THE LONG-TERM IMPACT OF BUSINESS SUPPORT?
– EXPLORING THE ROLE OF EVALUATION TIMING USING MICRO DATA

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Summary

The original contribution of this work is threefold. Firstly, this thesis develops a critical perspective on current evaluation practice of business support, with focus on the timing of evaluation. The general time frame applied for business support policy evaluation is limited to one to two, seldom three years post intervention. This is despite calls for long-term impact studies by various authors, concerned about time lags before effects are fully realised. This desire for long-term evaluation opposes the requirements by policy-makers and funders, seeking quick results. Also, current 'best practice' frameworks do not refer to timing or its implications, and data availability affects the ability to undertake long-term evaluation. Secondly, this thesis provides methodological value for follow-up and similar studies by using data linking of scheme-beneficiary data with official performance datasets. Thus data availability problems are avoided through the use of secondary data. Thirdly, this thesis builds the evidence, through the application of a longitudinal impact study of small business support in England, covering seven years of post intervention data. This illustrates the variability of results for different evaluation periods, and the value in using multiple years of data for a robust understanding of support impact. For survival, impact of assistance is found to be immediate, but limited. Concerning growth, significant impact centres on a two to three year period post intervention for the linear selection and quantile regression models – positive for employment and turnover, negative for productivity. Attribution of impact may present a problem for subsequent periods. The results clearly support the argument for the use of longitudinal data and analysis, and a greater appreciation by evaluators of the factor time. This analysis recommends a time frame of four to five years post intervention for soft business support evaluation.

Keywords: policy evaluation, business support, long-term impact, business structure database, data linking

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Contents

Please refer to Appendix F for an overview of the reports and conference papers prepared and previously published as a result of this thesis' research.

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Glossary

ARD	Annual Respondents Database
BERR (2007)	Initial one-year Business Link support evaluation, using the same firm inventory as for this analysis.
BLO	Business Link Operator
BLO Survey	Business Link Operator Survey – carried out for BERR (2007)
BSD	Business Structure Database
Business Link (BL)	Name for soft business support provision network (now discontinued, only an online service remains)
CIS	(European) Community Innovation Survey, same UK data as the UKIS
CRN	Company registration number (at the companies house). Serves as unique firm identifier for matching to the enterprise reference numbers in the Secure Lab.
EC	European Community
Hard business support	Financial support
HGF	High growth firm, defined as three years of consecutive growth of at least 20 percent
HMRC	Her Majesty's Revenue and Customs. UK tax authority.
IA	Intensive assistance / Intensively assisted firms
IDBR	Interdepartmental Business Register.
LD / L.D.	see below, "Longitudinal dataset"
Longitudinal dataset	Longitudinal dataset – the linked dataset most of this thesis' analysis is based on. Combines the BLO Survey's firm and owner characteristics with multiple annual editions of the BSD
NA	Non-assisted (firms), therefore the control group
OA	Other assistance / other assisted firms
OECD	Organisation for Economic Co-operation and Development
ONS	UK Office for National Statistics.
PAYE	Pay as you earn, UK automatic income tax deduction. All employers need to register.

SDS	Secure Data Service. Previous name of UK Data Service's 'Secure Lab' facility.
Secure Lab	Provided by the UK Data Service, virtual computer environment allowing remote access to micro data such as the BSD and UKIS.
SMS	Scientific Maryland Scale
Soft business support	Non-financial support, such as advice
(Storey's) *Six Steps*	Framework to assess the robustness of an evaluation (Storey, 1998).
UK Data Service	Provider of the Secure Lab
UKIS	UK Innovation Survey
VAT	Value added tax. Firms with more than £81,000 annual sales (in 2015) need to register.

Chapter One

Introduction

1.1   Thesis introduction

It is a long-established global practice for governments to intervene in the small business

sector to promote growth and job creation. A summary of that motivation by governments to

intervene is provided by McCann and Ortega-Argilés (2016):

> *"The fostering of SMEs, and in particular of entrepreneurship, are critical factors in driving economic development because of their impacts on wealth generation, innovation, skills and capabilities, the opening up of new markets, job creation and job satisfaction (Van Praag and Versloot 2007; Feldman et al. 2011; European Commission 2012). SME and entrepreneurship policies are governmental initiatives aimed at positively influencing the formation, viability and commercial success of new and smaller scale firms."*

McCann and Ortega-Argilés (2016, p. 539):

With wide-spread use of small business policy a need for evaluation arises, and a swathe of

evaluations certainly exists (WWG, 2014). However, in the large majority of cases, they take

place after relatively short periods, normally no later than two to three years following the

intervention. Those taking a longer perspective often seem quantitatively not very robust, and

usually rely on self-reported data and surveys, for example: "Did the assistance received help

your business?". Responses to such questions cannot provide a reliable measure of the

difference made by the support. At the same time, the availability of firm-level records as

captured and held by the government has become more wide-spread, with pockets of researchers around the globe exploring the use of this rich source of data.

Both of the above explain the Department for Business, Innovation and Skills' (BIS) motivation to fund this research, with a specific interest in the effects of 'soft' business support, that is, non-financial support such as business advice services. What happens to assisted firms in the longer term? Are current evaluations capturing all the effects generated by an intervention – or is there a case for taking a longer term view?

Therefore, **at the outset of this research is the concern that the research community and policy makers lack an important element – time – in their understanding of the impact of business support to small firms** – and as such of its value.

One problem with taking a longer term view is the availability of data. Surveying firms over multiple years to track performance following an intervention takes up considerable resources, and requires the cooperation of the participating firms. Given the increasing ease of gaining access to firm-level records for research purposes, a second interest by the funders (and the author) is to explore and evaluate the use of existing government firm-level records for an impact assessment over a longer term period. As part of that, providing evidence over what period an evaluation should be undertaken is an objective of the research. This raises the perennial problem of attribution: the impact of a single intervention will fade over time and become contaminated by other possible events or interventions which will affect firm performance.

1.2 Contribution made

Two major contributions are made by this research in the field of the evaluation of business support policies:

1) **A critique of current evaluation practice and its timing.** The current best practice evaluation frameworks stop short of assigning any role to the timing of evaluation. Some researchers have alluded to the fact that their research may be too short-term to fully understand the impact. Yet, for those very few examples of long-term evaluations that exist for non-financial business support, the role of time and choice of time period are not explained.

2) **The above to be underpinned by the application of a longitudinal impact study of small business support in England**, revisiting an evaluation of Business Link undertaken in 2006 (BERR, 2007). The 2006 evaluation assessed a one year period post intervention only. Revisiting this original dataset will allow to understand how impact has developed over time, beyond that one year period, and across measures used. It will also serve to inform as to what may be a suitable evaluation period.

The research is also of methodological value for follow-up and similar studies by setting out

3) **the key component of data linking scheme beneficiary data from the support organisations customer relationship management system with business registration databases and official firm-level data records for evaluation purposes.** Whilst it is not the aim of this thesis to make a contribution to theory, the methodological considerations around the used datasets and their linking will serve to inform future studies that seek to use these datasets for evaluation performances.

1.3 Structure of the thesis

Chapter One – Introduction and Contribution

The role of small business in the economy will be briefly introduced, and an understanding of policy-makers' desire for intervention developed. The justification for support for small businesses is based on market failure arguments. In response, a high number of support schemes have been designed in economies around the globe, with considerable government resource assigned to them.

Chapter Two – A Critique of Evaluation Practice

Given the central role of small business support in policy, and the number of evaluations required as a result, a large body of evaluation literature has emerged over the past two decades. Chapter Two develops a critique of current evaluation practice and its timing, establishing the theoretical argument behind the contribution of this research. An initial review of the evidence and its quality is followed by a specific focus on long-term evaluations. The argument about the importance of the timing of an evaluation is then developed, which has been suggested as important by authors of a number of previous studies. Yet, time is noticeably absent from 'best practice' frameworks for evaluation. This apparent gap results in research considered as robust when no attention has been paid to the timeline of impact or any of the potential time lags before realisation of that impact. The chapter concludes by discussing the key drivers behind the short-term focus of business support evaluation.

Chapter Three – Long-Term Evaluation: Methodology & Data

This chapter will introduce the different datasets used and include methodological considerations with regards to data linking, and therefore, adds to the core of the methodological contribution of this thesis. The use of data linking is explored as an alternative to counter one of the key problems with longitudinal analysis, namely data availability and the

difficulty of collecting data from scheme participants over an extended time period. Business Link, as the support programme which is providing the data for this thesis, is introduced along with the datasets used for linking. The Business Link data captures firms assisted in 2003, as well as a non-assisted control group. The data linking process is detailed, and the data properties of both the pre and post linking samples will be reviewed and compared. This is important given the substantial firm attrition as a result of the linking process, as will be illustrated, and as such the reduction in the size of the sample during the linking process.

Chapter Four – Survival

Using the linked dataset, this chapter will explore the survival of the assisted firms compared to the non-assisted. Firm survival is the underpinning requirement for any firm development and growth, and therefore provides a good basic measure of firm performance ('basic', given the limitations that exist around the desirability of inefficient firms surviving). This analysis only becomes possible with longitudinal data, and at the outset this chapter reviews the limited previous work on the impact of business support on firm survival, and also the general literature on firm survival. Comparisons are drawn between the differences in survival rates between supported and non-supported firms, taking into account the roles of age and size.

Chapter Five – Firm growth

This core part of the quantitative analysis focusses on the impact of business support on growth, as measured by employment and turnover growth. It also includes a productivity analysis as a function of employment and turnover. An introduction to the extensive literature on firm growth is provided, and the determinants of firm growth – including business support – are discussed. The analysis includes a number of analytical approaches. First, a variety of linear regression models with and without selection effect are estimated, covering the multiple time periods between 2004-5 and 2004-11, with and without lagged growth. This allows for comparison with the previous (short-term) evaluation results of the same set of support firms.

Quantile regressions follow, to control for the fact that impact of support is suspected not be equally distributed across outcome quantiles.

Chapter Six – Discussion and Conclusions

The final chapter reviews the evidence obtained from Chapters Four and Five, and links it back to the concerns raised in Chapter Two and the central contributions of this thesis. The research approach and possible extensions are discussed, and future good practice suggested.

1.4 The justification for business support

This section sets the context for the later chapters and the contribution they make. First, the contribution SMEs make to the economy is introduced, with focus on UK data.

Based on that introduction, the theoretical case for policy interventions in the field of SMEs is introduced and discussed, based mainly on market failure arguments. A more detailed focus on soft business support services follows, namely business advice. The empirical elements of this thesis focus on such 'soft support' in the form of business advice impact analysis.

1.4.1 The economic contribution of SMEs

There is no doubt about the key role of SMEs in the economic fabric. More than 99 out of 100 firms in any EU nation are SMEs (EC, 2013). And whilst the official definitions of what constitutes a SME may vary across other geographies outside the EU, small firms represent the vast majority of firms around the globe. They also provide and create the largest part of jobs around the globe (World Bank, 2011).

During the latest period of economic crisis, the total number of SMEs rose by 0.5 percent between 2008 and 2012[1] across the EU, whilst the number of large firms declined by 1.8 percent. The UK saw its number of SMEs shrink by three percent, compared to a 6.3 percent reduction in the number of large firms. The employment by SMEs dropped only by 0.8 percent, compared to 4.9 percent of large firm jobs having been shed 2008-12. Based on these headline figures, SMEs are not only central to the economic makeup of the UK, but appear to be more resilient than their large firm counterparts. It is that sort of evidence that leads governments to hail small business. Since 2012, the number of SMEs in the UK has been growing again.

The importance of SMEs in a nation's economy may appear obvious. However, this understanding has only evolved over the last three decades. Storey (2005) outlines that in the 1960s, small business was not considered fashionable by policy-makers and their ideas of the modern economy. Audretsch and Thurik (2004) describe how small firms "were viewed as a luxury" by governments. Research considered small firms as less innovative, less efficient, and paying its staff less. At the same time, the number of small firms and their share of total employment appeared to be falling during the 1960s and 1970s (Storey and Greene, 2010). In sum, there were few arguments in support of small business, and with small firms lacking the networks that large firms enjoyed with government and unions, the focus on large firms is hardly surprising.

Research by Birch (1979) started to shift governments' perception of the role of small firms. It is often considered as the turning point in small business policy in the developed world (Storey, 2005; Parker, 2009). His work highlighted the major contribution of small and new firms to job creation. Using US data for 1969 to 1976, Birch (1979) concluded that, for example, two thirds of jobs were generated by those firms with less than twenty employees. This research and its findings were not without considerable criticism. Brown et al. (1990; in Neumark et al., 2008)

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[1] All of the figures were sourced from the European Commission's SBA Fact Sheets for 2013. Accessed on 5th March 2014 and available from http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/performance-review/index_en.htm

argued that rather than just focussing on the number of jobs, the quality of employment would also need to be considered, based on their findings that small firms offer less desirable employment. Davis et al. (1996) were concerned about the model specifications as part of Birch's (1979) analysis.

However, along with an increasing interest by governments in the role of SMEs in the economy, regardless of how sound Birch's (1979) findings may or may not have been, entrepreneurship rates started to rise in the 1980s. Audretsch and Thurik (2004) depicted entrepreneurship rates across six nations (Belgium, Germany, Netherlands, Spain, the UK and New Zealand) and show how entrepreneurship rates declined until the early 1980s when all of the six nations show a reversal of that trend. Acs and Audretsch (1993) found this shift towards small firm employment to have taken place in every developed country.

As one of the many government reports concerned with the importance of small business, a report by Lord Young (2013, p. 9) ("A report on growth micro businesses") makes reference to Wright et al. (2010) and Scarpetta et al. (2002), by that

> *"New and growing small businesses drive economic growth by stimulating innovation, by creating a competitive spur to existing businesses to increase their productivity, and by making a disproportionate contribution to job creation".*

One of the current UK's government economic ambitions consequently is

> *"to make the UK the best place in Europe to start, finance and grow a business"*[2].
>
> <div align="right">UK's HM Treasury (March, 2011)</div>

Job creation and innovation are most commonly highlighted with reference to the importance of small business (as by Wright [2010] in Lord Young [2013] above).

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[2] In line with that objective, the Growth Plan's "independent review of how spending Departments and other relevant public sector bodies interact with the private sector, and to assess their capacity to deliver pro-growth policies" (BIS website, 21 June 2012) resulted in October 2012's Lord Heseltine's "No stone unturned" report, which also considers business support and its effective delivery.

1.4.2 Firm dynamics

Focussing on the UK context, a recent analysis by the Enterprise Research Centre (Anyadike-Danes et al., 2013) based on the Business Structure Database[3] (BSD), which captures an annual 'snapshot' of the Interdepartmental Business Register (IDBR) as maintained by the UK Office for National Statistics (ONS), found that:

- *"every year a large number of private sector firms are born in the UK ~ typically between 200,000 and 250,000"*
- *"most new born firms are very small ~ around 90% have less than 5 employees"*
- *"a decade later between 70% and 80% of those new born firms will be dead"*
- *"a cohort is born with about 1 million jobs ~ a decade later the survivors employ just half a million"*
- *"of those which have survived to age 10 ~ around 75% of those born with less than 5 employees will still have less than five employees"*

The central implications are that there are considerable dynamics at play, with high entry and exit rates. The majority of firms set up are small, and disappear again during the course of a decade. From a policy-maker perspective this raises the question why firms exit relatively quickly in the majority of cases, and whether anything can be done to support (small) business to avoid that quick exit. Firm exit thwarts the process of securing the economic contribution already generated by those businesses, for example employment.

1.5 Policy justification

As a group, small businesses are adding significantly to the economy, even if their individual impact is modest (OECD, 2013). Only the smallest fraction of small firms will ever become international champions, large firms that provide major economic impact (Hart and Anyadike-

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[3] The BSD is also the central database for the analyses undertaken in this thesis. It is introduced in detail in Chapter Three.

Danes, 2014). But given the total impact of small firms, policy-makers' interest is only logical, intending to support the success of small firms and their contribution to the economy.

In discussions of policy the distinction between small business and entrepreneurship policy can be useful, and is usually made[4]. The data available for the subsequent empirical chapters draws on data from Business Link – the now (largely) defunct UK scheme. The dataset captured firm assistance that was provided to existing firms only (with some of those firms of very young age, that is, new businesses). Whilst Business Link data is used, the analysis of this thesis is more concerned with evaluation practice, and as such both entrepreneurship and small business literature are included.

The concern by policy-makers is that small firms may not necessarily enjoy a level playing field with their larger counterparts. They do not benefit from the same economies of scale which may hinder innovation. Access to finance is harder for smaller and less established firms. Regulation may have a greater impact on small business, where the regulatory burden needs to be absorbed by smaller production volumes. They are also unlikely to have the internal capabilities available comparable to the regulatory compliance teams within larger firms. With a view on business advice, small firms may not employ the necessary overhead to understand any offer of support available to them. Failure to look outside their own operations may result in underestimating the value of any external offers available.

Markets failure arguments such as the above have commonly been used as a justification for public intervention for some time. Arrow (1969) appears to be the first to have established this argument. The interest of this thesis is in 'soft' business support, business advice to firms as offered through Business Link[5] in 2003. By comparison, 'hard' business support refers to financial assistance.

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[4] Bridge and O'Neill (2013, pp. 37-61) dedicate an entire chapter distinguishing the different uses of the terms "entrepreneurship" and "enterprise", including small business. A graphical illustration of their definitions' overlaps is found immediately after the cover.
[5] Business Link is introduced in detail in Chapter Three, as part of the data introduction.

For Britain, Bolton (1971) is widely cited as the initial work highlighting what he perceived as market failure. The concern was that small business lacks the relevant size for market influence. Also, due to higher risks or a higher tendency to avoid risk, small business was seen to invest less. This lack of investment may include choosing not to invest in external expertise or business advice, and in Bennett (2008, p. 376) a list of further authors making this and similar arguments are provided (for example, Gibb and Dyson, 1984; Storey, 1994; Mole, 2008).

Hill (2005) discussed the rational choice perspective as the basis for public intervention. In summary, the argument is that the estimated cost would be compared to the estimated (assumed) benefit – based on what is known to the decision-maker, in this context the business facing the choice for support. The implications are that firstly, with the markets choosing what activities to engage in, small business owners may negatively assess opportunities that they lack information on, and avoid engaging in some activities that would be beneficial to themselves and the wider society. With reference to business support that means that potential support advisors may decide against provision of their services, either due to unawareness of the market place, or due to limited private benefits but therefore also failing to offer what would be of wider social benefit. The second implication of Hill (2005) was that public bodies would assess this gap of private advice provision, and decide where the benefit of intervention would exceed the cost of intervention.

Based on this, Mole and Bramley (2006, p.886) developed a framework assessing the arguments for intervention, with three focal areas to justify any support intervention. Firstly, "Is publicly provided business advice a public good?" The question here is if there are 'externalities' present. This refers to situations where benefits arise out of public goods to those not directly involved in their actual production or use (for example, policing, transport, defence, utilities). Secondly, "Is public advice an incomplete market?" Incomplete market refers to a market where the private sector considers it as too risky to engage. Thirdly, "Is business advice subject to information asymmetries?" This refers to scenarios where not every party to an

agreement shares the same information. In the context of business support, this may be the consultant knowing of their abilities and value-add, but the small firm unaware of the value such consultant would be able to provide to their firm (see also Stiglitz, 2000).

Accordingly, if there was an incomplete market in the provision of business advice, and providing business advice would satisfy the requirements of being a public good (given its externalities), this would justify public intervention. Externalities are notoriously difficulty to capture, partly because any improved performance by business due to support received would translate into private benefits for the owners. In Mole and Bramley (2006), Lambrecht and Pirnay (2005) and Roper and Hart (2005) are referred to, who all suggest a lack of evidence to develop an understanding of externalities and their full extent.

The incompleteness of markets in business advice is easier to determine, yet arguments differ. Bennett (2008), drawing on surveys from the Cambridge Centre for Business Research, came to the conclusion that there is little evidence of market failures being present in the business advice market, and little opportunity for government to enhance the supply thereof. By comparison, Mole and Bramley (2006) highlight that paid-for advice, for example by accountants or lawyers, would be for specific identified issues. To what extent these would advise on matters outside their area of expertise (for example, how to grow the business or exporting), something they would not be able to bill for, is questionable. In turn, they may provide more than necessary advice on matters where they can bill. Given incompleteness of information, with a small business potentially unaware of the value of gaining advice on any topic, they may not ask for advice on topic outside their 'usual' advisors' remit. Given the client-supplier relationship paid advisors could also be biased (Hjalmarsson and Johansson, 2003; Turok and Raco, 2000).

Information asymmetries (the third question raised by Mole and Bromley, 2006) may not only mean small business not exploring the use of advice, but also that getting them engaged with advisors and consultants may assist small business to better assess the value of the external

advice (Storey, 2003). The role of government support would be to increase the overall supply of support schemes, and to demonstrate their value (Done et al., 2011). Where a business benefitted from the advice, therefore seeing value in it, the result may be in such business to seek out again advice in the future. Mole et al. (2014) underline this argument of ongoing advice, with reference to literature that highlights managers' desire of tying in with others (Bozeman and Feeney, 2007; Granovetter, 1985).

Whether or not a policy intervention is justified on above grounds is difficult to measure, and policy-makers usually choose other performance measures for evaluation. Employment presents an obvious measure for assessing firm performance. Chapter Two explores this process of evaluation, which seeks to provide confirmation/justification for the chosen policies, in detail.

1.6 Conclusions

Following an overview of this thesis' structure, this chapter sets out to introduce the role of small business and arguments for the provision of small business support, based on market failure arguments. With these arguments for business support in mind, the decision to provide business support has been taken by many OECD countries as an explicit policy priority (OECD, 2008). As a consequence, major public spending has been allocated to business support. Policy-makers are interested in how successful such interventions are in addressing perceived market failure, and as a result a large body of evaluation literature has developed.

Chapter Two highlights the scale of the policy expense for the UK, before reviewing current evaluation practice. It specifically explores the consideration of time in business support evaluation, and builds the theoretical foundations for the subsequent analysis.

Chapter Two

When best to undertake evaluations?
– A critique of short-term expediency

This chapter develops the central argument underpinning the idea of this thesis. It will commence by considering the reasons for (support) policy evaluation, and highlight the wildly varying quality of the evidence produced and drawn on. The Scientific Maryland Scale (Sherman et al., 1997) and Storey's *Six Steps* (Storey, 1998) are introduced as commonly referred to frameworks for ensuring robust impact evaluation. These frameworks undeniably play an important role and had significant impact in promoting what criteria robust evaluation should fulfil, and continue to do so. Nonetheless, there appears to be an important gap in current practice and debate – the issue of how to time evaluation. A systematic literature review follows, seeking to identify studies that go beyond the usual short evaluation time frame of one to two years. On the basis of that narrative the research hypotheses and contribution of this thesis are developed and highlighted.

2.1   Introduction – The cost of business support

Very large amounts of public money are spent on small business support, for (market failure) reasons explored in the previous chapter. Few exact estimates exist as support is provided from local through to national and EU level. The UK Department for Trade and Industry (DTI) estimated the cost of support to be £5.3 billion (DTI, 2002), in addition to £2.6 billion of indirect support through a tax regime benefitting small firms. A more recent figure is provided by Herriot

and Kingham (2009), without specifying the exact period. They state that "the government currently spends £2.5 billion per annum on direct business support schemes", a figure that is identical to an estimate by BIS (2007)[6]. The direct expenditure by BIS alone on "enterprise and economic development" was £1.8 billion in 2013-14 (HM Treasury, 2014). Forthcoming research by NESTA (forthcoming) considers that figure to be even considerably greater with around £15billion – this figure includes indirect benefits through tax reductions. Whichever of the previous estimates may be closer to the current cost of the provision of small business support, there is no doubt that the government allocates considerable resources to it[7]. In the UK, this support was delivered by more than 3,000 schemes according to a BIS (2007) estimate – a figure which at the time was aimed to be reduced to no more than 100 by 2010[8].

At such cost, it is a logical concern by policy-makers and those that deliver support, whether public or private, to understand how effective their particular support programmes may be. Some schemes may provide more benefits than others, and an understanding of what provides real (measureable) benefits allows for more effective allocation of resources or an adjustment of programmes in the future. This has become ever more relevant in times of government austerity programmes and increased competition for public funds[9].

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[6] Lundström et al. (2014) undertook an attempt at attaching a cost to SME and entrepreneurship policy cost in Sweden, where the total cost also represents a significant share of government spending.
[7] In comparison, in 2013-14, the UK government's spend on national roads was £3.2 billion, on public local transport £3.5 billion (HM Treasury, 2014), that is, of similar magnitude as business support spend.
[8] The Business and Finance Support Finder (https://www.gov.uk/business-finance-support-finder) listed 798 schemes in total on 17th June 2014, of which 380 are listed under "Expertise and Advice". Sivaev (2013) provides a figure of 900 support schemes.
[9] In 2009-10, £2 billion were allocated to BIS for "economic and enterprise development". In 2013-14, this was down to £1.8 billion, in 2011-12 £1.2 billion (HM Treasury, 2010; HM Treasury, 2012; HM Treasury, 2014).

2.2   Evidence-based policy making

The desire for evaluation in the field of business support forms part of a wider trend by the UK government for evidence-based policy making. This trend is described by Dorey (2005) as a shift from "merely muddling through" with small incremental changes to existing policy as implemented, towards an environment where the government drives research to understand the underlying causes of any problems to allow for the development of fitting policies.

"Pinning down causality is a crucially important part of impact evaluation. Estimates of the benefits of a programme are of limited use to policy-makers unless those benefits can be attributed, with a reasonable degree of certainty, to that programme."

WWG (2014, p. 10)

Evidence-based policy making became a key element of British policy making since the Blair governments from the late 1990s (David, 2002; in Dorey, 2005). When just "muddling through", the resulting incremental adjustment to policy makes the implicit assumption that the policy is broadly justified and worth the assigned resources. It does not consider what the actual outcome of a policy is, and fails to measure that against the intended and defined objectives[10].

Cowie (2012) summarises these changes, resulting in an increased focus on sound programme evaluation along two core themes. Firstly, a move away from interventionist industrial policy, which was often focussed on specific sectors alone, in all major Western Economies (UK: Blackburn and Smallbone, 2008; USA: Ketels, 2007; Europe: Aiginger, 2007 – in Cowie, 2012). This interventionist policy regime was replaced by a broader approach, looking at the wider economy and business environment. Cowie (2012) provides the example of the Small Business Service in the US, with its general objective of enterprise or innovation stimulation, rather than targeting a specific sector with a narrow set of policy tools. Secondly, Cowie (2012) argues that the attempt by policy-makers to correct market failures to provide a

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[10] Dorey (2005) warns in this context that evidence-based policy making does not imply objective policy making, "devoid of principles, priorities or preferences". Political agenda, the evaluation design and interpretation of the results play a role. Hart (2007) also points out the importance of not only the "generative mechanism" to produce the outcome, but "the specific context in which it works".

level playing field for firms (of all sizes) has led to an increased focus on evidence-based policy making; with justification sought for the rationale behind interventions ex-ante and then post intervention through impact assessments of the outcomes (see Chapter One for the policy justifications used).

In line with this shift towards using evidence, numerous impact evaluations were carried out and added to a growing body of literature in the field. In fact, the sheer number of evaluation studies available could be seen as indicative of an already saturated strand of literature[11].

That is not to say, however, that policy-makers are drawing on rich evidence for policy formulation, and where they do so it may be wrongly applied. Gibb (2000) argues that possibly due to the increase in the academic understanding of the impact of enterprise policy "there has been a growth of ignorance", "an absence of knowledge in a particular arena that might fairly be expected to be overcome" (Chambers, 1995; in Gibb, 2000). Gibb (2000) is concerned that policy priorities are established on the basis of "a number of mythical concepts and myths which are considerably influencing the establishment of policy priorities". One example illustrated is that of policy-makers' ideas about firm growth and support to small firms, which Gibb (2000) sees footed on little evidence, given the wide range of identified factors for firm growth, for example[12]. Bridge (2014) summarises the current evidence as inconclusive, also. He sees a failure of enterprise research informing policy-makers well[13].

Particularly non-academic contributions, that is, government and other institutions' research, provide a good understanding of how freely the term 'evaluation' gets used in policy. The following two examples of Dutch and Finnish evaluation studies illustrate how loosely it can be

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[11] The What Works Centre for Local Economic Growth initially identified some 700 business advice policy evaluations and evidence review (WWG, 2014).
[12] Chapter Five will review the Growth literature in more detail.
[13] This gap is widely recognised, and led to policy-makers' support e.g. for the Enterprise Research Centre, setup in 2013 as a collaboration between Aston, Warwick, Imperial College, Strathclyde and Birmingham Universities, with funding by the Economic and Social Research Council (ESRC), the Department for Business, Innovation & Skills (BIS), the Technology Strategy Board (TSB) and the British Bankers Association (BBA).

used, especially in the 'grey' literature as produced by (or for) government and other institutions.

A report by EIM Business and Policy Research (EIM, 2009), a co-production with the Dutch Ministry of Economic Affairs and international entrepreneurship experts, focuses on reviewing entrepreneurship policies developed worldwide in the ten previous years. It refers to the "positive evaluation" a Finnish entrepreneurship programme had received. It references a Finnish government report, not qualifying what had actually been evaluated. Reviewing the latter, the positive evaluation seems to entirely rest on the fact that more firms took up the offer of start-up financing assistance during the policy period reviewed (MTI, 2007). That may be positive, but fails to shed light on whether the policy is sensible and justified given its impact.

In another example, a review of Dutch SME and entrepreneur policy by Kuiper (2011), commissioned by EIM, spanning the 1982-2003 period, was designed as a "Policy Theory Evaluation". One of its objectives was to consider the effects of the policies during the given period with its approach aiming to determine the implied effects of the policy's "(implicit) assumptions", and to check whether they "are consistent with the formal policy objectives – that is, ends sought".   Links between policy and the changes in the country's small business landscape are described, but no estimations provided. Rather, a link back to the anticipated policy effects is made to explain the shift in attitude. The study expressively points out the lack of certainty provided: "While a definite causal relationship cannot be proven, the policy shift probably did contribute to a definite change in perception of the public regarding the value of entrepreneurship and entrepreneurship as a valuable alternative to wage employment" (Kuiper, 2011, p. 50).

It is beyond doubt that both the Finnish and Dutch impact assessments provide only limited insight into the schemes' economic contribution and general impact, nonetheless they were cited along similar studies as examples of evaluation (here in EIM, 2009) and were chosen as they provide good examples for evaluation of questionable robustness finding their way to

policy-makers. The general evaluation literature agrees on a number of aspects of what makes good evaluation. Central to evaluation is a clear understanding of what a policy's intent was.

Like any policy, support policy is designed with certain objectives in mind (Spicker, 2006) for a group of identified beneficiaries (e.g. a particular sector, firm size, lifecycle stage, etc.), something Kuiper (2011) paid attention to by linking back the observed firm behaviour to the original policy's aims. These objectives may or may not be articulated clearly. However, effective impact evaluation should also provide an exact understanding of the underpinning workings of the change initiated among beneficiaries, as argued by Khandker et al. (2010). They argue that programmes may indeed look beneficial (as in Kuiper's [2011] case) and yet fail to deliver on the promised objectives. Evaluation is needed to identify whether the intended effects of a policy have materialised, so that the right conclusions for e.g. future resource allocation can be drawn. Cook et al. (2008) provide a similar summary on what evaluation does, adding specific reference to *"the wider and longer-term effects on the behaviour and performance of those directly and indirectly involved in publicly-funded intervention"*.

Some evaluations include these additional dimensions of time, that is, the duration of effect, and externalities that are highlighted as desirable. Most, however, do not; the label "evaluation" can therefore be attached to a plethora of analyses and results with varying reliability or robustness.

2.3 Frameworks for robust evaluation

For a better understanding of the quality of evaluations available, and also to promote more robust evaluations by highlighting just how low many studies would rank, a number of frameworks are detailed to assess just how robust a specific evaluation may be rated. These frameworks have found wide use within the evaluation community. The section introduces two of the most widely quoted frameworks which are Storey's *Six Steps* framework (Storey, 1998) as well as the Maryland Scientific Methods Scale (SMS) (Sherman et al.,1997), as recently used by the What Works Centre for Local Economic Growth (WWG, 2014) as the central tool in their evidence review.

2.3.1. Storey's Six Steps

Storey (1998)[14] expressed his concern at the state of evaluation, looking specifically at the small business and entrepreneurship field.

> "*Given the huge variety of schemes, the diversity of countries in which the schemes are found, and the often inflated claims on the part of those administering the schemes for their effectiveness, it is disappointing that the academic community has been rather slow in seeking to address this area. Perhaps even more seriously, where the issues have been addressed by small business academics, the methods of evaluation employed have rarely been at the intellectual frontier.*"
>
> *Storey (1998, pp. 3-4)*

This concern led Storey to look at the entire evaluation process. His first published work on this matter (Storey, 1998) covers two parts of what he perceived as important in evaluation, starting with the importance of clear objectives, which can be considered as SMART[15] objectives. Secondly, a robust evaluation approach was introduced, with its robustness measureable against a scale of available approaches.

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[14] The initial working paper was published in 1998, picked up in a number of later works by Storey which are referred to interchangeably in the context of the *Six Steps* to Heaven approach, e.g. Storey (2000).
[15] A widely used term, SMART objectives define specific, measureable, assignable (later often stated as achievable), realistic and timed objectives (Doran, 1981). This concept will be returned to further below.

In detail, Storey (1998) describes clearly specified objectives as central to enabling any sort of evaluation. Examples of vague outcomes are provided – "creating an enterprising society" (see Cowie's [2012] SBS example earlier), "maximising SMEs contribution to economic development", "enhancing competiveness" and "creating jobs". Arguably the latter is comparably easier to measure, certainly by comparison to the other examples. But it fails to be of a specific nature – how many jobs are sought?[16] Without being clear on what outcomes were intended, it is impossible to measure them and to determine an intervention's impact and effectiveness.

This lack of defined objectives in entrepreneurship and small business policy was highlighted by Koning and Snijders (1992; in Storey, 1998). Considering SME policies in EU countries with an intention to provide a comparison of the same, the only comparable measure they found was the number of policies introduced for certain aspects of policy – hardly an insightful measure.

Storey devised a framework where each 'step' provides a category of sophistication for the evaluation approach applied. These *Six Steps* can be summarised as follows, starting at the most basic level. The initial three steps consider qualitative analysis, where Step 1 would be an analysis considering scheme take-up only, Step 2 would include recipients' opinions, Step 3 their views on the assistance's impact. Clearly, these approaches have their limitations, as they merely rely on observing the group that received a particular intervention. Steps 1-3 therefore are described as "Monitoring". The UNDP (2009) distinguishes between monitoring for the purpose of simply tracking progress of the implementation of an intervention or programme, and monitoring as a continuous process where frequent feedback is collected on progress towards specified goals. Either would be covered by Steps 1-3, however, given the

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[16] On a tangent, the argument may be extended further. It may also be questioned to what extent job creation is the actual aim of policy-makers – is policy really motivated by creating new jobs (and measured against), or is the actual motivation a reduction of unemployment (keeping in mind that new jobs created at one place may mean a reduction of jobs elsewhere among the competition). Also "creating new jobs" does not make any reference to the quality of these – clearly jobs in some sectors are more desirable and 'future-proof' than others.

observed lack of clearly articulated intervention objectives in enterprise policy[17] most such monitoring would automatically be limited to the more simple tracking approach, without a vision of what ultimately would define policy success.

Steps 4-6, by comparison, are referred to as "evaluation" steps. The difference between monitoring and evaluation is the latter's more rigorous and robust assessment of an activity (UNDP, 2009). As such, Step 4 would include the use of control groups, allowing determination of how non-assisted firms fared by comparison to those assisted. Step 5 further qualifies what would present a suitable control group through the use of a control group of matched firms, that is, firms with similar characteristics, so that any observed different outcome between the two groups can be attributed to the intervention assessed. However, differences are likely to remain between the groups even with the matching approach, and there may be systematic bias between the assisted and non-assisted groups – selection bias (the group getting assistance may be inherently different to firms not getting any, e.g. more proactive in researching their options, younger, in particular locations, etc.). Step 6 – "heaven" in Storey's (1998) framework - would be achieved by an evaluation that considers and corrects such selection bias[18].

An example of a short-term study that would be categorised as a Step 2 (and rather weak) evaluation would be Kapareliotis and Zarkada (2012), who set out – among other things – to evaluate the impact of a female entrepreneurship training in Greece. The training programme is described as having been the foundation for a large-scale programme across the nation. Their evaluation entirely built on facilitators' and participants' feedback straight after course completion. No specifics were reported on most of their detailed evaluation objectives, including results against measures on "the degree to which female students could see

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[17] Fortunately, Storey (1998) and subsequent works triggered some change, with clearly defined objectives more common in enterprise policy now (certainly in the UK). An example is the Growth Voucher Programme (employing a random control trial approach, where eligible firms are randomly assigned to the assisted or non-assisted groups) with articulated objectives – even if not quantified (see BIS, 2014b, p. 5).
[18] This limitation to six analytical steps is not without criticism, for example Roper and Hart (2003). Section 2.4 picks this up in detail.

themselves as potential entrepreneurs, having unique characteristics but being as competent as their male counterparts" and "[participants] attitude towards business ownership". As such the difference the training made was not assessed (which would be Step 3).

Just as demonstrated by Kapareliotis and Zarkada (2012) many evaluations provide dubious results failing to take into account the observable and unobservable differences between treated and untreated groups (Greene and Storey, 2007).

By comparison, Cumming and Fischer (2012) conducted a far more robust assessment of the non-profit Innovation Synergy Centre in Markham. Founded in 2003 it provides a "one-stop shop" linking available advisory services of "experienced consultants and business professionals" with those seeking it, described as "senior managers of established businesses". Expressly referring to Storey's work (2000) on the *Six Steps* methodology, their research hypotheses are all phrased to allow for selection effects and endogeneity. As such, different models with Heckman's selection correction regression were run. Their findings indicate a significant link between hours of advice provided and sales growth (and success with obtaining financing), whilst the impact on patents and alliance formation appears more dubious after allowing for endogeneity.

Cumming and Fischer's (2012) work provides one example of direct reference to the *Six Steps* framework. The framework has since been widely referred to by enterprise researchers when discussing the quality of evaluations, representing the enterprise policy evaluations' gold standard. This has – no doubt – more recently also been helped by the OECD's adoption of the *Six Steps* framework for its guidelines "for the evaluation of SME and entrepreneurship policies and programmes" in 2007[19].

What Storey achieved through his articulation of a memorable grading scale for evaluations is a widely applied framework that leads to a more critical appraisal of both existing evaluation and (of) the design of planned evaluations. Arguably this has led to a wider use of techniques

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19 Storey was a co-author for OECD (2007).

involving the counterfactual and addressing selection bias. The OECD (2007), the World Bank (2010) or Cook et al. (2008)[20] all provide fairly recent guides to what good evaluation should look like. The former two make express reference to Storey's framework, whilst Cook et al. (2008) are also clear about the difference of monitoring and impact assessment. The assessments of Business Link[21] by BERR (2007)[22], Mole et al. (2008); Mole et al. (2009) and Mole et al. (2011) are all examples of evaluations adopting this type of evaluation framework.

2.3.2. Maryland Scientific Methods Scale (SMS)

The What Works Centre for Local Economic Growth (WWG), a UK-based collaboration[23] setup in late 2013 to provide insights into what policies are most effective for supporting and increasing local growth, chose to rely on the Maryland Scientific Methods Scale when conducting their review of evidence on business advice schemes (WWG, 2014). Devised by Sherman et al. (1997; in Hope, 2005) the Maryland Scientific Methods Scale (SMS) ranks evaluations along five defined levels based on the methodological approach applied – and therefore allowing for a similar ranking as with the *Six Steps* approach. At a high level, the different levels of the SMS can be summarised as following:

- Level 1: Where an evaluation would use cross-sectional data with no establishment of a counterfactual or consideration of any potential selection bias.
- Level 2: The evaluation would consider the assessed group prior and post the intervention of interest, but again no use of a counterfactual or allowing for selection bias.

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[20] As widely used within UK government departments.
[21] Highlighted here with Business Link data also underpinning the analyses carried out for this thesis.
[22] BERR (2007) was authored by K. Mole, M. Hart, S. Roper, D. Saal and D. Storey. As an important previous contribution on Business Link evaluation, It will be referred to as BERR (2007) throughout the thesis for easy recognition.
[23] The What Works Centre is a collaboration between the London School of Economics and Political Science (LSE), Centre for Cities and Arup. It is funded by the Economic & Social Research Council, The Department of Communities and Local Government and The Department of Business Innovation and Skills.

- Level 3: Includes a counterfactual group, with some lose justification of how it would be suitable. Substantial uncontrolled differences are likely to be present despite controlling for some of the differences between the treated and untreated groups.

- Level 4: Makes use of a more carefully chosen counterfactual group, and the comparability between treated and untreated group is well evidenced. Selection issues are well controlled for through control variables. Consideration of sample attrition, even if not corrected.

- Level 5: Evaluations where treatment or assignment into the control group would take place entirely at random, with evidence provided on the comparability of the two groups. Control variables used should have no more than negligible impact on results[24].

The SMS was devised by researchers in the field of criminology, but as the WWG (2014) demonstrates, it is generally applicable to evaluation design. In their evidence review of business advice services (WWG, 2014) they considered 690 studies, ranking them along the SMS criteria. They found that only 19 could be categorised as a Level 3 evaluation, and 4 were Level 5 randomised control trials (with no studies found to fit Level 4 descriptors).

Four of the 23 identified robust studies cover Business Link (BERR, 2007; Mole et al., 2008; Mole et al. 2009; Mole et al., 2011 – all described as Level 3 evaluations), using the same data that was used for matching with official sources in this thesis.

The WWG's work illustrates well how there is certainly a broad range of studies available, but the vast majority of such evaluations does not provide robust evidence – only 3.3 percent of the initially identified studies in the WWG's case. MTI (2007) and Kuiper (2011), considered earlier, provide examples of studies failing to provide a robust understanding of the impact of

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[24] The previously highlighted current UK Growth Voucher scheme (BIS, 2014b) is one of the rare examples of a randomised control trial (RCT) study in business support in the UK, achieving SMS Level 5, and registered with the American Economic Association (AEA RCT Registry, 2015). It illustrates how business support evaluation practice continues to develop, seeking to reach the most robust levels of technique.

their assessed measures – and yet finding their way into other publications with the intent to inform policy.

2.4　Extending the evaluation framework(s)

However, for all the obvious benefits and undeniable important contribution made by the *Six Steps* framework, the overriding concern is that it (or the SMS) fails to reach far enough for truly robust evaluation. There appears to be a real danger that the evaluation community possibly has lulled itself into some false sense of certainty around the robustness of its findings.

This is not a novel concern. Possible extensions to the *Six Steps* framework have been suggested previously. Roper and Hart (2003) provided a tracker study of UK Business Link assisted firms in 1996, using 1994-2000 data. Following Storey's (1998) suggestions, they included a non-assisted control group and accounted for selection bias, referring to PACEC (1998) and Cosh et al. (1996) in this context. On the basis of their findings, they expressively underline "the value of striving to achieve methodological paradise". For the tracker study this included accounting for various factors beyond actual assistance. Guided by previous research – for example Storey (1994), Barkham et al. (1996), Roper and Hewitt-Dundas (2001; in Roper and Hart, 2003) – market conditions, business strategy, characteristics of the owner-manager and firm are all emphasised as influencing firm performance (e.g. employment, turnover or productivity growth). The *Six Steps* framework would, on paper, rank an evaluation that excluded such environmental factors as high as Roper and Hart's (2003) study that does include those environmental factors. Arguably, the inclusion of such environmental factors simply represents good econometric practice and does not require specific mention in an evaluation framework. The very same could, however, be argued around using the counterfactual and addressing potential selection bias, both aspects that the evaluation frameworks specifically make reference to. These also certainly represent nothing more but good econometric practice.

What was found to be of particular interest in Hart and Roper (2003) is their call for government to continue prioritising well maintained databases of "clients" (that is, firms that interacted with support outlets). The authors are clear in expressing the contribution such solid data makes to robust evaluation – arguing that without the "longitudinal databases specifically constructed for this purpose" they would have been unable to distinguish assistance and selection effects. This reference to a longitudinal database highlights an interesting aspect – that of time.

2.4.1   Evaluation objectives and the role of time

Storey (1998) attaches considerable weight to the importance of clear objectives for a policy intervention which later serve as reference points for evaluation. As previously referred to, Doran (1981) provided the most widely known criteria for defining good, or more appropriately, smart objectives. Smart objectives, Doran (1981) argued, are to be specific, measureable, assignable (later often stated as achievable), realistic and timed objectives. Storey (1998), and subsequently Cook et al. (2008), the OECD (2007) and the World Bank (2009) all call for well-defined objectives to be put in place ex-ante. This would then allow later evaluation to exactly estimate the desired programme effects.

Considering the individual SMART criteria, it is clear that for good evaluation specific objectives are called for. As these specific objectives are expressively required to allow later evaluation, they are also intended to be of measurable nature. Depending on the chosen definition of the letter 'A' in SMART, business support programme objectives are both to be assignable and possibly achievable – the latter as proven or disproven by the subsequent evaluation carried out. The former, assignable, is implied by the nature of these programme objectives: The interest lies in the impact of support provided, as such the objectives are seen as the consequence of the support. Objectives may be more or less realistic, this can only be based on previous evidence of similar schemes, and it is unlikely that policy-makers or evaluators would set themselves too aspirational objectives – unless they would receive some sort of gain from doing so, of course. Certainly though, business support evaluations have shown that not

all programmes make a positive contribution, but whether that is due to honest error or unrealistic objectives (out of whatever motivation, and around impact on the assessed measures) remains unknown.

Simplistically said, the interest here is with the T of SMART in objective setting. When are the defined objectives to be achieved? What is the duration of the desired effects? Evaluations appear to be carried out on the basis of the belief that at the point of evaluation, programme effects have been achieved. None of the literature presented in Section 2.6 justifies its choice of timing, or states that it makes an assumption of impact having been achieved. It must be made implicitly, as otherwise an evaluation would be of little sense. Programme impact may not be measureable if assessed too early, or it may fade in the long-term. And even if measureable, would the strength of impact be constant over time? There may be instances, for example, where programmes have an initial positive or negative effect on performance, and the reverse in the longer term. King and Behrman (2009) provide one of the few examples of a specific call for considering the impact timescales as part of the evaluation design.

Because of the importance of impact having been realised (and continuing) just as the evaluation is being carried out, this implicit assumption of evaluating at the right point in time should certainly be explained by evaluators. Why would the chosen point of time for evaluation be reasonable in the context of their scheme assessed? In fact, no evaluations – based on the author's review of the evidence – appear to provide such rationale for their timing.

The question whether the role of timing of an (business support) evaluation is rightfully ignored, or highlights a certain naivety or ignorance by researchers and those commissioning research, is inevitable. The answer is likely to be linked two central concerns faced by evaluators. Along with data availability, political considerations and pressures play an important role here, and this is discussed in Section 2.7.

2.5   Step seven to heaven?[25]

"When setting performance targets, governments and agencies appear to rely often on short-term indicators to measure what is inevitably long-term change. This can be counter-productive when there is also a tendency towards policy and programme implementation to be 'target driven' to achieve an easily measurable definition of success in the shorter term."

Bridge and O'Neill (2013, p. 308)

SME and entrepreneurship policies fall into two broad categories: They can aim at providing 'hard' financial support, or 'soft' non-financial[26] support. The evidence around the latter will be considered, seeking to draw on examples of evaluations of non-UK schemes where possible. Of particular interest is the length of the time covered by the evaluations between the business receiving the assistance and the evaluation occurring.

At the outset of this review the concern is that whilst evaluations of non-financial business support exist, these normally only cover a limited time span with the evaluation being undertaken within a year or two of the intervention. They would, therefore, be entirely robust from a SMS or *Six Steps* perspective, but limited to a very short-time frame post intervention. Hence despite technical robustness, they would be potentially of limited value in terms of understanding and assessing impact.

Bridge and O'Neill (2013) are concerned about this perceived short-term focus of evaluation, and numerous similar commentaries to the same effect exist. Schwartz (2009), with focus on

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[25] The long-term evaluation literature review (from this point to the end of the chapter) was prepared by the author for the BIS funded "Feasibility Study – Exploring the long-term impacts of business improvement services", (a number of conference papers resulted from this, e.g. ISBE 2013, NCSB 2014, and the main report is available by the Enterprise Research Centre Report No. 29 Mark Hart as the principal investigator reviewed the write-up of the literature and edited some sections, but the core of the work and narrative presented here is the author's.

[26] Examples of financial support would include loan guarantee schemes, start-up funding (which may aim at particular industries or groups of society) and innovation support for particular technologies; examples of non-financial "soft" support would include business advice provision, training and education measures (e.g. to foster an enterprise culture).

the impact of incubators, finds that "it is surprising that empirical evidence is very limited" once the intervention is over. Chrisman et al. (2005) are concerned that "most of the [outsider assistance] studies that have been done to date focus only on short-term, rather than long-term, impacts (…)". So whilst there is often a desire for the effectiveness of a new scheme to be considered, there is a concern that it is too short a time period since the intervention and this limits the chance of the impact of any intervention to have been fully realised.

This argument is also made by, for example, Lundström and Stevenson (2005) who stress the importance of taking into account any time-lag that may exist between an intervention and its impact. Shapira (2001), considering manufacturing advice services in the US, is concerned that those advice services that would create longer term and less tangible results, such as training, would look comparably worse than those services that yield more immediate gains, for example the reduction of energy consumed, and are therefore sooner to observe and "more readily measureable". The OECD (2007) also highlights this difference in time-spans between intervention and potential impact for the diverse forms of assistance.

The review of a decade of entrepreneurship policy in the Netherlands (EIM, 2009), and in particular entrepreneurship programmes at school, found that holistic and consistent evaluations for the programme are missing. It concluded the ideal scenario would be one where a longitudinal investigation would be conducted assessing "before and after the educational programmes".[27]

Similarly, the earlier economic impact study of the English Business Link offer concluded that one of its two main limitations is its restriction to an 18-24 month period for impact assessment following the original intervention (BERR, 2007). More than half of the firms surveyed for that study suggested that the benefits from the Business Link advice will occur beyond that time frame, leading the authors to indicate that the true impact may have been understated in their study – see also Mole et al. (2008); Mole et al. (2009) and Mole et al. (2011). Their

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[27] It is remarkable just how little reference to policy evaluation is made throughout the different sections of this EIM (2009) report, considering it's a review of a decade of global entrepreneurship policy.

recommendation, therefore, was to return to the sample to add longitudinal performance information at a later stage[28].

Step 7 = Time?

It also appears that existing evaluations provide no justification for the chosen points in time for measurement and evaluation (see also King and Behrman, 2009). That may appear surprising, as this lack of discussion results in the implicit assumption of an intervention's impact being linear over time, and observable pretty much with immediate effect[29].

Usually, where the timing of evaluation is discussed, the considerations focus around *ex-ante* and *ex-post* evaluations (Cowie, 2012). Whilst an important consideration, as ex-post evaluations may miss ex-ante design issues, it does not address the concern about the timing applied as part of the ex-post evaluation process.

Cook et al., (2008) provide a good summary of the state of evaluation specifically with regards to time, referring to the longer-term effects as persistence effects.

> *"Benefits from interventions last for different periods of time – some benefits occur only while the intervention is in place, others last well beyond its completion. […] Despite the importance of persistence effects, it is rare for evaluations to them into account or even discuss them. The consequence is that interventions with very different persistence effects end up being treated much the same.* **And that makes no sense at all.***"*
>
> Cook et al. (2008, p.11)

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[28] The current UK Growth Voucher scheme is taking time into consideration to some extent: "Every business that participates in the Growth Vouchers programme will be monitored to examine their progress over the next two to three years." (BIS, 2014b, p. 5), suggesting the intention of a (short) longitudinal evaluation, to the end of 2016.
[29] Section 2.7 considers data availability and importantly political expediency concerns as likely reasons explaining this problem.

2.6 Systematic literature review of long-term evaluations

A broad desire for longer-term impact analysis appears evident. There is concern that "persistence effects" may not be captured by what are usually fairly short timespans between an intervention and subsequent evaluation.

This section of the chapter serves to test these claims, by means of a systematic literature review looking for examples of long-term impact evaluations of non-financial support. Importantly, the studies are reviewed as to whether they offer any explanation for the chosen timing and time frame applied. Any studies that allowed for a longer time period between the measured intervention and observed effects were also of interest for insights into appropriate methodological approaches to conduct such long-term evaluation.

2.6.1 Methodology of long-term evaluations literature review

A literature review to identify to what extent evidence on the long-term effects of non-financial government interventions exists in the small business policy area was carried out. The literature review was undertaken systematically using the following processes:

- A database search using common relevant search terms for the area of interest, including multiple combinations of "business support", "non-financial", "assistance", "small firm", "policy", "advice centre".

- An online search for relevant publications outside academic journals, specifically those of governments or other relevant bodies, such as the European Commission and OECD.

- A search combining above keywords with identified support scheme names. This was done for all international schemes considered in Mole and Bramley (2006), based on the assumption that the schemes considered at Mole and Bramley's (2006) time of

writing would have existed sufficiently in the past for the long-term impact to have been reflected upon.

- An attempt to do the above steps in German language was also undertaken to partially negate the risk of all non-English language research being overlooked[30].

- For any relevant longitudinal evaluations identified through the above steps, other articles cited in the paper were checked (on the assumption that the probably small number of long-term evaluations is likely to refer to the potential limited body of evidence existing).

As outlined above, most known UK evaluations for non-financial small firm support consider impact of schemes for up to two years after intervention. Therefore, those studies that assess impact for at least three years after the original intervention will be considered as long-term. For comparison, and especially for methodological reasons, some research from outside the specific focus of non-financial assistance will then be reviewed. As noted earlier, no distinction will be made between primarily entrepreneurship policies and those aimed at existing small businesses; methodologically evaluations of both kinds are of equal interest.

Given the different levels of sophistication and accordingly potential value, when reviewing the somewhat limited existing evidence of long-term impact by non-financial schemes for small firms, particular attention was paid to those that would be considered as evaluations rather than monitoring studies, as defined above. Of particular interest were the methodologies applied by such evaluations, and the data they draw upon.

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[30] This was determined by available language skills more than anything else, but given the economic significance and strength of German SMEs, Germany certainly provides a sound reference case for the state of evaluation of business support.

2.6.2   Review of the evidence of long-term evaluations of non-financial schemes

Broadly, long-term evaluations of non-financial interventions for small firms fall into the following broad categories – just as studies for short-term impact do:

- Qualitative – Survey of firms subject to intervention in the past with/-out control group

- Quantitative – Analysis based on firm performance data with/-out control group

- Quantitative – A combination of survey and firm performance data with/-out control group

- Other – that is, the Dutch "policy theory evaluation", as described in Section 2.2.

Evaluations can be of very different quality. The OECD's (2007) approach using Storey's (2000) *Six Steps* framework (as reviewed earlier) was used to judge the sophistication of an evaluation.

As expected, there were very few robust studies of the long-term impact of non-financial support programmes to small firms. Indeed there was a limited body of long-term impact studies of business support policies, even when including those centred around the provision of financial support, among government sources and bodies such as the OECD and the European Commission.

However, some reviews have been undertaken that can be described as somewhat more sophisticated. For example, Gladys and Tan's (2010) work for the World Bank, which provides a selection of impact evaluations of SME programmes, many with robust econometric methods. Long-term impact studies for financial support seem more popular with researchers, with financial support easier to measure (and data more readily available). Notwithstanding, there are still few comprehensive studies overall, especially when considering the proportion of government expenditure dedicated to them. Given the potential methodological relevance of these, a number of the studies will certainly inform methodology of the empirical research to be undertaken. Table 1 provides a summary of some noteworthy contributions that should be considered for the design of long-term evaluations. These will be considered in some detail before concluding with some broader observations from the review.

2.6.3 Selected existing long-term studies in detail

Table 1 details the key points from seven studies. Their common denominator for inclusion here is that all of them present some form of long-term evaluation. They represent evaluations that span several years and therefore taking that longer term perspective few studies do. This thesis' focus is on the impact of non-financial support. In reviewing the studies it was decided to also include a couple of identified long-term financial support studies – based on the scarcity of appropriate long-term evidence available.

For the in-depth review of these seven studies a number of criteria were identified for consideration in line with this thesis' research objectives. Specific criteria of interest were the data sample and its source, how potential selection bias was addressed, the reasoning provided for the chosen time frame evaluated, and whether evaluation was based on two or multiple measurements (that is whether the long-term average effect was estimated or a profile of impact over time created, by comparing numerous time intervals for each measure available). These criteria are reflected in the summary material presented in Table 1.

All schemes highlighted in Table 1 were found to be of methodological relevance and can serve as a representative selection of appropriate case-studies on the limited volume of literature available in this field. Methodologically the studies presented here are strong when compared to Storey's Six Steps of the SMS, with the exception of Chrisman et al. (2005) given their lack of a control group.

Table 1 – Selected long-term evaluations (methodologically of interest)

Author(s)	Country	Evaluation span	Reasons provided for chosen evaluation horizon	Scheme type	Methodological highlights	Data in detail	Key Finding
Non-financial support schemes							
Rotger et al. (2012)	Denmark	5 years (firm performance); 7 years (firm survival	Data availability. Authors clearly articulate desire to return to studied cohort with more data (p.516).	Pre-start advice	Use of official micro data. Data linking. Non-parametric approach and propensity scoring (i.e. selection concerns addressed). "impact" profile for three years.	N=464/609. Official micro data provides information on firm setup date, turnover, number of staff and exit date. Sample size 464-609 (dep. on cohort).	Scheme positive for survival, less pronounced so for growth. Call for RCTs.
Wren, Storey (2002)	UK	2-8 years	N/A	Marketing advice	Extensive econometrics, selection issues tackled (Heckman two stage). Survival, employment and turnover as outcome measures. Analysis based on two data points for growth.	N=2840/4326. Data as captured via follow-up surveys (41 percent return rate). Survival cross-checked e.g. with BT directory.	Results differ, highest positive impact found for 10-80 employee firms, with no impact for the smallest firms.
Chrisman et al. (2005)	US	5-9 years	N/A	Pre-start advice	No control group, regression of hours of assistance and a number sales/employment growth controls. Selection issues discussed and representativeness of sample concluded.	N=159, split across three cohorts. 28 percent response rate. Limitations of data recognised.	Significant impact of scheme, but diminishing marginal effectiveness with potential negative overall impact in case of too much assistance
Chrisman et al. (2012)	US	5-7 years	N/A	Counselling/ Education	Regression incl. hierarchal analysis. Selection issue discounted for given dataset.	N=256. Data from follow-up survey, 12 percent response rate. NOTE: "Although the response rate was lower than we would have wished, it is not inconsistent with other studies using a longitudinal survey design."	Entrepreneurship education has positive link to start-up rate, counselling impacts firm performance.

Author(s)	Country	Evaluation span	Reasons provided for chosen evaluation horizon	Scheme type	Methodological highlights	Data in detail	Key Finding
Ministry of Economic Development (MED, 2009)	New Zealand	7 years	Data availability: "our analysis is restricted to 2000-2006 because of the coverage of the [database used]."	Not strictly non-financial: Funds provide to access expertise.	Use of official micro data. Data linking. Wide range of other support controlled for. (Significant) selection issues accounted for, panel models and propensity score matching.	Assisted N=1130, assessed against total NZ firm population (N=700k-1050k).	Most robust long-term study identified. All methods used suggest a generally positive impact on firm growth. One-off impacts observed.
Financial support schemes							
Criscuolo et al. (2012)	UK	19 years	"Because the objective of RSA is to increase employment, we are interested in the long run effect of treatment rather than the short-run effects that occur while the firm receives RSA."	Regional Selective Assistance programme	Use of official micro data. Data linking. Selection addressed. Value for money. .	N>2m (UK firm population).	Scheme effective for smaller firms, no effect on firms with more than 150 staff.
Almus, Prantl (2001)	Germany	6-9 years	Mid-term study justified by the need to look beyond short-term effects which are believed to fail capturing the full magnitude of impact (despite being common evaluation standard).	Broad financial support	Half yearly data 1990-1993 with 1999 follow-up survey. Firm matching and propensity scoring to address selection/for control reasons.	N=12k.	Overall positive scheme impact, including better survival chances.

The central observation relevant to this chapter are the considerations provided by the authors around their chosen time frames. Three of the five non-financial support studies fail to make any reference to timing of their study. MED (2009) refer to data availability considerations. Rotger et al. (2012) also point at data availability, but clearly expressing their desire to return to their dataset with more years of data in the future. Theirs is the only study therefore that does imply that evaluation timing could be of relevance, and on that basis they express their desire for more performance data to return to their analysis. The referenced financial support studies are of interest as they provide examples of express considerations around the timing of their evaluation. Criscuolo et al. (2012) with their evaluation of the Regional Selective Assistance programme make reference to the programme's objectives, in explaining that "because the objective of RSA is to increase employment, we are interested in the long run effect of treatment rather than the short-run effects that occur while the firm receives RSA".

Almus and Prantl (2001) in turn argue that their concern would be a failure to capture the full impact of their assessed scheme if undertaking a short-term study, even if that short-termism was standard for the evaluation literature. Both studies stop short of providing any evidence around their perceived need for taking a longer term view. Overall, the identified long-term evaluations illustrate the gap in current non-financial business support studies to properly consider the impact of their evaluation timing. This is a particularly curious finding given the authors' obviously decided to undertake long-term evaluation for an unstated reason.

The concern around data availability was raised previously in this chapter, and is referred to by a couple of the above studies also. The underlying sample sizes for some of the studies confirm this struggle. Those studies that worked with follow-up surveys to the assisted firms several years after the intervention struggled with low return rates (12% in the extreme), even if described by the authors as in-line with expectations. By comparison, sample size increases (and by large multiples) for those studies that used follow-up data as available from official sources: national firm registers and databases. MED (2009) and Criscuolo et al. (2012) rely on entire nations' firm populations as control group. The studies in Table 1 highlight another problem with follow-up surveys. Whilst such survey usually only looks establishing performance for a given time period, official databases allow to access annual data, allowing to understand the profile of any impact in better detail across the years. The case for and use of micro data will be considered in Chapter 3 in more detail.

2.6.4 Summary of the wider evaluation literature review findings

A summary of the key findings of the broader literature review is as follows:

- As already highlighted earlier in this chapter, robust policy evaluation in the field of business support policy has been called for (repeatedly) by several leading authors and bodies, with e.g. the OECD (2007) in their recent "OECD Framework for the Evaluation of SME and Entrepreneurship Policies and Programmes", or the World Bank (2010) making the case for the evaluation of support schemes.

- One of the key concerns with the evaluations, particularly the few long-term ones, is the use of self-reported impact. This self-assessment, among other factors such as a firm's satisfaction, perceived difference and additionality of programme, etc. is likely to be highly subjective, and lead to both over- and underestimations of impact.

- Studies drawing on performance data of firms such as sales and employment growth would be considered more reliable in that respect. Lambrecht and Pirnay (2005), assessing free consultancy days for a SME programme in the Walloon Region of Belgium, highlight the discrepancy between firms' reported satisfaction (found to be favourable) and measurable performance effects – finding no significant impact of the programme on net job creation, turnover or financial indicators.

- Key constraint to evaluation is data availability, and required long-term planning. Data samples tend to be small and covering specific and quite local geographies, and therefore the ability to generalise findings is constrained.

- Increasing availability of micro-data on firms requires only the details of treated firms (some controls and characteristics should be available), and can then be linked to

performance without a need for liaising with firms. Data linking also enables the use of much larger samples.

- Highlights some studies benefitting from data linking (all, by nature, longitudinal) for Denmark and New Zealand, however, e.g. Japan has also seen the use of data linking for business support evaluation (Motohashi, 2002).

There were also a number of observations of interest from identified short-term evaluations (even if the focus was on long-term evaluations for the review):

- Selection issues are mostly considered and treated (the latter not in the case of Lambrecht and Pirnay above), for instance Storey (2000) with the "Six Steps to Heaven" framework was very influential in pushing the wider use of this.

- Selection bias is often addressed through Heckman's two-stage model, but there is appetite for further advancement of methods in many studies.

- Just as Heckman's selection model has become part of the state of the art standard in recent years, methodologies including difference-in-difference models, instrument variables and propensity score matching for control purposes have all become widespread practice in quantitative business support evaluations.

- The number of interventions and participation in other assistance programmes of an individual firm is vital information (the attribution problem), but difficult if not impossible to capture. The longer the timespan an evaluation covers, the more concern this causes. There are examples of studies, such as for New Zealand (MED 2009), where firm participation in a considerable number of schemes, additional to the one evaluated, was captured and controlled for.

Figure 1 – Other issues with robust "sixth step" evaluations

Issues - other than time - with robust "sixth step" evaluations

Other problems with evaluation remain. A Step 6 evaluation along Storey's *Six Steps* framework, with measurements taken at one or preferably multiple carefully justified points in time (assuming that is at all possible) will still be only a technically most robust evaluation, but will be able to provide no better insights than what was measured. It is reasonable to assume that not all effects of policy are measureable.

Also, concerns remain about whether defined objectives appropriately reflect the expectations by both policy initiators and evaluators. Greene and Storey (2007) criticise what they refer to as the treatment of enterprise programmes as "black boxes"; in essence an evaluation construct where inputs such as the firm or individual are compared to the outputs (growth, survival, etc.). This is done to estimate the additionality of the intervention in question, but fails to account for the context in which the evaluation took place. Greene and Storey's (2007) concern is that the expectations between those evaluating and those evaluated may deviate. On the one side evaluators' objectives may be anything from attempting an objective and robust impact evaluation of the support provided, to using the evaluation as a mere medium to establish closer bonds with the evaluated. On the other hand, the evaluated may not be providing objective inputs due to fear of consequences (e.g. if the evaluation's results are feared to result in the termination of the assessed support programme). Alongside, the financiers of an evaluation may have a vested interest in the outcome of the evaluation. Often evaluations are paid for by those who initiated a particular programme, and it is reasonable to assume that in many (political) circumstances a certain positive or negative outcome may be hoped for by the funders (and possibly explain their interest in the evaluation being undertaken at all). Further, funders may not have articulated programme objectives and therefore not measured and assessed these – Greene and Storey (2007) provide the example of funders saying they are interested in programme outcomes, but not highlighting the fact that they were hoping to improve the managerial processes used by the programme. In consequence, funders may then ignore the evaluation findings, claiming they are irrelevant or, worse, not delivering the "correct" message (van der Meer, 1999; Weiss, 1999; in Greene and Storey, 2007).

A further concern with programme evaluation, however robust, is its failure to address the relative merit of one programme over another. Whilst a specific intervention may yield results favourable over the counterfactual, that result cannot serve as confirmation of a programme being an (or in fact the most) appropriate intervention.

2.7 Discussion and conclusion

The summary by Cook et al. (2008 – as quoted at the end of Section 2.5) remains valid even when considering recent evaluation evidence. Evaluators suggest certainty around the impact of an intervention based on assessment time frames that are usually fairly short, and, far more concerning, not at all explained or justified. It does make "no sense at all" that, regardless of the nature of an intervention and regardless of its target group, there is hardly any discussion as to how timing was chosen. As explored in Section 2.4 there are calls for applying a longer time frame, however.

Of course, there are good reasons for how evaluation is currently undertaken and timed. Firstly, the interest in a particular scheme's success fades over time, as the policy environment moves on. Policy-makers are keen to understand effects quickly. Funding for evaluations is usually awarded close to an intervention taking place, not years later.

Other reasons include the issue of access to data. Even if an evaluation is undertaken numerous years after an evaluation, the data captured as part of an intervention will usually not stretch much beyond the intervention period. Interest in capturing and maintaining data over numerous years is limited, as political and organisational changes may quickly render previous policies (and interest in them) obsolete. Capturing data retrospectively through surveys is very costly and relies on the willingness and ability of participants to remember their participation in the scheme of interest and provide the required insights into their business (and it still requires researchers to be able to identify a list of participants to survey)[31]. An alternative approach would be for qualitative evaluation (Done et al., 2011), but that will always be limited to insights based on few firms, and possibly subjective data.

With the intention to explore long-term evaluation of non-financial business support this thesis also ran into data availability issues. Originally, for the purpose of this thesis, it was agreed with BIS to work with assistance data from the UK Regional Development Agencies (RDAs).

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[31] For example, Cowie (2005), describes data collection as a key issue for any evaluating body.

However, by the time the funding for this research was approved and the work on this thesis commenced, the RDAs were preparing for their March 2012 closure and their data had become unobtainable for BIS[32].

In fact, the following analysis, whilst drawing on Business Link data, has been mainly funded to investigate the feasibility of long-term impact evaluation and to set out some methodological lessons for future work. With Business Link now reduced to a website, there is little appetite in government to understand the impact on firms originally assisted under the intervention over a decade ago. Other than the remaining website offer, the scheme has been replaced by Growth Accelerator (which in turn was set for closure at the time of printing this thesis). Attention has now turned to assessing its impact with the use of self-reported evaluation surveys undertaken independently (BIS, 2014c). However, lessons appear not to have been learnt as the short-term evaluation work points to a 'positive impact' of Growth Accelerator, yet such an assessment would not be ranked highly by the Maryland Scientific Methods Scale (as in WWG, 2014) or Storey's Six Steps framework. In addition to the main critique around the use of the self-reported data for, in the case of the Growth Accelerator evaluation, economic impact analysis and gross value added estimates is that in this instance firms were essentially asked to provide estimates about anticipated effects in the future as a result of programme participation.

The danger that emanates from this lack of debate around the actual timing of an evaluation is that results are almost always presented with some certainty and confidence that "Scheme A was effective", "Scheme B was not". In response to the literature reviewed in this chapter and the observed short-term frames generally applied for evaluation – despite critical voices that long-term evaluation may be required – it needs to be empirically tested whether the accurate conclusion drawn from such evaluations would not be more accurately reflected by "Scheme A was effective for the one year period assessed, but there is no evidence to suggest

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[32] This particular challenge with preparing this thesis is revisited in Chapter Three.

that this snapshot in time reflects the final truth about the effectiveness of the scheme (if there is such thing at all)".

Such results would not only be quite a mouthful, but also unlikely to resonate well with research funders[33]. From their perspective, there are some obvious questions to respond to about the claim that time matters for evaluation purposes – in line with the research hypotheses as introduced previously. In line with the contributions of this thesis as specified in Chapter One, what is required is:

1) Robust evidence demonstrating that short-term results do not necessarily tell the whole story.
2) A methodology that facilitates a workable approach to long-term evaluation.

The next chapter will introduce such methodology and the datasets that form the basis of my thesis, with the analysis and evidence undertaken presented in the chapters that follow.

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[33] Policy-makers met during the course of this PhD at various conferences and events were always reasonably keen to get an absolute response, that is, "Scheme A was effective", or "Scheme A was not effective". It is also questionable whether research results that include such caveats would be cited with the limitations specified – often literature reviews omit such limitations.

Chapter Three

Developing a long-term evaluation framework
– Methodology & Data

The previous chapter highlights the apparent gap and desirability for long-term evaluation of business support programmes. This desire works against two main opposing forces. Firstly, political pressure will always mean a keen interest by government and other support bodies to quickly gain evidence on a scheme's impact. Secondly, on the technical site, data availability presents a key obstacle for undertaking longitudinal impact assessments.

This chapter seeks to address the second of above-mentioned forces, and presents a methodological approach and the datasets required that allow such an evaluation of a business advice programme from intervention through to the present. In this thesis, the intervention in question took place in 2003.

3.1 Introduction

3.1.1 Research methodology

This section serves the purpose of briefly reviewing the research philosophy subscribed to in this thesis, prior to detailing the research methodology in detail in subsequent sections of this chapter. The purpose of this thesis is to test a number of hypotheses, that is, what is believed

to be true, and confirm or reject them to add to what is known to be true, as described by the term 'epistemology'. To reach this truth, the distinction is made between two major research philosophies: positivism and interpretivism. Positivists subscribe to a reality that is observable, constant and – importantly – can be described objectively and without interfering with the subject of interest. As a result, observations would be repeatable, and individual factors influencing the result could be seen in isolation. On the basis of the observations and the understanding of reality formed, predictions can be made. By comparison, interpretivists subscribe to a reality that can only be properly understood through subjective interpretation of observations and engaging with reality. As such interpretivists may affect and interact with their subjects of interest through their studies, and also end up with multiple interpretations of reality – all equally valid and jointly informing scientific knowledge. Both research philosophies have their place, and in fact mixed methods research combining positivist and interpretivist methodologies are common.

There are a number of factors why this particular piece of research takes a positivist stance. Most importantly, one of the central motivations for this piece of research is to work with a large longitudinal sample – investigating the use of available secondary data without the need to consult the firms involved. The difficulties around surveying thousands of firms over multiple years and the resource-intensity of doing so are considered as one of the key barriers to long-term impact studies (more detail on this in the next section). An interpretivist stance for research on such a number of firms over multiple years would be even less likely in practical terms. Importantly, the belief is held that given the large number of firms within the sample available for this research, a reasonable fair and representative picture of reality can be drawn. A mixed methods approach would have been desirable to understand some of the firms' developments better, and particularly the role of the business support received over time. What this positivist research will do is to average out effects and provide an idea of the general broad effects of business support. However, it will fail to provide a good understanding of the multiple individual experiences had by firms and groups of firms. An interpretivist approach may be

able to uncover some of the reasons as to why business support has been (or failed to) be of impact over time. However, as the firm data was only to be made available in anonymised format, identifying specific firms from within the sample was impossible – even if desirable to allow for a more inclusive use of research philosophies.

3.1.2   Introduction to the methodology chosen

With that in mind, a study seeking to investigate the long-term impact of an intervention (assistance) on firm performance has limited methodological options. The previous quantitative research introduced in Chapter Two draws exclusively on surveys of firms, whether specifically conducted for the presented study or as secondary data. The survey underpinning the Business Link evaluation in 2006 (BERR, 2007; the resulting dataset was also used in Mole et al., 2008; Mole et al., 2009 and Mole et al., 2011) would be an obvious example of such an approach, which is also recommended in Wren and Storey (2002) and Chrisman et al. (2005). Based on those previous studies, the desired approach to evaluate a business support intervention would be to undertake a survey of assisted firms, and for a more robust design, also of comparable non-assisted firms.

As part of the review of how previous research may influence the approach chosen here, the findings of Chrisman et al. (2005) are of particular interest. They follow up from a previous survey, approaching those assisted individuals that indicated that they had started a business following pre-start-up advice received. But: The analysis is not based on data from both surveys, and uses only the second wave of results. Depending on what was covered by the first wave survey a time profile could have been created and analysed across the data points shared between the two surveys. The potential to cover such developmental dynamics potentially holds considerable value, but as explored in previous chapters, hardly any examples exist that take into consideration the time profile of impact in the previous literature.

The technical difficulty (ignoring political expediency issues at this point) for policy-makers and researchers to develop such an impact profile across a number of years is the requirement to gather data for a number of intervals – for business performance this means for a number of years. The "traditional" survey approach as mentioned above and chosen by previous research is highly resource intense if undertaken once, let alone if it needs to be repeated for numerous years. To obtain a sample with significant statistical power, a large number of firms would need to be included, in order to allow for firms dropping out throughout the process (whether due to an unwillingness to further participate, mergers or firm deaths). The willingness by policy-makers to fund the required resources to carry out a number of survey waves is likely to fade over the years, as schemes might become unfashionable and/or governments change. This is also linked to the political expediency issue – administrators focus on fairly immediate insights. And clearly, with the lack of examples of previous research into the long-term impact of business support, these problems pose a considerable challenge.

With the aim of exploring the long-term evaluation of non-financial business support this thesis also ran into data availability issues. Originally, for the purpose of this thesis, it was agreed with BIS to work with assistance data from the UK Regional Development Agencies (RDAs). However, by the time the funding for this research was approved and the work on this thesis commenced, the RDAs were preparing for their March 2012 closure and their legacy data had become unobtainable by BIS. Public bodies evolve all the time, so this experience is unlikely to be a one-off but given the scale of the public investment in the RDAs this is an indication of the inability of government to cope with the short-term re-arrangement of governance structures.

With research so far limited to the short-term perspective, a new approach has to be explored that goes beyond what previous research has previously attempted. This thesis explores an approach based on data linking, using existing (that is, secondary) data as an alternative to the above way of (repeated) surveying. It aims to provide an assessment of the relative

strengths and limitations of such an approach. The reliance on secondary data for a comparably large sample, with no need to engage with firms directly for data collection purposes, holds obvious advantages. Primary data collection would be both time-intense and costly, and these time and monetary considerations often lead to what are relatively small samples informing the analysis (and fairly soon post intervention). It also allows for the relatively straightforward evaluation of schemes since abandoned, or delivered by a since defunct body, as with the case of the RDAs. However, a transfer of the inventory of assisted firms to the relevant government department or body would still be required, something that was too late to initiate in case of the RDA data (for the UK that would be BIS in 2015, for the 2003 intervention assessed herein, as introduced below, the then Department of Trade and Industry [DTI], replaced in 2007 by the Department for Business, Enterprise and Regulatory Reform [BERR])[34].

In summary, a single business support product, Business Link, is matched to the ONS Business Structure Database (BSD), which is the business demography version of the UK Inter-Departmental Business Register (IDBR). The BSD provides an annual snapshot of the IDBR. Linking the individual annual BSD data provides a dataset that can then facilitate an analysis of survival and growth of recipient businesses in the post assistance period[35]. The following section first explores the data already at hand about firms that have received support from Business Link and the BSD. There are some caveats to the use of that data, particularly given the reduction in sample size between the original sample and the fully matched sample. This will be reviewed along the technicalities of linking the survey firms to the BSD.

3.2   Data – Business Link & the BLO Survey

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[34] This would, of course, require evaluation to be woven into the fabric of the organisations and their schemes delivered from the beginning. It will always present a difficulty to attempt and collect such information *post hoc*, especially if it involves various organisations in the process of being dismantled.
[35] See also Norrman and Bager-Sjögren (2010), who provide a rare example of estimating scheme impact over multiple years for each post intervention year, albeit with limited evidence regarding impact.

The decision to use Business Link as the underlying scheme to be analysed was driven entirely by data availability at the time of embarking on this thesis. The data was captured as part of the Business Link Operator (BLO) Economic Impact Survey in 2005 (referred to as the "BLO Survey" for the remainder). It offers a large scale and detailed evaluation survey containing information on businesses that received Business Link assistance in 2003, as well as a comparison group of businesses that did not receive support. An official evaluation on behalf of the then BERR was published in the year after surveying (BERR, 2007). It is based on employment, turnover and productivity as outcome measures, for a post intervention period of two years. By using the same dataset again, but adding more years of performance data, it allows an opportunity to profile impact over time and to compare the original evaluation results for two years against it.

Despite using Business Link data in this thesis, it is important to keep the intended contributions of this work in mind. First and foremost, this research serves as an exploratory study into the use of using official micro data for long-term impact evaluations of business support. The results with regards to Business Link are essentially a by-product, likely to be of less interest to policy-makers as it is now an abolished scheme.

3.2.1 Business Link and its evolution

The structure of Business Link has been subject to numerous changes over time. Bennett and Robson (2003), BERR (2007a), Robson and Bennett (2010), Sivaev (2013) and Mole et al. (2014) provide details of the evolution of the Business Link product and its delivery, and inform this section accordingly. The main narrative follows Mole et al. (2008, pp. 317-320). The foundations for Business Link were laid in the 1980s with the Enterprise Allowance Scheme (1982-91 – allowing benefits payments to those setting up a new business). The Enterprise Initiative followed (1988-94 – promoting the use of external advice through approved consultants who are publicly funded). The previously referenced work by Wren and

Story (2002) based their study on data from the Marketing Initiative as part of the Enterprise Initiative.

The latter type of schemes were regarded a success, providing an effective way of countering the perceived market failure of small firms that were underestimating the potential gains from seeking external expertise (Wren and Storey, 2002; Turok and Raco, 2000; Bennett and Robson, 2003; all in Mole et al., 2008).

The 1990s then saw the first 'Business Links' by name, as part of a more local and decentralized approach to business support[36]. Support delivery in these Business Links was through appointed partnerships of local agents who had to be existing providers of business support – such as training and enterprise councils, chambers of commerce, local authorities and enterprise agencies (Bennett and Robson, 2003; in Mole et al., 2008). The theory behind this use of existing providers of support within a local Business Link was to foster collaboration between previously competing suppliers of advice and support. The range of partners involved led to "complicated local structures, with interlocking directorships and often opaque decision-making processes" (Mole et al., 2008, p. 318).

Notably, the support was not to be offered for free to businesses. A charge was introduced for the use of the support services, replacing previous public funds allocated. The hope was that this would improve services. By 1997, the original fee targets for the local Business Links were decreased, however, to provide 25 percent of the local Business Links financing (Robson and Bennett, 2010). The other reason for deciding against a free service was the thought that a free service would not be valued as highly by businesses. Part of the BLOs' performance was to be measured in terms of their income generation.

The performance between the then 89 Business Links varied greatly, with 21 percent of Business Links responsible for a share of 40 percent of dissatisfied customers (Bennett and

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[36] 'Business Connect' in Wales; in Scotland delivery was by local enterprise companies.

Robson, 2004; in Mole et al., 2008). It was observed that the highest satisfaction rates were achieved for those businesses subject to intensive assistance.

In 1999, Business Link was reduced to 45 local Business Link Operators (BLOs). Whilst government continued to stress the importance of fee raising by the BLOs, specific targets for doing so were dropped in 2001 (Robson and Bennett, 2010). It was also removed as a performance measure for the BLOs. Client satisfaction remained variable and linked to the individual business adviser assigned. Overall, BLOs increased their reach to a third of businesses (Bennett and Robson, 2003; in Mole et al., 2008).

The subsequent phase of Business Link was driven by the government's desire to align Business Link with the Regional Development Agencies (RDAs). This was initially piloted in 2003 and rolled out across the regions in 2004. The intent was to be able to provide a Business Link offer responsive to local needs, as determined by the RDAs. The model of Business Link engagement also evolved, moving towards a brokerage model of advice (Mole et al., 2008). This was not without criticism as it required a different set of skills by the advisers, and went against previous research findings suggesting that Business Link clients' satisfaction levels were higher for actual delivery of support than for diagnosis of what was needed (Keogh and Mole, 2005; Bennett and Payne, 2000; Bennett and Robson, 1999; Lambrecht and Pirnay, 2005; all in Mole et al., 2008). The total spend on Business Link was £300m for the year 2005 (Mole at al., 2008).

Eventually, with the closure programme of the RDAs in the 2010-2012 period Business Link support in its known form was terminated in 2011. It was replaced by a website and phone service.

3.2.2 Period and type of Business Link considered in this thesis

The period of interest for this thesis relates to the period just before the switch to RDAs. In 2003, BLOs were already operating within the brokerage model (Mole and Keogh, 2009), as the first port of call for small firms seeking assistance. Each BLO was free to determine their

own intervention strategy – which could involve a more intensive approach working closely with firms or an approach which is more thinly spread, focusing on specific issues only. BLOs were also able to seek further funding from other bodies, which meant for some BLOs to be able offer more intensive assistance (Mole et al., 2011).

Intensive assistance would usually have stretched over several months and a number of interactions between SMEs and Business Link, probably featuring an action plan and the use of external consultants. In comparison, 'other' assistance is more likely to be a "one-off" interaction by phone (Mole et al., 2008).

Mole et al. (2011) describe four intervention strategies as part of these two intensities of assistance. Three intervention strategies fall under IA – all of which would have required for the BLO to secure additional funding:

- Managed brokerage – where interactions between the BLO and the business involved close relationship building
- Pipeline forcing – where IA was provided to a higher proportion of firms but with less resource for each IA
- Managed brokerage - pipeline forcing – a combination of the above, requiring particular high levels of additional funding being available.

The non-intensive model of assistance (Other assistance = OA) was initially chosen by most BLOs prior to the acquisition of additional funding. Here, contact with businesses remained largely superficial. Ironically, with the little resources needed per interaction, high numbers of businesses could be 'assisted', higher penetration rates being beneficial for the metrics used to determine funding.

In 2003, Business Link support was delivered by 39 BLOs; and during the 6 months from April through to September 2003 the BLOs recorded provision of assistance to 166,312 businesses[37]. As one would expect, given the high number of support provisions recorded, the

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[37] For the avoidance of doubt, "Business Link" refers to assistance provided in England only.

bulk of interventions were light-touch, with 89 percent (147,650) of interactions recorded as Other Assistance (OA). Only around 11 percent (18,662) of interventions were classed as instances of Intensive Assistance (IA). Whilst the majority of the data is complete, there are no reported instances of OA in Norfolk, whilst the London IA data was unusable due to a lack of detail provided by the available data.

Among the remaining 37 BLOs the share of IA vs. OA differed considerably. Each BLO could decide on their own delivery strategy, where some BLOs chose a more intensive approach whilst others offered more light-touch but wider available support (Mole et al., 2008). Leicestershire with 2.6 percent of IAs is at the extreme end of those with a focus on broad non-intensive advice, Northamptonshire, Wessex and the West also had less than one IA for every 20 OAs recorded. On the other end of the scale, more than half of all support in Northumberland was IA, with that share being 40 percent of IAs for Cheshire & Warrington and Hereford & Worcestershire.

Table 18 (in Appendix C1) provides an overview of the distribution of IAs and OAs across the 39 BLOs. IA vs. OA differed considerably by BLO (see also Table 18 in Appendix C1), illustrating well the different delivery strategies BLOs could decide upon. Leicestershire with 2.6 percent of IAs was at the extreme end of those with a focus on broad non-intensive advice, Northamptonshire, Wessex and the West also had less than one IA for every 20 OAs recorded. On the other end of the scale, more than half of all support in Northumberland was IA, with that share being 40 percent of IAs for Cheshire & Warrington and Hereford & Worcestershire.

The BLOs covered areas of different size and economic activity, yet the differences in the numbers supported by each BLO can be vast. This illustrates both the effect of choosing different strategies, and the ability to attract further external funding by the individual Business Link Operators. Appendix C1 reviews the data in detail.

3.2.3 BLO Survey – Sampling and surveying

The firm universe of Business Link assisted firms introduced in section 3.2.2 (and described in detail in Appendix C1) served as the population from which, in 2005, a sample was drawn and surveyed by the original evaluation team (BERR, 2007). The survey's intention was to understand the impact of the assistance provided over the 2004 to 2005 period (with firms in receipt of assistance between April and October 2003).

BERR (2007) and Mole et al. (2008) provide a synopsis of how the survey based on this firm universe was conducted. This is reiterated here to provide an understanding of the data at hand.

A structured survey was conducted by telephone with SMEs who had received Business Link assistance between April and October 2003. The interviews took place between May and July of 2005, with most responses being by either owner-managers or firm-managing directors. In addition to drawing a sample from the firm universe of assisted firms, a control group of non-assisted firms was also surveyed. The sampling frame for these non-assisted firms was drawn from the Dun & Bradstreet UK database, and these respondents were asked to confirm that they had not received any Business Link assistance during the period of April to October 2003.

The survey was undertaken with the use of a computer-assisted telephone interviewing (CATI) system to automate the administration of the telephone survey, which accordingly was highly structured. Of those surveyed and in the survey dataset, 33 percent were intensively assisted (IA), 34 percent had received 'other' assistance (OA), and the remaining third was non-assisted (NA), with a total of 3,448 firms in the sample. Table 2 provides the summary descriptives for selected variables from the BLO Survey dataset, broken down into four groups: For all firms, and by type of assistance (IA, OA and NA).

Table 2 – BLO Survey: Descriptives for selected variables for full sample, and by type of assistance

BLO Survey Sample (N=3448)	Full sample			Intens. Assisted (IA)			Other Assisted (OA)			Non-assisted (NA)		
	Obs	Mean	Std. Dev.	Obs	Mean	S.D.	Obs	Mean	S.D.	Obs	Mean	S.D.
Employment 2004	3320	30.20	240.39	1097	27.16	85.13	1129	39.17	396.58	1094	23.98	75.94
Employment 2005	3333	31.39	257.61	1106	28.82	86.64	1130	41.20	427.51	1097	23.88	75.83
Firm age: 2≤3 years	3424	0.09	0.29	1120	0.12	0.32	1159	0.09	0.29	1145	0.08	0.26
Firm age: 3≤4 years	3424	0.05	0.22	1120	0.06	0.24	1159	0.06	0.25	1145	0.04	0.18
Firm age: 4≤5 years	3424	0.06	0.24	1120	0.08	0.27	1159	0.06	0.24	1145	0.05	0.21
Firm age: 5≤10 years	3424	0.17	0.37	1120	0.19	0.40	1159	0.17	0.37	1145	0.14	0.35
Firm age: 10≤20 years	3424	0.25	0.43	1120	0.24	0.43	1159	0.27	0.45	1145	0.24	0.43
Firm age: >20 years	3424	0.37	0.48	1120	0.31	0.46	1159	0.34	0.47	1145	0.46	0.50
Formal business plan	3368	0.50	0.50	1112	0.63	0.48	1142	0.55	0.50	1114	0.32	0.47
Multisite firm	3443	0.18	0.39	1127	0.19	0.40	1165	0.20	0.40	1151	0.16	0.36
Exporting firm	3440	0.20	0.40	1127	0.25	0.43	1165	0.20	0.40	1148	0.15	0.36
Legal form: Limited liability	3436	0.61	0.49	1125	0.68	0.47	1163	0.61	0.49	1148	0.54	0.50
Owner-Manager <25 years old	2891	0.01	0.08	982	0.00	0.06	919	0.00	0.07	990	0.01	0.10
Owner-Manager 25<35 years old	2891	0.08	0.27	982	0.08	0.27	919	0.10	0.29	990	0.07	0.25
Owner-Manager 35<45 years old	2891	0.28	0.45	982	0.29	0.45	919	0.27	0.45	990	0.28	0.45
Owner-Manager 45<55 years old	2891	0.35	0.48	982	0.37	0.48	919	0.36	0.48	990	0.33	0.47
Owner-Manager ≥55 years old	2891	0.28	0.45	982	0.26	0.44	919	0.27	0.45	990	0.32	0.47
OM is serial entrepreneur	3090	0.34	0.47	1019	0.39	0.49	1011	0.35	0.48	1060	0.27	0.45
% of female directors	3249	27.01	33.02	1064	28.05	33.10	1091	26.64	32.48	1094	26.36	33.49
% of ethnic minority directors	3234	4.11	36.01	1060	3.27	15.92	1085	5.27	49.46	1089	3.76	34.16
SIC1: Agriculture, Hunting & Fishing	3448	0.11	0.31	1130	0.12	0.32	1166	0.11	0.31	1152	0.11	0.31
SIC4: Manufacturing	3448	0.19	0.39	1130	0.19	0.39	1166	0.19	0.40	1152	0.18	0.38
SIC6: Construction	3448	0.08	0.28	1130	0.08	0.27	1166	0.09	0.28	1152	0.08	0.28
SIC7: Retail & Wholesale	3448	0.17	0.38	1130	0.14	0.34	1166	0.15	0.36	1152	0.24	0.43
SIC9: Financial Services	3448	0.03	0.16	1130	0.03	0.17	1166	0.02	0.15	1152	0.03	0.16
SIC11: Education	3448	0.22	0.42	1130	0.25	0.44	1166	0.26	0.44	1152	0.15	0.36
SIC13: Other Services	3448	0.06	0.24	1130	0.07	0.25	1166	0.06	0.24	1152	0.06	0.24
SIC14: Hotels & Catering	3448	0.05	0.21	1130	0.05	0.22	1166	0.05	0.21	1152	0.05	0.21

Source: BLO Survey

The sample characteristics are reviewed in detail below, to facilitate a better understanding of the data and any potential features of interest, between types of assistance but importantly also for a comparison of the samples before and after data linking. Data linking results in up to half of observations to drop out. If differences in the sample characteristics arise because of this attrition, it is important to understand where they have occurred.

<u>Sector:</u>

Sector is the only variable captured for all surveyed firms. 11 percent of sampled firms were in the agricultural sector, compared to only 4.5 percent of firms in that sector in the (firm universe as the) underlying sampling frame (compare with Appendix C1). 19 percent of firms were in manufacturing, broadly in line with the 20 percent in the firm universe. Construction had a share of eight percent of firms, up from six percent in the firm universe, 17 percent of firms in the sample were in wholesale and retail (15 percent in firm universe), three percent in finance (two percent), 22 percent in education (four percent), six percent in other social and personal services (seven percent), and five percent in hospitality (five percent). Given the variation in the share of some sectors between the original sampling frame (Appendix C1) and the sample eventually surveyed, the sector split became relatively more representative of the actual sectoral distribution in the economy.

Among the surveyed firms, the sectoral distribution is largely consistent across IAs, OAs and NAs. The only notable differences appear for the retail and education sectors. Of the surveyed IAs 14 percent were retailers and wholesalers, of the OAs 15 percent – compared to nearly a quarter (24 percent) of NAs. The reverse trend is true for the education sector, where 25 percent of surveyed IAs and 26 percent of surveyed OAs belonged to, but only 15 percent of NAs. This appears to be somewhat of an oddity in the survey design. Across IAs, OAs and NAs these differences are no more than one percent for any other sector. For the characteristics other than sector, there is some considerable variation across IAs, OAs and NAs, as detailed in the following.

<u>Firm age:</u>

Nearly half (46 percent) of NAs surveyed were older than 20 years, whilst this figure is closer to a third for the assisted groups (31 percent for IAs, 34 percent for OAs). Accordingly, the surveyed firms in receipt of IA and OA were on average younger than the control group of NAs. IAs in turn were somewhat younger than OAs, with 12 percent of IAs younger than three years,

compared to nine percent of OAs; but 27 percent of OAs in the 10≤20 years age bracket, and 24 percent of IAs (the same as for NAs in this age bracket).

Employment:

NAs on average were smaller than the IAs and OAs – somewhat counterintuitive given their higher age. IAs had an average employment of around 27 employees, compared to 24 for NAs in 2004, but 39 for OAs. The latter have a considerably higher standard deviation though, pointing to one or more outliers 'inflating' the mean. NAs were also the only group with a small decline in average employment from 2004 to 2005 (-0.1; -0.4 percent), whilst IAs' employment rose by 1.66 (+6.1 percent) and OAs' by 2.03 (+5.2 percent).

These observations are of some interest as *a priori*:

1. One would not expect firms that are younger on average to be larger, and

2. It is notable that despite being larger on average at the outset, the assisted firms' employment size grows, whilst the smaller non-assisted firm size average stagnates. This could be linked to their younger age. The high standard deviation for the OAs suggests outlier effects.

Owner-Manager (OM) age:

The largest age group of OMs were between 45 and 55 years old, and this held true across the difference assistance groups – 37 percent of IAs had an OM in that age group, 36 percent of OAs, and a slighter 33 percent among NAs. Given the considerably higher firm age of NAs it is not surprising to see them having the highest proportion of 55+ year OMs at 32 percent, whilst this number is 26 percent for IAs and 27 percent for OAs. NAs also featured the largest share of OMs younger than 25 years, however, with a very small N it is not an observation that too much weight should be assigned to. For the second youngest group of OMs aged between 25 and 35, IAs had a share of eight percent, OAs ten percent, compared to seven percent for NAs. The three groups have a roughly similar proportion of 35 to 45 year old OMs, 29 percent for IAs, 27 percent for OAs and 28 percent for NAs.

<u>OM characteristics:</u>

Those businesses in receipt of IA most often (39 percent) had an OM that has had at least one business before ("serial entrepreneur"). The same is true for 35 percent of OAs, but only 27 percent of NAs. IAs also had the highest share of female directors, 28.05 percent on average. However, this was only slightly less for both OAs (26.64 percent) and NAs (26.36 percent). OAs in turn had the highest proportion of ethnic minority directors, 5.27 percent on average. For IAs this was 3.27 percent, for NAs 3.76 percent.

<u>Firm characteristics:</u>

On average, half of all sampled firms had a formal business plan. However, this figure was 63 percent for IAs, 55 percent for OAs and 32 percent for NAs, showing some considerable difference between assisted and non-assisted firms. IAs were also most likely to be exporters (25 percent), OAs (20 percent) with NAs least likely (15 percent). Assisted firms were also more likely to be multisite firms (IAs: 19 percent; OAs: 20 percent; vs. NAs: 16 percent). Finally, IAs were also most likely to be limited liability companies (68 percent; OAs: 61 percent; and NAs: 54 percent).

Overall, whilst the sampling frame has what is an atypical distribution of firms by sector, this is somewhat corrected for in the sample drawn. For the other firm and owner characteristics, a comparison to the post data linking sample descriptives will highlight the representativeness of the linked versus the original sample. The varying characteristics between the different types of assistance as summarised above underpin the importance of taking into account these firm differences in the later analysis. It is also possible that some selection bias has been introduced at some stage during sampling or when providing support. This will also need to be considered and possibly corrected for in later analysis.

3.2.4 BLO Survey – Previous analysis: "Economic Impact Study of Business Link Local Service" – BERR, 2007

The original evaluation study of the BLOs had four analytical objectives (BERR, 2007). Firstly, it aimed to provide a national estimate of the value for money of Business Link (BL), based on the cost of BL during the intervention period measured and BL's impact of firm performance. This part of their evaluation is my key interest in Chapter Five.

Secondly, it analysed and compared different delivery models of assistance and their impact on firm performance. Thirdly, spatial analysis was conducted, exploring both a regional baseline model of assisted firms, and a rural perspective providing insights into BL operations in rural areas. This provides an area of potential future exploration based on the matched dataset now available. Fourthly, firms were interviewed about their views of Business Link and their perception on the quality and impact of the BL product. Naturally, that analysis cannot be extended any further through data linking.

The interest for this research is with the first aspect BERR (2007). The value for money analysis[38] by BERR (2007) was designed with the understanding that two main issues arise from the BLO Survey data. The first issue raised by the authors was in relation to the different firm characteristics between the IAs, OAs and NAs. The empirical analysis was designed to control for these differences, applying a multivariate approach and as such taking into account (and allowing for) these observed firm characteristics through an array of covariates. The second issue was the importance of accounting for selection. If selection was present, the effect had to be identified and included in the model to avoid estimation bias. *A priori* selection bias certainly appears a reasonable assumption. It is quite possible that those firms being assisted through BL may differ from those not being assisted, as seen for numerous other support schemes; and the reason why, for example, the *Six Steps* framework attaches some considerable weight to accounting for it, as discussed in Chapter Two).

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[38] This is reviewed in more detail in Chapter Five.

The original evaluation study chose to use Heckman's two-stage procedure to account for this potential selection bias, that is, the estimation of two linked statistical models (BERR, 2007). First, a probit regression was run to model the probability of a firm receiving assistance and to determine the strength of the selection effects. The approach is developed in some more detail as part of Chapter Five.

The selection effects were not deemed to be significant for IAs, and simple OLS without selection effects were reported. The weakness of the selection effect is surprising, and something Chapter Five looks at more closely in relation to its long-term analysis undertaken.

The findings of the original evaluation in relation to the impact of assistance on firm growth were "positive and significant" for IA and its effect on employment for the one year period investigated BERR (2007, p. 15). IA and OA were also found to have positive but "generally statistically insignificant" effects on sales growth and productivity.

3.3 Data: Business Structure Database (BSD)

The Business Structure Database (BSD) contains annual snapshots of the Inter-Departmental Business Register (IDBR). The IDBR includes nearly all of UK's businesses registered with the UK's tax department (HMRC) for Value Added Tax (VAT) and/or Pay As You Earn income tax (PAYE) purposes. The only exclusions are very small businesses: those that fall below the VAT threshold of currently £73,000 annually and/or those that are not part of PAYE (weekly salaries less than £107 [2012-13 tax year]). This is in contrast to the Annual Respondents Database (ARD), which would provide a wide range of data on firms, but includes few smaller firms (see the discussion below). When using the BSD for data on small firms this also implies that some of the smallest (no PAYE, no VAT) firms in a sample may possibly drop out as they will, by definition, be missing from the BSD.

The IDBR is a "live" database where data gets updated as it becomes available, from sources such as HMRC (VAT and PAYE participants information), and Companies House, among others. The BSD in turn provides a static (snapshots of the 'live' IDBR taken in March of each year, since 1997) but, of course, longitudinal view when these annual datasets are linked together. Compared to other datasets available on firms, it includes relatively few variables. Its coverage is for nearly all firms, however, a coverage not matched by other datasets available. Table 3 provides an overview, as provided by the ONS (2006).

Table 3 – Variables in the BSD files (2006)

	Enterprise Level	Local Unit Level
Entref – Enterprise Reference Number	x	x
Luref – Local Unit Reference Number		x
WOWref – Enterprise Group Reference Number	x	x
Inactive	x	x
SIC - Industry	x	x
Live_LU – Number of live local units	x	x
Live_RU – Number of reporting units	x	x
Employment	x	x
Turnover	x	
Birth of Enterprise/Local Unit	x	x
Death of Enterprise/Local Unit	x	x
Death Code		x
Imm_foc – Immediate Foreign Ownership	x	x
Ult_foc – Ultimate Foreign Ownership	x	x
Status – Legal Status	x	x
PAYE – live PAYE indicator	x	x
VAT – live VAT indicator	x	x
Postcode	x	x
Demvar	x	x
Demred – Local Unit Demographic		x
DTIref - Reference Number	x	x

Source: ONS (2006)

Table 3 distinguishes between enterprise and local unit levels. For both a BSD dataset exists for each year for which the enterprise level data captures company level data. Local units represent the individual plants/sites of these enterprises, that is, the fictional manufacturer *Manufacture & Co* would be an enterprise (enterprise level), but could have many individual factories at various locations (local unit level). The *Manufacture & Co* local units would all carry separate local unit reference numbers, but the same *Manufacture & Co* enterprise reference number. Accordingly, the BSD enterprise level dataset contains considerably fewer

entries than the BSD local unit level file. When working with the BSD, one of the key considerations, therefore, has to be whether to use enterprise or local unit level data as unit of analysis.

For the purpose of this piece, the analysis will be carried out entirely based on enterprise level data. Firstly, as a study of small firms, the vast majority are single unit enterprises[39], where enterprise and local unit level are identical. Secondly, whilst employment data is captured both at enterprise and local unit level, turnover data is only available at enterprise level. Enterprise level data therefore provides more opportunities for how to measure outcomes, productivity as a function of turnover over employment becoming a third possible measure. Thirdly, the initial data linking (with the process explained in the following sections) can only be done at enterprise level. In the (relatively few) cases of multiple local units per enterprise, there is a real risk that trying to identify the correct local unit to match the BLO Survey's specific observation will introduce additional error[40].

An important further consideration when using the BSD is how to assign which edition of the BSD to which calendar year. For example, when referring to 'BSD 2005', this refers to the annual snapshot of the IBDR taken in March 2005. The IDBR is a 'live' register of firms, it gets updated throughout the year. Hence a firm's annual VAT and PAYE returns data may have been updated in April 2004 or March 2005 (or any time in-between), referring to employment and turnover figures at some time prior to that update. Depending on a firm's business year, BSD 2005, therefore, reflects company data most likely to refer to sometime in 2004, but possibly even late 2003 in some cases. As a consequence, to assess a 2003 intervention (as in this study), one would need to refer to at least BSD 2004 and BSD 2005 to have one year of impact data, as BSD 2003 would provide company data preceding the timing of the

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[39] Post linking, 89 percent of firms within the sample were single unit firms, that is, where enterprise level is identical to local unit data – this is discussed in Section 3.5.1.
[40] This was initially attempted to explore the possibility, but it meant to take numerous 'educated guesses', introducing too much uncertainty in the reliability of the local unit matches.

intervention. Section 3.5.3 provides an investigation of this issue by comparing the linked BSD 2004 and BSD 2005 employment data, as compared to BLO employment figures.

A detailed explanation of the BSD is can be found in Evans and Welpton (2009).

3.4   Using the BSD and other datasets through the UK Data Service Secure Lab

Access to the BSD (and the UK Innovation Survey, as used for Appendix C3) is available through the UK Data Service (UKDS) and its "Secure Lab" facility. The Secure Lab provides a virtual environment available to the researcher at their respective academic institution, and access is to anonymised data only. A number of non-disclosure rules apply for exporting any results from the Secure Lab environment to ensure continued anonymity of the observations used for analysis. This always requires all results that are to be published to be checked by the UK Data Service prior to output approval. In practice, this requires the removal of the coefficients for all constants in any regression results, as well as only presenting results that are based on at least 10 observations. Appendix C2 explains these requirements and the process in more detail. It also illustrates how care needs to be taken when using the BSD, and some informed assumptions are needed around the determination of firm death based on multiple years of BSD data for the same firms.

3.5   Data linking – adding the longitudinal dimension

As described above, the approach for this feasibility study is to link the firms from the BLO Economic Impact Survey to the BSD. Hart and Bonner (2011) in a study for DG REGIO provide a comprehensive summary of the basic principles for data linking, which guided the linking as described here.

First of all, a common identifier across the datasets to be linked – the BLO Survey and the BSD – is required. This could be the business' name and postcode; however, this would add complexity at the linking stage as it would require the use of additional algorithms to match the data. An alternative to name matching is the use of company registration numbers. Bureau van Dijk's Orbis database was used to identify firms' registration numbers (CRNs). This provides a unique identifier across the datasets involved. Given the CRNs are firm-level data, the initial linking described here was of enterprise-level BSD with the BLO Survey.

The identification of CRNs through Orbis highlighted some of the limitations of survey data and the use of this approach. For the 3448 firms included in the BLO Survey CRNs could be identified for only 1,414 of these. There are a number of reasons for this (seemingly) low success rate. Firstly, Orbis only lists registered companies (and only registered firms have a CRN by definition). Sole proprietorships and partnerships (on the basis of self-employment) are excluded. As a consequence, this could imply that the characteristics of selected companies may differ to the actual underlying population of BL recipient businesses (as represented by the BLO Survey sample). Business Link has been used by many micro and small businesses, and it is most likely the excluded firms (that is, those not incorporated) were mostly those very small firms. Firms that a CRN was identified for therefore on average were greater in size than the average of all firms in the original BLO Survey sample – and therefore average firm size of the linked dataset is expected to be greater.

Another reason for not being able to identify CRNs even for potentially incorporated firms is explained by the difference in legal name (as held in Orbis) and the name recorded by Business Link or those that have carried out the BLO Survey. The omission of a "ltd" or different spelling, for example, "limited" instead of "ltd" in the firm name would not have resulted in much concern during CRN identification, with the search mechanism adjusting for those subtle and common differences. However, it was found that names were potentially abbreviated in the BLO Survey when the business would be registered under its full name. In some cases a postcode search could help. A fictitious example would be a firm recorded in the BLO Survey as "Smiths", when its actual name would have been "Gregor Smith & Sons Furniture Ltd". Whilst postcodes can help in such instances, many businesses appear to be registered elsewhere to their operational base (with the latter recorded in the BLO Survey), again making a match impossible. Also, as already described when introducing the BSD above, a registered firm can have multiple addresses – those of where the enterprise (HQ) is located, and then for its local units. If Business Link support was provided to a specific local unit of an enterprise, and that postcode was recorded, it will be impossible to identify the corresponding CRN if the recorded name of the site and that of the registered firm are not identical.

With the use of CRNs as the unique identifier, data was matched at firm-level within the BSD. The actual match was undertaken by the Secure Data Service (SDS) team to maintain data security. Firm names and actual CRNs get removed prior to the data being made available to the researcher again – an anonymous enterprise reference number takes the CRNs place as unique identifier within the SDS environment. The initial data linking took place at enterprise level and not at local unit level. The simple reason for that is that the SDS only has a CRN-enterprise key, since linking from CRN directly to the local unit would require a key taking location into account. From reviewing the survey entries and survey methodology, it is not obvious whether most assistance would have been recorded at the firm rather than plant level. The huge majority of surveyed firms were single entities (see footnote [39] above), as such the distinction between firm and plant level would not be an issue for data linking purposes.

They key variables of interest in the BSD are for annual sales and employment as performance indicators for the panel of firms in the original BL evaluation study. Following the data linking, the sample characteristics of the linked dataset will then be compared to the original BLO Survey data characteristics.

3.5.1   Data linking: Process and data adjustments

As aforementioned, CRNs could be identified for a total of 1,414 firms through the use of Bureau van Dijk's Orbis firm database. This represents 41 percent of the BLO Survey's original sample size of 3,448.

The CRNs and BLO Survey results of the 1,414 firms were passed to the UK Data Service Secure Lab (SL) for matching, a simple process using a CRN<->SL internal enterprise level reference (*entref*) key. With this approach the SL was able to match 1,247 of the 1,414 firms. The gap between the number of firms a CRN had been identified for and the number of firms successfully linked by the SL can appear unfavourable at first. But, as described earlier, only those firms registered for VAT and/or PAYE purposes are captured for the IDBR and accordingly included in the annual snapshots the BSD provides.

This matched file, now containing *entref*, the internal firm identifier, was then used to construct the longitudinal enterprise level performance dataset. The BSD is not one large dataset as the name would suggest, but consists of individual datasets for each year (as highlighted earlier). These datasets were combined at enterprise level for the years 2004-2011 (where 2004 covers the year of the assistance received, and then seven years of data post assistance)[41]. This may seem counterintuitive given a 2003 intervention, however, the data of the 2004 BSD provide an April 2003 to March 2004 snapshot. This covers the intervention period in question of April

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[41] Ying Zhou and Michael Anyadike-Danes deserve special mention here. They worked on a parallel BSD linking exercise at the time for the Enterprise Research Centre, resulting in a number of fruitful thought exchanges on the technicalities and oddities of the linking process.

2003 to October 2003. The 2011 cut-off was simply determined by the latest data available at the time of linking.

Table 4 illustrates the resulting (long) dataset's data structure.

Table 4 – Data Structure post matching (enterprise level)

Obs Nr.	BLO Survey covariates (2005)	*entref*	BSD 2004	BSD 2005	BSD 2006	BSD 2007	BSD 2008	BSD 2009	BSD 2010	BSD 2011
1	(e.g. firm & owner characteristics)	Unique firm ID	For each year: Employment, turnover, sector, birth, death, postcode (full list see 3)							
2										
:										

Source: own work

This enterprise level dataset was then cleaned, applying a number of criteria. Firstly, using the indicators as obtained through the BSD, all firms outside the SME definition of employment (>250 employees) where removed. There are two reasons for this removal of these large firms. The analysis to be carried out is for *small* business support, and Business Link was a scheme designed for small business support. Applying that logic, any firms with more than 250 employees in BSD 2004 were treated as outliers. Some of the firms removed were exceeding the 250 employees' threshold quite considerably. As such, their continued inclusion skewed the employment and turnover figures quite considerably. Also, large firms engage in acquisition activities, and the employment and turnover figures as a result varied by unlikely amounts year on year for some of those large firms removed. The assumption made is that this variation in size and acquisition activity did not result from BL interventions aimed at small firms.

There were also a number of firms with a 2003 or 2004 exit, therefore having exited prior to the intervention received or shortly after, according to BSD records. Three firms showed a growth trajectory that would have dramatically skewed the analysis, one of them with a year-on-year growth of 40,000 percent[42]. The firm displaying this growth was already fairly large at

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[42]Figure not exact but approximated to comply with disclosure rules. Such growth is usually a result of merging with a considerably larger firm.

the outset, ruling out organic growth. Table 5 summarises the changes to the count of firms with >250 employees. Less than ten firms had grown from 250 or less employees in BSD 2004 to more than 250 employees in BSD 2005.

Table 5 – Count of firms with more than 250 employees, before and after outlier removal

Count of firms with >250 employees	Before outlier removal		After outlier removal	
	BSD	BLO Survey	BSD	BLO Survey
2004	47	5	All removed.	2
2005	50	8	x	4

Source: BLO Survey and BSD; Reminder: BSD output <10 cannot be published.

Table 5 also points to the effect of linking at enterprise level. Considerably more firms had more than 250 employees in BSD 2004 before the removal of outliers than captured by the BLO Survey. This means that a number of firms assisted and captured as part of the BLO Survey were in reality part of a larger firm. Overall, once the outliers were removed, 931 single site firms remained. However, 55 firms had two sites, 24 three, and 36 four or (considerably) more – but all with less than 251 employees in BSD 2004. Therefore, separate local analysis, with all problems attached to the matching problems, and limitation to employment as performance measure, is not needed. In a sample including more large firms, or a higher proportion of multisite firms, such local unit analysis should certainly be explored, however.

Following the linking of the BLO Survey sample and the above adjustments, the final dataset had 1,044 firms. Out of these, 425 firms were intensively assisted (IAs), 321 had received other assistance (OAs), and 298 firms remained for the non-assisted control group. The size and other firm characteristics of this linked sample are reviewed below.

3.5.2 Data linking: Comparison of the original and matched datasets

The created longitudinal dataset will be used for the remainder of the analysis undertaken in this thesis.

Some level of caution is necessary when using the final matched dataset. Some of the limitations of both using Orbis and BSD were highlighted earlier in this chapter. The BSD is

limited to those firms registered for PAYE and VAT. Average firm size in the BSD is, therefore, larger than what would be representative for the entire firm population. In addition, Orbis only lists registered companies, which will also be larger than the average of the entire firm population would suggest (OECD, 2013). As unregistered entities sole proprietorships and partnerships are not captured by Companies House data. Business Link advice has been used by many (micro) small businesses. As a consequence of the exclusion of very small firms from both Orbis and the BSD, the expectation would be for the characteristics of the matched datasets to differ from the actual underlying population of Business Link recipients.

Table 2 (as detailed in Section 3.2.3) provided an overview of the BLO Survey's sample characteristics before matching. Table 6 to Table 8 provide the summary of the relevant test statistics to understand the differences between the original BLO Survey sample and the 1044 firms in the longitudinal dataset. The test descriptives for the differences in values are provided in the right hand columns of each table. Three tables are provided: For intensively assisted firms (Table 6), other assisted (Table 7) and the non-assisted control group (Table 8).

Table 6 – Comparison of firm characteristics: Original sample vs. longitudinal dataset (for IA)

Intensively Assisted Firms (IA)	Original Sample (BLO Survey)			Post matching: LD			Test statistics		
	Obs	Mean	S.D.	Obs	Mean	S.D.		LD<-Orig	
								t-/z-value	sig.
Employment 2004 (BLO S)	1097	27.163	85.132	416	25.844	36.840	t	0.513	
Employment 2004 (BSD)				425	23.348	36.558	t		
Employment 2005 (BLO S)	1106	28.816	86.636	418	28.148	40.607	t	0.256	
Employment 2005 (BSD)				425	23.955	36.157	t		
Firm age: 2≤3 years	1120	0.117	0.322	423	0.097	0.296	z	1.116	
Firm age: 3≤4 years	1120	0.061	0.239	423	0.071	0.257	z	-0.733	
Firm age: 4≤5 years	1120	0.079	0.271	423	0.095	0.293	z	-0.956	
Firm age: 5≤10 years	1120	0.194	0.395	423	0.222	0.416	z	-1.244	
Firm age: 10≤20 years	1120	0.244	0.430	423	0.243	0.430	z	0.010	
Firm age: >20 years	1120	0.305	0.461	423	0.272	0.445	z	1.285	
Formal business plan	1112	0.628	0.484	418	0.706	0.456	z	-2.850	***
Multisite firm	1127	0.193	0.395	425	0.193	0.395	z	0.022	
Exporting firm	1127	0.250	0.433	424	0.377	0.485	z	-4.944	***
Legal form: Limited liability	1125	0.682	0.466	425	0.904	0.296	z	-8.908	***
Owner-Manager <25 years old	982	0.003	0.055	397	0.003	0.050	z	0.168	
Owner-Manager 25<35 years old	982	0.080	0.272	397	0.076	0.265	z	0.304	
Owner-Manager 35<45 years old	982	0.288	0.453	397	0.317	0.466	z	-1.075	
Owner-Manager 45<55 years old	982	0.372	0.484	397	0.360	0.481	z	0.400	
Owner-Manager >55 years old	982	0.257	0.437	397	0.244	0.430	z	0.475	
OM is serial entrepreneur	1019	0.390	0.488	395	0.400	0.491	z	-0.359	
% of female directors	1064	28.047	33.099	414	24.406	30.588	t	3.578	***
% of ethnic minority directors	1060	3.272	15.923	411	2.835	13.696	t	0.892	
SIC1: Agriculture, Hunting & Fishing	1130	0.117	0.321	425	0.033	0.179	z	5.053	***
SIC4: Manufacturing	1130	0.188	0.391	425	0.273	0.446	z	-3.634	***
SIC6: Construction	1130	0.081	0.272	425	0.104	0.305	z	-1.435	
SIC7: Retail & Wholesale	1130	0.135	0.341	425	0.132	0.339	z	0.142	
SIC9: Financial Services	1130	0.030	0.171	425	0.031	0.172	z	-0.051	
SIC11: Education	1130	0.254	0.435	425	0.285	0.452	z	-1.227	
SIC13: Other Services	1130	0.068	0.252	425	0.040	0.196	z	2.075	**
SIC14: Hotels & Catering	1130	0.052	0.223	425	0.042	0.202	z	0.799	

Source: BLO Survey and BSD

Table 7 – Comparison of firm characteristics: Original sample vs. long. dataset (for OA)

Other Assisted Firms (IA)	Original Sample (BLO Survey)			Post matching: LD			Test statistics LD<-Orig	
	Obs	Mean	S.D.	Obs	Mean	S.D.	t-/z-value	sig.
Employment 2004 (BLO S)	1129	39.165	396.583	315	27.349	42.519	t	1.001
Employment 2004 (BSD)				321	23.620	38.835	t	
Employment 2005 (BLO S)	1130	41.200	427.514	316	28.348	43.510	t	1.010
Employment 2005 (BSD)				321	24.495	39.822	t	
Firm age: 2≤3 years	1159	0.093	0.291	321	0.084	0.278	z	0.500
Firm age: 3≤4 years	1159	0.064	0.245	321	0.050	0.218	z	0.929
Firm age: 4≤5 years	1159	0.063	0.243	321	0.065	0.248	z	-0.158
Firm age: 5≤10 years	1159	0.168	0.374	321	0.174	0.380	z	-0.262
Firm age: 10≤20 years	1159	0.272	0.445	321	0.287	0.453	z	-0.526
Firm age: >20 years	1159	0.340	0.474	321	0.340	0.474	z	0.013
Formal business plan	1142	0.550	0.498	316	0.620	0.486	z	-2.232 **
Multisite firm	1165	0.198	0.399	321	0.190	0.393	z	0.329
Exporting firm	1165	0.203	0.402	321	0.280	0.450	z	-2.982 ***
Legal form: Limited liability	1163	0.606	0.489	321	0.879	0.327	z	-9.152 ***
Owner-Manager <25 years old	919	0.004	0.066	283	0.007	0.084	z	-0.567
Owner-Manager 25<35 years old	919	0.095	0.293	283	0.106	0.308	z	-0.563
Owner-Manager 35<45 years old	919	0.273	0.446	283	0.300	0.459	z	-0.893
Owner-Manager 45<55 years old	919	0.357	0.479	283	0.314	0.465	z	1.311
Owner-Manager >55 years old	919	0.271	0.445	283	0.272	0.446	z	-0.038
OM is serial entrepreneur	1011	0.350	0.477	296	0.409	0.492	z	-1.845 *
% of female directors	1091	26.640	32.481	310	22.690	28.428	t	3.999 ***
% of ethnic minority directors	1085	5.271	49.457	310	8.210	86.638	t	1.925 *
SIC1: Agriculture, Hunting & Fishing	1166	0.105	0.307	321	0.044	0.205	z	3.394 ***
SIC4: Manufacturing	1166	0.194	0.395	321	0.259	0.439	z	-2.532 **
SIC6: Construction	1166	0.087	0.281	321	0.109	0.312	z	-1.234
SIC7: Retail & Wholesale	1166	0.149	0.356	321	0.178	0.383	z	-1.241
SIC9: Financial Services	1166	0.022	0.148	321	0.016	0.124	z	0.746
SIC11: Education	1166	0.264	0.441	321	0.287	0.453	z	-0.803
SIC13: Other Services	1166	0.059	0.236	321	0.031	0.174	z	1.982 **
SIC14: Hotels & Catering	1166	0.046	0.210	321	0.047	0.211	z	-0.031

Source: BLO Survey and BSD

Table 8 – Comparison of firm characteristics: Original sample vs. long. dataset (for NA)

Non-assisted Firms (NA)	Original Sample (BLO Survey)			Post matching: LD					
								LD<-Orig	
	Obs	Mean	S.D.	Obs	Mean	S.D.		t-/z-value	sig.
Employment 2004 (BLO S)	1094	23.982	75.944	291	28.186	37.765	t	1.828	*
Employment 2004 (BSD)				298	27.560	40.759	t		
Employment 2005 (BLO S)	1097	23.878	75.829	291	28.893	38.991	t	2.187	**
Employment 2005 (BSD)				298	29.117	45.114	t		
Firm age: 2≤3 years	1145	0.075	0.264	297	0.037	0.189	z	2.334	**
Firm age: 3≤4 years	1145	0.035	0.184	297	0.037	0.189	z	-0.175	
Firm age: 4≤5 years	1145	0.048	0.214	297	0.040	0.197	z	0.557	
Firm age: 5≤10 years	1145	0.144	0.351	297	0.165	0.372	z	-0.902	
Firm age: 10≤20 years	1145	0.239	0.427	297	0.242	0.429	z	-0.112	
Firm age: >20 years	1145	0.459	0.498	297	0.481	0.501	z	-0.707	
Formal business plan	1114	0.322	0.468	285	0.400	0.491	z	-2.476	**
Multisite firm	1151	0.156	0.363	297	0.185	0.389	z	-1.238	
Exporting firm	1148	0.152	0.359	295	0.217	0.413	z	-2.699	***
Legal form: Limited liability	1148	0.536	0.499	298	0.862	0.345	z	-10.271	***
Owner-Manager <25 years old	990	0.010	0.100	264	0.011	0.106	z	-0.180	
Owner-Manager 25<35 years old	990	0.065	0.246	264	0.091	0.288	z	-1.484	
Owner-Manager 35<45 years old	990	0.276	0.447	264	0.299	0.459	z	-0.755	
Owner-Manager 45<55 years old	990	0.328	0.470	264	0.318	0.467	z	0.311	
Owner-Manager >55 years old	990	0.321	0.467	264	0.280	0.450	z	1.274	
OM is serial entrepreneur	1060	0.271	0.445	270	0.300	0.459	z	-0.959	
% of female directors	1094	26.361	33.486	288	22.922	29.662	t	3.379	***
% of ethnic minority directors	1089	3.758	34.164	287	2.933	15.963	t	0.796	
SIC1: Agriculture, Hunting & Fishing	1152	0.111	0.314	298	0.040	0.197	z	3.691	***
SIC4: Manufacturing	1152	0.180	0.384	298	0.252	0.435	z	-2.799	***
SIC6: Construction	1152	0.083	0.277	298	0.124	0.330	z	-2.176	**
SIC7: Retail & Wholesale	1152	0.240	0.428	298	0.238	0.427	z	0.079	
SIC9: Financial Services	1152	0.028	0.164	298	0.027	0.162	z	0.088	
SIC11: Education	1152	0.149	0.357	298	0.154	0.362	z	-0.218	
SIC13: Other Services	1152	0.059	0.236	298	0.057	0.232	z	0.130	
SIC14: Hotels & Catering	1152	0.047	0.211	298	0.040	0.197	z	0.488	

Source: BLO Survey and BSD

The significant differences (at the five percent level) between original BLO sample and the matched dataset are summarised here.

Sector: The share of "agriculture, hunting and fishing" firms drops from a range of 10.5 to 11.7 percent down to 3.3 to 4 percent across the three groups of firms. In turn, the share of

manufacturing firms rises from the 18 to 19.4 percent range up to 25.2 to 27.3 percent. Not unilaterally significant across the three groups of firms is the change in the share of "other services". This drops for IAs from 6.8 to four percent, and for OAs from 5.9 to 3.1 percent, and, only among NAs, the share of construction firms rises from 8.3 to 12.4 percent.

Firm age: Only one significant difference exists, for NAs the 2≤3 years old category of firms represents a larger share pre-matching (7.5 percent) than post matching (3.7 percent).

Employment: Likewise, only for NAs has the average firm size increased significantly based on the BLO sample's employment figures, having risen from 24 employees pre-matching to 29 post matching for the 2005 figures, As a result, the figures are more in line with those reported for the size of IAs and OAs.

Owner-Manager (OM) age: No significant differences through matching.

OM characteristics: The average percentage of female directors is reduced in the post matching sample, from a 26.4 to 28 percent range to 22.7 to 24.4 percent, across all three groups of firms.

Firm characteristics: These show considerable change, unilaterally, across the three groups. Pre-matching, the proportion of firms with business plan is some seven to eight percent lower than post matching, keeping the absolute difference between the assisted groups and the non-assisted one intact. For exporting, the proportion rises from 25 to 37.7 percent for IAs, 20.3 to 28 percent for OAs, and 15.2 to 21.7 percent for NAs, widening the gaps between the IA, OA and NA. By comparison, the gap shrinks for the proportion of limited companies among the three groups, with rises from 68.2 to 90.4 percent for IAs, 60.6 to 87.9 percent for OAs, and 53.6 to 86.2 percent for NAs.

These variations in sample means across the three groups of firms confirm the earlier outlined weak spot of the BSD. Firms not part PAYE and/or VAT are not represented. This is very likely to explain the drop in share of agricultural, fishing and hunting businesses in the post matching sample, and the increase of limited liability companies, exporting firms and companies with formal business plans. Importantly, no changes in sample means occurred that would look out of line when compared to the sample means of the other groups of firms, meaning that whilst these differences between the original and post matching sample should be kept in mind, there are no concerns about the post matching sample's analytical validity.

3.5.3   Self-reported versus official dataset performance data

To develop the growth models (in Chapter Five), the self-reported firm performance for the years of 2004 and 2005 from the BLO Survey data was replaced by 2004-2011 employee and turnover data from the BSD.

As discussed earlier in this chapter the 2004 data is most likely to be reflected by BSD 2005, depending on the date of a firm's annual reports. But even when allowing for this lag of the BSD, the self-reported employment figures (Table 9) exceed those of both the BSD 2004 and 2005 figures. At the same time, the BLO Survey's recorded employment growth of 5.3 percent fails to match the lower 3.9 percent rate of the BSD 2005 over BSD 2004, or the higher rate of 8.4 percent of BSD 2006 over BSD 2005. Self-reported data is often known to be unreliable, something of particular concern in the fields of psychology and health where no measures other than self-reports may be available. A summary of the potential limitations is provided by Stone et al. (1999).

Table 9 – Comparison of employment means and growth rates between BLO survey (self-reported) and BSD (official statistics)

Employment	2004	2005	Change
BLO Survey	27.22	28.66	5.3%
BSD 2004 vs BSD 2005	24.85	25.83	3.9%
BSD 2005 vs BSD 2006	25.83	28.00	8.4%

Source: BLO Survey and BSD

It is not clear why such differences would arise for employment data. Even if, for example, different treatment of part-time employees (versus full-time equivalents) played a role, that would be unlikely to explain the differences in growth rates as observed. It is certainly more likely that the BSD figures, sourced from VAT and PAYE returns, provide a reliable measure of employment over time. The analysis in this thesis therefore is entirely based on performance data as provided by the BSD, ensuring consistency across the time periods included.

3.6   Data linking: Why not use BvD's Orbis data?

Few alternatives to the BSD for the UK, or comparable official datasets elsewhere exist for getting access to performance data at firm level other than surveying firms individually. The Bureau van Dijk Orbis[43] database is widely used as (the) source of secondary data on firms. In this thesis it was used only for identification of the company registration numbers to facilitate the matching process.

Anyadike-Danes (2011) provided a detailed comparison of the BSD and Orbis, and is summarised here. The BSD was introduced earlier in this chapter as an annual snapshot of the IDBR which relies on official VAT return and employer PATE tax data. The firm

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[43] BvD's Orbis database contains the same data as what may be referred to as BvD's Fame database. The difference is that Fame contains only UK records.

characteristics contained in the BSD are relatively few: employment, turnover, location, structure and industry sector.

Orbis relies on Companies House data and firms registered there. In theory, it has far more detailed records for each firm than the BSD, drawing from various sources. Data contained in Orbis include: employment, turnover, turnover outside the UK, balance sheet, profit and loss account, industry, ownership and subsidiary information, directors (and directors' other businesses they may be involved with) and more. In practice, only large firms are required to report many of these characteristics, including employment, turnover and assets. Smaller businesses don't report that data. That means its coverage is very limited in comparison to the BSD when it comes to details on smaller firms, but superior for larger firms (keeping in mind that Orbis data remains unverified, and may also include worldwide figures for companies with operations abroad).

When identifying the CRNs in Orbis this problem became very apparent – only a small fraction of businesses contained in the BLO Survey and identified in Orbis carried any employment or turnover information. Orbis may therefore provide a useful ready-data source for analysis on large firms. But when it comes to studying small business, it lacks in-depth coverage and, a vital aspect for this study, performance data for a majority of firms.

3.7   Chapter conclusions

This chapter illustrates how long-term impact evaluations of business support can be enabled by the use of official firm-level data. Political expediency and data availability work against any potential will and interest in undertaking long-term evaluation. The latter problem can be countered through the use of firm-level data as maintained for official purposes, and as such the need for carrying out resource-intensive longitudinal surveys can be avoided. In its most

basic form this would require a list of assisted firms only; the control group could be drawn from the BSD.

In essence, this simple approach provides an easy, but excellent, starting point for automatic performance tracking of all assisted firms in any public scheme, having the potential of carrying out evaluation as required, and when required. It would require for evaluation to be in embedded in all (UK) public (business support) bodies to such an extent that they would provide a timely update on the list of firms that have received an intervention, and any knowledge they have about these firms (and provided company owners agreed for their firm's information to be shared for research purposes). Problems as encountered for this research initially, due to the abolishment of the RDAs, could be avoided that way.

There are limitations to this approach, of course. Here, the list of assisted firms was already subject to a survey close to the time of intervention, capturing a variety of firm and owner characteristics. This certainly is a preferable scenario, as the BSD carries only few firm characteristics beyond employment and turnover data – sector, location, number of subsidiaries, entry and exit. Other firm-level datasets available in the UK could be used to link additional information to a list of firms, however, they are carried out on a sampling basis only, and therefore would require a very extensive initial list of firms to achieve a robust sample size post matching. Sample size is also important for matching to the BSD. In the case demonstrated here, only just under half of the original sample could be linked to a company registration number (partly due company names not representing actual firms' names), resulting in an eventual sample of only a third in size following data linking.

The sample means of the original BLO Survey sample compared with the post data linking sample underpin how the linking (and reduced sample size) may affect sample characteristics, the most obvious reason for this being BSD's lack of coverage for the smallest of firms without PAYE/VAT registration, and firms for which an appropriate company registration number may not be identified and therefore no data linking is possible. Again, that would usually affect the

smallest of firms, trading as partnerships or sole traders, which are therefore not registered at Companies House. For the data linked herein, the jump in the proportion of limited companies post data linking illustrates this phenomenon well. But importantly, the groups of assisted and non-assisted firms overall stayed remarkably similar, in large parts not significantly changed from its original sample means.

The use of official data may also be beneficial for the reliability of the performance measures used – as illustrated by the differences between the self-reported employment figures and growth in the BLO Survey, compared to that of the employment figures and growth for the same firms as based on the BSD (essentially tax data).

The result of this data linking between the BLO Survey with its list of firms (and firm characteristics near the point of intervention) and the BSD's performance data is a longitudinal dataset that will allow the analysis that many evaluators called for and which is discussed in Chapter Two. This analysis can, by default, be much richer than that of evaluations relying on two, or in rare instance three data points, essentially allowing the creation of a timeline of the impact of assistance over numerous years. This availability of numerous years of data enables investigating the concerns around potential time lags before (full) impact of a support measure can be estimated. If impact exists, its longevity can also be analysed.

This research will make use of the data in two ways. Chapter Four will consider the impact of assistance on firm survival, creating an annual survival profile. Chapter Five then will focus on the impact of assistance on firm growth, across time.

Chapter Four

Business support and firm survival

4.1 Introduction

Policy-makers widely regard small business creation and growth as effective stimuli to create jobs and accordingly counter unemployment (van Praag, 2003)[44]. In the UK each year between 200,000 and 500,000 new firms are born, depending on source and measurement methodology[45]. Whilst start-up rates are often heralded by policy-makers and the media, the net number of births less firm exits is often not considered (examples of that practice include FT, 2013; CFE, 2014). There are some 5.2m firms in the UK[46] (BIS, 2014a), an annual addition of up to 500k firms without a considerable exit rate would mean a large firm population growth.

The scale of this attrition is substantial. Earlier research concluded that only half of the firms survive the first three years (van Praag, 2003). Aldrich and Ruef (2006) and Bates and Nucci (1990), both as cited in Amezcua et al. (2013) find that "approximately half of all new [US] entrants survive less than five years". For the UK, recent research found that no more than two

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[44] Policy motives as introduced in Chapter One.
[45] Figures vary, Anyadike-Danes et al. (2013) using private sector estimates based on the Business Structure Database suggest the annual figure is around 200k-250k (as aforementioned, the BSD only contains firms registered for VAT and/or PAYE, that is, with a certain turnover and least one employee). Other sources suggest up to 500k new firms each year (e.g. FT 06/10/2013 referencing Start-Up Britain). The difference mainly arises from including self-employed rather than focussing on employer-enterprises.
[46] Of these, some 3.2m are active and registered companies at Companies House (Companies House, 2015).

to three start-ups out of ten will survive their first decade (Anyadike-Danes et al., 2013). The original employment of a million workers of these new firms – the "new jobs" figure that policy-makers are usually keen to mention – reduces to half a million jobs among the surviving firms (Anyadike-Danes et al., 2013).

Whilst these statistics are for new-born firms, they illustrate well the very dynamic firm environment economies face. Governments recognise the important role of small firms in the economic make-up, and are keen to not only foster new business but also support established firms. For the UK, the annual closure rate for the entire firm population was just under five percent in 2013 (House of Commons, 2014). The recognition of this central role of small business led to a growing focus on programmes designed to support small businesses (Amezcua et al., 2013).

In this chapter the effects of soft – non-financial – business support on firm survival are explored. Whilst the previous evaluations carried out on this set of firms were able to provide a short-term impact assessment (which will be returned to in Chapter Five), the data previously captured was too short-term for any survival analysis. The linked dataset herein, with its seven years of performance data, now facilitates an analysis of the impact of business support on firm survival.

To provide the necessary context for the analysis, Section 4.2 provides an introduction to the most popular business lifecycle approaches, introducing the role of firm survival as a success criterion. Section 4.3 then considers the broad literature around firm survival and its determinants. This will be followed in Section 4.4 by a review of the somewhat limited evidence that exists with regards to the impact of support on firm survival. Given the limited evidence available the review will include the impact of financial support. Section 4.5 will then develop the analysis, making specific reference to the impact by size and age also, before the chapter is concluded.

4.2   Stages theory and dynamic states

A widely cited model[47] by Lewis and Churchill (1983) considers business growth a five stage process: existence, survival, success, take-off and resource-maturity[48].

Lewis and Churchill (1983) define firm survival as a firm's ability to balance its income and outgoings, having proven that it has a product or service proposition by having surpassed the initial 'existence' stage; and that its proposition is designed to serve a market need, to attract and retain a level of custom. Achieving a positive cash flow is of central concern at this stage, allowing funding not only of the already established operational activities, but much more also for investment in growth to reach a sustainable firm size, that is, reaching an economically sustainable utilisation of workforce and assets. The owner is still seen as central to the firm's direction. Few formal systems exist, with planning likely to be limited to cash forecasting at best. Lewis and Churchill (1983) conclude that many businesses may never leave this stage, and potentially remain in this 'survival space' for some time. In that case a firm may cease to exist due to owner age or them giving up (whether or not for financial reasons).

A firm may be sold to a company that believes it could unlock additional potential and success from the purchased entity[49]. Only few firms of a cohort will be moving on to what is termed the 'success' stage in which a firm faces the choice of focussing on profitability or to expand, whether to current and/or new markets).

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[47] Based on Google Scholar, the citation count exceeded 1,750 on 30/6/2014. Numerous variations of stages models exist.
[48] Whilst introduced in this chapter as part of firm survival as performance indicator, it is also relevant for Chapter Five and firm growth, and will be referred to from there.
[49] Since Lewis and Churchill's (1983) five stage model, the rise of tech firms particular in the software and social media space has shown that a firm does not necessarily need to prove its economic viability to be successfully sold on. In fact, some start-up owners begin their business with the clear intention of a financially rewarding exit after a few years, and not necessarily of making the firm a self-sustained enterprise.

Whilst Lewis and Churchill's (1983) stages approach provides a popular way to understanding business development and growth, it is not without criticism and alternative models have been proposed. Levie and Lichtenstein (2010) in this context suggest a more flexible and plausible approach. They go as far as titling their paper "A Terminal Assessment of Stages Theory […]", leaving little doubt about the authors' view. With reference to Phelps et al. (2007) and Stubbart and Smalley (1999), they outline how stages theory has seen numerous criticisms, but at the same time a continued growth of stage models could be seen, consisting in the majority of three to five stages. The critique of these focusses on the lack of clarity and coherence across stages models as to why and how firms progress through the stages. In turn Lewis and Churchill (2010) propose what they term a "Dynamic States of Entrepreneurship" model, essentially seeing the firm as part of "a network of beliefs, relationships, systems, and structures that convert opportunity tension into tangible value […]". Firm survival is seen as dependent on that environment. As long as survival conditions are met, a firm may then create value.

In that sense both the outdated but widely quoted (static) stages and the dynamic states approach provide the same basic condition for any firm development: Survival.

> *"Survival is the minimum criterion of entrepreneurial success and is at first the most important attribute of firm development"*
>
> (Schwartz, 2009, p. 403; ref. Woywoode, 2004; Tamasay, 2005).

While 'simple' survival by a firm may not be identical to what might be considered as a success by a firm more broadly, survival is a fundamental condition for further firm performance. Using the longitudinal dataset as developed in Chapter Three, this chapter will therefore assess what difference (non-financial) business support makes to a firm's survival prospects. Testing this using the BLO Survey data was not possible in previous evaluations (for example, BERR, 2007; Mole et al., 2008) given the BLO Surveys limitation to two years of data.

4.3   Previous evidence on firm survival

Given the absolute nature of the entry and exit question, survival is at the core of a firm, with an accordingly prominent place in the small business literature. Firm survival received little attention until the second half of the 1980s, when a number of studies sought to understand what might influence firm survival (Audretsch and Mahmood, 1995; Lin and Huang, 2008). The studies agreed that the likelihood of a firm's survival is not equally distributed across the firm population, but that it was influenced by a wide range of factors.

Firstly, there is age. The initial death rates seen for young firms reduce considerably over time, following an exponential rather than linear pattern[50]. The older a firm, the less likely it is to exit; the larger a firm, the better its chances for survival (Wagner, 2012). There are numerous other studies confirming this inverse relationship between survival and age and size. Audretsch and Mahmood (1995) provide a number of references to that effect (e.g. Baldwin and Gorecki, 1991; Philips and Kirchhoff, 1989), rendering these two firm characteristics generally accepted as indicative of a firm's survival chances.

> *"Firm size is an important dimension in our analysis for several reasons. The empirical literature suggests that small firms tend to be affected by greater churning, but also have greater potential expansion".*
> *Bartelsman et al. (2009, p. 35)*

The growth pattern of small firms is of importance for the probability of survival. Interestingly, growth can both endanger firm survival, whilst also being the necessary condition for reaching a sustainable scale – both for returns on capital employed and resilience to any external shocks. Sapienza et al. (2006) illustrate this paradox. Specifically considering firms' decision to expand their market internationally, they describe this decision as fundamental for a higher likelihood of more rapid growth than enjoyed by non-international outfits. However, it may also decrease the probability of survival in the short-term given the increased demands on a firm's

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[50] Of course, if it was linear, no firms would survive beyond the 10-20 years age bracket.

limited resources. Mortality rates do not uniformly change with firm growth (Dobrev and Carroll, 2003; in Sapienza et al., 2006). Firm strategy also influences the growth/survival relationship, as highlighted by Romanelli (1989; in Sapienza et al., 2006), suggesting what is summarised as a "complex relationship between industry growth and mortality". According to Romanelli (1989), sector growth increased the likelihood of survival; but this relationship had to be considered alongside firm strategy, where specialised businesses were at a higher risk of death in high growth sectors, whilst a firm's high expansion rate posed a risk in low growth industries.

The significance of a firms' industry on survival was confirmed by Audretsch (1991), who compared survival rates of firms in different manufacturing sectors. Whilst capital-intensity was found to be of little deterrence to new firm foundation in a sector, firms in capital-intense business areas were more likely to fail. This effect was distinct for firms who faced both the high capital requirements and were unable to make up for it through innovative approaches and/or products. Those sector new-joiners that prove to engage with innovation activities were able to offset the negative impact of capital-intensity on survival. Dunne et al. (1989) also found this impact of sector on survival. Geroski (1995, p. 21; in Lin and Huang, 2008) confirm the role of innovation in survival, expanding the arguments presented by linking it to a sector's environment:

> *"the growth and survival prospects of new firms will depend on their ability to learn about their environment, and to link changes in their choices of strategy to the changing configuration of that environment... the more turbulent the market environment, the more likely it is that firms will fail to cope. If the process of entry continually throws up new aspirants for market places, then slow learning coupled with a turbulent environment means that high entry rates will be observed jointly with high failure rates".*

Of course, other macro-economic factors also influence firm survival, for example, at national level the recent financial crisis or government austerity. Both may not only impact spending power, but also a firm's ability to attract capital. Local effects impacting survival may be a firm's ability to attract and retain talent, or a more regionally contained economic crisis (or boom).

Geroski (p.23, 1995) concludes that "[new firm] entry appears to be relatively easy, but survival is not". Certainly the high annual entry figures described at the outset of this section and the quick exit of a large number of these entities confirms the challenges small firms are facing in relation to survival.

From a policy perspective, the questions that arise are whether – given the high attrition among new and young firms – a lower firm death rate among small firms would be desirable, and what measures could be taken and to yield actual impact? This chapter is concerned with adding evidence to the latter. On the question of desirability caution is required, and whilst beyond the core of this thesis, it is a valid concern. Support may help a promising business through a phase of difficulty, but it may also result in inefficient businesses surviving for longer. However, to what extent soft business support has the ability to extend an essentially unviable firm's lifetime is questionable. The problem will be more acute for financial support.

4.4   Previous evidence on the impact of support on firm survival

Chapter One outlined the market failure arguments, as an explanation of why policy is concerned with providing assistance to small firms. A large number of schemes exist to support small firms to overcome these perceived market failures in the economy. Policy-makers' intentions for specific interventions are often not well defined, leaving it uncertain as to what specific criteria support policy should be assessed against (as discussed in Chapter Two). Generally small business policy considers the array of options governments have at their disposal to support small firm development (Smallbone and Welter, 2001). It is a logical assumption that one of the intended outcomes of policy is to enhance the survival prospects of assisted firms. Unless firms survive, they would be unable to provide the job and other economic effects hoped for in the policy design (as concluded in Section 4.2 – keeping in mind that support could possibly also extent inefficient market contenders' lifes). In fact, Coad et al. (2013) make the argument that a firm's resource base influences the likelihood for its survival,

improving the odds of a (random) growth event. So if a support intervention adds to the firms' resource base, this would not translate into growth, which is perceived as a random event, but instead would only increase the odds for growth given that longer survival[51].

Some literature considering business support and its impact on the survival of firms exists, usually as an addition to their actual defined evaluation objectives. Wren and Storey (2002) found in their assessment of marketing consultancy to SMEs that advice had a considerable impact on firm performance. Overall, support was not found to be of significance on firm survival. However, when mediating by firm size, survival effects depending on firm size (and stage of the economic cycle) were identified. Support benefited mid-range SMEs, defined by Wren and Storey as having 6-80 employees and £300k-£2m sales, with four percent higher survival rates in the longer run, and for the survivors up to ten percent higher growth rates. Supported firms were low-growth but high-survival, without taking the selection bias into account the survival and growth impact would be about half. This was considered as "strong support" for the then recent changes to the UK's business support framework delivered through Business Link, with a stronger focus on those mid-range small businesses.

Fuentes and Dresdner (2013) considered the impact of support on micro-enterprise survival in Chile as a developing nation. There were two assessed dimensions to the support – firstly the amount of funds granted to the micro-enterprise; and secondly the characteristics of the so-called sponsors[52] providing soft support to complement the financial assistance. The study was based on a relatively small sample of 76 firms covering nine years, and the authors conclude their paper with the call for "a more complete database", to be "continuously pursued"[53]. It was found that the amount of funds granted was linked to longer firm survival, reducing their hazard rate minimally but significantly. Different sponsors also impacted the survival chances across

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[51] Coad et al. (2013) are not without criticism, Chapter 5 looks at that specific debate in more detail.
[52] The concept of 'sponsors' is interesting in that it represents a non-financial support product. Generally, the limited evidence around the impact of support on firm survival focusses on financial support (such as grants).
[53] This links back to Chapter Two, which discusses how data availability presents one of the major issues for robust long-term evaluation.

the firms. One obvious concern, raised by the authors, is the uncertainty around potential selection issues here. Have firms really survived due to higher grants and a more effective sponsor, or were those firms with a high probability to succeed singled out for higher grant awards and the "more effective" sponsors? A literature review by Schwartz (2009, p. 406) would suggest that substantial selection bias is highly likely in the context of such programme. It was not controlled for in Fuentes and Dresdner (2013).

Drawing on a far larger sample, an earlier study of the effects of government grants on survival was undertaken by Girma et al. (2007), studying the case of Ireland. Whilst also investigating financial support, their study is of interest due to the use of official micro-data. Their final sample of 3,095 firms was the result of linking national Irish databases, comprised of firm-level performance data and covariates with a universe of assisted firms, and therefore achieving a far greater sample size than the Chilean case reviewed above. Propensity score matching was undertaken to address selection issues (which were found to be clearly present). Kaplan-Meier survival functions suggest a higher likelihood of survival for those firms in receipt of grants compared to those that were not. After ten years, the probability of survival for firms in receipt of a grant was 85 percent, compared to 70 percent for those firms in the non-assisted control group. A subsequent Cox proportional hazards model confirms a significant difference between the two groups, with the grants linked to firms with a higher chance of survival. The results also underline the important role of size for firm survival, significant at one percent level across all presented models[54], whilst none of the other controls such as foreign ownership were found to be of significance.

Financial support will quite naturally help a small business more immediately than any non-financial support such as advice, by instantly impacting a firm's cash flow. Overall, the small amount of evidence that does exist for the impact of public support on firm survival would point

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[54] An interesting additional observation is the clearly limited evidence that exists with regards to the effect of business support on survival. Only Wren and Storey (2002, as presented above) and Jarmin (1999) are highlighted as previous survival studies by Girma et al. (2007). As survival is a long-term evaluation matter, this again points towards the lack of evidence accounting for the longer term.

towards some effect on survival rates for those firms in receipt of assistance. No survival studies other than Wren and Storey (2002) and Jarmin (1999) focussing on pure non-financial assistance through means of business advice appear to exist, however. Given the more immediate nature of the impact of financial support, care should be taken to avoid generalising the results and considering the impact of financial and non-financial support to be comparable. There is a clear need to add to the rather scarce evidence on the impact of non-financial business support on firm survival.

Given the scarce evidence in existence suggests a positive impact of support in survival rates, this chapter's analysis, therefore, seeks to test the following hypotheses:

Hypothesis H1 – *Business support impacts firm survival rates.*

Assistance is split into Intensive and Other Assistance. A reasonable assumption would be for Intensive Assistance to have a greater impact on survival rates than Other Assistance:

Hypothesis H2 – *Business support impact on firm survival rates will differ by intensity of support.*

Survival is impacted by a variety of factors, most notably age. It appears unlikely that a soft support intervention would make a lasting measurable impact on survival working against those broader trends.

Hypothesis H3 – *Assisted firms will face the same long-term survival prospects as non-assisted firms.*

The hypotheses will be tested in the following analysis.

4.5 Survival estimates for assisted vs. non-assisted firms

The effect of a firm having received assistance on its likelihood of survival is estimated using the BL impact dataset discussed in Chapter Three. The analysis differentiates between the survival effects of intensive assistance and other assistance, compared to the group of non-assisted firms. The analysis will take into account age and size as key determinants of survival rates.

In Chapter Three the longitudinal dataset of BL assistance was developed. The longitudinal dataset provides the underlying dataset for the survival analysis undertaken in this chapter (and for the growth analysis in Chapter Five). As previously outlined, the dataset allows for the comparison of three groups: The intensively assisted firms (IAs), those that had other assistance (OAs) and the non-assisted control group (NA). Assistance was provided to the IAs and OAs during the 6 months period between April and October of that year. With no further information available on the exact month of intervention, 2003 serves as the common 'origin' or base year for the analysis. The BSD is also limited to only being able to provide an annual insight into a firm's live status, this somewhat broader definition of the period of intervention has no impact on the analysis carried out (even if assistance could be attributed to a specific month during that six months period, only data for the annual intervals would be available for the analysis from the BSD).

The death or exit variable as provided by the BSD has been explored in Chapter Three. The definition of death applied here, therefore, differs from other firm death definitions. For example, Storey and Wynarczyk (1996) define firm death as an event where a number of changes are recorded simultaneously: If at least three characteristics out of name, location, sector and ownership change, a firm may be considered dead in their view. In the BSD, enterprise exit is recorded for IDs ('entrefs') that either cease to trade, which may be signalled by a lack of updates in the IDBR for more than three years for a specific firm, or gets taken

over by another entity and, therefore, ceases to trade as an enterprise. Name and sector do not make any difference.

The full sample descriptives are provided in Chapter Three. Given the literature's suggestion of the role of age and size on survival, they will be included as part of the analysis and reviewed in more detail in the respective following sections.

4.5.1 Survival analysis: All assisted versus all non-assisted

The central element of survival analysis is the hazard rate, which represents the likelihood of an event, in this case firm death, at a certain time. For this, the firm needs to have survived up to the previous time period, of course. The survival rate is the inverse of the hazard rate – the more firms are likely to die, the less can survive.

The non-parametrical Kaplan-Meier product limit estimator provides a simple first step to explore the survival differences by type of assistance. No censoring of data is required, the Kaplan-Meier model has no design issues with the 75-80 percent of firms that survive from (BSD) 2004[55] all the way through to 2011, which represents the last year of data included in the longitudinal dataset.

The survival rate is represented by:

$$S(T_k) = \frac{n_i - h_i}{n_1} \qquad\qquad (1)$$

The literature is clear on the significant role of size and particularly age on survival (e. g. Wren and Storey, 2002, as introduced earlier), and this should be taken into account for any analysis herein. Without taking into account age (or size) the Kaplan-Meier survival estimates returned

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[55] Keeping in mind that the intervention took place in 2003, which is reflected by the BSD 2004 edition. Any years referred to in this analysis refer to the year of the BSD data.

fairly small and insignificant differences in survival between the assistance and control groups (graphs not shown). Appendix D applies a number of tests confirming these observations.

4.5.2 Survival analysis: By type of assistance and firm age

Given the central role of firm age with respect to firm survival[56], rather than comparing the entire groups of IAs, OAs and NAs, the groups were split by firm age. Firm age was captured as part of the original BLO Survey (Table 10 – where "Firm age <5yrs" represents the BLO Survey age categories coded as 2<3 years, 3<4 years, 4<5 years, other categories as provided by BLO Survey). Age was coded with reference to 2005, that is, for the 2003 intervention the youngest firms in the BLO Survey must have been two years old.

Table 10 – Age categories as available from BLO Survey

Firm age in BLO Survey 2005	IA	OA	NA	Total
Firm age <5yrs (2003: 0-2 yrs.)	111	64	34	209
Firm age 5<10yrs (2003: 3-7 yrs.)	94	56	49	199
Firm age 10<20yrs (2003: 8-17 yrs.)	103	92	72	267
Firm age 20+yrs (2003: 18+ yrs.)	115	109	144	368
Total	423	321	299	1,043

Source: BLO Survey

In comparison to the BLO survey, where age was coded in above categories, the BSD allows determining age as a continuous variable, using its birth and death variables as discussed in Chapter Three. Table 11 shows age as coded on the basis of the BSD, compared to the BLO survey categories.

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[56] For a better understanding of the importance of the role of size and age and potential other firm and owner characteristics, probit regressions were run, with firm exit event as the binary dependent outcome variable. These confirmed the size and age impacts on survival, but provided no coherent results on any other suitable predictors.

Table 11 – Comparison of age categories, BSD and BLO Survey

Firm age 2003, BSD vs. BLO	IA		OA		NA		Total	Total
	BSD	BLO	BSD	BLO	BSD	BLO	BSD	BLO
Firm age 0-2 yrs.	73	111	49	64	26	34	148	209
Firm age 3-7 yrs.	103	94	70	56	51	49	224	199
Firm age 8-17 yrs.	134	103	112	92	103	72	349	267
Firm age 18+ yrs.	115	115	90	109	120	144	325	368
Total	425	423	321	321	300	299	1,046	1,043

Source: BLO Survey and BSD

Table 11 includes the age categories as based on the BLO Survey; they are for their largest part congruent with firm age as recorded in the BSD. Ideally, the figures should be identical. Especially the figures for the youngest firms are considerably lower based on the BSD. One likely reason for this apparent gap is the way the BSD 'learns' of a firm's existence: firm birth will be recorded in the BSD at the time of a firm's registration for VAT of PAYE, as discussed in Chapter Three. BLO Survey interviewees may therefore have provided birth dates that precede BSD records. Other than that, as with any survey, there is of course the risk of inaccurate responses to the BLO survey, or inaccurate recording of the same.

It was chosen to work with age based on the BSD, therefore with firm age as reflected by official records. This allows for determining age groups that achieve a more even count by age band. It also ensures age was determined in a comparable way to the BSD reference group (introduced and used in Figure 2 and Figure 3). Table 12 shows the age categories as redefined on the basis of the BSD for the survival analysis within this chapter.

Table 12 – Recoded age categories based on BSD

Firm age 2003 (BSD), re-categorised	IA	OA	NA	Total
Firm age 0-3 yrs.	102	63	36	201
Firm age 4-9 yrs.	101	75	65	241
Firm age 10-19 yrs.	125	110	85	320
Firm age 20+ yrs.	97	73	114	284
Total	425	321	300	1,046

Source: BLO Survey and BSD

Figure 2 demonstrates the importance of age on survival for the sample of firms at hand.

Figure 2 – Survival estimates by firm age group (all firms in longitudinal dataset)
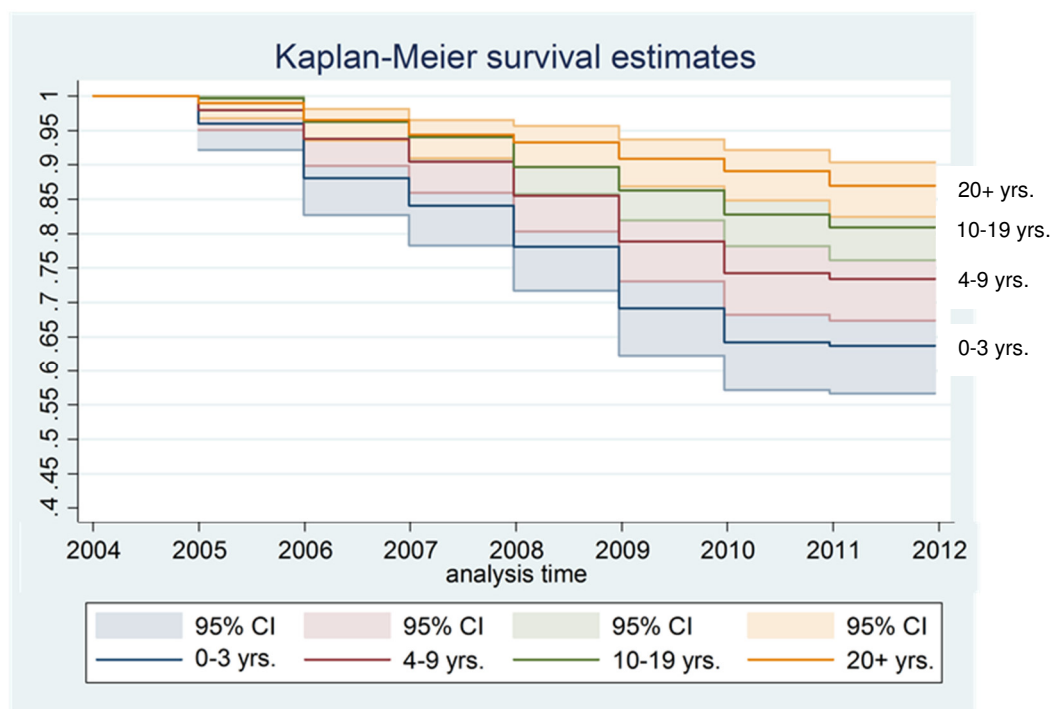
Source: BLO Survey and BSD

Figure 3 provides the same breakdown of firms by age group but for a random sample of 197,291 firms from the BSD[57]. It confirms the trends as observed in the longitudinal dataset to reflect general survival rates fairly accurately.

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[57] The random sample was drawn from linked 2004-2011 BSD data. The total sample size of 197,291 divides into 55,531 firm 0-3 years old, 57,721 4-9 years, 47,811 10<19 years. The use of a random sample rather than the full firm population was on the basis of computing power limitations.

Figure 3 – Survival estimates by firm age group (random sample from BSD)
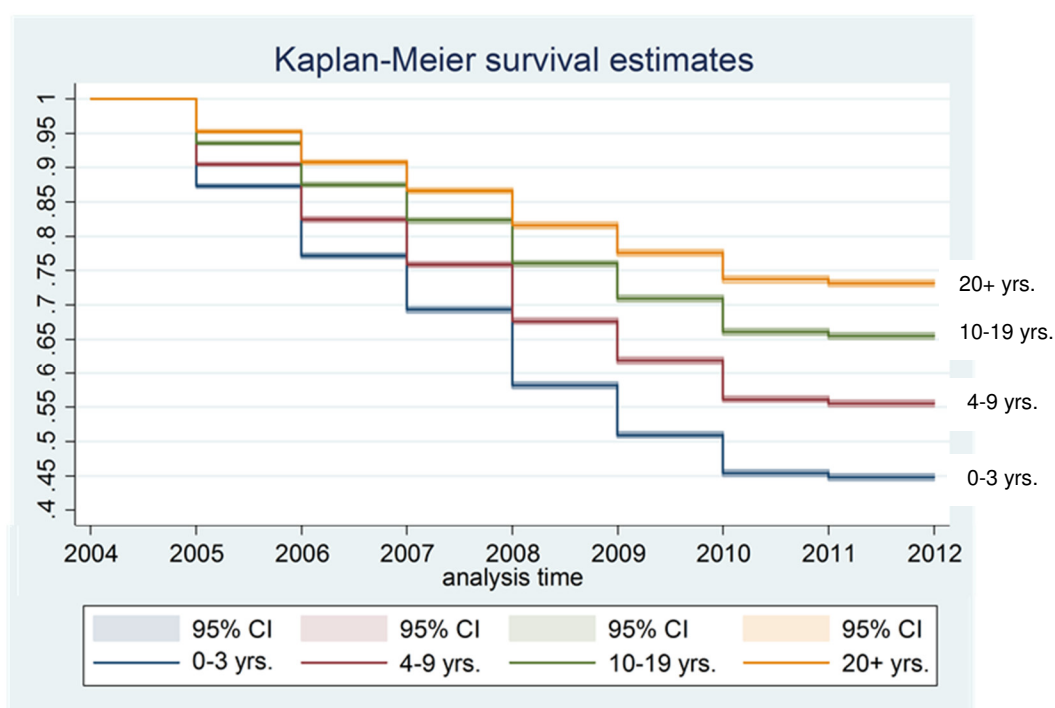
Source: BSD

Whilst the overall survival trends are comparable, the firms as captured as part of the BLO survey (Figure 2) enjoyed a considerably higher survival rate than the overall firm population (as represented by the large random BSD sample in Figure 3). The reasons for these observed differences may be manifold – section 4.5.4 looks at this.

Returning to Figure 2, the question arising is to what extent these survival rates differ by age group when comparing assisted and non-assisted groups. Combinations for both IA and OA compared to NA were looked at across age groups.

The results obtained suggest little significant impact of assistance on survival. The following six graphs Figure 4 to Figure 9 were chosen to illustrate the discussion of the results, split in pairs of both survival rate and resulting hazard rate graphs[58]. The results for OA were even

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[58] This analysis included the survival rates as obtained for the random sample from the BSD (introduced in Figure 3). They are of purely indicative nature, and no robust conclusions can be drawn on firms outperforming the firm population based on assistance received – again section 4.5.4 discusses this and any observations from the random sample's survival rates.

less remarkable than those for the IAs and are therefore not specifically reviewed in the following.

Figure 4 shows how the youngest firms, which were no more than three years old at the point of intervention, enjoy no distinct advantage for survival as recipients of IA. No IAs exited in 2005, but around six percent of NAs (and ten percent of OAs did so – not shown). Given the upper confidence limit for NAs is at around 98 percent, the early IA survival performance is significantly better for the youngest firms than the NAs. IAs then faced survival rates below those of the NAs, for a period of three years up to 2009, and from 2010 onwards.

Figure 5, showing the according hazard rates, shows a high exit rate for NAs between 2008 and 2009, but far less so for IAs. However, with the exception of the 2005 IA survival performance, no significant differences exist between IA, OA and NA groups for firms of less than three years of age, with confidence limits overlapping nearly entirely[59].

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[59] As the relatively wide confidence limits indicate, sample size for the 0-3 year old firms, which was then split by category of assistance, is smaller compared to the other age groups defined in the BLO Survey, with particularly few NAs.

Figure 4 – Survival estimates IA vs. NA (for firms aged 0-3 years at intervention)
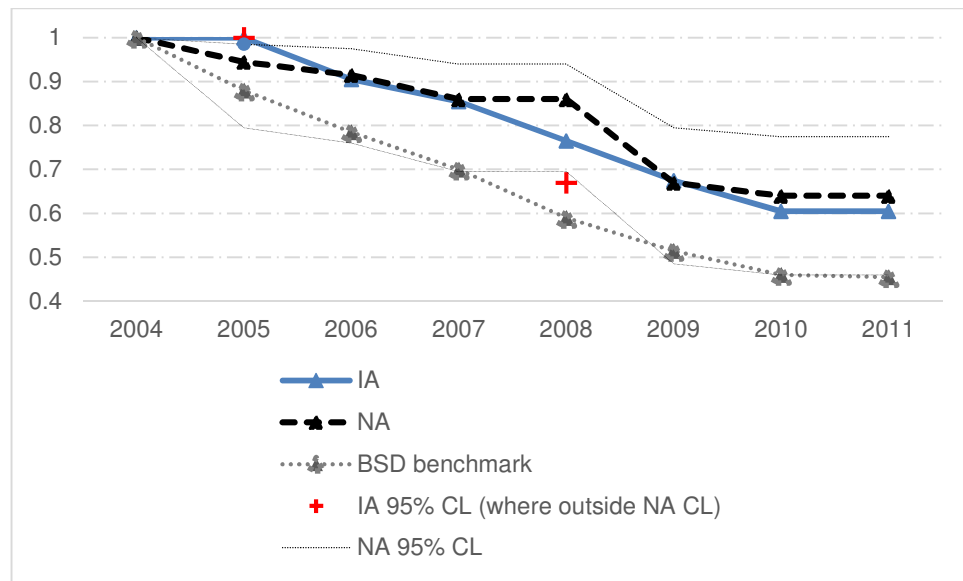
Source: BLO Survey and BSD

Figure 5 – Hazard rates IA vs. NA (for firms aged 0-3 years at intervention)
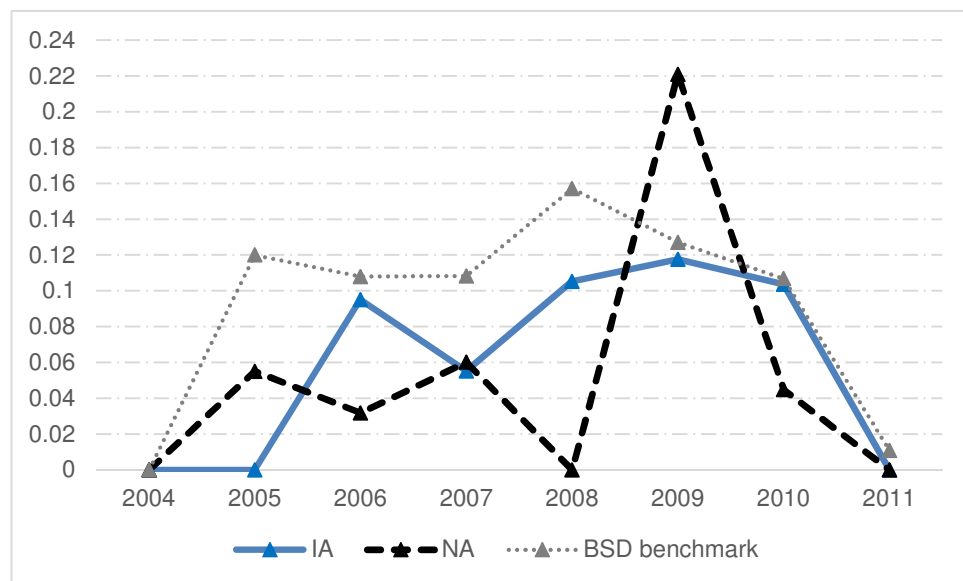
Source: BLO Survey and BSD

For the age category of 4-9 year old firms (Figure 6 and Figure 7, age at time of intervention) IA survival nearly always exceeds that of NAs (and OAs, not shown), with the hazard rate for the IAs remaining below that of the NAs until 2008. The approximate 77.5 percent survival rate in 2011 achieved by those 4-9 year old firms that benefitted from IA was near identical to the survival rate of NAs. Again, a significant difference between the survival rates was only found

for IAs immediately post intervention in 2005, with their 100 percent survival lying outside the NA confidence limits. Thereafter, confidence limits overlap, from 2008 onwards to a considerable degree.

Figure 6 – Survival estimates IA vs. NA (for firms aged 4-9 years at intervention)
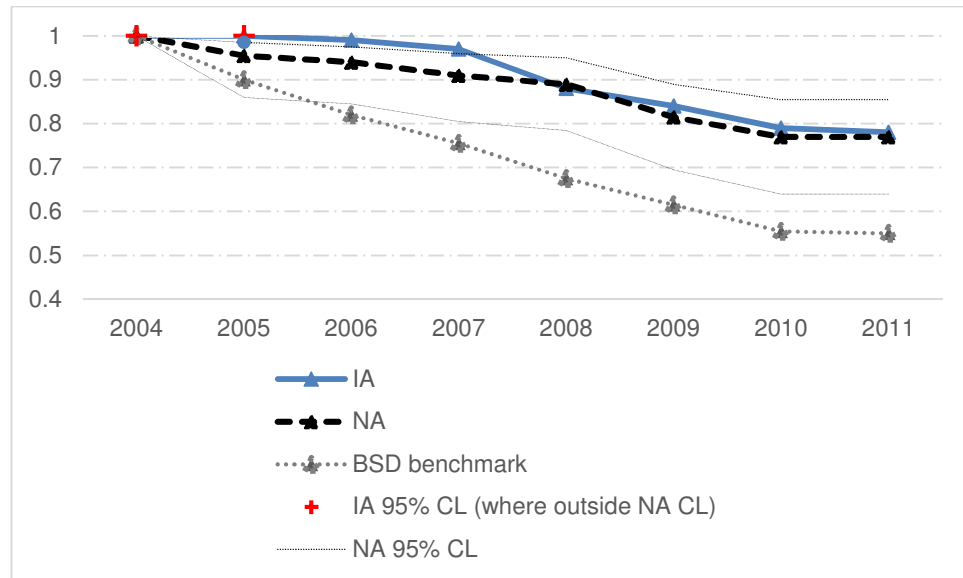
Source: BLO Survey and BSD

Figure 7 – Hazard rates IA vs. NA (for firms aged 4-9 years at intervention)
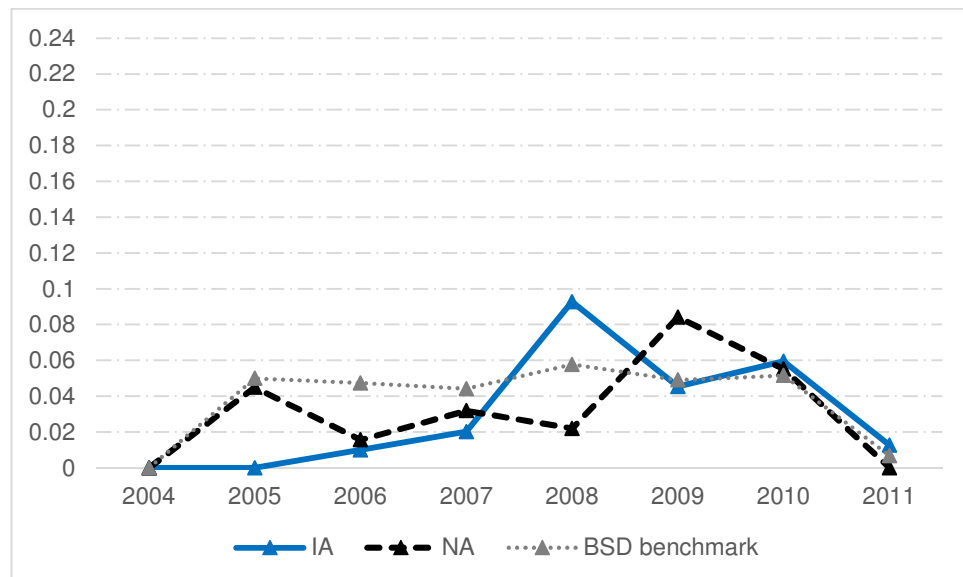
Source: BLO Survey and BSD

Figure 8 and Figure 9 show how survival prospects increase by age, compared to the younger age groups discussed above. For firms aged 20 years and above at the time of the intervention, survival rates are better than for any younger cohorts. The hazard rates for IAs and NAs cross at multiple times at overall low hazard levels. Up to 2010, IA and NA survival performance is relatively similar. In 2011 88 percent of IAs remain against 84 percent of NAs, a non-significant difference in survival.

Figure 8 – Survival estimates IA vs. NA (for firms aged 20+ years at intervention)
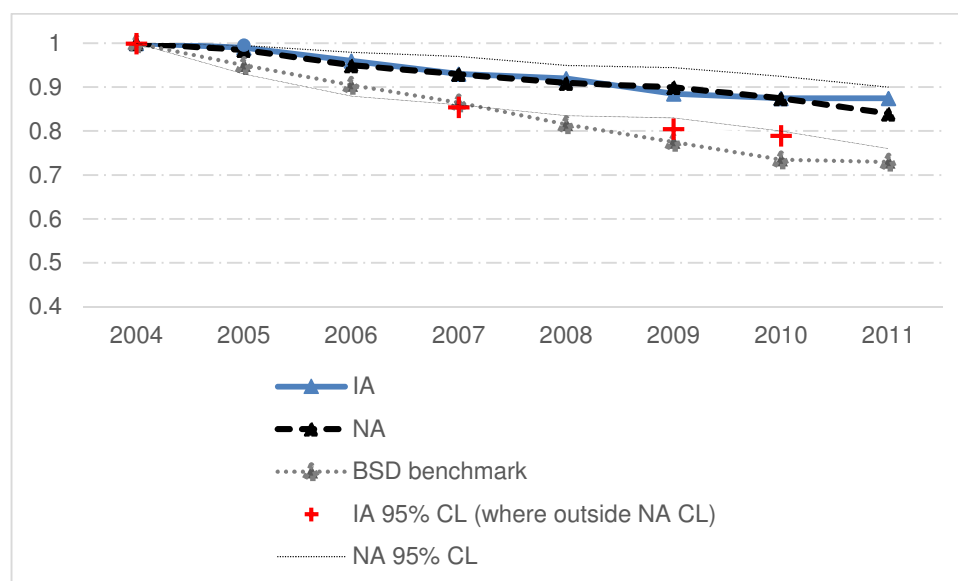
Source: BLO Survey and BSD

Figure 9 – Hazard rates IA vs. NA (for firms aged 20+ years at intervention)
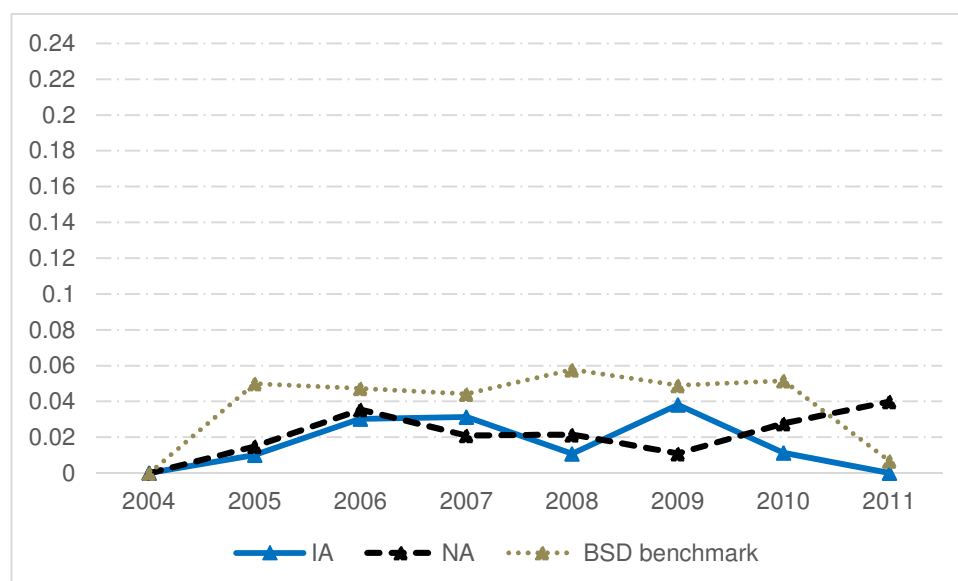
Source: BLO Survey and BSD

Overall, Section 4.5.2 confirms the role of firm age for survival. For the effectiveness of support it suggests that when considering assistance by firm age group, there may be some limited evidence for a very short-lived significant effect of IA on those firms that are relatively younger. Beyond that, no significant effects of assistance on survival could be identified.

4.5.3   Survival analysis: The role of size

Analogous to firm age, firm size is also considered as of relevance for survival, as introduced and discussed in Section 4.3. The previous sets of survival estimates and hazard rates were repeated: This time the groups were split by firm size category rather than age.

The results confirmed the role of size: Whilst 88 percent of the largest firms (>49 employees) survive the entire evaluation period, only some 67 percent of the 1-5 employee firms do so – significantly less. The results were similar to those when assessing the role of age, if not even less remarkable around any potential significant differences between IAs and NAs. That, plus the relationship between firm size and age (as looked at in the previous section), means that the results do not need to be reported herein: They would offer little additional insights.

4.5.4   Comparison of survival rates with BSD random sample

The "BSD benchmark" data as included in Figure 4 to Figure 9 indicate the survival rates as obtained for the random sample from the BSD, introduced in Figure 3. The random sample's survival performance is generally worse than the assisted firms, but also the NAs. This difference is often significant.

But there are two limitations to the use of the random sample for comparison purposes. Firstly, the random sample's generally worse survival performance, when compared to the NAs, hints at a selection effect of how the NAs were chosen to provide a representative counterfactual

for the IAs and OAs in BERR (2007). With little comparable owner and firm data available for the random BSD sample, the effect cannot be quantified, but some considerable differences between the firm and owner characteristics are likely. The selection effect's role for the comparison between IAs, OAs and NAs will be discussed as part of the concluding section. The value of having at least some firm and owner characteristics available is illustrated well by this dissimilarity between the performance of the longitudinal dataset and random sample groups. Complete reliance on the BSD for carrying out this analysis would be unlikely to provide robust results, therefore the need remains for firm and owner characteristics to be added.

The second limitation is sample contamination. The random sample was generated from the linked records of BSD 2004 through to BSD 2011 data. All firms born after BSD 2004, or dead before BSD 2005, were removed, as they would not have been live during the assistance period. All firms with no employment in BSD 2004 were also excluded. Of the remaining firms, 10 percent were included for the random sample used herein – resulting in a sample of 197,291 firms. As introduced in Section 3.2.2, 166,320 firms were assisted by Business Link in the six months period April to September 2003 alone – the IAs and OAs in the BLO Survey were drawn from that population. Based on these figures, that means some 8.4 percent of the entire firm population received business support through Business Link. These 8.4 percent would, accordingly, be reflected in the random sample used in this chapter for comparison purposes[60], making robust analysis impossible. As a result, the random sample's survival rates as indicated by "BSD benchmark" lines need to be regarded as of purely indicative descriptive nature. No robust conclusions can be drawn.

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[60] In addition, further contamination is possible from having received Business Link support outside the April-September 2003 time frame. However, this is equally true for the BLO Survey sample.

4.6   Conclusions

It is obvious that the BL intervention has little impact on survival. The overarching finding is that neither IA nor OA make any longer term difference to firm survival regardless of age or size group. Occasionally, with regards to survival assisted firms may even be performing worse than NAs for specific age and size groups assessed. Just as with the usual superior survival rate of assisted firms, the observed differences are not of statistical significance, however.

The only suggestion of a statistically significant impact of assistance exists for the immediate period post intervention. IAs enjoyed a 100 percent survival rate for that period for the 0-3 year, 4-9 year and 10-19 year old firms, OAs did so for their 10-19 year old firms. As the previous sections show well, age (and size, not shown) had a far greater impact on survival than assistance, with survival rates varying from 62 percent for the youngest firms to 87.5 percent for the oldest and 66 percent for the smallest to 88 percent for the largest – far greater than the variations observed between the assisted and non-assisted groups split by age or size group.

Parametric models could be used as an additional approach to further explore the impact of assistance on survival. However, the survival estimates suggest little value in expanding the analysis to include parametric approaches. An important consideration to keep in mind is the lack of control for the selection bias into the Business Link programme. Theoretically, it might be possible that selection bias has led to better or worse firms being selected into the group of assisted firms. There may also be selection bias introduced by the choice of IA or OA for a particular firm. For example, if IA was usually allocated to underperforming firms (there is no suggestion in the literature that it was) assistance may have brought survival up and in line with the NAs, leading to no observable significant difference (when in fact, IAs may have performed significantly worse without IA). However, as seen in Chapter Five, selection bias into the programme appears to have been of little significance and minimal impact for the results.

The conclusion, and response to H1 to H3 as formulated at the outset of this chapter, remains that assistance has – at best – a short-term positive impact on firm survival, but that depends on firm age and size. The effect disappears very quickly. To that effect, the results only partially confirm the better survival prospects of supported firms as identified – for other programmes – by Wren and Storey (2002), Fuentes and Dresdner (2013) and Girma et al. (2007).

Chapter Five

Business support and firm growth

5.1 Introduction

"Growth is a process that needs to be studied over time."

Davidsson (2006, p. 40: Section on "The need for longitudinal research on firm growth")

In this chapter, the interest is on the impact of business support on firm growth[61] as measured by employment and turnover, over time. The context will be set by a review of the evidence around the determinants of firm growth, and how these link to business support. Using the longitudinal dataset developed for this research project, various analyses will be undertaken to understand the impact of assistance over time. First, two-stage regression models will be estimated, with various measures of growth as the dependent variables and accounting for selection bias. The role of pre-intervention growth periods will also be investigated. This approach will allow to compare results across time periods, and to illustrate the impact of time on results depending on the evaluation period chosen. As in the previous chapter, the performance data available covers the periods 2004 to 2011. Simple regression techniques may mislead by assuming the same effect of assistance on all firms over the growth distribution and over time. Quantile regressions explore this issue.

This chapter, therefore, adds to the evidence around the concerns of ignoring time as an important factor in evaluation studies as already explored in Chapter Two. The dataset used

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[61] The long-term impact of assistance on productivity, as a function of employment and turnover, will also be included in this chapter.

is the longitudinal dataset as developed in Chapter Three and used in Chapter Four for the impact of business support on survival.

5.2 Literature review: Firm growth

> *"Even though there has been sustained interest in growth for almost 50 years, relatively little is known about this phenomenon and much misunderstanding and confusion surrounds it."*
>
> *Leitch et al. (2010, p. 249; in Anyadike-Danes and Hart, 2014)*

The central idea by policy-makers highlighted in Chapter One is that small business serves as a central force for economic wealth (see also OECD, 2008); a claim that appears obvious considering that more than 99 out of 100 businesses fall within the SME definition. The effect of small firms providing and creating the largest part of new jobs holds true around the globe (World Bank, 2011; Criscuolo et al., 2015). In line with improved employment records, other effects such as higher tax revenues, and a positive image for the region (and politicians) will also follow.

5.2.1 Growth as an outcome

The two main economic contributions of small businesses, as introduced in Chapter One, are their employment generation (growth) as well as innovation activities. With an interest in the impact of a supportive intervention on firm growth, a general understanding of the context of firm growth and its determinants is needed.

Davidsson (2015, s. 3) summarised "what we know" about firm growth as:

1) "Not all (young/small/independent) firms can grow; will grow; should grow, or even want to grow"

2) "What they [entrepreneurs] say they want matters [in achieving growth]"

3) "Growth is not a homogenous phenomenon"

4) Growth is not random

5) "However, it is definitely not deterministic, either"

6) "Growth is not necessarily 'good performance'"

This raises a number of important initial points in relation to the impact of business support. It would certainly not be the sole differentiator between a firm growing or not – the firms' intentions and individual context and capabilities matter. Firms that want to grow may be more likely to seek out support, introducing selection bias in any analysis. Firms with no intention of growing may also receive support (where growth would be the wrong measure to understand impact, but reducing the average impact of assistance on growth)[62].

For a review of the relevant literature, McKelvie and Wiklund (2010) suggest a categorisation of the evidence into three main research streams:

1) Growth as an Outcome

2) The Outcome of Growth

3) Growth as a Process

With the impact of business support on growth, or capabilities fostered by receiving such support, as the subject of this chapter, focus is on the first stream: "Growth as an Outcome". Drawing on a wide range of sources, a number of important points are made as part of the overview provided.

Key summary points from "Growth as an Outcome" in McKelvie and Wiklund (2010) are:

1) Determinants of growth: Hundreds of studies considering the determinants of firm growth failed to identify any "variables that have a consistent effect on growth across studies".

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[62] Davidsson's (2015) statement that "growth is not necessarily good performance" raises the important question as to how sensible it is to consider growth as a measure of business support impact. In a strict sense, evaluation ideally seeks to provide measurements against pre-intervention objectives. This policy design and objective setting process is somewhat outside the focus of this thesis, but will be touched upon in Chapter Six.

2) Selection bias: Many studies of growth exclude very small firms, or those that have no intention to grow, or achieved any (varying) number of stages in firm development. Many samples therefore include a bias from the outset, and also are difficult to compare.

3) Growth mode: Growth is usually assumed to be internal – organic – in most cases an unlikely assumption[63]. As seen above, this may be linked to firm size and age (smaller and younger firms focus on organic growth, larger and older firms focus on acquisitions). In fact, a firm may be shrinking its 'organic' employment whilst still considered 'high growth' through its acquisitions – at a net loss for society.

4) Variability over time: Growth is a process over time, between two or more points included for analysis. Legal form, parent and/or subsidiary status, intentions and goals (for example, preparation for initial public offering) of a firm may change over time. Especially young firms experience fast changes to their resource base, which may render early surveys of firm and entrepreneur characteristics out of date quickly, not explaining firm growth measured later.

5) No linear growth over time: Most studies of firm growth assume a linear relationship among variables which is commonly depicted by regression analysis, typically for a one year period or over a longer temporal period for three or five years. This fails to capture the inherent variation in growth rates over times – plenty of evidence suggests that growth has ups and downs over longer time frames; it "is anything but linear and stable".

6) Impact varies by measure: Measurement of growth varies (possible dependent variables include turnover, employment, profits, market share) and growth in one metric may not equate to growth in another – this includes firms that may be described as high growth in a particular metric (see also Chandler et al., 2009).

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[63] Compare with Penrose (1959), given it is considered to be one of the most influential works in the field it surprises that growth studies treat growth largely as an internal phenomenon.

For the study of business support and growth this suggests a number of further important points. Growth determinants are not considered as having a consistent effect across studies – so any findings on the impact of business support on growth should be understood as possibly not unilaterally robust. However, as Davidsson (2015) summarises, growth should also not be seen as random, opposing the randomness claim made, for example, by Geroski et al. (2003) or more recently argued by Coad et al. (2013 and 2015) with counter-responses by Derbyshire and Garnsey (2014 and 2015) – considered in detail in the next section.

Importantly, time – of central interest in this thesis – plays a role in two ways. Firstly, the firm characteristics measured at the outset, usually at the point of intervention, may change over time, which inadvertently could impact growth patterns. Of course, changes may be a result of the support received, but attribution of such effect becomes less likely over time. Secondly, studies (and this would be true especially for those studies over longer time periods than usual) usually compare an initial measurement of firm size with a second one at the point of evaluation – failing to capture variations in the growth rate that is described as anything but linear and stable. To assume that business support would have an average impact on firm growth over numerous years (when undertaking a long-term impact evaluation) should be avoided, in line with that commentary.

The summaries by McKelvie and Wiklund (2010) and Davidsson (2015) indicate the complexity of the growth phenomenon. To add the necessary context to this chapter's analysis a brief review of the (very large) body of growth literature was undertaken.

5.1.2 Gibrat's Law

There is extensive literature on the topic of firm growth, which in many cases makes reference to Gibrat's "Law [or Rule] [of Proportionate Effect]", as proposed by Gibrat (1931). Given Gibrat's continuing popularity in the debate of firm growth, with plenty of evidence produced in favour and against the key points made, the discussion of Gibrat's work here is used to provide

a starting point for reviewing the complex topic of growth literature – and for the illustration of how many and often conflicting findings exist.

> *"A suitable starting point for studies into industrial structure and dynamics is the firm size distribution, which is one of the oldest and most fundamental stylized facts about firm size and growth. In fact, it was while contemplating the empirical size distribution that Robert Gibrat (1931) proposed the well-known 'Law of Proportionate Effect' (also known as Gibrat's law'), which has arguably been the most influential model of firm growth. Even today, the firm size distribution continues to receive a lot of attention from both empirical researchers and theoretical modellers."*
>
> *Coad (2009, p. 14)*

Under the assumption of a fixed number of firms, and random growth rates by firms (under normal distribution) including independence from firm size and previous growth, Gibrat (1931) asserted that the distribution of firm sizes will assume lognormal and importantly an increasing variance over time. This conclusion was drawn on the basis of the underlying sample – industrial companies in France. Sutton (1997) provides more detail and a comprehensive discussion on Gibrat's Law.

The "huge" literature that followed is described by Anyadike and Hart (2014, p.4) as "[…] concerned with fitting increasingly exotic statistical distributions to the firm size distributions, and more recently to the distribution of firm growth rates", with reference to Axtell (2006) and Bottazzi and Secchi (2003).

Audretsch et al. (2004; in Petrunia, 2008) conclude that on the whole Gibrat's Law and size distribution theories have little support. Out of 51 studies captured, 27 reject it, 16 find mixed results, depending on industrial sector and sample of firms chosen. Petrunia (2008) summarises the reasons for rejection as

1) "Smaller firms grow at an expected rate that is greater than larger firms",

2) "Growth favours larger firms",

3) "Assumption of no persistence in firm growth over time fails to hold";

with a number of example sources provided for the above.

And whilst the commonly quoted results by Mansfield (1962) that see a negative relation between firm size and growth were explained as a result of sample bias by the author, plenty of other research since confirmed that this inverse relationship between firm size and growth rates was not linked to sample bias (Evans, 1987; Hall 1987; Dunne et al., 1989; all in Cabral, 1995). The description of an inverse relationship would be in support of non-random growth patterns.

In more detail, Coad (2009) offer a recent literature review and angle on Gibrat and size distribution work. Gibrat's work should be considered as pioneering in the field, and laying the foundation for a still popular field of research. However, given the at best mixed evidence, it fails to provide a robust and generally valid explanation for firm growth. Importantly, for the analysis of the impact of business support it a remains more of theoretical than practical value. The assumption of a fixed firm count and therefore ignoring new market entrants, generally smaller firms at start-up benefitting from an inverse firm size and growth relationship, does not sit well with the analysis of a support scheme aimed at small firms. However, it does serve as a viable introduction to the complexities of the firm growth debate. It is still commonly referred to in recent research as one of the many dimensions that there are to growth, resulting in many opposing findings as to the triggers of that growth. Ijiri and Simon (1964; in Coad, 2007) went as far as comparing Gibrat's law to that of Galileo: Approximately correct, but not taking into account numerous environmental factors such as air resistance *et cetera*. That means it provides but also remains a useful first approximation. In agreement with Coad (2007) this provides a workable concluding position on Gibrat's Law.

5.1.3   Extensions and alternative approaches to Gibrat

Keeping in mind this research's interest in soft business support and its impact, it is sensible to look at some of the extensions to Gibrat's work suggested over time, and alternative

approaches. The reasoning behind this is that soft business support can be hoped to add to firms' and owners' skill basis, depending on programme specifics. Such advancement in a firm's capabilities would have gone unaccounted for in Gibrat (1931).

Relevant extensions to Gibrat's model were suggested over time; the inclusion of individual firm characteristics (and size) affecting growth, or firm age and size by Ijiri and Simon (1977; in Parker, 2009). As an alternative approach, Parker (2009) presents (among others) Jovanovic's (1982) model of industry selection, which assumes imperfect information by entrepreneurs about their capabilities. The model assigns a central role to luck (that is, randomness) of an entrepreneur, and also refers to the unknown abilities (before start-up) of the entrepreneur in determining (survival) and growth. This implies that the entrepreneur who stays in business for longer learns more about their true abilities than the entrepreneur whose firm failed to survive for long. Again, this presents an area where business support may make a difference, highlighting owners' true abilities to them earlier. A further central distinction of the model is its assumption of continuous entry (and exit), compared to Gibrat's Law.

Other theories providing plausible explanations for firm growth (and providing a suitable link to the areas business support may address) include those that assign a central role to innovation to firm growth (and entry), as summarised in Parker (2009). Over time product maturity leads to zero economic profits and a terminal decline of market entrants (Klepper, 1996; Klepper and Simons, 2000). First movers are assumed to be those that grow fastest and then dominate the market, consequently leading to the formation of oligopolies.

Other extensions exist. Segal and Spivak (1989) were concerned with the relatively higher dissolution costs of intangible nature, such as reputation, faced by businesses operating with little economic profit. These firms tend to be smaller ones which therefore have a higher incentive to reinvest more of their profits into business development. As such, they grow faster than larger firms who do not face the perceived risk of exit and the dissolution costs involved.

Notably, for large firms, Segal and Spivak provide support for Gibrat's Law, in that large firms experience growth rates converging to a constant.

Again, focussing on the growth differential between smaller and larger firms, a further potential explanation is offered by Cabral (1995). His proposition is that investments into organisational or technological capacity include a certain level of sunk element, irrecoverable upon exit. Similar to Segal and Spivak (1989) this sunk cost is thought to then explain the different behaviours between smaller and larger firms. Smaller entrants are at a higher risk of exit than their larger peers, which leads to a more gradual investment approach by small firms. Cabral (1995) thereby explains higher growth rates than for larger entrants who undertake more upfront investment.

Other than Gibrat (1931) and the considerable research linking to and building on his work, another central contribution was made by Penrose (1959)[64]. Penrose differentiated between organic growth, for which entrepreneurial capabilities are key, and acquired growth, for which a firm's financial strength and spare managerial resource are key. Penrose (1959) explains a firm's ability to grow organically through its ability to identify opportunities for expansion and to reallocate existing resources within the firm in new ways, allowing exploitation of such opportunities. Sticking with this resource-based view, for an acquisition a firm would require the necessary financial strength and managerial slack, both related to firm size (Davidsson et al., 2006). As such, rather than by the desire to "develop new economic activities", a firm may choose to grow through acquisition as a result of its available resources (Davidsson et al., 2006), of which larger firms inadvertently have more of.

This is an important distinction, as a firm that acquires another one does indeed grow, but at the expense of another company's existence. Employment may even drop in sum due to efficiency gains, so that rather than growth of size, whether employment or turnover,

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[64] Gibrat (1931) and Penrose (1959) are singled out as the main growth theories, for example, in the extensive growth literature review by Coad (2009).

measuring productivity growth may provide the favourable results (for considerations about growth measurement see below – the key contribution of Penrose's work to this research is this very distinction of how growth was achieved). Davidsson et al. (2006) present an overview of studies supporting this distinction between small and young firms and their organic 'entrepreneurial' growth versus that of their larger and older peers that focus largely on acquisitioned growth. McKelvie and Wiklund (2010) provide a comprehensive summary of Penrose's work, and illustrate how it remains one of the most referred to theories in the field.

5.1.3 The (non-)desire of firms to grow

Given the focus of much of the research introduced above and also by policy-makers alike on understanding why certain firms may grow and others not, it is important to note that, in fact, most entrepreneurs and firms have little ambition to become much larger enterprises (Roper and Hart, 2013; Wiklund et al., 2003), or, in fact, would even possess the potential to grow considerably (Roper and Hart, 2013).

Based on figures of the British Household Panel Study (BHPS) 1991-1999, only a third of entrepreneurs hire people at all, and no more than seven percent of self-employed individuals in the UK create at least ten jobs (Henley, 2005). For the UK, Cowling et al. (2004) found some seven to eight percent of self-employed single employee businesses hire someone else over a three to four year timespan. They suggest the existence of a barrier that needs to be overcome before the decision to hire additional staff would be contemplated. And even though firms may be profitable, with sustained high profits over a number of years, in a Swedish sample 25 percent of firms chose not to grow employment (Bornhäll et al., 2014). Aldrich (1999) and Davidsson and Wiklund (2001; all in Jennings, Jennings and Greenwood, 2009) observe new small firms as ranging from " 'imitators', who reproduce prevailing practices, to 'innovators', who do things differently". Most new entrants are imitators in mature sectors that exclusively serve local markets, and they will always be limited in their growth potential, as

stated for example by Parker (2009)[65]. Wiklund et al. (2003) name non-economic concerns as a more important factor than personal gain or loss considerations. They provide the example of "work atmosphere" – likely to be affected by growth it will be considered when deciding for or against further growth. Other factors named include independence from other stakeholder and survival probability.

Small businesses as a group are still considered to add significantly to the economy (OECD, 2013), and that they contribute more to job creation than do larger firms, with some sector specific exemptions for manufacturing and trade[66] (Wit and Kok, 2014; with data from various EU member states). But, it is only a relatively small number of firms that satisfy the idea of small businesses as engines of job growth. In an attempt to identify the few high impact firms terms such as "high-growth firms" or "gazelles" sprung up. These are firms that grow considerably faster than the average firm.

5.1.5 Growth and randomness

On the basis of the inconclusive evidence identified and reviewed it is tempting to conclude that firm growth would be a process more determined by chance or, in fact, randomness than any other single hard factor. This would find some support by McKelvie and Wiklund (2010) and their key summary points made, less support in Davidsson (2015), both sources as introduced above. Coad et al. (2013) looked at this issue of growth and potential randomness in some detail, sparking a number of direct responses to their journal article. Their approach was somewhat novel, by arguing that firm growth was not triggered by certain firm or owner characteristics – their resource base. Instead, a firm's resource base would be linked to their

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[65] A simple example may be independent restaurants and fast food outlets, often offering little product differentiation and high exit rates. Most owners will have little desire to grow beyond a single location.
[66] It may be arguable to what extent such new employment adds to the total number of jobs. Possibly, it might merely replace other employment. Edmiston (2004; in Judd, 2006) and Fox and Murray (2004, in Judd, 2006) argue that much of the new job creation attributed to small firms results from considerable job losses at their large peers.

survival, seen as non-random[67], which in turn would allow firms more chances for random growth events. The study is based on tracking a cohort of 6,247 firms for five years. Their data was captured as part of opening their bank account, for which they had to respond to a firm and owner characteristics survey. 2,184 firms survived the entire period and could be used for the growth path analysis.

The results by Coad et al. (2013) "approximately" confirm the perceived random walk nature of firm growth. They call for building theories that consider growth as only one dimension of new business performance, and where the performance is primarily a game of chance. Central to this would be the recognition that a firm's resources drive its chances to survive, whether available immediately from point of start-up or acquired over the course of trading as a business. As part of this firm growth is confirmed to be impacting survival.

Coad et al. (2013) received a number of direct follow-ups and responses. Methodologically Derbyshire and Garnsey (2014) criticise the choice of measurement by Coad et al. (2013). Rather than sales they argue employment would be a more suitable and common measure. They also doubt the choice of growth categories that do not allow for firms that remain fairly similar in size with no real growth or decline. Derbyshire and Garnsey (2014) arrived at a sample size of 39,825 firms for the purpose of their study, using a database that relies on major business directory entries for firms' inception dates. Based on their results they argue that rather than chance making it impossible to determine drivers for firm growth it would be much more a case of "deterministic chaos"[68]. They argue entrepreneurial skill and effort in matching internal firm resources to external opportunities would be central to firm growth. However, prediction of these is impossible due to ensuing deterministic chaos – and not due to chance and randomness. In agreement with Coad et al. (2013) they call for new methods and

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[67] With a view on Chapter 4 results, business support would then be seen as not having made a significant enough contribution to firms' resource base to increase survival rates in any significant manner.
[68] Derbyshire and Garnsey (2014, p.11) refer to May (1976) to explain, who showed that "even in a deterministic model in which all parameters are correctly and fully specified outcomes still appear random and prediction impossible. In complexity science this is known as deterministic chaos."

theoretical logic to further understand the phenomenon of firm growth, but there was little to be gained from doing so under the assumption of randomness underpinning firm growth.

In response to the others' respective comments, Coad et al. (2015) and Derbyshire and Garnsey (2015) broadly reiterate and confirm their respective conclusions drawn, aside from exploring some of the methodological criticism. In the context of this research the message from both sets of authors' arguments is clear: Just as earlier literature review as part of this chapter suggests, there are serious doubts around the research community's current ability to explain firm growth drivers.

5.1.6 Literature review: Discussion

Firm growth presents an area of research that is widely investigated and discussed. And despite the many journal and research paper pages produced over a number of decades, major question marks remain. Various models to explain firm growth have been developed over time, but they appear to fit only very distinct scenarios, influenced by geography, sector and firm size considered. No common explanatory variables for growth have been identified. Results differ according to measure of growth chosen. There are calls for a new theoretical regime around investigating firm growth, based on perceived randomness and deterministic chaos arguments.

What does this mean for studying the long-term impact of business support on firm growth?

Policy-makers hope to understand if and how business support makes a positive contribution to firm development. Business support impact evaluations often rely on assessing performance effects such as growth, as discovered in Chapter Two. This was also the approach by the previous Business Link economic impact study undertaken on the same firms as herein (BERR, 2007).

A business support intervention will, if at all, impact growth as part of an array of factors inside and outside the firm. Growth presents a "multi-dimensional, heterogeneous, and complex phenomenon, as is each facet of it" (Leitch et al., 2010). The suggestion that luck or chance are also to be considered as brought up first by Jovanovic (1982) points to the complexity of the growth phenomenon. When considering that "decades of research […] failed to explain more than about 15% of the variation of firm performance" (Storey, 2011, Coad, 2009; both provided as reference for the quote from Derbyshire and Garnsey, 2014, p.8), one can relate to Coad et al. (2013) and Derbyshire and Garnsey (2014) calling for new approaches to investigate firm growth. Both sets of authors provide plausible arguments around the perceived failures of the current research regime in relation to firm growth.

The absence of such new (and tested) methodological regime and with chance impossible to control for, any modelling of the impact of support on growth will need to include measures for firm and owner characteristics to account for their potential impact. Care needs to be taken not to treat growth as (implicitly) organic as by the majority of studies, but in line with Penrose (1959), to appreciate the different growth modes of firms. If the evaluation of business support presented herein would find jobs grew manifold for the assisted firms, but this was in fact driven by acquiring other firms, then this would provide a useless indicator for economic impact (as measured in jobs growth).

It is a challenge to define defendable hypotheses around business support and its impact on the complex matter of firm growth, even when just considering the two sets of summary points around firm growth by McKelvie and Wiklund (2010) and by Davidsson (2015). By keeping the focus squarely on the purpose of this research – providing an understanding of whether and/or how long-term impact evaluation of business support matters – a number of research hypotheses can be defined.

Chapter Two outlines how there is a perceived gap in the long-term impact of business support evaluation literature. McKelvie and Wiklund (2010) highlight the importance of time in firm

growth analysis, and measure used (see also Derbyshire and Garnsby, 2014, and Coad et al., 2015 for a discussion on measurements). This chapter's analysis, therefore, tests the following hypotheses.

Hypothesis H1 – *The timing of an evaluation study may return different conclusions about the impact of a business support intervention for a single measured outcome such as employment growth.*

Hypothesis H2 – *An evaluation of business support over different time spans and multiple measures (employees, turnover, productivity) will illustrate how the time lag of impact differs by measured outcome.*

Along these two central contributions, and given the richness of the data available, the heterogeneity of growth will also be explored.

Hypothesis H3 – *Not all firms benefit from assistance in the same way, and over time: The role of the impact of assistance varies along the outcome distribution.*

The summary points raised as part of "Growth as an Outcome" section will be reviewed as part of the methodology used in this chapter, and also in the discussion of results. It will be used to illustrate potential concerns in chosen analytical approach given the state of the growth literature, with the focus remaining on the contribution intended by this thesis.

5.2   Linked dataset: Firm growth by type of assistance

Prior to developing the econometric approach to the analysis, this section compares the growth trends of firms, by type of assistance received. This is to identify any observable differences in growth between those firms in receipt of assistance, and those not.

Figure 10 to Figure 13 show how IA, OA and NA groups develop their employment and turnover over the assessed period (base year 2004=100). Employment and turnover both grow in the first years post intervention, stagnating or even declining only in the latter years of analysis. Previous analysis of this cohort of supported firms was limited to investigating the impact between the first and second year post intervention, as indicated by the space between the two green lines in each graph corresponding to data years 2005 and 2006. The data used herein continues to be the longitudinal dataset as created and discussed in Chapter Three. That means of the original sample 1,045 firms were successfully matched and included for the analysis in this chapter.

Figure 11, showing all firms' employment (therefore including the employment figures of firms that exit before 2011, up to their year of exit), depicts how IAs have showed the highest growth prior to intervention; keeping in mind that they are on average smaller than the other groups, as shown in the sample descriptive statistics in Chapter Three. OAs and NAs grow by similar amounts in the period before the intervention.

Figure 10 – Employment growth index (all firms)

Employment growth index, all firms
(N=1045)
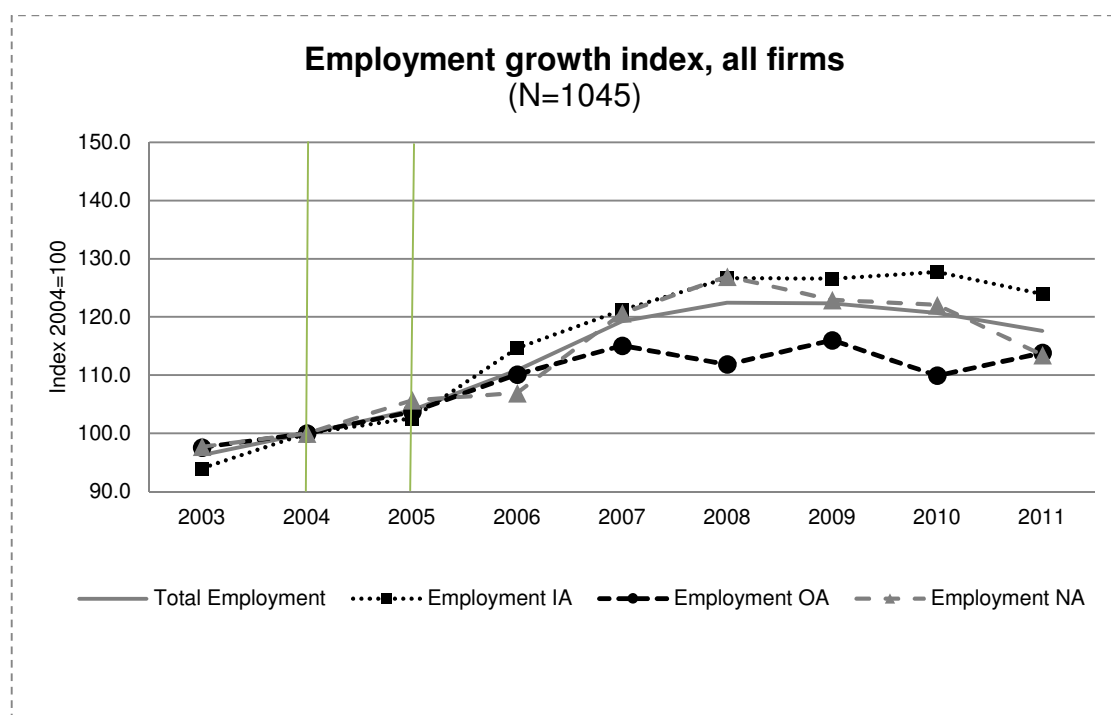
Source: BLO Survey and BSD

Interestingly, in the immediate time following the intervention, that is, between 2004 and 2005, OAs and NAs both grow a little more than IAs. However, in subsequent periods IAs outperform the growth of OAs by some margin. NAs achieve similar growth for the 2004-7 and 2004-8 periods as the IAs, before declining towards OAs' growth index level, matching it in 2011. This means that IAs show not only the most, but also most consistent growth over the period, with a relatively small decline from its peak 2008 and 2010 levels. OAs pull down the total average quite considerably, with employment remaining stable from 2007 onwards.

Every firm that dies reduces the total figures by its employment (Figure 10) or turnover (Figure 12) values. Figure 11 and Figure 13 adjust for this effect by using only the data of the firms having survived the entire period through to 2011.

For employment, Figure 11 illustrates how the focus on the surviving firms only results in less stagnation or decline among the three groups of firms – that is, the somewhat flat trends in later years in Figure 11 were caused by firms ceasing and dropping out from the figures.

Employment growth index, survivors only (N=824)
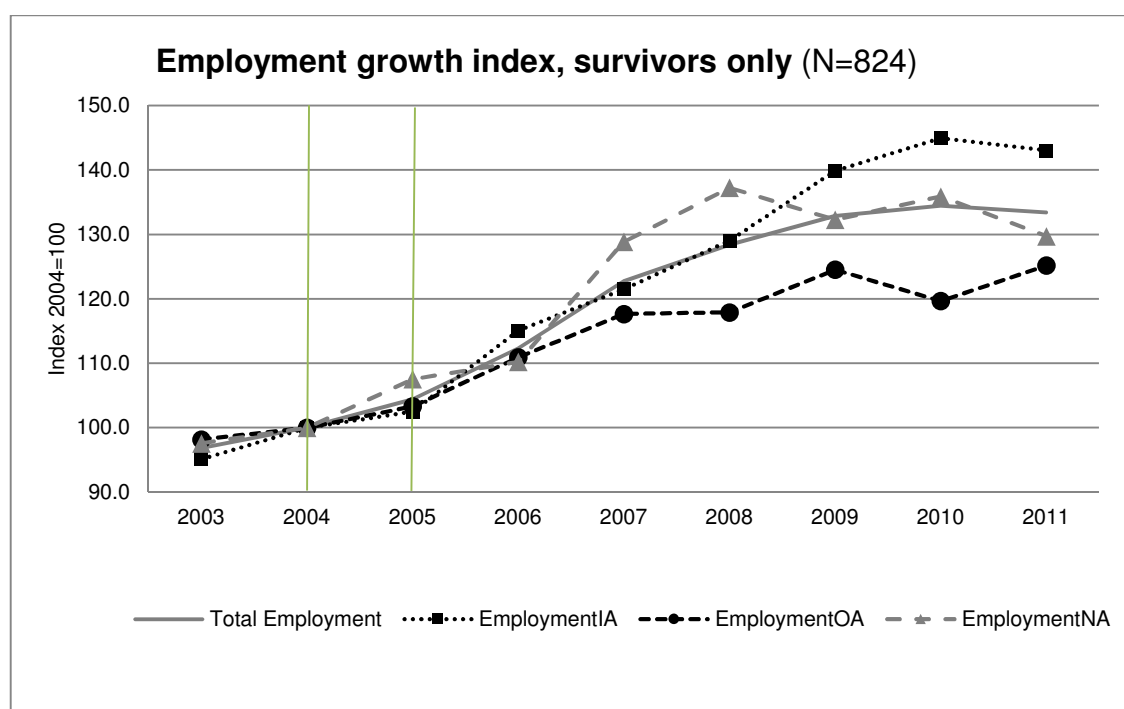
Source: BLO Survey and BSD

Taking that effect into account, employment figures are broadly in unison across the groups for the 2004-5 and 2004-6 periods, with NAs leading in 2005 and IAs in 2006. NAs then outperform both assisted groups in 2007 and 2008, before declining. OAs show least growth from 2007 onwards, with IAs growing their employment consistently all the way through to 2010, outperforming the other two groups from 2009 onwards.

Turnover growth shows less dramatic variations. For all firms (Figure 12) NAs experienced the largest growth in the pre-intervention period, but are then outperformed by IAs. OAs experience similar growth as NAs for the 2004-5 period (arguably for the 2004-6 period as well) and for the longer 2004-8 period. Interestingly, for the period 2004-7 IAs and OAs reach nearly identical growth levels, before IAs outperform OAs for the remaining periods. Overall, OAs remain closest to the overall average, IAs exceed it and NAs underperform by comparison.

Figure 12 – Turnover growth index (all firms)

Turnover growth index, all firms
(N=1045)
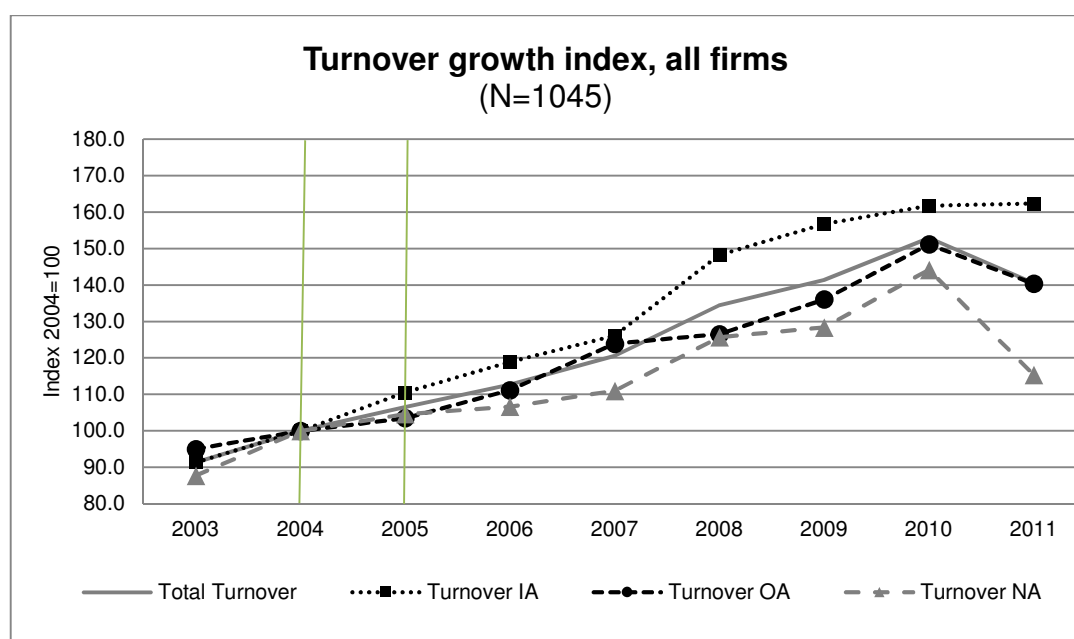
Source: BLO Survey and BSD

Focussing on survivors only (Figure 13) the overall trends remain unchanged. However, immediately post intervention OAs display the lowest growth between 2004 and 2005, before rising to match IAs for the 2004-7 period. The fall in turnover for OAs and NAs between 2010 and 2011 is also less pronounced when limiting the figures to survivors' data.

Figure 13 – Turnover growth index (survivors only)

Turnover growth index, all firms
(N=824)
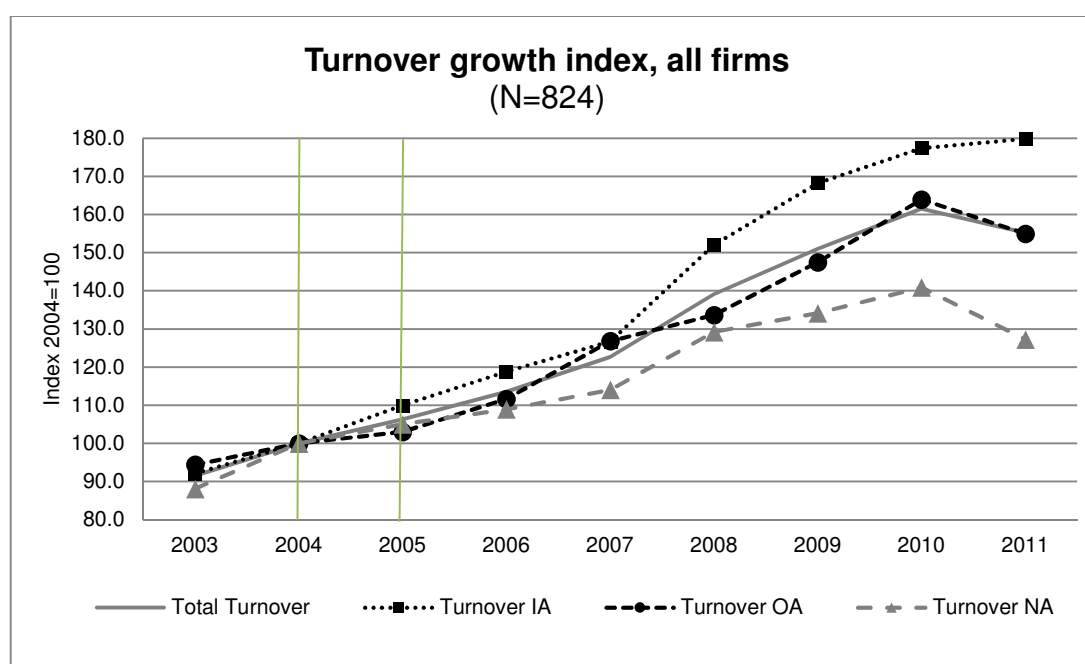
Source: BLO Survey and BSD

Figure 10 to Figure 13 illustrate well how IAs outperform NAs and OAs, suggesting how assistance appears to make a difference, that is, sufficient initial *a priori* evidence that justifies further analysis of the impact of support on growth. The graphs also indicate how obvious differences between the groups only arise two to three years post intervention. In fact, based purely on the short-term 2004-5 data, the story would be one of NAs outperforming IAs and OAs for employment growth – that is, assisted firms growing less than their non-assisted firms.

As reviewed as part of Chapter Three, some of the firm characteristics differ between the groups of IA, OA and NA firms. Appendix C4 illustrates how these differences remain when considering survivors only, for example, as in Figure 11 and Figure 13. There are no significant differences between the linked longitudinal datasets with and without survivors.

It is quite possible that some of the differences in firm characteristics explain some of the observed variations in growth trends, and this will be accounted for in the following analysis.

BSD data 2004-5: non-assisted firms grow their employment faster than assisted firms
BSD data 2004-6: intensively assisted grow faster than their peers

This presents a somewhat curious finding, opposing the findings as reported in BERR (2007) which ascribed a significant impact of assistance on employment growth. Of course, in BERR (2007) an approach based on self-reported performance data was employed, which was found to differ from the data reflected by the BSD – based on the self-reported data the same firms experienced far greater growth between 2004 and 2005 than when considering the official, BSD, data.

The above is a finding – or better: observation – that provides support to the argument of avoiding evaluation that is limited by short-term data. Being able to consider a time profile of firm growth provides a considerably more meaningful picture with regards to the three groups' development. This is also illustrated by the one-year time frame of the previous evaluations on the group of assisted firms: Any growth story discoverable as part of that one year period of data suffers from being unable to take into account the different growth patterns before and

after that short evaluation time frame. In that context, it would be interesting to see how the graphs would look based on multiple years of self-reported data to mirror the BSD data. Of course, as of yet it is unclear whether this catch-up of IAs and subsequent superior performance is due to the impact of assistance or down to other factors.

Figure 14 illustrates a further benefit of working with multiple years of performance data.

Figure 14 – Further benefits of having access to multiple years of performance data

Number of firms experiencing high growth periods by type of assistance

A further benefit of being able to draw on multiple years of performance data is the opportunity to identify firms with particularly consistent growth patterns.

High growth firms (HGF) are a commonly referred to concept and are defined as firms that grow by at least 20% for three consecutive years (OECD, 2008). Table 13 provides a count of high growth (employment) periods by type of assistance. These periods of high growth may be overlapping, therefore high growth for the periods of 2004-2007 and 2005-2008 would count as two high growth periods. Overall, 14.3 percent of IAs experienced at least one period of high growth post intervention, compared to 9.9 percent for both OAs and NAs. This would represent a significant difference between IA and OA/NA at the ten percent level, however, not with narrower confidence limits at the five percent level.

Table 13 – HGF periods (for any three year period 2004-2011, periods can overlap), based on employment

	N	Exact number of HGF periods 2004-11					Total (at least one HGF period)
		1	2	3	4	5	
Intensively assisted (IA)	372	6.18%	4.57%	2.15%	0.27%	1.08%	14.25%
Other assisted (OA)	292	3.08%	3.42%	2.74%	0.34%	0.34%	9.93%
Non-assisted (NA)	273	5.13%	2.93%	1.83%	0.00%	0.00%	9.89%

Source: BLO Survey and BSD

5.3 Modelling the effect of Business Link support

The overarching objective of this chapter's empirical analysis is to illustrate the impact of the choice of timing on the econometric results which seek to measure impact controlling for selection. The previous descriptive analysis underpins the importance of taking into account the differences in firm characteristics between the assisted and non-assisted firms, with the possibility of selection error having been introduced to the sample.

The econometric analysis will be able to account for these factors other than assistance, and is designed to address the hypotheses as defined in conclusion to this chapter's literature review. The econometric analysis undertaken herein is split into individual sections for the different approaches employed. The methodologies applied will be introduced for each analytical step separately.

Section 5.4 focusses on Heckman's two-stage selection model, taking into account the probability of receiving support in the outcome regression. Section 5.5 investigates the growth distribution, that is, how evenly any impact of assistance is spread across different outcome levels, estimating a series of quantile regressions.

All regression models will measure the outcomes in terms of firm performance as measured by employment, turnover and productivity, whereby strictly speaking employment and turnover represent growth measures, productivity as a function of the two is better described as performance measure. The use of different outcome measures is encouraged by previous research; growth for one measure does not necessarily mean growth among other measures (Murphy et al., 1996; Delmar et al., 2003). Examples of different results by impact measure include previous results on the BLO Survey dataset, for example, BERR (2007) and Drews and Hart (2015). Multiple outcome measures will also allow for a better understanding of the role of time lags, if any, and their variation by measure. It has previously been identified that turnover and employment growth behave differently, depending on the exact set of circumstances. Delmar et al. (2003) used a total of 19 different growth measures to define

seven types of firm growth patterns, concluding that only through the use of different measures different growth patterns will become recognisable. It should be kept in kind that these measures will not distinguish by internal versus external growth (see Penrose, 1959, discussed earlier in this chapter). However, as detailed before, few firms within the used sample had more than one site, pointing towards largely organic growth (if any). To understand the role of time, the same model specifications will be run multiple times, against varying outcome periods. For example, when creating the organisational capabilities to facilitate growth and the additional headcount that may result, employment effects may precede significant changes in sales. Analysis that would not allow for different time frames would not pick up on these different effects throughout time.

The rationale for each modelling approach will be introduced in more detail before each step. The models in the following section will all include a number of firm and owner-manager characteristics. Market conditions, business strategy, characteristics of the owner-manager and firm are all emphasised as influencing firm performance for example Storey (1994), Barkham et al. (1996), Roper and Hewitt-Dundas (2001); in Roper and Hart, 2003; Parker, 2009).

For this chapter, only firms that survived the entire period 2004-11 are included in the linked longitudinal database, for comparability of the impact across the models. The focus of the analysis will be the impact of IA. Preliminary analysis undertaken showed no significant impact of OA, as was also found by BERR (2007) and which is in line with the observations from Figure 10 to Figure 13 above. The objective of this thesis remains to underline the importance and role of time in evaluation; focus on one support product (IA) is therefore not detrimental to results. The results are presented individually for each method in this chapter. The implications of the results with a view on the thesis' central research questions around the timing of evaluation will be discussed subsequently in Chapter Six.

5.4 Impact of Business Link support – Separating the effects of assistance and selection

First, this section reviews the growth analysis undertaken as part of BERR's (2007) value for money analysis in this chapter, before mirroring their approach with the longitudinal dataset as compiled in Chapter Three. As noted before, BERR (2007) with their methodology and review of business support evaluations were rated highly in WWG (2014) and listed as one of the few robust evaluations of interest: Its model included the counterfactual and accounted for potential selection bias.

In detail, the analysis by BERR (2007) was designed with the understanding that two main issues arise from the BLO Survey data:

1) The first issue raised by the authors was in relation to the different firm characteristics between the IAs, OAs and NAs. The empirical analysis was designed to control for these differences, applying a multivariate approach and as such taking into account and allowing for these observed firm characteristics through an array of covariates.

2) The second issue was the importance of accounting for selection. The selection effect had to be identified and included in the model to avoid estimation bias. As discussed at various points throughout this thesis, selection bias is of concern here in that *a priori* it is quite possible that those firms assisted through BL may have been different from those not assisted.

Heckman's two-stage procedure was chosen to account for this potential selection bias, that is, estimation of two linked statistical models. The approach is developed in some more detail in the following section.

5.4.1   Controlling for the effects of selection: Model

Following the approach as developed by BERR (2007, p. 216) the objective of the analysis is to estimate the impact of BL assistance as captured by the BLO Survey data on firm performance for the period 2004-2011.

Let firm growth be denominated by Δ in a simple linear model:

$$\Delta = \beta x \quad + \quad \delta z \quad + \varepsilon \tag{1}$$

The independent terms on the right-hand side are

1) **x,** representing the vector of firm characteristics (as captured by the BLO Survey). These are mostly binary variables, but also include some continuous ones.

2) **z**, the treatment (here assistance) term, a binary of value 1 if a firm has been assisted, 0 if not assisted.

3) **ε**, the error term.

The effect of assistance is provided by z's coefficient δ, with its respective t-value to highlight the assistance's (in)significance.

As BERR (2007) point out, the treatment effect will only provide an unbiased estimate of the impact of assistance if no selection effects for the receipt of assistance are present. As such, the probability of receiving assistance needs to be randomly distributed between the IAs and NAs in the longitudinal dataset. As pointed out earlier, this random distribution appears unlikely a priori (even if BERR [2007] found the selection effects to be weak) and the model will need to include provision for dealing with this non-random probability of receiving assistance[69]. Failure to do so in the presence of selection effects would result in both assistance and selection effects being reflected in the treatment term's coefficient, resulting in the described

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[69] IAs and NAs differ in their individual characteristics (Appendix C1), and this remains true for the matched sample in the analysis here, as seen in Table 6, Table 7 and Table 8. The observed differences between the groups increase the likelihood of the samples having not being randomly selected – that means that potentially a selection bias may be present.

bias. Selection effect in this context would involve Business Link operators choosing firms to assist that would on average perform either better or worse than non-assisted firms and as such would introduce an estimation bias in the modelling of the outcome variable.

Guided by Greene (2003, p. 782) equation (1) is extended to form model (2), consisting of two equations (2.1 and 2.2). Firstly, to specifically provide for selection bias, a probability estimation of the likelihood of receiving assistance is required. **z*** denotes that probability, and is regressed on a number of relevant firm and management characteristics (w).

$$z^* = \gamma'w \quad + \quad \mu \qquad\qquad (2.1)$$

The primary interest remains to be the linear regression

$$\Delta = \beta'x \quad + \quad \delta'z \quad + \varepsilon \qquad\qquad (2.2)$$

Heckman's two-stage estimation procedure is the standard approach for this model (Greene, 1995; in BERR, 2007). Heckman's (1979; in Wooldridge, 2010) approach suggests to treat the presence of selection bias as an omitted variable problem, that is, assuming that the variable capturing the selection effect has not been included. BERR (2007) chose the two-stage approach given their perceived "importance of a strongly multivariate approach which explicitly allows for differences in the characteristics of assisted [IAs[70]] and non-assisted [NAs] companies, their strategic orientations and the strengths of their owner-managers and managerial teams". They also highlight their models' clear identification of both assistance and selection effect (if any), whilst "explicitly allowing for the differences between the characteristics of assisted and non-assisted firms".

For that purpose, a probit model by maximum likelihood is estimated first, comparing the probability of receiving IA versus NA. A selection parameter, the inverted Mills ratio, can be

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[70] A reminder that OAs, as outlined in Section 5.3, are not included in the analysis undertaken within this chapter.

inferred from the probit results and then serves as the appropriate parameter in the regression 2.2. Greene (2003) provides the details of this approach.

The treatment equation therefore becomes

$$\Delta = \beta' x + \delta' z + \lambda s + \varepsilon \qquad (2.3)$$

where **s** is the inferred selection parameter from the first stage probit model, in place of "the omitted variable". As laid out in BERR (2007), the vectors of appropriate characteristics included in the models, **w** in 2.1 and **x** in 2.3, should not be identical between the two equations. The characteristics data at hand from nearly a decade ago limits the variation of possible explanatories for use in the two equations – fortunately the firm characteristics captured were quite comprehensive. BERR (2007) drew on previous studies to inform their choice of firm characteristics for both equations, referring specifically to Roper and Hart (2005) and Storey (1994). The probit models focussed on what is described as "informational variables and objective and observable characteristics of firms – factors which may have provided the basis for administrative criteria for the targeting of assistance." For the second stage models organisational factors and characteristics of the entrepreneur were added, as felt appropriate with reference to the small business literature.

The value of mirroring the approach from a previous impact evaluation is as following[71]:

1) It provides an accepted approach that was used previously to evaluate and inform government policy. It was as such accepted by the then Department for Business, Enterprise and Regulatory Reform and by a number of academics in the research area[72].

2) It allows exploring the what-if scenarios of replacing 2005 performance data as used for the original study by data of a later year, increasing the evaluation span. This is relevant for future studies needing to decide on how long after an intervention they

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[71] The shortcomings of this approach are explored post analysis in subsequent parts of this chapter.
[72] Authors of BERR (2007) were Kevin Mole, Stephen Roper, Mark Hart and David Saal.

would need to collect their data if no secondary data was available for use (and the ability of running the analysis based on a number of annual periods, herein).

3) It provides an initial understanding of the variation of impact over time, in essence allowing to build a time profile of impact.

For this approach to be implemented the likelihood of firms receiving assistance is estimated first, through a probit model for IA, based on administrative data held in the specifically created longitudinal dataset. Estimation results are shown in Table 14.

The likelihood of having received assistance was reduced for firms of older age, an effect remaining significant in both the full and restricted models for the >17 year old firms. The only other determinants of significant nature focus on how the contact to Business Link was initially established. A first contact with Business Link through receipt of a promotional direct mailing or a first contact through the Business Link website had the largest impact on increasing the likelihood of receiving assistance. The only first method of contact of no significant impact on the likelihood of receiving assistance was a referral 'by others' – a referral not by friends. Gender and ethnicity of directors, industry, size, legal form and the number of directors all had no significant impact on the probability of receiving assistance.

Table 14 – Probit model to estimate likelihood of receiving IA

	Likelihood of IA
Legal form: Limited liability	-0.0993
	(0.267)
Employment 2004 (LLD)	-0.00148
	(0.00241)
Firm age: 0<2 years	-0.953*
	(0.511)
Firm age: 3<7 years	-1.079**
	(0.478)
Firm age: 8<17 years	-0.921*
	(0.472)
Firm age: >17 years	-1.184**
	(0.467)
BL contact: Mailing	1.056***
	(0.203)
BL contact: Website	1.064***
	(0.173)
BL contact: Direct contact	0.502***
	(0.174)
BL contact: Referred by other	0.202
	(0.189)
BL contact: Other referral (friend)	0.718**
	(0.308)
Number of directors	0.0634
	(0.0469)
% of female directors	0.00218
	(0.00275)
% of ethnic minority directors	-0.00526
	(0.00655)
SIC: Manufacturing	0.00828
	(0.249)
SIC: Construction	-0.171
	(0.312)
SIC: Retail & Wholesale	-0.376
	(0.256)
SIC: Education	-0.323
	(0.266)
Constant	x
	x
Pseudo R2	0.3624
Observations	406

Source: BLO Survey and BSD

The inverse mills ratio was calculated on the basis of this full probit model and included in the second step, the OLS models, to control for selection effects.

The models were specified as semi-log models (see, for example, BERR, 2007; Reichstein and Dahl, 2004), correcting for the skewed nature of the growth rates, where most firms experience fairly modest changes in size, and a few displaying far more rapid growth.

5.4.2   Growth Models: Impact of assistance and selection

Initially, a total of 84 estimations were run: full and restricted models, with and without selection term. The same models were run with the dependent variable measuring growth (for employment, turnover or productivity) for the seven periods of 2004 to 2005, 2004 to 2006, continuing up to 2004 to 2011. A full and a variety of restricted models were run for each time period and each dependent variable. In addition, full and restricted models were run each with and without a selection term.

The results will be reviewed in turn for each outcome measure, with the results of the full non-selection models being presented in below tables. Plots to show the strength of the IA coefficients for both selection and non-selection models are also included, providing a profile of impact over time. The summary tables provided here within the main body of the analysis are accompanied by the full model results for each estimation in Appendix E1.

Employment

Overall, for longer time periods the models perform better than in the short-term, using R^2 as a rough indicator for goodness of fit. However, considerable unexplained variation remains, with R^2 rarely exceeding 0.2. While the selection term is insignificant throughout, it does improve the fit of the full model notably in some instances. The impact of IA on employment growth is found to be positive for both selection and non-selection models, and regardless of the time period applied. The strength of the IA coefficient varies across time, however. In the full models IA only reaches (ten percent level) significance for the 2004-7 period.[73]

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[73] Restricted models, dropping the insignificant terms from the full models – with exception of the assistance term, without selection term return ten percent level significance for the 2004-6, 2004-8 and 2004-11 periods, and a stronger five percent level significance for the 2004-7, 2004-9 and 2004-10 models. For the restricted employment models including the selection term no significant IA impact is identified.

Figure 15 – Plot of assistance coefficient (employment model)
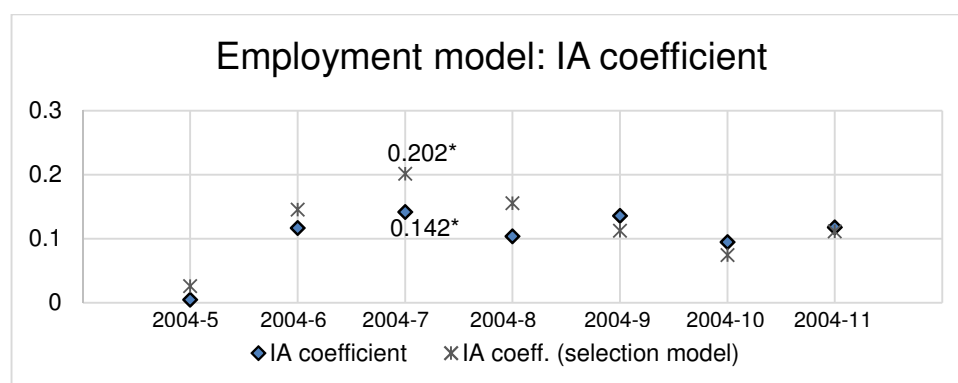
Table 15 – Impact of IA on employment, 2004-11

(where + for positive coefficient, - for negative coefficient)

2004 to	2005	2006	2007	2008
assistance	ns(+)	ns(+)	+	ns(+)
other significant variables	+++ multi-site ++ SIC: construct.	--- size (empl) ++ size² (empl) -- firm 20+ yrs. +++ multi-site	--- size (empl) +++ size² (empl) ++ multi-site	--- size (empl) +++ size² (empl) ++ multi-site ++ nonexec dir.
R²	0.082	0.121	0.133	0.138
N	342	342	342	342

2004 to	2009	2010	2011	
assistance	ns(+)	ns(+)	ns(+)	
other significant variables	--- size (empl) +++size² (empl) ++ nonexec dir.	--- size (empl) +++size² (empl) ++ multi-site	--- size (empl) ++ firm 3<5 yrs. +++size² (empl) ++ multi-site ++ nonexec dir.	
R²	0.185	0.174	0.197	
N	341	341	347	

Where +++/++ & ---/-- indicate significance at 1%/5% and the sign of the coefficient. ns(+) and ns(-) represent insignificant coefficients, and their sign.

Source: BLO Survey and BSD

Other than the assistance term, there are a number of other significant effects on employment growth, as summarised in Table 15. Firm size in 2003, at the time of intervention, is a negative and significant predictor of employment growth in nearly all models. Squared firm size in turn

is a positive significant predictor in most cases, suggesting a significant positive impact of size for the largest of firms. Firms with more than one firm site are growing their employment faster on average, again, regardless of outcome period measured. Being of older age reduces a firm's growth perspectives for the shorter outcome periods, whilst 3<5 year old firms have a significantly higher growth rate for 2004-11. Other significant effects exist for having appointed non-executive directors, and for being in the construction sector, the latter factor being a predictor for the outcome period 2004-5. None of these characteristics can be addressed through business support, as could be, for example, sales strategy, exporting and putting into place a business plan.

The original one year evaluation undertaken by BERR (2007) suggested a significant positive effect of assistance on employment growth, based on the firms' self-reported data. This early effect is not confirmed here, and it is clear that the observation of any significant assistance effects would be limited to the respective assessment period chosen.

Turnover

For employment, there was a distinct trend by models to perform better for the longer outcome periods, using R^2 as a rough indicator for goodness of fit. The performance of the turnover models follows no such trend. Again, considerable unexplained variation remains. The inclusion of the selection term was insignificant throughout. The restricted models' performance is weak, with many periods providing not a single significant explanatory variable other than assistance. The turnover results do not allow for straightforward interpretation. For the first three periods all models suggest a negative impact of IA on turnover, significantly so for the 2004-6 period. For the full models without selection the sign for IA then turns positive for the 2004-8 and 2004-9 models when including the selection term the sign change is limited to the 2004-9 model – all without statistical significance.

Figure 16 – Plot of assistance coefficient (turnover model)
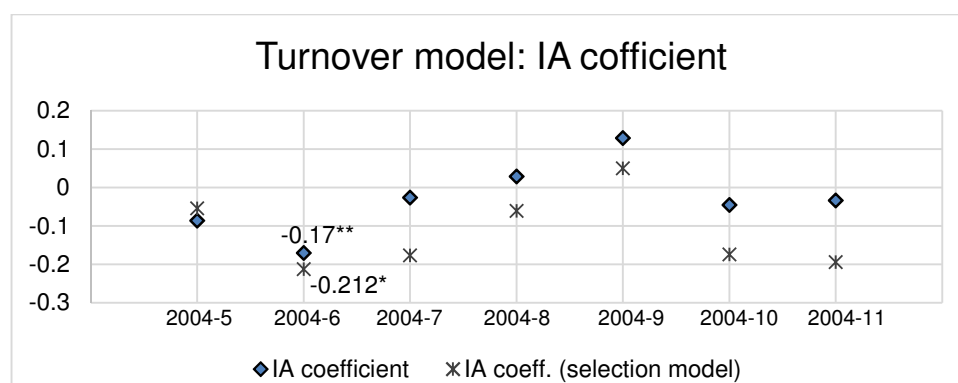
Source: BLO Survey and BSD

Table 16 – Impact of IA on turnover, 2004-11

2004 to	2005	2006	2007	2008
assistance	ns(-)	- -	ns(-)	ns(+)
other significant variables	++ firm 3<5 yrs. ++ exporting ++ maint. sales +++ new mkts. -- OM equity			
R²	0.116	0.079	0.081	0.111
N	342	340	340	340

2004 to .	2009	2010	2011	
assistance	ns(+)	ns(-)	ns(-)	
other significant variables				
R²	0.117	0.135	0.105	
N	339	340	339	

Where +++/++ & ---/-- indicate significance at 1%/5% and the sign of the coefficient. ns(+) and ns(-) represent insignificant coefficients, and their sign.

Source: BLO Survey and BSD

Compared to the employment models, fewer firm and owner characteristics are of significance across the estimated turnover models. For a number of models no significant effects at all were found. For all 2004-5 models – and only for those – the strategy of seeking new markets has a significant positive impact on turnover growth. The role of firm age is also evidenced for the

initial 2004-5 period. The original BERR (2007) results suggested an insignificant one year impact – this is confirmed here but qualified by a significant negative impact for 2004-6 period.

Productivity (turnover per employee)

Productivity growth here is defined and measured as the ratio of turnover growth over employment growth. The positive sign for the assistance coefficients in the employment models and the initially negative sign for the assistance terms in the turnover model both would point to an initially negative impact of assistance on productivity growth.

This combination of IA's positive impact on employment, whilst negative for turnover in the short-term, is confirmed by the models as negative impact of IA on productivity, found nearly unisono across the productivity models[74]. The IA coefficient is negative yet insignificant in the immediate short-term. For 2004-6 the full models indicate a negative impact of IA on productivity growth significant, both with and without inclusion of the insignificant selection term. The selection model also carries a significant negative assistance term for the 2004-7 period.

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[74] With regards to the fit of the model specification, longer outcome periods the models perform worse than in the short-term. Considerable unexplained variation remains. While the selection term is insignificant throughout, it does improve the fit for most full models, but not unilaterally. The restricted models do not offer any additional coherent insights.

Figure 17 – Plot of assistance coefficient (productivity model)

Productivity model: IA coefficient
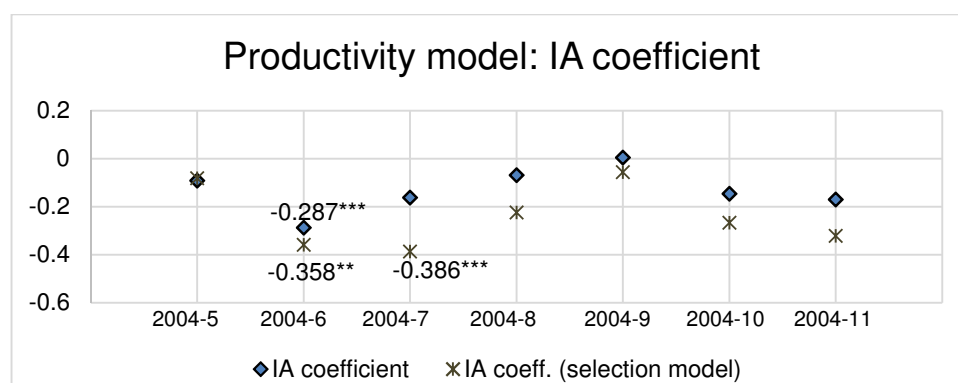
Source: BLO Survey and BSD

Table 17 – Impact of IA on productivity, 2004-11

2004 to	2005	2006	2007	2008
assistance	ns(-)	- - -	ns(-)	ns(-)
other significant variables	++ firm 3<5 yrs. ++ new mkts.	++ size (empl)	++ size (empl) -- size² (empl)	
R²	0.105	0.087	0.064	0.064
N	342	340	340	340

2004 to	2009	2010	2011	
assistance	ns(+)	ns(-)	ns(-)	
other significant variables	+++ size (empl) -- size² (empl) -- nonexec dir.	++ size (empl) ++ multi-site	++ size (empl) -- firm 5<10 yrs.	
R²	0.100	0.100		
N	340	340	0.092 339	

Where +++/++ & ---/-- indicate significance at 1%/5% and the sign of the coefficient. ns(+) and ns(-) represent insignificant coefficients, and their sign.

Source: BLO Survey and BSD

Few firm and owner characteristics are of significance across the estimated productivity outcome models. Size is of significant positive impact on productivity growth for the 2004-6, 2004-7 and 2004-9 to 2004-11 full models. For all 2004-5 models – and only for those – the strategy of seeking new markets has a significant positive impact on productivity growth; the

link to the turnover model results for 2004-6 is obvious, given productivity growth being a function of turnover over employment growth.

From the results, it is evident that the role of assistance is limited compared to other far more common factors assessed across periods. Whilst firm size and age effect are independent of firm characteristics that business support may influence, at least in the very short-term business support aiming at firms exploring new markets may yield positive impact (or where assistance may trigger them to do so). In comparison to the BERR (2007) results, the insignificance for the one year period post intervention is confirmed, and as for the turnover result this is qualified by the results for the two year period of 2004-6, that suggest a significant negative impact of assistance on productivity.

5.4.3   Lagged growth models

The above growth models were also estimated including lagged growth terms. The addition of (the statistically significant) time lags broadly confirms the findings from the linear regression analysis above – the full estimation results are presented in Appendix E2. There are few significant determinants for firm growth across outcome periods. The models seeking to assess impact immediately following the intervention (BSD period 2004-5) find no significance for the assistance term. Then, two to three years beyond intervention, the significant effects seen in previous section are confirmed. These are positive for employment growth, negative in terms of productivity. Any analysis including subsequent years returns no significant impact of support on growth. However, when analysing the long-term, that is the periods 2004-10/11, the support coefficient again turns significantly negative in the productivity estimations.

5.4.4 The role of size and age confirmed

Assistance is found to be only of significance for some evaluation time frames and measures. In turn, the roles of age and size are confirmed as more vital than that of assistance across the time periods chosen. In line with expectations on the role of age, the plots below show how the models suggest markedly stronger employment and turnover growth for the youngest of firms.

Figure 18 – Plot of age category coefficients (employment model)
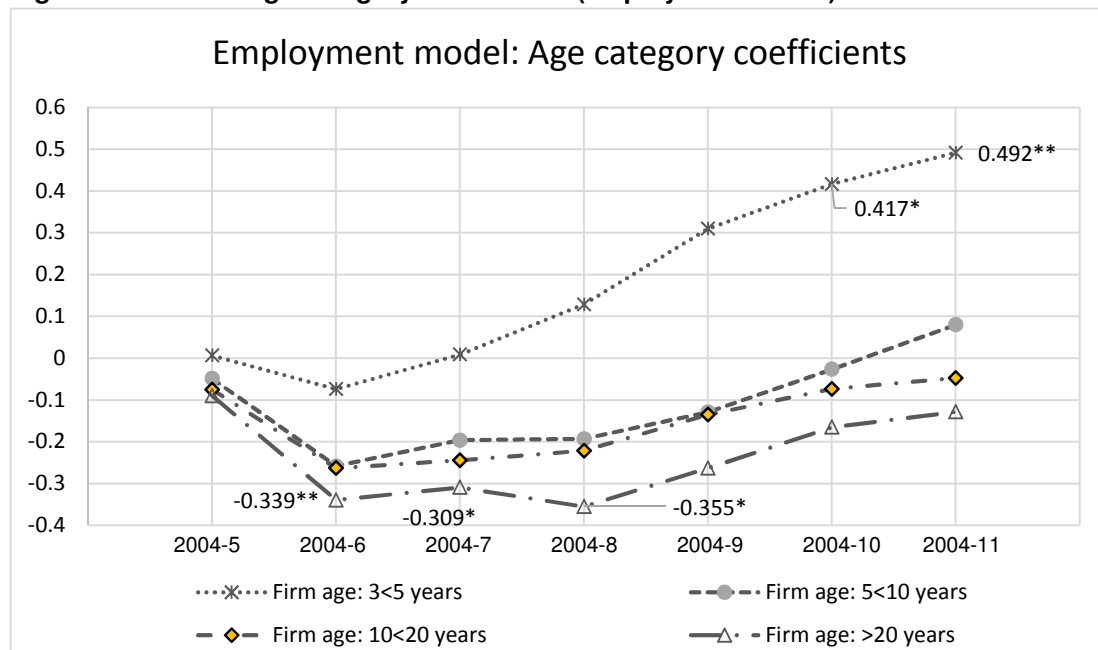
Source: BLO Survey and BSD

Figure 19 – Plot of age category coefficients (turnover model)
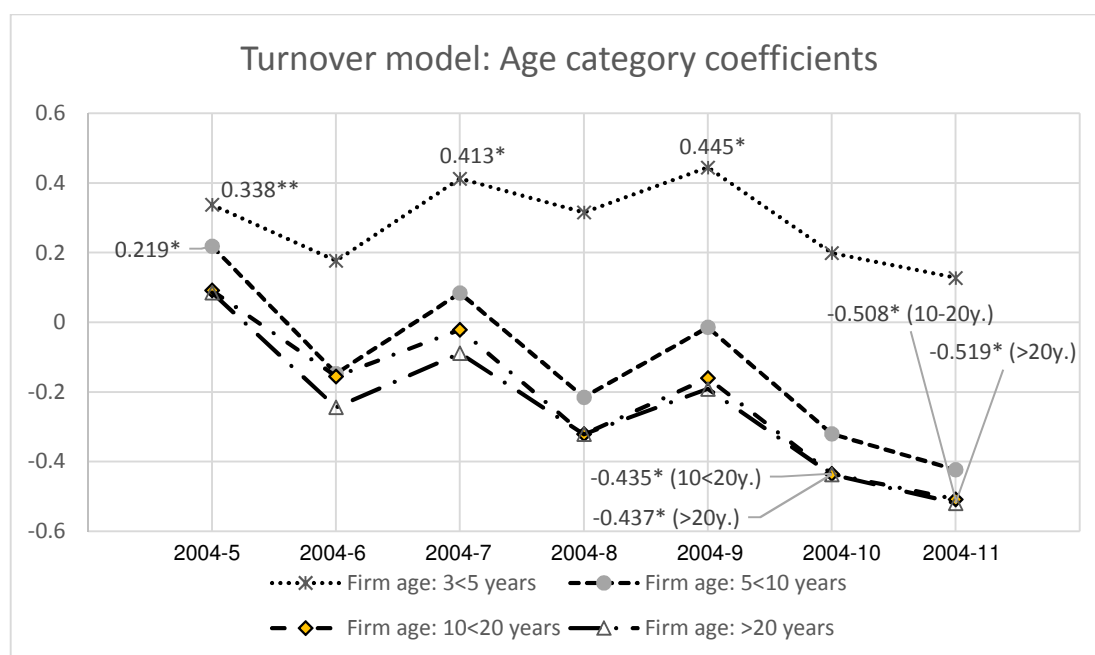
Source: BLO Survey and BSD

Whilst age coefficients are significant for some of the employment and turnover models, size is significant for many of the employment and productivity models[75]. The results confirm an increasing negative impact of firm size on employment growth. And when considering productivity growth, it becomes clear that size is an important determinant of productivity growth.

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[75] No significant coefficients were estimated for age/productivity and size/turnover, and therefore no respective plots included here.

Figure 20 – Plot of size coefficients (employment model)
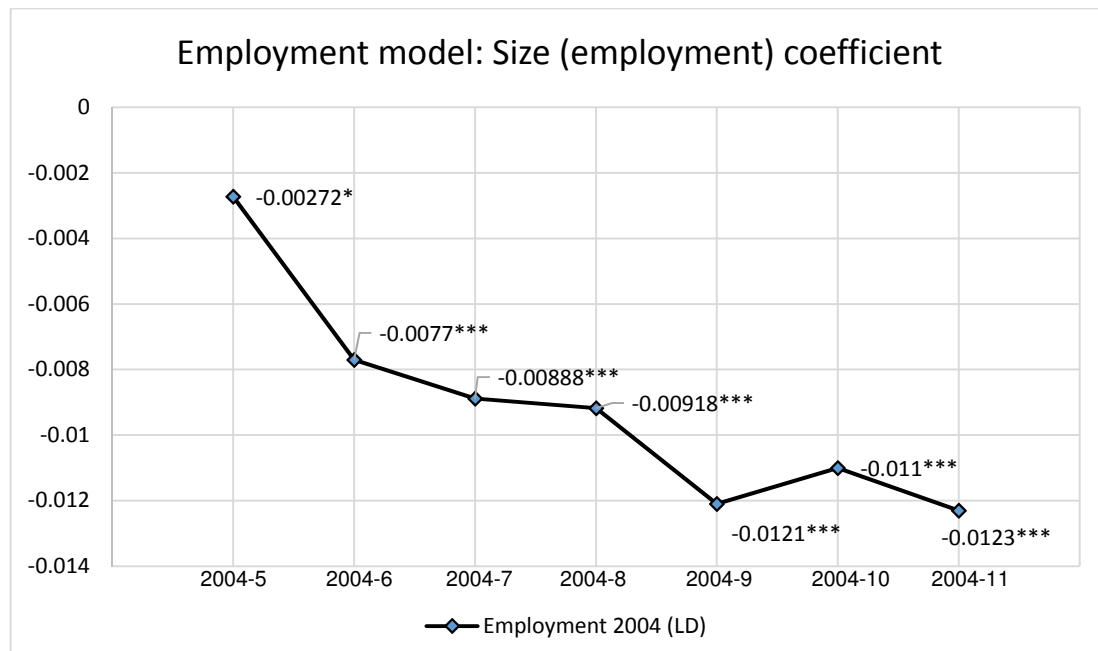
Source: BLO Survey and BSD

Figure 21 – Plot of size coefficients (productivity model)
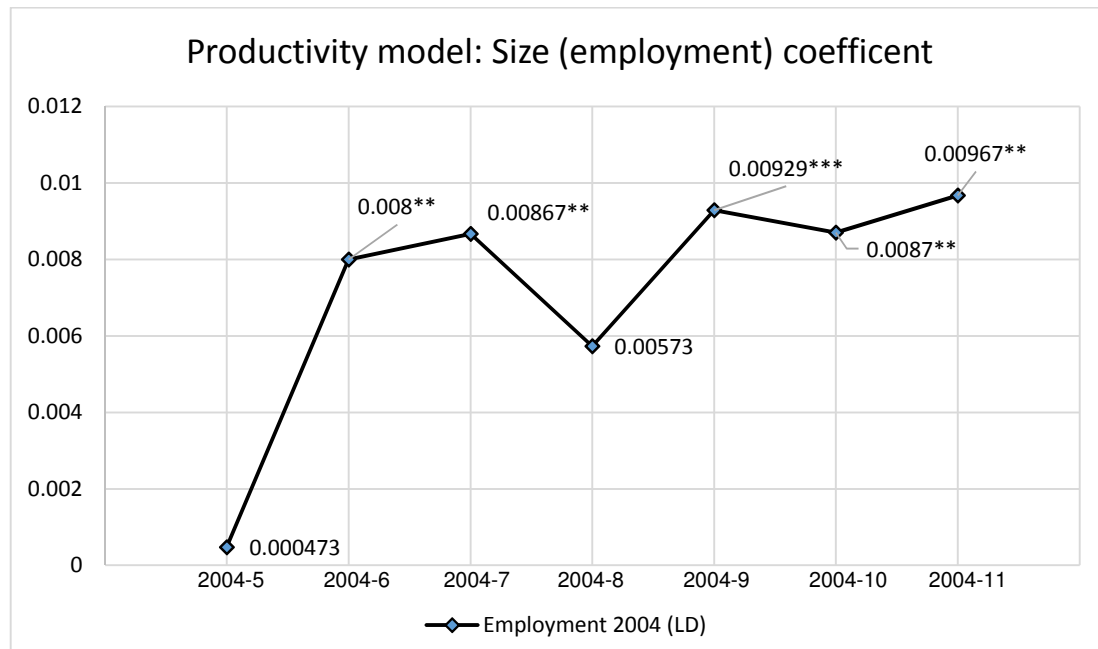
Source: BLO Survey and BSD

Two aspects are of note based on this confirmed role of age and size. Firstly, the strength of

the size and age coefficients compared to that of the assistance coefficients in the previous

section underlines how the role of size and age are undoubted when it comes to firm growth, and across various outcome periods. By comparison, the results around the impact of firm assistance on firm growth are pretty thin, significant only for very narrowly defined time periods and outcome measures. Secondly, business support may be of influence on firm and owner characteristics such as growth strategy or propensity to export, and through that may have an impact on firm growth. However, the coefficients for those terms are only significant in for some of the models and periods estimated. In turn, size and age influence growth for most estimated scenarios. Assistance cannot directly influence those.

5.4.5   Concluding remarks on regression results

Overall, it is interesting to see how in the immediate short-term no significant impact of assistance can be identified for employment and turnover as outcomes. Instead, significant effects focussed around the two to three year post intervention period. This contrasts the BERR (2007) findings for employment, which suggested a significant impact of assistance on employment growth for the short period evaluated. The results here also add context to the meaningfulness of the non-significant impact found for turnover and productivity in their one year evaluation[76]. The positive employment impact compared to the negative sign the assistance coefficients take in the shorter term turnover and productivity models underlines well how assisted businesses tend to grow by employment expansion first, that is, setting up for firm growth first. Turnover (and as a result productivity) effects lag behind.

The results are clearly not as robust as they preferably should be for reliable conclusions – most significant terms are so at the 10 percent level. However, given observable trends over

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[76] Drews and Hart (2015) in their feasibility study of investigating the long-term impact of business support found a continuous effect of assistance on employment growth for all periods 2004-6 through to 2004-11 (10 percent significance level), which is somewhat contrasting the findings herein. However, it was possible to use a considerably larger sample for this research, which resulted specifically in the inclusion of additional smaller firms, reducing average firm size for the sample investigated. Like for like comparisons with the exploratory results of the feasibility study are therefore, however, of little value.

time, they provide value in understanding how time affects conclusions drawn. Impact evaluations focussing on the short-term fail to capture this variation in the observed trends. In effect, the results show that depending on the time frame (and measure) chosen, very different conclusions about the impact of the scheme assessed could be drawn. If the results were taken at face value, a 2004-5 study based on this data would have concluded the assistance made no difference. A study constrained to the 2004-6 period could have become somewhat concerned with the impact of support being limited to turnover and productivity effects. A 2004-7 employment outcome study would likely to have drawn a more satisfying conclusion, based on the identified positive employment effects. This variation of impact is in stark contrast to the impact of size and age on firm growth, which are, as expected, far more consistent in their role as growth determinants.

5.5   Analysis: Impact of assistance along outcome percentiles

Both the linear regression and lagged growth models estimate the average effect of assistance and the included firm and owner-manager characteristics on the (average) outcome. The observed growth rates are fairly low for most firms, but not for all – the growth distribution is not even. It is therefore worth exploring models allowing for a more flexible estimation approach than a simple focus on averages. One such approach is offered by quantile regression.

5.5.1   Quantile regression model

Quantile regression was first introduced by Koenker and Bassett (1978). As illustrated through an example by Koenker and Hallock (2001), the scenario for this analysis is that a firm will display growth at the xth quantile if it performs better than the proportion of x of the firm population. Accordingly, its performance is also worse than 1-x. As Koenker and Hallock (2001) discuss, the defined quantiles refer to the general case. Koenker and Bassett (1978) extended these ideas with their quantile regression models. These are not linear, but conditional quantile

functions, where the "quantiles of the conditional distribution of the response variables are expressed as functions of observed covariates" (Koenker and Hallock, 2001, p. 143).

As introduced at the outset of this section, it is unlikely that growth is evenly distributed across the firm population, with linear regression and its reliance on averages possibly providing an incomplete picture (Mosteller and Tukey, 1977). Quantile regression performs better in such contexts than linear regression, as summarised by Coad and Rao (2006):

1) As introduced above, quantile regressions provide estimations for the entire conditional distribution of the outcome variable.

2) Quantile regression results are considered robust to outliers and tail heavy distributions.

3) Linear regression assumes identically distributed error terms across the conditional distribution; this assumption is relaxed for quantile regression allowing for firm hetereogeneity and differerent slope parameters across the different quantiles.

Coad and Rao (2006, p.6) describe the model as

$$y_{it} = \chi'_{it}\beta_\theta + u_{\theta it} \qquad \text{with} \quad \text{Quant}_\theta(y_{it} \mid x_{it}) = x'_{it}\beta_\theta \tag{3}$$

"where yit is the growth rate, x is a vector of regressors, β is the vector of parameters to be estimated, and u is a vector of residuals. Qμ(yit|xit) denotes the μth conditional quantile of yit given xit.

As for the previous regressions, the same full set of firm and owner-manager characteristics will be included again.

5.5.2   Results: Quantile regression

Figure 22 to 24 plot the assistance coefficients for each estimated quantile. The full quantile regression results are to be found in Appendix E3. The pseudo R^2 values as an indicator for measurement were generally very low, but they are not reported here due to the inherent problems of their suitability in the context of quantile regression.

Employment

Notable is how for the 2004-5 outcome period the coefficients are of similar magnitude across all estimated percentiles. Taking a longer view, the 10th percentile assistance term then considerably strengthens for the 2004-6 and 2004-7 outcome period, turning significant, suggesting a positive impact of assistance on this percentile on the outcome distribution. For the longer periods beyond that no further significant assistance impact on employment growth could be identified[77].

Figure 22 – Quantile regression (employment models), plot of assistance coefficients
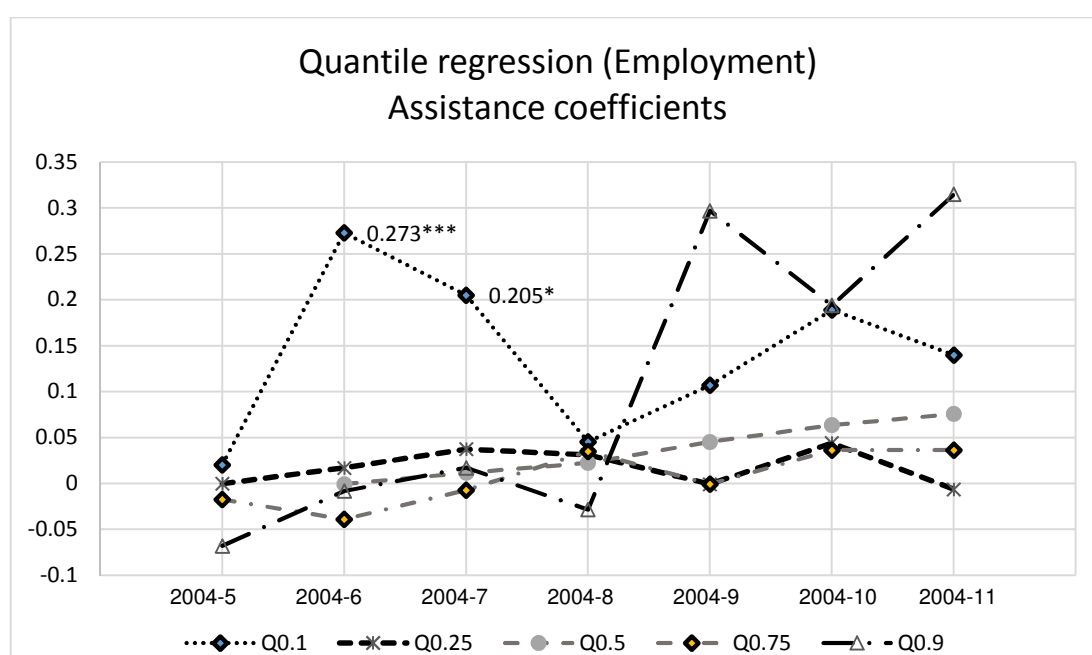
Source: BLO Survey and BSD

Turnover

The results are more varied when considering the turnover model outcomes. Four support coefficients are significant, albeit at the ten percent level only. They are distributed across different outcome periods (2004-6, 2004-10 and 2004-11). For 2004-6 assistance is found to

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[77] Selection models were also estimated. Only for two (of a total of 35 estimated) models did the selection term reach significance, suggesting an additional significant positive impact of assistance on the 90th percentile for the 2004-5 employment model.

be adversely affecting turnover growth for both the 75th and 90th percentile. The 2004-10 and

2004-11 results return a negative impact of assistance on the median[78].

Figure 23 – Quantile regression (turnover models), plot of assistance coefficients
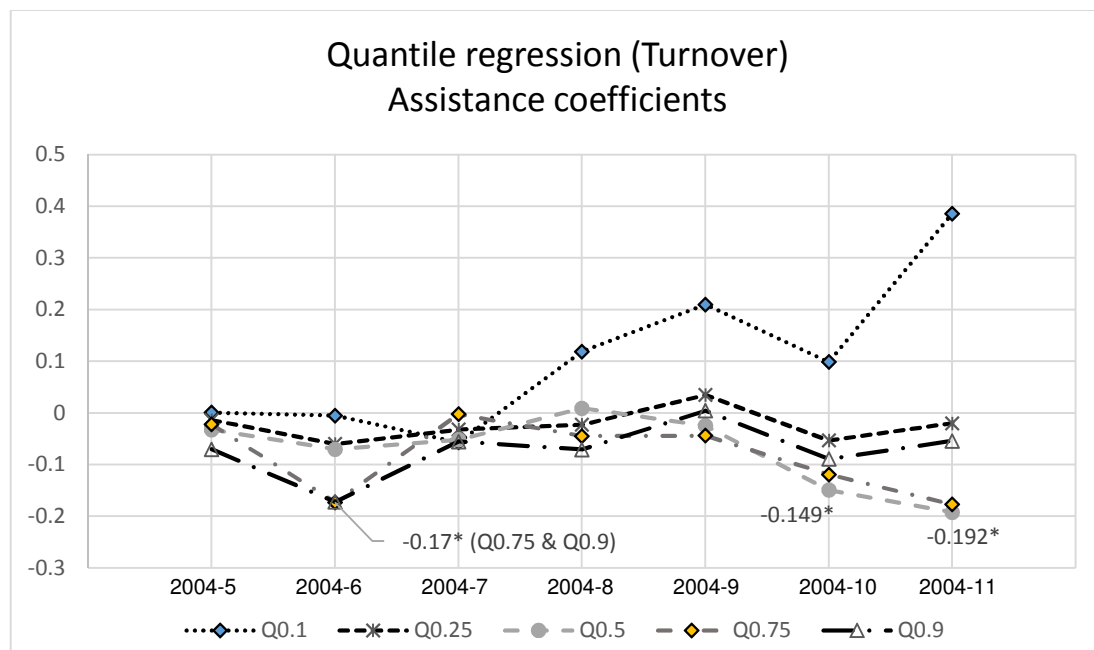
Source: BLO Survey and BSD

Productivity

All significant support coefficients in the productivity models carry a negative sign. Again, 2004-6 and 2004-7 see some significant coefficients, in this case for the 75th and 90th percentile. Outside that, the assistance coefficient is negative and significant for the 10th percentile for the shortest evaluation period 2004-5, and for the 2004-11 period for the 75th percentile.[79] Generally, it is notable how the coefficient strength for the 10th percentile generally remains the highest, and for the 90th percentile the lowest.

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[78] Inclusion of the selection term leads to only one instance of a significant selection coefficient across the estimated turnover models reported here. The assistance term for that model remains insignificant regardless.

[79] Again, including the selection term makes no difference to the results reported herein.

Figure 24 – Quantile regression (productivity models), plot of assistance coefficients
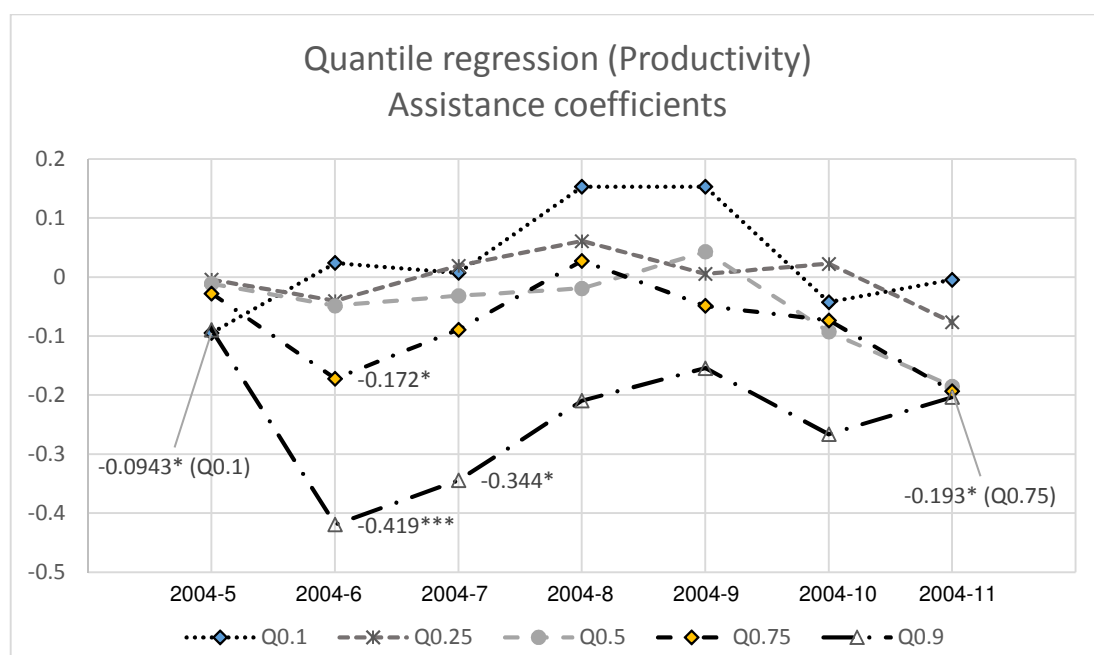
Source: BLO Survey and BSD

5.5.3 Discussion: Quantile regression

The quantile regression results suggest limited significance for the impact of business support for the majority of firms and their performance. Signs varies across the respective percentiles, time periods and outcome variables, but for the majority of results the assistance coefficient remains insignificant. Most significant results were returned for the shorter assessment periods. This underlines the results from the previous analysis in this chapter, where the impact of business support appears to be limited to a two to three year time frame post intervention. This impact is positive for employment, and negative for productivity 'growth'. This significance is mainly for the extreme percentiles, not for the median.

The full models as in Appendix E3 provide a number of significant coefficients other than assistance, especially for the 75th and 90th percentiles. For employment, previous size becomes an increasingly important (negative) determinant of growth for increasing lengths of outcome periods. The role of firm age is also confirmed again as being negative. For turnover, the role of firm age is equally confirmed. There are also a number of significant coefficients for

owner-manager age in the turnover models. The productivity models do not allow for singling out any group of variables for their pattern of significance.

From these results it is clear that – depending on period – the impact of support is not spread evenly across the distribution of firms and outcome measures. At the same time, the results show that even where significant coefficients for the impact of support were found in the OLS models, this does need to translate into significant effects for any of the estimated percentiles for the same period and outcome measure. Given these variations across results, few general conclusions are possible. What the results quite clearly do suggest is how choice of timing would affect the conclusions drawn from any evaluation. Here, where support had any significant impact, this was most likely for a two to three year period from point of intervention.

5.6   Discussion and conclusions

5.6.1   Summary of Results

A number of results hold true across the respective models applied. Firstly, there is no significant impact of assistance for the 2004-5 outcome period for any measure, the single exception being the extreme percentiles of one employment quantile regression model. For employment, depending on the model, significant effects start to appear for 2004-6, with the noted exception above, and most commonly for 2004-7[80]. By comparison, the quantile regression models suggest limited impact, with significant impact of support for the 2004-5/6 periods for some extreme percentiles. This impact generally carries a positive sign.

For turnover, the effects estimated across the models appear less robust. Linear regression suggests a negative impact of support for the 2004-6 outcome period, for the other periods the support coefficients remain weak and change sign a number of times. This weakness of

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[80] The lagged growth models also confirm that the significant impact centres on the 2004/5-6/7 periods, depending on the lags chosen.

coefficient is in line with the other characteristics controlled for, very few of which are significant at any point, rendering the inclusion of restricted models optional due to a lack of predictors. The inclusion of lagged growth adds no coherent insights to the role of support on turnover growth, the same applies to the quantile regression results.

In line with the results of the employment and turnover growth models, linear regression results suggest a negative impact of support on productivity growth as the function of the two measures for 2004-6/7. Only firm size provides a second significant predictor for these periods. With the inclusion of different lags, the strong negative effect for the 2004/5-6/7 periods is confirmed[81].

An additional important conclusion from the results is that interquantile regression shows how a reliance on average effects is likely to oversimplify impact of support. Relying on two measurements in time, the interquantile regression models suggest effects at the extreme ends of the outcome population.

5.6.2   Results by hypothesis

Hypothesis H1 – *Timing of evaluation will return different conclusions about impact of a business support intervention for a single measured outcome.*

The results strongly support the first hypothesis. Short-term evaluation, immediately after the intervention, would have suggested no significant impact of support on the outcomes measured based on the analysis undertaken here[82]. For a two to three year period, significant outcomes were identified, but these varied by the outcome measure chosen. For the analysis herein, any analysis purely considering long-term results would have been unlikely to identify

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[81] Unexpected is the suggestion by the lagged growth term results of a negative impact of support on productivity again for the 2004-10/11 periods. The quantile regression results show how this impact of support is focussed on the 10th, 75th and 90th percentiles, depending on period and lags chosen.
[82] As illustrated, these insignificant short-term results differ from the one year evaluation findings of BERR (2007) for employment.

a significant impact of business support, with exception of the long-term productivity effects after six to seven years, depending on the model. Therefore, as reasonably expected, the choice of timing and measure both play a significant role for robust evaluation results.

Hypothesis H2 – *An evaluation of business support over different time spans and multiple measures will illustrate how the time lag of impact differs by measure.*

One assumption would be to find evidence, for example, for the impact of assistance on employment to precede the impact onto turnover, as capability for turnover growth first needs to be built with any additional staff taken on board. However, the evidence from this analysis is inconclusive. The impact of support on employment and productivity growth is apparent after two years, and remains largely insignificant for turnover growth. The time profile of the coefficients' lends support to this hypothesis, however, with immediate and strengthening coefficients for assistance in the employment model, and initially negative but then strengthening and turning positive assistance coefficients for the turnover model.

Hypothesis H3 – *Not all firms benefit from assistance in the same way, and over time: The role of the impact of assistance varies along the outcome distribution.*

The few significant interquantile regression results confirm this varying impact of support, depending on chosen outcome percentile. Compared to the quantile regression results, more numerous significant effects were found in the simple regression models, that is, for the average outcomes.

5.6.3   Conclusion

Time periods for impact will differ by the type of assistance. Here, it was sought to understand how the impact of a soft business support programme would develop. The results can only provide an indication of how impact developed for this and possibly comparable schemes. The central suggestion that must arise from the variety of models and results is not to limit evaluation to one measurement at the point of intervention and one some period later on, however well justified that period may be. Data availability and political expediency are very good explanations for an approach to evaluation focussing on two data points within a relatively short time period. But, in summary, the results strongly suggest that such approach will always be limited to providing a snapshot of the impact, and will fail to understand the relevant outcomes of previous and subsequent periods. The length of what may be deemed a sensible time period post intervention for evaluation purposes is constrained by the problem of impact attribution. Based on the results presented here, longitudinal data covering a five year period would have captured the main effects.

Chapter Six

Discussion & Conclusions

6.1   Introduction

The core of this thesis was to provide a contribution to the evaluation and business support policy literature. What do we know about the impact of business support in the mid to longer term? Does it matter?

This research is at the intersection of economics and politics. The interest of the UK Department for Business, Innovation and Skills in the undertaking of this study stems from the awareness that political expediency led to many short-term evaluations, with long-term evidence more than scarce. The question is whether what is understood to be robust evidence actually provides that reliable understanding to a scheme's impact, or whether political pressures mean that economic analysis is, in fact, incomplete. If so, what would be sensible time frame for evaluation?

This thesis revisited the impact analysis undertaken as part of BERR (2007), rated as a highly robust contribution in later evidence reviews. BERR (2007) only had two measurements of firm performance data at hand, and these within two years of the intervention. On that basis, it was concluded that Business Link had a positive impact on employment, whilst none on turnover. This research looked at the same set of firms, but with performance data for up to seven years post intervention, seeking to understand the role of time in evaluation, and exploring the use of official firm-level data for this purpose.

Section 1.2 outlined the contributions intended:

Two major contributions are made by this research in the field of the evaluation of business support policies:

1) *A critique of current evaluation practice and its timing, underpinned by*

2) *the application of a longitudinal impact study of small business support in England, revisiting the BL evaluation undertaken in 2006 (BERR, 2007).*

The research is also of methodological value for follow-up and similar studies by setting out:

3) *The key component of data linking scheme beneficiary data from the support organisations customer relationship management system with business registration databases and official firm-level data records for evaluation purposes.*

6.2 Findings

6.2.1 "A critique of current evaluation practice and its timing"

Leading on from the policy justification arguments in Chapter One, Chapter Two illustrated the clear gap in the current literature and our understanding of how business support benefits firms beyond the short-term. For many evaluations one may wonder whether the desired/measured effects had sufficient time to be realised post intervention. A central concern is that authors offer no explanation as to why certain timings for evaluation were chosen. And, of course, it is inherently difficult, if not impossible, to do so, as it would require a case-by-case understanding of how long an intervention reasonably needs for it to develop its full potential in any set of given circumstances. This can only really be known post evaluation.

The literature makes the case for policy-makers to clearly specify what their policy intends to achieve (e.g. Storey, 1998; Spicker, 2006). This involves providing objectives that an

intervention can be clearly assessed against. In a scenario, in which a clearly defined objective is provided, and evaluation considered as an assessment of outcomes against such set targets, it would arguably not be the task of the evaluator to discuss timing considerations.

The trouble with that perspective is that it assumes a sensible time frame for the objectives to be achieved has been chosen. With next to no evidence on what suitable time frames would be for a desired impact to develop, it is likely to be the role of evaluators as part of the research community to articulate a view on sensible time frames. However, time frames are often formulated with a view to estimate "reliable" effects soon after, due to policy pressures. A government usually wishes to demonstrate results prior to the next election. Also, (tax) spend needs to be justified internally within government or any organisation, for that matter, putting the pressure onto policy-makers to provide evidence a scheme was worth the resources allocated to it.

In consequence, policy-makers' thinking is shaped by relatively short-term horizons. They are usually the same people that commission the evaluation research into their policies' impact. This is likely the biggest problem that evaluators are facing, as there are a numerous warnings about the danger of considering only the relative short-term, for example in BERR (2007), Bridge and O'Neill (2013), Chrisman et al. (2005), Cook et al. (2008), EIM (2009), Lundström and Stevenson (2005), OECD (2007), Schwartz (2009) and Shapira (2001). Yet, this concern has not been addressed yet in practice.

6.2.2 "Setting out the key component of data linking scheme beneficiary data from the support organisations' customer relationship management system with business registration databases and official firm-level data records for evaluation purposes"

Chapter Three then developed the methodology proposed. Other than policy expediency issues leading to short-term evaluations, there is also the problem of capturing longitudinal data. Surveys require a considerable resource, making them rather costly. Long-term

cooperation is needed from all programme participants, be it recipients or delivery organisations, which is notoriously difficult for both parts, as is also illustrated by this research's intended original use of Regional Development Agency data. Chapter Three explores the use of secondary performance data, as available from the UK Data Service, (but also from comparable agencies in other nations), as an alternative to engaging with scheme participants over many years for data collection purposes. This approach has its limitations, however. Linking the Business Link participants and their firm and owner characteristics as captured by a previous evaluation survey in 2005 with the official data records, namely the BSD, requires care and introduces its own set of challenges. Most notable is the high attrition from the original sample of 3,448 firms down to less than a third post linking and outlier removal. Reasons for this include the inability to identify the company registration number required as the unique and common identifier for firms. The firm list was recorded by the Business Link operators, and this difficulty of identification is due to either imprecise recording of firm names or not being a registered firm. The inclusion of only VAT registered and PAYE firms in the BSD leads to a further sample reduction. The BSD also requires some careful reflection, as it is not a ready-to-use dataset, but requires annual linking and an in-depth look at its data structure. For the purpose of this thesis specifically the firm exit date required some detailed attention.

Despite the caveats around the use of data linking, the sample characteristics changed significantly only for few firm and owner characteristics. One of the advantages of using official employee and turnover data is that self-reported performance data does not need to be relied upon, which appears to differ somewhat from the official records. Using larger samples or linking would require little additional effort as long as the company registration numbers would have been identified, allowing for analysis drawing on many more observations than common or, in fact, practicable with surveys. The use of larger samples could also allow linking with other available firm-level datasets, such as the Annual Respondents Database, or UK Innovation Survey, providing more outcome measures but also firm characteristics without the

need for primary data collection. In this case, the original sample was not of sufficient size for linking with other dataset available through the Secure Lab.

The data linking exercise provided a dataset that can be used for far richer analysis, given its now longitudinal nature. The firms had not to be revisited for capturing this data, which is another major benefit. However, it also means being limited to firm characteristics from the original survey carried out, and what additional information and limited information is available from the datasets the survey data gets linked to.

6.2.3 "Application of a longitudinal impact study of small business support in England"

The impact of assistance on survival and growth was explored. The key finding from the survival analysis was that firms in receipt of assistance had survival rates no different from those not assisted in the medium to long-term. The analysis suggested a short-term effect for the period immediately after the intervention having taken place, an effect observed most of the time regardless of age or size groups. Both, age and size are of considerable more influence on survival prospects than assistance. Survival rates of a random BSD sample were found to be overall lower than those of the assisted and non-assisted firms used for the analysis herein. Clearly, the random sample from BSD is not similar to the selected group of non-assisted firms used for analysis purposes. This flags the desirability of being able to draw on firm and owner characteristics. These are not available from the BSD, but they clearly are of importance to ensure firm groups of similar characteristics would be compared. The random sample here was unlikely to provide a suitable comparison group.

Chapter Four's results show how any survival analysis carried out for a two year period post intervention or beyond fails to support any effect of assistance on survival. Here, a one year evaluation would have provided a conclusion that, in fact, is only valid immediately post

intervention, and not suitable as a general summary of the impact of assistance on survival[83]. So, here the timing of evaluation makes a marked difference to the conclusions drawn.

The analysis in Chapter Five is of an exploratory nature, and was divided by four different methodological approaches. The initial approach applied followed the highly rated methodology of the previous short-term Business Link evaluation by BERR (2007), involving linear regression, both with and without selection effects. Making use of the longitudinal data available, lagged growth models (taking into account previous growth experienced by the firms) were also estimated, and interquantile regressions undertaken to understand the effect size across the outcome population. Across the regressions, the significance of impact is apparent for the two to three year period post intervention. In the linear regressions, support is positive for employment, but negative for turnover and productivity. Including lags in the lagged growth models, there is some later positive effect on turnover for 2006-7. The lagged growth models for productivity provide some indication of a negative effect of support for 2004-10 and 2004-11 periods. The few periods of significant impact remain similar for the generally weak interquantile regression results. Impact is limited to the extreme quantiles defined, and therefore is not distributed evenly across the outcome spectrum.

It is certain that no definite answer on the period of impact can be given – and, of course, the results presented in this thesis are specific to the particular business support programme assessed. The results show that there is a lag of impact; with assistance coefficients mostly significant two to three years post intervention. With conventional regressions techniques that is the point in time after which – here in this analysis – significance of impact largely fades. The role of support is underlined by the fact that there are few consistent predictors of growth across models, that is, firm age, multiple sites, size, and possibly non-executive directorships. Assistance joins that list as a further predictor of the few significant ones for the two to three

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[83] This is a somewhat theoretical contribution; in practice survival analysis would be unusual to be carried out for a one year period only. The limited existing evidence (Fuentes and Dresdner, 2013; Girma et al., 2007; Jarmin, 1999; Wren and Storey, 2002) certainly looked at longer time frames.

year periods highlighted. This holds true across multiple modelling approaches. The central problem with increasing lengths for the outcome periods is the attribution aspect: Firms, whether previously assisted or not, may benefit from further support through the same or other programmes. The regression results are in that sense not surprising, with the effect of the measured soft support intervention fading after three years.

What evidence does this provide then? The critique raised concerned current evaluation practice and the role of time in evaluation. It is clear that the timing of evaluation is absolute central to gaining a holistic understanding of support impact. A short evaluation period may miss effects becoming significant later. Evaluate "too" late, and previous significant effects may be missed. The research makes a case for the use of longitudinal data, undertaking evaluation at multiple points in time, and essentially creating time profiles of impact. It should be considered that a one-off evaluation based on two measurements will only be able to provide an understanding of average effects.

Based on the evidence herein, it is clear that the ideal time frame for business support policy evaluation would be four to five years, capturing the periods of significant assistance effects and their subsequent fading. It is unlikely that one could sensibly undertake evaluation for a period stretching beyond that period, without an understanding of potential other assistance received or changing firm characteristics.

6.3   Implications

6.3.1   What is the value of taking a longer term approach to impact evaluation?

Arguably, regardless of outcome, it will always be of value to allow for a taking into account a number of years of firm performance post intervention, ideally four to five years as found above. Even if no long-term effects are found, and a scheme appears only significant in the short-term, the clear policy implication is that the scheme in question may well have provided a short-

term boost to the support group of firms, but that the effect is fading in the mid- to long-term. The other way around, where long-term effects are shown by an evaluation, it is clear that a short-term evaluation could have underestimated the full economic impact of a scheme. Potentially, it would have estimated the impact as entirely insignificant, if the short-term evaluation's cut-off comes before a scheme's impact had sufficiently developed for a significant impact to develop. There is no doubt about the vital importance of timing in evaluation.

6.3.2   The implications for practice

The resulting challenges for business support evaluators are diverse:

- <u>Explain the choice of timing for evaluation</u>

  The evidence of this study suggests that significant assistance effects appear mainly for the two to three year period, using conventional methods, depending on the measure used, which in this thesis is employment versus turnover. A period of five years of post intervention data would have captured the main effects here. If a number of similar studies existed, authors may refer back to studies of comparable schemes for their assumptions around timing of their evaluation. However, given the variation of impact observed by length of time, for robust evaluation the answer can only be to evaluate outcomes for a number time periods, as done herein. Of course, the longer the time period assessed, the more likely it is that other effects may distort the findings – the attribution problem. It is not unlikely that firms assisted in one way may also benefit of other assistance in parallel. Changes to firm characteristics are increasingly likely to distort findings over time. This will always limit the maximum sensible time horizon for analysis but the question is where to apply the cut-off? The time period included in evaluation needs to reflect the magnitude of the scheme's impact – which of course can only be really known after evaluation.

- <u>Explain the required time needed to funders and those requesting fast understanding of the scheme</u>

Whilst the first point around timing is of rather theoretical nature, it is also arguably detached from the practical requirements of the 'real world'. The demand for support evaluations has a clear focus on rapid evidence; a five year evaluation would not fit within a single government term, including the time it takes to first design a support programme and to implement it. It would be naïve to ignore the push by policy-makers and funders for short-term analysis. However, as done with the BLO Survey data used for this thesis, such relatively short-term studies may be carried out initially to provide a first understanding of impact, and can then be subsequently extended longitudinally. That, of course, assumes that there would still be a market for findings on schemes being some five years old and possibly long abandoned. It also raises the question of the availability of funding for such evaluations with a potentially limited audience.

- <u>Highlight to the reader what the results actually tell</u>

Citations referring to "successful" schemes need to embed evidence into more context. Rather than suggesting, 'Scheme XY was successful', an addition that 'A one-year impact assessment suggests Scheme's XY effectiveness early on [and this evaluation is robust/not so robust given its methodological approach]' would highlight that the results are only true for when measurement was taken. Particularly the grey literature, produced for policy-making purposes, often provides little context on findings. The awareness must be raised that most existing evidence cannot universally confirm (or reject) a scheme's impact, it can only do so in the context of the timing of its applied measures. Of course, this also works in reverse, with users of evaluation results urged to be looking at the detailed context in which any particular scheme was deemed to be working or not.

- Device a strategy that provides the required, potentially longitudinal, data

This is mainly a question of resource and between the choice of primary and secondary methods for data acquisition. Rich longitudinal data on firms is hardly at all available through secondary sources, at least in the UK[84]. This thesis proposes one potential approach, where an extensive survey covering multiple firm characteristics gets linked to certain performance measures, reducing the need for resource-intensive primary data collection. Programme design could include automatic transmission of the inventory of assisted firms, allowing for that data to be stored and returned to later, even if the programme office has long been dissolved. However, comparable availability of official data as in this thesis may be limited by geography but also topic (see the linking of the BLO Survey to the UK Innovation Survey). Given data linking success rates (=attrition), the original sample needs to be of sufficient size.

6.4 Limitations and extensions

Are models ever true, in the sense that full reality is represented exactly by a model we can conceive and fit to the data[?], or are models merely approximations?"   Burnham and Anderson, 2004

A number of limitations were already explored as part of previous chapters.

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[84] Note that firm-level data is available in many nations, of varying depth. This availability of data allows the use of data–linking for business support evaluations in many countries other than the UK.

6.4.1 Attribution of impact

One of the most pressing issues with long-term analysis of a single intervention is the problem of attribution. There are numerous soft and hard business support programmes available. How much of a measureable difference and for how long can a single intervention make? Firms once assisted are more likely to seek advice in the future (BERR, 2007), this is one of the central ideas of providing public business support, addressing the market failure of firms unaware of the value of advice. The MED (2009) is the only evaluation to the author's knowledge using firm-level data with assistance data from various programmes. The inherent issues here are the many different bodies involved in support delivery. Few schemes are as big as Business Link in 2003, used for this thesis. Gathering data from hundreds if not thousands of support providers is not feasible, even when assuming there would be no data protection issues in doing so.

Without an understanding of what other support may be of relevance for a firm's performance, there is a natural limit to the length of what would constitute a sensible evaluation period.

6.4.2 Firm characteristics

Part of the purpose of this analysis was to demonstrate how a longitudinal study could be conducted with minimal resource implications by using officially captured micro data as available through the ONS' Secure Lab service in the case of the UK. As a result of this approach, firm and owner characteristics were only available for the reference year, 2003, the year of the BLO Survey. It is likely that characteristics such as firm strategy, exporting, appointment of non-executive directors, and multi-site status, are subject to change over an eight year period. To determine growth factors, inclusion of evolving firm characteristics may be desirable – as argued by Coad (2009, p. 144).

With reference to the attribution problem, it would have been interesting to understand whether firms had any further assistance (as discussed above). However, it is a question of striking a

balance. The big advantage of this study was no requirement for capturing any additional primary data, which will always require considerable resource. What may be worth investigating in this context is the use of other official datasets, which only have data for a sample of the firm population, unlike the BSD. For example, in the UK the Annual Business Survey (previously the Annual Respondents Database) allows insights into exporting status and tax paid (see Oulton, 1997, for more detail on the ARD). The UK Innovation Survey provides data on a firm's innovation activities, the Employer Skills Survey on the workforce. However, as the matching rates to the UK Innovation Survey in Appendix C3 suggest, the sample size for matching would need to be unusually large. The Business Link population the sample for the BLO Survey was drawn from was in excess of 160 thousand firms, likely to present a sufficiently sized sample for such activity.

6.4.3   Type of assistance

This thesis differentiated between intensive and other, non-intensive, assistance. In Chapter Five, given the lack of other assistance's impact, only intensive assistance was considered. The actual assistance as categorised as "intensive" in BERR (2007) was not homogenous, however. For example, if support resulted in getting access to new sources of finance, this would likely to have a more measureable impact on growth than advice on tax matters. Research by Mole et al. (2008) split the assistance into four types, depending on whether the Business Link provider chose a deeper or broader delivery approach. However, this could not be replicated in this thesis, given the post linking sample being too limited in size.

In a broader sense, type of assistance will also matter for what could be regarded as a sensible time frame for evaluation. Schemes providing a relatively small intervention will not have a measurable impact for extended periods of time, whilst more complex interventions may have longer lasting effects. As mentioned above, the appropriate period of time for evaluation will only be known once evaluation has been carried out.

6.4.4 Concluding remarks on limitations

There are other, wider limitations. The list of implications and suggestions provided as part of this Chapter is likely to be seen as rather theoretical in nature. Overcoming short-termism in politics is a far larger issue (see Stoker [2015] for a debate of this topic). Presenting results with a number of exclusions and limitations, such as saying that the "result is only true for the point of measurement" is unlikely when the policy-makers' question was to provide a "Yes" or "No" with regards to a programmes' positive impact.

The question of measurement arises. For this thesis, it was clear that performance had to be measured in employment and turnover, with the addition of survival. BERR (2007) defined them as their measures of interest, that is, their objectives they wanted to see impact against. Practically, not much other data of interest would have been available from the BSD for the purpose of evaluation. It is important to keep in mind that good performance is not necessarily reflected by growth (Davidsson, 2015) or survival. Improved survival rates due to support (which little evidence was found for in this thesis) could mean that an inefficient firm's life may have been artificially extended by support, potentially hindering new entrants with better prospects. In relation to growth, it is known that a large share of firms do not want to grow. They may perform well, nonetheless. Arguably, this concern is not one for evaluators, however. Policy objectives should be defined as part of the programme design (Storey, 1998; Spicker, 2006), with the evaluation's purpose to provide results against that defined purpose of a programme, also taking account of internal versus external growth if growth is of interest.

6.5   Thesis Conclusion

This thesis raised the question of the long-term impact of business support, and the role of evaluation timing using micro data. The literature, for reasons of political expediency and data availability, pays little attention to the impact of evaluation timing on results, despite numerous references made to the desirability of undertaking longitudinal analysis for that purpose. The evidence arising from this research shows how the choice of timing is central to evaluation. It is recommended for evaluators to make greater use of longitudinal data for impact evaluation. Focus on just one measurement period will always remain no more than a snapshot, obscuring the richness of the profile of impact, and leading to incomplete conclusions on a programme's impact. Based on this analysis, the recommendation would be to take into account four to five years of firm performance post intervention for soft business support evaluation.

References

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Appendix C – Chapter Three

Appendix C1 – BLO survey's sampling frame

During the 6 months from April through to September 2003 the Business Link delivery organisations (BLOs) recorded provision of assistance to 166,312 entities. The high count of interventions provides a good initial feel for the quality/intensity of the same.

As one would expect, given the high number of support provisions recorded, the bulk of interventions were light-touch, with 89 percent (147,650) of interactions recorded as Other Assistance (OA). Only around 11 percent (18,662) of interventions were classed as instances of Intensive Assistance (IA). Whilst the majority of the data is complete, there are no reported instances of OA in Norfolk, whilst the London IA data was unusable due to a lack of detail provided by the available data.

Among the remaining 37 BLOs the share of IA vs. OA differed considerably. Each BLO could decide on their own delivery strategy, where some BLOs chose a more intensive approach whilst others offered more light-touch but wider available support (Mole et al., 2008). Leicestershire with 2.6 percent of IAs is at the extreme end of those with a focus on broad non-intensive advice, Northamptonshire, Wessex and the West also had less than one IA for every 20 OAs recorded. On the other end of the scale, more than half of all support in Northumberland was IA, with that share being 40 percent of IAs for Cheshire & Warrington and Hereford & Worcestershire.

Table 18 provides an overview of the distribution of IAs and OAs across the 39 BLOs. Whilst the majority of the data is complete, there are no reported instances of OA in Norfolk, whilst the London IA data was unusable due to a lack of detail provided by the available data.

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Leicestershire with 2.6 percent of IAs is at the extreme end of those with a focus on broad non-intensive advice, Northamptonshire, Wessex and the West also had less than one IA for every 20 OAs recorded. On the other end of the scale, more than half of all support in Northumberland was IA, with that share being 40 percent of IAs for Cheshire & Warrington and Hereford & Worcestershire.

Table 18 – BLO sampling frame

BLO	Type > IA	OA	IA%	Total
B'ham & Solihull	1,063	8,706	10.9%	9,769
Beds & Luton	83	932	8.2%	1,015
Berkshire & Wiltshire	592	7,670	7.2%	8,262
Black Country	581	4,931	10.5%	5,512
Cambridge	161	2,893	5.3%	3,054
Cheshire & Warrington	299	446	40.1%	745
Coventry & Warwickshire	445	4,944	8.3%	5,389
Cumbria	801	1,932	29.3%	2,733
Derbyshire	754	3,248	18.8%	4,002
Devon & Cornwall	1,010	7,099	12.5%	8,109
Durham	279	1,160	19.4%	1,439
East Lancashire	227	2,439	8.5%	2,666
Gloucestershire	184	2,625	6.6%	2,809
Gr. Merseyside	229	640	26.4%	869
Hereford & Worcs	743	1,089	40.6%	1,832
Hertfordshire	220	1,158	16.0%	1,378
Kent	1,071	8,431	11.3%	9,502
Lancashire	603	5,880	9.3%	6,483
Leicestershire	79	2,608	2.9%	2,687
Lincolnshire	131	2,159	5.7%	2,290
London	NA	1,580	NA	1,580
MK Oxon Bucks	554	9,940	5.3%	10,494
Manchester & Northern Manchester	820	2,048	28.6%	2,868
Norfolk	770	NA	NA	770
Northamptonshire	85	2,289	3.6%	2,374
Northumberland	938	867	52.0%	1,805
Shropshire	601	1,589	27.4%	2,190
Somerset	274	4,240	6.1%	4,514
South Yorkshire	305	1,113	21.5%	1,418
Staffordshire	548	5,611	8.9%	6,159
Suffolk	1,134	2,226	33.8%	3,360
Surrey	324	4,072	7.4%	4,396
Sussex	388	5,212	6.9%	5,600
Teeside	121	1,093	10.0%	1,214
Tyne & Wear	180	2,879	5.9%	3,059
Wessex	567	11,884	4.6%	12,451
West	337	6,777	4.7%	7,114
West Yorkshire	825	7,047	10.5%	7,872
York & North Yorkshir	336	6,193	5.1%	6,529
Total	18,662	147,650	11.2%	166,312

Source: Business Link firm universe of assisted firms

The BLOs covered areas of different size and economic activity, but yet it is of note that some BLOs provided far greater numbers of interventions than others. The magnitude of that difference is unlikely to be proportional to economic activity (e.g. the number of firms by BLO)

for cases such as Wessex. It is a reasonable assumption to make that every IA will have required the resource for multiple OAs[85].

Overall, out of the 166,000 firms recorded around 148,000–150,000 had employment, sector and/or age information[86]. For the 148,049 firms for which employment figures were captured, the minimum employment was 0, the maximum 42,000; average size was considerable smaller, 33.4 employees (Table 19).

Table 19 – BLO sampling frame: Employment summary statistics

	Obs	Mean	Std. Dev.	Min	Max
Employment	148,049	33.4	343.9	0	42000

Source: Business Link firm universe of assisted firms

42,000 is an unusually high employment number for a firm in receipt of Business Link support – usually aimed at SMEs. Overall, some 2,600 firms exceeded the official SME definition's employment cut-off of 249 employees, some 540 had 1,000 staff or more (Table 20 [87]).

The highly skewed firm size distribution is reflected well in this population of assisted firms. Nearly a quarter of firms had no more than one employee, whilst nearly half of firms did not exceed four employees. Another 30 percent of firms had between 5 to 19 employees, and a total of 90 percent of firms employing fewer than 50 employees. As a result, removing the 1.8 percent of largest firms (>249 staff) reduces average firm size to around 16 employees, less than half the 33.4 employee average when accounting for all firm employment figures captured.

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[85] The split of resources between the 39 BLOs is not known, but is likely to explain some of the variance in total support offering seen across BLOs.

[86] The VAT reference and/or company house registration number were only recorded for 11,503 and 2,945 firms, respectively. Linking to other datasets based on these two identifiers would not be possible, but require the use of matching algorithms for name and address.

[87] Size band information was captured for around 2,500 more firms than exact employment count.

Table 20 – BLO sampling frame: Employment by size categories

Employment	Freq.	Percent	Cum.
No employees	13,487	9.0%	9.0%
1 employee	21,374	14.2%	23.2%
2-4 empl.	35,930	23.9%	47.0%
5-9 empl.	25,083	16.7%	63.7%
10-19 empl.	20,774	13.8%	77.5%
20-49 empl.	18,917	12.6%	90.0%
50-99 empl.	7,470	5.0%	95.0%
100-249 empl.	4,918	3.3%	98.3%
250-999 empl.	2,051	1.4%	99.6%
>1,000 empl.	544	0.4%	100.0%
Total	150,548	100.0%	

Source: Business Link firm universe of assisted firms

Table 21 provides a breakdown of firms by industry sector, for 148,154 firms from the total population assisted. Following by and large the total number of firms by sector, most interventions were recorded for SIC D (manufacturing), SIC G (wholesale) and SIC K (real estate), whilst SIC B (fishing), SIC C (mining) and SIC Q (extra-territorial organisation) had fewer than 60 interventions between them in total. The high number of firms supported in the real estate sector is an interesting side note, given the relative smallness of that sector of the economy (suggesting that some type of selection must have taken place for how the support was allocated: the sector split in the sampling frame of assisted firms does not mirror that of the actual economy).

Ignoring the extra-territorial sector due to the low number of firms, SIC A (agriculture) firms enjoyed the highest proportion of IA (18.2 percent), followed by SIC N (health and social) and SIC D (manufacturing) with 15.8 percent and 15.2 percent, respectively. The lowest proportion of IA was for firms in SIC J (finance) and SIC H (hospitality), where less than one in ten interventions were IA rather than OA at 8.3 percent and 9.7 percent, respectively.

Table 21 – BLO sampling frame: Industry sector (SIC) breakdown

SIC - Sector	IA	OA	IA%	Total	% of Total
A - Agriculture, Hunting	1,186	5,340	18.2%	6,526	4.4%
B - Fishing	3	16	15.8%	19	0.0%
C - Mining & Quarrying	3	27	10.0%	30	0.0%
D - Manufacturing	4,416	24,708	15.2%	29,124	19.7%
E - Electricity, Gas	29	213	12.0%	242	0.2%
F - Construction	977	7,659	11.3%	8,636	5.8%
G - Wholesale, Retail	2,214	19,897	10.0%	22,111	14.9%
H - Hotels and Restaurants	735	6,827	9.7%	7,562	5.1%
I - Transport, Storage	562	4,712	10.7%	5,274	3.6%
F - Financial Intermed.	254	2,806	8.3%	3,060	2.1%
K - Real Estate, Rent	4,032	35,166	10.3%	39,198	26.5%
L - Public Adminst.	136	1,153	10.6%	1,289	0.9%
M - Education	788	5,598	12.3%	6,386	4.3%
N - Health and Social	1,307	6,948	15.8%	8,255	5.6%
O - Other Social & P.	1,019	9,160	10.0%	10,179	6.9%
P - Private Household	28	225	11.1%	253	0.2%
Q - Extra-Territorial	2	8	20.0%	10	0.0%
Total	17,691	130,463	11.9%	148,154	100.0%

Source: Business Link firm universe of assisted firms

Firm foundation date is also included in the available data, however, it was not captured in a coherent manner. For example, all Birmingham & Solihull assisted firms are showing as 1900 or 1905 births, strongly suggesting that the data consistency has suffered over time (or, in fact, that the data was never recorded correctly). Similar issues were found for a number of other BLOs. For Table 22 all those instances where the firms' foundation date appeared uncertain were removed (i.e. among others all of Birmingham & Solihull's BLO assisted firms). 60 percent of the original firm population are included in the table, therefore still providing a good idea of the cohort's firm age distribution.

The distribution of total interventions is again influenced by the total number of firms, i.e. there are far more young firms than older ones. In this case this means that 12,699 firms were assisted when less than one year old, but only 4,783 four to five year old firms. Interestingly, the proportion of IA out of all interventions dropped with age, and whilst more than 13 percent of firms no older than two years enjoyed IA, less than 11 percent of firms 10 years and older

could do so[88]. For those firms in-between those age ranges, the share of IA was in the 11.1-12.1 percent range.

Table 22 – BLO sampling frame: Firm age categories

Firm Age	IA	OA	IA%	Total
Firm age: <1 year	1,663	11,036	13.1%	12,699
Firm age: 1<2	1,251	8,192	13.2%	9,443
Firm age: 2<3	836	6,323	11.7%	7,159
Firm age: 3<4	682	5,479	11.1%	6,161
Firm age: 4<5	531	4,252	11.1%	4,783
Firm age: 5<10	2,192	15,958	12.1%	18,150
Firm age: 10<20	2,300	19,728	10.4%	22,028
Firm age: >20	2,392	19,706	10.8%	22,098
Total	11,847	90,674		102,521

Source: Business Link firm universe of assisted firms

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[88] This reduction in the share of IA vs. OA could have taken place for various reasons, including a bias of advisors towards younger firms for IA (possibly in the light of more visible results being achievable when a firm is younger and potentially smaller), or a more proactive approach by firms to seek out IA.

Appendix C2 - Technical considerations, using the Secure Lab

Using the BSD and other datasets through the UK Data Service Secure Lab

The use of the UK Data Service Secure Lab (SL) comes with a number of limitations. Access to the BSD, ARD and UK Innovation Survey (CIS) (as explored later) is facilitated by UK Data Service through their SL. The data accessible through the SL (and also the VML, the Virtual Microdata Laboratory) is micro data on UK firms,

> *"[…] data that are too detailed, sensitive or confidential to be made available under a standard End User Licence of Special Licence. Our specialised staff apply statistical control techniques to ensure the delivery of safe statistical results.*
>
> *Data accessed in this way cannot be downloaded. Once researchers are specially trained, they analyse the data remotely from their institutional desktop or in our Safe Centre. We provide access to statistical and office software to make remote analysis and collaboration secure and convenient."*

(UKDS, 2015)

Just like the BSD, all these datasets are based on micro-data collected through surveys or compiled from administrative data. The data is available through a virtual computer environment to researchers at UK academic institutions or the Economics and Social Research Council (ESRC) funded research centres. Access is only possible through a registered and in my case university based IP address. Data cannot be downloaded onto an individual's computer but remains in the virtual environment where all analysis needs to be undertaken.

Researchers are subject to a number of rules when using the SL. These rules have been designed by a European group of bodies making detailed micro data available (referring to themselves as *National Statistical Institutes*), the *Network of Excellence in the European Statistical System in the field of Statistical Disclosure Control (ESSNet S D C)*. The ESSNet S D C have defined the following four central criteria as part of their "Overall rule of thumb" (ESSNet S D C, unknown date):

> *"1. **10 units:** all tabular and similar output should have at least 10 units (unweighted) underlying any cell or data point represented. […]*
>
> *2. **10 degrees of freedom:** all modelled output should have at least 10 degrees of freedom and at least 10 units have been used to produce the model. […]*
>
> *3. **Group Disclosure:** In all tabular and similar output no cell can contain more than 90% of the total number of units in its row or column to prevent group disclosure. […]*
>
> *4. **Dominance:** In all tabular and similar data the largest contributor of a cell can not [sic] exceed 50% of the cell total. […]"*

In essence, using data through the SL, no statistics for an individual firm or aggregate measures of less than 10 observations within can be disclosed. This is to avoid the possibility of an individual firm being identified from the statistics outside of the SL's virtual environment.

Naturally, this results in some limitations about what can be presented in this thesis. Scatter plots of various dimensions of the data were prepared at the outset of the analysis, useful to see the correlations but also to identify outliers. The scatter points represent individual firms, and these diagrams would allow recognising individual firms' characteristics and as such provide an example of which kind of outputs could not be cleared by the SL. Following data linking, a number of outliers were removed, and again to mention their size would have been problematic. Furthermore, minimum and maximum values can usually not be disclosed, unless it is known to be at least 10 observations that share the same minimum and maximum values (more of a challenge for continuous rather than categorical variables, of course. For clearance, it is also required to remove all constant terms from the output tables.

sk of unintentional disclosure.

Table **23** from ESSNet S D C (unknown date) summarises the safe and unsafe output classifications used by the UK Data Service. Unsafe output requires the researcher applying for output clearance to demonstrate that the output complies with above rules. For safe output, the onus would be on the UK Data Service to explain why they would want to withhold the output in question. Generally, descriptive outputs carry a far greater risk of unintentional disclosure.

Table 23 – Classification of output table by ESSNET S D C

Type of Statistics	Type of Output	Classification
Descriptive Statistics	Frequency tables	Unsafe
	Magnitude tables	Unsafe
	Maxima, minima and percentiles (incl. median)	Unsafe
	Mode	Safe
	Means, indices, ratios, indicators	Unsafe
	Concentration ratios	Safe
	Higher moments of distributions (incl. variance, covariance, kurtosis, skewness)	Safe
	Graphs: pictorial representations of actual data	Unsafe
Correlation and Regression Analysis	Linear regression coefficients	Safe
	Non-linear regression coefficients	Safe
	Estimation residuals	Unsafe
	Summary and test statistics from estimates	Safe
	Correlation coefficients	Safe

Source: ESSNET S D C (unknown date, p. 8)

Data linking: Data observations post linking

The use of the BSD is not straightforward. This section considers how the BSD records whether a firm has died or not, as one of the data's main peculiarities – especially when compiling multiple editions (years) of BSD data for the same firm.

Definitions of firm death vary, and depend to a large extent on the type of data available to the researcher. Storey and Wynarczyk (1996; in Wren and Storey, 2002) define firm death as "where a change occurs in at least three attributes as follows: name, location, ownership and sector".

In the BSD it is important to note that any changes to location, name and sector do not affect the firm's death date. Any acquisitions or break-ups also would not automatically result in the death of a firm, only if its unique reference number 'entref' ceases to be used (i.e. if becoming part of another entity, or more mundanely when ceasing trading due to bankruptcy or closure).

Generally, the firm's death date would be populated by the year of the death of a firm, if applicable, in the BSD following the year of its death (i.e. a 2005 death would first be recorded in the 2006 BSD). If this system was applied continuously, it would then be sufficient to take the year of death of the latest BSD data attached to one's longitudinal dataset, and have the

appropriate year of death for all firms included in the sample. As Table 24 demonstrates, that approach would fail (quite badly) to recognise a number of firms that appear to have previously been dead.

Table 24 – Extract of firm death dates as recorded by the BSD for 2004-2011 (enterprise level)

entref	2004 death	2005 death	2006 death	2007 death	2008 death	2009 death	2010 death	2011 death
Random+0						2008	2008	
Random+1								
Random+2								
Random+3			2005			2008	2008	2010
Random+4							2009	2009
Random+5								
Random+6								
Random+7								
Random+8						2007		
Random+9								
Random+10					2007	2007	2007	
Random+11								
Random+12								
Random+13				2006	2006			

Source: own work

Table 24 provides a sample of how, for the same firms (=*entref*), different dates of death may be recorded in different editions of the BSD. The oddities as depicted by the extract above include a number of firms that die but appear to come back to life, in the case of *Random+3* a 2005 death is recorded in BSD 2006, then no death date in subsequent years until BSD 2009, where the firm has a new death date of 2008. This remains unchanged for BSD 2010, before becoming a 2010 death date in BSD 2011.

There are some explanations offered by the UKDS provide some a number of explanations for the described phenomena. For example, small firms may drop below the minimum turnover level where they would need to be registered for VAT. Such firms may opt out from VAT, and if they are not on PAYE in parallel, would be recorded as a firm death. If a firm subsequently reaches a turnover size requiring it to re-register for VAT, its death date would be removed from the IDBR and the following annual BSD snapshot appears without a death date for the grown firm.

Throughout the sample there are a high number of firms with a death date recorded in BSD 2010, but not BSD 2011. Death dates are also removed after a period, causing the systematic inconsistency between BSD 2011 and previous versions. The BSD 2011 would only highlight firm 2009-2011 deaths. Any firm with an earlier death date in BSD 2010 would not have its death date listed in BSD 2011.

Random+8 died in 2007 according to BSD 2009 only, appearing without a recorded death date in BSD 2008 (and in BSD 2010 and BSD 2011)[89].

With the intention to establish a single reliable death date for each firm, other indicators in the data had to be used to determine it. The *Active* indicator (to provide an insight as to whether a firm is active or not) as part of each annual BSD is of no help as it behaves mostly identical to the death dates – it appears most likely that the death dates are a function of the *Active* indicator, or vice versa. In actual fact, instances exist where *Active* is recorded as missing across a number of BSD years, with an *Active* status recorded in BSD 2010 and BSD 2011. Throughout, no death date was recorded for any of the BSD years for the particular firm in question. *Active* could potentially be useful as it gets recorded as missing in BSD 2011 for those observations where a firm had a pre-2009 death date (which as a rule would disappear in BSD 2011). However, this does not hold valid for any of the early BSD years, where firms may "return to live" with *Active* switching from Inactive to Live accordingly.

Using a combination of employment and turnover records as well as the death dates as recorded, a single and definitive death date was determined for all firms. Turnover and employment records were reviewed, and where they remain unchanged for a number of years or were recorded as missing this was used as an indicator for firm inactivity – and as such death. This approach is similar to BIS (2011), where death was determined by a combination of using employee data and the active/inactive marker.

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[89] Example of a case where no sensible reason for the observed could be identified.

The underlying logic for using employment (and turnover) as the main indicators of whether a firm is alive or dead is that firms can remain in the IDBR with turnover and employment data depending on their type of death (merger vs. ceasing to trade) – firms will only be assigned a death date once the VAT and/or PAYE registrations are terminated. This "administrative death" can be some time following the actual death.

Overall, where firms had a death date recorded and omitted or replaced by different dates in subsequent BSD editions, that initial death date often provided a good indicator of the death date determined later: In most instances the approach outlined often resulted in the same (that earliest recorded) death date.

Turnover and employment values were then set as missing for the periods following the determined death date, to ensure they would not form part of the analysis.

From the inspection of the data it is apparent that the BSD was not designed for the research purpose it is used for herein. The IDBR's purpose is to provide a sampling frame for administrative purposes, and the BSD is merely the annual snapshot of that – and only reasonably recently made widely available for researchers.

The example of *death* shows that by no means the BSD constitutes a ready to go dataset for research. It requires considerable attention and understanding prior to analysis, and for informed assumptions to be made.

Appendix C3 – Exploring the use of the UK Innovation Survey

The relevance of small firms to the economy goes beyond the large number of jobs they provide. Economic progress, or growth, is linked to the innovative capabilities of an economy – innovation is a major driver of economic growth (Solow 1957; Romer 1987, 2000; in Antanssov, 2013).

The Austrian economist Schumpeter named innovation as the "critical dimension of change" (Schumpeter, 1934). Those economies and firms that make innovation a continuum will prosper and survive. They therefore develop new products and services and new ways to produce and run things, replacing the old.

A large body of literature underpins how innovation is at the core of economic growth. It often gets referred to in the context of the importance of small businesses. Chapter One of this study briefly refers to the link between small business and innovation. In that context, when undertaking long-term analysis, considering the effects of assistance on innovation provides an interesting and possible worthwhile angle to explore. Are assisted firms stronger innovators? Do they show different innovation behaviour, for example focus on process or product innovation to a different extent than their competitors?

Fostering innovation was not at the core of Business Link, and accordingly this study focusses on the impact of the support on firm growth. Certainly, analyses of innovation exist, but again, any long-term analyses of the impact of (soft) business support are rare as the long-term evaluation literature review found (by, in fact, failing to find studies). In the absence of data on firms that were part of an innovation assistance scheme, the BLO Survey data is used to demonstrate the potential of the use of datasets other than the BSD for performance data, and also the limitations of that wider use of firm-level datasets available.

"The UK Innovation Survey (UKIS) provides the main source of information on business innovation in the UK"[90]. As the main survey on innovation, it is intended to inform research and policy makers about the innovation activities and their nature taking place. Its data is used in the Community Innovation Survey on a European level.

Other than its purpose of measuring and understanding innovation, the UKIS is different to the BSD in that it does not capture all firms, as the BSD with the exception of the non-PAYE and non-VAT registered firms does. The UKIS' sampling frame is around 16,000 UK firms (as provided by the Interdepartmental Business Register [IDBR], of which the BSD provides the annual snapshots). That difference is easily explained by the UKIS' data collection being conducted through postal survey (whereas the IDBR simply draws on records provided for tax purposes by firms automatically, and by law). The UKIS also is not conducted annually, having moved from a four year to every two year survey in 2007. The data is captured at firm level but not across the same set of firms each year. It is therefore not possible to track individual firms' innovation behaviour across a number of years usually. The analysis is, therefore, limited to considering individual time periods, with trend analysis only possible by defining groups of similar firms. The firm identifier is the same as in the BSD, *entref*, enabling the linking of the BSD and UKIS in a relatively straightforward manner.

Table 25 shows the matching success across four waves of UKIS. UKIS 4 was conducted 2004, UKIS 5 2006, UKIS 6 2008 and UKIS 7 2010, therefore corresponding with the time period since the 2003 BLO intervention assessed in this study. The longitudinal dataset (as created in Chapter Three) contains 425 firms intensively assisted (IAs), 321 other assisted (OAs), and 298 firms non-assisted firms, 1044 firms in total. The achieved matching rate to the

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[90] As described by the UK Data Service on its website, "UK Innovation Survey, 1994-2010: Secure Access", http://discover.ukdataservice.ac.uk/catalogue?sn=6699 accessed 21/04/2014. The remainder of the paragraph also builds on information from their website on the UKIS.

UKIS was low, around 3.5 to 4.5 percent, roughly in proportion of the 16,000 firms sampling frame used for the UKIS and the total firm population of the BSD.

Table 25 – UKIS matching success across UKIS waves (longitudinal dataset)

	IA	OA	NA	Total
UKIS (CIS) 4	11	19	13	43
UKIS (CIS) 5	10	13	14	37
UKIS (CIS) 6	11	21	<10	32-41
UKIS (CIS) 7	16	14	16	46

Source: BLO Survey and UK Innovation Surveys 4-7

It is clear that too few firms are contained in the longitudinal dataset for data linking with the UKIS. Drawing robust conclusions about innovation behaviour of assisted firms and their control group is not possible. In fact, so little data was matched that when considering individual firms' innovation behaviours as measured in the UKIS, the cell count would be below 10 regularly, rendering the publication of such tables here impossible due to the disclosure protocol as highlighted in Chapter Three.

With the tables unpublishable, at a high-level the following was seen (keeping in mind the low number of observations underpinning this):

- In UKIS 4, both IAs and OAs were more than double as likely as NAs to be involved in innovation activities.

- In UKIS 5 that effects fades, IAs and OAs remain stronger product and process innovators by some margin though, compared to NAs.

- In UKIS 6, across the different innovation categories measures, IAs appear somewhat more likely to be innovating, but this effect is not marked. Less than a third of matched firms innovated at all.

- In UKIS 7 around half of the matched firms undertook some form of (captured) innovation, with that figure highest for OAs (by some margin), smallest for IAs.

What value is there to these small figures? At best, they indicate somewhat of a trend of assisted firms having been more innovative. That would be a welcome outcome for economic growth, and an effect not necessarily measureable by employment or turnover growth at the innovating firm itself – something that this study's main analysis has focussed on.

Given the lack of statistical robustness of the small figures involved, the value of this UKIS exploration is that innovation outcomes are a feasible further dimension of measurement for economic impact assessment of business support, provided that a large enough firm universe of assisted firms was available for linking into the UKIS. As such, this appended section on innovation provides a call for future research to consider the use the UKIS for this purpose[91].

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[91] In that context, a discussion of whether it is to be expected that assisted firms are more likely to have been innovators would be needed. It appears plausible that assisted firms are more likely to change, and more likely to be innovators? As such, the type of measured innovation becomes relevant. Rather than assisted firms innovating more than non-assisted one (confirming the expected), a surprising result might more likely to find no difference between those assisted and those that were not.

Appendix C4 – Summary table Longitudinal Data survivors only

Table 26 – Comparison of firm characteristics: long. dataset vs. L.D. survivors only (for IA)

IA	Post matching: ELD			Post matching: LD survivors			Test statistics	
Variable	**Obs**	**Mean**	**S.D.**	**Obs**	**Mean**	**S.D.**	LD<-LD (surv.) t-/z-value	sig.
Employment 2004 (BLO S)	416	25.844	36.840	319	28.774	39.581	t	1.619
Employment 2004 (BSD)	425	23.348	36.558	328	26.174	39.471	t	1.590
Employment 2005 (BLO S)	418	28.148	40.607	321	31.458	43.792	t	1.662
Employment 2005 (BSD)	425	23.955	36.157	328	26.838	38.662	t	1.640
Firm age: 2<3 years	423	0.097	0.296	326	0.067	0.251	z	1.439
Firm age: 3<4 years	423	0.071	0.257	326	0.064	0.246	z	0.350
Firm age: 4<5 years	423	0.095	0.293	326	0.095	0.294	z	-0.025
Firm age: 5<10 years	423	0.222	0.416	326	0.227	0.420	z	-0.155
Firm age: 10<20 years	423	0.243	0.430	326	0.236	0.425	z	0.232
Firm age: >20 years	423	0.272	0.445	326	0.310	0.463	z	-1.137
Formal business plan	418	0.706	0.456	321	0.710	0.454	z	-0.134
Multisite firm	425	0.193	0.395	328	0.201	0.402	z	-0.283
Esporting firm	424	0.377	0.485	327	0.404	0.491	z	-0.733
Legal form: Limited liability	425	0.904	0.296	328	0.902	0.297	z	0.050
Owner-Manager <25 years old	397	0.003	0.050	307	xxx	xxx	z	
Owner-Manager 25<35 years old	397	0.076	0.265	307	0.081	0.274	z	-0.288
Owner-Manager 35<45 years old	397	0.317	0.466	307	0.329	0.471	z	-0.327
Owner-Manager 45<55 years old	397	0.360	0.481	307	0.349	0.477	z	0.321
Owner-Manager >55 years old	397	0.244	0.430	307	0.241	0.428	z	0.101
OM is serial entrepreneur	395	0.400	0.491	302	0.377	0.486	z	0.604
% of female directors	414	24.406	30.588	319	23.807	30.769	t	0.397
% of ethnic minority directors	411	2.835	13.696	318	2.652	12.916	t	0.270
SIC1: Agriculture, Hunting & Fishing	425	0.033	0.179	328	0.037	0.188	z	-0.272
SIC4: Manufacturing	425	0.273	0.446	328	0.280	0.450	z	-0.230
SIC6: Construction	425	0.104	0.305	328	0.098	0.297	z	0.270
SIC7: Retail & Wholesale	425	0.132	0.339	328	0.152	0.360	z	-0.809
SIC9: Financial Services	425	0.031	0.172	328	0.034	0.180	z	-0.228
SIC11: Education	425	0.285	0.452	328	0.277	0.448	z	0.220
SIC13: Other Services	425	0.040	0.196	328	0.046	0.209	z	-0.387
SIC14: Hotels & Catering	425	0.042	0.202	328	xxx	xxx	z	

Source: BLO Survey and BSD

Table 27 – Comparison of firm characteristics: long. dataset vs. L.D. survivors only (for OA)

OA Variable	Post matching: ELD			Post matching: LD survivors				Test statistics	LD<-LD (surv.) t-/z-value	sig.
	Obs	Mean	S.D.	Obs	Mean	S.D.				
Employment 2004 (BLO S)	315	27.349	42.519	246	30.882	46.861		t	1.470	
Employment 2004 (BSD)	321	23.620	38.835	250	27.316	42.378		t	1.700	*
Employment 2005 (BLO S)	316	28.348	43.510	246	31.959	47.961		t	1.471	
Employment 2005 (BSD)	321	24.495	39.822	250	28.228	43.367		t	1.674	
Firm age: 2<3 years	321	0.084	0.278	250	0.072	0.259		z	0.533	
Firm age: 3<4 years	321	0.050	0.218	250	0.048	0.214		z	0.101	
Firm age: 4<5 years	321	0.065	0.248	250	0.052	0.222		z	0.672	
Firm age: 5<10 years	321	0.174	0.380	250	0.152	0.360		z	0.718	
Firm age: 10<20 years	321	0.287	0.453	250	0.304	0.461		z	-0.453	
Firm age: >20 years	321	0.340	0.474	250	0.372	0.484		z	-0.804	
Formal business plan	316	0.620	0.486	245	0.629	0.484		z	-0.202	
Multisite firm	321	0.190	0.393	250	0.200	0.401		z	-0.299	
Esporting firm	321	0.280	0.450	250	0.272	0.446		z	0.222	
Legal form: Limited liability	321	0.879	0.327	250	0.880	0.326		z	-0.054	
Owner-Manager <25 years old	283	0.007	0.084	220	xxx	xxx		z		
Owner-Manager 25<35 years old	283	0.106	0.308	220	0.100	0.301		z	0.220	
Owner-Manager 35<45 years old	283	0.300	0.459	220	0.318	0.467		z	-0.430	
Owner-Manager 45<55 years old	283	0.314	0.465	220	0.318	0.467		z	-0.088	
Owner-Manager >55 years old	283	0.272	0.446	220	0.264	0.442		z	0.212	
OM is serial entrepreneur	296	0.409	0.492	230	0.396	0.490		z	0.305	
% of female directors	310	22.690	28.428	239	22.403	28.040		t	0.177	
% of ethnic minority directors	310	8.210	86.638	239	8.279	97.650		t	-0.014	
SIC1: Agriculture, Hunting & Fishing	321	0.044	0.205	250	0.048	0.214		z	-0.249	
SIC4: Manufacturing	321	0.259	0.439	250	0.260	0.440		z	-0.039	
SIC6: Construction	321	0.109	0.312	250	0.108	0.311		z	0.039	
SIC7: Retail & Wholesale	321	0.178	0.383	250	0.172	0.378		z	0.174	
SIC9: Financial Services	321	0.016	0.124	250	xxx	xxx		z		
SIC11: Education	321	0.287	0.453	250	0.288	0.454		z	-0.037	
SIC13: Other Services	321	0.031	0.174	250	xxx	xxx		z		
SIC14: Hotels & Catering	321	0.047	0.211	250	0.056	0.230		z	-0.501	

Source: BLO Survey and BSD

Table 28 – Comparison of firm characteristics: long. dataset vs. L.D. survivors only (for NA)

NA	Post matching: ELD			Post matching: LD survivors				Test statistics	
	Obs	Mean	S.D.	Obs	Mean	S.D.		LD<-LD (surv.) t-/z-value	sig.
Variable									
Employment 2004 (BLO S)	291	28.186	37.765	225	31.631	42.808	t	1.551	
Employment 2004 (BSD)	298	27.560	40.759	232	31.659	45.080	t	1.730	*
Employment 2005 (BLO S)	291	28.893	38.991	225	32.351	43.970	t	1.507	
Employment 2005 (BSD)	298	29.117	45.114	232	34.052	51.064	t	1.881	*
Firm age: 2<3 years	297	0.037	0.189	231	xxx	xxx	z		
Firm age: 3<4 years	297	0.037	0.189	231	xxx	xxx	z		
Firm age: 4<5 years	297	0.040	0.197	231	xxx	xxx	z		
Firm age: 5<10 years	297	0.165	0.372	231	0.156	0.363	z	0.283	
Firm age: 10<20 years	297	0.242	0.429	231	0.238	0.427	z	0.115	
Firm age: >20 years	297	0.481	0.501	231	0.515	0.501	z	-0.768	
Formal business plan	285	0.400	0.491	219	0.416	0.494	z	-0.352	
Multisite firm	297	0.185	0.389	231	0.182	0.387	z	0.099	
Esporting firm	295	0.217	0.413	230	0.230	0.422	z	-0.368	
Legal form: Limited liability	298	0.862	0.345	232	0.888	0.316	z	-0.877	
Owner-Manager <25 years old	264	0.011	0.106	204	xxx	xxx	z		
Owner-Manager 25<35 years old	264	0.091	0.288	204	0.098	0.298	z	-0.262	
Owner-Manager 35<45 years old	264	0.299	0.459	204	0.324	0.469	z	-0.563	
Owner-Manager 45<55 years old	264	0.318	0.467	204	0.343	0.476	z	-0.570	
Owner-Manager >55 years old	264	0.280	0.450	204	0.225	0.419	z	1.347	
OM is serial entrepreneur	270	0.300	0.459	208	0.260	0.439	z	0.972	
% of female directors	288	22.922	29.662	223	22.503	29.036	t	0.239	
% of ethnic minority directors	287	2.933	15.963	222	2.890	15.558	t	0.045	
SIC1: Agriculture, Hunting & Fishing	298	0.040	0.197	232	0.047	0.213	z	-0.401	
SIC4: Manufacturing	298	0.252	0.435	232	0.254	0.436	z	-0.069	
SIC6: Construction	298	0.124	0.330	232	0.112	0.316	z	0.427	
SIC7: Retail & Wholesale	298	0.238	0.427	232	0.250	0.434	z	-0.313	
SIC9: Financial Services	298	0.027	0.162	232	xxx	xxx	z		
SIC11: Education	298	0.154	0.362	232	0.155	0.363	z	-0.026	
SIC13: Other Services	298	0.057	0.232	232	0.065	0.246	z	-0.365	
SIC14: Hotels & Catering	298	0.040	0.197	232	xxx	xxx	z		

Source: BLO Survey and BSD

Appendix D – Chapter Four

Appendix D1 – Log-rank and Wilcoxon tests

Log-rank and Wilcoxon tests can be used to confirm the insignificant differences between the assisted and non-assisted groups in survival terms (and ignoring size and age herein). The log-rank test provides a straightforward statistical comparison of group survival rates (both methodologically and in terms of interpretation). Non-parametrical in nature, it was first developed in the field of medical science by Mantel (1966; in Walker 2010). It takes the form of

$$X^2 \text{ (Log rank)} = \frac{(O_1 - E_1)^2}{E_1} + \frac{(O_2 - E_2)^2}{E_2} \qquad (2)$$

where O_1 and O_2 are the observed occurrence of the event (deaths), and E_1 and E_2 denote the expected number of events for the two groups. The null hypothesis H_o is that no difference exists between the survival rates of the compared two groups. The two groups initially compared were the IA and NA groups (Table 29). IAs appeared to be more distinctively different from the NAs than the OAs in the Kaplan-Meier graphs.

Interpretation of the results is straightforward. For the purpose of the log-rank test X^2 is assumed to have an approximate X^2 (chi[2]) distribution (Staub and Gekenidis, 2011). Table 29 provides the statistical results of the log-rank tests, with the p-values reported.

Three log-rank tests were undertaken. The first one tests for the equality of the survivor function across the entire 2004-2011 period. The p-values suggest anything but a significant difference between IAs' and NAs' survival chances seven years post intervention. A Kaplan-Meier graph would have suggested a superior survival of IAs over NAs in the early years post intervention. To test for the statistical significance of that observation, two further time periods were considered in separate tests, 2004-6 and 2004-7. Compared to the 2004-11 results the

p-values reduce considerably, serving as an indicator of a stronger impact of assistance soon after the assessed intervention.

Nonetheless, the group differences remain statistically insignificant, and the null hypothesis is accepted for all tests run. As no statistically significant differences were found between the IAs and NAs in the log-rank test, the OA versus NA test results are omitted here, given the visually even less distinct nature of OA performance compared to IA effects on survival in the hazard graphs.

Kaplan-Meier graphs showed non-proportionality of the three assistance groups across the years (graphs not reproduced here). In such circumstances it is not always advisable to rely on the log-rank test as applied above (Ziegler et al., 2007). The Wilcoxon test is regarded as an appropriate alternative for situations of non-proportionality (Ziegler et al, 2007) and was applied here to ensure the robustness of the log-rank test results. The generalised Wilcoxon test attaches more weight to the earlier stages of survival, and potentially a higher statistical power for non-proportionality situations.

Table 31 summarises the p-values for the Wilcoxon test for the same scenarios as tested in Table 30 by log-rank test (the results are shown again for easy comparison). The results differ only slightly between the two tests, confirming insignificance of assistance on survival suggested by the Kaplan-Meier survival estimates.

Table 29 – Log-rank test ["Event" = Death of firm]

2004-2011	Events observed	Events expected
Intensively assisted firms	97	95.94
Other assisted firms	71	71.52
Non-assisted firms	67	67.54
Total	235	235
chi2(2) =	0.02	
Pr>chi2 =	0.9897	

Check for 2004-7 ONLY	Events observed	Events expected
Intensively assisted firms	31	37.02
Other assisted firms	32	27.35
Non-assisted firms	27	25.63
Total	90	90
chi2(2) =	1.91	
Pr>chi2 =	0.3855	

Check for 2004-6 ONLY	Events observed	Events expected
Intensively assisted firms	18	25.04
Other assisted firms	24	18.6
Non-assisted firms	19	17.36
Total	61	61
chi2(2) =	3.83	
Pr>chi2 =	0.1472	

Table 30 – Log-rank test results compared to Wilcoxon test results (full results below)

		LD 04-11	LD 04-07	LD 04-06
Log-rank test	Chi2(2)	0.02	1.91	3.83
	Pr>chi2	0.9897	0.3855	0.1472
Wilcoxon	Chi2(2)	0.01	2.03	3.89
	Pr>chi2	0.9953	0.3622	0.143

As some of the graphs and the statistical tests suggest, the assisted groups appear to fare better in the immediate period after the intervention. However, no statistical significance is attached to those observations. In conclusion, there does not appear to be any evidence that would point towards any impact of assistance on firm survival. That result remains unchanged regardless of the evaluation timing chosen.

Table 31 – Log-rank test results compared to Wilcoxon test results (full results)

Wilcoxon (Breslow) test for equality of survivor functions

Events type	observed	Events expected	Sum of ranks
Intensively assisted firms (X1	97	95.94	507
Non-assisted firms (Y)	67	67.54	-598
Other assisted firms (X2)	71	71.52	91
Total	235	235	0
chi2(2) =		0.01	
Pr>chi2 =		0.9953	

Wilcoxon (Breslow) test for equality of survivor functions

Events type	observed	Events expected	Sum of ranks
Intensively assisted firms (X1	92	92.37	-634
Non-assisted firms (Y)	67	62.69	3860
Other assisted firms (X2)	66	69.95	-3226
Total	225	225	0
chi2(2) =		0.56	
Pr>chi2 =		0.7577	

Wilcoxon (Breslow) test for equality of survivor functions

Events type	observed	Events expected	Sum of ranks
Intensively assisted firms (X1	31	37.02	-6340
Non-assisted firms (Y)	27	25.63	1470
Other assisted firms (X2)	32	27.35	4870
Total	90	90	0
chi2(2) =		2.03	
Pr>chi2 =		0.3622	

Wilcoxon (Breslow) test for equality of survivor functions

Events type	observed	Events expected	Sum of ranks
Intensively assisted firms (X1	36	35.86	-140
Non-assisted firms (Y)	27	24.17	2791
Other assisted firms (X2)	24	26.97	-2651
Total	87	87	0
chi2(2) =		0.71	
Pr>chi2 =		0.7011	

Wilcoxon (Breslow) test for equality of survivor functions

Events type	observed	Events expected	Sum of ranks
Intensively assisted firms (X1	18	25.04	-7342
Non-assisted firms (Y)	19	17.36	1739
Other assisted firms (X2)	24	18.6	5603
Total	61	61	0
chi2(2) =		3.89	
Pr>chi2 =		0.143	

Wilcoxon (Breslow) test for equality of survivor functions

Events type	observed	Events expected	Sum of ranks
Intensively assisted firms (X1	22	25.94	-3760
Non-assisted firms (Y)	22	17.54	4241
Other assisted firms (X2)	19	19.52	-481
Total	63	63	0
chi2(2) =		1.88	
Pr>chi2 =		0.3911	

Appendix E – Chapter Five

Appendix E1 – Linear regression models, full outputs

1.1 – Impact of IA 2004-05 on employment (two part model, longitudinal dataset, only 2004-11 survivors)

VARIABLES	M S5.1 empl0405	M S5.2 empl0405	M S5.3 empl0405	M S5.4 empl0405
Employment 2004 (LD)	-0.00272*	-0.000977		
	(0.00151)	(0.00133)		
Employment 2004 squared	1.09e-05	4.66e-06		
	(7.61e-06)	(7.12e-06)		
Firm age: 3<5 years	0.00676	-0.0664		
	(0.105)	(0.0905)		
Firm age: 5<10 years	-0.0486	-0.0650		
	(0.100)	(0.0875)		
Firm age: 10<20 years	-0.0750	-0.136		
	(0.102)	(0.0887)		
Firm age: >20 years	-0.0895	-0.198**		-0.100***
	(0.101)	(0.0884)		(0.0349)
Legal form: Limited liability	0.0137	-0.0257		
	(0.0720)	(0.0637)		
Multi-site firm	0.159***	0.120**	0.0580	0.0690
	(0.0593)	(0.0522)	(0.0392)	(0.0422)
Exporting firm	-0.00554	0.00842		
	(0.0507)	(0.0439)		
Firm in competitive environ.	0.00442	-0.0152		
	(0.0482)	(0.0429)		
Firm faces price elastic demand	-0.0205	-0.0400		
	(0.0535)	(0.0469)		
Strategy: Maintain sales	0.0488	-0.00741		
	(0.109)	(0.0885)		
Strategy: Penetrate market	0.0365	-0.0206		
	(0.103)	(0.0844)		
Strategy: New markets	-0.0325	-0.0507		
	(0.121)	(0.103)		
Strategy: New products	-0.0224	-0.0355		
	(0.168)	(0.134)		
Firm has formal business plan	0.0497	0.00353		
	(0.0480)	(0.0422)		
Firm has non-executive directors	0.0481	-0.00162		
	(0.0559)	(0.0507)		
(Owner-)Manager: equity in firm	0.0117	-0.0247		
	(0.0583)	(0.0531)		
Owner-Manager 25<35 years old	-0.164			
	(0.395)			
Owner-Manager 35<45 years old	-0.116	0.0266		
	(0.391)	(0.0780)		
Owner-Manager 45<55 years old	-0.142	-0.0330		
	(0.390)	(0.0775)		
Owner-Manager >55 years old	-0.217	-0.0438		
	(0.391)	(0.0809)		
Owner-Manager had previous firm	-0.0138	0.0386		
	(0.0463)	(0.0393)		
SIC: Manufacturing	0.0562	0.0636		
	(0.0674)	(0.0620)		
SIC: Construction	0.170**	0.0895	0.130**	
	(0.0803)	(0.0694)	(0.0508)	
SICH: Retail & Wholesale	0.0427	0.0260		
	(0.0681)	(0.0617)		
SIC: Education	0.0500	0.00601		
	(0.0672)	(0.0584)		
Assistance Effect (IA)	0.00462	0.0262	0.0451	0.0503
	(0.0468)	(0.0533)	(0.0314)	(0.0457)
Selection Effect (inverse mills)		0.0349		0.0347
		(0.0503)		(0.0388)
Constant^	xx	xx	xx	xx
	xx	xx	xx	xx
Observations	342	272	559	406
R-squared	0.082	0.096	0.018	0.027

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

1.2 – Impact of IA 2004-6 on employment (two part model, L.D., survivors 2004-11 only)

VARIABLES	M S5.5 empl0406	M S5.6 empl0406	M S5.7 empl0406	M S5.8 empl0406
Employment 2004 (LD)	-0.00770***	-0.00578**	-0.00399**	-0.00212***
	(0.00257)	(0.00273)	(0.00171)	(0.000778)
Employment 2004 squared	3.13e-05**	2.54e-05*	1.14e-05	
	(1.30e-05)	(1.47e-05)	(9.20e-06)	
Firm age: 3<5 years	-0.0739	-0.145		
	(0.179)	(0.186)		
Firm age: 5<10 years	-0.258	-0.266		
	(0.171)	(0.180)		
Firm age: 10<20 years	-0.263	-0.327*		
	(0.173)	(0.183)		
Firm age: >20 years	-0.339**	-0.431**	-0.0882	-0.100
	(0.171)	(0.182)	(0.0560)	(0.0664)
Legal form: Limited liability	-0.0445	-0.00110		
	(0.122)	(0.131)		
Multi-site firm	0.272***	0.263**	0.169**	0.185**
	(0.101)	(0.108)	(0.0676)	(0.0795)
Exporting firm	-0.00980	0.00451		
	(0.0862)	(0.0905)		
Firm in competitive environ.	-0.0492	-0.0529		
	(0.0821)	(0.0884)		
Firm faces price elastic demand	-0.0172	-0.0580		
	(0.0911)	(0.0967)		
Strategy: Maintain sales	0.105	0.0930		
	(0.185)	(0.182)		
Strategy: Penetrate market	0.0194	0.00132		
	(0.176)	(0.174)		
Strategy: New markets	0.0382	0.0841		
	(0.205)	(0.213)		
Strategy: New products	-0.0449	0.0204		
	(0.286)	(0.275)		
Firm has formal business plan	0.0452	-0.0431		
	(0.0816)	(0.0869)		
Firm has non-executive directors	0.125	0.106		
	(0.0951)	(0.104)		
(Owner-)Manager: equity in firm	-0.0730	-0.116		
	(0.0992)	(0.109)		
Owner-Manager 25<35 years old	-0.251			
	(0.672)			
Owner-Manager 35<45 years old	-0.154	0.196		
	(0.666)	(0.161)		
Owner-Manager 45<55 years old	-0.291	0.00304		
	(0.664)	(0.160)		
Owner-Manager >55 years old	-0.198	0.178		
	(0.665)	(0.167)		
Owner-Manager had previous firm	0.0558	0.121		
	(0.0789)	(0.0810)		
SIC: Manufacturing	0.158	0.104		
	(0.115)	(0.128)		
SIC: Construction	0.198	0.155		
	(0.137)	(0.143)		
SICH: Retail & Wholesale	-0.0190	-0.0425		
	(0.116)	(0.127)		
SIC: Education	-0.0344	-0.125		
	(0.114)	(0.120)		
Assistance Effect (IA)	0.117	0.146	0.103*	0.130
	(0.0797)	(0.110)	(0.0530)	(0.0853)
Selection Effect (inverse mills)		0.00179		0.0251
		(0.104)		(0.0726)
Constant^	xx	xx	xx	xx
	xx	xx	xx	xx
Observations	342	272	556	556
R-squared	0.121	0.155	0.047	0.045

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

1.3 – Impact of IA 2004-7 on employment (two part model, L.D., survivors 2004-11 only)

VARIABLES	M S5.9 empl0407	M S5.10 empl0407	M S5.11 empl0407	M S5.12 empl0407
Employment 2004 (LD)	-0.00888***	-0.00826***	-0.00574***	-0.00385*
	(0.00275)	(0.00291)	(0.00181)	(0.00220)
Employment 2004 squared	4.07e-05***	4.19e-05***	2.25e-05**	1.29e-05
	(1.39e-05)	(1.56e-05)	(9.92e-06)	(1.24e-05)
Firm age: 3<5 years	0.00889	-0.0834		
	(0.192)	(0.198)		
Firm age: 5<10 years	-0.196	-0.205		
	(0.183)	(0.192)		
Firm age: 10<20 years	-0.244	-0.342*		
	(0.185)	(0.194)		
Firm age: >20 years	-0.309*	-0.407**		-0.0922
	(0.184)	(0.194)		(0.0743)
Legal form: Limited liability	-0.0815	-0.00491		
	(0.131)	(0.140)		
Multi-site firm	0.276**	0.316***	0.201***	0.261***
	(0.108)	(0.114)	(0.0733)	(0.0885)
Exporting firm	0.0256	0.0260		
	(0.0925)	(0.0963)		
Firm in competitive environ.	-0.0269	-0.0333		
	(0.0880)	(0.0941)		
Firm faces price elastic demand	-0.0729	-0.115		
	(0.0977)	(0.103)		
Strategy: Maintain sales	0.116	0.105		
	(0.198)	(0.194)		
Strategy: Penetrate market	0.0877	0.0951		
	(0.188)	(0.185)		
Strategy: New markets	0.0510	0.0585		
	(0.220)	(0.226)		
Strategy: New products	-0.103	-0.0250		
	(0.307)	(0.293)		
Firm has formal business plan	0.104	0.0199		
	(0.0876)	(0.0925)		
Firm has non-executive directors	0.170*	0.158		
	(0.102)	(0.111)		
(Owner-)Manager: equity in firm	-0.0521	-0.0966		
	(0.106)	(0.116)		
Owner-Manager 25<35 years old	-0.152			
	(0.720)			
Owner-Manager 35<45 years old	-0.160	-0.0293		
	(0.714)	(0.171)		
Owner-Manager 45<55 years old	-0.296	-0.190		
	(0.712)	(0.170)		
Owner-Manager >55 years old	-0.137	0.0468		
	(0.713)	(0.178)		
Owner-Manager had previous firm	0.0880	0.147*		
	(0.0846)	(0.0862)		
SIC: Manufacturing	0.146	0.151		
	(0.123)	(0.136)		
SIC: Construction	0.188	0.184		
	(0.146)	(0.152)		
SICH: Retail & Wholesale	-0.00855	-0.0314		
	(0.124)	(0.135)		
SIC: Education	-0.0630	-0.120		
	(0.123)	(0.128)		
Assistance Effect (IA)	0.142*	0.202*	0.147**	0.141
	(0.0855)	(0.117)	(0.0570)	(0.0940)
Selection Effect (inverse mills)		0.0800		0.0447
		(0.110)		(0.0800)
Constant^	xx	xx	xx	xx
	xx	xx	xx	xx
Observations	342	272	559	406
R-squared	0.133	0.170	0.043	0.042

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

1.4 – Impact of IA 2004-8 on employment (two part model, L.D., survivors 2004-11 only)

VARIABLES	M S5.13 empl0408	M S5.14 empl0408	M S5.15 empl0408	M S5.16 empl0408
Employment 2004 (LD)	-0.00918***	-0.00828**	-0.00763***	-0.00604**
	(0.00296)	(0.00325)	(0.00197)	(0.00234)
Employment 2004 squared	4.23e-05***	4.22e-05**	3.01e-05***	2.24e-05*
	(1.49e-05)	(1.74e-05)	(1.08e-05)	(1.33e-05)
Firm age: 3<5 years	0.129	0.0939		
	(0.206)	(0.222)		
Firm age: 5<10 years	-0.193	-0.145		
	(0.197)	(0.214)		
Firm age: 10<20 years	-0.221	-0.238		
	(0.199)	(0.217)		
Firm age: >20 years	-0.355*	-0.406*		
	(0.197)	(0.216)		
Legal form: Limited liability	-0.0856	-0.0194		
	(0.141)	(0.156)		
Multi-site firm	0.261**	0.308**	0.232***	0.303***
	(0.116)	(0.128)	(0.0800)	(0.0962)
Exporting firm	0.0251	0.0170		
	(0.0993)	(0.108)		
Firm in competitive environ.	0.00665	0.0178		
	(0.0945)	(0.105)		
Firm faces price elastic demand	-0.0568	-0.121		
	(0.105)	(0.115)		
Strategy: Maintain sales	0.0854	0.0730		
	(0.213)	(0.217)		
Strategy: Penetrate market	0.0950	0.0855		
	(0.202)	(0.207)		
Strategy: New markets	0.0758	0.0713		
	(0.237)	(0.253)		
Strategy: New products	-0.112	-0.0201		
	(0.329)	(0.327)		
Firm has formal business plan	0.0885	-0.0258		
	(0.0940)	(0.103)		
Firm has non-executive directors	0.222**	0.233*	0.195**	
	(0.109)	(0.124)	(0.0814)	
(Owner-)Manager: equity in firm	-0.0773	-0.157		
	(0.114)	(0.130)		
Owner-Manager 25<35 years old	-0.101			
	(0.773)			
Owner-Manager 35<45 years old	-0.216	-0.177		
	(0.766)	(0.191)		
Owner-Manager 45<55 years old	-0.334	-0.308		
	(0.764)	(0.190)		
Owner-Manager >55 years old	-0.136	-0.0323		
	(0.766)	(0.198)		
Owner-Manager had previous firm	0.0746	0.145		
	(0.0908)	(0.0962)		
SIC: Manufacturing	0.138	0.163		
	(0.132)	(0.152)		
SIC: Construction	0.184	0.213		
	(0.157)	(0.170)		
SICH: Retail & Wholesale	0.0402	0.0560		
	(0.133)	(0.151)		
SIC: Education	-0.0285	-0.0503		
	(0.132)	(0.143)		
Assistance Effect (IA)	0.104	0.156	0.119*	0.0568
	(0.0918)	(0.131)	(0.0616)	(0.103)
Selection Effect (inverse mills)		0.0547		-0.0239
		(0.123)		(0.0862)
Constant^	xx	xx	xx	xx
	xx	xx	xx	xx
Observations	342	272	550	406
R-squared	0.138	0.158	0.056	0.043

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

1.5 – Impact of IA 2004-9 on employment (two part model, L.D., survivors 2004-11 only)

VARIABLES	M S5.17 empl0409	M S5.18 empl0409	M S5.19 empl0409	M S5.20 empl0409
Employment 2004 (LD)	-0.0121***	-0.0116***	-0.00822***	-0.00624**
	(0.00310)	(0.00351)	(0.00206)	(0.00269)
Employment 2004 squared	5.42e-05***	5.56e-05***	3.21e-05***	1.96e-05
	(1.56e-05)	(1.89e-05)	(1.14e-05)	(1.56e-05)
Firm age: 3<5 years	0.310	0.372		
	(0.215)	(0.240)		
Firm age: 5<10 years	-0.129	-0.0205		
	(0.205)	(0.232)		
Firm age: 10<20 years	-0.135	-0.0616		
	(0.208)	(0.235)		
Firm age: >20 years	-0.263	-0.227		
	(0.206)	(0.234)		
Legal form: Limited liability	-0.0228	0.101		
	(0.147)	(0.169)		
Multi-site firm	0.215*	0.270*		
	(0.121)	(0.138)		
Exporting firm	-0.0226	-0.0749		
	(0.104)	(0.116)		
Firm in competitive environ.	-0.0188	-0.000422		
	(0.0989)	(0.114)		
Firm faces price elastic demand	-0.00465	-0.0829		
	(0.110)	(0.124)		
Strategy: Maintain sales	-0.0854	-0.141		
	(0.222)	(0.235)		
Strategy: Penetrate market	-0.0149	-0.0633		
	(0.211)	(0.224)		
Strategy: New markets	-0.0319	-0.0379		
	(0.247)	(0.273)		
Strategy: New products	-0.213	-0.161		
	(0.344)	(0.354)		
Firm has formal business plan	0.126	0.0113		
	(0.0987)	(0.112)		
Firm has non-executive directors	0.265**	0.288**	0.228***	0.261**
	(0.115)	(0.134)	(0.0873)	(0.117)
(Owner-)Manager: equity in firm	-0.0559	-0.138		
	(0.119)	(0.141)		
Owner-Manager 25<35 years old	-0.0993			
	(0.807)			
Owner-Manager 35<45 years old	-0.385	-0.293		
	(0.800)	(0.207)		
Owner-Manager 45<55 years old	-0.545	-0.495**		-0.0758
	(0.798)	(0.206)		(0.0880)
Owner-Manager >55 years old	-0.323	-0.198		
	(0.800)	(0.214)		
Owner-Manager had previous firm	0.129	0.165		
	(0.0949)	(0.104)		
SIC: Manufacturing	0.107	0.119		
	(0.138)	(0.164)		
SIC: Construction	0.124	0.134		
	(0.164)	(0.184)		
SICH: Retail & Wholesale	-0.0137	0.0414		
	(0.139)	(0.164)		
SIC: Education	-0.146	-0.147		
	(0.137)	(0.155)		
Assistance Effect (IA)	0.136	0.113	0.168**	0.000405
	(0.0962)	(0.141)	(0.0662)	(0.120)
Selection Effect (inverse mills)		-0.0497		-0.160
		(0.133)		(0.103)
Constant^	xx	xx	xx	xx
	xx	xx	xx	xx
Observations	341	272	550	374
R-squared	0.185	0.196	0.057	0.048

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

1.6 – Impact of IA 2004-10 on employment (two part model, L.D., survivors 2004-11 only)

VARIABLES	M S5.21 empl0410	M S5.22 empl0410	M S5.23 empl0410	M S5.24 empl0410
Employment 2004 (LD)	-0.0110***	-0.0105***	-0.00900***	-0.00785***
	(0.00321)	(0.00365)	(0.00216)	(0.00287)
Employment 2004 squared	4.90e-05***	4.93e-05**	3.50e-05***	2.52e-05
	(1.61e-05)	(1.96e-05)	(1.18e-05)	(1.65e-05)
Firm age: 3<5 years	0.417*	0.461*		
	(0.223)	(0.249)		
Firm age: 5<10 years	-0.0262	0.117		
	(0.213)	(0.241)		
Firm age: 10<20 years	-0.0733	0.0101		
	(0.215)	(0.244)		
Firm age: >20 years	-0.165	-0.137		
	(0.213)	(0.244)		
Legal form: Limited liability	-0.0546	0.0293		
	(0.152)	(0.176)		
Multi-site firm	0.288**	0.331**	0.286***	0.278**
	(0.126)	(0.144)	(0.0873)	(0.121)
Exporting firm	-0.0130	-0.0783		
	(0.108)	(0.121)		
Firm in competitive environ.	-0.0202	-0.0237		
	(0.102)	(0.118)		
Firm faces price elastic demand	-0.0808	-0.173		
	(0.114)	(0.129)		
Strategy: Maintain sales	-0.0717	-0.136		
	(0.230)	(0.244)		
Strategy: Penetrate market	-0.0499	-0.111		
	(0.219)	(0.233)		
Strategy: New markets	-0.0492	-0.0279		
	(0.256)	(0.284)		
Strategy: New products	-0.216	-0.151		
	(0.356)	(0.368)		
Firm has formal business plan	0.157	0.0384		
	(0.102)	(0.116)		
Firm has non-executive directors	0.232*	0.284**		0.216*
	(0.119)	(0.140)		(0.124)
(Owner-)Manager: equity in firm	0.112	0.0511		
	(0.123)	(0.146)		
Owner-Manager 25<35 years old	0.149			
	(0.836)			
Owner-Manager 35<45 years old	-0.156	-0.462**		-0.0362
	(0.829)	(0.215)		(0.112)
Owner-Manager 45<55 years old	-0.312	-0.674***		-0.0647
	(0.826)	(0.214)		(0.108)
Owner-Manager >55 years old	-0.135	-0.401*		
	(0.828)	(0.223)		
Owner-Manager had previous firm	0.127	0.169		
	(0.0982)	(0.108)		
SIC: Manufacturing	0.0793	0.106		
	(0.143)	(0.171)		
SIC: Construction	0.133	0.182		
	(0.170)	(0.191)		
SICH: Retail & Wholesale	-0.0191	0.0325		
	(0.144)	(0.170)		
SIC: Education	-0.167	-0.127		
	(0.142)	(0.161)		
Assistance Effect (IA)	0.0947	0.0746	0.167**	0.0126
	(0.0996)	(0.147)	(0.0679)	(0.126)
Selection Effect (inverse mills)		-0.0432		-0.127
		(0.139)		(0.108)
Constant^	xx	xx	xx	xx
	xx	xx	xx	xx
Observations	341	272	558	374
R-squared	0.174	0.200	0.061	0.059

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

1.7 – Impact of IA 2004-11 on employment (two part model, L.D., survivors 2004-11 only)

VARIABLES	M S5.25 empl0411	M S5.26 empl0411	M S5.27 empl0411	M S5.28 empl0411
Employment 2004 (LD)	-0.0123***	-0.0126***	-0.00989***	-0.00821***
	(0.00327)	(0.00370)	(0.00236)	(0.00299)
Employment 2004 squared	5.46e-05***	5.78e-05***	3.49e-05***	2.67e-05
	(1.65e-05)	(1.99e-05)	(1.28e-05)	(1.71e-05)
Firm age: 3<5 years	0.492**	0.555**	0.394***	0.347***
	(0.227)	(0.253)	(0.111)	(0.130)
Firm age: 5<10 years	0.0802	0.223		
	(0.217)	(0.244)		
Firm age: 10<20 years	-0.0474	0.0637		
	(0.220)	(0.248)		
Firm age: >20 years	-0.128	-0.0652		
	(0.218)	(0.247)		
Legal form: Limited liability	-0.113	0.0364		
	(0.156)	(0.178)		
Multi-site firm	0.308**	0.372**	0.296***	0.300**
	(0.128)	(0.146)	(0.0956)	(0.125)
Exporting firm	-0.0580	-0.136		
	(0.110)	(0.123)		
Firm in competitive environ.	-0.0297	-0.000572		
	(0.104)	(0.120)		
Firm faces price elastic demand	-0.0967	-0.201		
	(0.116)	(0.131)		
Strategy: Maintain sales	-0.0989	-0.147		
	(0.235)	(0.247)		
Strategy: Penetrate market	-0.0567	-0.135		
	(0.223)	(0.236)		
Strategy: New markets	-0.0691	-0.0482		
	(0.261)	(0.288)		
Strategy: New products	-0.222	-0.148		
	(0.363)	(0.373)		
Firm has formal business plan	0.158	0.0566		
	(0.104)	(0.118)		
Firm has non-executive directors	0.246**	0.294**	0.245**	0.241*
	(0.121)	(0.142)	(0.0960)	(0.128)
(Owner-)Manager: equity in firm	0.0353	-0.0664		
	(0.126)	(0.148)		
Owner-Manager 25<35 years old	-0.661			
	(0.853)			
Owner-Manager 35<45 years old	-0.945	-0.461**		-0.116
	(0.845)	(0.218)		(0.116)
Owner-Manager 45<55 years old	-1.096	-0.646***		-0.112
	(0.843)	(0.217)		(0.112)
Owner-Manager >55 years old	-0.921	-0.364		
	(0.845)	(0.226)		
Owner-Manager had previous firm	0.132	0.183*		
	(0.100)	(0.110)		
SIC: Manufacturing	0.144	0.145		
	(0.146)	(0.173)		
SIC: Construction	0.0733	0.113		
	(0.173)	(0.194)		
SICH: Retail & Wholesale	-0.0349	0.00712		
	(0.147)	(0.172)		
SIC: Education	-0.156	-0.120		
	(0.145)	(0.163)		
Assistance Effect (IA)	0.118	0.112	0.133*	0.0189
	(0.102)	(0.149)	(0.0735)	(0.130)
Selection Effect (inverse mills)		-0.0173		-0.0733
		(0.141)		(0.112)
Constant^	xx	xx	xx	xx
	xx	xx	xx	xx
Observations	341	272	546	374
R-squared	0.181	0.211	0.103	0.084

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

1.8 – Impact of IA 2004-5 on turnover (two-stage model, L.D., 2004-11 survivors only)

VARIABLES	M S5.29 turn0405	M S5.30 turn0405	M S5.31 turn0405	M S5.32 turn0405
Employment 2004 (LD)	-0.00224	-0.00247		
	(0.00199)	(0.00231)		
Employment 2004 squared	1.19e-05	1.35e-05		
	(1.01e-05)	(1.24e-05)		
Firm age: 3<5 years	0.338**	0.0154	0.176**	
	(0.139)	(0.158)	(0.0755)	
Firm age: 5<10 years	0.219*	-0.102		
	(0.133)	(0.152)		
Firm age: 10<20 years	0.0917	-0.210		
	(0.134)	(0.155)		
Firm age: >20 years	0.0858	-0.215		
	(0.133)	(0.154)		
Legal form: Limited liability	0.0910	0.0864		
	(0.0951)	(0.111)		
Multi-site firm	0.0736	0.0471		
	(0.0784)	(0.0909)		
Exporting firm	0.133**	0.132*	0.0175	
	(0.0670)	(0.0765)	(0.0547)	
Firm in competitive environ.	0.00807	0.0151		
	(0.0638)	(0.0748)		
Firm faces price elastic demand	-0.0445	-0.0664		
	(0.0707)	(0.0818)		
Strategy: Maintain sales	0.289**	0.282*	0.0902	
	(0.144)	(0.154)	(0.0583)	
Strategy: Penetrate market	0.202	0.198		
	(0.136)	(0.147)		
Strategy: New markets	0.445***	0.462**	0.280***	0.345***
	(0.160)	(0.180)	(0.0958)	(0.105)
Strategy: New products	0.168	0.127		
	(0.222)	(0.233)		
Firm has formal business plan	0.00298	0.0164		
	(0.0634)	(0.0735)		
Firm has non-executive directors	-0.0950	-0.0314		
	(0.0739)	(0.0883)		
(Owner-)Manager: equity in firm	-0.165**	-0.163*	-0.0514	
	(0.0770)	(0.0925)	(0.0667)	
Owner-Manager 25<35 years old	-0.0524			
	(0.522)			
Owner-Manager 35<45 years old	0.141	0.0424		
	(0.517)	(0.136)		
Owner-Manager 45<55 years old	0.0862	-0.0193		
	(0.515)	(0.135)		
Owner-Manager >55 years old	0.158	0.0703		
	(0.517)	(0.141)		
Owner-Manager had previous firm	0.0732	0.0412		
	(0.0612)	(0.0685)		
SIC: Manufacturing	-0.0937	-0.130		
	(0.0891)	(0.108)		
SIC: Construction	-0.0743	-0.107		
	(0.106)	(0.121)		
SICH: Retail & Wholesale	-0.00196	-0.111		
	(0.0900)	(0.108)		
SIC: Education	-0.0412	-0.0571		
	(0.0888)	(0.102)		
Assistance Effect (IA)	-0.0861	-0.0536	-0.0420	-0.0482
	(0.0619)	(0.0930)	(0.0522)	(0.0790)
Selection Effect (inverse mills)		0.0644		-0.0366
		(0.0877)		(0.0656)
Constant^	xx	xx	xx	xx
	xx	xx	xx	xx
Observations	342	272	500	394
R-squared	0.116	0.110	0.031	0.028

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

1.9 – Impact of IA 2004-6 on turnover (two-stage model, L.D., 2004-11 survivors only)

VARIABLES	M S5.33 turn0406	M S5.34 turn0406	M S5.35 turn0406	M S5.36 turn0406
Employment 2004 (LD)	0.000280	-0.000626		
	(0.00271)	(0.00306)		
Employment 2004 squared	1.65e-06	7.81e-06		
	(1.36e-05)	(1.64e-05)		
Firm age: 3<5 years	0.177	-0.185		
	(0.187)	(0.207)		
Firm age: 5<10 years	-0.147	-0.501**		
	(0.178)	(0.200)		
Firm age: 10<20 years	-0.155	-0.495**		
	(0.181)	(0.202)		
Firm age: >20 years	-0.244	-0.561***		-0.107
	(0.179)	(0.202)		(0.0714)
Legal form: Limited liability	0.0319	0.0524		
	(0.129)	(0.148)		
Multi-site firm	0.195*	0.155		
	(0.106)	(0.119)		
Exporting firm	0.0607	0.0208		
	(0.0903)	(0.100)		
Firm in competitive environ.	-0.0296	-0.0859		
	(0.0861)	(0.0983)		
Firm faces price elastic demand	-0.119	-0.132		
	(0.0953)	(0.107)		
Strategy: Maintain sales	0.0961	0.0489		
	(0.193)	(0.202)		
Strategy: Penetrate market	0.0637	0.0503		
	(0.184)	(0.193)		
Strategy: New markets	0.104	0.0164		
	(0.215)	(0.236)		
Strategy: New products	-0.0256	-0.102		
	(0.299)	(0.305)		
Firm has formal business plan	0.0656	0.0356		
	(0.0859)	(0.0964)		
Firm has non-executive directors	-0.0757	0.0461		
	(0.0995)	(0.116)		
(Owner-)Manager: equity in firm	-0.0382	-0.0938		
	(0.104)	(0.121)		
Owner-Manager 25<35 years old	0.193			
	(0.701)			
Owner-Manager 35<45 years old	0.317	-0.133		
	(0.695)	(0.178)		
Owner-Manager 45<55 years old	0.315	-0.151		
	(0.693)	(0.177)		
Owner-Manager >55 years old	0.323	-0.126		
	(0.695)	(0.185)		
Owner-Manager had previous firm	0.128	0.0791		
	(0.0824)	(0.0896)		
SIC: Manufacturing	-0.0348	-0.0625		
	(0.120)	(0.142)		
SIC: Construction	-0.0431	-0.0387		
	(0.143)	(0.158)		
SICH: Retail & Wholesale	0.0437	-0.0284		
	(0.121)	(0.142)		
SIC: Education	-0.128	-0.130		
	(0.120)	(0.133)		
Assistance Effect (IA)	-0.170**	-0.212*	0.0394	-0.106
	(0.0837)	(0.123)	(0.0605)	(0.0956)
Selection Effect (inverse mills)		-0.0576		-0.108
		(0.117)		(0.0810)
Constant^	xx	xx	xx	xx
	xx	xx	xx	xx
Observations	340	271	558	405
R-squared	0.079	0.108	0.001	0.012

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

1.10 – Impact of IA 2004-7 on turnover (two-stage model, L.D., 2004-11 survivors only)

VARIABLES	M S5.37 turn0407	M S5.38 turn0407	M S5.39 turn0407	M S5.40 turn0407
Employment 2004 (LD)	-0.000315	-0.00166		
	(0.00312)	(0.00324)		
Employment 2004 squared	5.06e-07	1.16e-05		
	(1.57e-05)	(1.74e-05)		
Firm age: 3<5 years	0.413*	0.0282		
	(0.215)	(0.219)		
Firm age: 5<10 years	0.0843	-0.328		
	(0.206)	(0.212)		
Firm age: 10<20 years	-0.0210	-0.400*		
	(0.208)	(0.214)		
Firm age: >20 years	-0.0884	-0.473**		-0.137*
	(0.206)	(0.214)		(0.0804)
Legal form: Limited liability	0.0916	0.106		
	(0.149)	(0.157)		
Multi-site firm	0.215*	0.241*		
	(0.122)	(0.126)		
Exporting firm	0.0417	-0.0396		
	(0.104)	(0.106)		
Firm in competitive environ.	-0.0335	-0.129		
	(0.0992)	(0.104)		
Firm faces price elastic demand	-0.135	-0.124		
	(0.110)	(0.113)		
Strategy: Maintain sales	-0.0602	-0.0967		
	(0.223)	(0.214)		
Strategy: Penetrate market	-0.0772	-0.108		
	(0.212)	(0.204)		
Strategy: New markets	-0.0864	-0.173		
	(0.247)	(0.250)		
Strategy: New products	-0.395	-0.531		
	(0.344)	(0.323)		
Firm has formal business plan	0.104	0.0280		
	(0.0990)	(0.102)		
Firm has non-executive directors	0.00514	0.0725		
	(0.115)	(0.123)		
(Owner-)Manager: equity in firm	-0.0440	-0.162		
	(0.120)	(0.129)		
Owner-Manager 25<35 years old	0.210			
	(0.808)			
Owner-Manager 35<45 years old	0.245	-0.0682		
	(0.801)	(0.189)		
Owner-Manager 45<55 years old	0.255	-0.148		
	(0.799)	(0.188)		
Owner-Manager >55 years old	0.273	-0.0959		
	(0.800)	(0.196)		
Owner-Manager had previous firm	0.166*	0.156		
	(0.0949)	(0.0950)		
SIC: Manufacturing	0.00578	0.0218		
	(0.139)	(0.150)		
SIC: Construction	-0.0344	-0.0400		
	(0.164)	(0.168)		
SICH: Retail & Wholesale	0.0855	-0.00601		
	(0.140)	(0.150)		
SIC: Education	-0.0870	-0.0806		
	(0.138)	(0.141)		
Assistance Effect (IA)	-0.0256	-0.176	0.159**	-0.0788
	(0.0965)	(0.131)	(0.0698)	(0.108)
Selection Effect (inverse mills)		-0.0711		-0.121
		(0.124)		(0.0912)
Constant^	xx	xx	xx	xx
	xx	xx	xx	xx
Observations	340	271	558	405
R-squared	0.081	0.134	0.009	0.014

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

1.11– Impact of IA 2004-8 on turnover (two-stage model, L.D., 2004-11 survivors only)

VARIABLES	M S5.41 turn0408	M S5.42 turn0408	M S5.43 turn0408	M S5.44 turn0408
Employment 2004 (LD)	-0.00355	-0.00472		
	(0.00345)	(0.00360)		
Employment 2004 squared	2.36e-05	3.47e-05*		
	(1.74e-05)	(1.93e-05)		
Firm age: 3<5 years	0.316	0.0886		
	(0.238)	(0.244)		
Firm age: 5<10 years	-0.215	-0.473**		-0.329**
	(0.227)	(0.236)		(0.144)
Firm age: 10<20 years	-0.321	-0.529**		-0.365**
	(0.230)	(0.238)		(0.143)
Firm age: >20 years	-0.321	-0.585**		-0.409***
	(0.228)	(0.238)		(0.134)
Legal form: Limited liability	0.0991	0.114		
	(0.165)	(0.175)		
Multi-site firm	0.0739	0.149		
	(0.134)	(0.140)		
Exporting firm	0.0516	-0.0719		
	(0.115)	(0.118)		
Firm in competitive environ.	-0.0450	-0.0873		
	(0.110)	(0.116)		
Firm faces price elastic demand	-0.100	-0.196		
	(0.121)	(0.126)		
Strategy: Maintain sales	0.00830	-0.0117		
	(0.246)	(0.238)		
Strategy: Penetrate market	0.0158	0.0168		
	(0.234)	(0.228)		
Strategy: New markets	0.101	0.0548		
	(0.273)	(0.278)		
Strategy: New products	-0.393	-0.410		
	(0.380)	(0.360)		
Firm has formal business plan	0.102	-0.0260		
	(0.109)	(0.114)		
Firm has non-executive directors	-0.0340	0.0544		
	(0.127)	(0.136)		
(Owner-)Manager: equity in firm	-0.234*	-0.316**		-0.152
	(0.132)	(0.143)		(0.130)
Owner-Manager 25<35 years old	0.424			
	(0.893)			
Owner-Manager 35<45 years old	0.306	-0.262		
	(0.885)	(0.210)		
Owner-Manager 45<55 years old	0.243	-0.415**		0.00958
	(0.882)	(0.209)		(0.0983)
Owner-Manager >55 years old	0.258	-0.335		
	(0.884)	(0.218)		
Owner-Manager had previous firm	0.116	0.124		
	(0.105)	(0.106)		
SIC: Manufacturing	-0.0547	0.0820		
	(0.153)	(0.167)		
SIC: Construction	-0.00586	0.147		
	(0.182)	(0.187)		
SICH: Retail & Wholesale	-0.0135	-0.0343		
	(0.154)	(0.167)		
SIC: Education	-0.0859	0.0152		
	(0.152)	(0.157)		
Assistance Effect (IA)	0.0288	-0.0605	0.228***	-0.0365
	(0.107)	(0.146)	(0.0783)	(0.134)
Selection Effect (inverse mills)		-0.0212		-0.147
		(0.138)		(0.118)
Constant^	xx	xx	xx	xx
	xx	xx	xx	xx
Observations	340	271	558	361
R-squared	0.111	0.186	0.015	0.043

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

1.12 – Impact of IA 2004-9 on turnover (two-stage model, L.D., 2004-11 survivors only)

VARIABLES	M S5.45 turn0409	M S5.46 turn0409	M S5.47 turn0409	M S5.48 turn0409
Employment 2004 (LD)	-0.00276	-0.00413		
	(0.00360)	(0.00380)		
Employment 2004 squared	1.81e-05	3.27e-05		
	(1.81e-05)	(2.04e-05)		
Firm age: 3<5 years	0.445*	0.361		
	(0.252)	(0.262)		
Firm age: 5<10 years	-0.0138	-0.165		
	(0.241)	(0.254)		
Firm age: 10<20 years	-0.160	-0.285		
	(0.244)	(0.256)		
Firm age: >20 years	-0.191	-0.431*		
	(0.242)	(0.256)		
Legal form: Limited liability	0.0397	0.0343		
	(0.172)	(0.184)		
Multi-site firm	0.0197	0.152		
	(0.140)	(0.148)		
Exporting firm	0.0377	-0.0673		
	(0.120)	(0.124)		
Firm in competitive environ.	0.00768	-0.0554		
	(0.115)	(0.122)		
Firm faces price elastic demand	-0.0829	-0.163		
	(0.127)	(0.133)		
Strategy: Maintain sales	-0.0189	-0.128		
	(0.257)	(0.251)		
Strategy: Penetrate market	0.0388	-0.0261		
	(0.244)	(0.239)		
Strategy: New markets	0.238	0.111		
	(0.285)	(0.292)		
Strategy: New products	-0.292	-0.347		
	(0.397)	(0.379)		
Firm has formal business plan	0.116	-0.0217		
	(0.114)	(0.120)		
Firm has non-executive directors	-0.0161	-0.00390		
	(0.132)	(0.144)		
(Owner-)Manager: equity in firm	-0.142	-0.284*		
	(0.139)	(0.153)		
Owner-Manager 25<35 years old	0.476			
	(0.932)			
Owner-Manager 35<45 years old	0.202	-0.383*		
	(0.924)	(0.221)		
Owner-Manager 45<55 years old	0.0904	-0.571***		-0.0420
	(0.921)	(0.220)		(0.0999)
Owner-Manager >55 years old	0.223	-0.356		
	(0.923)	(0.229)		
Owner-Manager had previous firm	0.154	0.194*		
	(0.110)	(0.112)		
SIC: Manufacturing	-0.0811	0.0879		
	(0.160)	(0.176)		
SIC: Construction	0.0504	0.210		
	(0.190)	(0.197)		
SICH: Retail & Wholesale	0.0156	0.0177		
	(0.161)	(0.176)		
SIC: Education	-0.231	-0.115		
	(0.159)	(0.166)		
Assistance Effect (IA)	0.129	0.0508	0.295***	-0.0145
	(0.112)	(0.154)	(0.0840)	(0.137)
Selection Effect (inverse mills)		0.0455		-0.191
		(0.146)		(0.118)
Constant^	xx	xx	xx	xx
	xx	xx	xx	xx
Observations	339	270	557	374
R-squared	0.117	0.183	0.022	0.012

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

1.13 – Impact of IA 2004-10 on turnover (two-stage model, L.D., 2004-11 survivors only)

VARIABLES	M S5.49 turn0410	M S5.50 turn0410	M S5.51 turn0410	M S5.52 turn0410
Employment 2004 (LD)	-0.00197	-0.00447		
	(0.00375)	(0.00391)		
Employment 2004 squared	1.27e-05	3.27e-05		
	(1.89e-05)	(2.09e-05)		
Firm age: 3<5 years	0.199	0.117		
	(0.259)	(0.264)		
Firm age: 5<10 years	-0.320	-0.473*		
	(0.247)	(0.255)		
Firm age: 10<20 years	-0.435*	-0.548**		-0.223
	(0.250)	(0.259)		(0.136)
Firm age: >20 years	-0.437*	-0.611**		-0.260**
	(0.248)	(0.258)		(0.122)
Legal form: Limited liability	0.0627	-0.00305		
	(0.179)	(0.190)		
Multi-site firm	-0.0150	0.0887		
	(0.146)	(0.152)		
Exporting firm	0.0989	0.0194		
	(0.125)	(0.128)		
Firm in competitive environ.	-0.0675	-0.158		
	(0.119)	(0.126)		
Firm faces price elastic demand	-0.164	-0.248*		
	(0.132)	(0.137)		
Strategy: Maintain sales	-0.132	-0.130		
	(0.267)	(0.258)		
Strategy: Penetrate market	-0.0490	-0.119		
	(0.254)	(0.247)		
Strategy: New markets	0.0766	-0.00757		
	(0.297)	(0.301)		
Strategy: New products	-0.690*	-0.689*		
	(0.413)	(0.390)		
Firm has formal business plan	0.210*	0.0830		
	(0.119)	(0.123)		
Firm has non-executive directors	-0.0331	0.00687		
	(0.138)	(0.148)		
(Owner-)Manager: equity in firm	-0.150	-0.301*		
	(0.144)	(0.155)		
Owner-Manager 25<35 years old	0.734			
	(0.971)			
Owner-Manager 35<45 years old	0.595	-0.293		
	(0.962)	(0.228)		
Owner-Manager 45<55 years old	0.463	-0.496**		0.0207
	(0.959)	(0.226)		(0.109)
Owner-Manager >55 years old	0.463	-0.388		
	(0.961)	(0.236)		
Owner-Manager had previous firm	0.226**	0.245**	0.111	0.0127
	(0.114)	(0.115)	(0.0973)	(0.109)
SIC: Manufacturing	-0.189	-0.124		
	(0.167)	(0.181)		
SIC: Construction	-0.146	0.0413		
	(0.198)	(0.203)		
SICH: Retail & Wholesale	-0.283*	-0.265		
	(0.168)	(0.181)		
SIC: Education	-0.271	-0.142		
	(0.166)	(0.171)		
Assistance Effect (IA)	-0.0449	-0.174	0.188**	-0.122
	(0.116)	(0.158)	(0.0932)	(0.148)
Selection Effect (inverse mills)		0.0676		-0.0957
		(0.150)		(0.130)
Constant^	xx	xx	xx	xx
	xx	xx	xx	xx
Observations	340	271	508	362
R-squared	0.135	0.209	0.012	0.019

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

1.14 – Impact of IA 2004-11 on turnover (two-stage model, L.D., 2004-11 survivors only)

VARIABLES	M S5.53 turn0411	M S5.54 turn0411	M S5.55 turn0411	M S5.56 turn0411
Employment 2004 (LD)	-0.00233	-0.00507		
	(0.00429)	(0.00475)		
Employment 2004 squared	1.71e-05	3.75e-05		
	(2.16e-05)	(2.55e-05)		
Firm age: 3<5 years	0.128	0.152		
	(0.296)	(0.321)		
Firm age: 5<10 years	-0.423	-0.521*		
	(0.283)	(0.311)		
Firm age: 10<20 years	-0.508*	-0.553*		
	(0.287)	(0.315)		
Firm age: >20 years	-0.519*	-0.654**		-0.202*
	(0.284)	(0.314)		(0.123)
Legal form: Limited liability	-0.0311	-0.0757		
	(0.205)	(0.231)		
Multi-site firm	0.0183	0.159		
	(0.167)	(0.185)		
Exporting firm	0.0131	-0.111		
	(0.143)	(0.156)		
Firm in competitive environ.	-0.0199	-0.148		
	(0.137)	(0.154)		
Firm faces price elastic demand	-0.154	-0.197		
	(0.152)	(0.168)		
Strategy: Maintain sales	-0.0737	-0.0868		
	(0.306)	(0.314)		
Strategy: Penetrate market	-0.121	-0.167		
	(0.291)	(0.300)		
Strategy: New markets	0.132	0.0142		
	(0.342)	(0.369)		
Strategy: New products	-0.656	-0.655		
	(0.473)	(0.474)		
Firm has formal business plan	0.185	0.0654		
	(0.137)	(0.151)		
Firm has non-executive directors	0.103	0.170		
	(0.158)	(0.180)		
(Owner-)Manager: equity in firm	-0.177	-0.357*		
	(0.164)	(0.189)		
Owner-Manager 25<35 years old	0.888			
	(1.111)			
Owner-Manager 35<45 years old	0.619	-0.440		
	(1.101)	(0.277)		
Owner-Manager 45<55 years old	0.436	-0.687**		-0.0385
	(1.098)	(0.275)		(0.120)
Owner-Manager >55 years old	0.424	-0.544*		
	(1.100)	(0.287)		
Owner-Manager had previous firm	0.175	0.196		
	(0.131)	(0.140)		
SIC: Manufacturing	-0.120	0.0168		
	(0.191)	(0.221)		
SIC: Construction	-0.221	0.0306		
	(0.226)	(0.246)		
SICH: Retail & Wholesale	-0.121	-0.0763		
	(0.193)	(0.221)		
SIC: Education	-0.154	0.00488		
	(0.189)	(0.207)		
Assistance Effect (IA)	-0.0334	-0.194	0.276***	-0.145
	(0.133)	(0.192)	(0.0984)	(0.164)
Selection Effect (inverse mills)		0.0777		-0.126
		(0.183)		(0.142)
Constant^	xx	xx	xx	xx
	xx	xx	xx	xx
Observations	339	270	557	374
R-squared	0.105	0.164	0.014	0.011

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

1.15 – Impact of IA 2004-5 on productivity (two part model, L.D., 2004-11 survivors only)

VARIABLES	M S5.57 prod0405	M S5.58 prod0405	M S5.59 prod0405	M S5.60 prod0405
Employment 2004 (LD)	0.000473	-0.00150		
	(0.00237)	(0.00252)		
Employment 2004 squared	1.05e-06	8.88e-06		
	(1.19e-05)	(1.36e-05)		
Firm age: 3<5 years	0.331**	0.0818	0.0441	
	(0.165)	(0.172)	(0.0810)	
Firm age: 5<10 years	0.268*	-0.0372		
	(0.157)	(0.166)		
Firm age: 10<20 years	0.167	-0.0738		
	(0.159)	(0.169)		
Firm age: >20 years	0.175	-0.0165		
	(0.158)	(0.168)		
Legal form: Limited liability	0.0773	0.112		
	(0.113)	(0.121)		
Multi-site firm	-0.0853	-0.0728		
	(0.0930)	(0.0993)		
Exporting firm	0.138*	0.124		
	(0.0795)	(0.0836)		
Firm in competitive environ.	0.00365	0.0303		
	(0.0757)	(0.0817)		
Firm faces price elastic demand	-0.0241	-0.0264		
	(0.0839)	(0.0893)		
Strategy: Maintain sales	0.240	0.290*		
	(0.170)	(0.169)		
Strategy: Penetrate market	0.165	0.218		
	(0.162)	(0.161)		
Strategy: New markets	0.477**	0.513***	0.388***	0.384***
	(0.189)	(0.196)	(0.102)	(0.108)
Strategy: New products	0.191	0.163		
	(0.263)	(0.254)		
Firm has formal business plan	-0.0468	0.0129		
	(0.0752)	(0.0802)		
Firm has non-executive directors	-0.143	-0.0297		
	(0.0877)	(0.0965)		
(Owner-)Manager: equity in firm	-0.177*	-0.138		
	(0.0914)	(0.101)		
Owner-Manager 25<35 years old	0.112			
	(0.619)			
Owner-Manager 35<45 years old	0.257	0.0157		
	(0.613)	(0.148)		
Owner-Manager 45<55 years old	0.228	0.0137		
	(0.612)	(0.148)		
Owner-Manager >55 years old	0.375	0.114		
	(0.613)	(0.154)		
Owner-Manager had previous firm	0.0870	0.00252		
	(0.0727)	(0.0748)		
SIC: Manufacturing	-0.150	-0.194		
	(0.106)	(0.118)		
SIC: Construction	-0.244*	-0.197		
	(0.126)	(0.132)		
SICH: Retail & Wholesale	-0.0447	-0.137		
	(0.107)	(0.117)		
SIC: Education	-0.0911	-0.0631		
	(0.105)	(0.111)		
Assistance Effect (IA)	-0.0907	-0.0799	-0.0733	-0.0950
	(0.0735)	(0.102)	(0.0545)	(0.0815)
Selection Effect (inverse mills)		0.0294		-0.0468
		(0.0958)		(0.0676)
Constant^	xx	xx	xx	xx
	xx	xx	xx	xx
Observations	342	272	536	394
R-squared	0.105	0.083	0.029	0.034

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

1.16 – Impact of IA 2004-6 on productivity (two part model, L.D., 2004-11 survivors only)

VARIABLES	M S5.61 prod0406	M S5.62 prod0406	M S5.63 prod0406	M S5.64 prod0406
Employment 2004 (LD)	0.00800**	0.00516	0.000795	
	(0.00333)	(0.00348)	(0.000824)	
Employment 2004 squared	-2.97e-05*	-1.76e-05		
	(1.67e-05)	(1.87e-05)		
Firm age: 3<5 years	0.251	-0.0401		
	(0.229)	(0.236)		
Firm age: 5<10 years	0.111	-0.235		
	(0.219)	(0.228)		
Firm age: 10<20 years	0.108	-0.168		
	(0.222)	(0.231)		
Firm age: >20 years	0.0954	-0.130		
	(0.220)	(0.230)		
Legal form: Limited liability	0.0748	0.0530		
	(0.159)	(0.169)		
Multi-site firm	-0.0773	-0.108		
	(0.130)	(0.136)		
Exporting firm	0.0707	0.0164		
	(0.111)	(0.114)		
Firm in competitive environ.	0.0192	-0.0332		
	(0.106)	(0.112)		
Firm faces price elastic demand	-0.102	-0.0743		
	(0.117)	(0.122)		
Strategy: Maintain sales	-0.00931	-0.0440		
	(0.237)	(0.230)		
Strategy: Penetrate market	0.0450	0.0492		
	(0.225)	(0.220)		
Strategy: New markets	0.0661	-0.0676		
	(0.263)	(0.269)		
Strategy: New products	0.0197	-0.122		
	(0.366)	(0.348)		
Firm has formal business plan	0.0203	0.0786		
	(0.105)	(0.110)		
Firm has non-executive directors	-0.201	-0.0601		
	(0.122)	(0.132)		
(Owner-)Manager: equity in firm	0.0354	0.0218		
	(0.127)	(0.138)		
Owner-Manager 25<35 years old	0.445			
	(0.861)			
Owner-Manager 35<45 years old	0.472	-0.329		
	(0.853)	(0.203)		
Owner-Manager 45<55 years old	0.607	-0.154		
	(0.851)	(0.202)		
Owner-Manager >55 years old	0.521	-0.305		
	(0.853)	(0.211)		
Owner-Manager had previous firm	0.0715	-0.0422		
	(0.101)	(0.102)		
SIC: Manufacturing	-0.193	-0.167		
	(0.148)	(0.162)		
SIC: Construction	-0.242	-0.194		
	(0.175)	(0.181)		
SICH: Retail & Wholesale	0.0620	0.0139		
	(0.149)	(0.161)		
SIC: Education	-0.0948	-0.00591		
	(0.147)	(0.152)		
Assistance Effect (IA)	-0.287***	-0.358**	-0.0926	-0.226**
	(0.103)	(0.141)	(0.0702)	(0.107)
Selection Effect (inverse mills)		-0.0590		-0.107
		(0.134)		(0.0896)
Constant^	xx	xx	xx	xx
	xx	xx	xx	xx
Observations	340	271	558	405
R-squared	0.087	0.098	0.005	0.011

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

1.17 – Impact of IA 2004-7 on productivity (two part model, L.D., 2004-11 survivors only)

VARIABLES	M S5.65 prod0407	M S5.66 prod0407	M S5.67 prod0407	M S5.68 prod0407
Employment 2004 (LD)	0.00867**	0.00643*	0.00257	
	(0.00364)	(0.00366)	(0.00232)	
Employment 2004 squared	-4.04e-05**	-2.95e-05	-1.31e-05	
	(1.83e-05)	(1.96e-05)	(1.29e-05)	
Firm age: 3<5 years	0.407	0.115		
	(0.251)	(0.247)		
Firm age: 5<10 years	0.285	-0.118		
	(0.239)	(0.239)		
Firm age: 10<20 years	0.223	-0.0587		
	(0.242)	(0.242)		
Firm age: >20 years	0.214	-0.0598		
	(0.240)	(0.242)		
Legal form: Limited liability	0.180	0.123		
	(0.173)	(0.178)		
Multi-site firm	-0.0578	-0.0732		
	(0.142)	(0.143)		
Exporting firm	0.00845	-0.0671		
	(0.121)	(0.120)		
Firm in competitive environ.	-0.0104	-0.0916		
	(0.115)	(0.118)		
Firm faces price elastic demand	-0.0562	-0.0109		
	(0.128)	(0.128)		
Strategy: Maintain sales	-0.181	-0.203		
	(0.259)	(0.242)		
Strategy: Penetrate market	-0.175	-0.208		
	(0.246)	(0.231)		
Strategy: New markets	-0.141	-0.236		
	(0.288)	(0.282)		
Strategy: New products	-0.292	-0.513		
	(0.400)	(0.365)		
Firm has formal business plan	-0.00823	0.0111		
	(0.115)	(0.115)		
Firm has non-executive directors	-0.158	-0.0836		
	(0.133)	(0.138)		
(Owner-)Manager: equity in firm	0.00354	-0.0694		
	(0.139)	(0.145)		
Owner-Manager 25<35 years old	0.353			
	(0.941)			
Owner-Manager 35<45 years old	0.393	-0.0404		
	(0.932)	(0.213)		
Owner-Manager 45<55 years old	0.536	0.0456		
	(0.929)	(0.212)		
Owner-Manager >55 years old	0.404	-0.138		
	(0.931)	(0.221)		
Owner-Manager had previous firm	0.0819	0.00945		
	(0.110)	(0.107)		
SIC: Manufacturing	-0.145	-0.125		
	(0.161)	(0.170)		
SIC: Construction	-0.222	-0.221		
	(0.191)	(0.190)		
SICH: Retail & Wholesale	0.100	0.0317		
	(0.163)	(0.170)		
SIC: Education	-0.0209	0.0430		
	(0.160)	(0.160)		
Assistance Effect (IA)	-0.161	-0.386***	0.00212	-0.217**
	(0.112)	(0.148)	(0.0749)	(0.110)
Selection Effect (inverse mills)		-0.161		-0.151
		(0.140)		(0.0916)
Constant^	xx	xx	xx	xx
	xx	xx	xx	xx
Observations	340	271	558	405
R-squared	0.064	0.084	0.002	0.010

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

1.18 – Impact of IA 2004-8 on productivity (two part model, L.D., 2004-11 survivors only)

VARIABLES	M S5.69 prod0408	M S5.70 prod0408	M S5.71 prod0408	M S5.72 prod0408
Employment 2004 (LD)	0.00573	0.00342		
	(0.00362)	(0.00377)		
Employment 2004 squared	-1.89e-05	-6.80e-06		
	(1.82e-05)	(2.02e-05)		
Firm age: 3<5 years	0.190	-0.00237		
	(0.249)	(0.255)		
Firm age: 5<10 years	-0.0173	-0.324		
	(0.238)	(0.247)		
Firm age: 10<20 years	-0.0998	-0.291		
	(0.241)	(0.250)		
Firm age: >20 years	0.0272	-0.174		
	(0.239)	(0.249)		
Legal form: Limited liability	0.191	0.143		
	(0.172)	(0.183)		
Multi-site firm	-0.184	-0.158		
	(0.141)	(0.147)		
Exporting firm	0.0191	-0.0900		
	(0.121)	(0.124)		
Firm in competitive environ.	-0.0556	-0.102		
	(0.115)	(0.121)		
Firm faces price elastic demand	-0.0374	-0.0760		
	(0.127)	(0.132)		
Strategy: Maintain sales	-0.0823	-0.0852		
	(0.258)	(0.249)		
Strategy: Penetrate market	-0.0894	-0.0726		
	(0.245)	(0.238)		
Strategy: New markets	0.0214	-0.0201		
	(0.286)	(0.291)		
Strategy: New products	-0.280	-0.396		
	(0.398)	(0.377)		
Firm has formal business plan	0.00514	0.00210		
	(0.115)	(0.119)		
Firm has non-executive directors	-0.249*	-0.177		
	(0.133)	(0.143)		
(Owner-)Manager: equity in firm	-0.161	-0.162		
	(0.138)	(0.150)		
Owner-Manager 25<35 years old	0.517			
	(0.936)			
Owner-Manager 35<45 years old	0.510	-0.0866		
	(0.928)	(0.220)		
Owner-Manager 45<55 years old	0.562	-0.104		
	(0.925)	(0.219)		
Owner-Manager >55 years old	0.388	-0.299		
	(0.927)	(0.228)		
Owner-Manager had previous firm	0.0454	-0.0201		
	(0.110)	(0.111)		
SIC: Manufacturing	-0.198	-0.0775		
	(0.161)	(0.175)		
SIC: Construction	-0.188	-0.0638		
	(0.191)	(0.196)		
SICH: Retail & Wholesale	-0.0479	-0.0853		
	(0.162)	(0.175)		
SIC: Education	-0.0545	0.0685		
	(0.160)	(0.165)		
Assistance Effect (IA)	-0.0682	-0.223	0.0776	-0.0523
	(0.112)	(0.152)	(0.0765)	(0.118)
Selection Effect (inverse mills)		-0.0837		-0.101
		(0.145)		(0.0981)
Constant^	xx	xx	xx	xx
	xx	xx	xx	xx
Observations	340	271	558	405
R-squared	0.064	0.092	0.002	0.003

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

1.19 – Impact of IA 2004-9 on productivity (two part model, L.D., 2004-11 survivors only)

VARIABLES	M S5.73 prod0409	M S5.74 prod0409	M S5.75 prod0409	M S5.76 prod0409
Employment 2004 (LD)	0.00929***	0.00753**	0.00386*	0.00259***
	(0.00326)	(0.00349)	(0.00228)	(0.000957)
Employment 2004 squared	-3.56e-05**	-2.32e-05	-1.39e-05	
	(1.64e-05)	(1.87e-05)	(1.26e-05)	
Firm age: 3<5 years	0.199	0.0734		
	(0.228)	(0.240)		
Firm age: 5<10 years	0.183	-0.0545		
	(0.218)	(0.233)		
Firm age: 10<20 years	0.0350	-0.145		
	(0.221)	(0.235)		
Firm age: >20 years	0.137	-0.117		
	(0.219)	(0.235)		
Legal form: Limited liability	0.0755	-0.0529		
	(0.155)	(0.169)		
Multi-site firm	-0.192	-0.121		
	(0.127)	(0.136)		
Exporting firm	0.0620	0.00911		
	(0.108)	(0.114)		
Firm in competitive environ.	0.0400	-0.0350		
	(0.103)	(0.112)		
Firm faces price elastic demand	-0.0807	-0.0809		
	(0.114)	(0.122)		
Strategy: Maintain sales	0.0531	-0.0112		
	(0.232)	(0.231)		
Strategy: Penetrate market	0.0502	0.0311		
	(0.220)	(0.220)		
Strategy: New markets	0.264	0.135		
	(0.258)	(0.269)		
Strategy: New products	-0.0717	-0.185		
	(0.358)	(0.348)		
Firm has formal business plan	-0.00233	-0.0264		
	(0.103)	(0.110)		
Firm has non-executive directors	-0.278**	-0.286**	-0.194**	-0.290***
	(0.119)	(0.132)	(0.0961)	(0.104)
(Owner-)Manager: equity in firm	-0.0623	-0.108		
	(0.126)	(0.141)		
Owner-Manager 25<35 years old	0.571			
	(0.842)			
Owner-Manager 35<45 years old	0.572	-0.0924		
	(0.834)	(0.203)		
Owner-Manager 45<55 years old	0.614	-0.0874		
	(0.832)	(0.202)		
Owner-Manager >55 years old	0.535	-0.155		
	(0.833)	(0.211)		
Owner-Manager had previous firm	0.0134	0.0136		
	(0.0992)	(0.103)		
SIC: Manufacturing	-0.182	-0.0227		
	(0.144)	(0.162)		
SIC: Construction	-0.0698	0.0830		
	(0.171)	(0.181)		
SICH: Retail & Wholesale	0.0331	-0.0123		
	(0.146)	(0.162)		
SIC: Education	-0.0980	0.0167		
	(0.144)	(0.153)		
Assistance Effect (IA)	0.00497	-0.0549	0.0823	-0.0267
	(0.101)	(0.141)	(0.0730)	(0.109)
Selection Effect (inverse mills)		0.0756		-0.0584
		(0.134)		(0.0909)
Constant^	xx	xx	xx	xx
	xx	xx	xx	xx
Observations	339	270	548	402
R-squared	0.082	0.083	0.015	0.034

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

1.20 – Impact of IA 2004-10 on productivity (two part model, L.D., 2004-11 survivors only)

VARIABLES	M S5.77 prod0410	M S5.78 prod0410	M S5.79 prod0410	M S5.80 prod0410
Employment 2004 (LD)	0.00870**	0.00565	0.00141	
	(0.00371)	(0.00386)	(0.000956)	
Employment 2004 squared	-3.49e-05*	-1.48e-05		
	(1.87e-05)	(2.07e-05)		
Firm age: 3<5 years	-0.217	-0.336		
	(0.256)	(0.261)		
Firm age: 5<10 years	-0.291	-0.580**		-0.0488
	(0.244)	(0.252)		(0.113)
Firm age: 10<20 years	-0.367	-0.558**		-0.0354
	(0.247)	(0.256)		(0.102)
Firm age: >20 years	-0.269	-0.462*		
	(0.245)	(0.255)		
Legal form: Limited liability	0.135	-0.00777		
	(0.177)	(0.188)		
Multi-site firm	-0.298**	-0.239	-0.145	
	(0.144)	(0.150)	(0.101)	
Exporting firm	0.112	0.0948		
	(0.124)	(0.127)		
Firm in competitive environ.	-0.0414	-0.126		
	(0.118)	(0.124)		
Firm faces price elastic demand	-0.0848	-0.0784		
	(0.130)	(0.135)		
Strategy: Maintain sales	-0.0580	0.00532		
	(0.264)	(0.255)		
Strategy: Penetrate market	-0.00328	-0.0185		
	(0.251)	(0.244)		
Strategy: New markets	0.124	0.0111		
	(0.294)	(0.298)		
Strategy: New products	-0.478	-0.553		
	(0.409)	(0.385)		
Firm has formal business plan	0.0590	0.0506		
	(0.118)	(0.122)		
Firm has non-executive directors	-0.264*	-0.274*		
	(0.136)	(0.146)		
(Owner-)Manager: equity in firm	-0.267*	-0.360**		-0.280**
	(0.142)	(0.153)		(0.120)
Owner-Manager 25<35 years old	0.573			
	(0.960)			
Owner-Manager 35<45 years old	0.736	0.166		
	(0.951)	(0.225)		
Owner-Manager 45<55 years old	0.767	0.185		
	(0.948)	(0.224)		
Owner-Manager >55 years old	0.591	0.0231		
	(0.950)	(0.234)		
Owner-Manager had previous firm	0.101	0.0775		
	(0.113)	(0.113)		
SIC: Manufacturing	-0.260	-0.221		
	(0.165)	(0.179)		
SIC: Construction	-0.273	-0.133		
	(0.195)	(0.200)		
SICH: Retail & Wholesale	-0.257	-0.284		
	(0.166)	(0.179)		
SIC: Education	-0.0960	-0.00719		
	(0.164)	(0.169)		
Assistance Effect (IA)	-0.145	-0.266*	0.0355	-0.131
	(0.115)	(0.156)	(0.0797)	(0.123)
Selection Effect (inverse mills)		0.0906		-0.0632
		(0.148)		(0.105)
Constant^	xx	xx	xx	xx
	xx	xx	xx	xx
Observations	340	271	557	385
R-squared	0.100	0.147	0.007	0.018

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

1.21 – Impact of IA 2004-11 on productivity (two part model, L.D., 2004-11 survivors only)

VARIABLES	M S5.81 prod0411	M S5.82 prod0411	M S5.83 prod0411	M S5.84 prod0411
Employment 2004 (LD)	0.00967**	0.00735*	0.000660	
	(0.00391)	(0.00421)	(0.00103)	
Employment 2004 squared	-3.66e-05*	-1.97e-05		
	(1.97e-05)	(2.26e-05)		
Firm age: 3<5 years	-0.367	-0.399		
	(0.269)	(0.284)		
Firm age: 5<10 years	-0.508**	-0.743***	-0.0357	-0.154
	(0.257)	(0.275)	(0.109)	(0.147)
Firm age: 10<20 years	-0.493*	-0.647**		-0.103
	(0.261)	(0.279)		(0.146)
Firm age: >20 years	-0.394	-0.584**		-0.0587
	(0.258)	(0.278)		(0.136)
Legal form: Limited liability	0.0931	-0.0946		
	(0.186)	(0.204)		
Multi-site firm	-0.275*	-0.196		
	(0.152)	(0.164)		
Exporting firm	0.0594	0.00758		
	(0.131)	(0.138)		
Firm in competitive environ.	0.0362	-0.113		
	(0.125)	(0.137)		
Firm faces price elastic demand	-0.0847	-0.0271		
	(0.139)	(0.149)		
Strategy: Maintain sales	0.0209	0.0575		
	(0.279)	(0.278)		
Strategy: Penetrate market	-0.0759	-0.0432		
	(0.265)	(0.266)		
Strategy: New markets	0.149	-0.00285		
	(0.312)	(0.327)		
Strategy: New products	-0.461	-0.537		
	(0.431)	(0.420)		
Firm has formal business plan	0.0487	0.0347		
	(0.124)	(0.134)		
Firm has non-executive directors	-0.140	-0.123		
	(0.143)	(0.159)		
(Owner-)Manager: equity in firm	-0.219	-0.301*		
	(0.150)	(0.167)		
Owner-Manager 25<35 years old	1.536			
	(1.011)			
Owner-Manager 35<45 years old	1.547	0.0147		
	(1.002)	(0.245)		
Owner-Manager 45<55 years old	1.513	-0.0514		
	(0.999)	(0.244)		
Owner-Manager >55 years old	1.339	-0.171		
	(1.001)	(0.254)		
Owner-Manager had previous firm	0.0554	0.0290		
	(0.119)	(0.124)		
SIC: Manufacturing	-0.242	-0.0971		
	(0.174)	(0.196)		
SIC: Construction	-0.289	-0.0753		
	(0.206)	(0.218)		
SICH: Retail & Wholesale	-0.0976	-0.0933		
	(0.175)	(0.195)		
SIC: Education	0.00747	0.136		
	(0.172)	(0.184)		
Assistance Effect (IA)	-0.169	-0.321*	0.0659	-0.169
	(0.121)	(0.170)	(0.0882)	(0.133)
Selection Effect (inverse mills)		0.0963		-0.0630
		(0.162)		(0.113)
Constant^	xx	xx	xx	xx
	xx	xx	xx	xx
Observations	339	270	554	404
R-squared	0.092	0.132	0.002	0.007

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix E2a – Growth Models: Extension to include lagged growth

In most cases evaluators have access to no more than two years of data for their studies, which does not allow for much more in terms of modelling than introduced in the previous section. When multiple years of data are available, however, the value of replicating the same model numerous times for ever increasing time periods is potentially too little for achieving robust results. Data availability for a number of years, as is the case here, allows for expanding the analytical approach in a number of ways. This section does so by the use of lagged growth models, in essence an extension of the previous linear regression models by including lagged growth terms. Section 5.6 will then explore the use of quantile regressions to take better account of the heterogeneity of the firms analysed.

Accounting for previous growth

In Section 5.4 the model did not take into account previous periods' firm growth, with the intent of using a comparable approach to BERR (2007). That essentially assumed that only the two performance data points used for each period modelled were available, and indicated how that choice of time period in between may impact the conclusions drawn.

However, in actual case the longitudinal dataset allows for inclusion of more than two years of performance data. It is commonly acknowledged that growth in one period may impact the same in following periods. Delmar and Wiklund (2008), for example, show how the willingness to grow in the past directly influences future growth intentions. Importantly, they note how it is not just the willingness, but actual success of growing, that predicts firms' motivations to grow in the subsequent time periods. A firm displaying higher growth in one year would then be more likely to do so also in subsequent periods, if it is paired with a willingness to grow.

At the same time, experiencing a period of growth may also put strain on the resources of a firm. This is especially likely where firms have grown through acquisition, requiring both finance

and effort for full integration of the previously separate organisation. Such scenario would essentially render immediate further growth less likely, as a direct result of previous growth.

Assessing the impact of assistance on growth, autocorrelation between the measured outcome and previous "outcomes" is not unlikely. In time series analysis, dynamic regressions – making use of lagged dependent variables – are commonly used. Their use allows to take into account how the "current values of the dependent variable are a function of its prior values" (Beck and Katz, 2011; Shurnway and Stoffer, 1995; both in Wilkins, 2014).

The previous treatment equation including the selection parameter

$$\Delta = \beta' x + \delta' z + \lambda s + \varepsilon \qquad (2.3)$$

therefore becomes

$$\Delta_t = \Delta_{t-k} + \beta' x + \delta' z + \lambda s + \varepsilon \qquad (2.4)$$

where **t** represents the current time period, and **t-k** one (or more) previous time periods.

Results: Inclusion of lagged growth

Table 32, Table 33 and Tables 34 provide summaries of the results for the expanded regression models estimated. No restricted models are reported due to similar problems as observed in the previous section – a lack of predictors and poor fit[92].

Overall, the selection models again perform better in nearly all instances, but the differences are not as stark as for the previous section's linear models. Significance of previous growth is confirmed by the significance of many lagged terms across the different outcome measures

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[92] Appendix E2 contains the full models for

Table **32**, Table 33 and

Table **34**. Models with more lags were also estimated, but their results added no further insights.

and periods. Firm size also remains to have a significant impact in many models, particularly those for a longer time period. As a multisite business, employment growth will be significantly higher for many models, and also a number of turnover models. For turnover, the effect of firm age, namely higher growth for the youngest firms, plays a role.

The impact of support then varies in significance by outcome measure and period. For employment, depending on exact lags and outcome period chosen, the impact of assistance is strongest (ten percent level significance or higher) in the relative short-term, but not immediately for 2004-5. The (positive) impact of assistance centres on the periods 2004-6 or 2005-6 for the non-selection models, and up to 2007 for the selection models.

The role of support is less clear, less robust, for the turnover models. The results differ remarkably by the choice of lags included. The sign of the IA coefficient changes depending on the model specified, and no conclusion on a significant role of support on turnover growth becomes evident.

The results are easier to describe for the productivity models. Again, no immediate impact of support on the outcome (2004-5) is observed, but a strong negative effect for the periods of 2004/5-6. For the selection model this is also evident for the periods of 2004/5-7. The selection effect is relatively strong for these models, significant at ten percent level. Remarkably, the 2004-10/11 models suggest the return of this negative impact of assistance on productivity.

Table 32 – Employment: Summary of IA impact coefficients when including lagged growth

Lag included for	Employment Growth period	Full model			Full model with selection term			
		IA Coef.	R²	N	IA Coef.	Selection coeff.	R²	N
2003-4	2004-5	ns(+)	0.085	323	ns(+)		0.103	256
2004-5	2005-6	+	0.137	323	+		0.148	256
2005-6	2006-7	ns(+)	0.092	323	ns(+)	+	0.143	256
2003-5	2005-6	+	0.098	342	++		0.116	272
2003-6	2006-7	ns(+)	0.073	342	ns(+)	+	0.121	272
Some further significant effects are present in above models, but not coherently across models. The full results are reported in Appendix E2b.								
2002-4	2004-5	ns(+)	0.091	302	ns(+)		0.096	240
2003-4	2004-5	ns(+)	0.085	323	ns(+)		0.103	256
2002-4	2004-6	ns(+)	0.106	302	++		0.168	240
2003-4	2004-6	ns(+)	0.158	323	++		0.177	256
2002-4	2004-7	ns(+)	0.157	302	++	+	0.184	240
2003-4	2004-7	ns(+)	0.158	323	++	+	0.189	256
2002-4	2004-8	ns(+)	0.155	302	ns(+)		0.164	240
2003-4	2004-8	ns(+)	0.156	323	ns(+)		0.174	256
2002-4	2004-9	ns(+)	0.18	301	ns(+)		0.19	240
2003-4	2004-9	ns(+)	0.199	322	ns(+)		0.206	256
2002-4	2004-10	ns(+)	0.184	301	ns(+)		0.207	240
2003-4	2004-10	ns(+)	0.198	322	ns(+)		0.215	256
2002-4	2004-11	ns(+)	0.193	301	ns(+)		0.228	240
2003-4	2004-11	ns(+)	0.21	322	ns(+)		0.232	256
The full results are in Appendix E2b. The following further significant effects are present for the lower part of this table: The included lags have a negative impact on growth for the non-selection models, for the 2004-6 to 2004-8 (2002-4 lag) or 2004-9 (2003-4 lag) models. Firm size does not matter in 2004-5, but during the other periods it has a negative impact on employment growth, whilst squared employment as firm size indicator has a positive impact also for all models beyond 2004-5. Multisite has an increasing positive impact on growth over time, throughout all specified employment models.								
Where +++/++/+ & ---/--/- indicate significance at 1%/5%/10% and the sign of the coefficient. ns(+) and ns(-) represent insignificant coefficients, and their sign.								

Source: BLO Survey and BSD

Table 33 - Turnover: Summary of IA impact coefficients when including lagged growth

Lag included for	Turnover Growth period	Full model			Full model with selection term			
		IA Coef.	R²	N	IA Coef.	*Selection coeff.*	R²	N
2003-4	2004-5	ns(-)	0.358	323	ns(-)		0.425	256
2004-5	2005-6	ns(-)	0.127	321	ns(-)		0.176	255
2005-6	2006-7	++	0.072	321	ns(+)		0.099	255
2003-5	2005-6	ns(-)	0.103	340	ns(-)		0.157	271
2003-6	2006-7	++	0.083	340	ns(+)		0.102	271
Some further significant effects are present in above models, but not coherently across models. The full results are reported in Appendix E2b.								
2002-4	2004-5	ns(-)	0.282	302	ns(+)		0.301	240
2003-4	2004-5	ns(-)	0.358	323	ns(-)		0.425	256
2002-4	2004-6	-	0.151	300	ns(-)		0.163	239
2003-4	2004-6	-	0.124	321	ns(-)		0.166	255
2002-4	2004-7	ns(-)	0.133	300	ns(-)		0.164	239
2003-4	2004-7	ns(-)	0.12	321	ns(-)		0.184	255
2002-4	2004-8	ns(-)	0.169	300	ns(-)		0.232	239
2003-4	2004-8	ns(-)	0.165	321	ns(-)		0.253	255
2002-4	2004-9	ns(-)	0.144	299	ns(+)		0.214	238
2003-4	2004-9	ns(+)	0.138	320	ns(+)		0.227	254
2002-4	2004-10	ns(-)	0.16	300	ns(-)		0.219	239
2003-4	2004-10	ns(-)	0.152	321	ns(-)		0.234	255
2002-4	2004-11	ns(-)	0.12	299	ns(-)		0.171	238
2003-4	2004-11	ns(-)	0.118	320	ns(-)		0.185	254
The full results are in Appendix E2b. The following further significant effects are present for the lower part of this table: The included lags have a negative impact on growth for the non-selection models, for the 2004-5 to 2004-10 (2002-4 lag) or 2004-11 (2003-4 lag) models. Multisite has its significantly positive periods between 2004-6 and 2004-9, depending on the exact model. Growth rates are also significantly higher for the youngest category of firms with a 2003-4 lag, mainly in the non-selection models 2004-5 to 2004-10. The choice of strategy impacts short-term (2004-5) growth positively. Other effects, significant in some models, exist for most variables, but no consistent patterns can be established. Where +++/++/+ & ---/--/- indicate significance at 1%/5%/10% and the sign of the coefficient. ns(+) and ns(-) represent insignificant coefficients, and their sign.								

Source: BLO Survey and BSD

Table 34 - Productivity: Summary of IA impact coefficients when including lagged growth

| Lag included for | Productivity Growth period | Full model | | | Full model with selection term | | | |
		IA Coef.	R²	N	IA Coef.	Selection coeff.	R²	N
2003-4	2004-5	ns(-)	0.327	323	ns(-)		0.36	256
2004-5	2005-6	- -	0.115	300	- - -		0.195	271
2005-6	2006-7	ns(+)	0.085	300	ns(-)		0.125	271
2003-5	2005-6	- -	0.12	340	- - -		0.162	239
2003-6	2006-7	ns(+)	0.062	340	ns(-)		0.135	239

Some further significant effects are present in above models, but not coherently across models. The full results are reported in Appendix E2b.

Lag included for	Productivity Growth period	IA Coef.	R²	N	IA Coef.	Selection coeff.	R²	N
2002-4	2004-5	ns(-)	0.315	302	ns(+)		0.356	240
2003-4	2004-5	ns(-)	0.327	323	ns(-)		0.36	256
2002-4	2004-6	- -	0.205	300	- - -		0.196	239
2003-4	2004-6	- - -	0.142	321	- - -		0.146	255
2002-4	2004-7	ns(-)	0.194	300	- - -	-	0.206	239
2003-4	2004-7	ns(-)	0.129	321	- - -	-	0.148	255
2002-4	2004-8	ns(-)	0.268	300	ns(-)		0.286	239
2003-4	2004-8	ns(-)	0.186	321	-		0.201	255
2002-4	2004-9	ns(-)	0.276	299	ns(-)		0.285	238
2003-4	2004-9	ns(-)	0.17	320	ns(-)		0.166	254
2002-4	2004-10	-	0.259	300	-		0.261	239
2003-4	2004-10	ns(-)	0.199	321	- -		0.242	255
2002-4	2004-11	- -	0.252	299	- -		0.256	238
2003-4	2004-11	-	0.197	320	- -		0.231	254

The following further significant effects are present for the lower part of this table: The included lags have a negative impact on productivity growth for all models. Firm size does not matter in 2004-5, and with varying significance then, with increasing coefficient strength for the longer outcome periods. A new markets strategy significantly improves productivity 2004-5. , whilst construction and manufacturing (the latter for selection model only) sectors reduce productivity 2004-5. Maintain sales as a strategy has a positive significant impact on productivity growth in the 2004-5 with 2003-4 lag models.

Where +++/++/+ & ---/--/- indicate significance at 1%/5%/10% and the sign of the coefficient. ns(+) and ns(-) represent insignificant coefficients, and their sign. The full results are in Appendix E2b.

Source: BLO Survey and BSD

Concluding remarks: Inclusion of lagged growth

The significant addition of time lags to the estimations broadly confirms the findings from the linear regression analysis. There are few significant determinants for firm growth across outcome periods. The models seeking to assess impact immediately following the intervention (BSD period 2004-5) find no significance for the assistance term. Then, two to three years beyond intervention, significant effects can be found. These are positive for employment growth, negative in terms of productivity. Any analysis including subsequent years returns no significant impact of support on growth. However, when analysing the long-term, that is the periods 2004-10/11, the support coefficient again turns significantly negative in the productivity estimations.

Appendix E2b – Lagged growth, full outputs

Employment 2.1, lagged growth, lag 2002-4

	(1) empl0405	(2) empl0405	(3) empl0406	(4) empl0406	(5) empl0407	(6) empl0407	(7) empl0408	(8) empl0408
Lag: Employment growth 2002-3								
Lag: Employment growth 2002-4	-0.0285	-0.0199	-0.199**	-0.0921	-0.253***	-0.161*	-0.259***	-0.171
	(0.0530)	(0.0449)	(0.0859)	(0.0898)	(0.0925)	(0.0958)	(0.0988)	(0.107)
Lag: Employment growth 2003-4								
Employment 2004 (ELD)	-0.00274*	-0.000844	-0.00721***	-0.00572**	-0.00829***	-0.00783***	-0.00840***	-0.00747**
	(0.00162)	(0.00139)	(0.00263)	(0.00278)	(0.00283)	(0.00296)	(0.00302)	(0.00331)
Employment 2004 squared	1.10e-05	3.46e-06	2.94e-05**	2.34e-05	3.90e-05***	3.84e-05**	3.98e-05**	3.69e-05**
	(8.28e-06)	(7.40e-06)	(1.34e-05)	(1.48e-05)	(1.44e-05)	(1.58e-05)	(1.54e-05)	(1.76e-05)
Firm age: 3<5 years	0.0184	-0.0250	-0.278	-0.326	-0.124	-0.174	0.0140	-0.0186
	(0.215)	(0.164)	(0.348)	(0.329)	(0.374)	(0.351)	(0.400)	(0.391)
Firm age: 5<10 years	-0.00976	0.00264	-0.507	-0.484	-0.357	-0.312	-0.327	-0.274
	(0.210)	(0.161)	(0.341)	(0.321)	(0.367)	(0.343)	(0.392)	(0.382)
Firm age: 10<20 years	-0.0380	-0.0733	-0.484	-0.507	-0.394	-0.429	-0.362	-0.371
	(0.210)	(0.162)	(0.341)	(0.324)	(0.367)	(0.345)	(0.392)	(0.385)
Firm age: >20 years	-0.0549	-0.137	-0.580*	-0.631*	-0.488	-0.521	-0.505	-0.536
	(0.211)	(0.162)	(0.341)	(0.324)	(0.367)	(0.346)	(0.393)	(0.386)
Legal form: Limited liability	-0.00109	-0.0313	-0.0778	0.0125	-0.176	-0.0661	-0.185	-0.0883
	(0.0834)	(0.0716)	(0.135)	(0.143)	(0.145)	(0.153)	(0.155)	(0.171)
Multi-site firm	0.172***	0.133**	0.324***	0.329***	0.326***	0.386***	0.320***	0.376***
	(0.0643)	(0.0555)	(0.104)	(0.111)	(0.112)	(0.119)	(0.120)	(0.132)
Exporting firm	-0.0127	0.00799	0.0224	0.0246	0.0624	0.0684	0.0471	0.0443
	(0.0567)	(0.0477)	(0.0919)	(0.0955)	(0.0989)	(0.102)	(0.106)	(0.114)
Firm in competitive environ.	0.0196	0.00494	-0.0395	-0.0204	-0.00245	0.00555	0.0346	0.0658
	(0.0539)	(0.0470)	(0.0874)	(0.0940)	(0.0941)	(0.100)	(0.101)	(0.112)
Firm faces price elastic demand	-0.0385	-0.0628	-0.0122	-0.0467	-0.0905	-0.121	-0.0673	-0.111
	(0.0591)	(0.0501)	(0.0957)	(0.100)	(0.103)	(0.107)	(0.110)	(0.119)
Strategy: Maintain sales	0.0802	0.0238	0.100	0.111	0.169	0.192	0.145	0.168
	(0.136)	(0.109)	(0.220)	(0.218)	(0.236)	(0.232)	(0.253)	(0.259)
Strategy: Penetrate market	0.0805	0.0195	0.0216	0.0173	0.156	0.184	0.183	0.213
	(0.129)	(0.104)	(0.210)	(0.208)	(0.226)	(0.222)	(0.241)	(0.247)
Strategy: New markets	-0.0262	-0.0506	-0.104	-0.0843	0.0137	0.0180	0.0203	0.0225
	(0.148)	(0.125)	(0.240)	(0.250)	(0.258)	(0.267)	(0.276)	(0.297)
Strategy: New products	0.0416	0.0520	0.0257	0.154	0.0669	0.214	0.0632	0.220
	(0.204)	(0.159)	(0.331)	(0.317)	(0.357)	(0.338)	(0.381)	(0.377)
Firm has formal business plan	0.0739	0.0180	0.0594	-0.0362	0.126	0.0258	0.110	-0.0242
	(0.0539)	(0.0463)	(0.0873)	(0.0926)	(0.0939)	(0.0988)	(0.100)	(0.110)
Firm has non-executive directors	0.0634	0.00295	0.111	0.0647	0.198*	0.133	0.221*	0.192
	(0.0605)	(0.0530)	(0.0980)	(0.106)	(0.106)	(0.113)	(0.113)	(0.126)
(Owner-)Manager: equity in firm	0.0187	-0.0207	-0.0706	-0.118	-0.0649	-0.111	-0.0678	-0.131
	(0.0632)	(0.0565)	(0.102)	(0.113)	(0.110)	(0.121)	(0.118)	(0.135)
Owner-Manager 25<35 years old	-0.144	0.0770	-0.217	-0.117	-0.0803	0.0306	-0.0736	0.0532
	(0.414)	(0.0909)	(0.670)	(0.182)	(0.721)	(0.194)	(0.771)	(0.216)
Owner-Manager 35<45 years old	-0.150	0.0616	-0.107	0.0525	-0.139	-0.0508	-0.170	-0.101
	(0.409)	(0.0561)	(0.663)	(0.112)	(0.714)	(0.120)	(0.763)	(0.134)
Owner-Manager 45<55 years old	-0.171	0.00505	-0.218	-0.121	-0.223	-0.172	-0.249	-0.215*
	(0.408)	(0.0542)	(0.661)	(0.108)	(0.711)	(0.116)	(0.760)	(0.129)
Owner-Manager >55 years old	-0.248		-0.195		-0.140		-0.128	
	(0.409)		(0.662)		(0.713)		(0.762)	
Owner-Manager had previous firm	-0.0168	0.0452	0.0337	0.120	0.0541	0.131	0.0278	0.101
	(0.0521)	(0.0431)	(0.0844)	(0.0861)	(0.0909)	(0.0919)	(0.0971)	(0.103)
SIC: Manufacturing	0.0583	0.0705	0.136	0.0943	0.141	0.149	0.154	0.172
	(0.0749)	(0.0663)	(0.121)	(0.133)	(0.131)	(0.141)	(0.140)	(0.158)
SIC: Construction	0.196**	0.102	0.187	0.0994	0.217	0.171	0.221	0.202
	(0.0878)	(0.0738)	(0.142)	(0.148)	(0.153)	(0.157)	(0.164)	(0.176)
SICH: Retail & Wholesale	0.0294	0.00981	-0.0912	-0.170	-0.0561	-0.129	-0.00640	-0.0514
	(0.0751)	(0.0666)	(0.122)	(0.133)	(0.131)	(0.142)	(0.140)	(0.158)
SIC: Education	0.0439	-0.00485	-0.0704	-0.167	-0.0709	-0.144	-0.0186	-0.0614
	(0.0752)	(0.0631)	(0.122)	(0.126)	(0.131)	(0.135)	(0.140)	(0.150)
Assistance Effect (IA)	0.00257	0.0424	0.106	0.254**	0.105	0.271**	0.0658	0.211
	(0.0516)	(0.0582)	(0.0836)	(0.116)	(0.0899)	(0.124)	(0.0961)	(0.139)
Selection Effect (inverse mills)		0.0535		0.114		0.189*		0.143
		(0.0520)		(0.104)		(0.111)		(0.124)
Constant^	x	x	x	x	x	x	x	x
	x	x	x	x	x	x	x	x
Observations	302	240	302	240	302	240	302	240
R-squared	0.091	0.098	0.146	0.168	0.157	0.184	0.155	0.164

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Employment 2.2, lagged growth, lag 2002-4

	(9) empl0409	(10) empl0409	(11) empl0410	(12) empl0410	(13) empl0411	(14) empl0411
Lag: Employment growth 2002-3						
Lag: Employment growth 2002-4	-0.136	-0.0463	-0.0464	0.0215	0.0251	0.0738
	(0.103)	(0.116)	(0.106)	(0.118)	(0.107)	(0.119)
Lag: Employment growth 2003-4						
Employment 2004 (ELD)	-0.0117***	-0.0113***	-0.0113***	-0.0105***	-0.0125***	-0.0128***
	(0.00316)	(0.00358)	(0.00322)	(0.00364)	(0.00327)	(0.00367)
Employment 2004 squared	5.27e-05***	5.25e-05***	5.02e-05***	4.75e-05**	5.50e-05***	5.61e-05***
	(1.61e-05)	(1.91e-05)	(1.64e-05)	(1.94e-05)	(1.67e-05)	(1.95e-05)
Firm age: 3<5 years	0.844**	0.899**	0.834*	0.883**	0.950**	1.025**
	(0.417)	(0.424)	(0.426)	(0.431)	(0.432)	(0.434)
Firm age: 5<10 years	0.377	0.461	0.399	0.492	0.544	0.656
	(0.408)	(0.414)	(0.417)	(0.421)	(0.423)	(0.424)
Firm age: 10<20 years	0.383	0.451	0.369	0.436	0.485	0.581
	(0.408)	(0.418)	(0.417)	(0.425)	(0.423)	(0.427)
Firm age: >20 years	0.256	0.304	0.283	0.310	0.406	0.464
	(0.409)	(0.418)	(0.418)	(0.425)	(0.424)	(0.428)
Legal form: Limited liability	-0.117	0.0656	-0.163	-0.0251	-0.154	0.0132
	(0.162)	(0.185)	(0.165)	(0.188)	(0.168)	(0.189)
Multi-site firm	0.301**	0.375***	0.409***	0.492***	0.432***	0.553***
	(0.125)	(0.143)	(0.128)	(0.146)	(0.129)	(0.147)
Exporting firm	-0.0396	-0.101	-0.0360	-0.0878	-0.0892	-0.147
	(0.110)	(0.123)	(0.113)	(0.125)	(0.114)	(0.126)
Firm in competitive environ.	0.00582	0.0400	0.00149	0.00394	0.0141	0.0318
	(0.105)	(0.121)	(0.107)	(0.123)	(0.109)	(0.124)
Firm faces price elastic demand	-0.0311	-0.0845	-0.125	-0.181	-0.142	-0.195
	(0.115)	(0.129)	(0.117)	(0.131)	(0.119)	(0.132)
Strategy: Maintain sales	0.0494	0.0446	0.108	0.120	0.182	0.226
	(0.263)	(0.281)	(0.269)	(0.285)	(0.273)	(0.287)
Strategy: Penetrate market	0.125	0.131	0.132	0.147	0.193	0.217
	(0.251)	(0.268)	(0.257)	(0.272)	(0.260)	(0.274)
Strategy: New markets	-0.0904	-0.0829	-0.154	-0.122	-0.103	-0.0712
	(0.288)	(0.322)	(0.294)	(0.328)	(0.298)	(0.330)
Strategy: New products	0.0416	0.172	-0.00754	0.156	0.0681	0.259
	(0.397)	(0.409)	(0.405)	(0.416)	(0.411)	(0.419)
Firm has formal business plan	0.103	-0.0395	0.156	0.000539	0.165	0.0209
	(0.105)	(0.119)	(0.107)	(0.121)	(0.109)	(0.122)
Firm has non-executive directors	0.248**	0.243*	0.213*	0.230*	0.240*	0.243*
	(0.118)	(0.137)	(0.120)	(0.139)	(0.122)	(0.140)
(Owner-)Manager: equity in firm	-0.0754	-0.157	0.0743	0.00554	-0.0117	-0.128
	(0.123)	(0.146)	(0.125)	(0.148)	(0.127)	(0.149)
Owner-Manager 25<35 years old	-0.159	0.118	0.0778	0.236	-0.777	0.152
	(0.803)	(0.235)	(0.820)	(0.239)	(0.832)	(0.240)
Owner-Manager 35<45 years old	-0.336	-0.0307	-0.144	-0.0311	-0.984	-0.0887
	(0.794)	(0.145)	(0.811)	(0.147)	(0.823)	(0.148)
Owner-Manager 45<55 years old	-0.454	-0.231*	-0.258	-0.242*	-1.076	-0.263*
	(0.792)	(0.140)	(0.808)	(0.142)	(0.820)	(0.143)
Owner-Manager >55 years old	-0.317		-0.133		-0.935	
	(0.794)		(0.810)		(0.822)	
Owner-Manager had previous firm	0.110	0.147	0.127	0.166	0.121	0.175
	(0.101)	(0.111)	(0.103)	(0.113)	(0.105)	(0.114)
SIC: Manufacturing	0.148	0.130	0.149	0.139	0.189	0.159
	(0.146)	(0.171)	(0.149)	(0.174)	(0.151)	(0.175)
SIC: Construction	0.143	0.0948	0.162	0.153	0.0930	0.0696
	(0.170)	(0.190)	(0.174)	(0.194)	(0.177)	(0.195)
SICH: Retail & Wholesale	-0.0310	-0.0365	-0.0532	-0.0662	-0.0668	-0.0992
	(0.146)	(0.172)	(0.149)	(0.175)	(0.151)	(0.176)
SIC: Education	-0.108	-0.128	-0.111	-0.0994	-0.110	-0.113
	(0.146)	(0.163)	(0.149)	(0.166)	(0.151)	(0.167)
Assistance Effect (IA)	0.119	0.190	0.0823	0.165	0.132	0.237
	(0.100)	(0.150)	(0.103)	(0.153)	(0.104)	(0.154)
Selection Effect (inverse mills)		0.0295		0.0535		0.102
		(0.134)		(0.136)		(0.137)
Constant^	x	x	x	x	x	x
	x	x	x	x	x	x
Observations	301	240	301	240	301	240
R-squared	0.180	0.190	0.184	0.207	0.193	0.228

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Employment 2.3, lagged growth, lag 2003-4

	(15) empl0405	(16) empl0405	(17) empl0406	(18) empl0406	(19) empl0407	(20) empl0407	(21) empl0408	(22) empl0408
Lag: Employment growth 2002-3								
Lag: Employment growth 2002-4								
Lag: Employment growth 2003-4	0.0507	0.0633	-0.291***	-0.141	-0.315***	-0.193	-0.282**	-0.160
	(0.0651)	(0.0561)	(0.105)	(0.111)	(0.113)	(0.118)	(0.121)	(0.131)
Employment 2004 (ELD)	-0.00289*	-0.00111	-0.00685***	-0.00533**	-0.00810***	-0.00787***	-0.00832***	-0.00764**
	(0.00155)	(0.00135)	(0.00250)	(0.00268)	(0.00270)	(0.00284)	(0.00289)	(0.00316)
Employment 2004 squared	1.13e-05	4.92e-06	2.71e-05**	2.21e-05	3.68e-05***	3.91e-05**	3.79e-05***	3.80e-05**
	(7.82e-06)	(7.26e-06)	(1.26e-05)	(1.43e-05)	(1.36e-05)	(1.53e-05)	(1.45e-05)	(1.70e-05)
Firm age: 3<5 years	0.0379	-0.00754	-0.00865	-0.0941	0.193	0.0576	0.273	0.179
	(0.124)	(0.108)	(0.200)	(0.213)	(0.216)	(0.227)	(0.231)	(0.252)
Firm age: 5<10 years	-0.0178	-0.00739	-0.276	-0.292	-0.0833	-0.130	-0.105	-0.114
	(0.119)	(0.104)	(0.192)	(0.205)	(0.207)	(0.218)	(0.222)	(0.242)
Firm age: 10<20 years	-0.0447	-0.0750	-0.227	-0.283	-0.0979	-0.211	-0.114	-0.169
	(0.119)	(0.104)	(0.191)	(0.205)	(0.206)	(0.218)	(0.221)	(0.242)
Firm age: >20 years	-0.0557	-0.137	-0.309	-0.408**	-0.167	-0.297	-0.237	-0.338
	(0.118)	(0.103)	(0.190)	(0.203)	(0.204)	(0.216)	(0.219)	(0.240)
Legal form: Limited liability	0.00290	-0.0308	-0.0551	0.00127	-0.128	-0.0626	-0.142	-0.0849
	(0.0796)	(0.0701)	(0.128)	(0.139)	(0.138)	(0.147)	(0.148)	(0.164)
Multi-site firm	0.160***	0.122**	0.311***	0.325***	0.322***	0.388***	0.316***	0.390***
	(0.0615)	(0.0536)	(0.0990)	(0.106)	(0.107)	(0.113)	(0.114)	(0.125)
Exporting firm	-0.00651	0.0118	-0.0246	-0.0146	0.0133	0.0165	-0.0201	-0.0214
	(0.0534)	(0.0454)	(0.0898)	(0.0898)	(0.0926)	(0.0955)	(0.0991)	(0.106)
Firm in competitive environ.	0.0103	-0.00734	-0.0237	-0.0138	0.00298	0.00724	0.0580	0.0843
	(0.0513)	(0.0453)	(0.0826)	(0.0896)	(0.0890)	(0.0952)	(0.0952)	(0.106)
Firm faces price elastic demand	-0.0314	-0.0579	-0.0236	-0.0680	-0.0912	-0.134	-0.0878	-0.150
	(0.0569)	(0.0491)	(0.0916)	(0.0971)	(0.0988)	(0.103)	(0.106)	(0.115)
Strategy: Maintain sales	0.0473	-0.0145	0.0818	0.0987	0.0892	0.104	0.0297	0.0390
	(0.119)	(0.0960)	(0.192)	(0.190)	(0.207)	(0.202)	(0.222)	(0.224)
Strategy: Penetrate market	0.0364	-0.0293	0.0143	0.0184	0.0796	0.113	0.0762	0.0979
	(0.113)	(0.0912)	(0.182)	(0.180)	(0.196)	(0.192)	(0.210)	(0.213)
Strategy: New markets	-0.0309	-0.0499	-0.104	-0.0934	-0.0620	-0.0771	-0.0754	-0.110
	(0.133)	(0.113)	(0.214)	(0.224)	(0.231)	(0.238)	(0.247)	(0.265)
Strategy: New products	-0.0128	-0.0241	-0.00581	0.0966	-0.0681	0.0451	-0.0968	0.0192
	(0.183)	(0.143)	(0.295)	(0.283)	(0.318)	(0.301)	(0.340)	(0.335)
Firm has formal business plan	0.0524	0.00134	0.0344	-0.0576	0.0878	-0.000999	0.0621	-0.0640
	(0.0505)	(0.0440)	(0.0813)	(0.0870)	(0.0876)	(0.0924)	(0.0938)	(0.103)
Firm has non-executive directors	0.0484	-0.00172	0.127	0.0964	0.174*	0.138	0.213**	0.202*
	(0.0576)	(0.0520)	(0.0927)	(0.103)	(0.0999)	(0.109)	(0.107)	(0.122)
(Owner-)Manager: equity in firm	0.00932	-0.0332	-0.0640	-0.125	-0.0492	-0.105	-0.0584	-0.137
	(0.0603)	(0.0547)	(0.0971)	(0.108)	(0.105)	(0.115)	(0.112)	(0.128)
Owner-Manager 25<35 years old	-0.147		-0.262		-0.169		-0.124	
	(0.404)		(0.651)		(0.702)		(0.751)	
Owner-Manager 35<45 years old	-0.120	0.0105	-0.117	0.185	-0.120	-0.00957	-0.189	-0.161
	(0.401)	(0.0835)	(0.645)	(0.165)	(0.695)	(0.176)	(0.744)	(0.195)
Owner-Manager 45<55 years old	-0.146	-0.0489	-0.248	-0.00129	-0.244	-0.165	-0.286	-0.282
	(0.399)	(0.0826)	(0.643)	(0.163)	(0.693)	(0.174)	(0.742)	(0.193)
Owner-Manager >55 years old	-0.222	-0.0590	-0.212	0.122	-0.144	0.0124	-0.152	-0.0706
	(0.400)	(0.0868)	(0.645)	(0.172)	(0.695)	(0.182)	(0.743)	(0.203)
Owner-Manager had previous firm	-0.0164	0.0423	0.0190	0.106	0.0492	0.122	0.0221	0.100
	(0.0488)	(0.0411)	(0.0786)	(0.0812)	(0.0847)	(0.0863)	(0.0907)	(0.0960)
SIC: Manufacturing	0.0672	0.0709	0.162	0.127	0.168	0.182	0.202	0.236
	(0.0719)	(0.0646)	(0.116)	(0.128)	(0.125)	(0.136)	(0.134)	(0.151)
SIC: Construction	0.178**	0.0916	0.229*	0.165	0.236	0.210	0.255	0.263
	(0.0840)	(0.0721)	(0.135)	(0.143)	(0.146)	(0.151)	(0.156)	(0.169)
SICH: Retail & Wholesale	0.0373	0.0186	-0.0437	-0.118	-0.0146	-0.0970	0.0416	-0.00796
	(0.0720)	(0.0647)	(0.116)	(0.128)	(0.125)	(0.136)	(0.134)	(0.151)
SIC: Education	0.0458	-0.000137	-0.0456	-0.129	-0.0539	-0.116	0.0168	-0.0102
	(0.0710)	(0.0610)	(0.114)	(0.121)	(0.123)	(0.128)	(0.132)	(0.143)
Assistance Effect (IA)	0.00238	0.0346	0.112	0.234**	0.123	0.274**	0.0778	0.214
	(0.0491)	(0.0565)	(0.0790)	(0.112)	(0.0852)	(0.119)	(0.0912)	(0.132)
Selection Effect (inverse mills)		0.0456		0.103		0.187*		0.151
		(0.0509)		(0.101)		(0.107)		(0.119)
Constant^	x	x	x	x	x	x	x	x
	x	x	x	x	x	x	x	x
Observations	323	256	323	256	323	256	323	256
R-squared	0.085	0.103	0.158	0.177	0.158	0.189	0.156	0.174

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Employment Part 2.4, lagged growth, lag 2003-4

	(23) empl0409	(24) empl0409	(25) empl0410	(26) empl0410	(27) empl0411	(28) empl0411
Lag: Employment growth 2002-3						
Lag: Employment growth 2002-4						
Lag: Employment growth 2003-4	-0.258**	-0.124	-0.217*	-0.114	-0.248*	-0.156
	(0.126)	(0.142)	(0.130)	(0.147)	(0.133)	(0.150)
Employment 2004 (ELD)	-0.0113***	-0.0110***	-0.0104***	-0.00973***	-0.0116***	-0.0118***
	(0.00301)	(0.00343)	(0.00311)	(0.00356)	(0.00318)	(0.00363)
Employment 2004 squared	4.95e-05***	5.11e-05***	4.53e-05***	4.46e-05**	5.11e-05***	5.32e-05***
	(1.51e-05)	(1.84e-05)	(1.56e-05)	(1.91e-05)	(1.60e-05)	(1.95e-05)
Firm age: 3<5 years	0.503**	0.492*	0.690***	0.667**	0.826***	0.814***
	(0.240)	(0.274)	(0.248)	(0.284)	(0.253)	(0.290)
Firm age: 5<10 years	0.00396	0.0251	0.185	0.218	0.324	0.362
	(0.230)	(0.263)	(0.239)	(0.273)	(0.243)	(0.278)
Firm age: 10<20 years	0.0319	0.0385	0.160	0.168	0.246	0.261
	(0.229)	(0.262)	(0.237)	(0.272)	(0.242)	(0.278)
Firm age: >20 years	-0.0834	-0.127	0.0809	0.0199	0.171	0.124
	(0.227)	(0.261)	(0.235)	(0.270)	(0.240)	(0.276)
Legal form: Limited liability	-0.0901	0.0429	-0.130	-0.0516	-0.115	-0.00764
	(0.154)	(0.178)	(0.159)	(0.184)	(0.162)	(0.188)
Multi-site firm	0.280**	0.365***	0.350***	0.432***	0.372***	0.475***
	(0.119)	(0.136)	(0.123)	(0.141)	(0.125)	(0.144)
Exporting firm	-0.0797	-0.119	-0.0661	-0.100	-0.103	-0.149
	(0.103)	(0.115)	(0.107)	(0.119)	(0.109)	(0.122)
Firm in competitive environ.	0.0460	0.0631	0.0482	0.0367	0.0404	0.0424
	(0.0992)	(0.115)	(0.103)	(0.119)	(0.105)	(0.122)
Firm faces price elastic demand	-0.0713	-0.127	-0.157	-0.219*	-0.177	-0.237*
	(0.110)	(0.125)	(0.114)	(0.129)	(0.116)	(0.132)
Strategy: Maintain sales	-0.165	-0.188	-0.132	-0.155	-0.158	-0.168
	(0.230)	(0.243)	(0.239)	(0.253)	(0.243)	(0.258)
Strategy: Penetrate market	-0.0623	-0.0720	-0.0780	-0.0933	-0.0993	-0.126
	(0.218)	(0.231)	(0.226)	(0.240)	(0.231)	(0.245)
Strategy: New markets	-0.268	-0.304	-0.278	-0.269	-0.313	-0.318
	(0.257)	(0.287)	(0.266)	(0.298)	(0.271)	(0.304)
Strategy: New products	-0.204	-0.124	-0.214	-0.114	-0.213	-0.108
	(0.353)	(0.363)	(0.365)	(0.377)	(0.373)	(0.384)
Firm has formal business plan	0.102	-0.0348	0.131	-0.0166	0.137	-0.00192
	(0.0980)	(0.112)	(0.101)	(0.116)	(0.103)	(0.118)
Firm has non-executive directors	0.261**	0.266**	0.224*	0.257*	0.240**	0.261*
	(0.111)	(0.132)	(0.115)	(0.137)	(0.118)	(0.139)
(Owner-)Manager: equity in firm	-0.0448	-0.131	0.116	0.0542	0.0320	-0.0655
	(0.116)	(0.139)	(0.121)	(0.144)	(0.123)	(0.147)
Owner-Manager 25<35 years old	-0.103		0.186		-0.646	
	(0.780)		(0.807)		(0.824)	
Owner-Manager 35<45 years old	-0.365	-0.275	-0.138	-0.410*	-0.949	-0.387*
	(0.773)	(0.212)	(0.800)	(0.220)	(0.817)	(0.224)
Owner-Manager 45<55 years old	-0.493	-0.464***	-0.273	-0.624***	-1.072	-0.582***
	(0.770)	(0.210)	(0.797)	(0.217)	(0.814)	(0.222)
Owner-Manager >55 years old	-0.341	-0.229	-0.157	-0.405*	-0.948	-0.339
	(0.772)	(0.220)	(0.799)	(0.228)	(0.816)	(0.233)
Owner-Manager had previous firm	0.0886	0.126	0.110	0.142	0.128	0.168
	(0.0943)	(0.104)	(0.0976)	(0.108)	(0.0995)	(0.110)
SIC: Manufacturing	0.194	0.197	0.184	0.191	0.217	0.215
	(0.139)	(0.164)	(0.144)	(0.170)	(0.147)	(0.173)
SIC: Construction	0.206	0.180	0.216	0.228	0.145	0.146
	(0.162)	(0.183)	(0.168)	(0.190)	(0.171)	(0.193)
SICH: Retail & Wholesale	-0.000580	-0.0158	-0.00589	-0.0212	-0.0212	-0.0494
	(0.139)	(0.164)	(0.144)	(0.170)	(0.147)	(0.174)
SIC: Education	-0.103	-0.121	-0.115	-0.106	-0.114	-0.114
	(0.137)	(0.155)	(0.142)	(0.160)	(0.145)	(0.164)
Assistance Effect (IA)	0.109	0.171	0.0686	0.126	0.113	0.191
	(0.0951)	(0.143)	(0.0985)	(0.149)	(0.100)	(0.152)
Selection Effect (inverse mills)		0.0470		0.0578		0.0955
		(0.129)		(0.134)		(0.137)
Constant^	x	x	x	x	x	x
	x	x	x	x	x	x
Observations	322	256	322	256	322	256
R-squared	0.199	0.206	0.198	0.215	0.210	0.232

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Turnover 2.5, lagged growth, lag 2002-4

	(1) turn0405	(2) turn0405	(3) turn0406	(4) turn0406	(5) turn0407	(6) turn0407	(7) turn0408	(8) turn0408
Lag: Turnover growth 2002-3								
Lag: Turnover growth 2002-4	-0.237***	-0.256***	-0.175***	-0.164***	-0.192***	-0.160***	-0.211***	-0.201***
	(0.0333)	(0.0385)	(0.0489)	(0.0539)	(0.0562)	(0.0564)	(0.0591)	(0.0589)
Lag: Turnover growth 2003-4								
Employment 2004 (ELD)	-0.00224	-0.00149	-0.000112	-0.000126	0.000656	-8.85e-05	-0.00265	-0.00282
	(0.00172)	(0.00214)	(0.00253)	(0.00301)	(0.00291)	(0.00315)	(0.00306)	(0.00329)
Employment 2004 squared	1.38e-05	9.74e-06	6.08e-06	6.41e-06	-1.51e-06	5.72e-06	2.27e-05	2.72e-05
	(8.83e-06)	(1.14e-05)	(1.29e-05)	(1.60e-05)	(1.48e-05)	(1.68e-05)	(1.56e-05)	(1.75e-05)
Firm age: 3<5 years	-0.0910	-0.110	-0.0886	-0.0983	0.0882	0.109	0.0213	0.0544
	(0.240)	(0.265)	(0.349)	(0.370)	(0.401)	(0.388)	(0.422)	(0.405)
Firm age: 5<10 years	-0.250	-0.262	-0.452	-0.474	-0.261	-0.293	-0.466	-0.479
	(0.232)	(0.257)	(0.338)	(0.359)	(0.389)	(0.376)	(0.409)	(0.392)
Firm age: 10<20 years	-0.423*	-0.436*	-0.494	-0.492	-0.421	-0.386	-0.635	-0.565
	(0.230)	(0.256)	(0.335)	(0.357)	(0.385)	(0.374)	(0.405)	(0.390)
Firm age: >20 years	-0.457**	-0.476*	-0.612*	-0.580	-0.496	-0.463	-0.668*	-0.647*
	(0.230)	(0.255)	(0.335)	(0.357)	(0.385)	(0.373)	(0.404)	(0.390)
Legal form: Limited liability	0.0548	0.0519	-0.0164	0.0226	-0.0103	0.0685	-0.00480	0.0899
	(0.0893)	(0.111)	(0.131)	(0.158)	(0.151)	(0.165)	(0.159)	(0.173)
Multi-site firm	0.109	0.115	0.227**	0.228*	0.268**	0.325**	0.166	0.264**
	(0.0697)	(0.0866)	(0.102)	(0.121)	(0.117)	(0.127)	(0.123)	(0.133)
Exporting firm	0.139**	0.171**	0.0835	0.0778	0.0561	-0.0187	0.0271	-0.0686
	(0.0602)	(0.0732)	(0.0878)	(0.102)	(0.101)	(0.107)	(0.106)	(0.112)
Firm in competitive environ.	-0.00859	-0.0107	-0.0608	-0.128	-0.115	-0.161	-0.113	-0.108
	(0.0577)	(0.0726)	(0.0843)	(0.102)	(0.0969)	(0.107)	(0.102)	(0.111)
Firm faces price elastic demand	-0.0227	-0.0201	-0.114	-0.120	-0.0813	-0.0775	-0.0814	-0.151
	(0.0633)	(0.0775)	(0.0923)	(0.108)	(0.106)	(0.113)	(0.111)	(0.118)
Strategy: Maintain sales	0.240*	0.220	0.145	0.122	0.0780	0.0197	0.226	0.211
	(0.145)	(0.168)	(0.211)	(0.235)	(0.242)	(0.246)	(0.255)	(0.256)
Strategy: Penetrate market	0.228	0.223	0.183	0.189	0.125	0.112	0.277	0.354
	(0.139)	(0.161)	(0.202)	(0.225)	(0.232)	(0.235)	(0.244)	(0.246)
Strategy: New markets	0.457***	0.457**	0.269	0.192	0.147	0.0731	0.366	0.390
	(0.158)	(0.193)	(0.230)	(0.270)	(0.265)	(0.282)	(0.278)	(0.295)
Strategy: New products	0.0385	0.0641	0.126	0.179	-0.109	-0.0868	0.175	0.346
	(0.219)	(0.246)	(0.319)	(0.343)	(0.366)	(0.359)	(0.385)	(0.375)
Firm has formal business plan	0.0327	0.0189	0.0383	-0.0269	0.0438	-0.0517	0.0689	-0.0955
	(0.0575)	(0.0714)	(0.0844)	(0.100)	(0.0969)	(0.105)	(0.102)	(0.110)
Firm has non-executive directors	-0.00964	-0.0130	-0.000210	0.0309	0.0426	0.0605	0.00438	0.0468
	(0.0648)	(0.0823)	(0.0945)	(0.115)	(0.109)	(0.120)	(0.114)	(0.126)
(Owner-)Manager: equity in firm	-0.0956	-0.0936	0.0143	-0.0612	0.0328	-0.111	-0.200*	-0.276**
	(0.0679)	(0.0880)	(0.0989)	(0.123)	(0.114)	(0.129)	(0.119)	(0.135)
Owner-Manager 25<35 years old	0.0705	0.0278	0.348	0.180	0.443	0.123	0.595	0.302
	(0.442)	(0.139)	(0.643)	(0.195)	(0.738)	(0.204)	(0.776)	(0.213)
Owner-Manager 35<45 years old	0.0554	-0.0140	0.245	0.0206	0.288	0.0658	0.326	0.105
	(0.438)	(0.0868)	(0.637)	(0.122)	(0.731)	(0.128)	(0.769)	(0.133)
Owner-Manager 45<55 years old	-0.0158	-0.0899	0.232	-0.0107	0.308	-0.0139	0.306	-0.0545
	(0.436)	(0.0837)	(0.635)	(0.117)	(0.729)	(0.122)	(0.766)	(0.128)
Owner-Manager >55 years old	0.0754		0.246		0.304		0.301	
	(0.437)		(0.636)		(0.730)		(0.768)	
Owner-Manager had previous firm	0.0775	0.0846	0.146*	0.133	0.170*	0.156	0.113	0.0895
	(0.0558)	(0.0666)	(0.0813)	(0.0932)	(0.0933)	(0.0975)	(0.0981)	(0.102)
SIC: Manufacturing	-0.145*	-0.219**	-0.120	-0.187	-0.0480	-0.0958	-0.0474	-0.0383
	(0.0798)	(0.102)	(0.117)	(0.143)	(0.134)	(0.150)	(0.141)	(0.156)
SIC: Construction	-0.0921	-0.139	-0.0772	-0.0859	0.00554	-0.0242	0.0597	0.149
	(0.0938)	(0.114)	(0.137)	(0.160)	(0.157)	(0.167)	(0.165)	(0.174)
SICH: Retail & Wholesale	-0.0519	-0.165	-0.0401	-0.105	0.0660	-0.0236	0.0398	-0.0372
	(0.0802)	(0.103)	(0.117)	(0.144)	(0.134)	(0.151)	(0.141)	(0.158)
SIC: Education	-0.0879	-0.148	-0.139	-0.175	-0.0171	-0.0532	-0.0428	-0.0446
	(0.0807)	(0.0980)	(0.118)	(0.137)	(0.135)	(0.144)	(0.142)	(0.150)
Assistance Effect (IA)	-0.0882	0.000378	-0.153*	-0.148	-0.0798	-0.148	-0.0591	-0.0299
	(0.0549)	(0.0896)	(0.0804)	(0.126)	(0.0923)	(0.132)	(0.0971)	(0.138)
Selection Effect (inverse mills)		0.109		-0.0196		-0.0331		0.0405
		(0.0804)		(0.113)		(0.118)		(0.123)
Constant	x	x	x	x	x	x	x	x
	x	x	x	x	x	x	x	x
Observations	302	240	300	239	300	239	300	239
R-squared	0.282	0.301	0.151	0.163	0.133	0.164	0.169	0.232

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Turnover 2.6, lagged growth models, lag 2002-4

	(9) turn0409	(10) turn0409	(11) turn0410	(12) turn0410	(13) turn0411	(14) turn0411
Lag: Turnover growth 2002-3						
Lag: Turnover growth 2002-4	-0.172**	-0.160**	-0.131**	-0.125*	-0.122	-0.109
	(0.0682)	(0.0687)	(0.0656)	(0.0654)	(0.0773)	(0.0823)
Lag: Turnover growth 2003-4						
Employment 2004 (ELD)	-0.00157	-0.00134	-0.00124	-0.00226	-0.000980	-0.00210
	(0.00326)	(0.00353)	(0.00340)	(0.00366)	(0.00400)	(0.00460)
Employment 2004 squared	1.77e-05	2.08e-05	1.39e-05	2.23e-05	1.60e-05	2.38e-05
	(1.67e-05)	(1.88e-05)	(1.73e-05)	(1.95e-05)	(2.04e-05)	(2.45e-05)
Firm age: 3<5 years	0.656	0.792*	-0.167	-0.00724	-0.0993	0.103
	(0.487)	(0.467)	(0.469)	(0.449)	(0.552)	(0.565)
Firm age: 5<10 years	0.147	0.180	-0.652	-0.608	-0.663	-0.628
	(0.478)	(0.458)	(0.454)	(0.435)	(0.535)	(0.547)
Firm age: 10<20 years	-0.0138	0.0831	-0.754*	-0.623	-0.710	-0.573
	(0.477)	(0.458)	(0.450)	(0.434)	(0.530)	(0.546)
Firm age: >20 years	-0.0643	-0.0451	-0.794*	-0.685	-0.747	-0.658
	(0.477)	(0.458)	(0.449)	(0.433)	(0.529)	(0.544)
Legal form: Limited liability	-0.0895	0.0402	-0.0412	0.00834	-0.102	-0.0110
	(0.169)	(0.185)	(0.176)	(0.192)	(0.208)	(0.241)
Multi-site firm	0.126	0.262*	0.105	0.223	0.149	0.310*
	(0.131)	(0.142)	(0.136)	(0.147)	(0.161)	(0.186)
Exporting firm	0.0157	-0.0794	0.0525	-0.0171	-0.0373	-0.162
	(0.113)	(0.120)	(0.118)	(0.124)	(0.139)	(0.157)
Firm in competitive environ.	-0.0542	-0.0438	-0.110	-0.118	-0.0695	-0.108
	(0.109)	(0.120)	(0.113)	(0.124)	(0.134)	(0.157)
Firm faces price elastic	-0.0620	-0.132	-0.154	-0.222*	-0.142	-0.175
	(0.119)	(0.127)	(0.124)	(0.131)	(0.148)	(0.167)
Strategy: Maintain sales	0.381	0.232	0.125	0.111	0.232	0.199
	(0.272)	(0.275)	(0.283)	(0.285)	(0.333)	(0.358)
Strategy: Penetrate market	0.490*	0.459*	0.282	0.260	0.244	0.255
	(0.260)	(0.263)	(0.271)	(0.273)	(0.319)	(0.343)
Strategy: New markets	0.609**	0.497	0.261	0.202	0.348	0.245
	(0.297)	(0.316)	(0.309)	(0.327)	(0.367)	(0.416)
Strategy: New products	0.261	0.314	-0.0341	0.0681	0.0439	0.135
	(0.411)	(0.402)	(0.428)	(0.417)	(0.504)	(0.524)
Firm has formal business plan	0.0538	-0.124	0.169	0.00493	0.134	-0.0189
	(0.109)	(0.117)	(0.113)	(0.122)	(0.134)	(0.154)
Firm has non-executive	0.0130	-0.00204	-0.0279	-0.0134	0.0962	0.141
	(0.122)	(0.134)	(0.127)	(0.139)	(0.149)	(0.175)
(Owner-)Manager: equity in	-0.167	-0.278*	-0.146	-0.278*	-0.177	-0.336*
	(0.128)	(0.146)	(0.133)	(0.149)	(0.156)	(0.188)
Owner-Manager 25<35 years	0.611		0.844	0.343	1.017	0.535*
	(0.828)		(0.862)	(0.237)	(1.016)	(0.298)
Owner-Manager 35<45 years	0.278	-0.261	0.631	0.183	0.709	0.211
	(0.820)	(0.218)	(0.854)	(0.148)	(1.006)	(0.186)
Owner-Manager 45<55 years	0.225	-0.470**	0.538	-0.0499	0.558	-0.0855
	(0.818)	(0.218)	(0.851)	(0.142)	(1.003)	(0.179)
Owner-Manager >55 years old	0.297	-0.297	0.468		0.471	
	(0.819)	(0.228)	(0.853)		(1.005)	
Owner-Manager had previous	0.175*	0.167	0.227**	0.190*	0.169	0.130
	(0.105)	(0.110)	(0.109)	(0.113)	(0.129)	(0.143)
SIC: Manufacturing	-0.0657	-0.00904	-0.165	-0.216	-0.0911	-0.0511
	(0.150)	(0.168)	(0.156)	(0.174)	(0.185)	(0.220)
SIC: Construction	0.115	0.220	-0.0660	0.0697	-0.136	0.0774
	(0.176)	(0.187)	(0.183)	(0.194)	(0.216)	(0.243)
SICH: Retail & Wholesale	0.0676	0.0241	-0.284*	-0.300*	-0.0762	-0.0627
	(0.151)	(0.169)	(0.157)	(0.175)	(0.185)	(0.221)
SIC: Education	-0.0756	-0.0309	-0.157	-0.0994	-0.0152	0.0943
	(0.152)	(0.161)	(0.158)	(0.167)	(0.186)	(0.210)
Assistance Effect (IA)	-0.00247	0.0112	-0.148	-0.175	-0.159	-0.206
	(0.104)	(0.148)	(0.108)	(0.153)	(0.127)	(0.192)
Selection Effect (inverse mills)		0.0518		0.0774		0.102
		(0.132)		(0.137)		(0.173)
Constant	x	x	x	x	x	x
	x	x	x	x	x	x
Observations	299	238	300	239	299	238
R-squared	0.144	0.214	0.160	0.219	0.120	0.171

Standard errors in
*** p<0.01, ** p<0.05, * p<0.1

Turnover 2.7, lagged growth models, lag 2003-4

	(15) turn0405	(16) turn0405	(17) turn0406	(18) turn0406	(19) turn0407	(20) turn0407	(21) turn0408	(22) turn0408
Lag: Turnover growth 2002-3								
Lag: Turnover growth 2002-4								
Lag: Turnover growth 2003-4	-0.488***	-0.523***	-0.279***	-0.287***	-0.312***	-0.309***	-0.392***	-0.385***
	(0.0459)	(0.0471)	(0.0701)	(0.0734)	(0.0796)	(0.0761)	(0.0847)	(0.0821)
Employment 2004 (ELD)	-0.00175	-0.00143	0.000507	-6.10e-05	0.000392	-0.000716	-0.00264	-0.00334
	(0.00174)	(0.00190)	(0.00268)	(0.00300)	(0.00304)	(0.00311)	(0.00323)	(0.00335)
Employment 2004 squared	9.68e-06	7.44e-06	1.67e-07	3.57e-06	-2.99e-06	6.03e-06	1.91e-05	2.76e-05
	(8.75e-06)	(1.02e-05)	(1.34e-05)	(1.60e-05)	(1.53e-05)	(1.66e-05)	(1.62e-05)	(1.80e-05)
Firm age: 3<5 years	0.657***	0.245	0.426**	-0.0492	0.678***	0.185	0.883***	0.450*
	(0.141)	(0.154)	(0.215)	(0.240)	(0.245)	(0.249)	(0.260)	(0.268)
Firm age: 5<10 years	0.435***	0.0499	0.0780	-0.393*	0.323	-0.202	0.280	-0.186
	(0.134)	(0.146)	(0.204)	(0.228)	(0.232)	(0.236)	(0.247)	(0.255)
Firm age: 10<20 years	0.311**	-0.0486	0.0649	-0.359	0.188	-0.274	0.150	-0.244
	(0.134)	(0.146)	(0.204)	(0.228)	(0.232)	(0.237)	(0.247)	(0.256)
Firm age: >20 years	0.264**	-0.110	-0.0482	-0.464**	0.111	-0.360	0.128	-0.321
	(0.132)	(0.145)	(0.202)	(0.226)	(0.229)	(0.235)	(0.244)	(0.253)
Legal form: Limited liability	0.0980	0.0501	-0.00178	-0.00416	0.0184	0.0507	0.0541	0.0897
	(0.0890)	(0.0985)	(0.137)	(0.157)	(0.156)	(0.163)	(0.166)	(0.176)
Multi-site firm	0.131*	0.0938	0.244**	0.219*	0.273**	0.316**	0.168	0.251*
	(0.0690)	(0.0754)	(0.105)	(0.118)	(0.120)	(0.122)	(0.127)	(0.132)
Exporting firm	0.141**	0.127**	0.0623	0.0147	0.0239	-0.0678	0.00417	-0.0931
	(0.0597)	(0.0638)	(0.0912)	(0.0995)	(0.104)	(0.103)	(0.110)	(0.111)
Firm in competitive environ.	0.0553	0.0897	0.0183	-0.0124	0.0217	-0.0320	0.0196	-0.0132
	(0.0575)	(0.0637)	(0.0880)	(0.0999)	(0.100)	(0.104)	(0.106)	(0.112)
Firm faces price elastic demand	-0.100	-0.124*	-0.193**	-0.220**	-0.195*	-0.193*	-0.213*	-0.269**
	(0.0638)	(0.0691)	(0.0974)	(0.108)	(0.111)	(0.112)	(0.118)	(0.121)
Strategy: Maintain sales	0.304**	0.278**	0.0724	0.0412	-0.139	-0.175	-0.0744	-0.0967
	(0.133)	(0.134)	(0.203)	(0.210)	(0.231)	(0.218)	(0.245)	(0.235)
Strategy: Penetrate market	0.259**	0.253**	0.0795	0.0878	-0.0876	-0.110	-0.00932	0.0187
	(0.126)	(0.128)	(0.193)	(0.200)	(0.219)	(0.207)	(0.233)	(0.224)
Strategy: New markets	0.396***	0.392**	-0.00729	-0.131	-0.236	-0.368	-0.0812	-0.166
	(0.149)	(0.159)	(0.227)	(0.248)	(0.258)	(0.257)	(0.274)	(0.278)
Strategy: New products	0.336	0.311	0.101	0.0674	-0.134	-0.241	-0.105	-0.114
	(0.205)	(0.202)	(0.313)	(0.315)	(0.355)	(0.326)	(0.378)	(0.352)
Firm has formal business plan	0.0491	0.0638	0.0756	0.0531	0.0972	0.0316	0.105	-0.0469
	(0.0567)	(0.0619)	(0.0871)	(0.0970)	(0.0990)	(0.101)	(0.105)	(0.109)
Firm has non-executive directors	-0.0444	0.0377	-0.0408	0.0913	0.0314	0.0937	0.00786	0.0760
	(0.0645)	(0.0730)	(0.0985)	(0.114)	(0.112)	(0.118)	(0.119)	(0.128)
(Owner-)Manager: equity in firm	-0.116*	-0.113	-0.0189	-0.0833	-0.00276	-0.124	-0.204	-0.271**
	(0.0676)	(0.0769)	(0.103)	(0.120)	(0.117)	(0.125)	(0.125)	(0.135)
Owner-Manager 25<35 years old	-0.0220		0.233	0.279	0.202	0.224	0.375	0.362*
	(0.452)		(0.689)	(0.192)	(0.783)	(0.199)	(0.833)	(0.215)
Owner-Manager 35<45 years old	0.0902	-0.135	0.265	-0.0116	0.215	0.0471	0.275	0.0996
	(0.448)	(0.118)	(0.683)	(0.119)	(0.777)	(0.124)	(0.826)	(0.134)
Owner-Manager 45<55 years old	0.0203	-0.191	0.284	0.0205	0.251	0.0272	0.254	-0.00763
	(0.447)	(0.117)	(0.681)	(0.116)	(0.774)	(0.120)	(0.823)	(0.130)
Owner-Manager >55 years old	0.0716	-0.142	0.268		0.218		0.213	
	(0.448)	(0.123)	(0.683)		(0.776)		(0.825)	
Owner-Manager had previous firm	0.0589	0.0344	0.126	0.0848	0.138	0.144	0.0954	0.0999
	(0.0546)	(0.0577)	(0.0833)	(0.0900)	(0.0947)	(0.0933)	(0.101)	(0.101)
SIC: Manufacturing	-0.105	-0.111	-0.0351	-0.0371	0.0395	0.0718	0.0577	0.146
	(0.0803)	(0.0907)	(0.123)	(0.142)	(0.140)	(0.147)	(0.149)	(0.159)
SIC: Construction	-0.101	-0.120	-0.0419	-0.0129	-0.00137	0.0157	0.0797	0.205
	(0.0938)	(0.101)	(0.143)	(0.158)	(0.163)	(0.164)	(0.173)	(0.177)
SICH: Retail & Wholesale	-0.0577	-0.144	-0.0169	-0.0846	0.0562	-0.0287	0.0281	-0.0430
	(0.0805)	(0.0908)	(0.123)	(0.142)	(0.140)	(0.148)	(0.149)	(0.159)
SIC: Education	-0.151*	-0.183**	-0.207*	-0.218	-0.150	-0.141	-0.0992	-0.0555
	(0.0802)	(0.0864)	(0.122)	(0.135)	(0.139)	(0.140)	(0.148)	(0.151)
Assistance Effect (IA)	-0.0630	-0.0139	-0.161*	-0.170	-0.0451	-0.140	-0.00125	-0.0208
	(0.0550)	(0.0794)	(0.0843)	(0.125)	(0.0958)	(0.129)	(0.102)	(0.140)
Selection Effect (inverse mills)		0.0532		-0.0256		-0.0287		0.0176
		(0.0715)		(0.112)		(0.116)		(0.126)
Constant	x	x	x	x	x	x	x	x
	x	x	x	x	x	x	x	x
Observations	323	256	321	255	321	255	321	255
R-squared	0.358	0.425	0.124	0.166	0.120	0.184	0.165	0.253

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Turnover 2.8, lagged growth models, lag 2003-4

	(23) turn0409	(24) turn0409	(25) turn0410	(26) turn0410	(27) turn0411	(28) turn0411
Lag: Turnover growth 2002-3						
Lag: Turnover growth 2002-4						
Lag: Turnover growth 2003-4	-0.316***	-0.330***	-0.286***	-0.240***	-0.301***	-0.250**
	(0.102)	(0.100)	(0.0937)	(0.0909)	(0.108)	(0.112)
Employment 2004 (ELD)	-0.00177	-0.00266	-0.000930	-0.00293	-0.000859	-0.00303
	(0.00339)	(0.00351)	(0.00358)	(0.00371)	(0.00413)	(0.00458)
Employment 2004 squared	1.24e-05	2.45e-05	6.73e-06	2.43e-05	9.06e-06	2.63e-05
	(1.70e-05)	(1.88e-05)	(1.80e-05)	(1.99e-05)	(2.07e-05)	(2.45e-05)
Firm age: 3<5 years	0.893***	0.619**	0.639**	0.341	0.615*	0.450
	(0.275)	(0.285)	(0.288)	(0.297)	(0.332)	(0.367)
Firm age: 5<10 years	0.353	-0.0178	0.0636	-0.326	-0.0265	-0.333
	(0.264)	(0.274)	(0.273)	(0.282)	(0.315)	(0.349)
Firm age: 10<20 years	0.224	-0.0781	-0.0393	-0.349	-0.0932	-0.321
	(0.263)	(0.273)	(0.273)	(0.283)	(0.315)	(0.350)
Firm age: >20 years	0.183	-0.235	-0.0452	-0.403	-0.0896	-0.384
	(0.261)	(0.272)	(0.269)	(0.281)	(0.311)	(0.346)
Legal form: Limited liability	-0.00522	0.0266	0.0215	-0.0160	-0.0377	-0.0272
	(0.174)	(0.184)	(0.183)	(0.194)	(0.212)	(0.240)
Multi-site firm	0.120	0.276**	0.0748	0.183	0.136	0.299*
	(0.133)	(0.138)	(0.141)	(0.146)	(0.163)	(0.181)
Exporting firm	-0.0371	-0.119	0.0226	-0.0271	-0.0720	-0.171
	(0.115)	(0.117)	(0.122)	(0.123)	(0.141)	(0.153)
Firm in competitive environ.	0.101	0.0524	0.0308	-0.0490	0.0941	-0.0130
	(0.112)	(0.117)	(0.118)	(0.124)	(0.137)	(0.155)
Firm faces price elastic	-0.195	-0.241*	-0.277**	-0.321**	-0.287*	-0.292*
	(0.123)	(0.126)	(0.130)	(0.133)	(0.152)	(0.167)
Strategy: Maintain sales	-0.108	-0.221	-0.247	-0.264	-0.189	-0.217
	(0.258)	(0.246)	(0.272)	(0.260)	(0.313)	(0.321)
Strategy: Penetrate market	0.0126	-0.0335	-0.0805	-0.153	-0.161	-0.199
	(0.244)	(0.234)	(0.258)	(0.247)	(0.297)	(0.305)
Strategy: New markets	-0.00705	-0.199	-0.174	-0.312	-0.210	-0.430
	(0.287)	(0.290)	(0.303)	(0.307)	(0.353)	(0.384)
Strategy: New products	-0.0260	-0.0861	-0.481	-0.530	-0.456	-0.509
	(0.396)	(0.369)	(0.418)	(0.390)	(0.483)	(0.482)
Firm has formal business plan	0.125	-0.0388	0.225*	0.0631	0.211	0.0611
	(0.110)	(0.114)	(0.117)	(0.120)	(0.135)	(0.149)
Firm has non-executive	0.0145	0.00802	-0.00508	0.0239	0.130	0.174
	(0.125)	(0.133)	(0.132)	(0.141)	(0.152)	(0.174)
(Owner-)Manager: equity in	-0.143	-0.286**	-0.129	-0.270*	-0.148	-0.320*
	(0.132)	(0.143)	(0.138)	(0.149)	(0.159)	(0.184)
Owner-Manager 25<35 years	0.443		0.722	0.453*	0.880	
	(0.873)		(0.922)	(0.238)	(1.063)	
Owner-Manager 35<45 years	0.154	-0.408*	0.532	0.139	0.587	-0.462
	(0.866)	(0.216)	(0.914)	(0.148)	(1.054)	(0.282)
Owner-Manager 45<55 years	0.102	-0.538**	0.456	-0.00569	0.449	-0.671**
	(0.862)	(0.214)	(0.910)	(0.144)	(1.050)	(0.280)
Owner-Manager >55 years old	0.149	-0.429*	0.372		0.356	-0.614**
	(0.865)	(0.226)	(0.913)		(1.052)	(0.294)
Owner-Manager had previous	0.136	0.176*	0.211*	0.217*	0.160	0.181
	(0.106)	(0.106)	(0.111)	(0.111)	(0.129)	(0.138)
SIC: Manufacturing	0.0647	0.183	-0.0436	-0.0485	0.0509	0.143
	(0.156)	(0.166)	(0.164)	(0.176)	(0.190)	(0.218)
SIC: Construction	0.167	0.294	-0.0194	0.136	-0.0857	0.139
	(0.181)	(0.185)	(0.191)	(0.195)	(0.221)	(0.241)
SICH: Retail & Wholesale	0.0542	-9.56e-05	-0.252	-0.280	-0.0783	-0.0821
	(0.156)	(0.167)	(0.164)	(0.176)	(0.190)	(0.219)
SIC: Education	-0.182	-0.117	-0.219	-0.142	-0.104	0.0225
	(0.155)	(0.158)	(0.164)	(0.168)	(0.189)	(0.207)
Assistance Effect (IA)	0.0588	0.0405	-0.104	-0.204	-0.103	-0.206
	(0.107)	(0.146)	(0.113)	(0.154)	(0.130)	(0.191)
Selection Effect (inverse mills)		0.0834		0.0601		0.0994
		(0.131)		(0.139)		(0.172)
Constant	x	x	x	x	x	x
	x	x	x	x	x	x
Observations	320	254	321	255	320	254
R-squared	0.138	0.227	0.152	0.234	0.118	0.185

Standard errors in
*** p<0.01, ** p<0.05, * p<0.1

Productivity 2.9, lagged growth models, lag 2002-4

	(1) prod0405	(2) prod0405	(3) prod0406	(4) prod0406	(5) prod0407	(6) prod0407	(7) prod0408	(8) prod0408
Lag: Productivity growth 2002-3								
Lag: Productivity growth 2002-4	-0.335***	-0.341***	-0.324***	-0.264***	-0.381***	-0.303***	-0.457***	-0.415***
	(0.0392)	(0.0395)	(0.0577)	(0.0598)	(0.0641)	(0.0622)	(0.0591)	(0.0590)
Lag: Productivity growth 2003-4								
Employment 2004 (ELD)	-0.000416	-0.00154	0.00696**	0.00541	0.00897***	0.00775**	0.00564*	0.00463
	(0.00207)	(0.00220)	(0.00306)	(0.00336)	(0.00340)	(0.00350)	(0.00314)	(0.00332)
Employment 2004 squared	6.54e-06	1.01e-05	-2.22e-05	-1.62e-05	-3.96e-05**	-3.26e-05*	-1.54e-05	-9.65e-06
	(1.06e-05)	(1.17e-05)	(1.56e-05)	(1.79e-05)	(1.74e-05)	(1.86e-05)	(1.60e-05)	(1.77e-05)
Firm age: 3<5 years	0.119	0.104	0.510	0.437	0.627	0.579	0.546	0.516
	(0.288)	(0.274)	(0.422)	(0.415)	(0.469)	(0.432)	(0.433)	(0.410)
Firm age: 5<10 years	-0.0464	-0.108	0.325	0.185	0.449	0.271	0.318	0.171
	(0.279)	(0.265)	(0.409)	(0.402)	(0.455)	(0.418)	(0.419)	(0.397)
Firm age: 10<20 years	-0.169	-0.175	0.247	0.194	0.299	0.277	0.155	0.163
	(0.278)	(0.266)	(0.408)	(0.403)	(0.453)	(0.419)	(0.418)	(0.397)
Firm age: >20 years	-0.167	-0.125	0.227	0.240	0.311	0.304	0.260	0.261
	(0.278)	(0.266)	(0.408)	(0.403)	(0.454)	(0.419)	(0.418)	(0.398)
Legal form: Limited liability	0.0315	0.0692	0.0358	-0.00307	0.147	0.130	0.152	0.163
	(0.107)	(0.114)	(0.159)	(0.177)	(0.177)	(0.184)	(0.163)	(0.175)
Multi-site firm	-0.0385	0.00383	-0.0521	-0.0731	0.00243	-0.0159	-0.0770	-0.0470
	(0.0833)	(0.0894)	(0.122)	(0.136)	(0.136)	(0.141)	(0.125)	(0.134)
Exporting firm	0.112	0.123	0.0461	0.0326	-0.0301	-0.103	-0.0529	-0.141
	(0.0723)	(0.0757)	(0.106)	(0.115)	(0.118)	(0.119)	(0.109)	(0.113)
Firm in competitive environ.	-0.0294	-0.00475	-0.0258	-0.102	-0.122	-0.158	-0.159	-0.163
	(0.0692)	(0.0749)	(0.102)	(0.114)	(0.113)	(0.119)	(0.104)	(0.112)
Firm faces price elastic demand	0.0211	0.0463	-0.0877	-0.0637	0.0342	0.0579	0.0159	-0.0184
	(0.0758)	(0.0800)	(0.111)	(0.121)	(0.124)	(0.126)	(0.114)	(0.120)
Strategy: Maintain sales	0.201	0.234	0.0748	0.0329	-0.0623	-0.150	0.123	0.0791
	(0.174)	(0.173)	(0.255)	(0.263)	(0.283)	(0.273)	(0.262)	(0.259)
Strategy: Penetrate market	0.167	0.226	0.208	0.203	0.0182	-0.0270	0.159	0.209
	(0.166)	(0.166)	(0.244)	(0.252)	(0.271)	(0.262)	(0.250)	(0.248)
Strategy: New markets	0.499***	0.529***	0.369	0.279	0.122	0.0447	0.335	0.357
	(0.190)	(0.199)	(0.278)	(0.302)	(0.309)	(0.314)	(0.285)	(0.298)
Strategy: New products	-0.101	-0.0714	0.00511	-0.0443	-0.288	-0.392	-0.0405	-0.0102
	(0.263)	(0.254)	(0.386)	(0.385)	(0.429)	(0.400)	(0.396)	(0.380)
Firm has formal business plan	-0.0597	-0.0174	-0.0249	-0.000338	-0.0938	-0.0812	-0.0564	-0.0813
	(0.0689)	(0.0738)	(0.102)	(0.112)	(0.113)	(0.117)	(0.105)	(0.111)
Firm has non-executive directors	-0.0647	-0.00960	-0.0951	-0.0203	-0.127	-0.0493	-0.182	-0.112
	(0.0777)	(0.0848)	(0.114)	(0.129)	(0.127)	(0.134)	(0.117)	(0.127)
(Owner-)Manager: equity in firm	-0.0927	-0.0517	0.116	0.0824	0.131	0.0337	-0.0877	-0.0930
	(0.0814)	(0.0908)	(0.120)	(0.138)	(0.133)	(0.143)	(0.123)	(0.136)
Owner-Manager 25<35 years old	0.136	-0.120	0.532	0.276	0.477	0.0891	0.603	0.237
	(0.530)	(0.143)	(0.777)	(0.218)	(0.864)	(0.226)	(0.797)	(0.215)
Owner-Manager 35<45 years old	0.184	-0.0613	0.334	-0.0184	0.392	0.128	0.453	0.228*
	(0.525)	(0.0897)	(0.769)	(0.137)	(0.855)	(0.142)	(0.789)	(0.135)
Owner-Manager 45<55 years old	0.122	-0.0878	0.412	0.112	0.464	0.155	0.473	0.158
	(0.523)	(0.0864)	(0.767)	(0.131)	(0.852)	(0.136)	(0.786)	(0.129)
Owner-Manager >55 years old	0.309		0.418		0.406		0.382	
	(0.524)		(0.768)		(0.854)		(0.788)	
Owner-Manager had previous firm	0.101	0.0533	0.124	0.0252	0.136	0.0415	0.110	0.0134
	(0.0669)	(0.0688)	(0.0981)	(0.104)	(0.109)	(0.109)	(0.101)	(0.103)
SIC: Manufacturing	-0.170*	-0.253**	-0.256*	-0.272*	-0.198	-0.244	-0.207	-0.207
	(0.0955)	(0.105)	(0.141)	(0.160)	(0.156)	(0.166)	(0.144)	(0.158)
SIC: Construction	-0.309***	-0.265**	-0.270	-0.197	-0.215	-0.200	-0.169	-0.0652
	(0.112)	(0.118)	(0.165)	(0.179)	(0.183)	(0.186)	(0.169)	(0.176)
SICH: Retail & Wholesale	-0.0558	-0.149	0.0640	0.0783	0.143	0.122	0.0746	0.0380
	(0.0962)	(0.106)	(0.141)	(0.162)	(0.157)	(0.168)	(0.145)	(0.159)
SIC: Education	-0.162*	-0.176*	-0.104	-0.0394	0.0150	0.0546	-0.0768	-0.0417
	(0.0968)	(0.101)	(0.142)	(0.154)	(0.158)	(0.160)	(0.146)	(0.152)
Assistance Effect (IA)	-0.0645	0.00517	-0.249**	-0.373***	-0.166	-0.396***	-0.100	-0.197
	(0.0659)	(0.0928)	(0.0973)	(0.142)	(0.108)	(0.147)	(0.0997)	(0.140)
Selection Effect (inverse mills)		0.0585		-0.128		-0.220*		-0.0956
		(0.0830)		(0.126)		(0.132)		(0.125)
Constant^	x	x	x	x	x	x	x	x
	x	x	x	x	x	x	x	x
Observations	302	240	300	239	300	239	300	239
R-squared	0.315	0.356	0.205	0.198	0.194	0.206	0.268	0.286

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Productivity 2.10, lagged growth models, lag 2002-4

	(9) prod0409	(10) prod0409	(11) prod0410	(12) prod0410	(13) prod0411	(14) prod0411
Lag: Productivity growth 2002-3						
Lag: Productivity growth 2002-4	-0.423***	-0.401***	-0.402***	-0.322***	-0.388***	-0.336***
	(0.0569)	(0.0591)	(0.0642)	(0.0659)	(0.0668)	(0.0715)
Lag: Productivity growth 2003-4						
Employment 2004 (ELD)	0.00936***	0.00945***	0.00895***	0.00744**	0.0103***	0.00983**
	(0.00288)	(0.00315)	(0.00340)	(0.00370)	(0.00354)	(0.00402)
Employment 2004 squared	-3.08e-05**	-2.96e-05*	-3.10e-05*	-2.14e-05	-3.35e-05*	-2.89e-05
	(1.47e-05)	(1.68e-05)	(1.74e-05)	(1.97e-05)	(1.81e-05)	(2.14e-05)
Firm age: 3<5 years	0.365	0.420	-0.403	-0.465	-0.459	-0.434
	(0.430)	(0.420)	(0.470)	(0.458)	(0.489)	(0.496)
Firm age: 5<10 years	0.239	0.168	-0.542	-0.741*	-0.707	-0.876*
	(0.422)	(0.411)	(0.455)	(0.443)	(0.473)	(0.480)
Firm age: 10<20 years	0.0518	0.0677	-0.632	-0.706	-0.712	-0.758
	(0.421)	(0.411)	(0.454)	(0.444)	(0.472)	(0.482)
Firm age: >20 years	0.144	0.119	-0.563	-0.605	-0.631	-0.672
	(0.421)	(0.412)	(0.454)	(0.444)	(0.472)	(0.482)
Legal form: Limited liability	0.00377	-0.0322	0.0979	0.0419	0.0191	-0.0259
	(0.149)	(0.166)	(0.177)	(0.195)	(0.184)	(0.211)
Multi-site firm	-0.0959	-0.0374	-0.217	-0.205	-0.193	-0.161
	(0.115)	(0.127)	(0.136)	(0.150)	(0.142)	(0.163)
Exporting firm	0.0191	-0.0218	0.0436	0.0282	-0.00915	-0.0731
	(0.0997)	(0.107)	(0.118)	(0.126)	(0.123)	(0.137)
Firm in competitive environ.	-0.0614	-0.0647	-0.112	-0.100	-0.0693	-0.101
	(0.0959)	(0.107)	(0.113)	(0.126)	(0.119)	(0.138)
Firm faces price elastic demand	-0.00990	-0.0256	-0.00742	-0.0250	0.00162	0.0207
	(0.105)	(0.113)	(0.124)	(0.134)	(0.131)	(0.147)
Strategy: Maintain sales	0.392	0.237	0.0867	0.0405	0.120	0.0283
	(0.240)	(0.246)	(0.284)	(0.290)	(0.295)	(0.314)
Strategy: Penetrate market	0.434*	0.400*	0.224	0.168	0.114	0.103
	(0.229)	(0.235)	(0.271)	(0.277)	(0.282)	(0.301)
Strategy: New markets	0.698***	0.574**	0.417	0.323	0.421	0.278
	(0.261)	(0.282)	(0.310)	(0.333)	(0.325)	(0.365)
Strategy: New products	0.0437	-0.0279	-0.224	-0.239	-0.245	-0.311
	(0.362)	(0.360)	(0.429)	(0.424)	(0.447)	(0.460)
Firm has formal business plan	-0.0559	-0.0968	0.00474	-0.00398	-0.0330	-0.0407
	(0.0957)	(0.105)	(0.113)	(0.124)	(0.119)	(0.135)
Firm has non-executive directors	-0.207*	-0.209*	-0.212*	-0.215	-0.114	-0.0718
	(0.107)	(0.120)	(0.127)	(0.142)	(0.132)	(0.154)
(Owner-)Manager: equity in firm	-0.0449	-0.0629	-0.170	-0.243	-0.116	-0.159
	(0.113)	(0.131)	(0.133)	(0.152)	(0.138)	(0.165)
Owner-Manager 25<35 years old	0.681		0.658	0.0529	1.674*	
	(0.729)		(0.864)	(0.240)	(0.899)	
Owner-Manager 35<45 years old	0.564	-0.0507	0.717	0.225	1.633*	-0.00612
	(0.722)	(0.194)	(0.856)	(0.151)	(0.890)	(0.248)
Owner-Manager 45<55 years old	0.601	-0.0809	0.710	0.192	1.540*	-0.151
	(0.719)	(0.194)	(0.853)	(0.144)	(0.888)	(0.248)
Owner-Manager >55 years old	0.567	-0.138	0.550		1.356	-0.322
	(0.721)	(0.204)	(0.855)		(0.889)	(0.260)
Owner-Manager had previous firm	0.0871	0.0498	0.124	0.0514	0.0777	-0.00482
	(0.0924)	(0.0981)	(0.109)	(0.115)	(0.114)	(0.125)
SIC: Manufacturing	-0.193	-0.117	-0.283*	-0.322*	-0.230	-0.159
	(0.132)	(0.150)	(0.157)	(0.176)	(0.163)	(0.192)
SIC: Construction	-0.0368	0.109	-0.240	-0.0963	-0.244	-0.00907
	(0.155)	(0.167)	(0.184)	(0.197)	(0.191)	(0.213)
SICH: Retail & Wholesale	0.135	0.0993	-0.187	-0.191	0.0264	0.0694
	(0.133)	(0.151)	(0.157)	(0.178)	(0.164)	(0.194)
SIC: Education	-0.0194	0.0321	-0.102	-0.0495	0.0345	0.148
	(0.134)	(0.144)	(0.158)	(0.170)	(0.165)	(0.184)
Assistance Effect (IA)	-0.100	-0.124	-0.205*	-0.296*	-0.268**	-0.385**
	(0.0916)	(0.133)	(0.108)	(0.156)	(0.113)	(0.169)
Selection Effect (inverse mills)		0.0251		0.0205		0.00971
		(0.118)		(0.139)		(0.152)
Constant^	x	x	x	x	x	x
	x	x	x	x	x	x
Observations	299	238	300	239	299	238
R-squared	0.276	0.285	0.259	0.261	0.252	0.256

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Productivity 2.11, lagged growth models, lag 2003-4

	(15) prod0405	(16) prod0405	(17) prod0406	(18) prod0406	(19) prod0407	(20) prod0407	(21) prod0408	(22) prod0408
Lag: Productivity growth 2002-3								
Lag: Productivity growth 2002-4								
Lag: Productivity growth 2003-4	-0.493***	-0.463***	-0.276***	-0.220***	-0.372***	-0.303***	-0.503***	-0.436***
	(0.0498)	(0.0470)	(0.0755)	(0.0733)	(0.0830)	(0.0767)	(0.0795)	(0.0766)
Employment 2004 (ELD)	0.000303	-0.00106	0.00737**	0.00493	0.00855**	0.00670*	0.00556	0.00377
	(0.00210)	(0.00215)	(0.00321)	(0.00338)	(0.00353)	(0.00354)	(0.00338)	(0.00353)
Employment 2004 squared	5.75e-07	4.20e-06	-2.69e-05*	-1.71e-05	-3.98e-05**	-3.13e-05*	-1.84e-05	-8.92e-06
	(1.06e-05)	(1.15e-05)	(1.61e-05)	(1.81e-05)	(1.77e-05)	(1.89e-05)	(1.70e-05)	(1.89e-05)
Firm age: 3<5 years	0.520***	0.0973	0.436*	-0.0144	0.517*	0.105	0.643**	0.248
	(0.169)	(0.171)	(0.255)	(0.268)	(0.280)	(0.280)	(0.269)	(0.280)
Firm age: 5<10 years	0.367**	-0.0699	0.357	-0.142	0.424	-0.0900	0.394	-0.100
	(0.161)	(0.164)	(0.244)	(0.256)	(0.268)	(0.268)	(0.257)	(0.268)
Firm age: 10<20 years	0.296*	-0.0732	0.293	-0.117	0.303	-0.0839	0.280	-0.0943
	(0.161)	(0.164)	(0.243)	(0.256)	(0.268)	(0.268)	(0.257)	(0.268)
Firm age: >20 years	0.263*	-0.0556	0.261	-0.0851	0.283	-0.0699	0.366	0.0102
	(0.159)	(0.163)	(0.241)	(0.255)	(0.265)	(0.267)	(0.254)	(0.266)
Legal form: Limited liability	0.0592	0.0946	0.0573	0.00857	0.159	0.140	0.199	0.201
	(0.108)	(0.111)	(0.165)	(0.177)	(0.181)	(0.185)	(0.173)	(0.185)
Multi-site firm	-0.0397	-0.0514	-0.0665	-0.113	-0.0384	-0.0718	-0.135	-0.138
	(0.0832)	(0.0851)	(0.126)	(0.133)	(0.139)	(0.139)	(0.133)	(0.139)
Exporting firm	0.132*	0.104	0.0861	0.0271	0.000270	-0.0883	0.00823	-0.0796
	(0.0721)	(0.0721)	(0.109)	(0.112)	(0.120)	(0.118)	(0.115)	(0.118)
Firm in competitive environ.	0.0585	0.114	0.0411	0.000539	0.0202	-0.0278	-0.0292	-0.0731
	(0.0695)	(0.0721)	(0.106)	(0.113)	(0.116)	(0.118)	(0.111)	(0.118)
Firm faces price elastic demand	-0.0792	-0.0757	-0.168	-0.150	-0.102	-0.0631	-0.130	-0.131
	(0.0771)	(0.0781)	(0.117)	(0.122)	(0.128)	(0.127)	(0.123)	(0.127)
Strategy: Maintain sales	0.330**	0.372**	-0.0119	-0.0399	-0.228	-0.261	-0.0835	-0.0981
	(0.161)	(0.152)	(0.244)	(0.237)	(0.268)	(0.248)	(0.257)	(0.248)
Strategy: Penetrate market	0.252*	0.310**	0.0622	0.0692	-0.174	-0.222	-0.0804	-0.0656
	(0.153)	(0.145)	(0.231)	(0.226)	(0.255)	(0.236)	(0.244)	(0.236)
Strategy: New markets	0.476***	0.521***	0.0955	-0.0159	-0.182	-0.280	-0.00685	-0.0358
	(0.180)	(0.179)	(0.272)	(0.280)	(0.299)	(0.293)	(0.286)	(0.292)
Strategy: New products	0.350	0.320	0.106	-0.0514	-0.0437	-0.294	0.0300	-0.125
	(0.248)	(0.228)	(0.375)	(0.356)	(0.412)	(0.372)	(0.395)	(0.372)
Firm has formal business plan	-0.0112	0.0512	0.0403	0.107	0.00542	0.0379	0.0405	0.0250
	(0.0684)	(0.0699)	(0.104)	(0.110)	(0.115)	(0.115)	(0.110)	(0.114)
Firm has non-executive directors	-0.0725	0.0653	-0.167	-0.00718	-0.126	-0.0367	-0.177	-0.102
	(0.0780)	(0.0827)	(0.118)	(0.129)	(0.130)	(0.135)	(0.125)	(0.135)
(Owner-)Manager: equity in firm	-0.151*	-0.114	0.0443	0.0278	0.0441	-0.0310	-0.150	-0.149
	(0.0815)	(0.0867)	(0.123)	(0.136)	(0.136)	(0.142)	(0.130)	(0.142)
Owner-Manager 25<35 years old	0.111	0.0630	0.493	0.374*	0.359	0.227	0.485	0.303
	(0.546)	(0.139)	(0.826)	(0.217)	(0.909)	(0.227)	(0.871)	(0.227)
Owner-Manager 35<45 years old	0.195	-0.0724	0.380	-0.0863	0.310	0.0573	0.427	0.183
	(0.542)	(0.0859)	(0.820)	(0.135)	(0.901)	(0.141)	(0.864)	(0.141)
Owner-Manager 45<55 years old	0.168	-0.0404	0.529	0.142	0.464	0.207	0.501	0.218
	(0.540)	(0.0841)	(0.816)	(0.131)	(0.898)	(0.137)	(0.860)	(0.137)
Owner-Manager >55 years old	0.292		0.479		0.339		0.332	
	(0.541)		(0.818)		(0.900)		(0.863)	
Owner-Manager had previous firm	0.0740	-0.00778	0.107	-0.0207	0.0935	0.0236	0.0774	0.00169
	(0.0660)	(0.0652)	(0.0999)	(0.102)	(0.110)	(0.106)	(0.105)	(0.106)
SIC: Manufacturing	-0.136	-0.177*	-0.198	-0.162	-0.132	-0.0991	-0.139	-0.0750
	(0.0970)	(0.103)	(0.147)	(0.161)	(0.162)	(0.168)	(0.155)	(0.168)
SIC: Construction	-0.321***	-0.265**	-0.269	-0.181	-0.243	-0.198	-0.195	-0.0811
	(0.114)	(0.114)	(0.172)	(0.179)	(0.189)	(0.187)	(0.181)	(0.187)
SICH: Retail & Wholesale	-0.115	-0.181*	0.0292	0.0348	0.0738	0.0754	-0.0198	-0.0336
	(0.0974)	(0.103)	(0.148)	(0.161)	(0.162)	(0.168)	(0.156)	(0.168)
SIC: Education	-0.208**	-0.188*	-0.159	-0.0719	-0.106	-0.0184	-0.141	-0.0596
	(0.0968)	(0.0977)	(0.147)	(0.153)	(0.161)	(0.160)	(0.155)	(0.160)
Assistance Effect (IA)	-0.0642	-0.0570	-0.272***	-0.412***	-0.156	-0.426***	-0.0638	-0.246*
	(0.0664)	(0.0897)	(0.101)	(0.141)	(0.111)	(0.147)	(0.107)	(0.147)
Selection Effect (inverse mills)		-0.0127		-0.132		-0.230*		-0.159
		(0.0809)		(0.127)		(0.133)		(0.133)
Constant^	x	x	x	x	x	x	x	x
	x	x	x	x	x	x	x	x
Observations	323	256	321	255	321	255	321	255
R-squared	0.327	0.360	0.142	0.146	0.129	0.148	0.186	0.201

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Productivity 2.12, lagged growth models, lag 2003-4

	(23) prod0409	(24) prod0409	(25) prod0410	(26) prod0410	(27) prod0411	(28) prod0411
Lag: Productivity growth 2002-3						
Lag: Productivity growth 2002-4						
Lag: Productivity growth 2003-4	-0.403***	-0.363***	-0.485***	-0.413***	-0.523***	-0.448***
	(0.0817)	(0.0818)	(0.0836)	(0.0803)	(0.0865)	(0.0868)
Employment 2004 (ELD)	0.00922***	0.00790**	0.00890**	0.00623*	0.0103***	0.00844**
	(0.00313)	(0.00337)	(0.00355)	(0.00370)	(0.00368)	(0.00401)
Employment 2004 squared	-3.59e-05**	-2.57e-05	-3.67e-05**	-1.89e-05	-4.10e-05**	-2.70e-05
	(1.57e-05)	(1.81e-05)	(1.78e-05)	(1.98e-05)	(1.85e-05)	(2.15e-05)
Firm age: 3<5 years	0.472*	0.203	0.0243	-0.270	-0.125	-0.295
	(0.253)	(0.273)	(0.282)	(0.293)	(0.292)	(0.317)
Firm age: 5<10 years	0.413*	0.0327	-0.0941	-0.522*	-0.322	-0.670**
	(0.244)	(0.264)	(0.270)	(0.280)	(0.279)	(0.303)
Firm age: 10<20 years	0.257	-0.0463	-0.161	-0.490*	-0.311	-0.563*
	(0.243)	(0.263)	(0.270)	(0.281)	(0.279)	(0.304)
Firm age: >20 years	0.333	-0.0188	-0.0917	-0.383	-0.221	-0.462
	(0.241)	(0.262)	(0.267)	(0.279)	(0.276)	(0.302)
Legal form: Limited liability	0.0961	0.0194	0.161	0.0764	0.0775	0.0122
	(0.161)	(0.177)	(0.182)	(0.194)	(0.189)	(0.210)
Multi-site firm	-0.146	-0.0890	-0.250*	-0.234	-0.200	-0.147
	(0.123)	(0.133)	(0.140)	(0.146)	(0.145)	(0.158)
Exporting firm	0.0394	-0.00416	0.0811	0.0635	0.0126	-0.0425
	(0.107)	(0.112)	(0.121)	(0.123)	(0.126)	(0.134)
Firm in competitive environ.	0.0777	0.0256	0.0124	-0.0416	0.105	0.0126
	(0.103)	(0.113)	(0.117)	(0.124)	(0.122)	(0.136)
Firm faces price elastic demand	-0.138	-0.125	-0.143	-0.124	-0.160	-0.103
	(0.114)	(0.121)	(0.129)	(0.133)	(0.136)	(0.146)
Strategy: Maintain sales	0.0670	-0.0196	-0.0797	-0.0764	-0.00315	-0.0212
	(0.238)	(0.237)	(0.270)	(0.259)	(0.279)	(0.281)
Strategy: Penetrate market	0.0838	0.0465	0.0212	-0.0435	-0.0413	-0.0555
	(0.226)	(0.225)	(0.256)	(0.247)	(0.265)	(0.268)
Strategy: New markets	0.255	0.114	0.0977	-0.0479	0.0442	-0.174
	(0.265)	(0.279)	(0.301)	(0.306)	(0.314)	(0.335)
Strategy: New products	0.207	0.0414	-0.207	-0.378	-0.197	-0.372
	(0.366)	(0.354)	(0.415)	(0.389)	(0.430)	(0.422)
Firm has formal business plan	0.0376	0.00613	0.118	0.104	0.113	0.102
	(0.102)	(0.109)	(0.116)	(0.120)	(0.120)	(0.131)
Firm has non-executive directors	-0.231**	-0.236*	-0.200	-0.193	-0.0765	-0.0471
	(0.115)	(0.129)	(0.131)	(0.141)	(0.136)	(0.153)
(Owner-)Manager: equity in firm	-0.0836	-0.138	-0.241*	-0.333**	-0.174	-0.262
	(0.122)	(0.137)	(0.137)	(0.148)	(0.142)	(0.161)
Owner-Manager 25<35 years old	0.540		0.526	0.0972	1.522	
	(0.807)		(0.915)	(0.237)	(0.947)	
Owner-Manager 35<45 years old	0.488	-0.143	0.619	0.141	1.481	-0.143
	(0.800)	(0.208)	(0.908)	(0.148)	(0.939)	(0.246)
Owner-Manager 45<55 years old	0.563	-0.0767	0.684	0.235	1.465	-0.143
	(0.797)	(0.205)	(0.904)	(0.144)	(0.936)	(0.244)
Owner-Manager >55 years old	0.461	-0.198	0.474		1.246	-0.340
	(0.799)	(0.217)	(0.906)		(0.938)	(0.257)
Owner-Manager had previous firm	0.0402	0.0380	0.101	0.0781	0.0413	0.0266
	(0.0979)	(0.102)	(0.111)	(0.111)	(0.115)	(0.121)
SIC: Manufacturing	-0.112	0.00785	-0.205	-0.212	-0.131	-0.0261
	(0.144)	(0.160)	(0.163)	(0.176)	(0.169)	(0.191)
SIC: Construction	-0.0466	0.0996	-0.255	-0.116	-0.250	-0.0284
	(0.168)	(0.178)	(0.190)	(0.195)	(0.197)	(0.211)
SICH: Retail & Wholesale	0.0510	0.0258	-0.260	-0.249	-0.0883	-0.0409
	(0.144)	(0.160)	(0.163)	(0.176)	(0.170)	(0.191)
SIC: Education	-0.104	-0.0178	-0.143	-0.0746	-0.0369	0.0949
	(0.143)	(0.152)	(0.163)	(0.167)	(0.168)	(0.181)
Assistance Effect (IA)	-0.0413	-0.133	-0.166	-0.346**	-0.218*	-0.409**
	(0.0990)	(0.141)	(0.112)	(0.154)	(0.116)	(0.167)
Selection Effect (inverse mills)		0.00400		-0.0400		-0.0245
		(0.127)		(0.139)		(0.151)
Constant^	x	x	x	x	x	x
	x	x	x	x	x	x
Observations	320	254	321	255	320	254
R-squared	0.170	0.166	0.199	0.242	0.197	0.231

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix E3 – Quantile Regression models, full outputs

Employment 3.1 - 2004-5, quantiles, no lags (full models with and without selection [s]); quantiles 0.1, 0.25, 0.5, 0.75, 0.9

	FULL	FULL	Q0.1	Q0.1 S	Q0.25	Q0.25	Q0.5	Q0.5 S	Q0.75	Q0.75	Q0.9	Q0.9S
	(11)	(12)	(13)	(14)	(15)	(16)			(17)	(18)	(19)	(20)
	empl04	empl040	empl04	empl04	empl04	empl04			empl04	empl04	empl04	empl04
Employment 2004 (ELD)	-	-	0.0004	-	-	-7.18e-	could not compu	could not compu	-	-	-	-
	(0.0015	(0.00132	(0.002	(0.001	(0.0002	(0.0002			(0.0008	(0.001	(0.002	(0.001
Employment 2004	1.09e-	4.52e-06	-2.03e-	2.91e-	2.41e-	-3.64e-	be compu	be compu	4.10e-	5.82e-	1.01e-	4.89e-
	(7.61e-	(7.12e-	(9.84e-	(5.21e-	(1.75e-	(1.44e-			(4.08e-	(6.50e-	(8.77e-	(6.23e-
Firm age: 3<5 years	0.0067	-0.0684	-	-	0.0003	-			-0.183*	-0.257*	0.0489	-0.168
	(0.105)	(0.0905)	(0.196)	(0.117)	(0.0118	(0.0094			(0.0936)	(0.143)	(0.192)	(0.164)
Firm age: 5<10 years	-0.0486	-0.0667	0.0295		0.0003	0.00028			-0.133	-0.158	-	-
	(0.100)	(0.0875)	(0.084	(0.054	(0.0114	(0.0102			(0.0939)	(0.147)	(0.144)	(0.181)
Firm age: 10<20 years	-0.0750	-0.137	0.0069	-	0.0003	-			-	-0.252*	-	-
	(0.102)	(0.0885)	(0.090	(0.051	(0.0116	(0.0095			(0.0829)	(0.137)	(0.124)	(0.149)
Firm age: >20 years	-0.0895	-0.200**	-	-	-	-			-	-0.262*	-	-
	(0.101)	(0.0884)	(0.103	(0.058	(0.0119	(0.0100			(0.0843)	(0.133)	(0.146)	(0.153)
Legal form: Limited	0.0137	-0.0277	-	-	0.0005	0.00034			0.0227	-	0.0169	0.0318
	(0.0720)	(0.0638)	(0.033	(0.032	(0.0072	(0.0057			(0.0290)	(0.036	(0.086	(0.052
Multi-site firm	0.159**	0.121**	0.0635	0.0429	0.0015	0.00064			0.0092	0.0297	0.0892	0.0932
	(0.0593)	(0.0521)	(0.043	(0.045	(0.0072	(0.0072			(0.0333)	(0.034	(0.102	(0.071
Exporting firm	-	0.00886	0.0030	-	0.0004	-4.49e-			-	-	0.0368	0.0235
	(0.0507)	(0.0438)	(0.056	(0.034	(0.0056	(0.0044			(0.0229)	(0.027	(0.057	(0.051
Firm in competitive	0.0044	-0.0145	-	-	-	-			-0.0185	0.0086	-	-
	(0.0482)	(0.0429)	(0.044	(0.041	(0.0051	(0.0037			(0.0284)	(0.029	(0.059	(0.055
Firm faces price elastic	-0.0205	-0.0403	0.0048	-	0.0006	0.00085			-0.0235	-	-	-
	(0.0535)	(0.0469)	(0.053	(0.049	(0.0057	(0.0044			(0.0253)	(0.031	(0.061	(0.049
Strategy: Maintain sales	0.0488	-0.00515	-	-	-3.79e-	-			0.0056	-	0.155	0.0959
	(0.109)	(0.0886)	(0.049	(0.063	(0.0101	(0.0076			(0.0565)	(0.042	(0.105	(0.067
Strategy: Penetrate	0.0365	-0.0175	-	-	0.0003	-			0.0136	0.0326	0.0907	0.105*
	(0.103)	(0.0846)	(0.047	(0.053	(0.0097	(0.0075			(0.0542)	(0.038	(0.080	(0.060
Strategy: New markets	-0.0325	-0.0462	-	-0.103	-	-			0.0152	0.0586	0.137	0.0754
	(0.121)	(0.104)	(0.069	(0.083	(0.0131	(0.0104			(0.0699)	(0.077	(0.100	(0.075
Strategy: New products	-0.0224	-0.0312	-0.108	-	-0.0314	-0.0389			-0.0270	0.0305	-	0.0300
	(0.168)	(0.134)	(0.167	(0.067	(0.0521	(0.0363			(0.139)	(0.078	(0.120	(0.086
Firm has formal	0.0497	0.00350	0.0311	-	0.0001	0.00016			0.0438	0.0085	0.0922	0.0493
	(0.0480)	(0.0421)	(0.061	(0.033	(0.0049	(0.0036			(0.0284)	(0.025	(0.063	(0.043
Firm has non-executive	0.0481	-0.00354	-	-	0.0017	-			0.0262	-	0.142	0.0381
	(0.0559)	(0.0508)	(0.060	(0.069	(0.0070	(0.0050			(0.0480)	(0.027	(0.117	(0.066
(Owner-)Manager:	0.0117	-0.0234	0.0836	0.0032	-	-			-0.0531	-	-	0.0458
	(0.0583)	(0.0531)	(0.146	(0.055	(0.0095	(0.0080			(0.0574)	(0.045	(0.082	(0.069
Owner-Manager 25<35	-0.164		-0.159	-0.292*	-0.0519	-			-0.0184	0.0251	0.171	-
	(0.395)		(0.170)	(0.176)	(0.0387	(0.0072			(0.0710)	(0.077	(0.291	(0.075
Owner-Manager 35<45	-0.116	0.0260	-0.132	-	-0.0521	-			0.0095	0.0084	0.143	0.116*
	(0.391)	(0.0780)	(0.206)	(0.030	(0.0380	(0.0041			(0.0645)	(0.030	(0.259	(0.067
Owner-Manager 45<55	-0.142	-0.0350	-0.148	-	-0.0516	-			-0.0222	-	0.0733	-
	(0.390)	(0.0776)	(0.178)	(0.034	(0.0376	(0.0040			(0.0616)	(0.023	(0.251	(0.044
Owner-Manager had	-0.0138	0.0380	-	0.0018	-	0.00014			0.0085	0.0244	-	-
	(0.0463)	(0.0391)	(0.044	(0.040	(0.0047	(0.0031			(0.0252)	(0.030	(0.051	(0.038
SIC: Manufacturing	0.0562	0.0650	0.193	0.186	0.0203*	0.00252			-0.0312	-	-	-
	(0.0674)	(0.0620)	(0.148)	(0.135)	(0.0097	(0.0065			(0.0372)	(0.055	(0.098	(0.099
SIC: Construction	0.170**	0.0897	0.169	0.158	0.0207*	0.00217			0.136	0.0191	0.329	0.147
	(0.0803)	(0.0693)	(0.185)	(0.157)	(0.0107	(0.0070			(0.200)	(0.147	(0.670	(0.123
SICH: Retail &	0.0427	0.0248	0.191	0.197	0.0207*	0.00253			-0.0169	-	-	-
	(0.0681)	(0.0617)	(0.131)	(0.122)	(0.0089	(0.0065			(0.0410)	(0.057	(0.099	(0.097
SIC: Education	0.0500	0.00692	0.162	0.137	0.0202*	0.00203			-0.0478	-	0.0501	0.0945
	(0.0672)	(0.0584)	(0.125)	(0.128)	(0.0090	(0.0059			(0.0409)	(0.051	(0.113	(0.112
Assistance Effect (IA)	0.0046	0.0318	0.0204	-	-	-			-0.0174	0.0491	-	0.0858
	(0.0468	(0.0538)	(0.031	(0.034	(0.0051	(0.0047			(0.0228	(0.040	(0.065	(0.038
Selection Effect (inverse		0.0409		-		-				0.0497		0.136**
		(0.0483)		(0.051		(0.0050				(0.045		(0.065
Constant^	x	x	x	x	x	x			x	x	x	x
	x	x	x	x	x	x			x	x	x	x
Observations	342	272	342	272	342	272			342	272	342	272
R-squared	0.082	0.097										

Standard errors in
*** p<0.01, ** p<0.05, *

Employment 3.2 - 2004-6, quantiles, no lags (full models with and without selection (s); quantiles 0.1, 0.25, 0.5, 0.75, 0.9

	FULL	FULL S	Q0.1	Q0.1 S	Q0.25	Q0.25	Q0.5	Q0.5 S	Q0.75	Q0.75	Q0.9	Q0.9S
	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)
	empl04	empl04	empl04	empl04	empl04	empl04	empl04	empl04	empl04	empl04	empl04	empl04
Employment 2004 (ELD)	-	-	-	-	-	-	-	-	-	-	-	-
	(0.0025)	(0.0027)	(0.002)	(0.006)	(0.0013)	(0.002)	(0.0009)	(0.001)	(0.0012)	(0.001)	(0.0040)	(0.003)
Employment 2004	3.13e-	2.50e-	1.43e-	2.73e-	1.30e-	2.13e-	1.09e-	4.74e-	1.47e-	2.18e-	5.40e-	2.10e-
	(1.30e-	(1.47e-	(1.21e-	(2.35e-	(5.41e-	(1.17e-	(4.13e-	(5.44e-	(6.97e-	(1.30e-	(1.89e-	(1.54e-
Firm age: 3<5 years	-0.0739	-0.158	-	-0.171	-0.0534	-0.119	-	-0.246	-0.310	-0.231	-0.0444	-0.291
	(0.179)	(0.186)	(0.114)	(0.116)	(0.0895)	(0.109)	(0.112)	(0.151)	(0.215)	(0.180)	(0.493)	(0.370)
Firm age: 5<10 years	-0.258	-0.284	-	-	-0.0823	-	-	-0.246	-	-0.284	-0.522**	-0.388
	(0.171)	(0.180)	(0.117)	(0.133)	(0.0825)	(0.085)	(0.110)	(0.150)	(0.210)	(0.180)	(0.212)	(0.261)
Firm age: 10<20 years	-0.263	-0.342*	-	-0.195*	-0.0852	-0.138	-	-	-	-	-	-
	(0.173)	(0.182)	(0.110)	(0.106)	(0.0864)	(0.095)	(0.108)	(0.147)	(0.209)	(0.170)	(0.210)	(0.257)
Firm age: >20 years	-0.339**	-	-	-	-0.126	-0.208*	-	-	-	-	-	-
	(0.171)	(0.182)	(0.099)	(0.124)	(0.0849)	(0.112)	(0.105)	(0.145)	(0.204)	(0.168)	(0.191)	(0.267)
Legal form: Limited	-0.0445	-0.0133	-	-	-0.0713	-0.125	0.0002	-	-0.0212	0.0853	0.134	0.0968
	(0.122)	(0.131)	(0.086)	(0.104)	(0.0459)	(0.077)	(0.0347)	(0.048)	(0.0996)	(0.083)	(0.131)	(0.146)
Multi-site firm	0.272***	0.283**	0.160*	0.209**	0.0476	0.0805	0.0022	0.0359	0.123	0.153	0.399**	0.468
	(0.101)	(0.107)	(0.085)	(0.104)	(0.0387)	(0.061)	(0.0346)	(0.048)	(0.0767)	(0.113)	(0.184)	(0.321)
Exporting firm	-	0.0149	-	0.0204	0.0150	0.0053	0.0001	-	0.0334	0.0128	0.0437	0.111
	(0.0862)	(0.0902)	(0.066)	(0.082)	(0.0322)	(0.043)	(0.0286)	(0.033)	(0.0505)	(0.057)	(0.0921)	(0.096)
Firm in competitive	-0.0492	-0.0479	0.0211	0.0842	0.0143	0.0208	0.0005	0.0030	-0.0245	-	-0.0252	-
	(0.0821)	(0.0883)	(0.055)	(0.071)	(0.0344)	(0.053)	(0.0287)	(0.041)	(0.0515)	(0.067)	(0.123)	(0.112)
Firm faces price elastic	-0.0172	-0.0551	-	-0.216*	-0.0108	-	-	-	-	0.0151	-0.0616	-
	(0.0911)	(0.0964)	(0.083)	(0.119)	(0.0422)	(0.052)	(0.0300)	(0.037)	(0.0560)	(0.059)	(0.105)	(0.091)
Strategy: Maintain sales	0.105	0.115	-	0.137	0.0371	0.0755	-	-	-0.0751	-	0.141	0.126
	(0.185)	(0.182)	(0.132)	(0.127)	(0.0499)	(0.080)	(0.0679)	(0.108)	(0.102)	(0.114)	(0.183)	(0.221)
Strategy: Penetrate	0.0194	0.0288	-	0.0258	0.0116	0.0136	-	-	-0.121	-0.121	-0.0212	0.0452
	(0.176)	(0.174)	(0.129)	(0.082)	(0.0460)	(0.079)	(0.0659)	(0.105)	(0.0920)	(0.081)	(0.166)	(0.169)
Strategy: New markets	0.0382	0.111	-0.257	-0.125	0.0144	0.0269	-	-	-0.119	-0.117	-0.101	-
	(0.205)	(0.213)	(0.323)	(0.208)	(0.0659)	(0.101)	(0.0785)	(0.117)	(0.118)	(0.107)	(0.228)	(0.164)
Strategy: New products	-0.0449	0.0637	-	0.181	0.0767	0.171	0.115	0.0335	-0.210*	-0.240*	-0.324	-
	(0.286)	(0.275)	(0.178)	(0.145)	(0.164)	(0.127)	(0.107)	(0.143)	(0.112)	(0.127)	(0.212)	(0.231)
Firm has formal	0.0452	-0.0364	-	-0.158*	-0.0203	-	-6.56e-	-	0.0807	0.0171	0.169*	-
	(0.0816)	(0.0866)	(0.068)	(0.088)	(0.0331)	(0.050)	(0.0245)	(0.032)	(0.0450)	(0.061)	(0.0952)	(0.105)
Firm has non-executive	0.125	0.0874	0.182**	0.139	0.0266	0.0669	0.0013	0.0297	0.0374	0.0117	0.00429	0.150
	(0.0951)	(0.105)	(0.071)	(0.090)	(0.0375)	(0.059)	(0.0326)	(0.041)	(0.0630)	(0.071)	(0.115)	(0.115)
(Owner-)Manager:	-0.0730	-0.113	-	-	-	-	-	-	-0.0332	-	-0.0733	0.0356
	(0.0992)	(0.109)	(0.094)	(0.098)	(0.0411)	(0.048)	(0.0413)	(0.051)	(0.0624)	(0.063)	(0.107)	(0.104)
Owner-Manager 25<35	-0.251		-0.315	-0.876	-0.0717	0.0251	0.0963	-	0.151	-	0.314	-0.329*
	(0.672)		(0.368)	(0.570)	(0.181)	(0.101)	(0.102)	(0.064)	(0.130)	(0.100)	(0.465)	(0.194)
Owner-Manager 35<45	-0.154	0.186	-0.378	-	-0.0993	-	0.0963	0.0149	0.264**	0.193**	0.286	0.0609
	(0.666)	(0.160)	(0.354)	(0.099)	(0.172)	(0.050)	(0.0940)	(0.041)	(0.120)	(0.085)	(0.429)	(0.212)
Owner-Manager 45<55	-0.291	-0.0120	-0.457	-	-0.112	-	0.0942	-	0.0294	-	0.0471	-0.257
	(0.664)	(0.160)	(0.361)	(0.079)	(0.171)	(0.052)	(0.0925)	(0.034)	(0.107)	(0.048)	(0.432)	(0.165)
Owner-Manager had	0.0558	0.127	0.0358	0.0387	0.0218	0.0635	0.0007	0.0285	0.0823	0.0790	-0.0538	0.0381
	(0.0789)	(0.0806)	(0.062)	(0.086)	(0.0314)	(0.041)	(0.0258)	(0.030)	(0.0563)	(0.056)	(0.0976)	(0.097)
SIC: Manufacturing	0.158	0.118	0.377**	0.530**	0.163**	0.273**	0.0004	0.0183	-0.0776	-0.229*	-0.0855	-0.674
	(0.115)	(0.128)	(0.122)	(0.195)	(0.0684)	(0.130)	(0.0480)	(0.069)	(0.100)	(0.134)	(0.177)	(0.751)
SIC: Construction	0.198	0.159	0.419**	0.366*	0.121	0.285*	0.0005	0.0159	-0.0213	-0.200	0.454	-0.146
	(0.137)	(0.143)	(0.122)	(0.213)	(0.0818)	(0.158)	(0.0589)	(0.074)	(0.133)	(0.153)	(0.320)	(0.839)
SICH: Retail &	-0.0190	-0.0587	0.218**	0.298*	0.105	0.169	-	-	-0.141	-	-0.264	-0.741
	(0.116)	(0.127)	(0.109)	(0.167)	(0.0654)	(0.130)	(0.0459)	(0.068)	(0.103)	(0.127)	(0.201)	(0.727)
SIC: Education	-0.0344	-0.116	0.255**	0.330*	0.129**	0.214	-	-	-0.157*	-	-0.303	-0.867
	(0.114)	(0.120)	(0.106)	(0.184)	(0.0649)	(0.140)	(0.0492)	(0.070)	(0.0903)	(0.127)	(0.188)	(0.781)
Assistance Effect (IA)	**0.117**	**0.211***	**0.273****	**0.720***	**0.0171**	**0.0419**	**-**	**-**	**-0.0388**	**0.0035**	**-**	**0.0171**
	(0.0797)	**(0.111)**	**(0.098)**	**(0.377)**	**(0.0347)**	**(0.072)**	**(0.0246)**	**(0.035)**	**(0.0597)**	**(0.060)**	**(0.0797)**	**(0.104)**
Selection Effect (inverse		0.0972		0.172		-		-		-		0.0532
		(0.0993)		(0.162)		(0.046)		(0.028)		(0.059)		(0.123)
Constant^	x	x	x	x	x	x	x	x	x	x	x	x
	x	x	x	x	x	x	x	x	x	x	x	x
Observations	342	272	342	272	342	272	342	272	342	272	342	272
R-squared	0.121	0.158										

Standard errors in
*** p<0.01, ** p<0.05, *

Employment 3.3 - 2004-7, quantiles, no lags (full models with and without selection (s); quantiles 0.1, 0.25, 0.5, 0.75, 0.9

	FULL	FULL S	Q0.1	Q0.1 S	Q0.25	Q0.25	Q0.5	Q0.5 S	Q0.75	Q0.75	Q0.9	Q0.9S
	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)	(43)	(44)
	empl04	empl04	empl0	empl0	empl0	empl0	empl0	empl0	empl04	empl0	empl04	empl04
Employment 2004	-	-	-	-	-	-	-	-	-	-	-	-
	(0.0027	(0.0028	(0.004	(0.006	(0.002	(0.002	(0.001	(0.001	(0.0019	(0.005	(0.0041	(0.0040
Employment 2004	4.07e-	4.12e-	2.22e-	5.30e-	7.03e-	8.31e-	4.54e-	6.57e-	2.49e-	4.90e-	0.00012	0.00011
	(1.39e-	(1.55e-	(2.40e-	(2.86e-	(1.03e-	(1.18e-	(7.38e-	(8.79e-	(9.48e-	(5.41e-	(2.34e-	(2.58e-
Firm age: 3<5 years	0.00889	-0.101	-	0.192	-	0.0630	0.0473	-	-0.236	-0.332	-0.0296	-0.400
	(0.192)	(0.198)	(0.236)	(0.255)	(0.106)	(0.144)	(0.210)	(0.248)	(0.258)	(0.328)	(0.490)	(0.282)
Firm age: 5<10 years	-0.196	-0.227	-	0.112	-	0.0443	-0.107	-0.136	-0.195	-0.398	-0.318	-0.449
	(0.183)	(0.191)	(0.214)	(0.178)	(0.105)	(0.112)	(0.183)	(0.233)	(0.275)	(0.332)	(0.195)	(0.272)
Firm age: 10<20 years	-0.244	-0.358*	-	0.137	-0.134	-0.170	-0.133	-0.176	-0.439*	-	-0.453*	-0.580**
	(0.185)	(0.193)	(0.232)	(0.190)	(0.117)	(0.112)	(0.241)	(0.258)	(0.312)		(0.267)	(0.261)
Firm age: >20 years	-0.309*	-0.435**	-0.235	-	-0.197*	-0.186*	-0.236	-0.271	-0.475*	-	-0.330	-0.694**
	(0.184)	(0.193)	(0.200)	(0.189)	(0.103)	(0.107)	(0.179)	(0.226)	(0.266)	(0.338)	(0.282)	(0.293)
Legal form: Limited	-0.0815	-0.0218	-	-	-0.148	-0.121	-	-	-0.0793	0.0387	0.0850	0.341**
	(0.131)	(0.139)	(0.129)	(0.132)	(0.095)	(0.106)	(0.071)	(0.097)	(0.0864)	(0.147)	(0.292)	(0.149)
Multi-site firm	0.276**	0.340**	0.104	0.213	0.0877	0.160*	0.133*	0.205*	0.233**	0.305*	0.441*	0.471*
	(0.108)	(0.114)	(0.152)	(0.142)	(0.079)	(0.080)	(0.064)	(0.094)	(0.0954)	(0.114)	(0.226)	(0.265)
Exporting firm	0.0256	0.0375	0.0206	-	0.0635	0.0753	0.0853	0.0373	0.150	0.0680	-0.0793	0.136
	(0.0925)	(0.0957)	(0.103)	(0.106)	(0.051)	(0.066)	(0.062)	(0.065)	(0.0942)	(0.107)	(0.161)	(0.130)
Firm in competitive	-0.0269	-0.0267	-	-0.143	-	-	-	-	-0.0443	0.0269	0.0501	-
	(0.0880)	(0.0936)	(0.079	(0.101)	(0.056	(0.071)	(0.059	(0.064)	(0.0842)	(0.086)	(0.154)	(0.137)
Firm faces price elastic	-0.0729	-0.113	-0.139	-0.206	-	0.0556	-	-	-0.0571	-0.213*	-0.245	-0.205
	(0.0977)	(0.102)	(0.165	(0.213)	(0.062	(0.082)	(0.056	(0.065)	(0.0919)	(0.127)	(0.155)	(0.145)
Strategy: Maintain sales	0.116	0.133	-0.153	-0.140	0.144	0.0833	0.0822	0.155	0.0999	0.140	-0.0653	0.265
	(0.198)	(0.193)	(0.232)	(0.259)	(0.157)	(0.114)	(0.105)	(0.118)	(0.222)	(0.194)	(0.530)	(0.184)
Strategy: Penetrate	0.0877	0.130	0.0033	-	0.103	0.0858	0.0244	0.0874	0.0966	0.117	0.00565	0.248
	(0.188)	(0.185)	(0.185)	(0.250)	(0.140)	(0.099)	(0.103)	(0.107)	(0.223)	(0.179)	(0.552)	(0.151)
Strategy: New markets	0.0510	0.0963	-0.146	-	0.107	-	0.0334	-	-0.0857	-	-0.0557	-0.0404
	(0.220)	(0.226)	(0.267)	(0.320)	(0.160)	(0.188)	(0.139)	(0.143)	(0.239)	(0.248)	(0.768)	(0.302)
Strategy: New products	-0.103	0.0282	0.0321	0.0321	0.0748	0.0909	-	-	-0.222	-0.162	-0.906*	-0.268
	(0.307)	(0.292)	(0.323)	(0.338)	(0.162)	(0.148)	(0.143)	(0.143)	(0.258)	(0.231)	(0.547)	(0.182)
Firm has formal	0.104	0.0266	-	-0.229*	0.0326	-	0.0504	0.0481	0.250**	0.273*	0.512***	0.376***
	(0.0876)	(0.0918)	(0.106)	(0.133)	(0.059)	(0.068)	(0.063)	(0.063)	(0.0775)	(0.113)	(0.156)	(0.124)
Firm has non-executive	0.170*	0.135	0.323*	0.312*	0.0297	0.0951	0.0321	0.0461	0.0441	0.0205	0.246	0.00065
	(0.102)	(0.111)	(0.123)	(0.137)	(0.060)	(0.077)	(0.057)	(0.076)	(0.0926)	(0.118)	(0.311)	(0.166)
(Owner-)Manager:	-0.0521	-0.0910	-0.239*	-	-	-	-	-	-0.0116	-	-0.0560	0.0266
	(0.106)	(0.116)	(0.129)	(0.173)	(0.064)	(0.083)	(0.062)	(0.085)	(0.113)	(0.125)	(0.145)	(0.140)
Owner-Manager 25<35	-0.152		-0.569	-0.213	-	-0.106	0.177	0.0627	0.121	-	0.159	-0.257
	(0.720)		(0.584)	(0.314)	(0.168)	(0.138)	(0.183)	(0.118)	(0.160)	(0.167)	(0.670)	(0.269)
Owner-Manager 35<45	-0.160	-0.0408	-0.760	-0.202*	-	-	0.149	-	0.245	0.0468	0.144	-0.0962
	(0.714)	(0.170)	(0.583)	(0.111)	(0.158)	(0.078)	(0.182)	(0.073)	(0.189)	(0.147)	(0.630)	(0.244)
Owner-Manager 45<55	-0.296	-0.210	-0.844	-	-	-	0.106	-	0.0127	-0.181	-0.0118	-0.359
	(0.712)	(0.169)	(0.580)	(0.110)	(0.137)	(0.067)	(0.189)	(0.062)	(0.163)	(0.134)	(0.601)	(0.219)
Owner-Manager had	0.0880	0.151*	0.187*	0.298*	0.0444	0.110*	0.0672	0.0838	0.0827	0.118	0.136	0.157
	(0.0846)	(0.0854)	(0.082)	(0.111)	(0.062)	(0.064)	(0.071)	(0.071)	(0.0743)	(0.079)	(0.162)	(0.135)
SIC: Manufacturing	0.146	0.168	0.381*	0.359*	0.108	0.206*	0.0004	0.0803	-0.0688	0.0653	0.0225	-0.236
	(0.123)	(0.135)	(0.124)	(0.136)	(0.090)	(0.114)	(0.087)	(0.111)	(0.118)	(0.178)	(0.205)	(0.307)
SIC: Construction	0.188	0.188	0.212	0.239	0.114	0.300*	0.0830	0.182	0.248	0.171	-0.0112	-0.102
	(0.146)	(0.151)	(0.221)	(0.258)	(0.119)	(0.167)	(0.147)	(0.190)	(0.213)	(0.204)	(0.387)	(0.380)
SICH: Retail &	-	-0.0505	0.275*	0.250*	0.113	0.180	-	0.0308	-0.156	-0.177	-	-0.602*
	(0.124)	(0.135)	(0.124)	(0.136)	(0.086)	(0.113)	(0.074)	(0.108)	(0.0976)	(0.162)	(0.186)	(0.315)
SIC: Education	-0.0630	-0.109	0.0155	0.0447	0.0189	0.0029	-	0.0556	-0.148	-0.220	-0.476**	-0.515*
	(0.123)	(0.127)	(0.154)	(0.157)	(0.099	(0.125)	(0.086	(0.104)	(0.115)	(0.159)	(0.235)	(0.307)
Assistance Effect (IA)	0.142*	0.280**	0.205*	0.268	0.0375	0.190*	0.0118	0.0701	-	0.0593	0.0172	0.00618
	(0.0855)	(0.117)	(0.107)	(0.200)	(0.055	(0.104)	(0.049	(0.091)	(0.0694)	(0.096)	(0.159)	(0.154)
Selection Effect		0.190*		0.143		0.0769		0.0237		0.0970		0.198*
		(0.105)		(0.153)		(0.073)		(0.077)		(0.081)		(0.111)
Constant^	x	x	x	x	x	x	x	x	x	x	x	x
	x	x	x	x	x	x	x	x	x	x	x	x
Observations	342	272	342	272	342	272	342	272	342	272	342	272
R-squared	0.133	0.179										

Standard errors in
*** p<0.01, ** p<0.05, *

Employment 3.4 - 2004-8, quantiles, no lags (full models with and without selection (s); quantiles 0.1, 0.25, 0.5, 0.75, 0.9

	FULL	FULL	Q0.1	Q0.1 S	Q0.25	Q0.25	Q0.5	Q0.5 S	Q0.75	Q0.75	Q0.9	Q0.9S
	(45)	(46)	(47)	(48)	(49)	(50)	(51)	(52)	(53)	(54)	(55)	(56)
	empl04	empl04	empl04	empl04	empl04	empl04	empl04	empl04	empl04	empl04	empl04	empl04
Employment 2004	-	-	-	-	-	-	-	-	-	-	-	-
	(0.0029	(0.003	(0.005	(0.006	(0.003	(0.002	(0.002	(0.002	(0.0026	(0.007	(0.0052	(0.0070
Employment 2004	4.23e-	4.15e-	3.91e-	4.97e-	1.75e-	6.56e-	9.86e-	1.95e-	2.91e-	3.44e-	0.00013	0.00013
	(1.49e-	(1.74e-	(2.66e-	(2.76e-	(1.31e-	(1.34e-	(9.56e-	(1.25e-	(1.36e-	(6.72e-	(2.91e-	(3.95e-
Firm age: 3<5 years	0.129	0.0767	0.149	0.230	0.0356	0.0981	0.162	0.207	0.136	-0.145	0.273	0.0458
	(0.206)	(0.221)	(0.195)	(0.227)	(0.147)	(0.146)	(0.210)	(0.147)	(0.334)	(0.549)	(0.679)	(0.660)
Firm age: 5<10 years	-0.193	-0.167	-0.255	-0.136	-	-0.164	0.0733	0.108	-0.0956	-0.193	-0.180	-0.0920
	(0.197)	(0.213)	(0.206)	(0.252)	(0.160)	(0.176)	(0.168)	(0.150)	(0.267)	(0.572)	(0.225)	(0.349)
Firm age: 10<20 years	-0.221	-0.255	-0.198	-0.100	-	-0.112	-	0.0296	-0.175	-0.375	-0.398*	-0.480
	(0.199)	(0.216)	(0.180)	(0.254)	(0.150)	(0.157)	(0.171)	(0.159)	(0.294)	(0.555)	(0.232)	(0.406)
Firm age: >20 years	-0.355*	-	-	-0.265	-0.242	-	-0.180	-0.173	-0.333	-0.540	-0.377	-0.317
	(0.197)	(0.216)	(0.171)	(0.219)	(0.147)	(0.136)	(0.164)	(0.146)	(0.272)	(0.565)	(0.265)	(0.437)
Legal form: Limited	-0.0856	-	-	-	-0.101	-	-	-	-0.104	0.0678	-0.109	0.267
	(0.141)	(0.156)	(0.127)	(0.172)	(0.126)	(0.134)	(0.104)	(0.146)	(0.181)	(0.175)	(0.284)	(0.193)
Multi-site firm	0.261**	0.333**	0.154	0.215	0.0717	0.237**	0.124	0.232*	0.232	0.394*	0.297	0.513*
	(0.116)	(0.127)	(0.125)	(0.171)	(0.101)	(0.103)	(0.092)	(0.135)	(0.155)	(0.211)	(0.261)	(0.288)
Exporting firm	0.0251	0.0291	0.0340	0.0531	0.0718	0.0443	0.0526	0.0253	0.187	0.0877	0.00161	0.0579
	(0.0993)	(0.107)	(0.090)	(0.147)	(0.070)	(0.092)	(0.074)	(0.080)	(0.114)	(0.157)	(0.146)	(0.246)
Firm in competitive	0.00665	0.0244	0.0376	-	0.0142	0.0062	0.0069	0.0115	-0.0589	-	0.00547	0.00690
	(0.0945)	(0.105)	(0.090)	(0.116)	(0.088)	(0.098)	(0.079)	(0.100)	(0.108)	(0.174)	(0.157)	(0.176)
Firm faces price elastic	-0.0568	-0.118	-	-0.281	0.0218	-	0.0019	-	-0.0729	-	-0.0749	-0.116
	(0.105)	(0.114)	(0.126)	(0.180)	(0.084)	(0.116)	(0.076)	(0.089)	(0.105)	(0.146)	(0.172)	(0.195)
Strategy: Maintain sales	0.0854	0.101	-	-	0.0206	-	-	0.0266	0.152	0.297	-0.0185	0.332
	(0.213)	(0.216)	(0.224)	(0.274)	(0.142)	(0.224)	(0.148)	(0.175)	(0.223)	(0.206)	(0.522)	(0.278)
Strategy: Penetrate	0.0950	0.120	0.0464	0.121	0.0766	0.0486	0.0106	0.0338	0.182	0.299	0.0189	0.446
	(0.202)	(0.206)	(0.181)	(0.212)	(0.127)	(0.195)	(0.132)	(0.164)	(0.193)	(0.184)	(0.559)	(0.290)
Strategy: New markets	0.0758	0.108	-0.207	-	0.0661	-0.264	-	-0.0335	0.103	-0.0752	0.490	
	(0.237)	(0.253)	(0.207)	(0.271)	(0.167)	(0.303)	(0.153)	(0.208)	(0.221)	(0.250)	(0.476)	(1.098)
Strategy: New products	-0.112	0.0339	-0.198	-	-	-0.112	-	0.0097	-0.0719	0.316	-0.555	-0.108
	(0.329)	(0.326)	(0.450)	(0.433)	(0.225)	(0.241)	(0.272)	(0.238)	(0.393)	(0.306)	(0.570)	(0.461)
Firm has formal	0.0885	-	-0.145	-	-	-	0.0970	0.0127	0.229**	0.120	0.374**	0.0809
	(0.0940)	(0.103)	(0.092)	(0.135)	(0.081)	(0.096)	(0.074)	(0.079)	(0.108)	(0.150)	(0.150)	(0.257)
Firm has non-executive	0.222**	0.209*	0.316**	0.320**	0.0944	0.204	0.0468	0.109	0.0278	-	0.220	0.0257
	(0.109)	(0.124)	(0.125)	(0.137)	(0.075)	(0.129)	(0.101)	(0.110)	(0.135)	(0.139)	(0.208)	(0.215)
(Owner-)Manager:	-0.0773	-0.152	-	-	-0.140	-0.196*	-	-	0.0371	-	-0.103	-0.102
	(0.114)	(0.130)	(0.152)	(0.182)	(0.093)	(0.110)	(0.091)	(0.100)	(0.180)	(0.154)	(0.142)	(0.283)
Owner-Manager 25<35	-0.101		-0.656	-0.273	-	-	0.0409	0.121	0.328	0.204	0.390	0.162
	(0.773)		(0.669)	(0.336)	(0.394)	(0.225)	(0.253)	(0.318)	(0.429)	(0.486)	(0.683)	(0.392)
Owner-Manager 35<45	-0.216	-0.189	-0.729	-0.220	-0.197	-0.166*	-	-0.110	0.252	-	0.228	0.142
	(0.766)	(0.190)	(0.652)	(0.142)	(0.388)	(0.096)	(0.249)	(0.088)	(0.383)	(0.195)	(0.631)	(0.247)
Owner-Manager 45<55	-0.334	-0.328*	-0.884	-	-0.236	-0.217*	-0.134	-	0.0740	-0.269	0.0979	-0.0257
	(0.764)	(0.189)	(0.642)	(0.128)	(0.387)	(0.116)	(0.262)	(0.084)	(0.368)	(0.200)	(0.611)	(0.358)
Owner-Manager had	0.0746	0.150	0.227**	0.251*	0.0572	0.0573	0.0558	0.0692	0.0630	0.131	-0.0544	0.218
	(0.0908)	(0.095)	(0.093)	(0.147)	(0.082)	(0.091)	(0.070)	(0.093)	(0.125)	(0.144)	(0.164)	(0.167)
SIC: Manufacturing	0.138	0.180	0.537**	0.454*	0.151	0.227	-	0.0818	-0.0456	0.0021	-0.212	-0.377
	(0.132)	(0.151)	(0.187)	(0.239)	(0.155)	(0.173)	(0.100)	(0.166)	(0.164)	(0.193)	(0.213)	(0.479)
SIC: Construction	0.184	0.217	0.277	0.424	0.164	0.267	0.0632	0.232	0.201	0.199	-0.153	-0.0986
	(0.157)	(0.169)	(0.296)	(0.265)	(0.191)	(0.212)	(0.173)	(0.215)	(0.217)	(0.188)	(0.350)	(0.494)
SICH: Retail &	0.0402	0.0364	0.430**	0.304	0.138	0.176	-	0.0483	-0.0826	-0.116	-0.498**	-0.703**
	(0.133)	(0.151)	(0.178)	(0.221)	(0.141)	(0.166)	(0.093)	(0.181)	(0.139)	(0.197)	(0.231)	(0.316)
SIC: Education	-0.0285	-	0.0460	0.0807	0.0070	0.0360	-	0.0220	-0.101	-	-0.219	-0.368
	(0.132)	(0.142)	(0.218)	(0.218)	(0.183)	(0.185)	(0.102)	(0.165)	(0.201)	(0.177)	(0.323)	(0.347)
Assistance Effect (IA)	0.104	0.236*	0.0454	0.186	0.0312	-	0.0225	0.0612	0.0351	0.175	-0.0283	0.192
	(0.0918	(0.131)	(0.110)	(0.238)	(0.071	(0.098	(0.064	(0.108)	(0.0904)	(0.154)	(0.196)	(0.388)
Selection Effect (inverse		0.168		0.139		-		-		0.221		0.114
		(0.118)		(0.163)		(0.104)		(0.095)		(0.162)		(0.287)
Constant^	x	x	x	x	x	x	x	x	x	x	x	x
	x	x	x	x	x	x	x	x	x	x	x	x
Observations	342	272	342	272	342	272	342	272	342	272	342	272
R-squared	0.138	0.164										

Standard errors in
*** p<0.01, ** p<0.05, *

Employment 3.5 - 2004-9, quantiles, no lags (full models with and without selection (s); quantiles 0.1, 0.25, 0.5, 0.75, 0.9

	FULL	FULL S	Q0.1	Q0.1 S	Q0.25	Q0.25	Q0.5	Q0.5 S	Q0.75	Q0.75	Q0.9	Q0.9S
	(57)	(58)	(59)	(60)	(61)	(62)	(63)	(64)	(65)	(66)	(67)	(68)
	empl04	empl04	empl04	empl04	empl04	empl04	empl04	empl04	empl04	empl04	empl04	empl04
Employment 2004	-	-	-	-	-	-	-	-	-	-	-	-
	(0.0031	(0.0035	(0.004	(0.009	(0.003	(0.004	(0.002	(0.002	(0.003	(0.010	(0.0057	(0.0051
Employment 2004	5.42e-	5.52e-	3.84e-	3.32e-	1.75e-	2.85e-	1.20e-	2.45e-	3.17e-	7.95e-	0.00012	0.00014
	(1.56e-	(1.89e-	(2.17e-	(8.31e-	(1.44e-	(1.92e-	(1.19e-	(1.36e-	(1.53e-	(9.08e-	(3.15e-	(3.43e-
Firm age: 3<5 years	0.310	0.359	0.277	0.568	0.166	0.297	0.252	0.149	0.278	0.311	0.648	0.369
	(0.215)	(0.240)	(0.182)	(0.345)	(0.191)	(0.189)	(0.195)	(0.252)	(0.330)	(0.412)	(0.541)	(0.335)
Firm age: 5<10 years	-0.129	-0.0408	-0.210	0.0335	-0.158	-	0.0487	0.0037	-	0.0627	0.0297	0.208
	(0.205)	(0.232)	(0.229)	(0.321)	(0.228)	(0.218)	(0.196)	(0.242)	(0.228)	(0.295)	(0.362)	(0.302)
Firm age: 10<20 years	-0.135	-0.0799	-0.130	0.0318	-0.199	-	-	-0.122	-0.190	-0.210	-0.164	-0.0220
	(0.208)	(0.235)	(0.190)	(0.353)	(0.205)	(0.201)	(0.171)	(0.229)	(0.240)	(0.293)	(0.383)	(0.352)
Firm age: >20 years	-0.263	-0.255	-0.350*	-0.130	-0.344*	-0.303	-0.162	-0.258	-0.247	-0.238	-0.0164	0.128
	(0.206)	(0.234)	(0.179)	(0.331)	(0.193)	(0.197)	(0.191)	(0.246)	(0.241)	(0.345)	(0.408)	(0.335)
Legal form: Limited	-0.0228	0.0885	-0.237*	-	-	0.0625	0.109	0.207	-0.153	0.192	0.268	0.452*
	(0.147)	(0.169)	(0.138)	(0.181)	(0.112)	(0.162)	(0.133)	(0.151)	(0.242)	(0.311)	(0.228)	(0.265)
Multi-site firm	0.215*	0.294**	0.174	0.0101	0.110	0.267	0.275**	0.323**	0.140	0.306*	0.188	0.313
	(0.121)	(0.138)	(0.174)	(0.228)	(0.123)	(0.167)	(0.127)	(0.159)	(0.133)	(0.161)	(0.230)	(0.272)
Exporting firm	-0.0226	-0.0620	-	0.0652	0.0671	-	0.0004	-	0.0335	-	-0.151	-0.0856
	(0.104)	(0.116)	(0.104)	(0.178)	(0.086)	(0.110)	(0.081)	(0.097)	(0.116)	(0.136)	(0.135)	(0.239)
Firm in competitive	-0.0188	0.00504	0.0556	-0.116	0.0443	0.0549	0.0177	-	-	-	0.160	0.139
	(0.0989)	(0.114)	(0.109)	(0.143)	(0.108)	(0.127)	(0.093)	(0.109)	(0.144)	(0.164)	(0.151)	(0.182)
Firm faces price elastic	-	-0.0786	-	-0.255	0.102	-	0.0287	0.0308	0.0746	0.0390	-0.0155	0.0188
	(0.110)	(0.124)	(0.126)	(0.186)	(0.105)	(0.155)	(0.086)	(0.110)	(0.146)	(0.158)	(0.232)	(0.229)
Strategy: Maintain sales	-0.0854	-0.116	-	-0.339	-0.276	-0.115	-	-	-0.151	-0.152	0.0339	0.0143
	(0.222)	(0.235)	(0.699)	(0.276)	(0.185)	(0.272)	(0.182)	(0.198)	(0.279)	(0.298)	(0.228)	(0.235)
Strategy: Penetrate	-0.0149	-0.0321	0.120	0.0396	-0.125	-	-0.112	-	-	-	0.358	0.125
	(0.211)	(0.224)	(0.656)	(0.233)	(0.152)	(0.217)	(0.171)	(0.187)	(0.286)	(0.241)	(0.232)	(0.193)
Strategy: New markets	-0.0319	-	-	-	-0.371*	-0.240	-0.331	-0.242	-0.133	-0.193	0.501	0.634
	(0.247)	(0.274)	(0.676)	(0.286)	(0.218)	(0.319)	(0.205)	(0.239)	(0.373)	(0.375)	(0.395)	(0.574)
Strategy: New products	-0.213	-0.111	0.107	0.344	-0.342	-	-0.389	-0.316	-0.352	-0.407	-0.317	-0.539
	(0.344)	(0.354)	(0.656)	(0.375)	(0.229)	(0.284)	(0.242)	(0.302)	(0.385)	(0.359)	(0.366)	(0.402)
Firm has formal	0.126	0.0201	-	-0.165	0.0550	-	0.223**	0.0910	0.287**	0.206	0.306*	0.194
	(0.0987)	(0.112)	(0.120)	(0.137)	(0.098)	(0.109)	(0.074)	(0.099)	(0.135)	(0.132)	(0.185)	(0.249)
Firm has non-executive	0.265**	0.267**	0.436**	0.356*	0.130	0.263*	0.0926	0.240*	0.0691	-	0.190	0.114
	(0.115)	(0.135)	(0.152)	(0.214)	(0.105)	(0.138)	(0.095)	(0.131)	(0.129)	(0.150)	(0.223)	(0.241)
(Owner-)Manager:	-0.0559	-0.137	-0.137	-0.297	-	-0.138	0.0334	-0.105	-0.120	-	0.183	0.0190
	(0.119)	(0.141)	(0.160)	(0.232)	(0.117)	(0.177)	(0.119)	(0.118)	(0.147)	(0.161)	(0.139)	(0.173)
Owner-Manager 25<35	-0.0993		-0.628	-0.648	-0.105	-	0.0994	0.306	0.369	0.260	0.263	0.465
	(0.807)		(0.753)	(1.264)	(0.468)	(0.297)	(0.321)	(0.254)	(0.477)	(0.312)	(0.451)	(0.416)
Owner-Manager 35<45	-0.385	-0.305	-0.969	-	-0.303	-0.221	-	0.0746	0.0686	0.0104	-0.0744	0.118
	(0.800)	(0.207)	(0.727)	(0.157)	(0.473)	(0.143)	(0.246)	(0.105)	(0.465)	(0.192)	(0.347)	(0.236)
Owner-Manager 45<55	-0.545	-0.511**	-1.063	-	-0.413	-	-0.244	-	-	-0.103	-0.144	0.0819
	(0.798)	(0.206)	(0.718)	(0.180)	(0.457)	(0.121)	(0.246)	(0.100)	(0.437)	(0.219)	(0.296)	(0.264)
Owner-Manager had	0.129	0.174*	0.0543	-	0.122	0.0206	0.0689	0.129	0.131	0.234*	0.0869	0.248
	(0.0949)	(0.104)	(0.124)	(0.186)	(0.106)	(0.136)	(0.089)	(0.097)	(0.130)	(0.141)	(0.165)	(0.191)
SIC: Manufacturing	0.107	0.134	0.487**	0.210	0.136	0.283	-	-	-0.164	-0.132	-0.317	-0.365
	(0.138)	(0.164)	(0.228)	(0.285)	(0.169)	(0.253)	(0.113)	(0.161)	(0.164)	(0.261)	(0.257)	(0.298)
SIC: Construction	0.124	0.138	0.224	0.378	0.0691	0.226	0.0046	-	0.0315	-	-0.347	-0.228
	(0.164)	(0.184)	(0.266)	(0.274)	(0.245)	(0.306)	(0.128)	(0.189)	(0.261)	(0.335)	(0.286)	(0.426)
SICH: Retail &	-0.0137	0.0221	0.407*	0.273	0.0610	0.256	-	-0.147	-0.165	-0.241	-	-0.749**
	(0.139)	(0.164)	(0.239)	(0.219)	(0.154)	(0.232)	(0.117)	(0.160)	(0.168)	(0.276)	(0.234)	(0.361)
SIC: Education	-0.146	-0.137	-	0.0029	-0.237	-	-0.102	-0.195	-	-0.172	-	-0.573
	(0.137)	(0.155)	(0.255)	(0.264)	(0.176)	(0.253)	(0.136)	(0.152)	(0.195)	(0.303)	(0.258)	(0.460)
Assistance Effect (IA)	0.136	0.189	0.107	-0.122	-	0.0360	0.0453	0.0699	-	0.0713	0.297	0.138
	(0.0962	(0.143)	(0.115)	(0.190)	(0.108)	(0.145)	(0.073)	(0.116)	(0.124)	(0.139)	(0.193)	(0.319)
Selection Effect (inverse		0.0657		-0.209		-0.100		-		0.0358		-0.105
		(0.128)		(0.166)		(0.148)		(0.099)		(0.158)		(0.200)
Constant^	x	x	x	x	x	x	x	x	x	x	x	x
	x	x	x	x	x	x	x	x	x	x	x	x
Observations	341	272	341	272	341	272	341	272	341	272	341	272
R-squared	0.185	0.196										

Standard errors in
*** p<0.01, ** p<0.05, *

Employment 3.6 - 2004-10, quantiles, no lags (full models with and without selection (s); quantiles 0.1, 0.25, 0.5, 0.75, 0.9

	FULL	FULL	Q0.1	Q0.1 S	Q0.25	Q0.25	Q0.5	Q0.5 S	Q0.75	Q0.75	Q0.9	Q0.9S
	(69)	(70)	(71)	(72)	(73)	(74)	(75)	(76)	(77)	(78)	(79)	(80)
	empl04	empl04	empl0	empl0	empl0	empl0	empl04	empl04	empl04	empl0	empl04	empl04
Employment 2004	-	-	-	-	-	-	-	-	-	-	-	-
	(0.0032	(0.003	(0.005	(0.004	(0.003	(0.005	(0.003	(0.0030	(0.0035	(0.009	(0.0059	(0.0084
Employment 2004	4.90e-	4.89e-	6.69e-	5.57e-	1.54e-	2.95e-	3.12e-	4.41e-	4.37e-	0.0001	0.00011	0.00012
	(1.61e-	(1.96e-	(3.40e-	(2.82e-	(1.58e-	(2.96e-	(1.70e-	(1.37e-	(1.70e-	(8.22e-	(3.21e-	(4.20e-
Firm age: 3<5 years	0.417*	0.446*	0.541*	0.923	0.229	0.332	0.345*	0.445**	0.369	0.243	0.336	0.255
	(0.223)	(0.250)	(0.325)	(0.928)	(0.178)	(0.242)	(0.195)	(0.185)	(0.368)	(0.376)	(0.552)	(0.422)
Firm age: 5<10 years	-0.0262	0.0956	-	0.329	-	0.119	0.204	0.299*	0.0289	-	-0.252	0.0491
	(0.213)	(0.241)	(0.388)	(0.899)	(0.215)	(0.263)	(0.187)	(0.174)	(0.317)	(0.339)	(0.333)	(0.269)
Firm age: 10<20 years	-0.0733	-	-	0.214	-0.136	0.0672	0.0471	0.179	-0.0305	-0.158	-0.433	-0.101
	(0.215)	(0.244)	(0.400)	(0.880)	(0.215)	(0.271)	(0.166)	(0.171)	(0.327)	(0.341)	(0.388)	(0.416)
Firm age: >20 years	-0.165	-0.165	-0.181	0.0473	-0.328	-0.193	-	-0.0210	-0.143	-0.173	-0.210	-0.0186
	(0.213)	(0.244)	(0.328)	(0.782)	(0.200)	(0.266)	(0.194)	(0.186)	(0.321)	(0.377)	(0.361)	(0.375)
Legal form: Limited	-0.0546	0.0159	-0.379*	-0.302	-	-	0.101	0.183	-0.110	0.101	0.0270	0.312
	(0.152)	(0.176)	(0.202)	(0.202)	(0.123)	(0.166)	(0.129)	(0.138)	(0.341)	(0.315)	(0.458)	(0.561)
Multi-site firm	0.288**	0.356**	0.260	0.257	0.254	0.248	0.279**	0.438**	0.256*	0.338	0.201	0.530
	(0.126)	(0.144)	(0.248)	(0.262)	(0.158)	(0.173)	(0.136)	(0.164)	(0.142)	(0.218)	(0.238)	(0.453)
Exporting firm	-0.0130	-	0.0248	0.0690	0.0101	-	0.098	-0.0849	0.0306	-	-0.216	0.0441
	(0.108)	(0.121)	(0.154)	(0.268)	(0.114)	(0.132)	(0.098)	(0.114)	(0.105)	(0.152)	(0.162)	(0.333)
Firm in competitive	-0.0202	-	0.113	0.0006	0.115	-0.103	-	-0.0929	-0.0541	-	-0.103	0.151
	(0.102)	(0.118)	(0.173)	(0.187)	(0.134)	(0.127)	(0.087)	(0.0958)	(0.129)	(0.149)	(0.189)	(0.245)
Firm faces price elastic	-0.0808	-0.169	-0.177	-0.337	-	-	0.0051	-0.0372	-0.0789	-	-0.195	-0.261
	(0.114)	(0.129)	(0.212)	(0.213)	(0.112)	(0.201)	(0.093)	(0.101)	(0.118)	(0.151)	(0.179)	(0.269)
Strategy: Maintain sales	-0.0717	-0.110	-0.113	-0.198	-0.239	-0.255	-	-0.196	0.0184	-	-0.209	0.170
	(0.230)	(0.244)	(0.367)	(0.419)	(0.219)	(0.327)	(0.169)	(0.177)	(0.227)	(0.231)	(0.221)	(0.312)
Strategy: Penetrate	-0.0499	-	-	-0.112	-0.220	-0.182	-0.106	-0.281*	0.00732	-	0.0772	0.334*
	(0.219)	(0.233)	(0.301)	(0.334)	(0.205)	(0.278)	(0.149)	(0.162)	(0.214)	(0.197)	(0.228)	(0.198)
Strategy: New markets	-0.0492	0.0024	-0.120	-0.393	-	-0.433	-0.226	-0.393	-0.209	0.216	0.617	0.743
	(0.256)	(0.285)	(0.327)	(0.406)	(0.240)	(0.291)	(0.226)	(0.243)	(0.278)	(0.795)	(0.611)	(0.743)
Strategy: New products	-0.216	-	0.0342	0.242	-0.299	-	-0.352	-0.393*	-0.278	-0.390	0.00028	-0.0561
	(0.356)	(0.368)	(0.378)	(0.441)	(0.249)	(0.337)	(0.205)	(0.205)	(0.414)	(0.420)	(0.420)	(0.614)
Firm has formal	0.157	0.0474	-	-0.193	0.118	0.0222	0.262**	0.122	0.317**	0.269*	0.267	0.149
	(0.102)	(0.116)	(0.145)	(0.328)	(0.102)	(0.109)	(0.091)	(0.106)	(0.108)	(0.135)	(0.162)	(0.409)
Firm has non-executive	0.232*	0.262*	0.323*	0.389	0.208*	0.332*	0.130	0.199*	0.0944	0.0856	0.136	0.0148
	(0.119)	(0.140)	(0.193)	(0.238)	(0.124)	(0.153)	(0.097)	(0.114)	(0.125)	(0.147)	(0.252)	(0.193)
(Owner-)Manager:	0.112	0.0528	-	-0.215	0.191	0.126	0.163	0.0261	0.128	0.0414	0.202	0.184
	(0.123)	(0.146)	(0.194)	(0.285)	(0.150)	(0.278)	(0.109)	(0.133)	(0.140)	(0.134)	(0.151)	(0.246)
Owner-Manager 25<35	0.149		-0.271	0.301	-	0.345	0.108	0.351**	0.318	0.555	0.801	0.764
	(0.836)		(0.708)	(0.543)	(0.514)	(0.268)	(0.299)	(0.171)	(0.303)	(0.455)	(0.872)	(0.583)
Owner-Manager 35<45	-0.156	-0.215	-0.762	-0.146	-0.346	-0.176	-	0.0792	0.251	0.0981	0.446	0.230
	(0.829)	(0.215)	(0.694)	(0.260)	(0.520)	(0.144)	(0.295)	(0.102)	(0.330)	(0.195)	(0.870)	(0.216)
Owner-Manager 45<55	-0.312	-	-0.915	-0.559*	-0.422	-	-0.241	-0.149	0.0537	-	0.293	0.0948
	(0.826)	(0.214)	(0.706)	(0.296)	(0.508)	(0.119)	(0.293)	(0.105)	(0.271)	(0.217)	(0.841)	(0.306)
Owner-Manager had	0.127	0.177	0.170	0.289	0.0366	0.0034	0.112	0.202*	0.156	0.205	0.401**	0.561*
	(0.0982)	(0.108)	(0.154)	(0.237)	(0.122)	(0.128)	(0.104)	(0.120)	(0.137)	(0.135)	(0.189)	(0.310)
SIC: Manufacturing	0.0793	0.122	0.442	0.481	0.114	0.287	0.0070	0.0387	-0.0635	-0.184	-0.395	-0.475
	(0.143)	(0.171)	(0.276)	(0.327)	(0.171)	(0.259)	(0.152)	(0.175)	(0.166)	(0.225)	(0.326)	(0.682)
SIC: Construction	0.133	0.186	0.411	0.507	0.0256	0.428	0.101	0.136	0.0912	-0.167	-0.580	-0.232
	(0.170)	(0.191)	(0.267)	(0.361)	(0.204)	(0.313)	(0.157)	(0.176)	(0.192)	(0.255)	(0.384)	(0.670)
SICH: Retail &	-0.0191	0.0126	0.420*	0.490	0.0703	0.286	-	-0.0310	-0.154	-0.381	-	-0.919
	(0.144)	(0.170)	(0.239)	(0.329)	(0.147)	(0.237)	(0.127)	(0.170)	(0.152)	(0.260)	(0.289)	(0.696)
SIC: Education	-0.167	-0.116	-	0.114	-0.200	0.0344	-0.104	-0.148	-0.0995	-0.245	-	-0.715
	(0.142)	(0.161)	(0.308)	(0.437)	(0.154)	(0.270)	(0.152)	(0.181)	(0.202)	(0.262)	(0.305)	(0.706)
Assistance Effect (IA)	0.0947	0.153	0.189	0.104	0.0441	-	0.0637	0.0334	0.0364	0.0723	0.194	0.0809
	(0.0996	(0.148)	(0.130)	(0.288)	(0.109)	(0.155)	(0.097)	(0.137)	(0.106)	(0.131)	(0.141)	(0.317)
Selection Effect		0.0755		0.0125		-		-0.0653		0.0474		-0.0121
		(0.133)		(0.197)		(0.123)		(0.0976		(0.145)		(0.342)
Constant^	x	x	x	x	x	x	x	x	x	x	x	x
	x	x	x	x	x	x	x	x	x	x	x	x
Observations	341	272	341	272	341	272	341	272	341	272	341	272
R-squared	0.174	0.200										

Standard errors in
*** p<0.01, ** p<0.05, *

Employment 3.7 - 2004-11, quantiles, no lags (full models with and without selection (s); quantiles 0.1, 0.25, 0.5, 0.75, 0.9

	FULL	FULL S	Q0.1	Q0.1 S	Q0.25	Q0.25	Q0.5	Q0.5 S	Q0.75	Q0.75S	Q0.9	Q0.9S
	(81)	(82)	(83)	(84)	(85)	(86)	(87)	(88)	(89)	(90)	(91)	(92)
	empl04	empl04	empl0	empl0	empl0	empl0	empl04	empl04	empl04	empl04	empl04	empl04
Employment 2004	-	-	-	-	-	-	-	-	-	-	-	-
	(0.0032	(0.0037	(0.004	(0.005	(0.003	(0.003	(0.0033	(0.0033	(0.0040	(0.0071	(0.0071	(0.0072
Employment 2004	5.46e-	5.74e-	2.88e-	3.79e-	2.24e-	3.42e-	3.65e-	4.11e-	5.69e-	0.00011	0.00010	0.00014
	(1.65e-	(1.99e-	(2.40e-	(3.09e-	(1.35e-	(2.48e-	(1.49e-	(1.56e-	(1.97e-	(3.75e-	(3.65e-	(3.69e-
Firm age: 3<5 years	0.492**	0.541**	0.491*	0.699	0.379*	0.455*	0.401**	0.341	0.728**	0.397	0.400	0.426
	(0.227)	(0.253)	(0.194)	(0.543)	(0.173)	(0.235)	(0.201)	(0.227)	(0.282)	(0.578)	(0.530)	(0.367)
Firm age: 5<10 years	0.0802	0.202	-0.133	0.248	0.190	0.296	0.239	0.298	0.352	0.0870	-0.251	0.316
	(0.217)	(0.244)	(0.245)	(0.615)	(0.189)	(0.248)	(0.184)	(0.207)	(0.256)	(0.577)	(0.400)	(0.299)
Firm age: 10<20 years	-0.0474	0.0459	-0.157	0.0988	-	0.0848	0.0476	0.0737	0.118	0.00418	-0.304	0.223
	(0.220)	(0.247)	(0.214)	(0.533)		(0.261)	(0.189)	(0.245)	(0.245)	(0.570)	(0.452)	(0.365)
Firm age: >20 years	-0.128	-0.0927	-0.256	-	-0.174	-0.130	-0.0586	-0.0490	0.0792	-0.0356	-0.193	0.257
	(0.218)	(0.247)	(0.181)	(0.525)	(0.182)	(0.242)	(0.179)	(0.208)	(0.242)	(0.580)	(0.470)	(0.394)
Legal form: Limited	-0.113	0.0225	-	-0.334	-	-0.121	0.0310	0.0375	0.0420	0.348	0.0662	0.577**
	(0.156)	(0.178)	(0.158)	(0.206)	(0.126)	(0.146)	(0.129)	(0.146)	(0.208)	(0.228)	(0.426)	(0.247)
Multi-site firm	0.308**	0.396**	0.388*	0.375*	0.315*	0.288*	0.378**	0.456**	0.349**	0.428*	0.506	0.665***
	(0.128)	(0.145)	(0.159)	(0.216)	(0.130)	(0.165)	(0.141)	(0.141)	(0.144)	(0.225)	(0.355)	(0.194)
Exporting firm	-0.0580	-0.123	-	0.0553	-	-0.118	-0.0712	-0.113	0.0601	-0.114	-0.185	-0.226
	(0.110)	(0.122)	(0.137)	(0.201)	(0.099)	(0.111)	(0.112)	(0.121)	(0.146)	(0.192)	(0.217)	(0.227)
Firm in competitive	-0.0297	0.0052	0.0768	0.0416	0.0234	-	-0.0236	-0.0395	-0.0281	0.0854	-0.117	0.265
	(0.104)	(0.120)	(0.115)	(0.175)	(0.117)	(0.116)	(0.0927)	(0.0989)	(0.133)	(0.161)	(0.248)	(0.258)
Firm faces price elastic	-0.0967	-0.198	-0.154	-0.235	-	-0.121	-0.0852	-0.124	-	-0.114	-0.283	-0.492**
	(0.116)	(0.131)	(0.120)	(0.175)	(0.108)	(0.145)	(0.104)	(0.122)	(0.120)	(0.186)	(0.179)	(0.219)
Strategy: Maintain	-0.0989	-0.120	-0.246	-0.129	-	-0.211	-0.166	-0.102	-0.0471	-0.0899	-0.0446	-0.234
	(0.235)	(0.247)	(0.284)	(0.445)	(0.189)	(0.298)	(0.213)	(0.229)	(0.238)	(0.306)	(0.308)	(0.261)
Strategy: Penetrate	-0.0567	-0.103	-0.152	-	-	-0.138	-0.236	-0.200	-0.0389	-0.116	0.125	-0.106
	(0.223)	(0.236)	(0.244)	(0.388)	(0.173)	(0.291)	(0.205)	(0.237)	(0.240)	(0.305)	(0.258)	(0.186)
Strategy: New markets	-0.0691	-0.0170	-0.410	-0.160	-0.208	-0.380	-0.242	-0.202	-0.332	-0.0678	0.599	0.371
	(0.261)	(0.289)	(0.303)	(0.427)	(0.228)	(0.311)	(0.258)	(0.322)	(0.325)	(0.528)	(0.660)	(0.635)
Strategy: New products	-0.222	-0.0972	-	0.170	0.0608		-0.285	-0.0866	-0.563*	-0.566	-0.324	-0.522
	(0.363)	(0.373)	(0.239)	(0.735)	(0.211)	(0.326)	(0.247)	(0.293)	(0.317)	(0.460)	(0.363)	(0.546)
Firm has formal	0.158	0.0649	0.0212	-	0.135	0.0100	0.168*	0.0940	0.348**	0.344*	0.208	0.357
	(0.104)	(0.117)	(0.130)	(0.240)	(0.092)	(0.106)	(0.100)	(0.125)	(0.125)	(0.178)	(0.232)	(0.219)
Firm has non-executive	0.246**	0.272*	0.444*	0.492*	0.257*	0.319*	0.181	0.227**	0.0481	0.103	0.211	0.0360
	(0.121)	(0.142)	(0.137)	(0.216)	(0.116)	(0.126)	(0.111)	(0.113)	(0.164)	(0.187)	(0.226)	(0.209)
(Owner-)Manager:	0.0353	-0.0639	-	-0.217	0.148	0.0842	0.0108	-0.105	0.128	-0.0585	0.195	-0.172
	(0.126)	(0.148)	(0.136)	(0.266)	(0.136)	(0.169)	(0.133)	(0.150)	(0.156)	(0.229)	(0.202)	(0.211)
Owner-Manager 25<35	-0.661		-1.174*	0.274	-0.767	0.357*	-0.644*	0.443**	-	0.456	-	0.440
	(0.853)		(0.711)	(0.345)	(0.492)	(0.187)	(0.346)	(0.206)	(0.313)	(0.369)	(0.478)	(0.374)
Owner-Manager 35<45	-0.945	-	-	-0.272	-	-0.168	-	0.0781	-	0.0473	-0.306	-0.0735
	(0.845)	(0.218)	(0.718)	(0.175)	(0.510)	(0.125)	(0.345)	(0.117)	(0.303)	(0.212)	(0.409)	(0.214)
Owner-Manager 45<55	-1.096	-	-	-	-	-	-	-0.124	-	-0.164	-0.412	-0.174
	(0.843)	(0.217)	(0.712)	(0.178)	(0.498)	(0.105)	(0.338)	(0.110)	(0.285)	(0.231)	(0.428)	(0.205)
Owner-Manager had	0.132	0.190*	0.138	0.277	0.0854	0.0137	0.0928	0.0934	0.120	0.189	0.343	0.687***
	(0.100)	(0.109)	(0.114)	(0.227)	(0.111)	(0.102)	(0.0948)	(0.0962)	(0.111)	(0.155)	(0.224)	(0.236)
SIC: Manufacturing	0.144	0.161	0.475*	0.613	0.238	0.255	0.120	0.0989	-0.158	-0.163	-0.363	-0.0612
	(0.146)	(0.173)	(0.199)	(0.448)	(0.154)	(0.176)	(0.181)	(0.186)	(0.226)	(0.280)	(0.332)	(0.235)
SIC: Construction	0.0733	0.117	0.352*	0.481	0.108	0.258	0.0586	0.147	-0.337	-0.163	-0.566	-0.136
	(0.173)	(0.194)	(0.198)	(0.487)	(0.210)	(0.199)	(0.180)	(0.181)	(0.285)	(0.335)	(0.371)	(0.313)
SICH: Retail &	-0.0349	-0.0122	0.323*	0.475	0.168	0.214	-0.0467	-0.0571	-0.342	-0.412	-	-0.634**
	(0.147)	(0.172)	(0.186)	(0.375)	(0.132)	(0.162)	(0.182)	(0.258)	(0.344)	(0.273)		(0.275)
SIC: Education	-0.156	-0.110	-0.143	0.0082	-0.127	-	-0.0374	-0.0154	-0.248	-0.220	-0.746**	-0.661
	(0.145)	(0.163)	(0.247)	(0.461)	(0.147)	(0.188)	(0.176)	(0.192)	(0.276)	(0.370)	(0.335)	(0.409)
Assistance Effect (IA)	0.118	0.189	0.140	0.205	-	-	0.0758	0.140	0.0364	0.137	0.315	0.208
	(0.102)	(0.150)	(0.114)	(0.329)	(0.099)	(0.129)	(0.0991)	(0.114)	(0.119)	(0.149)	(0.216)	(0.384)
Selection Effect		0.0970		0.0712		-		0.0473		0.0229		-0.119
		(0.135)		(0.244)		(0.103)		(0.0989)		(0.142)		(0.261)
Constant^	x	x	x	x	x	x	x	x	x	x	x	x
	x	x	x	x	x	x	x	x	x	x	x	x
Observations	341	272	341	272	341	272	341	272	341	272	341	272
R-squared	0.181	0.213										

Standard errors in
*** p<0.01, ** p<0.05, *

Employment 3.8 - 2004-5, quantiles, with 2003-4 lag (full models with and without selection (s); quantiles 0.1, 0.25, 0.5, 0.75, 0.9

	Q0.1	Q0.1 S	Q0.25	Q0.25 S	Q0.5	Q0.5 S	Q0.75	Q0.75S	Q0.9	Q0.9S
	(1) empl040	(2) empl040	(3) empl040	(4) empl040			(5) empl040	(6) empl040	(7) empl040	(8) empl040
Lag: Employment growth	0.0171 (0.0379)	0.0446 (0.0603)	-2.38e-05 (0.0156)	-0.0139 (0.0230)			0.0788 (0.105)	0.0714 (0.0583)	0.0583 (0.0496)	0.237** (0.118)
Lag: Employment growth										
Lag: Employment growth										
Lag: Employment growth										
Employment 2004 (ELD)	0.00126 (0.00091	0.00056 (0.00106	1.10e-05 (0.00030	- (0.00064	could not compute	could not compute	-0.00104 (0.00083	-0.00136 (0.00105	-0.00232 (0.00170	- (0.00096
Employment 2004 squared	-5.23e-06 (3.54e-	-1.49e- (4.75e-	-1.27e-06 (1.93e-	-1.43e-06 (8.52e-	be compute	be compute	5.09e-06 (3.91e-	7.20e-06 (7.01e-	8.21e-06 (8.46e-	-9.95e-07 (4.58e-
Firm age: 3<5 years	-0.0373 (0.112)	-0.137 (0.167)	2.59e-05 (0.0187)	0.0143 (0.0182)			-0.0770 (0.377)	-0.174 (0.124)	0.326 (0.209)	0.371** (0.173)
Firm age: 5<10 years	0.0365 (0.0823)	-0.0300 (0.0817)	4.22e-05 (0.0179)	0.0159 (0.0175)			-0.0835 (0.150)	-0.104 (0.151)	-0.112 (0.133)	-0.0347 (0.133)
Firm age: 10<20 years	-0.0101 (0.0812)	-0.0176 (0.0655)	3.07e-05 (0.0177)	0.0119 (0.0171)			-0.150 (0.132)	-0.178** (0.0862)	-0.132 (0.122)	-0.173 (0.110)
Firm age: >20 years	-0.0573 (0.0851)	-0.0558 (0.0739)	1.68e-05 (0.0177)	0.00904 (0.0163)			-0.151 (0.133)	-0.202** (0.0841)	-0.149 (0.130)	-0.224** (0.111)
Legal form: Limited liability	-0.0498 (0.0381)	-0.00341 (0.0498)	1.21e-05 (0.0132)	0.00126 (0.0102)			-0.0431 (0.0636)	-0.0547 (0.0531)	0.00467 (0.0859)	-0.0393 (0.0534)
Multi-site firm	0.0779** (0.0362)	0.0177 (0.0441)	2.45e-05 (0.00939)	0.00374 (0.00937)			0.0214 (0.0385)	0.0299 (0.0385)	0.0758 (0.0901)	0.0542 (0.0495)
Exporting firm	0.0173 (0.0285)	-0.0358 (0.0346)	-5.72e-06 (0.00779)	0.000226 (0.00687)			0.00188 (0.0278)	-0.0195 (0.0297)	0.0378 (0.0461)	0.0146 (0.0385)
Firm in competitive environ.	-0.0180 (0.0316)	0.00998 (0.0386)	-4.79e-06 (0.00717)	0.000149 (0.00734)			0.00285 (0.0353)	0.0170 (0.0330)	-7.73e- (0.0530)	-0.0310 (0.0430)
Firm faces price elastic	-0.0224 (0.0309)	-0.0527 (0.0341)	-9.67e-06 (0.00724)	0.00250 (0.00711)			-0.0198 (0.0422)	-0.0515 (0.0382)	-0.0721 (0.0571)	-0.0188 (0.0347)
Strategy: Maintain sales	0.00293 (0.0505)	-0.0628 (0.0593)	-1.30e-05 (0.0127)	-0.00510 (0.0120)			0.0254 (0.0693)	-0.00696 (0.0606)	0.102 (0.118)	0.0671 (0.0869)
Strategy: Penetrate market	-0.0199 (0.0469)	-0.0648 (0.0510)	-7.62e-06 (0.0117)	-0.00127 (0.0102)			0.0141 (0.0548)	0.00085 (0.0594)	0.0499 (0.111)	0.0976 (0.0639)
Strategy: New markets	-0.118 (0.0808)	-0.103 (0.0955)	-4.69e-05 (0.0182)	-0.00818 (0.0175)			0.0301 (0.125)	0.0975 (0.102)	0.0939 (0.115)	0.102 (0.0908)
Strategy: New products	-0.0896 (0.0850)	-0.152* (0.0869)	-0.0403 (0.0703)	-0.0383 (0.0527)			0.0142 (0.139)	0.0601 (0.106)	-0.0706 (0.144)	0.0122 (0.102)
Firm has formal business plan	0.0105 (0.0320)	-0.00783 (0.0332)	-2.99e-07 (0.00664)	0.00159 (0.00584)			0.0560 (0.0404)	0.0335 (0.0384)	0.0893 (0.0549)	0.0153 (0.0381)
Firm has non-executive	-0.0420 (0.0603)	-0.0516 (0.0465)	8.23e-06 (0.00921)	-0.00562 (0.00916)			0.0128 (0.0392)	-0.0188 (0.0277)	0.137 (0.123)	0.106 (0.0758)
(Owner-)Manager: equity in	0.105 (0.0647)	-0.0125 (0.0385)	- (0.0117)	-0.00461 (0.0129)			-0.0345 (0.0457)	-0.0535 (0.0377)	-0.0568 (0.0919)	-0.0743 (0.0713)
Owner-Manager 25<35 years	-0.0976 (0.189)		-0.0320 (0.0449)				0.0272 (0.112)		0.147 (0.292)	
Owner-Manager 35<45 years	0.000223 (0.177)	0.239** (0.117)	-0.0320 (0.0441)	- (0.0140)			0.0229 (0.0643)	-0.0224 (0.116)	0.133 (0.264)	0.0761 (0.112)
Owner-Manager 45<55 years	-0.0454 (0.175)	0.143 (0.130)	-0.0320 (0.0437)	- (0.0146)			-0.0167 (0.0544)	-0.0348 (0.127)	0.0553 (0.258)	-0.0238 (0.0715)
Owner-Manager >55 years old	0.0197 (0.176)	0.261** (0.123)	-0.0320 (0.0437)	0.00156 (0.0143)			-0.0301 (0.0541)	-0.0409 (0.119)	-0.00203 (0.259)	-0.00211 (0.0640)
Owner-Manager had previous	0.00419 (0.0304)	-0.00980 (0.0405)	-9.40e-06 (0.00651)	0.000458 (0.00628)			-0.0196 (0.0349)	0.0368 (0.0340)	-0.0883* (0.0506)	0.00820 (0.0348)
SIC: Manufacturing	0.272*** (0.0727)	0.218* (0.120)	0.0378 (0.0634)	0.0308 (0.0599)			-0.0318 (0.0858)	0.00226 (0.0498)	-0.104 (0.114)	-0.0129 (0.0830)
SIC: Construction	0.251*** (0.0852)	0.200 (0.139)	0.0378 (0.0628)	0.0328 (0.0650)			0.156 (0.147)	0.0375 (0.120)	0.221 (0.230)	0.147 (0.125)
SICH: Retail & Wholesale	0.246*** (0.0720)	0.223** (0.113)	0.0378 (0.0644)	0.0308 (0.0592)			-0.0534 (0.0847)	-0.0652 (0.0591)	-0.0842 (0.110)	-0.0940 (0.0728)
SIC: Education	0.218*** (0.0757)	0.169 (0.119)	0.0378 (0.0617)	0.0279 (0.0579)			-0.0573 (0.0987)	-0.0416 (0.0465)	0.0567 (0.138)	0.0134 (0.0757)
Assistance Effect (IA)	-0.00564 (0.0240)	-0.00328 (0.0412)	-2.69e-06 (0.00688)	-0.00346 (0.00712)			-0.0149 (0.0304)	0.0440 (0.0420)	-0.0723 (0.0549)	0.113*** (0.0398)
Selection Effect (inverse mills)		-0.0331 (0.0404)		-0.00228 (0.00733)				0.0719 (0.0537)		0.131*** (0.0408)
Constant^	x x	x x	x x	x x			x x	x x	x x	x x
Observations	323	256	323	256			323	256	323	256

Standard errors in
*** p<0.01, ** p<0.05, * p<0.1

Employment 3.9 - 2004-6, quantiles, with 2003-4 lag (full models with and without selection (s); quantiles 0.1, 0.25, 0.5, 0.75, 0.9

	Q0.1	Q0.1 S	Q0.25	Q0.25 S	Q0.5	Q0.5 S	Q0.75	Q0.75S	Q0.9	Q0.9S
	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
	empl040	empl040	empl040	empl040	empl040	empl040	empl0406	empl040	empl040	empl040
Lag: Employment growth	-0.00723 (0.110)	0.0724 (0.171)	-0.00814 (0.126)	0.0245 (0.103)	0.0110 (0.0916)	-0.00336 (0.0886)	-0.100 (0.146)	0.00563 (0.199)	-0.475*** (0.163)	-0.446*** (0.131)
Lag: Employment growth										
Lag: Employment growth										
Lag: Employment growth										
Employment 2004 (ELD)	- (0.00296	-0.00605 (0.00493	-0.00218 (0.00136	- (0.00205	- (0.00111	-0.00116 (0.00122	- (0.00129	-0.00391 (0.00244	-0.0103** (0.00402	-0.00399 (0.00419
Employment 2004 squared	-2.62e- (1.79e-	3.25e-05 (2.05e-	1.03e- (5.46e-	-2.15e- (1.15e-	4.60e-06 (5.16e-	5.72e-06 (5.51e-	1.53e-05* (7.86e-	2.34e- (1.36e-	4.59e- (1.90e-	1.80e-05 (2.53e-
Firm age: 3<5 years	-0.234 (0.147)	0.112 (0.289)	-0.0272 (0.124)	-0.114 (0.110)	-0.254** (0.111)	-0.223** (0.113)	-0.315* (0.162)	-0.324 (0.291)	-0.176 (0.471)	-0.151 (0.388)
Firm age: 5<10 years	-0.375** (0.157)	-0.0962 (0.300)	-0.0676 (0.109)	-0.137 (0.0893)	-0.260** (0.105)	-0.245** (0.100)	-0.383*** (0.135)	-0.377 (0.251)	-0.568 (0.345)	-0.482 (0.318)
Firm age: 10<20 years	-0.360*** (0.138)	-0.0404 (0.273)	-0.0701 (0.112)	-0.172* (0.0893)	-0.274*** (0.0992)	-0.272*** (0.0962)	-0.492*** (0.128)	-0.496** (0.251)	-0.775*** (0.340)	-0.521* (0.314)
Firm age: >20 years	-0.358*** (0.125)	-0.103 (0.262)	-0.128 (0.107)	-0.234*** (0.0858)	-0.276*** (0.104)	-0.283*** (0.0962)	-0.482*** (0.133)	-0.506** (0.242)	-0.746** (0.340)	-0.597** (0.298)
Legal form: Limited liability	-0.200* (0.103)	-0.219* (0.112)	-0.0911 (0.0585)	-0.0688 (0.0865)	-0.00838 (0.0518)	-0.0198 (0.0607)	0.00530 (0.120)	0.0753 (0.131)	-0.178 (0.281)	0.0919 (0.235)
Multi-site firm	0.170** (0.0857)	0.245* (0.133)	0.0630 (0.0390)	0.0878 (0.0615)	0.0230 (0.0386)	0.0353 (0.0498)	0.109 (0.0832)	0.162 (0.150)	0.343* (0.181)	0.356 (0.270)
Exporting firm	-0.0360 (0.0797)	-0.00665 (0.0839)	0.0196 (0.0336)	0.00254 (0.0502)	-0.00365 (0.0303)	0.00445 (0.0345)	0.00265 (0.0564)	-0.0408 (0.0912)	0.0597 (0.0903)	-0.0465 (0.124)
Firm in competitive environ.	0.0299 (0.0677)	0.0369 (0.0966)	0.0117 (0.0388)	0.0189 (0.0569)	0.00091 (0.0335)	-0.00464 (0.0404)	-0.0335 (0.0573)	-0.00254 (0.0816)	-0.132 (0.139)	0.0809 (0.155)
Firm faces price elastic	-0.0320 (0.0891)	-0.240 (0.174)	-0.0251 (0.0428)	-0.0257 (0.0597)	-0.00981 (0.0325)	-0.0101 (0.0370)	-0.0149 (0.0658)	-0.0478 (0.0714)	0.0348 (0.105)	-0.211 (0.144)
Strategy: Maintain sales	-0.0563 (0.127)	0.0180 (0.142)	0.0483 (0.0822)	0.0494 (0.0924)	-0.00718 (0.103)	-0.0163 (0.137)	-0.130 (0.124)	-0.0708 (0.127)	-0.00270 (0.226)	0.0406 (0.244)
Strategy: Penetrate market	-0.0830 (0.122)	-0.114 (0.121)	0.0330 (0.0740)	-0.00346 (0.0838)	-0.00292 (0.0986)	-0.0146 (0.135)	-0.163 (0.107)	-0.0927 (0.102)	-0.126 (0.259)	-0.0484 (0.236)
Strategy: New markets	-0.319 (0.379)	-0.181 (0.252)	0.0185 (0.0883)	0.0269 (0.102)	-0.0181 (0.114)	-0.0509 (0.146)	-0.233* (0.122)	-0.172 (0.131)	-0.277 (0.329)	-0.189 (0.277)
Strategy: New products	-0.0194 (0.310)	0.0813 (0.146)	0.122 (0.165)	0.212 (0.135)	0.105 (0.155)	0.0580 (0.172)	-0.207* (0.118)	-0.158 (0.150)	-0.0360 (0.443)	0.366 (0.708)
Firm has formal business plan	-0.254*** (0.0760)	-0.190** (0.0950)	-0.0240 (0.0352)	-0.117* (0.0615)	0.00198 (0.0287)	-0.00781 (0.0324)	0.0678 (0.0571)	0.0266 (0.0704)	0.236** (0.112)	0.0476 (0.138)
Firm has non-executive	0.157* (0.0838)	0.0967 (0.123)	0.0181 (0.0383)	0.0612 (0.0693)	0.0150 (0.0414)	0.0322 (0.0440)	0.0603 (0.0647)	0.0434 (0.0815)	0.000545 (0.101)	-0.0318 (0.138)
(Owner-)Manager: equity in	-0.199** (0.0885)	-0.141 (0.126)	- (0.0455)	-0.144** (0.0602)	-0.0494 (0.0466)	-0.0460 (0.0605)	-0.0101 (0.0646)	-0.0567 (0.0821)	0.0385 (0.108)	0.0169 (0.136)
Owner-Manager 25<35 years	-0.274 (0.421)		-0.0602 (0.107)		0.0618 (0.120)		0.191 (0.150)		0.238 (0.578)	
Owner-Manager 35<45 years	-0.316 (0.398)	0.733 (0.553)	-0.0585 (0.0991)	-0.0283 (0.104)	0.0686 (0.108)	0.0235 (0.0834)	0.259** (0.128)	0.122 (0.202)	0.386 (0.561)	0.477* (0.250)
Owner-Manager 45<55 years	-0.413 (0.414)	0.651 (0.575)	-0.0887 (0.0959)	-0.0992 (0.109)	0.0450 (0.105)	-0.0152 (0.0681)	0.0304 (0.116)	-0.105 (0.152)	0.207 (0.544)	- (0.228)
Owner-Manager >55 years old	-0.314 (0.407)	0.724 (0.597)	-0.0416 (0.0978)	0.0223 (0.102)	0.0609 (0.105)	0.0188 (0.0665)	0.0445 (0.112)	-0.00353 (0.153)	0.0874 (0.561)	0.149 (0.233)
Owner-Manager had previous	0.0141 (0.0641)	0.106 (0.100)	0.0435 (0.0348)	0.0469 (0.0454)	0.00941 (0.0313)	0.0236 (0.0336)	0.0482 (0.0533)	0.0782 (0.0731)	-0.0830 (0.126)	0.0399 (0.128)
SIC: Manufacturing	0.398*** (0.123)	0.604*** (0.214)	0.211** (0.105)	0.253** (0.124)	0.00631 (0.0553)	-0.00550 (0.0837)	-0.0903 (0.127)	-0.176 (0.203)	-0.221 (0.161)	-0.541* (0.326)
SIC: Construction	0.469*** (0.131)	0.465*** (0.178)	0.142 (0.129)	0.315** (0.150)	0.00344 (0.0691)	0.00169 (0.0866)	-0.0350 (0.151)	-0.159 (0.239)	0.554* (0.292)	0.0579 (0.527)
SICH: Retail & Wholesale	0.236* (0.134)	0.331* (0.186)	0.141 (0.102)	0.165 (0.119)	-0.0144 (0.0519)	-0.0467 (0.0854)	-0.177 (0.132)	-0.272 (0.192)	-0.370** (0.180)	-0.777*** (0.327)
SIC: Education	0.298*** (0.103)	0.298* (0.167)	0.156 (0.1000)	0.184 (0.134)	-0.0413 (0.0560)	-0.0413 (0.0865)	-0.207 (0.132)	-0.263 (0.186)	-0.457** (0.186)	-0.786** (0.314)
Assistance Effect (IA)	0.275** (0.111)	0.733* (0.407)	0.0138 (0.0364)	0.0923 (0.103)	-0.00387 (0.0329)	-0.00698 (0.0390)	-0.0244 (0.0599)	0.0236 (0.0654)	0.0303 (0.106)	-0.0111 (0.157)
Selection Effect (inverse mills)		0.153 (0.163)		-0.0304 (0.0528)		-0.0108 (0.0341)		-0.0101 (0.0709)		-0.0204 (0.165)
Constant^	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x
Observations	323	256	323	256	323	256	323	256	323	256

Standard errors in
*** p<0.01, ** p<0.05, * p<0.1

Employment 3.10 - 2004-7, quantiles, with 2003-4 lag (full models with and without selection (s); quantiles 0.1, 0.25, 0.5, 0.75, 0.9

	Q0.1	Q0.1 S	Q0.25	Q0.25 S	Q0.5	Q0.5 S	Q0.75	Q0.75S	Q0.9	Q0.9S
	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)
	empl040	empl040	empl040	empl040	empl040	empl040	empl040	empl040	empl040	empl0407	empl0407
Lag: Employment growth	0.137 (0.285)	0.0552 (0.112)	0.136 (0.168)	0.0424 (0.142)	0.0136 (0.143)	0.131 (0.245)	-0.288 (0.204)	-0.103 (0.198)	-0.687 (0.516)	-0.510*** (0.157)
Lag: Employment growth										
Lag: Employment growth										
Lag: Employment growth										
Employment 2004 (ELD)	-0.00532 (0.00816	-0.00730 (0.00695	-0.00173 (0.00240	- (0.00222	-0.00131 (0.00172	-0.00206 (0.00184	- (0.00229	-0.0101 (0.00707	-0.0165*** (0.00478	- (0.00392
Employment 2004 squared	2.51e-05 (3.88e-	3.80e-05 (4.89e-	8.30e-06 (1.03e-	4.62e-06 (1.03e-	5.19e-06 (7.72e-	9.00e-06 (8.15e-	2.06e- (1.17e-	6.18e-05 (6.14e-	0.000105* (2.75e-05)	9.48e- (2.04e-
Firm age: 3<5 years	0.202 (0.218)	0.272 (0.213)	-0.105 (0.174)	0.0675 (0.221)	0.198 (0.156)	0.0657 (0.269)	0.137 (0.260)	-0.319 (0.690)	-0.298 (0.520)	-0.207 (0.266)
Firm age: 5<10 years	-0.00140 (0.216)	0.245 (0.172)	-0.149 (0.109)	0.0690 (0.134)	0.0538 (0.108)	-0.0314 (0.235)	0.0345 (0.249)	-0.325 (0.698)	-0.401 (0.451)	-0.466** (0.217)
Firm age: 10<20 years	-0.0296 (0.219)	0.208 (0.188)	-0.191* (0.113)	-0.0744 (0.161)	0.0498 (0.113)	-0.0789 (0.239)	-0.175 (0.237)	-0.619 (0.693)	-0.699 (0.452)	-0.479 (0.304)
Firm age: >20 years	-0.129 (0.225)	0.0554 (0.186)	-0.246** (0.102)	-0.136 (0.142)	-0.0274 (0.105)	-0.167 (0.231)	-0.204 (0.229)	-0.600 (0.704)	-0.533 (0.462)	-0.621** (0.280)
Legal form: Limited liability	-0.265 (0.250)	-0.312*** (0.111)	-0.178 (0.129)	-0.203 (0.143)	-0.143 (0.0911)	-0.0760 (0.102)	-0.0977 (0.0909)	0.0451 (0.174)	-0.00169 (0.190)	0.101 (0.165)
Multi-site firm	0.243* (0.142)	0.301** (0.120)	0.133 (0.0809)	0.206** (0.0828)	0.160** (0.0668)	0.229** (0.109)	0.228* (0.119)	0.355*** (0.130)	0.301* (0.171)	0.582*** (0.202)
Exporting firm	-0.00164 (0.112)	-0.0329 (0.0854)	0.0855 (0.0543)	0.0732 (0.0687)	0.0817 (0.0557)	0.0386 (0.0702)	0.0535 (0.0888)	0.0167 (0.0928)	-0.0378 (0.130)	-0.0597 (0.105)
Firm in competitive environ.	-0.00118 (0.0925)	-0.157* (0.0907)	0.0127 (0.0692)	-0.0344 (0.0765)	-0.0102 (0.0579)	0.0252 (0.0626)	-0.113 (0.0923)	0.0267 (0.0949)	-0.194 (0.151)	-0.00921 (0.120)
Firm faces price elastic	-0.206 (0.137)	-0.167 (0.143)	-0.0707 (0.0859)	-0.0252 (0.104)	-0.0738 (0.0622)	-0.0553 (0.0671)	-0.00810 (0.103)	-0.0885 (0.0921)	0.0961 (0.198)	-0.0382 (0.164)
Strategy: Maintain sales	0.0770 (0.265)	-0.132 (0.150)	0.226 (0.171)	0.0957 (0.136)	0.182 (0.124)	0.204 (0.130)	-0.0539 (0.223)	0.0722 (0.306)	-0.0910 (0.290)	0.288 (0.254)
Strategy: Penetrate market	0.139 (0.209)	0.0373 (0.124)	0.166 (0.152)	0.0720 (0.110)	0.110 (0.112)	0.134 (0.114)	-0.0422 (0.221)	0.0605 (0.279)	-0.0580 (0.290)	0.291 (0.264)
Strategy: New markets	0.0424 (0.283)	-0.135 (0.183)	0.208 (0.156)	-0.0803 (0.239)	0.0946 (0.129)	0.0293 (0.145)	-0.230 (0.227)	-0.176 (0.335)	-0.366 (0.292)	-0.131 (0.241)
Strategy: New products	0.243 (0.290)	0.146 (0.306)	0.150 (0.241)	0.0485 (0.155)	0.0775 (0.159)	0.0856 (0.161)	-0.303 (0.248)	-0.181 (0.337)	-0.241 (0.895)	0.211 (0.340)
Firm has formal business plan	-0.192 (0.132)	-0.309*** (0.114)	0.0214 (0.0625)	-7.38e- (0.0693)	0.0536 (0.0563)	0.0305 (0.0616)	0.192* (0.0981)	0.215* (0.119)	0.349*** (0.109)	0.199 (0.130)
Firm has non-executive	0.386** (0.168)	0.348** (0.156)	0.0704 (0.0681)	0.0791 (0.0819)	0.0235 (0.0618)	0.0345 (0.0706)	0.0921 (0.101)	0.0786 (0.124)	0.0844 (0.205)	0.0268 (0.135)
(Owner-)Manager: equity in	-0.208 (0.176)	-0.326** (0.130)	-0.0980 (0.0691)	-0.0680 (0.0864)	-0.00463 (0.0609)	-0.0899 (0.0952)	0.0214 (0.119)	-0.0501 (0.139)	0.0155 (0.124)	0.0565 (0.146)
Owner-Manager 25<35 years	-0.536 (0.679)		-0.00181 (0.277)		0.190 (0.186)		0.0790 (0.352)		0.405 (0.654)	
Owner-Manager 35<45 years	-0.521 (0.614)	0.124 (0.455)	0.0195 (0.286)	0.0105 (0.209)	0.183 (0.181)	-0.0786 (0.133)	0.336 (0.349)	0.154 (0.146)	0.699 (0.666)	0.309* (0.178)
Owner-Manager 45<55 years	-0.607 (0.624)	0.0249 (0.481)	-0.0733 (0.274)	-0.0483 (0.199)	0.0986 (0.185)	-0.184 (0.129)	0.0655 (0.343)	-0.0199 (0.163)	0.413 (0.638)	-0.0878 (0.153)
Owner-Manager >55 years	-0.342 (0.603)	0.336 (0.443)	0.0242 (0.274)	0.0987 (0.211)	0.185 (0.182)	-0.0114 (0.120)	0.0967 (0.351)	0.0643 (0.151)	0.474 (0.719)	0.302 (0.331)
Owner-Manager had previous	0.162 (0.113)	0.351*** (0.103)	0.0900 (0.0852)	0.144* (0.0848)	0.0665 (0.0590)	0.0682 (0.0736)	0.0287 (0.0756)	0.123 (0.0884)	0.0400 (0.148)	0.0797 (0.132)
SIC: Manufacturing	0.519 (0.340)	0.381*** (0.134)	0.190 (0.137)	0.304** (0.136)	-0.00185 (0.0938)	0.0535 (0.126)	-0.0732 (0.135)	0.00524 (0.177)	-0.0761 (0.177)	-0.214 (0.239)
SIC: Construction	0.262 (0.417)	0.258 (0.218)	0.128 (0.172)	0.368* (0.188)	0.0997 (0.168)	0.126 (0.172)	0.191 (0.233)	0.110 (0.243)	0.363 (0.433)	-0.0413 (0.299)
SICH: Retail & Wholesale	0.374 (0.326)	0.204 (0.135)	0.135 (0.129)	0.224 (0.145)	-0.0455 (0.0872)	-0.0253 (0.115)	-0.152 (0.128)	-0.221 (0.169)	-0.437** (0.184)	-0.613*** (0.211)
SIC: Education	0.146 (0.324)	0.00272 (0.145)	0.0243 (0.163)	0.123 (0.170)	-0.0688 (0.0890)	-0.0151 (0.130)	-0.220 (0.156)	-0.247 (0.182)	-0.270 (0.229)	-0.639** (0.249)
Assistance Effect (IA)	0.114 (0.0823)	0.212 (0.150)	0.0251 (0.0664)	0.165 (0.127)	0.0279 (0.0523)	0.107 (0.0875)	0.0474 (0.0856)	0.0655 (0.109)	-0.0427 (0.104)	0.118 (0.165)
Selection Effect (inverse mills)		0.0573 (0.148)		0.0715 (0.0849)		0.0283 (0.0757)		0.0650 (0.0975)		0.160 (0.165)
Constant^	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x
Observations	323	256	323	256	323	256	323	256	323	256

Standard errors in
*** p<0.01, ** p<0.05, * p<0.1

Employment 3.11 - 2004-8, quantiles, with 2003-4 lag (full models with and without selection (s); quantiles 0.1, 0.25, 0.5, 0.75, 0.9

	Q0.1	Q0.1 S	Q0.25	Q0.25 S	Q0.5	Q0.5 S	Q0.75	Q0.75S	Q0.9	Q0.9S
	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)
	empl040	empl040	empl040	empl040	empl040	empl040	empl040	empl040	empl0408	empl0408
Lag: Employment growth	0.111 (0.137)	0.0994 (0.143)	-0.0164 (0.294)	-0.0478 (0.199)	0.0361 (0.284)	0.0213 (0.181)	-0.286 (0.252)	-0.204 (0.296)	-0.695 (0.630)	-0.550*** (0.133)
Lag: Employment growth										
Lag: Employment growth										
Lag: Employment growth										
Employment 2004 (ELD)	- (0.00484	-0.0104* (0.00616	-0.00319 (0.00317	-0.00232 (0.00301	-0.00297 (0.00285	-0.00444 (0.00273	- (0.00303	-0.0119 (0.00843	-0.0223*** (0.00492)	-0.0181*** (0.00327)
Employment 2004 squared	5.26e- (2.10e-	5.74e- (3.14e-	1.47e-05 (1.30e-	1.26e-05 (1.59e-	1.16e-05 (1.19e-	1.81e-05 (1.22e-	2.26e- (1.35e-	7.27e-05 (7.49e-	0.000136* (3.17e-05)	0.000119* (1.87e-05)
Firm age: 3<5 years	0.188 (0.144)	0.468** (0.232)	0.0766 (0.159)	0.0663 (0.195)	0.104 (0.208)	0.189 (0.174)	0.276 (0.302)	0.0942 (0.392)	0.387 (0.633)	0.364 (0.495)
Firm age: 5<10 years	-0.257 (0.163)	0.170 (0.237)	-0.107 (0.158)	-0.101 (0.156)	0.0807 (0.194)	0.144 (0.154)	-0.00620 (0.278)	-0.127 (0.391)	-0.0144 (0.524)	0.0928 (0.437)
Firm age: 10<20 years	-0.157 (0.137)	0.0742 (0.245)	-0.0539 (0.124)	-0.0864 (0.160)	-0.0655 (0.150)	0.0266 (0.244)	-0.225 (0.366)	-0.373 (0.546)	-0.154 (0.546)	-0.149 (0.479)
Firm age: >20 years	-0.336*** (0.128)	0.00288 (0.244)	-0.262** (0.124)	-0.357** (0.154)	-0.211 (0.183)	-0.138 (0.152)	-0.302 (0.268)	-0.387 (0.413)	-0.188 (0.542)	-0.360 (0.453)
Legal form: Limited liability	-0.163 (0.174)	-0.0771 (0.304)	-0.113 (0.171)	-0.138 (0.149)	-0.0966 (0.175)	-0.0579 (0.152)	-0.229 (0.175)	0.117 (0.208)	0.0135 (0.292)	0.456** (0.192)
Multi-site firm	0.280** (0.123)	0.301* (0.159)	0.106 (0.113)	0.343*** (0.119)	0.156 (0.0960)	0.232* (0.125)	0.323** (0.133)	0.392** (0.173)	0.533** (0.251)	0.646*** (0.208)
Exporting firm	0.0608 (0.0848)	-0.0141 (0.120)	0.0618 (0.0828)	0.0484 (0.105)	0.0349 (0.0726)	0.00170 (0.0782)	0.0145 (0.109)	-0.0775 (0.139)	0.0545 (0.136)	-0.0649 (0.117)
Firm in competitive environ.	0.0663 (0.0787)	-0.0102 (0.105)	0.0135 (0.0965)	0.0542 (0.114)	0.0176 (0.0821)	0.0408 (0.100)	-0.0239 (0.123)	0.0728 (0.125)	-0.101 (0.210)	-0.0783 (0.173)
Firm faces price elastic	-0.194* (0.117)	-0.311 (0.230)	-0.0269 (0.0932)	-0.171 (0.138)	-0.0523 (0.0881)	-0.0406 (0.0912)	-0.0493 (0.104)	-0.127 (0.132)	0.0975 (0.323)	-0.0255 (0.159)
Strategy: Maintain sales	-0.0166 (0.172)	-0.0445 (0.351)	-0.00503 (0.199)	-0.0359 (0.208)	0.0301 (0.197)	0.0427 (0.207)	-0.0588 (0.229)	-0.0789 (0.246)	0.268 (0.245)	0.0869 (0.205)
Strategy: Penetrate market	0.0479 (0.152)	0.0753 (0.349)	0.0379 (0.183)	0.0919 (0.160)	0.0628 (0.185)	0.0482 (0.198)	-0.0306 (0.200)	0.117 (0.189)	0.419* (0.226)	0.347* (0.182)
Strategy: New markets	0.0543 (0.170)	-0.0542 (0.374)	0.0128 (0.211)	-0.279 (0.306)	0.00912 (0.193)	0.0175 (0.244)	-0.258 (0.221)	-0.229 (0.225)	0.134 (0.295)	-0.0690 (0.256)
Strategy: New products	-0.0353 (0.250)	0.0869 (0.466)	-0.0762 (0.360)	-0.0304 (0.204)	0.0691 (0.340)	0.00185 (0.329)	-0.323 (0.301)	-0.367 (0.347)	0.115 (0.334)	-0.0152 (0.228)
Firm has formal business plan	-0.165 (0.102)	-0.343** (0.163)	-0.0385 (0.0846)	-0.0835 (0.115)	0.0836 (0.0905)	0.0230 (0.0807)	0.215** (0.108)	0.135 (0.147)	0.0962 (0.188)	-0.144 (0.189)
Firm has non-executive	0.331*** (0.0896)	0.374** (0.158)	0.102 (0.0956)	0.252** (0.127)	0.0303 (0.105)	0.114 (0.103)	0.0529 (0.109)	-0.00282 (0.124)	0.00300 (0.170)	-0.0807 (0.158)
(Owner-)Manager: equity in	-0.256 (0.158)	-0.524*** (0.179)	-0.171* (0.103)	-0.137 (0.126)	-0.0951 (0.109)	-0.180 (0.112)	-0.00559 (0.164)	-0.0148 (0.158)	0.120 (0.187)	0.205 (0.158)
Owner-Manager 25<35 years	-0.693* (0.397)		-0.0905 (0.417)		0.0619 (0.249)		0.202 (0.420)		0.339 (0.714)	
Owner-Manager 35<45 years	-0.589* (0.300)	0.182 (0.411)	-0.168 (0.397)	-0.221 (0.302)	-0.0393 (0.244)	-0.252 (0.309)	0.214 (0.424)	-0.182 (0.312)	0.479 (0.676)	0.121 (0.228)
Owner-Manager 45<55 years	-0.813*** (0.274)	-0.0802 (0.381)	-0.239 (0.411)	-0.235 (0.271)	-0.116 (0.256)	-0.333 (0.307)	0.0347 (0.413)	-0.365 (0.311)	0.275 (0.649)	-0.0512 (0.220)
Owner-Manager >55 years	-0.396 (0.252)	0.384 (0.368)	-0.0654 (0.400)	0.0299 (0.293)	0.0133 (0.234)	-0.136 (0.317)	0.0596 (0.418)	-0.273 (0.292)	0.254 (0.688)	0.121 (0.246)
Owner-Manager had previous	0.173* (0.0945)	0.354** (0.148)	0.0649 (0.0838)	-0.0432 (0.0995)	0.0122 (0.0739)	0.0431 (0.0963)	0.0775 (0.0979)	0.0462 (0.124)	-0.0826 (0.142)	-0.0349 (0.130)
SIC: Manufacturing	0.666*** (0.204)	0.642** (0.261)	0.208 (0.191)	0.346 (0.211)	0.00838 (0.103)	0.116 (0.186)	0.0303 (0.148)	0.166 (0.230)	-0.418 (0.287)	-0.340** (0.170)
SIC: Construction	0.496** (0.222)	0.528* (0.287)	0.160 (0.243)	0.420* (0.248)	0.111 (0.160)	0.262 (0.223)	0.315 (0.373)	0.275 (0.284)	-0.130 (0.381)	-0.0875 (0.271)
SICH: Retail & Wholesale	0.535*** (0.180)	0.389 (0.237)	0.149 (0.173)	0.194 (0.193)	-0.0457 (0.128)	0.0205 (0.178)	-0.0478 (0.149)	-0.0570 (0.248)	-0.444* (0.260)	-0.409** (0.168)
SIC: Education	0.222 (0.184)	0.225 (0.260)	0.0804 (0.207)	0.135 (0.215)	-0.0471 (0.110)	0.0522 (0.179)	-0.139 (0.186)	-0.153 (0.227)	-0.331 (0.266)	-0.220 (0.199)
Assistance Effect (IA)	0.0146 (0.0753)	0.199 (0.355)	-0.00786 (0.0739)	0.0281 (0.110)	0.0122 (0.0812)	0.0644 (0.117)	0.0392 (0.0959)	-0.0951 (0.177)	0.0587 (0.161)	0.0837 (0.199)
Selection Effect (inverse mills)		0.108 (0.234)		-0.0158 (0.0907)		-0.0236 (0.0956)		0.0300 (0.152)		-0.0250 (0.164)
Constant^	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x
Observations	323	256	323	256	323	256	323	256	323	256

Standard errors in
*** p<0.01, ** p<0.05, * p<0.1

Employment 3.12 – 2005-6, quantiles, with 2003-5 lag (full models with and without selection (s); quantiles 0.1, 0.25, 0.5, 0.75, 0.9

	Q0.1	Q0.1 S	Q0.25	Q0.25 S	Q0.5	Q0.5 S	Q0.75	Q0.75S	Q0.9	Q0.9S
	(39)	(40)	(41)	(42)	(43)	(44)	(45)	(46)	(47)	(48)
	empl050	empl050	empl050	empl050	empl0506	empl050	empl050	empl050	empl050	empl050
Lag: Employment growth										
Lag: Employment growth	-0.0696	-0.0380	-0.00157	-0.0202	1.09e-05	0.000151	0.00886	0.0328	-0.163	-0.327
	(0.0835)	(0.0723)	(0.00532)	(0.0247)	(0.000544)	(0.00831)	(0.0206)	(0.0541)	(0.333)	(0.317)
Lag: Employment growth										
Lag: Employment growth										
Employment 2004 (ELD)	-0.00149	0.00029	-	-	-1.66e-05	-5.59e-05	0.000157	0.000246	-0.00253	0.00137
	(0.00226	(0.00234	(0.00043	(0.00058	(2.64e-	(0.00028	(0.00048	(0.00081	(0.00248	(0.00197
Employment 2004 squared	8.82e-06	2.75e-06	2.98e-	4.52e-	3.89e-	1.38e-06	-4.04e-07	5.94e-07	1.17e-05	-6.31e-
	(9.37e-	(1.00e-	(1.71e-	(2.73e-	(1.31e-	(1.35e-	(2.66e-	(4.83e-	(1.03e-	(9.47e-
Firm age: 3<5 years	-0.245	-0.0386	-0.00118	-0.0167	-0.223***	-0.223***	-0.241	-0.208**	0.109	0.155
	(0.149)	(0.227)	(0.0146)	(0.0331)	(0.00651)	(0.0551)	(0.205)	(0.0820)	(2.333)	(0.468)
Firm age: 5<10 years	-0.271	-0.119	-0.00674	-0.0312	-0.223***	-0.223***	-0.297	-0.234***	-0.595	-0.329
	(0.360)	(0.224)	(0.0147)	(0.0361)	(0.00641)	(0.0540)	(0.205)	(0.0719)	(0.655)	(0.228)
Firm age: 10<20 years	-0.161*	-0.106	-0.00519	-0.0303	-0.223***	-0.223***	-0.337	-0.251***	-0.645	-0.282
	(0.0829)	(0.220)	(0.0141)	(0.0305)	(0.00641)	(0.0549)	(0.199)	(0.0692)	(0.673)	(0.242)
Firm age: >20 years	-0.199**	-0.218	-0.00591	-0.0509	-0.223***	-0.223***	-0.338	-0.248***	-0.650	-0.440*
	(0.0930)	(0.226)	(0.0136)	(0.0397)	(0.00637)	(0.0542)	(0.199)	(0.0661)	(0.674)	(0.235)
Legal form: Limited liability	-0.170	-0.153*	-0.00572	-0.0328	-2.66e-07	4.57e-05	0.0364	0.0208	-0.117	-0.0854
	(0.104)	(0.0809)	(0.0102)	(0.0372)	(0.000760)	(0.00756)	(0.0296)	(0.0396)	(0.171)	(0.134)
Multi-site firm	0.00144	-0.0434	0.00525	0.0223	5.55e-05	0.000310	0.117*	0.0609	0.161	0.110
	(0.0720)	(0.0944)	(0.00769)	(0.0219)	(0.00760)	(0.00756)	(0.0702)	(0.0625)	(0.188)	(0.108)
Exporting firm	-0.0650	-0.0825	0.00192	0.00932	-8.20e-06	-9.22e-05	0.00110	0.00325	0.0219	-0.0544
	(0.0650)	(0.0666)	(0.00604)	(0.0186)	(0.000497)	(0.00619)	(0.0234)	(0.0266)	(0.0741)	(0.0777)
Firm in competitive environ.	0.0535	0.0883	0.00188	-0.00199	-8.01e-06	-1.65e-05	0.000785	0.0160	-0.0440	0.0491
	(0.0771)	(0.0610)	(0.00518)	(0.0162)	(0.000480)	(0.00570)	(0.0217)	(0.0283)	(0.120)	(0.104)
Firm faces price elastic	-0.0324	-0.0733	-0.00535	-0.0153	4.55e-06	-	-0.00136	-0.0165	0.0991	0.00718
	(0.0724)	(0.0823)	(0.00663)	(0.0193)	(0.000511)	(0.00536)	(0.0240)	(0.0308)	(0.0950)	(0.127)
Strategy: Maintain sales	0.0214	-0.0822	-0.00188	-0.0137			-0.00140	0.00331	0.101	-0.0110
	(0.122)	(0.0959)	(0.0162)	(0.0403)	(0.00638)	(0.0154)	(0.0433)	(0.0443)	(0.147)	(0.137)
Strategy: Penetrate market	-0.0384	-0.115	-0.00332	-0.0181			0.00139		0.0185	0.00395
	(0.104)	(0.0830)	(0.0151)	(0.0347)	(0.00633)	(0.0143)	(0.0366)	(0.0416)	(0.103)	(0.125)
Strategy: New markets	-0.221	-0.167	-0.00224	-0.0259			-0.00348	0.00145	-0.0302	0.0902
	(0.293)	(0.139)	(0.0170)	(0.0411)	(0.00638)	(0.0154)	(0.0370)	(0.0514)	(0.110)	(0.205)
Strategy: New products	0.0547	0.0939	0.00423	0.0482	0.0833***	0.111**	0.158**	0.118	-0.0218	0.281
	(0.200)	(0.123)	(0.0548)	(0.0905)	(0.00855)	(0.0500)	(0.0663)	(0.158)	(0.185)	(0.649)
Firm has formal business plan	-0.101	-0.196***	-0.00404	-0.0338	-2.54e-05	-1.37e-05	-0.00523	-0.00528	-0.0451	-0.0621
	(0.0897)	(0.0663)	(0.00485)	(0.0280)	(0.000423)	(0.00448)	(0.0178)	(0.0210)	(0.0677)	(0.0759)
Firm has non-executive	0.0789	0.139*	0.00621	0.0322	4.86e-05	0.000164	0.00734	0.0129	0.00131	0.0641
	(0.0795)	(0.0721)	(0.00634)	(0.0217)	(0.000457)	(0.00587)	(0.0174)	(0.0239)	(0.127)	(0.119)
(Owner-)Manager: equity in	-0.168**	-0.148**	-0.00567	-0.0213	-2.19e-05	-	-0.00896	-0.0331	0.00571	0.171
	(0.0804)	(0.0656)	(0.00783)	(0.0239)	(0.000542)	(0.00940)	(0.0379)	(0.0586)	(0.0946)	(0.129)
Owner-Manager 25<35 years	-0.198	-1.083***	0.0744***	-0.00434	0.118***	-	0.135*	0.00274	0.277	-0.141
	(0.285)	(0.269)	(0.0318)	(0.0298)	(0.00231)	(0.00870)	(0.0787)	(0.0601)	(0.394)	(0.179)
Owner-Manager 35<45 years	-0.119	-0.111*	0.0807***	-0.0104	0.118***	3.22e-05	0.184**	0.0923	0.465	0.272**
	(0.260)	(0.0659)	(0.0267)	(0.0174)	(0.00220)	(0.00545)	(0.0900)	(0.0880)	(0.452)	(0.106)
Owner-Manager 45<55 years	-0.189	-0.229***	0.0772***	-0.0249	0.118***	-	0.129	-0.0163	0.260	-0.0695
	(0.261)	(0.0716)	(0.0264)	(0.0203)	(0.00226)	(0.00475)	(0.0796)	(0.0203)	(0.415)	(0.0780)
Owner-Manager had previous	0.0819	-0.00838	0.00225	0.0153	-7.60e-06	-7.89e-07	-0.00154	-0.00400	-0.0280	-0.0823
	(0.0608)	(0.0704)	(0.00497)	(0.0172)	(0.000457)	(0.00462)	(0.0199)	(0.0264)	(0.0705)	(0.0636)
SIC: Manufacturing	0.206*	0.424*	0.0105	0.0504	4.49e-05	0.000197	0.00426	-0.00108	-0.290	-0.550
	(0.114)	(0.230)	(0.00967)	(0.0455)	(0.000594)	(0.00777)	(0.0238)	(0.0487)	(0.328)	(0.484)
SIC: Construction	0.0950	0.370*	0.00643	0.0659	5.76e-05	0.000331	0.00302	0.0169	-0.0168	-0.146
	(0.207)	(0.203)	(0.0114)	(0.0549)	(0.000729)	(0.00791)	(0.0302)	(0.0589)	(0.359)	(0.427)
SICH: Retail & Wholesale	0.0362	0.0819	0.00306	0.0208	1.60e-05	8.91e-05	-0.00166	-0.0208	-0.370	-0.580
	(0.176)	(0.246)	(0.00859)	(0.0356)	(0.000570)	(0.00721)	(0.0254)	(0.0412)	(0.329)	(0.485)
SIC: Education	0.0878	0.292	0.00448	0.0214	2.21e-05	4.16e-05	0.00167	-0.00962	-0.420	-0.635
	(0.124)	(0.226)	(0.00963)	(0.0421)	(0.000656)	(0.00755)	(0.0247)	(0.0390)	(0.383)	(0.544)
Assistance Effect (IA)	0.0741	0.382**	0.000422	-0.00576	-4.74e-06	-	-1.84e-05	-0.0123	0.0670	-0.142
	(0.0685)	(0.184)	(0.00573)	(0.0187)	(0.000542)	(0.00628)	(0.0187)	(0.0316)	(0.0666)	(0.134)
Selection Effect (inverse mills)		0.0978		-0.00405		3.95e-05		-0.00273		-0.135
		(0.0965)		(0.0143)		(0.00444)		(0.0237)		(0.108)
Constant^	x	x	x	x	x	x	x	x	x	x
	x	x	x	x	x	x	x	x	x	x
Observations	323	256	323	256	323	256	323	256	323	256

Standard errors in
*** p<0.01, ** p<0.05, * p<0.1

Employment 3.13 – 2006-7, quantiles, with 2003-6 lag (full models with and without selection [s]; quantiles 0.1, 0.25, 0.5, 0.75, 0.9

	Q0.1	Q0.1 S	Q0.25	Q0.25 S	Q0.5	Q0.5 S	Q0.75	Q0.75S	Q0.9	Q0.9S
	(49)	(50)	(51)	(52)	(53)	(54)	(55)	(56)	(57)	(58)
	empl0607	empl060	empl060	empl060	empl060	empl060	empl060	empl060	empl0607	empl0607
Lag: Employment growth										
Lag: Employment growth										
Lag: Employment growth	0.0381	-0.0259	-	-0.00112	9.24e-06	-6.19e-	-0.0178	-0.0589	-0.124***	-0.119*
	(0.0297)	(0.0485)	(0.0107)	(0.0141)	(0.00693)	(0.00920)	(0.0248)	(0.0454)	(0.0410)	(0.0697)
Employment 2004 (ELD)	0.00321**	0.00328*	1.47e-05	-	-4.97e-	-7.30e-	-0.00133	-	-	-
	(0.00101)	(0.00142)	(0.00050)	(0.00061)	(0.00034)	(0.00047)	(0.00090)	(0.00158)	(0.00179)	(0.00191)
Employment 2004 squared	-1.02e-	-1.12e-	1.18e-06	2.39e-06	8.28e-07	9.30e-07	5.12e-06	1.20e-05	6.82e-	7.17e-
	(4.21e-)	(5.80e-	(2.15e-	(2.72e-	(1.48e-	(2.32e-	(4.01e-	(8.68e-	(1.26e-	(1.48e-
Firm age: 3<5 years	0.136	-0.0196	0.210*	0.204	0.000569	0.000712	0.144*	0.183*	0.115	0.141
	(0.139)	(0.161)	(0.123)	(0.139)	(0.0203)	(0.0291)	(0.0859)	(0.109)	(0.0980)	(0.114)
Firm age: 5<10 years	0.183	0.0936	0.199	0.198	0.000344	0.000741	0.0767	0.0766	0.0957	0.148
	(0.148)	(0.0981)	(0.121)	(0.134)	(0.0155)	(0.0221)	(0.0578)	(0.0852)	(0.107)	(0.109)
Firm age: 10<20 years	0.0148	-0.117	0.181	0.179	0.000489	0.000493	0.0138	0.0243	0.0273	0.0783
	(0.108)	(0.0887)	(0.122)	(0.138)	(0.0163)	(0.0223)	(0.0459)	(0.0766)	(0.0961)	(0.0990)
Firm age: >20 years	-0.0835	-0.160**	0.170	0.172	0.000367	0.000256	0.0340	0.0256	0.111	0.132
	(0.131)	(0.0756)	(0.124)	(0.140)	(0.0177)	(0.0250)	(0.0488)	(0.0759)	(0.104)	(0.116)
Legal form: Limited liability	-0.0788	-0.0566	-0.0300	-0.0160	-	-	-0.215***	-0.130	-0.142**	-0.128
	(0.0957)	(0.177)	(0.0253)	(0.0349)	(0.0196)	(0.0265)	(0.0808)	(0.111)	(0.0708)	(0.125)
Multi-site firm	0.0445	0.0782	0.00403	0.0148	0.000228	0.000504	0.0705**	0.0849	0.0984	0.108
	(0.0707)	(0.0736)	(0.0195)	(0.0263)	(0.0200)	(0.0200)	(0.0348)	(0.0733)	(0.0684)	(0.0774)
Exporting firm	0.131*	0.117*	0.0103	0.00718	6.80e-05	-8.20e-	0.00575	-0.0208	0.0463	0.0334
	(0.0722)	(0.0640)	(0.0146)	(0.0190)	(0.00901)	(0.0125)	(0.0350)	(0.0531)	(0.0632)	(0.0844)
Firm in competitive environ.	0.108	0.105*	0.00566	0.00648	0.000155	0.000539	-0.0235	-0.0193	-0.00636	-0.00589
	(0.0878)	(0.0593)	(0.0163)	(0.0198)	(0.00943)	(0.0134)	(0.0334)	(0.0460)	(0.0675)	(0.0848)
Firm faces price elastic	0.0225	-0.0633	-0.00584	0.00452	-	-9.61e-	-0.00176	-0.00508	-0.134**	-0.129*
	(0.0592)	(0.0671)	(0.0150)	(0.0183)	(0.00907)	(0.0134)	(0.0281)	(0.0364)	(0.0536)	(0.0734)
Strategy: Maintain sales	0.427**	0.209	0.0550	0.0684	-5.40e-	-9.27e-	-0.00678	-0.0552	-0.00515	0.109
	(0.204)	(0.425)	(0.0448)	(0.0656)	(0.0310)	(0.0458)	(0.0902)	(0.0823)	(0.0845)	(0.126)
Strategy: Penetrate market	0.445**	0.287	0.0555	0.0763	5.44e-05	0.000134	0.0221	0.00780	0.149**	0.217*
	(0.216)	(0.427)	(0.0431)	(0.0645)	(0.0299)	(0.0446)	(0.0881)	(0.0763)	(0.0721)	(0.125)
Strategy: New markets	0.518**	0.256	0.0504	0.0684	-8.98e-		-0.00709	-0.0865	0.156	0.221
	(0.204)	(0.424)	(0.0483)	(0.0699)	(0.0323)	(0.0463)	(0.0907)	(0.0886)	(0.161)	(0.162)
Strategy: New products	0.344	-0.0388	-0.116	-0.113	-	-	-0.127	-0.137	-0.311***	-0.211
	(0.252)	(0.494)	(0.0869)	(0.122)	(0.0404)	(0.0578)	(0.124)	(0.116)	(0.118)	(0.165)
Firm has formal business	-0.112	-0.0579	0.0152	0.0111	0.000120	0.000284	0.0935**	0.0728	0.275***	0.301***
	(0.0755)	(0.0871)	(0.0135)	(0.0175)	(0.00864)	(0.0129)	(0.0381)	(0.0556)	(0.0534)	(0.0667)
Firm has non-executive	-0.0530	-0.0455	0.00908	-0.00385	0.000111	0.000513	0.0180	0.0507	0.0727	0.0772
	(0.0757)	(0.0876)	(0.0164)	(0.0289)	(0.0114)	(0.0199)	(0.0368)	(0.0700)	(0.0735)	(0.117)
(Owner-)Manager: equity in	0.000509	0.0273	-0.0129	-0.00446	-6.83e-		0.0299	-0.00813	0.0949	0.0764
	(0.0502)	(0.0685)	(0.0182)	(0.0213)	(0.0121)	(0.0169)	(0.0321)	(0.0517)	(0.0595)	(0.0618)
Owner-Manager 25<35 years	-0.0268	-0.0502	0.0386	-0.0142	0.0785**	0.000316	0.0817	0.148	0.444	0.145
	(0.120)	(0.102)	(0.0409)	(0.0356)	(0.0398)	(0.0268)	(0.120)	(0.130)	(0.318)	(0.253)
Owner-Manager 35<45 years	-0.112	-0.119	0.0182	-0.0201	0.0783*		0.0377	-0.00361	0.321	-0.0806
	(0.250)	(0.0751)	(0.0443)	(0.0258)	(0.0406)	(0.0170)	(0.123)	(0.0457)	(0.298)	(0.0892)
Owner-Manager 45<55 years	-0.00416	-0.0894	0.0380	-0.00705	0.0785**	-7.24e-	0.0336	0.0164	0.304	-0.0860
	(0.240)	(0.0817)	(0.0417)	(0.0213)	(0.0398)	(0.0152)	(0.124)	(0.0575)	(0.295)	(0.103)
Owner-Manager had	0.0104	0.0496	0.00320	0.00361	-7.61e-	-6.27e-	0.0204	0.0324	0.0256	0.0150
	(0.0487)	(0.0870)	(0.0157)	(0.0190)	(0.00941)	(0.0143)	(0.0283)	(0.0397)	(0.0494)	(0.0691)
SIC: Manufacturing	0.106	0.197*	-0.0100	-0.00344	-	-	-0.00692	-0.00188	0.0581	0.0549
	(0.0743)	(0.108)	(0.0198)	(0.0259)	(0.0133)	(0.0197)	(0.0372)	(0.0660)	(0.0699)	(0.107)
SIC: Construction	-0.0482	0.0501	-0.00738	0.0111	0.000408	0.000765	0.117**	0.0961	0.152*	0.153
	(0.0844)	(0.166)	(0.0318)	(0.0410)	(0.0197)	(0.0283)	(0.0580)	(0.0779)	(0.0850)	(0.115)
SICH: Retail & Wholesale	0.130	0.150	0.0100	0.0147	9.17e-05	2.89e-05	-0.0323	-0.0629	-0.0542	1.95e-06
	(0.0926)	(0.114)	(0.0188)	(0.0273)	(0.0133)	(0.0208)	(0.0328)	(0.0843)	(0.0812)	(0.116)
SIC: Education	-0.0228	0.0177	-0.0172	-0.00846	-	-	-0.0363	-0.0642	-0.0445	-0.0583
	(0.0836)	(0.120)	(0.0226)	(0.0290)	(0.0158)	(0.0219)	(0.0408)	(0.0770)	(0.0702)	(0.0956)
<mark>Assistance Effect (IA)</mark>	0.0373	0.0593	0.00792	0.00113	0.000222	0.000253	0.00675	0.0200	-0.0650	0.0223
	(0.0559)	(0.0873)	(0.0140)	(0.0241)	(0.00918)	(0.0188)	(0.0329)	(0.0775)	(0.0483)	(0.0930)
Selection Effect (inverse		0.0923		-0.00280		-		0.0244		0.0830
		(0.0979)		(0.0210)		(0.0162)		(0.0538)		(0.110)
Constant^	x	x	x	x	x	x	x	x	x	x
	x	x	x	x	x	x	x	x	x	x
Observations	323	256	323	256	323	256	323	256	323	256

Standard errors in
*** p<0.01, ** p<0.05, * p<0.1

Appendix F – Reports and conference papers as a result of this research

<u>Research reports</u>

Drews, C.-C. and M. Hart (2015); "Feasibility Study: Exploring Long-Term Impacts of Business Improvement Services", *Report for the UK Department for Business, Innovation and Skills*; made available through the Enterprise Research Centre (ERC) as Research Paper No 29, 2015.

<u>Conference papers</u>

Drews, C.-C. and M. Hart (2014); "Business support and long-term impact - building the evidence base". Paper for the Institute for Small Business and Entrepreneurship (ISBE) Conference (5-6 November 2014), Manchester *(not presented due to illness)*.

Drews, C.-C. and M. Hart (2014); "Business Support Policy – Is there a Case for Long-Term Evaluation?". Paper presented at the International Council for Small Business - World Conference on Entrepreneurship 2014 (11-14 June 2014), Dublin.

Drews, C.-C. and M. Hart (2013); "Business Support Impact – getting the evaluation timeframe right". Paper presented at the Nordic Conference on Small Business and Entrepreneurship Research (NCSB) (14-16 May 2014), Bodø.

Drews, C.-C. and M. Hart (2013); "Measuring the Long-Term Benefits of Business Support?". Paper presented at the Institute for Small Business and Entrepreneurship (ISBE) Conference (12-13 November 2013), Cardiff.

<u>Other Conferences</u>

Drews, C.-C. (2014); "Does local economic performance matter for the choice of how to deliver a national business support programme?". Abstract accepted for the Regional Studies Association European Conference (15-18 June, 2014), Izmir *(not presented due to illness)*.

Drews, C.-C. (2014); "Measuring the long-term benefits of Business Support?", Poster presented at the UK Evaluation Society Annual Conference 2014, London.

I acknowledge that previous versions (including preliminary findings) of extracts of this thesis were presented at the conferences as referenced above. My particular appreciation goes to Professor Mark Hart for his input regarding these.

I also thank the reviewers as well as conference attendees for their comments at the various events.

The Postgraduate Certificate in Learning & Teaching in Higher Education was completed and awarded.