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METHODS
APPLIED IN
EVALUATING
BUSINESS
SUBSIDY
PROGRAMS:
A SURVEY

Takis Venetoklis

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Valtion taloudellinen tutkimuskeskus

Government Institute for Economic Research

Hämeentie 3, 00530 Helsinki, Finland

Email: takis.venetoklis@vatt.fi

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Abstract: This paper surveys evaluation studies of business subsidy programs conducted in Finland and abroad. The aim is to assess the evaluation methods applied and then recommend the most appropriate ones applicable in Finland. In the paper twenty seven studies are analysed; eighteen using Finnish data and the rest, data from other countries.

In the study, evaluation methods are divided into two types: ones which gather data and others which analyse them. We found that the evaluation methods utilised are associated with the results produced. Interestingly, also the commissioner of the evaluations seems to play a role in the results reported.

The study recommends among others, that estimations on the impacts of business subsidy programs should not be based on primary data (from interviews or questionnaires of recipient firms) but rather on secondary data (from financial statements of firms). In addition, ex post evaluations, utilising both descriptive and econometric methods of analysis, should be the main focus of evaluation activities in the ministries and agencies distributing these business subsidies.

Key words: Evaluation methods, business subsidy programs

Tiivistelmä: Tässä tutkimuksessa tarkastellaan Suomessa ja ulkomailla tehtyjä yritystukiohjelmien arviointitutkimuksia. Tarkoituksena on arvioida käytettyjä menetelmiä ja sitten päätyä suosituksiin, mitä niistä olisi tarkoituksenmukaisinta käyttää Suomessa. Analysoinnin kohteena on 27 tutkimusta; niistä 18 Suomesta ja 9 ulkomailta.

Tutkimuksessa arviointimenetelmät jaetaan kahteen päätyyppiin: tietoa kerääviin ja tietoa analysoiviin. On havaittavissa, että käytetyillä arviointimenetelmillä on yhteys saatuihin lopputuloksiin. Myös arviointitutkimuksen teettäjällä näyttää olevan tietty yhteys aikaansaatuihin lopputuloksiin.

Tutkimus päättyy suosittelemaan että yritystukiohjelmien vaikutuksia koskevien arvioiden tulisi mieluummin perustua sekundääriaineistoon (yritysten tilinpäätösinformaatioon) kuin primääriaineistoon (tukea saaneiden yritysten haastattelut ja niihin suunnatut kyselyt). Lisäksi ministeriöiden ja yritystukea jakavien yksiköiden olisi järkevää keskittyä arviointityössään ex post-arvioihin, joissa sovelletaan sekä deskriptiivisiä että ekonometrisiä analyysimenetelmiä.

Avainsanat: Arviointimenetelmät, yritystukiohjelmat

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1. Introduction¹

It is common that governments in most countries give subsidies to private sector firms. These policies are motivated by the desire to correct market failures, and social or regional disparities. Business subsidies are hence a central part of industrial and regional policies. They are usually distributed in two forms: (a) as direct transfers of money (i.e. grants or subsidised interest of loans for investments and for R&D activities) and (b) as non-financial aid (i.e. advisory services).

Although the use of business subsidies is a widespread phenomenon which consumes non-negligible amounts of public money, there is not a very clear – research based – view about the effectiveness of such policies. The aim of this paper is to survey evaluation studies, assess the evaluation methods applied in them and then recommend the most appropriate ones applicable in Finland. It is hoped that by identifying and then applying appropriate evaluation methods, the true effectiveness of the business subsidy programs can be measured.

The evaluation of business subsidy programs has been a subject of increasing number of studies both in Finland and the EU. This research topic has been given lately a boost due to the legal obligations for evaluation mentioned in the EU directives on Structural Funds as well as in the most recent Finnish law regarding business subsidies. In both cases, evaluation becomes an integrated activity of the subsidy program itself. Results from such evaluations can then be utilised in either altering the current business subsidy programs or in planning the next ones so that they can become as effective and efficient as possible.

In March 2000 a working group was set up under the co-ordination of the Ministry of Trade and Industry (KTM) to examine the methods² available for evaluating of business subsidy programs and to give recommendations as to the most appropriate ones. The group was comprised of business subsidy experts from Statistics Finland, the Research Institute of the Finnish Economy (ETLA), the Government Institute for Economic Research (VATT), the Employment and Economic Development Regional Centres (TE-centres), the private consulting firm Net Effect Oy, and from the KTM within. This study is related to the work of this experts' group.

To reiterate, the study aims at two things:

- To discuss, assess and recommend a selection of methods with which one can evaluate business subsidy programs
- To test whether the types of methods used to evaluate these programs are associated with the results produced.

The hypothesis is that the validity of the results depends to a great extent on the validity of the methods used to produce them. Or, to put it differently, the results produced should reflect the true situation in the program and not depend on the type of evaluation methodology applied.

The approach is selective rather than comprehensive. The idea is not to present all possible methods available, due to time and space constraints. One criterion for presenting them is

¹ This study has benefited from the comments of Dr. Jaakko Kiander and Dr. Seppo Kari, both in VATT. The author is solely responsible for opinions expressed and mistakes found in the text.

² The definition of method as used in this paper is shown below.

whether they have already been used in evaluation studies of business subsidy programs in Finland. The reason is simple. Once a method has been applied, it is easy to examine and easier to replicate.

The word “method” in this paper refers simply³ to the procedure, the technique, the step by step operation of doing something (in our case the gathering and the analysis of data – see below). There are tens of methods applicable for the evaluation of the business subsidy programs. To be able to put things in some conceptual frame we need to use typologies, to classify them based on certain common factors which characterise them.

When conducting a program evaluation, we can see the whole operation as a simple input-output system. In other words, the evaluator does essentially four things:

He collects data (inputs), manipulates them (analyses them) and then produces results (outputs). After the results, the evaluator comments on them (gives judgements and recommendations). Hopefully these comments are then taken under consideration when designing and implementing the next program or when adjustments are made in the current program.

We could thus distinguish between the methods with which

- we gather data (inputs)
- we manipulate the data (analysis) and produce results (outputs).

This typology will be followed all through the rest of the paper which proceeds as follows. In section 2, several evaluation studies are listed which refer to business subsidy programs conducted in Finland and abroad. They are analysed based on the methods they have utilised. In section 3, certain methods are examined and elaborated in more detail. The paper concludes in section 4 with a discussion and recommendations.

³ The European Commission approaches the matter of defining a method in much more detail (see MEANS publication Vol. 3, 1999). This detailed approach will not be followed here.

2. Literature review

This section examines recent studies dealing with evaluation of business subsidy programs in Finland and other countries. The studies listed are *not* necessarily devoted exclusively to examining impacts of business subsidies. They may examine other areas of a program as well (i.e. implementation procedures, how program documents fair against EU guidelines and goals, etc.). However, as will be evident later on, this analysis concentrates on the impacts, thus the emphasis is placed on ex post evaluations.

A business subsidy can take many forms. Here we discuss mainly studies on programs distributing direct grant subsidies to firms and in the case of R&D programs, interest subsidised loans as well; in one study guarantees are also examined and in another advisory services (in part). In total twenty seven studies from Finland and other countries are analysed. Several characteristics are used to classify each study. Their index is shown in Table 1 below. The characteristics are relevant to methodological issues of each study.

Table 1. Classification characteristics of evaluation studies

<p>Commissioned/Conducted by Ministry / Research organisation (Commissioned), Conducted independently by research organisation (Own)</p> <p>The level of (potential) impacts at Firm level (micro – In depth), regional/national level (macro – Overall)</p> <p>Types of subsidies in question Direct transfer of moneys, Interest subsidised loans, Guarantees, Advisory services</p> <p>Perspective Ex ante, Ex nunc (on going), Ex post</p> <p>The method of gathering the data for analysis</p> <ul style="list-style-type: none"> • For primary data⁴ Interviews / Questionnaires with parties receiving aid and/or with other parties directly/indirectly involved in the process of subsidy planning/distribution • For secondary data⁴ Other documentation, Financial Statements, Project data, Socio-economic indicators, Case studies <p>Counterfactual measurement Based on data (<i>estimates</i>) from firms (primary data), Based on data (<i>no estimates</i>) from non-subsidised firms (secondary data), No measurement, N/a</p> <p>The method applied in analysing the data</p> <ul style="list-style-type: none"> • Qualitative (Descriptive including cross-tabulations) • Quantitative (Econometric/Statistical) ANOVA (Analysis Of Variance), OLS (Ordinary Least Squares), 2SLS (2-Stage Least Squares), 3SLS, IV (Instrumental variable), GMM (Generalised Methods of Moments), GLM (Generalised Least Squares), DID (Difference in Differences), WLS (Weighted Least Squares), Logit, Probit, Logistic <p>Evaluation results (general consensus of the study) Positive (+), Negative (-), Mixed, rather positive (+/-), Mixed, rather negative (-/+)</p> <p>Overall classification Positive (for +, +/-), Negative (for -, -/+)</p> <p>In the first column of the table, we include the title, the authors, the main goals of the study and from where the data for analysis was gathered. We do not classify the studies in more detail, for example, based on the type of investment for which the subsidies are given.</p>

The last two categories referring to the results, constitute a key part for this paper. The hypothesis mentioned earlier - that the methods utilised affect the results of the study - is a very difficult causal argument to prove. One might say that the classification of the results as positive, negative or mixed is based on subjective criteria which may be biased. We can only

⁴ The classification of data into primary and secondary is found in Hedrick et al. (1993, pp. 68-92).

discuss the approach of classification. The logic was simple. We classified the results of each study based on the *final* results that were reported in the abstracts, summaries, conclusions and in the recommendation sections. Indeed within some of the studies there were parts which warned in taking the results as absolute. However, the central message that the authors of the study disseminated to the readers was found in the four aforementioned sections. It is well known that especially public policy planners and decision makers do not have time to read in detail each and every document that passes through their desk. They mostly rely on summarised text. Hence, the results shown in these sections may be critical in influencing their opinions and actions in regard to the topics of the studies.

2.1 Evaluation studies on business subsidy programs in Finland

Brief description and selection procedure

In this section we review eighteen Finnish studies (Table 2). They have been evaluating business subsidies distributed mostly from the KTM and from TEKES (the National Technology Agency). They were conducted either by outside organisations (universities or research institutions) on their own or first commissioned by ministries.

This is not a comprehensive review of Finnish evaluation studies on business subsidies. Nor is it an attempt to conduct a meta-evaluation of these⁵. We have not included earlier (pre-1995) impact studies on business subsidies. (i.e. Okko (1986))⁶. We have neither reviewed studies which examine how subsidies influence the output of subsidised firms at a regional level (by displacing output from non-assisted areas to assisted areas) or the effect on the decision of the firm to relocate based on the existence of subsidies in a specific region (i.e. Tervo, 1990). In addition, there are studies which forecast the development of several macro economic indicators due to subsidy inflows to a particular region (see Ainali (2000) for an example of such a model). Those type of studies have not been analysed either. Finally, we have not examined publications directly from TEKES, FINNVERA (Government Special Credit Agency) or the Ministry of Labour⁷ which also subsidise firms in many different forms.

⁵ For a comprehensive meta-evaluation of evaluation studies conducted in Finland, see Haapalainen (1998).

⁶ Okko examined the effectiveness of subsidies geared towards industrial firms in the southern regions of Finland. Methodologically he used questionnaires to gather data directly from firms (both recipient and non recipient of subsidies) and analysed the data with logit regression models. His results were mixed.

⁷ The Ministry of Labour in particular, is very active in publishing research reports on employment subsidies. Even as early as 1998 (after only 4 years from the start of the programmes for the period 1995-1999) there were as many as 12 mid-term (1995-1997) evaluation reports on the Finnish Objective 3 and 4 programmes. For a summary, see ESF publications, 31/98.

Table 2. Studies evaluating business subsidies conducted in Finland

Study	Commissioned/ Conducted	Impact level	Subsidy type	Perspective	Method of gathering data	Counter- factual measurement	Method of analysis	Main conclusions
<p>Title: Yritystuen vaikutukset yrityksen ja yhteiskunnan kannalta. (The effects of enterprise subsidies from the standpoint of enterprise and society).</p> <p>Author: Rolf Myhrman, et al. (1995)</p> <p>Goal: Measure effectiveness of grants on financial structure, profitability, market functioning of firms</p> <p>Data from: Firms having received Investment and Development subsidies between 1989-1994. (10 case studies of firms)</p>	KTM /VATT (Commissioned)	In depth, Overall	Direct transfers	Ex post	Case studies	No measurement	Descriptive	(+) <ul style="list-style-type: none"> • Positive effects on output quality • Positive impact on financial structure due to reduction of financial risk
<p>Title: A prior Appraisal of the Regional Development plan for Finland's Objective 2 Regions.</p> <p>Author: Heikki Eskellinen et al. (1996)</p> <p>Goal: To analyse the target regions, investigate the basis of the proposed strategy and of the priorities and examine the proposed policy measures and their monitoring.</p> <p>Data from: Document of Finnish Single Programming Document (SPD) for Objective 2 areas</p>	NordREFO (Own)	Overall	Direct transfers	Ex ante	Other docs	N/a	Descriptive (SWOT analysis)	(-/+) <ul style="list-style-type: none"> • Strategies and priorities were derived from a fairly limited background analysis and seemed rather intuitive • Rationale for delivery of the funding between priorities was not presented • Implementation and monitoring organisations had been planned but proposed indicators for evaluating and follow up were only tentative
<p>Title: Suomen tavoite 2 –ohjelmantyon käynnistyminen. Elinkeinopoliittisten hankkeiden seuranta vuoden 1995 loppuun mennessä</p> <p>Author: Bo Försström and Maarit Mustonen (1996)</p> <p>Goal: Analyse the initial implementation of the Finnish Objective 2 programme on a regional basis</p> <p>Data from: Programme document, subsidised firms (8 case studies of firms having received subsidies during 1995 located in each of the 8 Objective 2 regions)</p>	SM / Neopoli Oy (Commissioned)	In depth, Overall	Direct transfers	Ex nunc, Ex post	Other docs, Case studies	No measurement	Descriptive	(+/-) <ul style="list-style-type: none"> • Implementation problems due to (a) inflexibility between central and regional authorities (b) uncertainty on funding amounts coming from EU till end of 1995 • Handling of subsidy applications was efficient and projects financed seemed to fulfil set targets

Table 2. (cont.)

Study	Commissioned/ Conducted	Impact level	Subsidy type	Perspective	Method of gathering data	Counter- factual measurement	Method of analysis	Main conclusions
<p>Title: Suomen Tavoite 2-Ohjelmaehdotuksen Vuosille 1997-1999 Ex Ante –Arviointi. Author: Timo Aro et al. (1997) Goal: Examine how the Finnish Objective 2 program document matches predefined criteria and how it assists in their fulfilment Data from: Document of Finnish Objective 2 program proposals for 1997-1999</p>	TuKKK (Own)	Overall	Direct transfers	Ex ante	Other docs	N/a	Descriptive (SWOT analysis)	(+) <ul style="list-style-type: none"> The proposal seemed to adapt well to national and EU goals and strategies.
<p>Title: Tavoite 2 –ohjelman ympäristövaikutusten arviointi Author: Pauli Marjanen (1997) Goal: Evaluate the predefined effects on the environment mentioned in the Objective 2 program document at Satakunta; evaluate the evaluation methods applied Data from: Document of Finnish Objective 2 program for Satakunta, data from environmental subsidy applications (amount of applications examined not defined)</p>	SM / Merma Oy (Commissioned)	Overall	Direct transfers	Ex nunc, Ex post	Interviews/ Questionnaires, Other docs, Project docs,	N/a	Descriptive (strategic level meta-evaluation)	(-) <ul style="list-style-type: none"> Author is critical of evaluation methods applied; many aspects could be improved and clarified
<p>Title: Suomen tavoite 2 –ohjelman 1995-1996 arviointi Author: Sisäasiainministeriö (1997) Goal: Evaluate the implementation of the Finnish Objective 2 programme for the period 1995-1996 Data from: Program document; Monitoring database (REUHA); 100 subsidised firms interviewed, 78 subsidised firms through written questionnaires, 214 training participants, municipal officials (85 interviews), case studies projects (4)</p>	SM / TuKKK & TY (Commissioned)	In depth, Overall	Direct transfers	Ex nunc, Ex post	Interviews/ Questionnaires, Other docs, Case studies	Estimates from firms	Descriptive	(+) <ul style="list-style-type: none"> Structure of program: reasonably functional Choice of projects: Non-uniform criteria. Economic benefits were created in companies receiving support in terms of increased competitiveness Positive employment (preliminary) impacts on firms receiving subsidies
<p>Title: Kuntien yritystuet. Kustannus-Hyötytarkastelu suorien yritystukien vaikutuksista kuntien talouteen Author: Hannu Pirkola (1997) Goal: Develop better methods for assessing the costs and benefits accruing to the municipal economy through subsidised projects; assessing the impacts of subsidised projects Data from: Municipalities having given subsidies to firms between 1985-1990 (362); Projects having received subsidies during the same period (30)</p>	Åbo Akademi (Own)	In depth, Overall	Direct transfers, Guarantees, Interest subs. loans	Ex post	Interviews/ Questionnaires, Other docs, Project docs, Case studies	Estimates from firms	Descriptive, Econometric/ Statistical (correlation)	(+) <ul style="list-style-type: none"> There is a positive correlation between employment in firms and business subsidies given to them through municipalities It is difficult to measure the costs and the benefits of a project

Table 2. (cont.)

Study	Ordered / Conducted	Impact level	Subsidy type	Perspective	Method of gathering data	Counter-factual measurement	Method of analysis	Main conclusions
<p>Title: Pk-Yritykset ja julkinen tuki. Tutkimus yritystukilain mukaisten yritystukiä vaikuttavuudesta, toimivuudesta ja kehittämistarpeista.</p> <p>Author: Marko Muotio (1998)</p> <p>Goal: Examine the impact of business subsidies based on Law 1136/93</p> <p>Data from: Firms having applied for subsidies between 1995-1996 (743 subsidised , 26 non-subsidised firms)*</p>	KTM / Vaasan Yliopisto (Commissioned)	In depth; Overall	Direct transfers	Ex post	Interviews/ Questionnaires	Estimates from firms	Descriptive	(+) <ul style="list-style-type: none"> With the subsidies the firms managed to purchase better production technologies Employment on recipient firms was maintained and new permanent jobs were created Direct effects of subsidies on environment were minimal but indirect effects were higher
<p>Title: Yritystuen vaikuttavuus ja sen mittaaminen: puu- ja huonekaluteollisuusyrityksille myönnetyt investointiavustukset</p> <p>Author: Marko Tuomiäro and Matti Virén (1998)</p> <p>Goal: Measure impacts on investment growth and employment</p> <p>Data from: Firms having received investment subsidies between 1988-1994 (69 firms), 292 non subsidised firms*</p>	VATT (Own)	In depth, Overall	Direct transfers	Ex post	Financial statements, Project docs	Estimates from secondary data	Descriptive, Econometric/ Statistical (GMM)	(-/+) <ul style="list-style-type: none"> Effects of subsidies on employment and investment were positive but minor
<p>Title: High Technology Investment, Growth and productivity</p> <p>Author: Petri Niininen (1999)</p> <p>Goal: Impacts of publicly subsidised R&D on private R&D investments</p> <p>Data from: Firms having received R&D subsidies between 1985-1993 (94 firms), 15 non subsidised firms *</p>	Helsinki School of Economics and Business Admin. (Own)	In depth, Overall	Direct transfers	Ex post	Interviews/ Questionnaires, Other docs	Estimates from secondary data	Descriptive, Econometric/ Statistical (2SLS with IV)	(+/-) <ul style="list-style-type: none"> Limited effect on private R&D investment; Loans seem to have had more effect.
<p>Title: Process evaluation of business subsidies in Finland. A quantitative approach.</p> <p>Author: Takis Venetoklis (1999)</p> <p>Goal: Evaluate process with which business subsidies were distributed to firms</p> <p>Data from: Firms having received business subsidies between 1995-1997 (304 firms), KTM regional offices at Turku & Lahti., and of firms whose applications were rejected for the same period (115)</p>	VATT (Own)	In depth, Overall	Direct transfers	Ex nunc	Financial statements, Project docs, Other docs	Estimates from secondary data	Descriptive, Econometric/ Statistical (logistic regression, ANOVA, t-tests),	(-) <ul style="list-style-type: none"> No clear differences between firms receiving aid and those that did not Financing procedures and project selection were not standardised between the two KTM regional offices examined

* This is just one combination of recipient and non-recipient firms analysed in the study; for all the different samples refer directly to the study

Table 2. (cont.)

Study	Ordered / Conducted	Impact level	Subsidy type	Perspective	Method of gathering data	Counter-factual measurement	Method of analysis	Main conclusions
<p>Title: Economic Value Added from EU Investment Subsidies: Evidence from the Finnish Fish Industry Author: Jaakko Kjellman et al. (1999) Goal: Examine what factors contributed to value creation in subsidised firms in the Fish processing industry. Data from: Firms having received subsidies through the EU Structural Funds – the FIGF between 1995-1997 (47 firms)</p>	Åbo Akademi (Own)	In depth, Overall	Direct transfers	Ex post	Interviews/ Questionnaires	Estimates from firms	Descriptive, Econometric/ Statistical (logistic regression, Mann-Whitney U-test)	(+) <ul style="list-style-type: none"> Despite considerable dead weights, subsidies generated investments and increased product quality
<p>Title: Selvitys Elintarviketeollisuuden EU-siirtimäkauden kansainvälistymistuen käytöstä ja vaikuttavuudesta Author: Raija Lääperi and Timo Tohmo (1999) Goal: Measure impacts on employment, competitiveness, internationalisation Data from: Firms having received subsidies between 1995-1999 (35 firms, 152 projects)</p>	KTM / Jyväskylän Yliopisto (Commissioned)	In depth, Overall	Direct transfers	Ex post	Interviews/ Questionnaires, Other docs	Estimates from firms	Descriptive	(+) <ul style="list-style-type: none"> Medium to high positive influence on firm competitiveness and internationalisation
<p>Title: Impact of business subsidies on growth of firms – Preliminary evidence from Finnish Panel Data Author: Takis Venetoklis (2000) Goal: Measure the impact of direct subsidies on Value Added Growth of firms Data from: Firms having received subsidies (not R&D) between 1995-1997 (12876 firms)*, and from non-subsidised firms (23769)*</p>	VATT (Own)	In depth, Overall	Direct transfers	Ex post	Financial statements, Other docs, Project docs	Estimates from secondary data	Descriptive, Econometric/ Statistical (OLS)	(-/+) <ul style="list-style-type: none"> Positive but very limited impact on VA growth of subsidised firms Net return (based on monetary value of the subsidies distributed) was not achieved
<p>Title: Suomen SME – Yhteisöaloiteohjelman väliarviointi /Mid-term Evaluation of Finnish SME Community Initiative (CI) programme 1995-1999 Author: Pekka Stenholm and Satu Hietanen (2000) Goal: Examine how the projects under the CI program operated and what were the benefits on the participant firms. Data from: Firms having received SME subsidies through the CI between 1995-1999 (62 firms interviewed, 43 firms through questionnaires)</p>	KTM / TuKKK (Commissioned)	In depth, Overall	Direct transfers	Ex nunc, Ex post	Interviews/ Questionnaires, Project docs	Estimates from firms	Descriptive	(+) <ul style="list-style-type: none"> Effects were positive, especially in the development of activities of subsidised SMEs

* This is just one combination of recipient and non-recipient firms analysed in the study; for all the different samples refer directly to the study

Table 2. (cont.)

Study	Ordered / Conducted	Impact level	Subsidy type	Perspective	Method of gathering data	Counter-factual measurement	Method of analysis	Main conclusions
<p>Title: Tavoite 2 – ohjelman arviointi kaudella 1995-99, Loppuraportti</p> <p>Author: Kari Itkonen et al. (2000)</p> <p>Goal: Measure the impacts of the Finnish Objective 2 program for the period 1995-1999</p> <p>Target: Firms having received subsidies and officials involved in the planning and implementation of the program</p> <p>Data from: 432 projects, 48 subsidised firms, 84 interviews, 72 written questionnaires</p>	SM / Jyväskylän Yliopisto and Seppo Laakso Tmi (Commissioned)	In depth, Overall	Direct transfers	Ex post	Interviews/ Questionnaires, Project docs, Other docs, MI, Socio-economic indicators	Estimates from firms	Descriptive	(+/-) <ul style="list-style-type: none"> In general program has had positive effects on employment There are differences in the employment growth rates among the Objective-2 regions and unemployment is still higher in these regions vis-à-vis the rest of the country
<p>Title: Impact of public R&D on the profitability and growth performance of firms: A panel data study on Finnish Firms</p> <p>Author: Olavi Lehtoranta (2000)</p> <p>Goal: Measure the impact of public R&D on profitability and growth of firms during 1991-1997; find the characteristics of firms which are most important in their profitability and sales; identify differences between firms having received and not having received public R&D subsidies</p> <p>Data from: Subsidised firms through TEKES between 1991-1997 (4 sets of firm panel data), projects (1241 subsidised firms, 196 non-subsidised)*</p>	Statistics Finland (Own)	In depth, Overall	Direct transfers, Interest subsidised loans	Ex post	Financial statements, Interviews/ Questionnaires, Project docs	Estimates from secondary data	Descriptive, Econometric/ Statistical (probit, GMM, 2SLS, GLM)	(+/-) <ul style="list-style-type: none"> Subsidies did not seem to have any direct effect on the growth of sales or profits of firms They did have a positive effect on the creation of new jobs
<p>Title: Kauppa- ja teollisuusministeriön hallinnoalan EAKR- ja ESR-hankeiden vaikuttavuus</p> <p>Author: Mika Silander et al. (2000)</p> <p>Goal: Assess the impacts of projects financed through the ERDF and ESF in Objective 2, 5b and 6 regions in Finland using employment, diversification and restructuring indicators</p> <p>Data from: Projects of firms (282 through questionnaires, 22 case studies)</p>	KTM / Jyväskylän Yliopisto (Commissioned)	In depth, Overall	Direct transfers	Ex post	Interviews/ Questionnaires, Other docs, Project docs, Case studies	Estimates from firms	Descriptive	(+) <ul style="list-style-type: none"> Employment objective 'has been met well' Restructuring efforts in the assisted areas have been implemented well through the rise of technological standards Efforts to diversify have remained few

* This is just one combination of recipient and non-recipient firms analysed in the study; for all the different samples refer directly to the study

2.2 Evaluation studies on business subsidy programs in other countries

Description and selection procedure

This review was more selective than the Finnish one, due to the vast material in existence. The idea was to find respective studies which utilise the same methodological approaches⁸ as the Finnish ones and compare their results. Unfortunately the effort came rather short. In literature it was not easy to find, for example, many studies measuring business subsidy impacts when the impact *estimates were given by the firms themselves* and the subsidy type was direct transfers of money⁹. Nor were there accessible any studies commissioned by ministries in other countries with outside evaluators, evaluating the ministries' business subsidy activities¹⁰.

On the other hand, when the gathered data was not based on estimates from firms but on other secondary data sources, and the commissioner was an outside "independent" organisation (university, research organisation) there was an abundance of quantitative studies measuring and evaluating both non - R&D and R&D subsidy programs. A selection is shown in Table 3.

Seven studies are listed evaluating business subsidy programs from Norway, Sweden, UK, Israel and Korea. Furthermore, in a study by Capron and van Pottelsberghe (1997), one finds a survey of twenty studies on the impacts of public R&D subsidies conducted in five countries (US, Belgium, Sweden, Italy, UK) as well as a reference to another survey study by Levy (1990) where some nine more R&D subsidy programs are examined in nine countries (US, UK, Italy, Japan, Germany, Sweden, Netherlands, France, Switzerland). Finally, in the study by the European Commission (EC, 1999b) results are reported from fourteen EU countries (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain, Sweden, and the UK - see footnote 9 and Appendix).

⁸ See Table 1 for more on these methodological characteristics

⁹A notable exception is a study by the European Commission (EC, 1999b). Because this study was commissioned directly by the Commission, was conducted in many different EU member states and it cost a substantial amount of money, we found it interesting to examine it detail. The analysis, shown in the Appendix, is in terms of methods used, of results reported and - as always - only in reference to impacts.

¹⁰ These types of studies most likely do exist but are probably available at national level only, and not reported in journals.

Table 3. Studies evaluating business subsidies conducted abroad

Study	Ordered / Conducted	Impact level	Subsidy type	Perspective	Method of gathering data	Counter-factual measurement	Method of analysis	Main conclusions
<p>Title: Real Options, Wage bargaining, Factor Subsidies and Employment Author: Stein Østbye (1995) Goal: Examine whether regional subsidies on factors of production increase employment and find which is the most cost-effective factor to subsidise, labour or capital Data from: Industrial groups (at SIC-3 digit level), in 313 Norwegian municipalities having received subsidies during 1980-1988</p>	University of Umeå (Own)	Overall	Direct transfers	Ex post	Socio-economic indicators	No estimates	Econometric/ Statistical (3SLS)	(+/-) <ul style="list-style-type: none"> Labour subsidies increase employment and the impact is large Capital subsidies reduce employment, but the effect is small
<p>Title: Government interventions and productivity growth Author: Jong-Wha Lee (1996) Goal: Measure the impact of government industrial policy in Korea through tax incentives and subsidised credit Data from: 38 Korean industries during 1963-1983 (measurements were take from 4 periods: 63-68, 68-73, 73-78, 78-83 for growth rate of Value Added per worker, of capital stock, of TFP)</p>	Korea University and NBER (Own)	Overall	Interest subs. loans	Ex post	Socio-economic indicators	N/a	Descriptive, Econometric/ Statistical (WLS, 3SLS)	(-) <ul style="list-style-type: none"> Financial incentives were only insignificantly correlated with sectoral growth of value added No evidence supporting positive contributions made by government interventions to productivity growth Korean success occurred "in spite of" rather than "because of" interventions.
<p>Title: Support to business R&D: A survey and some new quantitative evidence Author: Henri Capron and Bruno van Pottelsberghe (1997) Goal: Test whether R&D subsidies have a direct impact on productivity growth and whether they have a direct impact on private R&D investment Data from: Literature survey of 21 evaluation studies: 14 conducted at firm level, 4 at industry level and 3 at country level</p>	OECD (Own)	In depth, Overall	Direct transfers	Ex post	Financial statements, Socio-economic indicators	N/a**	Econometric/ Statistical ***	(-/+) <ul style="list-style-type: none"> No conclusion that impact of private funded R&D on productivity growth is significantly higher than impact on publicly financed R&D. Private R&D not associated with higher or even equivalent, returns than total R&D Only total R&D is associated with significant rates of return R&D may stimulate or inhibit private R&D depending on country and/or industry R&D more likely to be efficient in stimulating private R&D if directed to medium-tech industries

** It was not possible to check whether the studies in the survey used control groups

*** The econometric methods used in the studies were not mentioned. However, the values of the B coefficient of the R&D subsidies in each study were.

Table 3. (cont.)

Study	Ordered / Conducted	Impact level	Subsidy type	Perspective	Method of gathering data	Counter-factual measurement	Method of analysis	Main conclusions
<p>Title: Capital subsidies an the performance of firms (1998a) Author: Fredrik Bergström (1998) Goal: Examine the effects on Total Factor Productivity (TFP) of public subsidies to firms in Sweden Data from: Subsidised (56)* and non-subsidised (634)* manufacturing firms (with 1-75 employees) during 1987-1993</p>	Stockholm School of Economics (Own)	In depth	Direct transfers	Ex post	Financial statements, Other docs, Socio-economic indicators	Estimates from secondary data	Econometric/ Statistical (OLS)	(-/+) <ul style="list-style-type: none"> Subsidisation correlated positive with Value Added Productivity increases the first year after subsidies were granted. After first year, the more subsidies granted, the worse TFP growth develops. There is little evidence that subsidies effect positively productivity
<p>Title: Characteristics of government supported firms Author: Fredrik Bergström (1998b) Goal: Examine the types of firms to which subsidies are allocated and compare them with randomly non-subsidised firms in order to check whether allocation of support reflects political considerations Data from: Subsidised and non-subsidised firms in 1989 (454 - 924) and in 1992 (306 - 803)</p>	Stockholm School of Economics (Own)	In depth	Direct transfers	Ex nunc	Financial statements, Other docs, Socio-economic indicators	Estimates from secondary data	Econometric/ Statistical (logit)	(-/+) <ul style="list-style-type: none"> Younger firms supported due to lack of capital. No difference between subsidised and non-subsidised firms (could these firms have been able to finance the subsidised projects privately ?) Interest group hypothesis is supported.
<p>Title: The effects of capital subsidization on Israeli Industry Author: Arie Bregman et al.(1998) Goal: Evaluate the policy effects of subsidising capital in firms at outlying development areas Data from: Subsidised (293) and non-subsidised (434) manufacturing firms in Israel during 1990 -1994</p>	NBER (Own)	In depth, Overall	Direct transfers,	Ex post	Financial statements	Estimates from secondary data	Econometric/ Statistical (OLS)	(-) <ul style="list-style-type: none"> Production inefficiencies ranging from 5% for firms that receive average level of subsidies, to 15% for heavily subsidised firms Much the subsidisation not necessary (subsidised firms earned higher rates of return on their total physical capital, than firms not subsidise)
<p>Title: Thematic Evaluation of Structural Fund Impacts on SMEs Author: European Commission (1999) Goal: Examine the Impacts of Structural fund Interventions on SMEs located 14 EU countries in terms of employment, development and growth prospects Data from: Recipient (805) and non-recipient firms (267) of Structural Funds assistance between 1996-1998, Project information (90) in 26 regions</p>	EC / Ernst and Young (Commissioned)	In depth, Overall	Direct transfers, Advisory services	Ex post	Interviews/ Questionnaires, Other docs, Case studies, Project docs, Socio-economic indicators	Estimates from firms	Descriptive	(+) <ul style="list-style-type: none"> Overall interventions have had a significant impact on the SME sector and made an important contribution to wider regional aid

* This is just one combination of recipient and non-recipient firms analysed in the study; for all the different samples refer directly to the study

Table 3. (cont.)

Study	Ordered / Conducted	Impact level	Subsidy type	Perspective	Method of gathering data	Counter-factual measurement	Method of analysis	Main conclusions
<p>Title: Small firms, Economic growth and public policy: What exactly are the connections?</p> <p>Author: Mark Hart (1999)</p> <p>Goal: Examines SME policy in Northern Ireland and how the financial assistance to small firms has affected their business performance, employment, turnover and productivity growth.</p> <p>Data from: Firms subsidised during 1991-1997 through the Local Enterprise Development Unit (LEDU), a small business agency for regions. In total, 457 firms were analysed, of which 100 fastest growing firms. Those growth firms were analysed in more detail.</p>	SBRC, Kingston University and NIERC (Own)	In depth, Overall	Direct transfers	Ex post	Financial statements	No	Econometric/ Statistical (GLS)	<p>(+/-)</p> <ul style="list-style-type: none"> • Positive link between grant assistance and increase in employment within assisted firms, especially in the 100 fastest growing firms • Government grants and subsidies were raising profit rates in Northern Ireland above their expected level relative to Great Britain • Control group of non-assisted firms would have been useful to construct (lack of data on employment growth and turnover for non-subsidised firms)
<p>Title: Do R&D subsidies stimulate or displace private R&D? Evidence from Israel</p> <p>Author: Saul Lach (2000)</p> <p>Goal: Evaluate the effects of R&D subsidies on private R&D expenditures by measuring (estimating) what the subsidised firms would have spent on R&D themselves had they not received the subsidy</p> <p>Data from: Israeli manufacturing firms during 1990-1995 (109 subsidised - 77 non-subsidised)*</p>	NBER (Own)	In depth	Direct transfers	Ex post	Financial statements	Estimates from secondary data	Econometric/ Statistical (OLS, DID, GMM)	<p>(-/+)</p> <ul style="list-style-type: none"> • An extra dollar of R&D subsidies increased private R&D by .41 dollars • Projects could have been undertake w/o public subsidies • Subsidy effect lower than expected (not dollar for dollar return)

* This is just one combination of recipient and non-recipient firms analysed in the study; for all the different samples refer directly to the study

2.3 Frequency analysis¹¹ of methodological characteristics

As mentioned in the introduction, one of the purposes of the present paper was to test the hypothesis that the methods utilised in an evaluation study play a role in the results produced. For this we counted the frequencies of certain methodological characteristics of the studies listed in Tables 2 and 3 using the classifications of Table 1.

The characteristics of the studies that, according to this hypothesis, could have played a role in the results were (independent variables):

- The method analysing the data (Econometric/Statistical, Descriptive)
- The commissioner of the study (Commissioned by a ministry, on its own)
- The counterfactual calculation (No counterfactual measurement, based on firm estimates, based on secondary sources, N/a)

The results produced (overall positive, overall negative) was the dependent variable.

Out of the total twenty seven studies, the ones chosen to be used for the analysis were those that were referring to ex nunc and/or ex post evaluations only. There, one can examine the potential impacts of the policy at firm level and maybe at more general level. Twenty two studies were finally analysed. The ones that were not, were by Eskellinen et al. (1996), Aro et al. (1997), Marjanen (1997)¹², Bergström (1998b) and Venetoklis (1999).

The following three Tables (4-6) count the frequencies for each of these independent variables separately, based on the positive or negative result of the study. Table 7 joints together the three tables.

Table 4. Method of analysis by Result

		Result		Total
		Negative	Positive	
Method of analysis	Descriptive		9	9
	Econometric/ Statistical	7	6	13
Total		7	15	22

Table 5. Commissioned by Result

		Result		Total
		Negative	Positive	
Commissioned	Conducted Independently	7	6	13
	Commissioned by agency		9	9
Total		7	15	22

¹¹ Before proceeding further, a word of warning is needed. The analysis presented below is not statistically valid for many reasons. One is that the selection method of the sample (the studies) is not done at random, nor does it institute a representative sample of all the studies conducted in Finland or elsewhere. It is a sample of convenience. Second, the observations are very low in some cells of the cross tabulations produced. Nevertheless, there are many difficulties in creating a statistically valid sample of these evaluations studies due to access problems. Thus, we have to content ourselves with the data at hand.

¹² Although this study is in principle an ex post evaluation, it was difficult to comprehend and classify, thus was left out.

Table 6. Counterfactual measurement by Result

		Result		Total
		Negative	Positive	
Counterfactual	No measurement		4	4
	Estimates from firms		9	9
	Estimates from secondary data	5	2	7
	N/a	2		2
Total		7	15	22

Table 7. Counterfactual by Commissioned by Analysis by Result

Method of analysis	Commissioned	Counterfactual	Result		Total	
			Negative	Positive		
Descriptive	Commissioned by agency	No counterfactual calculation			2	
		Estimates from firms			7	
		Estimates from calculations			7	
	Conducted Independently	N/a				
		No counterfactual calculation				
		Estimates from firms				
Econometric/Statistical	Commissioned by agency	Estimates from calculations				
		N/a				
		No counterfactual calculation				
	Conducted Independently	Estimates from firms			2	2
		Estimates from calculations	5	2	7	7
		N/a	2		2	2
Total				7	15	22

Looking at the tables one notices certain trends in the methods used vis-à-vis the results. The most obvious ones are that there are *only* positive results, when the counterfactual is estimated by the firms or not estimated at all; and that, regardless of who commissions the study or what type of analysis is applied.

Studies commissioned by ministries basically use descriptive evaluation methods and produce positive results; on the other hand, studies carried out by non-commissioned evaluators, use econometric/statistical methods (to be precise, they use *both* – econometric and descriptive) and their results are more on the negative side.

Again, we can not infer conclusively about the association of data gathering/data analysis methods and of the results due to (a) the small sample examined and (b) the nature (non-random) with which these studies were selected and examined. However, the analysis gives some *indications* to support our hypothesis that data gathering and data analysis methods may play a role in the results of evaluation studies of business subsidy programs.

In fact the case might well be that a *biased relationship* is created between the commissioning agency and the institution conducting the evaluation. Because there are pressures and interests involved from both sides¹³ a so called “master-servant” relationship may be in the making. In other words, results are effected indirectly from this relationship. Indeed, the simple analysis above could be interpreted in this way.

¹³ For example, from the ministry’s point of view to show good results with its policies; from the evaluator’s point of view, to receive future research contracts from the ministry.

To conclude, our results support the findings of Backman and Fölster (1995) who conducted a similar survey analysis. They argued that

"...our survey of empirical studies on the effect of producer subsidies yields a pessimistic picture. Most studies render small effects, some even produce negative effects that counteract policy goals. Subsidies that conserve production structures are often found to have negative effects such as increasing unemployment in the long run. Various forms of employment subsidies often appear to render small positive effects, but it remains unclear whether the value of these effects exceed costs... Our survey of empirical studies reveals a peculiar contradiction. International and Swedish scientific studies often find only small effects of subsidies using fairly sophisticated methods. In contrast, subsidy providing agencies' own studies point to large positive effects -usually based on rather suspect methods" (p. 113-114).

What are the pros and cons of each method? Which method can provide more reliable (valid) results? Can we rely on firm estimates as our data sources and a descriptive method of analysis or do we use secondary data sources and implement quantitative methods for data analysis? These questions will be addressed in the following section.

3. Examination of methods in gathering and analysing data

3.1 Methods in gathering data

We classified earlier the methods utilised for evaluation of business subsidy programs into two broad categories. Ones which are used in collecting the data and others in analysing the data. An old saying talks about GIGO (Garbage-In, Garbage-Out). We thus need to ensure that the data we gather should be as authentic and close to the truth as possible. Otherwise, if the data is not reflecting the real situation of what we attempt to evaluate, the analysis will produce unreliable results.

The dependency problem

If we examine Table 2, we see that many of the evaluation impact studies on business subsidies conducted in Finland use as their data source impact estimates from the firm itself. In fact in most cases the information either comes from interviews or from distributed questionnaires.

How reliable is this data? Usually, impacts of the government intervention measured through quantitative indicators (i.e. turnover changes, new jobs created, existing jobs maintained, etc.) are being estimated based on answers given by firms receiving free money. It is indeed important to keep in mind that money is distributed *freely* from the responsible organisation. In that sense there is a dependency created between the receiver of the funds and for example the KTM. Thus, it would be natural to assume that many firms are more prone to give an answer indicating positive impacts; this would - in their minds - increase their chances of receiving free money at a later time as well.

Are then these answers reliable and close to the truth? We can not be sure. In fact, these are not the only problems we are faced with. The question of measuring impacts is extremely complex. What are the dead weight effects of such an intervention? The spill over effects? What about the counterfactual?

The counterfactual problem

What would have happened to the firm had the intervention not occurred? This is the “policy off” situation. Why is it important? Because only then can we measure the *net* impact of the intervention. Unfortunately this is a hypothetical condition which we can not measure *directly*.

This is why we must incorporate in our analysis a control group of firms which have not received the subsidy and account for this non-intervention situation. Once we have chosen a control group, we may use the right analytical tools¹⁴ and can come closer to measuring the net impact of the intervention.

However the selection of a control group is not an easy exercise. Logically, the experimental and the control groups must be as similar as possible. The ideal would be to have the *same* firm examined under two different regimes (given and not given subsidies). Because this is not possible, in so called “pure experimental” designs two groups are randomly selected from the population under focus and the intervention is distributed randomly to one of the two. Statistical theory says that the *random selection* of the two

¹⁴ These analytical tools will be the topic of the following section.

groups assures that the differences among the members of the two groups will be equally distributed, will thus cancel out and not influence the measurement of the effect. Of course the more heterogeneous the individual members of the groups, the bigger the subgroups need to be to match and then cancel their potential differences.

In the case of firms receiving subsidies it is really hard to build this control group due to a couple of reasons. First, we can not use the random distribution of subsidies because aid is distributed under certain predefined criteria. Second, as mentioned above there is high heterogeneity among all firms. Brave attempts are however available to select (match) the control group using as selection criteria, certain characteristics of the firms which received aid (location of firm, SIC industrial code, financial indicators, size in terms of personnel, markets where it is operating, etc).

Another obstacle is the dynamic nature of the firms' operations. For example, the behaviour of the firm before the intervention may play a role in its future development, thus this must also be taken into account.

Still another consideration is the financing of the firms from other sources except the one under scrutiny. Is the firm financing the relevant investment for example, only through subsidies from the KTM or are there other sources (ministries, agencies) participating? Is the firm's own capital part of the financing package and, if so, by how much? What is the contribution of the private capital markets? What is the percentage share of each of the financing sources making up the total investment?

Finally, the timing in measuring the impact of the intervention must be considered. How long after the intervention is ideal to measure the impact? Should the impact be measured only after all the subsidies are distributed or is the knowledge of the future receipt of the subsidies already influencing the behaviour of the firm (and consequently some indicators we are trying to measure)?

Having said all this, one has to wonder how the firm interviewee can be so knowledgeable of the above measurement difficulties and still can answer with precision and confidence the usual impact questions posed to him.

The following is a sample of actual questions found in impact studies listed in Table 2 and in the database system operated by the different TE-centres; there, they gather data on subsidy applications and monitor the projects financed:

- Would you have made the investment had you not received the aid?
- What has been the real impact of the subsidy received, in terms of turnover growth in your firm?
- How many new jobs have been created because of this investment? How many jobs have been saved?
- Do you think that the turnover of your firm has grown due to the subsidy received/project invested (choose one)
 - a. more than otherwise
 - b. the same
 - c. less than other wise

With these questions posed, what the evaluator is doing, is essentially passing the responsibility of estimating the counterfactual situation to the firm. And that, as was shown above, produces answers (data) which suffer extremely from validity problems.

To conclude, the importance of creating a good counterfactual environment is supported by one more argument. Having chosen a representative¹⁵ control group we partly solve the problems of spill over and dead weight effects of the government intervention. And this, because (a) in the control group there will be non-subsidised firms which have been effected from spill over effects coming from subsidised firms and/or (b) they have been influenced/influencing the dead weight¹⁶ phenomena in the impact indicators measured with our evaluation.

3.2 Methods in analysing data

In this section we refer to the methods of data analysis encountered earlier in the evaluation studies conducted in Finland and elsewhere, and discuss some advantages and problems linked to their implementation.

Qualitative methods

Descriptive analysis using cross-tabulations, SWOT analysis, document analysis

The basic advantage of applying such methods of analysis is that they are fairly easy to use. One does not need to have expertise in describing a phenomenon; nor is it complex to present some data in a cross-tabulation format making sure that different frequencies of certain sub-groups are emphasised. Also, SWOT analysis (Strengths, Weaknesses, Opportunities, Threats) is a fairly easy method to comprehend and to present as long as the presenter is knowledgeable of the examined topic and can identify clearly the different components of the 2X2 grid.

The biggest weakness of these methods are that they do not necessarily provide proof of causal interactions among the different factors involved in the topic evaluated nor do they necessarily quantify results; this makes the judgement and comparison of results with benchmark values and other results from similar studies rather hard.

Quantitative methods

Regression models

A big advantage of these models¹⁷ is that of giving the evaluator indications of probable causal relationships and of allowing him to make inferences about the topic evaluated. Also, where as qualitative analysis may give us the *direction* of change, quantitative analysis shows the *magnitude* of change (Chiang, 1974, p.136).

¹⁵ By "representative" we mean a group of non-subsidised firms as similar as possible to the subsidised ones.

¹⁶ An excellent discussion on dead weight and spill over effects, specifically geared towards employment programs, is found in Hietala (1997).

¹⁷ A basic definition of a model is that it is nothing else than a simplistic representation of the world, by using several variables in either numeric (continuous) or non-numeric (categorical) format (In practice categorical variables are also converted into numeric format).

The basic approach is to create a model in the form of a so called “*structural equation*”: On the left hand side of the equation is the indicator (the dependent variable) we want to measure as impact. On the right side are variables (independent variables) which we believe are relevant to our study (we believe influence the dependent variable). Of course in most cases we are really interested in the effects of one of the independent variables listed in the right side of the equation. The other variables are included in the equation (model) for control purposes. Finally we add the error term which includes the differences between the predicted and observed values from our sample as well as all the other variables which may influence the dependent variable but we choose not to account for (or we are not aware of):

Dependent variable = intercept + array (1..n) of control independent variables X their coefficients C(1...n) + independent variable of interest X its coefficient (B) + error term

The whole idea is that, by having a number of observations (i.e. with variables for each firm or industrial sector) and by applying the model for each of these observations, we can measure on average the coefficient B of the independent variable of interest. This B coefficient shows how much the dependent variable would increase or decrease (depending on whether the B's sign is positive (+) or negative (-)) with a respective unit increase of the independent variable, controlling for all other independent variables in the equation.

In building these models efforts are focused on applying methods which would

- (a) ensure (test) that the size of the coefficient of interest is not biased on the upper or the lower side and
- (b) reduce the residual variance (the variance of the error term).

And all this, in order to produce a correct estimate of the real (hopefully causal) relationship existing between the dependent and independent variable of interest.

As one may realise, regression analysis is not exact science in a sense that it would conclusively determine causal relationships; nor can it answer with certainty all the evaluation questions posed. Results and their interpretation depend very much

- on the assumptions that the evaluator (model builder) is making on the data at hand
- on the characteristics of the variables utilised¹⁸
- on whether the sample analysed is representative of the true population of interest
- on whether there are enough observations in the sample for a robust model with enough statistical power
- on whether the variables chosen in the model form a logical group which is theoretically valid
- on whether the model is incorporating dynamic effects (i.e. of subsidies) or it is static and so on.

¹⁸ For example, are the variables normally distributed, do they need to be transformed, are they correlated with each other and with the error term, etc. Indeed, these models also depend on whether in the equation we include categorical or continuous variables (as dependent or independent or both), whether we control for interactions among them, and on many other considerations. The more exact we want to be in our estimates, the more complex the model becomes. And then the question of how parsimonious we want to be comes into the scene.

In addition, results on net impacts (measured through the size and sign of the B coefficient) are also affected on whether the counterfactual measurements are included in the model¹⁹.

On the other hand, if the method is used correctly (the regression models are correctly specified and tested) it can indeed isolate the effects of the variable of interest (i.e. of the subsidy amount given), and the evaluator can get a fairly good idea on the situation under examination, on causal relationships and on net impacts achieved.

¹⁹ For example, if we measure the impact of subsidies on employment growth in subsidised firms we should include in the calculations the employment growth of similar non-subsidised firms (see discussion in previous section).

4. Discussion and recommendations²⁰

One aim of this paper was to test the hypothesis that the methods utilised in gathering and analysing data on the impacts of business subsidy programs played a role in the results produced. Indeed our analysis of evaluation studies carried out in Finland and in other countries seemed to confirm this hypothesis. Most of the studies surveyed produced positive results when they utilised primary data (estimates on impacts directly from the subsidised firms). In this approach, we identified two problems, the dependency and the counterfactual problem. On the other hand, the results of studies which utilised secondary data were more on the negative side.

In addition, we found that results were associated not only with the method of gathering and analysing data but also with the commissioning organisation of the study. Evaluation studies commissioned by the agencies which themselves distributed subsidies, seemed to produce more favourable results than studies conducted independently by “outside” organisations/research institutes.

As to the *methods* themselves applied, again we noticed that quantitative (econometric) methods produced more balanced results and indeed more on the negative side than the qualitative ones.

Which methods are more appropriate for the evaluation of business subsidy programs is the subject of the rest of the section.

4.1 The type of evaluation studies

Till now we have centred our discussion on evaluation methods. However, we eventually also need to refer to the evaluation studies themselves in which these methods are implemented. Why? Because different methods are used in gathering and analysing data (i.e. for an ex ante evaluation and for ex nunc or ex post evaluations). Hence, here we put emphasis on certain *types* of evaluation studies.

Consider an “ideal” 3X3 implementation grid²¹ (Figure 1), where different types of evaluations are conducted based on the relevant time perspective and the level where the evaluation is implemented.

Figure 1. The implementation of evaluation studies based on time perspective and examined level

Level/Time perspective	EX ANTE	EX NUNC	EX POST
Policy	↓		↑
Program	↓		↑
Firm	⇒⇒⇒⇒	⇒⇒⇒⇒	⇒⇒⇒⇒

²⁰ The recommendations mentioned in this section are primarily geared to assist the evaluation practices of the KTM. However, they could potentially apply to other agencies and ministries involved in the distribution of business subsidies to firms.

²¹ Such a grid was discussed recently in the KTM working group.

The flow of information from these evaluation studies is at the beginning (ex ante) stages, top \Rightarrow bottom. As the implementation phase proceeds and subsidies are distributed to firms, the information flow reverses direction and becomes bottom \Rightarrow up.

Ex ante versus ex nunc and ex post evaluations

More emphasis should be on ex nunc and, even more so, on ex post evaluation methods and studies. In essence, the emphasis should be on their *impact* aspects. Why not ex ante evaluation? This type of evaluation is useful in order to *control* the government agency²², as well as *assist* it in putting into perspective the different goals that the agency attempts to achieve with this program, *before* the program is actually implemented. However, this whole ex ante exercise is *speculative* since one can not foresee the future.

In comparison, ex nunc and ex post evaluation should indeed be able to measure the real impacts against the designed ones, give judgements on their worth and incorporate the knowledge gathered for the next similar program. This is where most of their value lays. Furthermore, when ex ante evaluation is implemented at program and policy level, it is done once, unlike ex nunc and ex post evaluations that are done on more frequent intervals.

Is there a case where ex ante evaluation is to be considered in more detail? Yes, it is in the decision making phase of subsidy applications. Before final decisions are made to grant or not funds, financial models should be used to forecast the estimated net returns of the investment.

Optimisation methods should be applied in estimating the best possible amount of subsidies needed for the particular firm, for the particular project, taking under consideration the financial position of the firm, the other sources of finance available to the firm and what ever other constraints the firm faces in its operations²³. This approach may not guarantee perfect allocation of tax payers' moneys but at least may identify which firms can finance projects without subsidies, but nevertheless, still apply for funds since they fulfil the minimum criteria required by law.

Recommendations

- Based on Figure 1, the KTM should thus shift its resources on ex nunc and ex post evaluation methods and studies when it *itself is conducting* them. The ministry should also concentrate on evaluations at *firm level*, since it is the most competent organisation to do so, due to the easy data access capabilities it has with its databases. Other advantages from internal evaluations are cost savings, and quickness in producing results.
- Furthermore, it is imperative that when evaluations are conducted within the KTM, different departments are to be responsible for evaluating other departments' activities. This may give some protection from possible biased results which could appear if the same personnel evaluate their own activities.
- Finally, if external evaluators are commissioned, conditions discouraging the "master-servant" syndrome discussed in section 2.3 are to be created.

²² The government agency responsible for the design and implementation of the business subsidy policy.

²³ For a good example of such a model, see Honohan, (1998).

In what follows, there are a few recommendations on the different methods suitable for evaluating business subsidy programs. In essence all previously mentioned methods are suitable. However, we may have to clarify which methods are to be *acceptable* and *applicable* by the KTM. Here we also have to think of the constraints and obligations that the KTM faces. As before, the same dichotomous approach is followed, methods for gathering data followed by methods for analysing data.

4.2 Methods in gathering data

Recommendations

- All types of data regarding the development and operations of firms should be gathered directly from firms in as frequent time intervals as possible. Financial statements (balance sheet and profit & loss) as well as other, more detailed, information is welcome (i.e. amount of personnel, exports as % of sales, R&D expenditures, etc). This data should be gathered not only for recipient firms also but for those, whose applications have been rejected and for non-recipient ones as well (see below control groups).
- *Estimations* of subsidy impacts should *not* be asked directly from the recipient firms of subsidies (neither from the non-recipients for that matter).
- Also, control group of firms (based on the subsidised firms' industrial sector, geographical location, operating markets, size, etc.) should be created and monitored. That could be achieved with the co-operation of other state organisations (i.e. Statistics Finland). The dissemination of firm financial statements among the interested parties in a standardised format will definitely help the process.
- Gathering methods based on guidelines by the European Commission can not but continue, but one should insure that correct and unbiased data is indeed collected.

4.3 Methods in analysing data

Recommendations

- If we first look at the evaluations done within the KTM one can easily suggest descriptive analyses which simply calculate differences of indicators between time periods in specific sub-groups of firms (i.e. recipient and non-recipient of subsidies). Although this may not completely isolate the net impact of the subsidies given, it can give some indication on certain trends. This evaluation method is described in more detail in the MEANS guide (EC, 1999a, pp. 89-93) under the name "Shift share analysis".
- Other types of descriptive methods should comply with the reporting requirements of the European Commission.
- The KTM should continue to commission ad hoc evaluations as the practice has been till now. Whether these evaluation include input-output models, geographical information systems, advanced regression models, or other econometric and statistical techniques this is for the ministry to decide. One needs to keep in mind though, the assumptions of each method and the limitations under which it is implemented.
- The KTM should also look into cost benefit and cost effectiveness analyses in its programs because even advanced quantitative evaluation methods can not give but a single measurement of impact. These methods should be applied both in the selection and decision phase of the applications handling (ex ante –see section 4.1) as well as in an ex post evaluation context. In other words, if one wants to examine whether the size

of the impact is acceptable or not, he has, not only to calculate the net impact but also the other benefits and costs associated with it.

- Finally, the KTM could take advantage of the data already stored in its databases. It could for instance, examine the operations of its units internally, in more detail, by using relevant indicators as measures of effectiveness and efficiency.

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Appendix

Thematic Evaluation of Structural Fund impacts on SMEs

The study was carried out by the consulting firm Ernst and Young between 1998-1999. The aims of the evaluation were (a) to provide a thorough and systematic analysis of the contribution and impact of Structural Funds support to SMEs and (b) to draw up recommendations for future investment by Structural Funds in support of SMEs in the assisted regions based on the experience of past and current interventions.

If we use the same classification as for the Finnish evaluation studies (Table 1), we can see that the level of potential impacts was examined both at regional/national level (overall) and at firm level (in depth). Interviews (IQ - telephone surveys) were used to gather estimates of impacts from firms (SMEs) which received business subsidies between 1996-1998 (805 firms) but also from non-subsidised firms (267 - 68 firms whose application was rejected, 199 firms never applied). The firms were located in 14 EU - countries, including Finland. In each country a sub contractor was hired to carry out the study, but Ernst and Young kept the overall responsibility of the study. The business subsidies offered, included both direct transfers and advisory services. In addition, 90 case studies based on projects assisted with Structural Funds were reported. These projects were selected from 26 regions around Europe.

The report gathered the responses of the firms through questions, which referred among others (a) to the importance of the Structural Funds' assistance on the SMEs' development and (b) to the impact of the Structural Funds' assistance on the SMEs' performance and growth prospects. As mentioned above feedback through interviews was sought from non-subsidised firms as well.

When the evaluation dealt with the impacts on the SMEs' development, the method applied was to gather the responses of recipient firms through a list of questions with predefined answers. Attempts were made to measure the concepts of additionality and dead weight. The responses were then analysed and reported descriptively. Examples of these responses follow.

- Project would not have proceeded at all without the assistance (absolute additionality)
- Project would have gone ahead without Structural Funds assistance, but would have been delayed and/or only gone ahead on a modified basis (partial additionality)
- Structural Funds aid made no difference to the SME's plans and the firms would have proceeded with the project anyway (dead weight).

When the evaluation attempted to measure the impact of Structural Funds on the SMEs' performance and growth, two separate methods were used to gather and analyse data. The first was based on the firm's own estimate of the impacts on new jobs created and on the percentage increase of firm turnover. The second was based on a before-and-after gathering of employment levels in assisted firms. In the latter case, respective levels of employment levels were gathered from non-assisted firms as well. In the analysis of the data, these two sets of employment levels were compared to each other and the net differences were simply calculated.

In general, the results indicated a positive impact (+) of the Structural Funds interventions. The study reported that

“..overall it is clear that Structural Fund interventions have had a significant impact on the SME sector and have made an important contribution to wider regional aim ...during the 1994-1999 period, around 2 million net jobs were created or saved as a result of Structural Fund assistance to SMEs ...in the absence of Structural Fund assistance, 70% of SMEs said they would not have gone ahead with their project or that it would have been delayed/modified”(p. 159).

Nevertheless, one can not but alert the reader of the weaknesses²⁴ of the data gathering methods in the study. For now it would suffice to quote some parts *in the study itself* which more or less acknowledge these problems.

“Relying on beneficiary feedback to assess the extent of additionality demonstrated by Structural Funds interventions in favour of SMEs is clearly not ideal from a methodological point of view. ...firms that claimed that the assistance was fully additional could clearly be influenced by an intention to apply for further aid. ...drawbacks of a survey-based approach to assessing additionality are well known²⁵ but equally, alternative (econometric) methods are not always possible to apply and would have not been so in this study” (p. 131).

“Employment levels in assisted SMEs would appear to have increased at a faster rate than non-assisted firms – a average of over four new jobs being created or saved by SMEs that received Structural Fund assistance compared with three in the non-assisted businesses. These comparison should, however, be treated with caution since the difference between the rates of job creation could reflect other causal factors such as some Structural Fund schemes being targeted on high growth firms” (p. 136).

“Considerable caution should be exercised in comparing the survey data for assisted and non-assisted SMEs. Whilst an effort was made to create a sample of non-assisted SMEs with broadly similar characteristics to the assisted firms, it was not possible to adopt a classic experimental approach, i.e. random selection of treatment and control groups prior to intervention taking place. Also, the sample of non-assisted SMEs is relatively small. For these and other reasons, only broad comparisons can be made between the findings for assisted and non-assisted SMEs in the sample” (p. 138).

²⁴ These weaknesses are discussed in more detail in section 3.1.

²⁵ The report cites McEldowney (1997) for additional information on methods applied in measuring additionality and dead weight