t-statistic in excess of one.

Five main groups of variables were included in the estimation:

(a) Firm characteristics including the legal status of the company, size, prior growth (intended to pick up any orientation towards backing winners) and the age of the firm.

(b) Informational sources by which the firm might have made contact with BL. These included other companies known to have received support from BL, BL mailshots etc, magazine articles etc.

(c) Owner-manager characteristics including age and qualifications and whether the owner-manager of the business was the founder of the business.

(d) A set of industry dummies designed to control for any sectoral targeting in BL support or differences in the propensity of firms in different sectors to make use of BL services.

(e) A set of dummy variables designed to control for any geographical differences in the intensity of BL support.

The factors included in groups (a) and (c) in particular were chosen following earlier similar studies (e.g. Roper and Hewitt-Dundas, 2001). Factors included in group (b) reflect the sources of information on BL highlighted in PACEC (1998). One issue that arises with the measurement of factors such as the characteristics of the owner-manager, information sources used by the firm etc., is that these reflect the situation at the time of the interview with firms in 2000. In the probit analysis we are essentially assuming that these variables were similar in 1996 and are therefore valid conditioning factors for assistance by BL. The less attractive alternative, due mainly to reasons of accurate recall on behalf of the owner-manager, would have been to ask firms about their activities in 1996.

The final estimated equations, the results of the general to simple modelling procedure, are in Table 3. The first two equations contain the same factors with the difference being the inclusion of turnover growth or employment growth to represent the previous growth performance of the business. The third equation in the table represents a further simplification of the model including only a limited range of the more statistically significant variables. It is this version of the probit model which is used in the sample selection modelling reported in the next section.

Table 3: Probit Models for the Probability of Receiving BL Assistance

	Equation 1		Equation 2		Equation 3	
	Coeff.	T-stat	Coeff.	T-stat	Coeff.	T-stat
Constant	-1.0538**	-2.52	-1.0795**	-2.50	-1.0066**	-3.49
Firm Characteristics						
Partnership	0.2417	1.09	0.0545	0.22		
Employment in 1996	-0.0026	-1.05	-0.0030	-1.15	-0.0034	-1.26
Turnover Growth 94-96	-0.0087	-0.08				
Employment Growth 94-96			-0.0277	-0.25		
Business Age (yrs)	0.0076	0.57	0.0039	0.29		
Informational Variables (i.e., How business found out about BL)						
Other BL clients	0.4126**	2.12	0.3778*	1.90	0.2998*	1.68
Mailshots from BL	0.0580	0.30	0.0892	0.45		
Direct Contact from BL	0.8223**	4.53	0.8550**	4.52	0.7879**	5.10
BL Advertising	-0.1411	-0.73	-0.2281	-1.14		
Media articles on BL	-0.0299	-0.15	-0.0526	-0.26		
Directed to BL	-0.1553	-0.77	-0.1320	-0.64		
O-M Characteristics						
Founder in Firm	-0.1203	-0.61	-0.1158	-0.59		
O-M has significant equity in the business	0.0880	0.40	0.0708	0.32	0.1686	0.86
O-M shares power with others	0.4337**	2.44	0.4642**	2.53	0.4244**	2.53
O-M Qualifications - Apprenticeship or below	0.3499*	1.71	0.4363**	2.03	0.3426*	1.77
O-M Qualifications - Graduate	0.1888	0.93	0.2913	1.41	0.2056	1.07
O-M Age 20-30	0.8389	1.00				
O-M Age 40-50	0.2193	1.28	0.2696	1.53	0.1904	1.19
Large/Small Firm Experience.	-0.2152	-1.60	-0.1563	-1.13	-0.2300*	-1.82
Number of observations	290		274		310	
Chi Square (9-18)	49.70		46.83		48.46	
% Correct Predictions	68.6		67.8		67.4	
Log Likelihood	-172.16		-162.95		-186.59	
Restricted Log Likelihood	-197.02		-186.37		-210.82	

Notes: The dependent variable in each Probit model is a 0/1 variable. O indicates that the firm did not receive BL assistance (i.e. controls); 1 indicates that the firm did receive BL assistance (i.e. actions). Statistically significant variables are denoted as follows: ** denotes variables significant at the 5 per cent level; * denotes significance at 10 per cent.

In general terms the estimated probit equations are similar to others of this type with similar levels of correct predictions. The other main points arising from the estimation exercise are:

- No significant differences were identified between industries in the probability of receiving BL assistance. The industry dummy variables were therefore excluded from the final models

- Similarly, no significant differences were evident between the geographical clusters (rural, industrial city and London/Birmingham) in terms of the probability of receiving BL support. The cluster dummies were also, therefore, excluded from the estimation.

- Firm characteristics had only weak effects on the probability of receiving BL support. Partnerships were marginally more likely to receive support than other types of firms as were older firms. Small firms were more likely to receive support than larger businesses although again this effect was statistically insignificant.

- There was also no evidence that BL assistance was being targeted at firms which had grown faster than average over the 1994-96 period. Both turnover growth and employment growth were insignificant (and negative) over this period.

- Informational variables proved more significant. In particular, a 'gossip effect' from knowing other firms which had received BL support and a 'mail-out' effect when a firm received direct mail from BL both significantly increased the probability that a firm would have had BL support. Other information channels seemed largely insignificant.

- Having the founder of a business still involved (and whether they had significant equity in the business) proved unimportant in terms of the probability of receiving BL support. There was evidence, however, that if the owner-manager was willing to share power, had only school level qualifications and experience of working in medium-sized firms this increased the probability of receiving BL support.

- Graduate owner-managers were also more likely to receive assistance than other less well qualified groups as were those in their twenties and forties. Neither of these effects was statistically significant, however.

Perhaps the key result here is that the probit models suggest no evidence that BL support was targeted at firms that grew faster in terms of employment or sales in the 1994-96 period. In other words any attempt at 'targeting' assistance at faster growing firms over this period was largely ineffective. Instead, the probability of support was determined primarily by the willingness of the owner-manager of the business to share power and whether or not they became aware of the potential benefits of BL support. Particularly important in terms of awareness were the gossip effect and direct mailings from BL.

Selection and Assistance Effects on Business Growth

The second stage of the econometric analysis is the identification of the *'selection'* and *'assistance'* effects on business growth conditioned (or allowing for) the impact of other potential drivers of business growth. As previously the choice of explanatory variables was conditioned by previous studies (e.g. Roper and Hewitt-Dundas, 2001) and surveys of the determinants of business growth (e.g. Storey, 1994; Barkham et al., 1996). The modelling approach adopted was again a 'general-to-simple' procedure with variables being dropped successively to derive more parsimonious explanations. In terms of the main parameters of interest – i.e. the selection and assistance effects the results differ between the productivity growth and sales growth equations. Table 4 presents the results of the regression models for productivity growth.[1] In terms of the overarching priorities and PSA targets of the DTI this is the key measure of the impact study.

It proved difficult to identify very robust equations for growth in productivity, turnover and employment. This is reflected in low F statistics for the equations (see Table 4) and limits the strength of any implications which can be drawn from the models. In terms of the key *'selection'* and *'assistance'* effects, however, the productivity growth models suggest that:

- **Assistance Effect** - BL assistance in 1996 had a positive and statistically significant effect on productivity growth over the subsequent four- year period.

- **Selection Effect** –a negative and marginally significant selection effect is identified in regard of productivity growth.

Two factors suggest caution in terms of the positive productivity effect of BL assistance. First, the overall weakness of the productivity equations suggests missing variables which may be distorting the result. Second, the large size of the apparent BL productivity effect (102% to 108% over 4 years) may suggest that the assistance dummy variable is also picking up the effect of other unrelated influences on business performance. What is clear from the model, however, is that BL assistance is effectively being targeted at firms which without support would have had lower than expected productivity growth. One possible explanation is that firms which perceived that they had some form of productivity problem were more likely to seek out BL assistance as a means of 'catching-up' with their competitors. The positive aspect of this is that the assistance provided by BL does seem to have accelerated productivity growth in these firms. In terms of sales growth the results are less satisfying although BL assistance was still seen to be having a small positive effect.

In methodological terms these results are also of some interest. In particular, the productivity equations highlight the value of allowing separately for the *'assistance'* and *'selection'* effects. The negative selection effect would otherwise have biased

[1] Equations were also estimated for turnover and employment growth as part of the full analysis for the SBS and are not reported here due to space constraints. However, it should be noted that they are less robust than the productivity equations.

downwards the overall assistance impact, effectively underestimating the 'true' positive impact on productivity growth of BL assistance.

Other factors which influenced productivity growth over the 1996 to 2000 period were as follows (Table 4):

- *Company Characteristics* – larger firms tended to have faster productivity growth although this effect was not statistically significant. Previous productivity growth also had a negative effect on productivity growth over the 1996 to 2000 period. This is suggestive of a growth – consolidation phasing in business growth and perhaps underlies a 'catch-up' motivation for firms to seek BL assistance in 1996.

- *Strategy* – Firms having an export growth objective tended to have lower growing productivity than other firms (an effect which is also evident in sales growth). Other aspects of business strategy were less significant although positive productivity effects were associated with strategic aspirations to increase firms' market shares in their current markets and develop new products for new markets.

- *Owner manager* – small firm experience had a positive effect on productivity growth but more significant were negative effects associated with the age of the owner-manager and whether or not s/he was willing to share equity in the business. In particular, firms run by owner-managers in the 40-50 age group tended to have lower productivity growth than those run by younger owner-managers. Willingness to share equity in the business also weakened firms' productivity growth performance.

- *Location* – this proved to be an important element of productivity growth linked to the relatively strong locational effects on turnover growth. Firms in the rural and industrial city clusters both increased their productivity more rapidly than those in the Birmingham and London clusters.

Table 4: Determinants of Productivity Growth

	Equation 1		Equation 2	
	Coeff.	T-stat	Coeff.	T-stat
BL Assistance	1.019**	1.99	1.084**	2.23
Selection Parameter	-0.507	-1.58	-0.536*	-1.71
Company Characteristics				
Size In 1996 (Log Employment)	-0.113	-1.05	-0.114	-1.05
Productivity Growth: 1994-96	-0.291**	-2.27	-0.299**	-2.33
Objective - Export Growth	-0.227	-1.25	-0.250	-1.39
Strategy – maintain sales of present products/services in present markets	-0.325	-1.23	-0.306	-1.18
Strategy – increase the sale of present products/services in present markets	0.260	1.01	0.232	0.91
Strategy – increase sales by selling present products/services in new markets	-0.147	-0.72		
Strategy – develop new products/services for new markets	0.264	1.37	0.225	1.21
Business Plan in operation/existence	-0.172	-0.90	-0.193	-1.05
Owner-Manager Characteristics				
O-M owns significant equity in business	0.031	0.12		
O-M shares equity with others	-0.498**	-2.49	-0.521**	-2.60
O-M Age 40-50	-0.492**	-2.58	-0.499**	-2.58
O-M has had previous small firm experience	0.287	1.51	0.275	1.44
Location				
Rural Cluster	0.737**	2.48	0.742**	2.49
Industrial City Cluster	0.494*	1.89	0.514**	1.97
Constant	-0.062	-0.11	-0.132	-0.25
Number of Observations	123		123	
Adj R-Squared	0.119		0.132	
F(..)	2.04		2.33	
Log Likelihood	-155.88		-157.29	

Notes: *The dependent variable in each model is the log difference of real productivity (sales per employee) in 2000 and 1996. Turnover and employment data is taken from the survey responses of firms. Sample selection is allowed for on the basis of equation 3 in Table 3.*

Methodological Lessons Learnt

Three main methodological issues are relevant to these results. First, the use in the models of survey rather than the indicators database data for 1996 and 2000. Secondly the issue of contamination (i.e. situations where firms have had contact with BL post March 1998), and thirdly other methodological uncertainties relating to the results.

Whilst survey data is never perfect, the value of the survey was demonstrated by rerunning the analysis using the IDBR data collated over the period of the study. To test the effect of using database rather than survey information for 1996 and 2000 the equations in Table 4, as well as equations for turnover and employment growth, were re-run using the Impact Indicators database information. Some notable differences were evident between the signs and significance of the explanatory variables relating both to the 'conditioning' factors (i.e. business strategy, prior performance, firm characteristics, the owner-manager) and the selection and assistance effects. For turnover (and employment) growth the assistance and selection parameters estimated using the indicators data were essentially similar to those estimated using the survey data. In terms of productivity growth, however, the selection and assistance effects proved insignificant in the equations run using the indicators database although the sign pattern was consistent. That is, using the indicators database, the BL assistance effect on productivity growth was positive but insignificant while the selection effect was negative but insignificant.

The importance of this result depends crucially on our view of the reliability of the impact indicators and survey information for turnover and employment growth over the 1996 to 2000 period. Our general preference is to rely on the survey data and results and to regard the consistency of the sign pattern of the selection and assistance effects on productivity growth as reassuring.

To examine the potential impact of post-1998 BL contact it useful to realise that post-1998 contact with BL might impact on turnover or employment growth over the 1996-2000 period but can have had no influence on whether a firm is an action or control. The potential issue of contamination therefore relates solely to the second element of the selection modelling and its impact can be assessed simply by including in the equations an additional dummy variable for post-1998 contact with BL. One practical difficulty here is the relatively large number of 'don't knows' in the responses to a question probing on the last contact with Business Links (before or after March 1998), reducing further the number of observations in the sample selection models. In both the productivity and turnover equations, however, the contamination dummy variable proves insignificant suggesting that any contamination effect is likely to be small.

One final methodological issue relates to other possible uncertainties in the analysis which might be taken up in future studies. For example, the measures of sales growth and productivity growth used here are both based on the total sales of valid Actions and Controls. For manufacturing firms in the sample one clear possibility is that increases in sales could be the result of increases in merchanting, factoring or sub-contracting rather than increased sales of their own production. If the extent of such developments differed between the assisted and non-assisted companies, inferences about 'productivity' or growth improvements may be misleading. While there is no a

priori reasoning to suggest why assisted and non-assisted firms should differ in these respects, it is nonetheless, a consideration for future studies wishing to expand the range of possible impact variables.

Other methodological issues relate to the structure of the sample itself which was based originally on a census of BL assisted clients and comparable controls in specific geographical areas. In other words while the results are likely to provide an accurate assessment of the impact of BL in these areas it is not necessarily representative of all areas covered by the BL network.

CONCLUSIONS AND RECOMMENDATIONS

Using data from the specially constructed Business Link Impact Indicators Database for the period 1994-2000 together with a survey of assisted firms and non-assisted firms , and adopting an econometric approach designed to make allowance for both *'assistance'* and *'selection'* effects, this study concludes that:

- First, we find no evidence that in 1996 BL assistance was being targeted effectively at faster growing firms.

- Second, we find some, albeit tentative evidence, that BL assistance in 1996 was having a positive effect on productivity growth.

- Third, we identify a positive but statistically insignificant effect of BL assistance on turnover and employment growth.

- Fourth, our analysis has highlighted a number of other factors which contribute to productivity, turnover and employment growth. The range of these factors – embracing market conditions, business strategy, the characteristics of the owner-manager and the firm itself – emphasise the complexity of the process of business growth and the consequent difficulties in both modelling and assisting the process.

The value in maintaining large-scale "tracker" databases to assist in the immensely difficult task of policy evaluation cannot be understated. Other studies have made important contributions to the question of the impact of Business Link assistance to small firms in the UK (e.g., PACEC, 1998; Bryson *et al*., 1999 and Bennett *et al*., 2000), but none have been able to separate out the interaction between *'selection'* and *'assistance'* effects. It has only been possible to do so in this study due to the longitudinal databases specifically constructed for this purpose. While many of the results presented above concerning the precise ways in which BL assistance achieve these impacts on productivity will be debated among the academic and practitioner community perhaps the more important message of the paper has been to underline the value of striving to achieve methodological paradise!

Leaving aside the somewhat qualified positive message of this evaluation study for the overall priorities of the DTI, in terms of encouraging a more competitive SME sector, the importance of investing in this type of policy evaluation framework and its

attendant data requirements (e.g., a national well maintained client database) must remain a priority within government.

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