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Takis Venetoklis

**BUSINESS SUBSIDIES AND  
BUREAUCRATIC BEHAVIOUR**

**A REVISED APPROACH**

Valtion taloudellinen tutkimuskeskus  
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**Abstract:** This dissertation is a collection of three studies whose central theme is the business subsidies policy implemented in Finland during the 1990s by the ministry of Trade and Industry (KTM). The purpose is to examine whether the policy is effective and at the same time explain the rationale behind it.

The first study measures econometrically the impact of business subsidies on the growth of value added of firms. The results indicate that the impact is positive but extremely low considering the amount of subsidies spent. This in turn raises questions on the effectiveness of the business subsidies policy currently in force.

The second study surveys other evaluation studies of business subsidies that were conducted in Finland and abroad. The methods found in the surveyed studies are associated with the results produced. When primary data are utilised (estimates of impacts are taken directly from the subsidised firms) the results are positive. On the contrary, when secondary data are used to measure impact and scientific methods are applied, the results lean more on the negative side.

If impact studies on business subsidies suggest ineffectiveness why is such policy still adopted? The third study attempts to answer this question by approaching the problem not from the demand side (the recipient firms) but from the supply side (the organisation designing and distributing the subsidies to firms). It tests whether the behaviour of the KTM's civil servants, when distributing business subsidies to firms, is in line with William Niskanen's (1971) bureau budget maximising theory. The empirical results support the theory on some accounts.

**Key words:** Business subsidies, bureaucratic behaviour, budget maximisation, evaluation methods, value added growth

**Tiivistelmä:** Tässä väitöskirjassa on koottu yhteen kolme tutkimusta, joissa keskeisenä aiheena on kauppa- ja teollisuusministeriön (KTM) 1990-luvulla toteuttama yritystukipolitiikka Suomessa. Tarkoituksena on tutkia, onko yritystukipolitiikka ollut tehokasta ja samalla selittää sen taustalla olevat perustelut.

Ensimmäisessä tutkimuksessa mitataan yritystukien vaikutusta yritysten arvonlisäyksen kasvuun. Tulokset osoittavat, että vaikutus on positiivinen mutta erittäin pieni käytettyihin tukimääriin verrattuna. Tämä puolestaan herättää käytössä olevan yritystukipolitiikan tehokkuuteen liittyviä kysymyksiä.

Toinen tutkimus on katsaus muihin Suomessa ja ulkomailla yritystuen arvioinnista tehtyihin tutkimuksiin. Tarkastelluissa tutkimuksissa havaituilla menetelmillä on yhteys saatuihin tuloksiin. Käytettäessä primääriaineistoa (vaikutusarviot on saatu suoraan tukea saaneilta yrityksiltä) tulokset ovat positiiviset. Sitä vastoin käytettäessä vaikutusten mittaamiseen sekundääriaineistoa ja tieteellisiä menetelmiä, tulokset kallistuvat enemmän negatiiviselle puolelle.

Jos yritystuen vaikuttavuus näyttää olevan tehotonta, miksi yritystukipolitiikkaa silti käytetään? Kolmas tutkimus pyrkii vastaamaan tähän kysymykseen lähestymällä ongelmaa ei niinkään kysyntäpuolelta (tukea saavat yritykset) kuin tarjontapuolelta (organisaatio, joka suunnittelee ja jakaa tukia yrityksille). Siinä testataan, onko KTM:n virkamiehistön käyttäytyminen sen jakaessa elinkeinotukia yrityksille yhdenmukainen William Niskasen (1971) virastojen budjettimaksimointia koskevan teorian kanssa. Empiiriset tulokset antavat jossain määrin tukea tälle teorialle.

**Asiasanat:** Arviointimenetelmät, arvonlisäyksen kasvu, budjetin maksimointi, virkamiesten käyttäytyminen, yritystuet



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- [1] Takis Venetoklis (2000). *Impact of business subsidies on growth of firms*. Government Institute for Economic Research – VATT, discussion papers, No. 220, Helsinki (revised).
- [2] Takis Venetoklis (2000). *Methods applied in evaluating business subsidy programs: A survey*. Government Institute for Economic Research – VATT, discussion papers, No. 236, Helsinki (revised).
- [3] Takis Venetoklis (2001). *Business subsidies and bureaucratic behaviour*. Government Institute for Economic Research – VATT, research reports, No. 79, Helsinki (revised).



## Acknowledgements

This dissertation is the product of four and half years of labour. Now that I see this effort coming to the much desired result, I have the need to look back and thank the people that played a key role in bringing the process to this stage.

I first met my opponent, Professor Evert Vedung at a two-day public policy evaluation seminar he gave at the University of Tampere during the spring of 1999. I immediately realised that I had much to gain from his expertise. I owe a great deal to Evert because he responded always positively to my requests. Since that seminar he has followed closely my work and has suggested in different occasions key ideas on how to proceed. The last few months he operated as my pre-examiner as well. In that capacity he has challenged me immensely. Initially I disagreed with some of his comments. However, now I realise that by rewriting on certain methodological issues, the relevant sections became clearer and hopefully the dissertation's scientific value was raised. Evert has told me that first of all he is an educator, a tutor; I believe that he fits the role perfectly.

I happen to know my other pre-examiner also from the past. Professor Paavo Okko was my boss between 1996-1997, during my second tenure as a researcher at the Institute for European Studies in Turku. Paavo may have not realised this, but he was instrumental in my developing preliminary ideas for this dissertation. In 1996 he arranged financing for me to conduct a pilot research project whose purpose was to examine firms that received subsidies from the KTM. I was fortunate in that both Paavo and I live in Turku. This made it much easier for us to meet during the pre-examining period, discuss all the changes that he and Evert suggested and debate face to face on matters that I had a somewhat different opinion. Paavo gave important feedback on what I was supposed to focus upon. His previous research experience on business subsidies proved for me an invaluable asset.

I would also like to thank my first supervisor, Professor Pertti Ahonen. I owe gratitude to Pertti, not only because he accepted me in the department of Administrative Science, but also because he supported my application to the VALHAL doctorate programme, and at the same time he arranged for me to conduct the research at the premises of VATT. Pertti encouraged me to push forward, and he was the one behind my receipt of the Licentiate degree. This was a very important first step, a concrete return which gave me a much needed courage to continue.

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I started working in VATT in December of 1997. Immediately I realised of the vast human and technological resources this research institution possessed. During my stay in VATT I have had the chance to co-operate with brilliant scientific minds in public policy, economics and econometrics; their contribution to my thesis was most crucial. I would thus like to thank Dr. Reino Hjerppe, Director General at VATT for accepting me in the organisation and giving me full access to all these resources.

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I wrote in my Licentiate thesis in 1999 that I have made only friends in VATT. Today, more than two years later, I feel even more so and want to thank some of my colleagues for their assistance. Outi Kröger, Senior Researcher, provided some of the databases which I initially worked with, and was a key person in getting more data-years from the Taxation Authorities later on. In addition, Outi together with Lea Schendo, Departmental Secretary, solved on my behalf in 1998 a crucial bureaucratic obstacle and this permitted me

to continue in VATT; likko Voipio, Development Director did the same a couple of years later. Also, likko together with Teuvo Junka, Senior Researcher were always available to discuss parts of my dissertation or translate into Finnish whatever I requested from them. Raimo Hintikka, Head of IT department and Timo Pessi, IT specialist have been the invisible backbone of my dissertation. Had I not had their immediate and continuous support in terms of software and hardware, this work would have probably taken much longer to complete. Helinä Silén, Publications Secretary, arranged as always for the effortless and prompt printing of the dissertation.

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When I think back of how this all started, it seems I became a researcher entirely by accident. It was September of 1991 and I was looking for a place to work temporarily in order to get some 'job training'. I was thus sent to the Institute for European Studies in Turku where Professor Esko Antola was its director. He was the first to give me the opportunity to work in the research field and repeatedly told me that I should aim for a higher academic degree. I am grateful to Esko and I now realise how right he was.

It's time to thank a couple of close friends. Kari Karppinen, MBA, always encouraged me. He frequently said that I do not realise "what it means to be a PhD". I think *he* has achieved much more, and that, in a fiercely competitive and uncertain environment; Kari owns an SME. His firm would have been a 'positive outlier' in my firm sample distribution, since it is a recipient of business subsidies that actually performs *much better* than the average. With George Nikolakaras, MD we spent many hours discussing database handling and model building. I first taught him some basics but soon after, he became *my* tutor.

Finally, I would like to mention a few words about my family. I grew up in an environment where hard work and pursuit of professional and academic excellence have always been valued. My utmost gratitude go to my mother, Stavroula Natsinas, my father Dimitris Venetoklis and my late step father General Alexandros Natsinas for giving me directly or indirectly all those basic values that prepared me for this four and half year ordeal.

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What can I say about my children, the suns of my life? When I think of them and the joy they give me, I put things in perspective. Every time I come home from work with worries about this or that, they welcome me with hugs, kisses and smiling faces. This is when I realise that I have really nothing to complain about.

Turku, 21.11.2001

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# **BUSINESS SUBSIDIES AND BUREAUCRATIC BEHAVIOUR**

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**University of Tampere, Department of Administrative Science**

**Summary**



# BUSINESS SUBSIDIES AND BUREAUCRATIC BEHAVIOUR

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## Summary

### Introduction and purpose of the dissertation

This dissertation has as its central theme the business subsidy policy implemented in Finland during the 1990s by the ministry of Trade and Industry (KTM). The KTM happens to be the major distributor of subsidies to firms in the country with over 50% of all subsidy appropriations distributed through its units.

Business subsidies are a very important tool of government intervention since they are supposed to assist unbalanced markets in returning to equilibrium conditions and are ideally used to correct market failures. Through the distribution of subsidies the government fulfils some of the traditional roles it plays in society, namely distributional, allocative and that of a stabilising force (Musgrave & Musgrave (1986, pp.6-13)).

Excluding those to the agricultural sector, business subsidies appropriations in Finland are in their majority absorbed by firms in the manufacturing sector. Their share of the yearly governmental budgeted expenditures is less than 0.9 percent, where as the respective average in the EU is 2.3 percent. The same case seems to be when subsidies are matched against the GDP. Finland has the lowest ratio of approximately half of a percent of its GDP, where as the average in all EU member states is more than double, at 1.1 percent (Table 1).

**Table 1.** Overall subsidies\* in the EU Member States as % of GDP and relative to government expenditure

	Subsidies as % of GDP**	Subsidies as % of Government Expenditure**
Austria	0,65	1,23
Belgium	1,18	2,26
Denmark	0,94	1,59
Germany	1,45	2,95
Greece	1,24	2,25
Spain	0,98	2,22
Finland	0,47	0,85
France	1,13	2,08
Ireland	0,99	2,66
Italy	1,57	3,04
Luxembourg	0,53	1,27
Netherlands	0,62	1,24
Portugal	1,63	3,44
Sweden	0,78	1,24
UK	0,52	1,20
EUR 15	1,12	2,35

Source: EC (2000, p. 54.)

\* Agriculture produce subsidies not included

\*\* Average for the period 1996-1998 in 1997 prices

However, it is well accepted there are problems arising from such subsidy policies for two main reasons. One is that these policies can create conditions of unfair competition when certain firms receive subsidies versus others that do not. Second, the recipients of subsidies run the risk of diverting into non-productive activities, thereby operating in a rent seeking environment and hence wasting society's resources.

The dissertation does not examine the topic from the legal (unfair competition) point of view but concentrates on the recipient firms and on one of the organisations that distribute subsidies to them, the KTM. A careful examination of the process through which business subsidies are distributed reveals that there is always room for improvement of the system. In a study by Venetoklis (1999), it was found that firms receiving subsidies through the KTM, did not differ significantly from the ones that did not and that a factor which played a significant role on whether a firm was to receive aid or not was the firm analyst who handled the application in question. Furthermore it was noted that the criteria used in assessing an application for aid differed significantly from regional office to regional office although in theory firms applying for aid were in the

same industrial sector, their investment projects were similar and they operated in regions whose socio economic conditions were alike (industrially declining with growing unemployment).

The aforementioned results indicated a need to look into the whole subsidies system in more detail. Hence the purpose of this dissertation was to examine whether the current business subsidies policy in Finland is effective and at the same time explain the rationale behind it.

The dissertation is composed of three studies. The first study titled "Impact of Business Subsidies on Growth of Firms – Preliminary Evidence from Finnish Panel Data", hereafter [1], measures econometrically the impact of business subsidies on the Value Added growth of firms. The second study titled "Methods Evaluating Business Subsidy Programs: A Survey", hereafter [2], is a literature review of 27 impact studies on business subsidy programs. It classifies and analyses them based on characteristics of the evaluation methods they apply. The third study titled "Business Subsidies and Bureaucratic Behaviour", hereafter [3], lends its title to the whole dissertation. It attempts to explain the whole business subsidies policy not from the demand side (the recipient firms) but from the supply side; that is, it examines the behaviour of an organisation designing and implementing (distributing) the subsidies to firms, in our case the KTM. The study tests whether the behaviour of the KTM's bureaucrats, when distributing business subsidies to firms, supports William Niskanen's (1971) budget maximisation theory.

The logo of a known journal on Administrative Science reads "Dedicated to advancing the understanding of administration through empirical investigation and theoretical analysis". According to the journal's editors this statement contains three components that affect editorial decisions. (Studies) should (a) advance understanding, (b) address administration matters and (c) have mutual relevance for empirical investigation and theoretical analysis.

Using the above criteria, we believe that this dissertation contributes positively to the administrative research in three ways. First, the dissertation advances the understanding of the business subsidy policies adopted in Finland through positive and normative analysis. All three studies describe and analyse empirically different aspects of business subsidies policies in Finland. If a policy decision maker takes into account the results generated from the empirical analysis, the understanding of how a policy is implemented increases and hopefully any flaws found are then corrected. At the end of studies [2] and [3] there is a section with recommendations on how to improve the evaluation and implementation of the business subsidy programs in Finland.

Second, the presentation of the research methods themselves is important. We have noticed that the utilisation of such methods is still not extensive (at least for business subsidy programs). Hence, it is beneficial for the policy decision maker, the policy planner and the policy implementer to be aware of the different methodological tools with which one can conduct policy analysis. However, no method for policy analysis is flawless. The awareness of such statement, prompted us to include in each paper a section that lists some considerations and limitations in the relevant analyses. This will hopefully give a balanced approach as to what are the most appropriate methods in analysing business subsidy programs.

Finally, although Niskanen presented his budget maximising bureaucrat arguments almost thirty years ago, they are still relevant even today. To our knowledge no study in the past has attempted to analyse and explain the business subsidy programs in Finland utilising Niskanen's theory. In that respect the third contribution of the dissertation is that it tests empirically a well known theory for the first time.

The three studies can be read independently. However, there are obvious links among them since they examine the same topic from different angles. Inevitably certain sections overlap. One can thus interpret studies [1] and [2] also as feeds to study [3]. Table 2 lists the sections in each study and what they refer to.

**Table 2.** Sections of three studies on business subsidies and how they overlap

Material discussed/Sections in study	[1]	[2]	[3]
General information of business subsidies in Finland and elsewhere	1	1	1, 2.3, 2.4
Theoretical aspects on business subsidies			2.1, 2.2
Literature review on business subsidies	1	2.1, 2.2	2.5
Public Choice and Niskanen's model			3.1, 3.2
Literature review on Niskanen's model			3.3
Adaptation of Niskanen's model to the KTM's business subsidy policy			4
Description of data and analysis	2, 3	2.3, 3	4.1- 4.4
Discussion, limitations, conclusions and recommendations	4	4	5

### [1] Do subsidies have any impact on the recipient firms?

The examination of the effectiveness of the business subsidies is found in [1]. The impact of business subsidies on recipient and non-recipient firms during a short three year period, 1995-1997 was measured. The effectiveness indicator used was the Value Added growth of firms over the aforementioned period. The subsidies whose impact was analysed were distributed from the KTM, the National Technology Agency (TEKES), the ministry of Labour (TM) and the ministry of Agriculture (MMM). Approximately 36 000 firms were analysed, 35% of which received direct subsidies from one or more of the previously mentioned organisations. Several models were built, and Ordinary Least Square (OLS) as well as Two Stage Least Squares (2SLS) regressions were run.

The Value Added growth ( $\Delta VA$ ) of the firm was used as a dependent variable for two reasons. One was the *plethora* of different subsidies distributed to firms and the many sources of organisations (four) distributing subsidies. In the sample analysed there were literally hundreds of types of subsidies given for different purposes. It was thus assumed that Value Added growth can be accepted as a universal goal of subsidies, since it can easily be a direct or indirect consequence of subsidies' distribution. Second, the selection was prompted by the European Commission's suggestion (EU, 1999) in using a firm's Value Added growth as an indicator when evaluating the impact of the EU's structural financing on recipient firms.

Existing data on fixed capital, labour input, business subsidies and some other firm characteristics were also utilised to build these models. The growth of the firm's Tangible Assets ( $\Delta TA$ ) was chosen to represent fixed capital and the growth of the firm's Personnel ( $\Delta PE$ ) to represent labour input. These two independent variables together with the subsidy amounts (S) and other firms characteristics (an array of Z characteristics: Location, Industrial Code, Legal Status) were placed on the right side of the equation. Assuming that the equation referred to a production function of a Cobb-Douglas type, the final model equation in log-linear format was

$$\Delta VA = \beta \Delta TA + \gamma \Delta PE + \delta S + \varepsilon Z \text{ where } \beta, \gamma, \delta, \varepsilon \text{ are the parameters estimated}$$

The models built were both at aggregate level (all firms irrespective of source of aid were included) and at disaggregate level (firms were classified based on the organisation through which they received aid). The results indicated that in some cases there was a positive relationship between the firms' Value Added growth and the amount of subsidies received.

Nevertheless, although its sign was positive, in only a few models did the coefficient of the independent subsidies variable turn out significant when the Value Added growth was regressed against it. And even then, its magnitude was so small that the estimated influence of the received subsidies on the Value Added growth of firms was minuscule. To give just one example, in firms whose projects were partly-financed through the KTM, their "return" on subsidies received was 0,86. In other words, strictly based on the limitations and the restrictions of our models, the Value Added growth of these firms generated from receiving these subsidies covered only 86% of the initial subsidies receipts.

It is important to keep in mind that there may have been many other reasons because of which Value Added growth did not increase to such degree as to cover the subsidies given to these firms. The most reasonable argument could be that the impacts of subsidies are lagging and would only surface after a certain period after the utilisation of subsidies. This could be indeed the case here especially because the period examined was short (3 years). However in a similar study where the period examined was longer (Bergström, 1998), it was found that after the third year of the subsidy receipt, the coefficient of the subsidy variable turned negative.

## [2] Literature review and analysis of previous studies on business subsidies

In [2], impact studies of business subsidy programs conducted in Finland and abroad were surveyed. Twenty seven studies were analysed; 18 using Finnish data and 9 data from other countries. The aim was to assess the evaluation methods applied in those studies and recommend the most appropriate ones applicable in Finland. The main hypothesis was that the methods utilised in an evaluation study may play a role in the results reported. The studies were classified using the following characteristics:

**Table 3.** Classification characteristics of evaluation studies

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**Commissioned/Conducted by**

Ministry / Research organisation (Commissioned), Conducted independently by research organisation (Own)

**The level of (potential) impacts at**

Firm level (micro – In depth), regional/national level (macro – Overall)

**Types of subsidies in question**

Direct transfer of moneys, Interest subsidised loans, Guarantees, Advisory services

**Perspective**

Ex ante, Ex nunc (on going), Ex post

**The method of gathering the data for analysis**

*For primary data*

Interviews / Questionnaires with parties receiving aid and/or with other parties directly/indirectly involved in the process of subsidy planning/distribution

*For secondary data*

Other documentation, Financial Statements, Project data, Socio-economic indicators, Case studies

**Counterfactual measurement**

Based on data (estimates) from firms (primary data), Based on data (no estimates) from non-subsidised firms (secondary data), No measurement, N/a

**The method applied in analysing the data**

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), GLS (Generalised Least Squares), DID (Difference in Differences), WLS (Weighted Least Squares), Logit, Probit, Logistic

**Evaluation results (general consensus of the study)**

Positive (+), Negative (-), Mixed, rather positive (+/-), Mixed, rather negative (-/+)

**Overall classification**

Positive (for +, +/-), Negative (for -, -/+)

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Certain of the aforementioned characteristics were cross-tabulated. For example, as shown in Table 4 one notices certain trends in the methods used vis-à-vis the results. The most obvious ones are that there were *only* positive results, when the counterfactual was estimated by the firms or not estimated at all<sup>1</sup>; and that, regardless of who commissioned the study or what type of analysis was applied. Studies commissioned by ministries basically used descriptive evaluation methods and produce positive results; on the other hand, studies carried out by non-commissioned evaluators, used econometric/statistical methods (to be precise, they use *both* – econometric and descriptive) and their results are more on the negative side. In other words, it was found that the evaluation methods utilised were indeed associated with the results reported. Also an important observation was that the commissioning organisation seemed to play a role in the results reported.

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<sup>1</sup> The notion of the counterfactual is of paramount importance when conducting impact evaluations on business subsidy programs. The counterfactual simply represents an estimate of the “policy-off” condition; that is what would have been the impact on the indicator under scrutiny had the policy intervention *not* taken place.

**Table 4.** Counterfactual by Commissioned by Analysis by Result

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

### [3] Explaining the links between business subsidy policies and bureaucratic behaviour

Study [3] examined the business subsidy policies not from the demand size of subsidies (at firm level) as the case had been with [1] and [2], but from the supply side. That is, we focused upon the behaviour of the distributors of aid to firms, which in this case was the KTM. The supply side approach was triggered from the fact that it was not possible to explain adequately the following. In the empirical study [1] it was noted that the impact of business subsidy programs was, although positive, minimal considering the amount of funds invested. In most cases the programmes did not even generate (in the form of Value Added growth) the initial subsidy appropriations allocated. Furthermore the literature review conducted in [2] and the subsequent analysis of studies on business subsidy impacts indicated that in most cases, direct subsidies to firms produced rather poor impacts. Nevertheless, these results did not represent all the studies reviewed. Pessimistic impacts were reported in studies *not* commissioned by the evaluated organisations. In addition, those studies in general applied scientific methods of analysis. On the contrary, studies commissioned by the *same* organisations whose programmes were evaluated produced results more positive. However, the methods utilised in those latter studies suffered from validity problems.

The purpose of any utilitarian government is to design and implement programs that maximise society's welfare. But, if empirical scientific studies show minimal impacts, why are direct subsidy programs to firms still operating? Wouldn't these programs' appropriations constitute waste of society's resources? Could it be that were they to be used in a different context (either in connection to firms or not) they would probably have reduced these inefficiencies?

It was thus hypothesised that at least one reason for the perpetuation of these programs was the *influence* generated by the behaviour of the bureaucrats designing and implementing them. For a base, the theory of Public Choice was used. This theory basically says that all individuals regardless of whether they are in the public or the private sector, have a set of preferences which they attempt to satisfy and maximise at all times. In the public sector this personal utility function could be satisfied indirectly from the maximisation of the organisation's budget. William Niskanen first discussed this theory in his seminal paper "Bureaucracy and representative government" (1971). Bureaucrats, he argued, can not participate directly in their organisation's successes and potential profit distribution as may be the case with a respective employee in a private organisation. On the other hand they could satisfy their personal utility function indirectly, through higher status, prestige, power, more personnel, travel, etc. And this they could achieve through maximising their bureau's budget.

In Niskanen's theory, there are two actors involved in the process of budget formulation and negotiations: the bureau (the organisation receiving the appropriations) and the sponsor (the organisation granting the budgeted appropriations to the bureau). In addition, he imposes certain assumptions for the theory to work.

First, there is *information asymmetry* between the sponsor and the bureau, in that the bureau knows the real costs of its services but the sponsor can only rely on the budget claims by the bureau. Second, the relationship between the sponsor and the bureau is that of bilateral *monopoly*; the services requested by the sponsor can only be provided by the bureau and the bureau can sell its services only to the sponsor. Third the sponsor is *passive* and accepts non objectively the budgetary appropriation requests by the bureau. And fourth, bureaucrats have as their main goal to *maximise* their bureau's budget since, as mentioned above, their own utility function is a positive monotonic function of the size of the bureau's budget.

#### **Adapting Niskanen's theory to the KTM business subsidies policy**

In testing Niskanen's theory, we examined whether all the four aforementioned assumptions were relevant and applicable within the context of the KTM's business subsidies policy.

**Information asymmetry** was found to exist indeed, since the data gathering system and the methods applied thus far in monitoring and evaluating these subsidy programs were insufficient and inadequate to give a clear picture of the true impact of such policies (Hynninen (2000, pp. 207-208), Rautkoski (2000)). The same result could also be concluded from the literature survey conducted in [2].

**Bilateral monopoly** was also evident since the KTM is the only organisation offering these specific services (specific type of direct subsidies to a specific type of firms (e.g. fixed asset purchases for manufacturing firms



in industrial declining regions) and the Ministry of Finance (VM) is the only organisation buying them<sup>2</sup>. However although the theoretical conditions for bilateral monopoly existed, they did not seem to influence negatively the otherwise strong negotiating power of the sponsor (the VM) in the budget negotiations. In other words the “*passive role of the sponsor*” assumption was not supported.

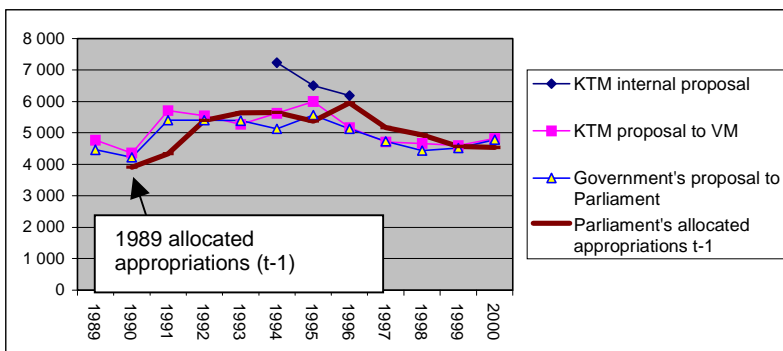
The fourth assumption, the bureaucrat as a *bureau budget maximiser* was examined with two different approaches. With the first, we looked at the budget maximisation *strategies* that KTM bureaucrats, involved in the implementation of business subsidy programmes, utilised in their attempt to maximise their bureau’s (unit’s) budget. With the second we measured whether these strategies were indeed *successful*.

## Budget maximising strategies

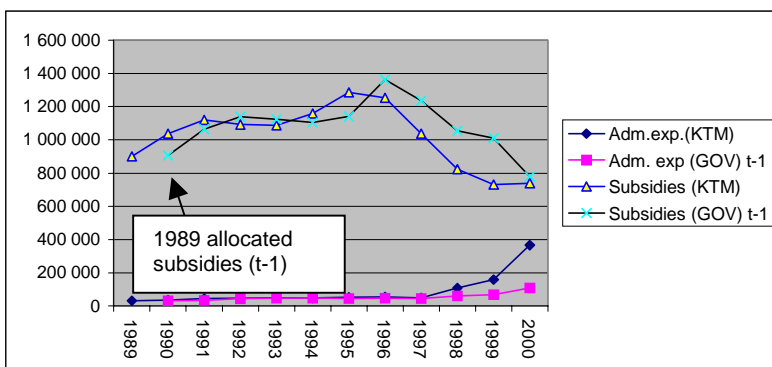
### 1. Requested versus allocated appropriations

Three hypothesised strategies in maximising the budget were tested. In the first, requested appropriations versus allocated appropriations related to business subsidies were compared. The hypothesis was that the KTM officials, in order to maximise their budget would request at least as much as the previous year’s approved appropriations by the sponsor. Several comparisons were made, and the main conclusion was that the KTM does *not* normally request more or even as much appropriations of the previous year during the budget negotiations between itself and the VM. Nevertheless a trend was found supporting the hypothesis when we examined the appropriations requested initially from *within* the KTM by its units. Those requests were indeed higher than the ones approved during the previous year. Figure 1 shows the overall appropriations requested by the KTM matched against the ones approved during year *t-1*. The same is presented in Figure 2, only now the appropriations specifically destined for business subsidies are selected.

**Figure 1.** KTM requested budget appropriations at year *t*, versus allocated appropriations at year *t-1* (1989 – 2000, in FIM 1 000 000)



**Figure 2.** KTM requested subsidy and administration appropriations at year *t*, versus allocated at year *t-1* (1989 – 2000, in FIM 1000)



<sup>2</sup> In Finland business subsidies are diversified/specialised in that different ministries offer different subsidies (e.g. the ministry of Labour distributes employment related subsidies, TEKES distributes R&D related subsidies to technology firms, etc.).

## 2. The “December” syndrome

Examining the second strategy, we looked at the monthly frequencies during which decisions were made by the KTM regional offices (nowadays TE-centres) to reject or approve an application for aid by a firm.

- (1) It was found that during December the amount of decisions made constituted approx. 24% of all decisions made through out the year.
- (2) The success rate during December was higher than the average for all the year (78% to 70%).
- (3) December applications coming from firms applying more than once during the 5-year period examined (1995-1999), had an even higher success rate versus the ones that came from firms which applied once only (81% to 74%).
- (4) As far as subsidy amounts are concerned, the average amount approved on average was FIM 174 000. It was almost twice as high for multi applicant firms than for the ones which applied once only (FIM 202 000 to FIM 120 000). Controlling for the month of decision, in December the approved applications of multi applicant firms received on average FIM 242 000. Even the firms which applied once for aid and their application happened to be approved in December received on average FIM 148 000 which is higher than the average for this sub-group (FIM 120 000)
- (5) The total amount of subsidies shown to have been approved in the sample during the period 1995 to 1999 was FIM 3.2 billion. Of this, FIM 1.04 billion, or almost 33% of all subsidies granted was decided during the five Decembers under examination.

We have named the phenomenon described above, the “December syndrome“. What do these results imply? Officials attempt to *get rid* of the budgeted but still unallocated amounts of grants by the end of the year  $t$ . By doing so they try to avoid getting less funds the following year (in actual terms the year  $t+2$ ) because they were not able to absorb the pre allocated amounts<sup>3</sup>. In other words they pursue a budget maximising strategy.

## 3. Multi recipient firms and “creaming“

In the third budget maximising strategy examined, the data was analysed from a slightly different angle. Where as previously the analysis was conducted on a “per application for aid“ basis, we now examined the data on a “total aid per recipient firm“ basis. We found that firms which received aid more than once through the KTM between 1995 and 1999 got approximately FIM 594 000 whereas the ones which received aid once only got a little less than one fifth or FIM 129 000.

Hence, among others, we tested for significant characteristics of the firms receiving aid more than once versus the ones which received once only. We built and run several logistic regression models<sup>4</sup> utilising the following variables:

### *Dependent variable*

**MULTREC:** binary variable, 0: firm received aid once, 1: firm received aid more than once between 1995-1999

### *Independent variables (all categorical)*

**SIC95AGG:** Standard Industrial Code (SIC) of the firm at 2-digit level (sector)

**LEGATAGG:** Legal type of the firm

**PIIRIAG2:** The TE-centre/KTM regional office in which firm’s applications were handled

**NDECIAGE:** quartiles 25, 50, 75, >75 of firm age *at the time of decision*

<sup>3</sup> As Johnson (1991, pp. 291-292 ) put it “...we have to spend it or return it“; Stiglitz (1986, p. 173) called this phenomenon the “spend-out problem“.

<sup>4</sup> The logistic regression models run were of the format

$\text{Log}(\text{Prob}(\text{event})/\text{Prob}(\text{no event})) = B_0 + B_1X_1 + B_2X_2 + \dots + B_pX_p$ , where

$X_1 \dots X_p$  are the aforementioned independent variables

$B_1 \dots B_p$  are the coefficients of the independent variables estimated from the data

$p$  is the number of independent variables

**event** is that a firm will receive aid more than once (MULTREC=1)

**no event** is that the firm will receive aid once only (MULTREC=0)

**NVA95:** quartiles 25, 50, 75, >75 of Value Added of the firm for 1995

**NDVA97\_5, NDVA97\_6, NDVA96\_5:** quartiles 25, 50, 75, >75 for Value Added growth of the firm between 1995-97, 1996-97 and 1995-96 respectively.

In general, the results of the models indicated that the odds of the firms receiving repeatedly aid from the KTM increased if they were in the Manufacturing sector, their legal status was Ltd (Oy) were older than 7 years and their Value Added growth was positive (versus firms not in these sub-categories). This phenomenon is quite common in public policy implementation theory and is called “creaming”. The public officials, pressed to show positive results on their activities, select recipients who may have more and better chances of achieving the predefined goals of the implemented policy (Lipsky (1980), pp. 107-108). Thus, one may interpret this selective distribution of subsidies as one more strategy by bureaucrats to secure the continuation of subsidy payments and thus maximise the bureau’s budget in the long run.

Nevertheless we would argue, that the distribution of the aid to a certain type of firms does not necessarily maximise society’s welfare. It is not certain that these (better) firms are indeed of real need for such subsidies. Is the found Value Added growth due to the subsidies received or is the decision to give subsidies due to the higher Value Added growth of the firms? If firms have already been growing at a fast rate for some time, they may not be in need of any extra subsidies any more. Their growth could have carried forward regardless of the subsidies given to them. Consequently, these subsidy moneys could have been given to other less fast growing firms to assist them in their growth efforts.

### ***Budget maximising success***

Finally we looked whether the budget maximising bureaucrats were indeed successful in their attempts to maximise their bureau’s budget. Niskanen’s theory would have been clearly supported had we seen increases of subsidies followed by equivalent increases in administrative expenses. Examining for example Figure 2 earlier, one notices that this has not been the case here. On the other hand, the opposite has not happened either. The decreases of subsidies has not been followed by equivalent decreases of administrative expenses. And if we check the ratio of administrative expenses to subsidies distributed, it stays at all times above 3% and in later years even increases. To put it differently, the appropriations that are of most practical importance to bureaucrats have not decreased despite the reduction in activity. One needs to keep in mind that the above is not a causal analysis. We do not have enough observations to run regressions and see for example, the elasticity of administrative expenses in connection to changes in the subsidies distributed.

In the last section of [3] we describe certain measurement (validity) limitations of the study, discuss several other theories on bureaucratic behaviour (i.e. constraints theory - Brown and Jackson (1990, p.203), Wilson (1989, p. 115)) and list some other potential factors that might explain the design and implementation of business subsidy programs (i.e. external and internal pressure groups, median voter and political commitments). The study concludes by recommending further reductions of direct subsidies to firms and these activities to be substituted by advanced advisory services and forgivable loans.

### ***Niskanen’s theory and business subsidies in Finland: An overall assessment***

To recap, in testing Niskanen’s theory we examined whether its four assumptions were relevant within the context of the KTM’s business subsidies policy. Information asymmetry as well as bilateral monopoly were found to exist between the KTM and its sponsor, the VM. However, contrary to Niskanen’s assumption, the VM is active in their between budget negotiations. Frequently the VM is the one that defines the level of many types of appropriations. Testing the potential budget maximising behaviour of the bureaucrats, we noticed that there were attempts to get rid of the unallocated appropriations by year’s end (December syndrome) and to distribute subsidies to better firms (Creaming). Finally, we saw that administrative expenses have stayed flat or even grown in the period examined, regardless of fluctuations of the respective subsidy appropriations. Hence, although budget maximisation has not been achieved, bureaucrats seem to have succeeded in keeping the appropriations of most importance to them stable. Overall we believe we have found evidence supporting<sup>5</sup> Niskanen’s theory when applied to the business subsidy programs in Finland, as implemented by the KTM.

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<sup>5</sup> Partly, at least.



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**IMPACT OF BUSINESS SUBSIDIES ON GROWTH OF FIRMS –  
PRELIMINARY EVIDENCE FROM FINNISH PANEL DATA**

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# IMPACT OF BUSINESS SUBSIDIES ON GROWTH OF FIRMS – PRELIMINARY EVIDENCE FROM FINNISH PANEL DATA<sup>\*</sup>

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## Abstract

This study examines the impact of business subsidies on recipient and non-recipient firms during a short three year period, from 1995 to 1997. The indicator measuring the impact of subsidies on these firms is their Value Added growth over the three-year period. The study is based on financial data of firms and data of subsidies given to firms found in the databases of the Finnish Taxation Authorities. In the data analysed the aid was distributed through four different organisations: the Ministry of Trade and Industry (KTM), the National Technology Agency (TEKES), the Ministry of Labour (TM) and the Ministry of Agriculture (MMM).

A very large amount of records (approx. 36 000) with firm-specific data is utilised. Some of the firms (35 percent) had received subsidies during the period examined and some had not. Several multivariate models are built at aggregate and disaggregate level. From the analysis it appears that in most cases, there is a positive relationship between subsidies and Value Added growth. However, the relationship is sensitive to the choice of variables in the models. Only in some of the models do the subsidies turn out statistically significant. And even then, the magnitude of the subsidies' influence to the firms' Value Added growth is relatively small considering the amounts of subsidies spent. Notwithstanding certain limitations in the study, the low estimated impact raises questions on the effectiveness of the business subsidy policies currently in force.

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## 1. Introduction

### ***The study and its importance***

This study examines the impact of government business subsidies on the performance of firms. The impact is measured by estimating the effect of subsidies on the Value Added growth of a sample of firms, some of which have received and some others which have not received subsidies. Microdata from a large population of firms is available for the years 1995-1997. Hence we use observations from that period to calculate the Value Added growth indicator. In the sample, the subsidies received have been granted from four different government bodies, namely the Ministry of Trade and Industry (KTM), the National Technology Agency (TEKES), the Ministry of Labour (TM), and the Ministry of Agriculture (MMM).

The study attempts to answer two simple but very vital questions: *Is there any real impact - measured in Value Added growth - when distributing business subsidies to firms? What is the magnitude of the impact of implementing this policy on both the recipient and non-recipient firms?*

The answers to these questions are important for many obvious reasons. First, notwithstanding the pressures for fiscal consolidation, large amounts of public funds are still spent for business subsidies in many countries. Second, questions of unfair competition rise through the implementation of this subsidising process. Third, socio-economic convergence goals are imposed by governments who attempt to fulfil them through subsidies. Fourth, business subsidies are widely used as a tool in correcting market inefficiencies and failures. Finally, one must not disregard the legal accountability of the distributors of subsidies which stems from the European Union (EU) directives and the Finnish legislation.

### ***Some aggregate statistics on business subsidies***

In most countries governments tend to subsidise private firms in many ways. In the EU the business subsidies amount to about 1,12 percent of GDP and to 2,35 percent of total central government expenditure. As shown in Table 1, disparities among the Member States are evident. For example, between 1996 and 1998 the respective figures for Portugal were 1,63 and 3,44 percent, for Italy 1,57 and 3,04 percent, but for the UK 0,52 and 1,20 percent and for Sweden 0,78 and 1,24 percent.

[Place Table 1 here – All tables mentioned in the text are found at the end of the study]

Also in Finland, the respective share has traditionally been lower. From 1984 to 1996 business subsidies ranged between 0,7 to 1,16 percent of GDP and 2 to 3 percent of total government expenditure. In the 1990s the development of business subsidies has been counter-cyclical; they peaked in 1991-1993 when the Finnish economy went through a severe recession. The present study focuses on observations from the years 1995 to 1997, a period characterised by an economic recovery and declining subsidy outflows. In 1997 business subsidies had dropped to about 0,5 percent of GDP and 1,6 percent of total government expenditure<sup>1</sup> (Table 2). Nonetheless, subsidies still constitute a substantial amount of public outlays.

[Place Table 2 here]

Since we are dealing with Value Added growth of firms it is also interesting to examine how these amounts have developed at aggregate level. Table 3 lists the real annual Value Added of all firms residing in Finland for the period 1984 to 1997 as well as their percentage growth from year to year. Note that for the period we examine (1995-1997) the average Value Added growth was quite high, at 12,6 percent.

[Place Table 3 here]

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<sup>1</sup> The difference between the Finnish figures shown in Table 1 and Table 2 is probably due to the different base year deflator used, as well as the different way with which total government expenditure is calculated for this purpose at EU level and at national level.

Finally Table 4 lists the amount of business subsidies in Finland based on the distributing organisation for the period 1990-1997. Over 80 percent of all aid is distributed by the four organisations we have in our sample, with the KTM having the lion's share. We see that aid from TEKES is very substantial part of the total KTM aid and has been growing steadily despite the decrease of the KTM's traditional business aid. The aid through the Ministry of Labour peaked during the recession (1992-1994) but has also been gradually diminishing since. The MMM business aid is insignificant and amounts to less than 2 percent of the total business aid.

[Place Table 4 here]

### **Earlier studies on business subsidies**

Business subsidies and the measurement of their impacts has always been an object of interest among researchers. Especially in the last few years, the interest has been growing rapidly. This is partly due to the legislation at EU and at national level which clearly obliges the agents involved in the distribution of subsidies to evaluate these operations.

When we measure the impact of a governmental policy, we conduct a type of evaluation<sup>2</sup>. Here we will not attempt to make a comprehensive review of the topic. Rather, we shall refer to a few studies conducted the last few years in Finland and in Sweden. Some of them are in nature close to the current study and from which, we have obtained certain ideas on design logic and analysis.

Impact studies of business subsidies could be classified in many different ways. One could be based on the type of indicator they measure (e.g. investment growth, labour growth, R&D growth); or on their methodological approach (e.g. quantitative, qualitative, survey analysis, econometric modelling); or even on the level which they examine (e.g. aggregate/macro, disaggregate/micro, program, firm). One central feature of this study is that it attempts to measure impact at a very aggregate level. Because of this, we do not disaggregate the analysis based on the type of aid, although we have several types of subsidies distributed in our sample. Only in the latter part of the study, do we control for the *source* of aid (see section 3). Another characteristic, quite unique, is the vast amount of observations analysed at firm level. We have not come across to any similar studies measuring the impact of business subsidies that utilise so many records of firms (over 36 000).

Okko (1986) measured the effectiveness of public finance towards industrial firms in the southern part of Finland, using logit and tobit estimators. He concluded among others, that subsidies do not seem to play a major role in the development growth of the recipient firms and that it is difficult to measure with certainty the subsidies' effectiveness on the firms. Tervo (1990) used a logit regression approach to estimate displacement effects linked to characteristics of firms receiving regional development subsidies between 1975 and 1981 in Finland. Although the results indicated that these effects can be linked to certain firm characteristics, there was also certain ambiguity in the results due to misclassification. The effectiveness of grants to businesses was the focus of a study by Myhrman et al. (1995). Empirical qualitative research was employed by interviewing several companies, recipients of state aid. The study reported in general positive effects of business aid, but that depended on the type of aid examined and on the indicator measured. Another study on the effectiveness of state aid is one by Kuitunen and Lavaste (1995). The study utilised qualitative (case-study) techniques. It examined whether the aid granted created an unfair competition environment between the recipient and non-recipient enterprises. The aid in question was Investment and Development aid given by the KTM. The results were inconclusive. Itkonen et al. (1998) presented an evaluation of the Objective 2 programs in Finland for the programming period 1995-1999. In a separate section of the report, subsidies towards companies were examined. The report listed certain positive effects of the subsidies on the recipient firms in terms of new jobs created or sustained, improvement of operations, internationalisation,

<sup>2</sup> According to the definitions given by the US General Accounting Office (GAO, 1998, p.5) evaluation is classified into four different types, based on the focus and the usage of evaluation:

**Process** (or implementation) evaluation assesses the extent to which a program is operating as it was intended.

**Outcome** evaluation assesses the extend to which a program achieves its outcome-oriented objectives.

**Cost-benefit** and **cost-effectiveness** analyses compare the program's outcomes with the costs (resources expended) to produce them.

**Impact** evaluation is a form of outcome evaluation that assesses the net effect of a program by comparing program outcomes with an estimate of what would have happened in the absence of the program. This form of evaluation is employed when external factors are known to influence the program's outcomes, in order to isolate the program's contribution to achievement of its objectives.

product development and profitability. Kjellman et al. (1998) analysed EU investment subsidies given to the Finnish fish processing industries using logistic regression models. The study reported that, despite considerable dead-weights, the subsidies generate investments and increase product quality. Bergström (1998) examined the effects on total factor productivity growth of public capital subsidies to industrial firms in Sweden between 1987 and 1993. Tuomiario and Virén (in Junka, 1998) analysed the impact of subsidies on firms in the wood and furniture industrial sector during a seven-year period 1988 - 1994. Finally last year, Niininen (1999) studied the effects of public R&D subsidies on firms' R&D investment between 1985 and 1993. We will refer to the results of the last three papers in section 4.2.

A consensus of the results in the aforementioned studies is that the measured impacts of business subsidies to firms are mixed. Some studies reported positive impacts, some minimal, some none and some claimed that impacts are very difficult to calculate with certainty. In the majority of the studies where the impacts were shown to be positive, the results reflected the origin of the commissioners of the study. This is in accordance with statements made by Barkman and Fölster (1995, p.114). They argue that "...academic studies have often found only small effects of subsidies using sophisticated methods. In contrast, studies commissioned by subsidy providing agencies often point to large positive effects, but usually utilising 'suspect' methods".

The rest of the paper is organised as follows. In section 2 we describe the data at hand, and discuss the logic behind the design of the study. In the same section we also show how we selected the dependent and the predictor variables utilised in our regression models. In section 3 we list several ordinary least squares (OLS) and two stage least squares (2SLS) models and commend on the results. We conclude in section 4, where we refer to certain policy implications that are evident from the results. At the same time we discuss the assumptions and limitations that one needs to be aware of, when reading the study. In the Appendix one finds all the tables and figures referred to in the study, as well as a section explaining in detail how a certain cost-benefit indicator (the "return") is calculated based on information from the regression models.

Business subsidies encompass a whole range of financial instruments. For this study, we define business subsidies only as direct capital outflows from government ministries and agencies/organisations to private for-profit firms. The utilisation of these funds is mainly for investments in machinery, equipment, buildings, for subsidising labour costs, for labour educational programs and finally for expenditures related to R&D. The firm does not have the obligation to return the funds to the distributing body, unless of course something goes wrong and the procedural rules are breached. Indeed our sample includes only these direct subsidies.

The names business subsidies, subsidies and aid are used interchangeably in the text and mean the same thing. The same applies for the names firms, businesses, companies and enterprises.





## 2. Data and variables

### 2.1 Data

The data used in this study consisted of several databases which were linked together. One group of databases contained Financial Statements data (Balance sheet and Profit and Loss figures) of firms which submitted their tax declarations to the Taxation Authorities (Verohallitus - VH) during the years 1995, 1996 and 1997.

Another group of databases consisted of government subsidies data paid out to firms during the years 1995, 1996 and 1997. The source of the subsidies were four different government organisations/agencies: the Ministry of Trade and Industry or KTM, the Finnish National Technology agency or TEKES, the Ministry of Labour or TM, and the Ministry of Agriculture or MMM<sup>3</sup>.

In cases where more than one subsidy payment was recorded per firm, the payments were summed on the basis of source and on the year in which they were paid out. In other words, in our analysis we utilised the subsidy amounts received *per firm per year* from each of the aforementioned sources<sup>4</sup>.

The initial joined database contained 321063 records of firms (Table 5). Some of these firms had received subsidies during the examined period (187435); some others had not (133618). Note that the amount of repeater<sup>5,6</sup> recipient firms was quite substantial. This depended on the source of aid and consequently on the *type* of aid received.

[Place Table 5 here]

Unfortunately not all of these records of firms had financial data which we could use in our models. A substantial amount of data were missing<sup>7</sup>. In addition, numerous variables were erroneously inputted. We thus selected only those records of firms whose variables contained financial and subsidy values that could be used in our models. The final amount of records with firm data that was analysed is shown in Table 6.

[Place Table 6 here]

As we mentioned in the introduction the types of subsidies analysed are used for capital investments, for labour related expenditures and for R&D. The government organisations listed below specialise in distributing specific type of subsidies (e.g. the KTM distributes capital subsidies, the TM distributes labour related subsidies and the TEKES distributes R&D subsidies to technology firms). Nonetheless, there are exceptions. For example, the KTM can distribute a so called development subsidy which may resemble slightly an R&D subsidy but geared to industrial firms. Also, particularly in the case of the MMM, the subsidies analysed refer only to investments subsidies (e.g. investments in machinery and

<sup>3</sup> VH receives from each of the Ministries and Agencies either in electronic form or in paper the subsidies paid out to firms. We were assured that we received the analytical subsidies data that VH itself received in electronic form.

<sup>4</sup> There might have been other sources from which the firms of our database received subsidies but that was not possible to examine. See also table 4 and section 4.1.

<sup>5</sup> According to our classification, a repeater recipient firm is one that received aid in more than one year during the three year period; it is not necessarily a firm which received aid for different projects in more than one year. It may well be that payments for one and the same project have been disbursed over a two year or even a three year period. That depends on how quickly the firm itself has produced the respective invoices of the costs to the source of aid. See also next footnote.

<sup>6</sup> For certain types of projects and types of aid, the recipient firm has first itself to pay for the costs and then present the invoices to the source for reimbursement; for others, the funds are disbursed "right up front".

<sup>7</sup> As to why such a substantial amount of data was missing, there are several explanations. First, in the three-year period examined some existing firms stopped their operations and some new firms were established. We excluded those firms that did not have financial data in all three years.

Second, the majority of the firms that received aid from the MMM did not have financial data in the data set given to us. These firms are agricultural enterprises and in Finland, for taxation purposes, agricultural enterprises are not classified as "businesses". They thus have a different reporting system for their tax declarations and their financial data. In the database we received containing the financial statements of firms, the majority of these agricultural enterprises was not present. On the contrary, in the database which contained the subsidies data, these agricultural firms were present. Hence, when we joined the two databases there was a sharp decline of observations and variables available for analysis from this subset of firms.

Finally, as far as the other missing observations are concerned from the other source categories, we can only speculate. One reason might be that the type of some of these firms is small (e.g. personal) and some do not generate financial information in the format that we could analyse. This seems to be the case at least for the firms which did not receive any aid.

equipment for farms); subsidies for the support of agricultural production are *not* analysed (see also footnote 7).

In Table 7 we list some descriptive financial data of our examined sample controlling on whether the firms in question received aid or not. The variables listed are the percentage change of Value Added growth between 1995 and 1997 (DLNVA975) and the absolute amount in FIM of the Value Added growth for the same period (DVA97\_5). In addition, we list the Value Added amount (VA95), the sales (SALES95T), the operating margin (OPEMA95T), the total assets (TOTA95T), the personnel amounts (PERSO95T), and the tangible assets (TANGA95T), all for the year 1995.

[Place Table 7 here]

In general we see that the distributions of the examined variables for the recipient firms are more spread than the respective ones of the non-recipient firms (except for the SALES95T variable). The non-recipient firms have more skewed distributions and also more observations “under the tails”. We also notice that the financial figures of the recipient firms seem to be “better”. That is, the firms which received aid during the three year period had in general higher average sales, better operating margins, their total asset and tangible asset values were stronger and employed on average more people, at least during the first year (1995) of our examined period. Pair-wise t-tests confirmed all these differences (tests are not shown)<sup>8</sup>.

We could justify these differences by the selection process that apparently is implemented when aid is distributed. The ministries and agencies handling applications for business subsidies, select the “better” applicant firms<sup>9</sup>. Indeed the law stipulates that only profitable firms are eligible for aid. Later on, when we measure the impact of received aid on the growth of Value Added, this selection bias will be again discussed. The recipient firms’ Value Added growth rate was higher than the respective rate of the non- recipient firms (18,1% to 11,0%).

Figure 1 shows graphically the kernel density estimation of the Value Added growth (differences of logged values of VA for 1995 and 1997-DLNVA975) for the two groups of firms. Note that the two distributions are more or less similar. We may thus say that the firms in our sample are not growing at completely different speeds during the period examined, although on average the recipient firms seem to have achieved a higher Value Added growth. Figure 2 displays again the kernel density estimation for the VA growth of the recipient firms but now controlling for the source. The VA growth looks to be evenly distributed around the middle regardless of the source. Finally Figure 3 lists the kernel density estimation of the subsidies received (logged) based on source. In general the distributions have a tail to the left. TEKES apparently pays out the most in subsidies per project where as TM spends the least.

[Place Figures 1, 2 and 3 here - All figures are found at the end of the study]

## 2.2 The empirical model

It is not self-evident how the subsidies received by firms affect their behaviour and profitability. We could approach this problem by assuming that the subsidies reduce the costs of firms. Governments may subsidise certain investments or labour costs in order to increase R&D activities, equipment investments or labour demand. If this is the main channel of impact of subsidies the profit function ( $\Pi$ ) of an aid receiving firm can be written as

$$\Pi = pQ - C(Q,q,S,Z) \quad (1), \text{ where}$$

revenue is output ( $Q$ ) multiplied by price ( $p$ ), and cost is a function ( $C$ ) influenced by output ( $Q$ ), by factor prices ( $q$ ), by business subsidies received ( $S$ ) and by a vector ( $Z$ ) of several dummy variables which control for different characteristics of the firm (e.g. Location, Legal status, Industrial sector).

<sup>8</sup> This is a simplistic comparison of the financial status of the two groups. However, for the purpose of this section where we want to examine for rough differences if possible, this suffices.

<sup>9</sup> In contrast to these results, in a recent study by the author (Venetoklis, 1999) it was found that there were not significant differences between the firms receiving aid and those whose applications were rejected. The results of this study however, are not perfectly comparable to the other study for two reasons. First in the current study we do not know whether the non-recipient firms had applied or not for aid which was then rejected. We only know that they did not receive aid between 1995 and 1997 from the sources in our sample. Second, in the previous study the recipient firms examined received aid from KTM only; in the current study the aid comes from four different sources.

The optimal level of a firm's capital and labour input is where the firm maximises her profits. Hence, the optimal factor inputs can be written as implicit solutions to profit maximisation:

$$K^* = \arg \max \Pi(p, K, q, L, S, Z) \quad (2)$$

$$L^* = \arg \max \Pi(p, K, q, L, S, Z) \quad (3)$$

Substituting these values into the production function yields:

$$Q = f(K^*(p, q, S, Z), L^*(p, q, S, Z)) \quad (4)$$

In order to build an empirical model based on this kind of microeconomic reasoning we have to operationalise the variables used. There is not data of firm-specific factor prices. Instead, we have data on fixed capital, labour input, business subsidies and some other firm characteristics. Hence, to build the model we replace the output Q by Value Added growth (VA), the capital stock K by Tangible Assets growth (TA), the labour input L by Personnel growth (PE) and add Subsidies (S) and the other factors (Z). Then we have a reduced form equation for Value Added growth:

$$\Delta VA = f(\Delta TA, \Delta PE, S, Z) \quad (5)$$

Assuming that the production function is a Cobb-Douglas type, we can write the Value Added equation in log-linear form as follows

$$\Delta VA = \beta \Delta TA + \gamma \Delta PE + \delta S + \varepsilon Z \quad (6), \text{ where } \beta, \gamma, \delta, \varepsilon \text{ are the parameters estimated}$$

## 2.3 Description of variables

### ***Dependent variable***

Output: We defined Output (Q) as the percentage growth of Value Added from 1995 to 1997

The Value Added amount was calculated based on the following formula<sup>10</sup>:

Value Added for 95 (and 97 respectively) = Operating margin + Total Labour costs (Salaries, etc.) + Rents + Leasing costs (all figures for the respective year)

We first logged the yearly Value Added of each firm and then calculated its percentage growth based on the following formula:

$$\text{Percentage growth}^{11} \text{ of Value Added from 95 to 97} = \ln(VA_{97}) - \ln(VA_{95})$$

Thus the dependent variable<sup>12</sup> related to Value Added for the aforementioned period was DLNVA975.

The motivation for the choice of the Value Added growth as our output dependent variable lies in the *plethora* of different subsidies distributed to firms and the many sources of organisations (four) distributing subsidies. In our sample, there were literally hundreds<sup>13</sup> of types of subsidies given for different purposes. It would be logical to assume that Value Added growth can be considered and accepted as a universal goal of subsidies, since it can easily be a direct or indirect consequence of

<sup>10</sup> The Value Added calculation is based on the formula listed by the Committee for Corporate Analysis (KERA, 1995). Note that the components of the formula differ from the ones used by Statistics Finland (1998). They use different variables when they calculate the Value Added growth of firms at aggregate level in the National Accounts listings.

<sup>11</sup> To be technically correct, percentage growth of Value Added is defined as DLNVA975 multiplied by 100. The same applies for the percentage growth of Tangible Assets (DLNTA975 \* 100) and for the percentage growth of Labour (DLNPE975 \* 100). See also the independent variables for Capital and Labour below.

<sup>12</sup> The actual Value Added amounts for each year were logged and then the year to year change calculated. This of course excluded the Value Added values which were negative. We estimated that around 10% of the firms in our sample had negative Value Added for the year. We then examined to see if the negative Value Added values differed significantly between those firms that received subsidies and those that did not, amount and percentage wise. We found no significant differences, thus we preceded only with the positive Value Added logged values.

<sup>13</sup> The KTM for example had 7 types of subsidies distributed between 1995 and 1997; TEKES had 2; TM had 9; MMM had 155(!). Of course we did not have that many types of subsidies in our sample due to missing values. Nevertheless, the numbers show the heterogeneity of the whole subsidies system and the need for a more aggregate approach in order to measure its impact.

subsidies distribution. That is, regardless of the type of subsidies given and regardless of whether it is or it is not mentioned as a pre-defined goal of the type of subsidy.

To get the whole picture at aggregate level, we examined the percentage growth of Value Added of recipient firms vis-à-vis of those firms which did not get money during the same period. We also looked at the recipient firms separately and measured what impact, if any, the received aid had on their Value Added growth.

### ***Independent variables***

#### ***a. Capital***

For Capital we used the percentage growth of Tangible Assets (TA) of the firms between the years 1995 and 1997. We first logged the TA and then measured the growth using the formula:

Percentage growth of TA from 95 to 97 =  $\ln(\text{TA}_{97}) - \ln(\text{TA}_{95})$

Thus the independent variable related to TA for the respective period was DLNTA975

#### ***b. Labour***

For Labour we used the change of Personnel (PE) of the firms between 1995 and 1997. Unfortunately in the data we received, there were personnel numbers only for the year 1995; 1996 and 1997 figures were missing. Nevertheless, we estimated the personnel numbers for the respective firms for the years 1996 and 1997 based on the salaries costs for the years 1995, 1996 and 1997 (these salary costs were not missing from our database).

Since we had the amount of personnel for 1995 and the total salaries for 1995, we estimated the average salary per person for each firm for 1995. We then indexed that amount by 3% and 3,5% for the years 1996 and 1997 respectively, and got the average salary per person per firm for these two years<sup>14, 15</sup>.

We then estimated the personnel amounts per firm using the following formulae:

PE96= Salaries costs 96/(estimated) Salary per person 96

PE97= Salaries costs 96/(estimated) Salary per person 97

Finally we logged the PE for the respective years and then measured the percentage growth between 1995 and 1997 using the simple formula:

Percentage growth of PE from 95 to 97 =  $\ln(\text{PE}_{97}) - \ln(\text{PE}_{95})$

Thus the independent variable related to PE for the respective period was DLNPE975

We would have of course preferred to use other, even more informative Labour related figures (e.g. yearly hours worked per person) but those were unavailable.

<sup>14</sup> The 3,5% increase and the 3% increase were the average salary increases in Finland for 1996 and 1997 respectively.

<sup>15</sup> We believe that our personnel estimates for the years 1996 and 1997 are close to the real average personnel figures of the firms analysed. In our sample the average salary cost per personnel for 1995 was FIM 113 000, close enough to the actual average salary paid in Finland during 1995. Based on the Statistics Finland (1998) National Accounts the average salary was approx. FIM 121 000. The difference of FIM 8 000 is probably due to selection bias of firms and sampling error.

### ***c. Characteristics related to firms and to the subsidies received***

In our models we used three categorical<sup>16</sup> variables and one continuous variable to control for certain characteristics of the firms and for the subsidies received by the recipient firms.

#### **Location of firm**

We used the categorical variable LAANI95T to indicate at which prefecture (lääni) the firm in our sample resided during the first year of the period examined (1995). This variable had the following categories:

- 1: Uusimaa
- 2: Turku
- 3: Häme
- 4: Kymi
- 5: Mikkeli
- 6: Pohjois-Karjala
- 7: Kuopio
- 8: Keski-Suomi
- 9: Vaasa
- 10: Oulu
- 11: Lappi
- 12: Ahvenanmaa

#### **Industrial sector**

We also attempted to control for the Industrial sector of the examined firms at 2-digit level. The variable SIC95 had the following categories:

- 1: Agriculture, Hunting and Forestry
- 2: Fishing
- 3: Mining and Quarrying
- 4: Manufacturing
- 5: Electricity, Gas and Water Supply
- 6: Construction
- 7: Wholesale and Retail Trade
- 8: Hotel and Restaurants
- 9: Transport, Storage and Communication
- 10: Financial Intermediation
- 11: Real Estate
- 12: Public Administration and Defence
- 13: Education
- 14: Health and Social work
- 15: Other Community, Social and Personal Service Activities
- 16: Private Households with Employed Persons
- 17: Extra-Territorial Organisations and Bodies
- 18: Industry Unknown

#### **Legal status**

Finally we controlled for the legal status of the firms examined. We ended up with four general categories for the variable LEGATYPE:

- 1: Personal Enterprise (Toiminimi)
- 2: Partnership (Ay)
- 3: Partnership (Ky)
- 4: Ltd. (Oy)

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<sup>16</sup> Not all of the sub-categories listed below were found in our models.

#### ***d. Subsidies received***

In our models, the amount of subsidies received was the independent variable of interest. Due to the short period examined (1995-1997) it was assumed that the dependent variable -the Value Added growth of firms- was sensitive to the definition of the amount of subsidies included in our models<sup>17</sup>. In addition, because of certain characteristics of the data sample linked to the *time* of government intervention, the *nature* of our target group (the firm) and the *format* of the existing data, the decision as to what *amount of subsidies per firm* was to be included in the models became a challenge.

#### ***Time-lag assumption***

Basically, in an impact analysis of a public policy one measures certain impact indicators of the target group *after* a certain period has passed from the government intervention<sup>18</sup>. The precedence (or time-lag) of the intervention from its potential impact measurement assures that there is time enough for a probable causal relationship to evolve between the two.

In our case we have a government intervention (subsidies) given to a target group (the firm) between 1995 and 1997, and a measurement of a certain indicator of the target group (the firms' Value Added growth) during the same period. By regressing one onto the other we attempt to find out if there is indeed some relationship between Value Added growth and subsidies received.

In Table 6 we saw that subsidies were received in all three years. If we were to apply strictly this assumption of time-lag we should disregard firms that have received aid in 1997, either exclusively or in addition to earlier years (in 1995 and/or in 1996). That is, we should select and measure the impact only on those firms that have received subsidies in 1995 (line 2 in Table 6), in 1996 (line 3)<sup>19</sup> and in 1995 and 1996 (line 5).

#### ***Expectations assumption of firm behaviour***

However, a strict time-lag assumption may not be applicable in all cases. Because we are dealing with firms and their investments, it is not always clear when exactly the receipt of subsidies begins to potentially effect their behaviour, translated in Value Added growth. One could assume that the firm (or the entrepreneur) does not necessarily change its behaviour solely *after* the receipt of subsidies. The entrepreneur sometimes, *expecting* a certain subsidy, proceeds with some investments plans *before* the subsidy is disbursed or even approved. For example, Venetoklis (1999) measured that for aid distributed through the KTM, it takes on average eight months between the time of submission for an application and the last aid payment. This could be in the form of making the investment with own and private market capital, reorganising the firm's operations to accommodate the investment, etc.

This in turn implies that perhaps, some of the firms that received subsidies in 1997 only (or in 1997 and earlier years), should be included in our models since they may have also changed their behaviour *before* 1997. That is, we could include any category of firms listed in Table 6 (lines 2-8); we could even include all the firms irrespective of year of receipt (Totals, line 9)<sup>20</sup>.

It is obvious that the expectations assumption is not so strict compared to the time-lag assumption. The problem is of course to determine the *earlier* point in time than that of the actual subsidies payment, when these expectations began to influence the indicator of interest; and based on *that* point in time start measuring the Value Added growth.

Consider that we examine firms that have received aid in 1995 exclusively or in other years as well. If we assume that the expectations began to change the behaviour of the firm a year earlier we should have begun measuring the firms' Value Added growth already in 1994. Unfortunately our sample did not contain reliable pre-1995 data.

<sup>17</sup> As the regression models will show later, this assumption turned out not to hold; results were similar irrespective of subsidies amount used.

<sup>18</sup> Some may call this an ex post evaluation, an evaluation *after* the event.

<sup>19</sup> We finally did not analyse this category - see below.

<sup>20</sup> This was in fact the approach followed in an earlier version of the paper; all subsidies were added accross per year per firm and this total subsidies amount was use in the regressions. Doing this, we were also able to increase the number of observations in some sub-categories.

### ***Data on subsidies are not per project***

Finally, as mentioned in section 2.1, the data given to us included subsidies received *per year, per source, per firm*. We would have rather obtained data of subsidies received ***per project, per year, per source, per firm***. Had this been the case, we would have been in a better position to attribute the growth of the firm's Value Added to the aid received and to the frequency with which it received it. However, the data available was not detailed enough as to which specific project the aid was meant for.

Take for example a firm classified in Table 6 as having received aid in 1995 and 1997 or 1995, 1996 and 1997 (lines 6 and 8). Again, because of the format of the data, we can not know for sure that these yearly payments refer to the same or different projects. Let us assume that all payments refer to the same project. Based on the strict time-lag assumption, we would disregard these firms from our models although the receipts in 1997 have indirectly affected the firm's behaviour. This would be even more evident, had the amount of subsidies received in 1995 been much higher than the ones received in subsequent years. The end result would be elimination of potentially valid observations.

Hence, another approach would be to include those firms that received subsidies in 1995 and/or 1996 and 1997, but utilise as subsidies the aggregate amount of subsidies for the three years less those received in 1997.

### ***Comments***

As can be seen, the decision as to which amount of subsidies to use as our independent variable is very complicated. Were we to have more complete data, we would have been able to determine the subsidies amount much better and define the period of impact in more precision.

We decided to include in our analyses firms which received subsidies in 1995 only and in 1995 and 1996 only. We assumed that the effect for the first group of firms (line 2 in Table 6) began after they received aid in 1995, those entrepreneurs had no lagged expectations, and the payments in 1995 were the only ones for the relevant project. That is, there were neither pre-1995 subsidy payments for the same project, nor after 1995.

For firms that received aid in 1995 and 1996 (line 5 in Table 6) we assumed that the payments for both years were for the same projects or for two separate projects, and there were no other payments before 1995 or after 1996. Furthermore, for this specific group of firms we imposed two additional assumptions.

First, if the payments were for the same project, we assumed that the entrepreneur had no lagged expectations, thus the calculation of the Value Added growth between 1995 and 1997 has no problems.

Second, if the payments were for two different projects, the 1996 payment under the strict time-lag assumption should have started effecting from the beginning of 1997 onwards. However, since we calculate the Value Added growth using 1995 as our base year, just for those firms we impose the expectations assumption. That is, those firms begun changing their behaviour a year before the actual receipt of subsidies, in 1996.

From the above methodological analysis, it is clear that we can not be absolutely consistent with all cases. Absolute consistency means too much specification which in turn reduces considerably the number of observations that fit all our assumption criteria. This creates many small groups of firms that have very specific and unique characteristics. The examination of each group separately might give us higher confidence as to the true impact measured. On the other hand, we run the risk of not being able to make inferences for the general population of firms or to utilise the results for policy analysis and policy planning at a higher level.

We hypothesised that the amount of subsidies has a different effect on firms of different sizes. In order to capture this size effect, we divided the relevant amount of subsidies by four proxy (for size) variables. The general form was a fraction:

- Subsidies / Sales in 1995 or "TASA95P0"
- Subsidies / Total assets in 1995 or "TATA95P0"
- Subsidies / Operating margin in 1995 or "TAOM95P0"
- Subsidies / Value Added in 1995 or "TAVA95P0"

All these fractions were multiplied by 100 to represent percentages. For firms which did not receive aid these variables' values were zero (0).

### ***What to look for and keep in mind when examining the models***

Several things must be kept in mind when examining the models. We are first interested in whether the aid has had *any impact* on Value Added growth of firms. For this, in general look for t-scores less than -2 or more than +2 and for significance levels of less than 0,100 (the shown significance level of 0,000 means that it is actually less than 0,001).

We are also interested on the *magnitude* of the impact of the aid when the impact is of course shown to be significant. For this check the B coefficient. This number simply tells you the amount of change of the dependent variable (in our case the Value Added growth for the period in question) when one of the independent variables (for example the fraction where the aid paid is the nominator) increases by one, and when the other independent variables remain unchanged.

We also need to check the *sign* of the B coefficient. If the sign is positive, this indicates that when the aid increases so does the Value Added growth. When the sign is negative the opposite occurs.

Furthermore, one must look at the *number (N) of observations*. If the N is small then one should hold certain reservations on the significance levels, the B coefficient and its sign. When the N is less than 30 (for some less than 100), the power of the model is low, thus one should not conclude with the same confidence as with models with many observations.

Finally, in our comments later on, we sometimes use phrases indicating that "...aid seems to effect positively the Value Added growth...". It is important to keep in mind, that although aid might turn out to be significant and might have a positive sign, this only means that there is a positive *association* between the Value Added growth and the aid paid out. Association does *not* necessarily mean *causation*<sup>21</sup>.

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<sup>21</sup> We could also examine association and causation in reverse order. That is, examine the impact of Value Added growth on the aid received. Could the payment of aid to a firm be a kind of "reward" because the firm's Value Added growth has been substantial? Indeed we have mentioned earlier that the law stipulates that profitable firms are to be given aid. However it is difficult to justify this reverse position just because profitable firms receive aid.



### 3. Results

Two sets of models were built. The first set comprised of models at aggregate level where both recipient firms and non-recipient firms were examined. The latter set became more detailed. There, we broke the data based on the source of aid (KTM, TEKES, TM, MMM, Combination<sup>22</sup>) and examined each subset of recipient firms separately.

#### *Aggregate models*

[Place Table 8 here]

In Table 8 we list 20 aggregate models, each with a slight different variation of the subsidies independent variable (see previous section for a detailed description of each variable). To briefly reiterate,

- models 1 - 4 use the percentage of subsidies over sales in 1995 (TASA95P0)
- models 5 - 8 use the percentage of subsidies over operating margin in 1995 (TAOM95P0)
- models 9 - 12 use the percentage of subsidies over total assets in 1995 (TATA95P0)
- models 13 - 20 use the percentage of subsidies over Value Added in 1995 (TAVA95P0)

The amount of subsidies utilised in the models was either the total amount of subsidies received in 1995 and 1996 or in 1995 only (“When aid“ column)<sup>23</sup>.

The rest of the independent variables below, were the same for all models.

- The growth of personnel between 1995 and 1997 (DLNPE975)
- The growth of tangible assets between 1995 and 1997 (DLNTG975)
- The location of the firm (LAANI95T)
- The Industrial code of the firm (SIC95)
- The legal status of the firm (LEGATYPE)

In some models we examined both recipient and non-recipient firms; in some others recipient firms only. By using both types of firms we attempted to account for the “policy off“ or counterfactual situation; that is, what would have happened to the Value Added growth of the recipient firms had they not received any subsidies (“Counterfactual“ column).

Due to space constraints and to enhance readability, we just list the B coefficients, t-scores and p-values (sig.) of the independent variable of interest, the subsidies. All the relevant statistics for the other independent variables are not shown but are available upon request.

At the end of each model, if the subsidies variable turned out statistically significant at the 10% level (sig.<0,1), we produced an *impact* indicator (titled **RETURN**) on the Value Added growth as a ratio of the subsidies received. This impact indicator was based on the data and the variables generated from our models *only*. Thus, the reader should be careful in interpreting it and must keep in mind all the constraints and limitations of the models themselves. We explain in the Appendix how this indicator was calculated<sup>24</sup>.

Examining the first three versions of the subsidies independent variable (models 1-12) we see that in most cases, the B coefficients had a positive sign. However, they were quite small and that was reflected in that they turned out statistically insignificant. In models 11 and 12, where the significance

<sup>22</sup> In the Combination category, we classified all firms that received aid from at least two different sources during the period in question.

<sup>23</sup> As mentioned earlier, we experimented with other versions of the subsidies variable as well. One was that we used the aggregate amount of subsidies received in all years (subsidies added accross), thus included all recipient firms in the sample. In another version we used all recipient firms in the sample and first eliminated those that received aid in 1997 only and those that received aid in 1996 and 1997 only. For the remaining firms, we added the subsidies that were received in 1995 and 1996 only. For example, for firms that received aid in 1995, 1996 and 1997 we added and used the 1995 and 1996 subsidies only. For those that received aid in 1995 and 1997 we used the 1995 subsidies only. In all models the B coefficients came out statistically insignificant and very similar to the models in Tables 8 – 13 (All additional models are not shown, but are available upon request).

<sup>24</sup> We could characterise this as an attempt for a “brute“ cost-benefit evaluation (see definition in footnote 2); brute, since we do not include in our calculations all the potential benefits and costs that may occur through such an intervention.

level was less than 0,1 the return indicator was less than one. Put it differently, out of every FIM 100 given as subsidies to firms, the amount of Value Added growth attributed to these subsidies was only FIM 22 (model 11) and FIM 29 (model 12).

The situation was opposite with the fourth version of the subsidies variables, the TAVA95P0, or subsidies over Value Added for 1995 (models 13,15,17,19). In all these models the B coefficient came out statistically significant and the "Return" indicator was close to or over one. How could we interpret these results? We suspected that they were due to *simultaneity bias*. This developed because in both sides of the equation we had the exact same amount, the Value Added for 1995<sup>25</sup>. This was then reflected in the high and statistically significant B coefficient.

To adjust for such bias, we used another variable (instrumental variable) as a proxy for the subsidies/VA95. An obvious choice was the subsidies amount itself. We run two stage least squared (2SLS) models and produced new instrumental variable (IV) estimators in models 14,16,18 and 20. Now the instrumental B coefficients compared to the OLS ones, became much smaller and statistically insignificant.

The above results made our analysis more robust and prompt us to conclude that the effect of business subsidies on the firms' Value Added growth is minuscule, at least as far our data set is concerned.

It is also interesting to compare the magnitude of the B coefficients based on their counterfactual and timeliness characteristics. The B coefficients are in most cases smaller when the non-recipient firms are included in the analysis (Counterfactual = Yes) compared to the models where only the recipient firms are analysed (Counterfactual = No). This was expected, because in Table 7 we saw that the financial figures of the recipient firms were in general better and have had higher growth rates versus the respective figures of the non-recipient firms. This means that the B coefficients for those aggregate models (Counterfactual = Yes) would have been *even smaller* had we had in our sample *similar* non-recipient firms; and consequently the net impact of subsidies on Value Added growth would have been even less than the current minuscule levels.

As far as the timeliness of the receipt of subsidies, we note that the B coefficients of the firms that received aid in 1995 only, were in most models higher than those that received aid in 1995 and 1996. This is an expected result since subsidies received in 1995 have had *more time* to influence the Value Added growth of the firms versus those in the other group. As noted earlier the influence is indeed very small and statistically insignificant but nevertheless, the change of the B coefficient values from the latter group to the former is mostly positive.

### ***Disaggregate models based on source***

[Place Tables 9 – 13 here]

Tables 9 – 13 list disaggregate models based on the source of subsidies. Here we examine recipient firms only. The models were built and run in exactly the same way as the aggregate ones earlier. Firms receiving aid through the KTM (Table 9) seemed not to be influenced significantly by the subsidies received. In only one case (model 24) where the OLS estimator came statistically significant and the return indicator was close to one (0,86) we run a 2SLS model. Then, the IV B estimator declined considerably and became statistically insignificant.

The TEKES subsidies (Table 10) turned out insignificant as well. Here we must note that R&D projects constitute the bulk of projects financed by TEKES and take many years to develop. It is thus unlikely that they would have influenced the firms' Value Added growth in the short period examined here.

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<sup>25</sup> The dependent variables was defined as  $\ln(\text{VA97}) - \ln(\text{VA95})$ . The subsidies independent variable was defined as  $\text{subsidies}/\text{VA95}$

Subsidies from the TM (Table 11) seemed to be the most effective although after producing IV estimators, the respective B coefficients also declined. One may explain that the higher impact, is due to the *type* of subsidies distributed through the TM. They are mostly amounts to subsidise salaries, and salaries is a direct component of the Value Added indicator (see definition in section 2.3).

The MMM subsidies (Table 12) can not be analysed due to the small number of observations.

The subsidies received from the "Combination" of sources (Table 13) produced very high B coefficients and consequently extremely high return indicators. However, it is difficult to explain how for example FIM 100 of subsidies "returned" FIM 2075 in terms of Value Added growth (model 60) in just two years. Most probably, these results are due to selection bias, high outlier values and the low number of observations.

Finally it is important to keep in mind that in these disaggregate models we do not account for the counterfactual (Counterfactual = No). Thus, the B coefficients showing the *net* impact of subsidies on Value Added growth are most probably even lower.



## 4. Discussion

### 4.1 Considerations

Regardless of the importance or not of the previous results and their possible policy implications on government subsidies to firms, we feel that there are several aspects of this study which need further comments.

These aspects refer to internal and external validity questions of the results. To put it differently, when we look at the results and their interpretation, we need to ask two questions:

- How valid (true) are these results and how close do they represent the true situation we are trying to explain? This is the internal validity question.
- How comfortable are we to infer that these results can be generalised and can be thought to refer to the whole population of firms in Finland? This is the external validity question<sup>26</sup>.

Below we list several matters related to these internal and external validity questions.

#### ***Time span***

We are examining only a very short period of time when we measure the growth of Value Added in firms. We have seen that the actual contribution of the amount of aid to the Value Added growth is either minimal or less than the amount of aid spent (RETURN < 100%). We have not examined what would have happened had we examined one or more years after the receipt of the aid, say from 1995 to 1998, or from 1995 to 1999. It is possible that the impact of subsidies comes only slowly visible.

#### ***Previous growth of firms***

We do not know what was the rate of Value Added growth of firms before the periods we examined, say from 1990 to 1994. Had this been known, we could have included it in our models. In other words, the real situation might be that some of the firms in our sample have already had accelerated or decelerated Value Added growths before 1995. These growth rates might have carried over to the period we have examined. Thus they may have biased the B coefficients in our models<sup>27</sup>.

#### ***Current and previous subsidies from other sources***

We do not know whether the firms in our sample have had other types of subsidies received from other sources during the period we examined (1995-1997); that is in addition to the KTM, the TEKES, the TM and the MMM (see Table 4). This of course might have influenced their Value Added growth. We also do not know whether the same firms had received aid from all available sources before the period in question<sup>28</sup>.

#### ***Missing values and selection bias of sample***

Approximately 11% of the total amount of firms' records were finally analysed. That was due to missing values in certain variables or due to unreliable data<sup>29</sup>. The problem does not lie in the amount of firms analysed per se because indeed the sample is more that substantial for statistical analysis. The problem lies in the way the sample was chosen. Due to the aforementioned missing values and erroneous data, we were forced to eliminate a substantial amount of variables and records of firms. We ended up with firms that *had* existing information both related to their financial statements and to their subsidies receipt. In other words we had a sample of "convenience". Thus we are not so confident in generalising these results with absolute certainty.

#### ***Selection bias of recipient firms***

We mentioned earlier that in general, firms which receive aid are "better" and financially "healthier" compared to those that do not. This by itself may influence the dependent variable we are examining (the Value Added growth); that is, what ever impact we attribute to the aid given to the recipient firms might have also been influenced by their good financial status.

<sup>26</sup> Validity questions in evaluation research are much more complex than the ones presented here. We have decided nevertheless, not to expand the matter in detail since it would obscure the main purpose of the study.

<sup>27</sup> One can argue that this is not a real problem since the past Value Added growth is unknown for both group of firms (recipients and non-recipients). Thus theoretically it is distributed evenly between the two groups and consequently cancels out.

<sup>28</sup> See previous footnote for a similar explanation.

<sup>29</sup> But look also footnote 7.

## 4.2 Conclusions

In the previous section we reported that in general, subsidies given during the three year period we examined, turned out *not* to influence significantly the Value Added growth of the recipient firms. Only in certain OLS models did we find the aid influencing positively the Value Added growth of firms when its B coefficients turned out statistically significant. However, we also observed that despite the positive influence of the aid, its actual magnitude was minimal. When we rerun the models using instrumental variable estimators with 2SLS, the B coefficients were reduced considerably and became statistically insignificant<sup>30</sup>.

There are several explanations for these results. One may be that the wrong firms have been subsidised. Unfortunately we can not test this hypothesis since it is not possible to examine the effects of aid on the Value Added growth of a *different* set of firms retrospectively. On the other hand this explanation might be quite valid. In an earlier study evaluating the process through which funds are distributed to firms (Venetoklis, 1999) it was found that indeed there were flaws in the distribution of funds and the selection of recipient and non-recipient firms. Another reason could be that aid does not really affect firm behaviour. As mentioned in the introductory section several studies have been proponents of this argument. A third reason could be that the true effect of aid is not found in Value Added growth but rather in other variables measured separately (e.g. productivity growth, profitability growth, increase in competitiveness); these, we did not study. Finally we must not disregard the fact that our models are very sensitive to variable specification.

What then do we conclude? A unique feature of this study is the analysis of a vast number of records with firm data. This gave our models high levels of statistical power and consequently credibility for the results. Thus, if we focus only on the results of the study as such and at the same time take under consideration the huge amount of data analysed, we may say that *the study raises questions and doubts on the effectiveness of the business subsidy policies currently in force.*

The previously listed limitations of the data and the shortness of the period examined force us to look ahead and attempt to measure with more accuracy the impact of business subsidies. The methodology described in this study has proved to be functioning, thus what is needed in the future is a refinement of the models used and a way through which one can obtain more reliable and complete data. We plan to obtain financial information of firms having received aid and of those not having received aid for the years 1998 and 1999. Furthermore, the amounts of aid paid out will also be gathered for the same years. It will then be possible to run similar models as those in the current study, but now covering the whole five-year period (1995-1999). The multinomial logistic regression modelling is another type of analysis which may be conducted in the future study. Also, a pseudo-quasi experiment could be created. We could use the group of firms having received aid as our base of reference. Then we could choose those non-recipient firms which pertain close characteristics to the recipient firms. For this we may utilise usual standard control variables such as the location of firm at Prefecture (Lääni) level, the SIC industrial classification of the firm at very low level (5-digit), the legal status of the firm, and the size of the firm in terms of Turnover and Personnel amounts.

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<sup>30</sup> In the introduction we mentioned that some studies have found that the impact of business subsidies to firms is small. Our results are broadly consistent with those results. For example, Tuomiario and Virén (in Junka, 1998) concluded that the impact of business subsidies to firms in the wood and furniture manufacturing sector was minimal in terms of investment and employment. Also Bergström (1998) has indicated that the impact of capital subsidies on Value Added growth is positive during the first two years but in the longer run it turns negative. On the other hand Niininen (1999) argued that public technology subsidies are effective. He was careful though to focus the positive effects on firms with intensive R&D operations; he also emphasised that subsidised loans seemed to have a higher positive impact on new R&D investments than direct subsidies.

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## Appendix

### Tables

**Table 1.** Overall subsidies\* in the EU Member States in percent of GDP and relative to government expenditure

	<b>Subsidies as % of GDP**</b>	<b>Subsidies as % of Gov. Expenditure**</b>
<b>Austria</b>	0,65	1,23
<b>Belgium</b>	1,18	2,26
<b>Denmark</b>	0,94	1,59
<b>Germany</b>	1,45	2,95
<b>Greece</b>	1,24	2,25
<b>Spain</b>	0,98	2,22
<b>Finland</b>	0,47	0,85
<b>France</b>	1,13	2,08
<b>Ireland</b>	0,99	2,66
<b>Italy</b>	1,57	3,04
<b>Luxembourg</b>	0,53	1,27
<b>Netherlands</b>	0,62	1,24
<b>Portugal</b>	1,63	3,44
<b>Sweden</b>	0,78	1,24
<b>UK</b>	0,52	1,20
<b>EUR 15</b>	1,12	2,35

Source: EC (2000, p. 54)

\* Agriculture produce subsidies not included

\*\* Average for the period 1996-1998 in 1997 prices

**Table 2.** Business subsidies and government expenditures in Finland 1984-1997

<b>Year</b>	<b>Subsidies *</b>	<b>Subsidies as % of GDP</b>	<b>Subsidies as % of Gov. Expenditures</b>
1984	3 358	0,70	2,53
1985	3 400	0,69	2,42
1986	3 439	0,68	2,32
1987	3 579	0,68	2,27
1988	3 353	0,60	2,29
1989	3 951	0,68	2,59
1990	4 298	0,74	2,73
1991	5 502	1,01	2,99
1992	5 554	1,05	2,75
1993	6 094	1,16	2,84
1994	5 746	1,06	2,80
1995	4 489	0,80	2,26
1996	4 308	0,73	2,16
1997	3 018	0,48	1,64

Source: Junka and Venetoklis (1999, pp. 233-234)

\* in FIM 1 000 000; in 1995 prices

**Table 3.** Value Added growth of firms 1984-1997

<b>Year</b>	<b>Value Added *</b>	<b>yr/yr % change</b>	
<b>1984</b>	315 410		
<b>1985</b>	325 509	3,20	
<b>1986</b>	333 116	2,34	
<b>1987</b>	347 097	4,20	
<b>1988</b>	363 665	4,77	
<b>1989</b>	385 137	5,90	
<b>1990</b>	386 639	0,39	
<b>1991</b>	353 450	-8,58	
<b>1992</b>	341 086	-3,50	
<b>1993</b>	342 675	0,47	
<b>1994</b>	364 425	6,35	
<b>1995</b>	380 582	4,43	95-97 %
<b>1996</b>	399 109	4,87	change
<b>1997</b>	428 749	7,43	12,66

Source: Statistics Finland

\* in FIM 1 000 000; in 1995 prices

**Table 4.** Business subsidies\* in Finland per distributor 1990-1997

	1990	1991	1992	1993	1994	1995	1996	1997
<b>VN - Council of State **</b>	-3,2	-2,9	-8,4	-5,7	-8,1	-14,0	-9,0	-3,2
<b>UM - (M)inistry of For. Affairs</b>	33,4	41,7	50,4	40,2	34,7	34,2	32,3	26,1
<b>SM - M of Interior</b>	4,3	0,0	0,0	0,0	0,0	0,0	0,0	193,8
<b>PM - M of Defence **</b>	0,0	-0,4	1,8	3,3	1,9	4,5	3,6	1,6
<b>VM - M of Finance</b>	147,3	197,4	199,1	220,5	177,3	173,0	59,7	44,6
<b>OP - M of Education</b>	181,6	196,5	161,9	130,9	170,5	296,3	357,0	518,2
<b>MMM - M of Agriculture</b>	2,0	1,7	20,5	48,0	58,6	46,8	47,2	35,7
<b>LM - M of Transport</b>	813,3	954,7	882,0	476,7	609,4	470,3	361,8	223,9
<b>KTM - M of Trade &amp; Industry</b>	2117,9	2991,2	2691,3	3830,1	3709,4	2861,2	3149,9	1667,8
- of which TEKES	191,8	251,7	308,7	446,4	325,7	607,5	615,9	665,3
<b>TM - M of Labour</b>	505,2	592,0	1049,7	916,1	689,9	530,4	319,8	315,0
<b>YM - M of Environment</b>	48,5	47,0	61,8	77,5	74,6	86,5	55,4	50,0
<b>Total</b>	3850,2	5018,9	5110,0	5737,5	5518,3	4489,2	4377,7	3073,5

Source: Statistics Finland

\*in FIM 1 000 000

\*\* Negative figures are probably due to redemption of state guarantee subsidies given earlier to firms

**Table 5.** Initial amount of records received with data on firms and their subsidies

		<b>Source No aid</b>	<b>KTM</b>	<b>TEKES</b>	<b>TM</b>	<b>MTYE<sup>31</sup></b>	<b>MMM</b>	<b>Comb.</b>	<b>Total</b>
<b>When</b>	<b>No aid</b>	133618							133618
<b>Paid</b>	<b>95</b>		1273	145	15233		8558	232	25441
	<b>96</b>		1174	76	13546	33	1126	59	16014
	<b>97</b>		1235	60	15748	27	9575	290	26935
	<b>95, 96</b>		619	62	4523		6519	822	12545
	<b>95, 97</b>		176	12	1221		444	563	2416
	<b>96, 97</b>		459	54	4952	22	5814	793	12094
	<b>95, 96, 97</b>		372	76	3035		84275	4242	92000
<b>Total</b>		133618	5308	485	58258	82	116311	7001	321063

<sup>31</sup> MTYE stands for the Finnish Farmers' Pension Organisation. The amount of firms receiving aid from this source are quite small, but are nevertheless reported since they appeared in our initial sample. The final sample of firms examined (Table 6) did not include any of these 82 firms.

**Table 6.** Sample of firms examined based on source of subsidies

		<b>Source</b>						
		<b>No aid</b>	<b>KTM</b>	<b>TEKES</b>	<b>TM</b>	<b>MMM</b>	<b>Comb.</b>	<b>Total</b>
<b>When</b>	<b>(1) No aid</b>	23769						23769
<b>Paid</b>	<b>(2) 95</b>		253	32	2601	16	81	2983
	<b>(3) 96</b>		260	15	837	31	24	1167
	<b>(4) 97</b>		211	9	1546	118	63	1947
	<b>(5) 95, 96</b>		173	22	1154	8	293	1650
	<b>(6) 95, 97</b>		64	4	476	5	238	787
	<b>(7) 96, 97</b>		141	12	1171	6	256	1586
	<b>(8) 95, 96, 97</b>		196	24	1208	69	1259	2756
	<b>(9) Total</b>	23769	1298	118	8993	253	2214	36645

**Table 7.** Selected financial data statistics of recipient and non-recipient firms

		<b>N</b>	<b>Mean *</b>	<b>Std. Deviation *</b>	<b>Skewness</b>	<b>Kurtosis</b>
	<b>Variables</b>					
<b>Non-recipient firms</b>	<b>DLNVA975</b>	23 769	0,110	0,514	0,2	11,5
	<b>DVA97_5 *</b>	23 769	206	2 001	6,2	241,5
	<b>VA95 *</b>	23 769	1 682	3 887	8,6	108,8
	<b>SALES95T *</b>	22 318	9 913	573 780	148,4	22 120,6
	<b>OPEMA95T *</b>	23 356	570	1 783	10,5	174,2
	<b>TOTA95T *</b>	23 430	4 490	45 765	48,2	2 915,0
	<b>PERSO95T</b>	23 769	9,2	15,3	6,3	56,2
	<b>TANGA95T *</b>	23 769	868	4 795	16,9	374,2
<b>Recipient firms</b>	<b>DLNVA975</b>	12 876	0,181	0,530	0,4	10,6
	<b>DVA97_5 *</b>	12 876	651	3 432	5,6	97,2
	<b>VA95 *</b>	12 876	3 404	6 749	4,8	29,9
	<b>SALES95T *</b>	12 199	10 810	33 408	19,4	718,8
	<b>OPEMA95T *</b>	12 641	1 042	2 614	6,5	61,4
	<b>TOTA95T *</b>	12 685	7 563	45 520	54,4	4 108,9
	<b>PERSO95T</b>	12 876	18,6	27,3	3,5	15,4
	<b>TANGA95T *</b>	12 876	2 096	7 447	9,0	108,0

\* in FIM 1 000

Table 8. Aggregate models with recipient and non-recipient firms

Dependent variable: DLNVA975

Model	Independent variable	Estimator	When aid	Counterfactual	B	t	sig.	R <sup>2</sup> (adj.)	N of firms	RETURN
1	TASA95P0	OLS	95 & 96	Yes	2,01E-05	0,496	0,620	0,481	25338	
2		OLS	95 & 96	No	1,53E-05	0,381	0,703	0,504	1569	
3		OLS	95	Yes	9,42E-04	1,049	0,294	0,486	26577	
4		OLS	95	No	8,53E-04	0,987	0,324	0,539	2808	
5	TAOM95P0	OLS	95 & 96	Yes	8,24E-07	0,333	0,739	0,482	25398	
6		OLS	95 & 96	No	8,57E-07	0,353	0,724	0,510	1629	
7		OLS	95	Yes	-6,93E-06	-0,625	0,532	0,488	26689	
8		OLS	95	No	-6,21E-06	-0,605	0,545	0,552	2920	
9	TATA95P0	OLS	95 & 96	Yes	-2,07E-05	-0,719	0,472	0,482	25394	
10		OLS	95 & 96	No	-2,06E-05	-0,720	0,472	0,517	1625	
11		OLS	95	Yes	9,20E-04	1,866	0,062	0,487	26707	0,220
12		OLS	95	No	8,34E-04	1,730	0,084	0,542	2938	0,299
13	TAVA95P0	OLS	95 & 96	Yes	5,25E-03	12,494	0,000	0,486	25419	0,722
14		IV	95 & 96	Yes	4,46E-04	0,357	0,721	0,482	25419	
15		OLS	95 & 96	No	6,27E-03	14,765	0,000	0,575	1650	1,559
16		IV	95 & 96	No	-2,10E-04	-0,117	0,906	0,516	1650	
17		OLS	95	Yes	5,75E-03	7,935	0,000	0,489	26752	1,260
18		IV	95	Yes	9,02E-04	0,488	0,626	0,487	26752	
19		OLS	95	No	6,29E-03	8,711	0,000	0,557	2983	2,048
20		IV	95	No	3,31E-04	0,155	0,877	0,546	2983	



Table 9. Disaggregate models with recipient firms only. Subsidies received through the KTM.

Dependent variable: DLNVA975

Model	Independent variable	Estimator	When aid	Counterfactual	B	t	sig.	R <sup>2</sup> (adj.)	N of firms	RETURN
21	TASA95P0	OLS	95 & 96	No	-5,31E-05	-0,347	0,729	0,637	165	
22	TAOM95P0	OLS	95 & 96	No	-2,77E-07	-0,123	0,903	0,615	170	
23	TATA95P0	OLS	95 & 96	No	-1,16E-04	-0,053	0,958	0,611	171	
24	TAVA95P0	OLS	95 & 96	No	3,07E-03	2,088	0,038	0,623	173	0,863
25		IV	95 & 96	No	8,47E-04	0,275	0,783	0,615	173	
26	TASA95P0	OLS	95	No	-1,40E-03	-1,180	0,239	0,613	239	
27	TAOM95P0	OLS	95	No	-8,25E-06	-0,073	0,942	0,633	244	
28	TATA95P0	OLS	95	No	1,50E-04	0,255	0,799	0,626	248	
29	TAVA95P0	OLS	95	No	-5,52E-05	-0,032	0,974	0,624	253	

Table 10. Disaggregate models with recipient firms only. Subsidies received through TEKES.

Dependent variable: DLNVA975

Model	Independent variable	Estimator	When aid	Counterfactual	B	t	sig.	R <sup>2</sup> (adj.)	N of firms	RETURN
30	TASA95P0	OLS	95 & 96	No	-2,38E-03	-0,502	0,631	0,884	21	
31	TAOM95P0	OLS	95 & 96	No	9,19E-05	1,477	0,183	0,912	22	
32	TATA95P0	OLS	95 & 96	No	-2,25E-04	-0,083	0,936	0,884	22	
33	TAVA95P0	OLS	95 & 96	No	-1,15E-03	-0,406	0,697	0,887	22	
34	TASA95P0	OLS	95	No	6,49E-03	0,794	0,439	0,675	31	
35	TAOM95P0	OLS	95	No	2,84E-04	1,145	0,269	0,678	31	
36	TATA95P0	OLS	95	No	2,13E-04	0,048	0,962	0,719	31	
37	TAVA95P0	OLS	95	No	2,29E-03	0,774	0,540	0,683	32	

Table 11. Disaggregate models with recipient firms only. Subsidies received through the TM.

Dependent variable: DLNVA975

Model	Independent variable	Estimator	When aid	Counterfactual	B	t	sig.	R <sup>2</sup> (adj.)	N of firms	RETURN
38	TASA95P0	OLS	95 & 96	No	1,74E-05	0,394	0,694	0,473	1098	
39	TAOM95P0	OLS	95 & 96	No	1,64E-05	0,279	0,781	0,469	1137	
40	TATA95P0	OLS	95 & 96	No	-2,00E-05	-0,661	0,509	0,481	1134	
41	TAVA95P0	OLS	95 & 96	No	7,92E-03	15,701	0,000	0,577	1154	3,641
42		IV	95 & 96	No	1,90E-03	0,207	0,836	0,503	1154	
43	TASA95P0	OLS	95	No	3,69E-03	2,551	0,011	0,528	2447	0,573
44	TAOM95P0	OLS	95	No	-6,95E-06	-0,668	0,504	0,538	2556	
45	TATA95P0	OLS	95	No	2,09E-03	2,025	0,043	0,528	2562	0,796
46	TAVA95P0	OLS	95	No	1,08E-02	11,046	0,000	0,554	2601	3,460
47		IV	95	No	-1,19E-05	-0,002	0,9987	0,532	2601	

Table 12. Disaggregate models with recipient firms only. Subsidies received through the MMM.

Dependent variable: DLNVA975

Model	Independent variable	Estimator	When aid	Counterfactual	B	t	sig.	R <sup>2</sup> (adj.)	N of firms	RETURN
48	TASA95P0	OLS	95 & 96	No	n/a	n/a	n/a	n/a	8	
49	TAOM95P0	OLS	95 & 96	No	n/a	n/a	n/a	n/a	8	
50	TATA95P0	OLS	95 & 96	No	n/a	n/a	n/a	n/a	8	
51	TAVA95P0	OLS	95 & 96	No	n/a	n/a	n/a	n/a	8	
52	TASA95P0	OLS	95	No	0,181	n/a	n/a	n/a	14	
53	TAOM95P0	OLS	95	No	-2,86E-02	n/a	n/a	n/a	15	
54	TATA95P0	OLS	95	No	2,32E-02	0,373	0,773	0,737	16	
55	TAVA95P0	OLS	95	No	-6,61E-03	-2,065	0,287	0,983	16	

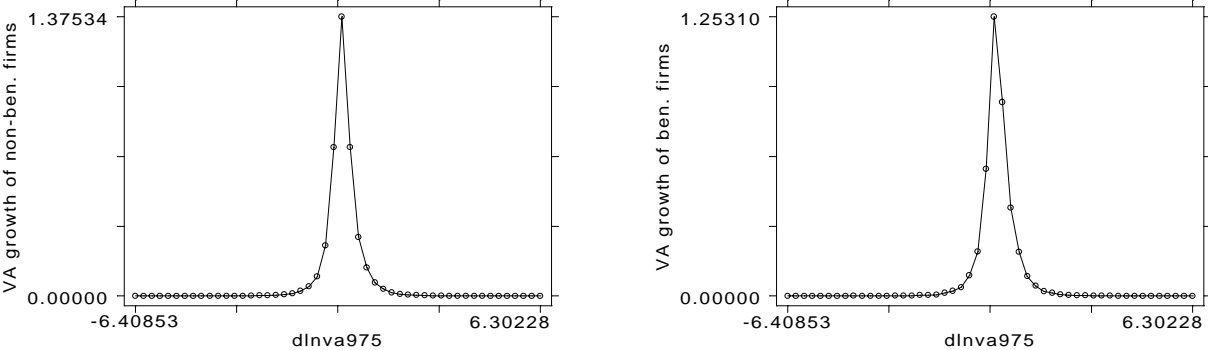
Table 13. Disaggregate models with recipient firms only. Subsidies received through COMBINATION.

Dependent variable: DLNVA975

Model	Independent variable	Estimator	When aid	Counterfactual	B	t	sig.	R <sup>2</sup> (adj.)	N of firms	RETURN
56	TASA95P0	OLS	95 & 96	No	-2,23E-04	-0,129	0,897	0,615	277	
57	TAOM95P0	OLS	95 & 96	No	1,09E-04	1,058	0,291	0,669	292	
58	TATA95P0	OLS	95 & 96	No	1,19E-03	0,950	0,343	0,668	290	
59	TAVA95P0	OLS	95 & 96	No	9,29E-04	0,844	0,399	0,667	293	
60	TASA95P0	OLS	95	No	6,73E-02	3,977	0,000	0,716	77	20,756
61	TAOM95P0	OLS	95	No	5,67E-05	0,735	0,466	0,708	74	
62	TATA95P0	OLS	95	No	1,42E-02	1,683	0,098	0,655	81	6,402
63	TAVA95P0	OLS	95	No	2,65E-02	5,116	0,000	0,751	81	15,511
64		IV	95	No	1,51E-01	0,510	0,6117	-0,00024	81	

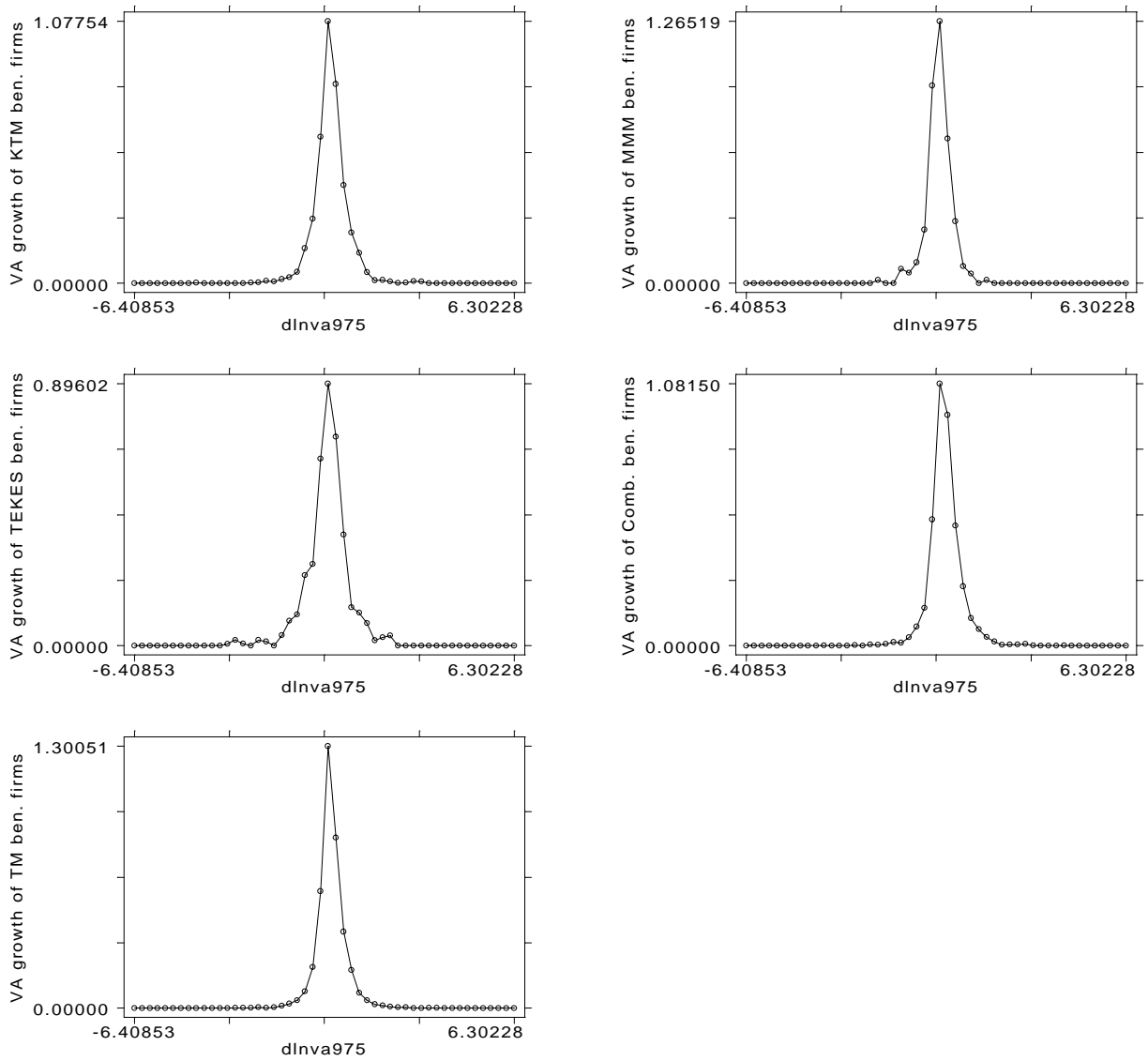
**Figures**

**Figure 1.** Kernel density estimation of VA growth\* for non-recipient and recipient firms



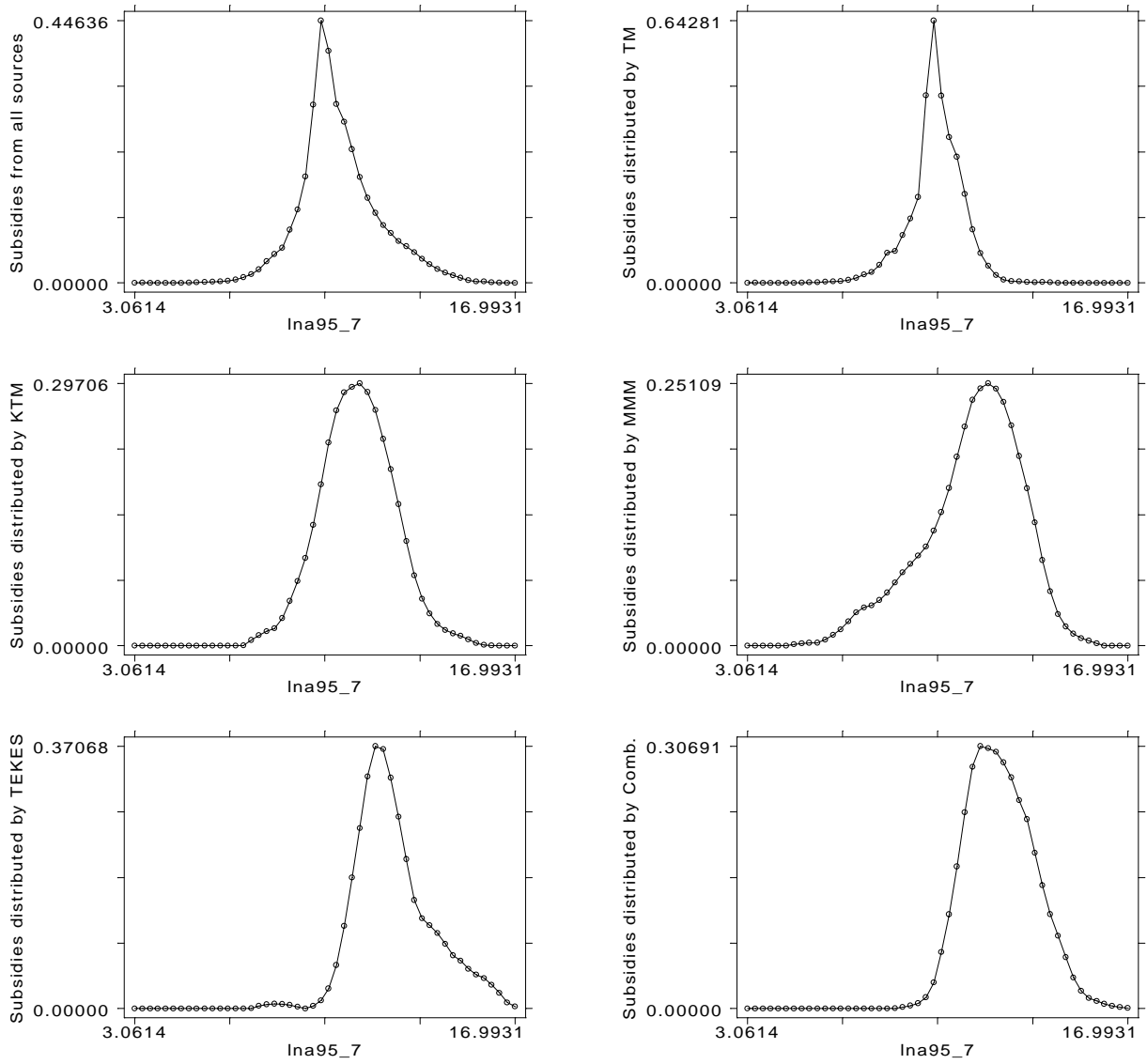
\* differences of logged values

**Figure 2.** Kernel density estimation of VA growth\* for recipient firms based on source



\* differences of logged values

**Figure 3.** Kernel density estimation of subsidies\* for all recipient firms and based on source



\* logged values



## The “return“ indicator

In Tables 8 -13, next to the models where the B coefficient turned out statistically significant, we estimated a RETURN number. This is nothing more than a rough indicator of how much Value Added has been attributed to the receipt of the respected subsidies. Consider as an example the return indicator in model 24 (in Table 9). Table 14 lists the amounts we will use to describe the calculations.

**Table 14.** Amounts used to calculate the RETURN indicator of model 24.

	<b>N</b>	<b>Sum</b>	<b>Mean</b>		
<b>DLNVA975</b>	173		0,13841		
<b>TAVA95P0</b>	173		12,289		
<b>DVA97_5</b>	173	99 374 915			
<b>AID95670</b>	173	31 351 595			
<b>Valid N (listwise)</b>	173				
<b>B Coefficient</b>	<b>inc 1%</b>	<b>% inc</b>	<b>FIM inc</b>	<b>FIM inc</b>	<b>RETURN</b>
	<b>TASA95P0</b>	<b>AID95670</b>	<b>AID95670</b>	<b>va97_5</b>	
3,07E-03 or 0,00307	13,289	0,08137	2 551 166	2 204 134	0,863

In our models we calculated the Value Added growth (our dependent variable) in log linear format (see section 2.3). Thus, we have

$$DLNVA975 = \text{Value added 97 (logged to base e)} - \text{Value Added 95 (logged to base e)}.$$

This difference (of logged value added between 97 and 95) has a mean 0,13841 or 13,841%.

The subsidy (independent) variable used in this model is subsidies received for 1995 and 1996 over Value Added in 1995; it is the variable TAVA95P0. That variable's mean value is 12,28% (the fraction has already been multiplied by 100 to represent percentage).

Were we to increase the TAVA95P0 by 1% from 12,289% to 13,289%, keeping the denominator Value Added for 1995 *constant* (remember we are interested in the subsidy variable which is the *nominator* of the TAVA95P0 fraction variable), the total subsidies would have to increase by approx. 8,137% [(13,289%-12,289%)/12,289% or 1%/12,289%].

This is shown under "% inc AID95670" or by FIM 2 551 166 (31 351 595 \* 8,137%)

How much would the Value Added growth increase at the same time? We know that the B coefficient indicates the percentage increase of the dependent variable as the independent variable increases by 1% (that is because the values are logged to the base e). The B coefficient of the TAVA95P0 in this case is 0,00307.

If the 13,841% increase represents Value Added growth of FIM 99 374 915, then the 0,307% increase (0,00307 \* 100) would represent approx. FIM 2 204 134 [(99 374 915 \* 0,307%)/13,841%].

The RETURN indicator 0, 863 is then calculated by dividing Value Added growth over Subsidies growth or FIM 2 204 134 over FIM 2 551 166. This indicates that for every FIM 100 of subsidies received through the KTM, the recipient firms in our sample generated between 1995 and 1997 FIM 86 in Value Added growth; that is, less than the initial amount received.

At first glance the above calculations may seem complicated, but they are really based on elementary algebra. One just needs to keep in mind that the dependent variable is in *log linear form* and the independent variable is the *nominator of a fraction multiplied by 100 to represent percentage*.

The amounts based on which the other return indicators were calculated are not shown here, but are available upon request.



**METHODS APPLIED IN EVALUATING BUSINESS SUBSIDY  
PROGRAMS: A SURVEY**

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**University of Tampere, Department of Administrative Science**



# METHODS APPLIED IN EVALUATING BUSINESS SUBSIDY PROGRAMS: A SURVEY <sup>\*</sup>

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## Abstract

This study 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. 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.

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<sup>\*</sup> 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.



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## 1. Introduction

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 methods<sup>1</sup> 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 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 simply<sup>2</sup> 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:

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<sup>1</sup> The definition of method as used in this paper is shown below.

<sup>2</sup> 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.

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. In the Appendix one finds all the tables referred to in the text as well as a methodological analysis of a study evaluating the impacts of the Structural Funds on recipient SMEs.

## 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.

[Place Table 1 here – All tables mentioned in the text are found at the end of the study]

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 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.

[Place Table 2 here]

This is not a comprehensive review of Finnish evaluation studies on business subsidies. Nor is it an attempt to conduct a meta-evaluation of these<sup>3</sup>. We have not included earlier (pre-1995) impact studies on business subsidies. (i.e. Okko (1986))<sup>4</sup>. 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.

<sup>3</sup> For a comprehensive meta-evaluation of evaluation studies conducted in Finland, see Haapalainen (1998).

<sup>4</sup> 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.

Finally, we have not examined publications directly from TEKES, FINNVERA (Government Special Credit Agency) or the Ministry of Labour<sup>5</sup> which also subsidise firms in many different forms.

## 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 approaches<sup>6</sup> 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 money<sup>7</sup>. Nor were there accessible any studies commissioned by ministries in other countries with outside evaluators, evaluating the ministries' business subsidy activities<sup>8</sup>.

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.

[Place Table 3 here]

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 7 and in Appendix for more on this study).

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<sup>5</sup> 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.

<sup>6</sup> See Table 1 for more on these methodological characteristics.

<sup>7</sup> A 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.

<sup>8</sup> These types of studies most likely do exist but are probably available at national level only, and not reported in journals.

### 2.3 Frequency analysis<sup>9</sup> 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)<sup>10</sup>, 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.

[Place Tables 4 - 7 here]

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 sides<sup>11</sup> 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.

<sup>9</sup> 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.

<sup>10</sup> Although this study is in principle an ex post evaluation, it was difficult to comprehend and classify, thus was left out.

<sup>11</sup> 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 Barkman 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 tools<sup>12</sup> 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 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.

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<sup>12</sup> These analytical tools will be the topic of the following section.

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 representative<sup>13</sup> 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 weight<sup>14</sup> phenomena in the impact indicators measured with our evaluation.

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<sup>13</sup> By "representative" we mean a group of non-subsidised firms as similar as possible to the subsidised ones.

<sup>14</sup> An excellent discussion on dead weight and spill over effects, specifically geared towards employment programs, is found in Hietala (1997).



### 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 models<sup>15</sup> 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).

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 ensure (test) that the size of the coefficient of interest is not biased on the upper or the lower side and 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.

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<sup>15</sup> 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).

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 utilised<sup>16</sup>
- 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.

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 model<sup>17</sup>.

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.

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<sup>16</sup> 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.

<sup>17</sup> 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 recommendations<sup>18</sup>

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 grid<sup>19</sup> (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	⇒⇒⇒⇒	⇒⇒⇒⇒	⇒⇒⇒⇒

The flow of information from these evaluation studies is at the beginning (ex ante) stages, top ⇒ bottom. As the implementation phase proceeds and subsidies are distributed to firms, the information flow reverses direction and becomes bottom ⇒ 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 agency<sup>20</sup>, 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

<sup>18</sup> The recommendations listed in this section are primarily geared to assist the evaluation practices of the KTM. However, since these recommendations could potentially apply to other agencies and ministries involved in the distribution of business subsidies to firms, the KTM is not mentioned specifically. Instead, the word “ministry” is used to incorporate both ministries and other government agencies distributing business subsidies.

<sup>19</sup> Such a grid was discussed recently in the KTM working group.

<sup>20</sup> The government agency responsible for the design and implementation of the business subsidy policy.

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 operations<sup>21</sup>. 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 ministry should thus shift its resources on ex nunc and ex post evaluation methods and studies when it *is itself 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 a ministry, 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. For example, committees selecting potential evaluators should not include members from the department whose operations are evaluated.

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 ministry, and have to think of the constraints and obligations that the ministry in question 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.

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<sup>21</sup> For a good example of such a model, see Honohan, (1998).

### 4.3 Methods in analysing data

#### ***Recommendations***

- If we first look at the evaluations done within the ministry 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 ministry should continue to commission ad hoc evaluations if this practice has already been adopted. 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 ministry 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 ministry 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

### Tables

**Table 1.** Classification characteristics of evaluation studies

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<p><b>Commissioned/Conducted by</b> Ministry / Research organisation (Commissioned), Conducted independently by research organisation (Own)</p>
<p><b>The level of (potential) impacts at</b> Firm level (micro – In depth), regional/national level (macro – Overall)</p>
<p><b>Types of subsidies in question</b> Direct transfer of moneys, Interest subsidised loans, Guarantees, Advisory services</p>
<p><b>Perspective</b> Ex ante, Ex nunc (on going), Ex post</p>
<p><b>The method of gathering the data for analysis</b>  <i>For primary data</i><sup>22</sup> Interviews / Questionnaires with parties receiving aid and/or with other parties directly/indirectly involved in the process of subsidy planning/distribution  <i>For secondary data</i><sup>3</sup> Other documentation, Financial Statements, Project data, Socio-economic indicators, Case studies</p>
<p><b>Counterfactual measurement</b> 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><b>The method applied in analysing the data</b> 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), GLS (Generalised Least Squares), DID (Difference in Differences), WLS (Weighted Least Squares), Logit, Probit, Logistic</p>
<p><b>Evaluation results (general consensus of the study)</b> Positive (+), Negative (-), Mixed, rather positive (+/-), Mixed, rather negative (-/+)</p>
<p><b>Overall classification</b> 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>

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<sup>22</sup> The classification of data into primary and secondary is found in Hedrick et al. (1993, pp. 68-92).

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><b>Title:</b> Yritystuen vaikutukset yritykseen ja yhteiskunnan kannalta. (The effects of enterprise subsidies from the standpoint of enterprise and society).</p> <p><b>Author:</b> Rolf Myhrman, et al. (1995)</p> <p><b>Goal:</b> Measure effectiveness of grants on financial structure, profitability, market functioning of firms</p> <p><b>Data from:</b> 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	(+) Positive effects on output quality Positive impact on financial structure due to reduction of financial risk
<p><b>Title:</b> A prior Appraisal of the Regional Development plan for Finland's Objective 2 Regions.</p> <p><b>Author:</b> Heikki Eskelinen et al. (1996)</p> <p><b>Goal:</b> 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><b>Data from:</b> 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)	(-/+) Strategies and priorities were derived from a fairly limited background analysis and seemed rather intuitive Rationale for delivery of the funding Implementation and monitoring organisations had been planned but proposed indicators for evaluating and follow up were only tentative
<p><b>Title:</b> Suomen tavoite 2 –ohjelmantöön käynnistyminen. Elinkeinopoliittisten hankkeiden seuranta vuoden 1995 loppuun mennessä</p> <p><b>Author:</b> Bo Förström and Maarit Mustonen (1996)</p> <p><b>Goal:</b> Analyse the initial implementation of the Finnish Objective 2 programme on a regional basis</p> <p><b>Data from:</b> 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	(+/-) 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><b>Title:</b> Suomen Tavoite 2-Ohjelman toteutuksen Vuosille 1997-1999 Ex Ante –Arviointi.  <b>Author:</b> Timo Aro et al. (1997)  <b>Goal:</b> Examine how the Finnish Objective 2 program document matches predefined criteria and how it assists in their fulfilment  <b>Data from:</b> 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)	(+) The proposal seemed to adapt well to national and EU goals and strategies.
<p><b>Title:</b> Tavoite 2 –ohjelman ympäristövaikutusten arviointi  <b>Author:</b> Pauli Marjanen (1997)  <b>Goal:</b> Evaluate the predefined effects on the environment mentioned in the Objective 2 program document at Satakunta; evaluate the evaluation methods applied  <b>Data from:</b> 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)	(-) Author is critical of evaluation methods applied; many aspects could be improved and clarified
<p><b>Title:</b> Suomen tavoite 2 –ohjelman 1995-1996 arviointi  <b>Author:</b> Sisäasiainministeriö (1997)  <b>Goal:</b> Evaluate the implementation of the Finnish Objective 2 programme for the period 1995-1996  <b>Data from:</b> 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	(+) 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><b>Title:</b> Kuntien yritystuet. Kustannus-Hyötärkastelu suorien yritystukien vaikutuksista kuntien talouteen  <b>Author:</b> Hannu Pirkola (1997)  <b>Goal:</b> Develop better methods for assessing the costs and benefits accruing to the municipal economy through subsidised projects; assessing the impacts of subsidised projects  <b>Data from:</b> Municipalities having given subsidies to firms between 1985-1990 (362); Projects having received subsidies during the same period (30)</p>	Abo 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)	(+) 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><b>Title:</b> Pk-Yritykset ja julkinen tuki. Tutkimus yritystukilain mukaisten yritystukien vaikuttavuudesta, toimivuudesta ja kehittämisarpeista.</p> <p><b>Author:</b> Marko Muotio (1998)</p> <p><b>Goal:</b> Examine the impact of business subsidies based on Law 1136/93</p> <p><b>Data from:</b> 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	<p>(+)</p> <p>With the subsidies the firms managed to purchase better production technologies</p> <p>Employment on recipient firms was maintained and new permanent jobs were created</p> <p>Direct effects of subsidies on environment were minimal but indirect effects were higher</p>
<p><b>Title:</b> Yritysten vaikuttavuus ja sen mittaaminen: puu- ja huonekaluteollisuusyrityksille myönnetty investointiavustukset</p> <p><b>Author:</b> Marko Tuomiaro and Matti Virén (1998)</p> <p><b>Goal:</b> Measure impacts on investment growth and employment</p> <p><b>Data from:</b> 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)	<p>(-/+)</p> <p>Effects of subsidies on employment and investment were positive but minor</p>
<p><b>Title:</b> High Technology Investment, Growth and productivity</p> <p><b>Author:</b> Petri Nijinen (1999)</p> <p><b>Goal:</b> Impacts of publicly subsidised R&amp;D on private R&amp;D investments</p> <p><b>Data from:</b> Firms having received R&amp;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)	<p>(+/-)</p> <p>Limited effect on private R&amp;D investment;</p> <p>Loans seem to have had more effect.</p>
<p><b>Title:</b> Process evaluation of business subsidies in Finland. A quantitative approach.</p> <p><b>Author:</b> Takis Venetoklis (1999)</p> <p><b>Goal:</b> Evaluate process with which business subsidies were distributed to firms</p> <p><b>Data from:</b> Firms having received business subsidies between 1995-1997 (304 firms), and of KTM regional offices at Turku &amp; 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),	<p>(-)</p> <p>No clear differences between firms receiving aid and those that did not</p> <p>Financing procedures and project selection were not standardised between the two KTM regional offices examined</p>

\* 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><b>Title:</b> Economic Value Added from EU Investment Subsidies: Evidence from the Finnish Fish Industry  <b>Author:</b> Jaakko Kjellman et al. (1999)  <b>Goal:</b> Examine what factors contributed to value creation in subsidised firms in the Fish processing industry.  <b>Data from:</b> Firms having received subsidies through the EU Structural Funds – the FIGG between 1995-1997 (47 firms)</p>	Abo Akademi (Own)	In depth, Overall	Direct transfers	Ex post	Interviews/ Questionnaires	Estimates from firms	Descriptive, Econometric/ Statistical (logistic regression, Mann-Whitney U-test)	(+) Despite considerable dead weights, subsidies generated investments and increased product quality
<p><b>Title:</b> Selvitys Elintarviketeollisuuden EU-siirtimäkauden kansainvälistymistuen käytöstä ja vaikuttavuudesta  <b>Author:</b> Raija Lääperi and Timo Tohmio (1999)  <b>Goal:</b> Measure impacts on employment, competitiveness, internationalisation  <b>Data from:</b> 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	(+) Medium to high positive influence on firm competitiveness and internationalisation
<p><b>Title:</b> Impact of business subsidies on growth of firms – Preliminary evidence from Finnish Panel Data  <b>Author:</b> Takis Venetoklis (2000)  <b>Goal:</b> Measure the impact of direct subsidies on Value Added Growth of firms  <b>Data from:</b> Firms having received subsidies (not R&amp;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, 2SLS with IV**)	(-/+) 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><b>Title:</b> Suomen SME – Yhteisöaloiteohjelman väliarviointi /Mid-term Evaluation of Finnish SME Community Initiative (CI) programme 1995-1999  <b>Author:</b> Pekka Stenholm and Satu Hietanen (2000)  <b>Goal:</b> Examine how the projects under the CI program operated and what were the benefits on the participant firms.  <b>Data from:</b> 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	(+) 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

\*\* In revised version

Table 2. (cont.)

Study	Ordered / Conducted	Impact level	Subsidy type	Perspective	Method of gathering data	Counter-factual measurement	Method of analysis	Main conclusions
<p><b>Title:</b> Tavoite 2 – ohjelman arviointi kaudella 1995-99. Loppuraportti  <b>Author:</b> Kari Itkonen et al. (2000)  <b>Goal:</b> Measure the impacts of the Finnish Objective 2 program for the period 1995-1999  <b>Target:</b> Firms having received subsidies and officials involved in the planning and implementation of the program  <b>Data from:</b> 432 projects, 48 subsidised firms, 84 interviews, 72 written questionnaires</p> <p><b>Title:</b> Impact of public R&amp;D on the profitability and growth performance of firms: A panel data study on Finnish Firms  <b>Author:</b> Olavi Lehtoranta (2000)  <b>Goal:</b> Measure the impact of public R&amp;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&amp;D subsidies  <b>Data from:</b> Subsidised firms through TEKES between 1991-1997 (4 sets of firm panel data), projects (1241 subsidised firms, 196 non-subsidised)*</p>	SM / Jyväskylä 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	(+/-) 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><b>Title:</b> Kauppa- ja teollisuusministeriön hallinnoalan EAKR- ja ESR-hankeiden vaikuttavuus  <b>Author:</b> Mika Silander et al. (2000)  <b>Goal:</b> 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  <b>Data from:</b> Projects of firms (282 through questionnaires, 22 case studies)</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, GLS)	(+/-) 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
	KTM / Jyväskylä Yliopisto (Commissioned)	In depth, Overall	Direct transfers	Ex post	Interviews/ Questionnaires, Other docs, Project docs, Case studies	Estimates from firms	Descriptive	(+) 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



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><b>Title:</b> Real Options, Wage bargaining, Factor Subsidies and Employment  <b>Author:</b> Stein Østbye (1995)  <b>Goal:</b> Examine whether regional subsidies on factors of production increase employment and find which is the most cost-effective factor to subsidise, labour or capital  <b>Data from:</b> Industrial groups (at SIC-3 digit level), in 313 Norwegian municipalities having received subsidies during 1980-1988</p>	University of Urmeå (Own)	Overall	Direct transfers	Ex post	Socio-economic indicators	No estimates	Econometric/Statistical (3SLS)	(+/-) Labour subsidies increase employment and the impact is large Capital subsidies reduce employment, but the effect is small
<p><b>Title:</b> Government interventions and productivity growth  <b>Author:</b> Jong-Wha Lee (1996)  <b>Goal:</b> Measure the impact of government industrial policy in Korea through tax incentives and subsidised credit  <b>Data from:</b> 38 Korean industries during 1963-1983 (measurements were taken 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)	(-) 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><b>Title:</b> Support to business R&amp;D: A survey and some new quantitative evidence  <b>Author:</b> Henri Capron and Bruno van Pottelsberghe (1997)  <b>Goal:</b> Test whether R&amp;D subsidies have a direct impact on productivity growth and whether they have a direct impact on private R&amp;D investment  <b>Data from:</b> 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 ***	(-/+) 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><b>Title:</b> Capital subsidies and the performance of firms (1998a)</p> <p><b>Author:</b> Fredrik Bergström (1998)</p> <p><b>Goal:</b> Examine the effects on Total Factor Productivity (TFP) of public subsidies to firms in Sweden</p> <p><b>Data from:</b> 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)	<p>(-/+)</p> <p>Subsidisation correlated positive with Value Added</p> <p>Productivity increases the first year after subsidies were granted.</p> <p>After first year, the more subsidies granted, the worse TFP growth develops. There is little evidence that subsidies effect positively productivity</p>
<p><b>Title:</b> Characteristics of government supported firms</p> <p><b>Author:</b> Fredrik Bergström (1998b)</p> <p><b>Goal:</b> 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</p> <p><b>Data from:</b> 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)	<p>(-/+)</p> <p>Younger firms supported due to lack of capital.</p> <p>No difference between subsidised and non-subsidised firms (could these firms have been able to finance the subsidised projects privately ?)</p> <p>Interest group hypothesis is supported.</p>
<p><b>Title:</b> The effects of capital subsidisation on Israeli Industry</p> <p><b>Author:</b> Arie Bregman et al.(1998)</p> <p><b>Goal:</b> Evaluate the policy effects of subsidising capital in firms at outlying development areas</p> <p><b>Data from:</b> 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)	<p>(-)</p> <p>Production inefficiencies ranging from 5% for firms that receive average level of subsidies, to 15% for heavily subsidised firms</p> <p>Much the subsidisation not necessary (subsidised firms earned higher rates of return on their total physical capital, than firms not subsidise)</p>
<p><b>Title:</b> Thematic Evaluation of Structural Fund Impacts on SMEs</p> <p><b>Author:</b> European Commission (1999)</p> <p><b>Goal:</b> Examine the Impacts of Structural fund interventions on SMEs located 14 EU countries in terms of employment, development and growth prospects</p> <p><b>Data from:</b> 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	<p>(+)</p> <p>Overall interventions have had a significant impact on the SME sector and made an important contribution to wider regional aid</p>

\* 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><b>Title:</b> Small firms, Economic growth and public policy: What exactly are the connections?</p> <p><b>Author:</b> Mark Hart (1999)</p> <p><b>Goal:</b> 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><b>Data from:</b> 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)	(+/-) 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><b>Title:</b> Do R&amp;D subsidies stimulate or displace private R&amp;D? Evidence from Israel</p> <p><b>Author:</b> Saul Lach (2000)</p> <p><b>Goal:</b> Evaluate the effects of R&amp;D subsidies on private R&amp;D expenditures by measuring (estimating) what the subsidised firms would have spent on R&amp;D themselves had they not received the subsidy</p> <p><b>Data from:</b> 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)	(-/+) An extra dollar of R&D subsidies increased private R&D by .41 dollars Projects could have been undertaken 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

**Table 4.** Method of analysis by Result

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

**Table 5.** Commissioned by Result

Commissioned		Result		Total
		Negative	Positive	
	Conducted Independently	7	6	13
	Commissioned by agency		9	9
	<b>Total</b>	<b>7</b>	<b>15</b>	<b>22</b>

**Table 6.** Counterfactual measurement by Result

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

**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	2
		Estimates from firms		7	7
	Conducted Independently	Estimates from calculations			
		N/a			
Econometric/Statistical	Commissioned by agency	No counterfactual calculation			
		Estimates from firms			
		Estimates from calculations			
	Conducted Independently	N/a			
		No counterfactual calculation		2	2
		Estimates from firms		2	2
	Estimates from calculations	5	2	7	
	N/a	2		2	
	<b>Total</b>		<b>7</b>	<b>15</b>	<b>22</b>

## 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 weaknesses<sup>23</sup> 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 known<sup>24</sup> 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).*

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<sup>23</sup> These weaknesses are discussed in more detail in section 3.1.

<sup>24</sup> The report cites McEldowney (1997) for additional information on methods applied in measuring additionality and dead weight

**BUSINESS SUBSIDIES AND BUREAUCRATIC BEHAVIOUR**

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# BUSINESS SUBSIDIES AND BUREAUCRATIC BEHAVIOUR \*

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## Abstract

The study attempts to apply William Niskanen's (1971) theory of budget maximising bureaucrats to the business subsidies policy implemented in Finland, by one of the major distributor of subsidies to firms, the ministry of Trade and Industry (KTM). The empirical analysis is based on records of 15 300 firms applying for aid through the KTM regional offices during 1995-1999 and on the budgeted appropriations given to the KTM between 1989 and 2000.

In testing Niskanen's theory we examine whether the four assumptions of the theory are relevant and applicable within the context of the KTM's business subsidies policy. First, information asymmetry is found to exist between the KTM and its sponsor (the ministry of Finance – VM). Second, bilateral monopoly is also evident between the two parties. Third, the VM does not seem to play a passive role during the budget negotiations with the KTM, as Niskanen assumed. The fourth assumption – the budget maximising bureaucrat – is tested by examining (a) the strategies of the KTM bureaucrats in attempting to maximise their bureau's budget and (b) the success in their budget maximisation efforts.

Looking at the budget maximisation strategies, we first examine whether, during the budget formulation procedure, the bureaucrats' request for funds is based on the previous year's appropriations. The results show that this is not the case between the KTM and the VM. However during the budget formulation the individual units within the KTM always request at least as much moneys as the previous year's allocated appropriations. We also examine how the bureaucrats behave in distributing the subsidies to firms and whether this supports a budget maximisation strategy. We find that during December an increased amount of positive decisions to subsidise are made. This indicates that bureaucrats attempt to get rid of unallocated funds before year's end in order to avoid receiving less the following years. Finally we question why 25% of the recipient firms during the period 1995-1999 received repeatedly subsidies while 75% of firms received subsidies only once. We find that the odds of firms receiving aid more than once, compared to receiving aid once only, generally increased if they were older, their value added growth was higher and their legal status was Ltds (Oy). In other words bureaucrats pursued a "creaming" policy where only the firms that had better chances of success received more subsidies. Theoretically, in that way they can guard themselves by reducing the chances that a policy does not achieve its goals and thus avoid the risk of having later deductions in the program's budget.

In testing whether the bureaucrats are successful in maximising their budgets, we match administrative expenditures against appropriations for subsidies during the period 1989-2000. The analysis shows that despite the fact that subsidy appropriations have fluctuated during the period, administrative expenses (including salaries) have stayed flat or grown to some degree. Although this is not a finding that could be used causally, it indicates that bureaucrats have succeeded in - at least - safeguarding the appropriations which are of most importance to them. Overall we believe we have found evidence (partly) supporting Niskanen's theory when applied to the business subsidy programs in Finland, as implemented by the KTM.

The study concludes that the current business subsidy policy in Finland should change. Among others, it recommends that direct subsidies to firms should be reduced further, and be substituted by advanced advisory services, subsidised loans and forgivable loans.

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Although the pronoun "we" is used through out the text, the author is solely responsible for any opinions expressed, mistakes or omissions found.



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## 1. Introduction

This study examines the business subsidy policy implemented in Finland and attempts to explain the rationale behind it. Although the amount of subsidies spent on firms has gradually been diminishing during the second half of the 1990s, and compared to other EU Member States is much lower, it still constitutes a substantial chunk of Finland's yearly budget outlays (Table 1). Thus, measuring the effectiveness and efficiency of the business subsidy programs is quite important; if the use of business subsidies is not effective and efficient then welfare could be improved by channelling the subsidy appropriations to other uses or returning them back to the taxpayers. However, the measurement of the impacts of subsidies is in general problematic, mainly due to the lack of detailed and reliable financial data of subsidised firms as well as due to the inherited heterogeneity of these firms. Furthermore, the multiple factors which interact in the firms' business environment make it even harder to isolate the true impacts of a received subsidy on the firm's operations, on other firms and on the region where the firm is located (due to spill over effects).

[Place Table 1 here – All tables mentioned in the text are found at the end of the study]

The ultimate purpose of a utilitarian government policy is to improve the welfare of its citizens. Nevertheless, numerous studies on business subsidies, indicate that such an optimistic view is questionable by showing only small positive impacts. In addition, when the costs associated with the implementation of such policies are taken into account, the net effect of subsidies is overwhelmingly negative.

Hence the question that comes forward is why such business subsidy policies are still implemented. There are many theories attempting to explain this. Most examine the problem from the demand side of subsidies (i.e. the recipient firm). These theories basically argue that due to market failures in the business environment where these firms operate, governments are obliged to intervene and restore to equilibrium the distorted markets functions. However, there are other theories which look into the problem from the supply side of subsidies (the distributors of subsidies). These are the so called public choice theories that basically assume that bureaucrats who design and implement government policies are in fact maximisers of their own utility. To achieve this, they pursue the maximisation of the budget allocated to their agencies. Thus one can apply this logic to the business subsidy programs and can argue that a proportion of direct subsidy transfers given to firms is due to budget maximising attempts of bureaucrats involved in these programs. To put it differently, part of the subsidies to firms is oversupplied because it does not correspond to the true needs of the recipient firms. This in turn creates inefficiency and ineffectiveness in the business subsidy policies. We will adopt this hypothesis in this study and we present empirical evidence testing it.

The rest of the study continues as follows. In chapter 2 we introduce the concept of subsidies in general and business subsidies in particular. We discuss the classic rationale behind government intervention through subsidies and mention the roles that the government plays, in particular the ones which can be linked to subsidy policies. We also refer to the different subsidies currently in existence in Finland and elsewhere and list several policies that are pursued through business subsidy programs both in Finland and at EU level. Finally, in the same chapter, we review studies which investigate the impacts of such business subsidy policies. In chapter 3, we introduce our basic hypothesis of budget maximising bureaucratic behaviour, a theory first introduced by William Niskanen (1971). At the same time we mention several arguments and criticisms raised by other authors. In chapter 4 we attempt to adapt Niskanen's theory to the business subsidy policies in Finland. We first elaborate on several key prerequisites linked to the budget maximising bureaucrat, namely the existence of information asymmetry (section 4.1) and that of bilateral monopoly between the bureau and the sponsor (4.2). In section 4.3 we examine in three ways strategies that bureaucrats pursue in attempting to maximise their budget. We look at the budget formulation procedures, the requested versus allocated subsidy appropriations and the assumed passive role of the sponsor (4.3.1), the timing of the fiscal year during which positive decisions on subsidies are made (4.3.2), and the characteristics of recipient firms, especially of those which receive subsidies more often than others (4.3.3). Finally we examine whether the bureaucrats are indeed successful in maximising their budget, all in reference to empirical evidence from Finnish business subsidy programs (4.4). We conclude with chapter 5 where one finds a discussion on the topic, limitations of the study, its extensions and certain policy recommendations.

The empirical data analysed is based on firms which have applied and some have received subsidies from the Finnish ministry of Trade and Industry (KTM) during the period 1995-1999. This period is important because it is the first time that Finland has been eligible for EU Structural Funds financing and thus her business subsidy programs are very much linked to them. The empirical analysis includes also data on the budgeted appropriations given to the KTM for the period 1989 to 2000.

Business subsidies, state aid, grants, direct transfers and assistance are used in the text interchangeably and refer to the same thing. The same applies for the words firm, company, business, and enterprise. Within the text there are references to several tables presented at the end of the study.

## 2. Theoretical aspects

The subject of business subsidies is very complex. For the novice, it is quite hard to clearly distinguish among the different types of subsidies, to comprehend the reasons behind their distribution, and to see how they fit to the overall policy goals of the government. It is even harder to measure empirically the impacts of these government interventions, although numerous theories are well developed<sup>1</sup>. In this chapter we attempt to give a brief overview of these issues.

### 2.1 Definitions

Government subsidies can be defined in many ways. In most usual terms a subsidy is any government assistance, in cash or in kind, to private sector producers or consumers for which the government receives no equivalent compensation in return, but conditions the assistance on particular preference by the recipient (US Congress Economic Committee, 1972).

Because in this paper we are examining in particular subsidies to firms we should be able to distinguish what constitutes a producer subsidy. Wolfson (1990, p. 5) gives a simple rule of thumb to this question: Any (government) amount of funds that end up in the pocket of the producer directly or indirectly is a producer subsidy<sup>2</sup>.

### 2.2 The role of the government

In order to comprehend better business subsidies as a policy instrument, we will discuss briefly the roles that the government plays in society and why it is using subsidies to pursue some of its objectives. Musgrave & Musgrave (1989, pp. 6-13) proposed that the government can be perceived to play three different economic roles.

One role could be *allocative*, in the sense that government could intervene in the market and correct potential market failure<sup>3</sup> symptoms or introduce policies that would compensate the effects of such failures. Thus, the existence of market failures is the main trigger mechanism for such government behaviour.

Another role could be *distributive*. Society can question at one time or another the equity or social justice of the distribution of the income and welfare which the market produces. If the market fails to produce a socially just and acceptable distribution of welfare then the government could intervene to bring the distribution of incomes into line with what is considered acceptable by the society.

Third, another role of the government could be that of *stabilisation*. Economies periodically suffer from inflation, unemployment, lack of real growth, etc. The government could intervene to stabilise the economy using monetary and fiscal policies to reduce inflation, unemployment and stimulate growth, hereby improve the welfare of society.

Finally the government plays a *regulatory* role (Baily (1995, p.19), Brown & Jackson (1990, p.29)). It intervenes to ensure that laws of contract are enforced and hence market trades and private exchanges take place in a smooth fashion.

From the above we may classify business subsidy policies as tools used by the government in many of its roles: allocative, distributive and that of stabilisation.

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<sup>1</sup> For example theories on firm behaviour or regional socio-economic changes due to inflow of funds for whatever purpose.

<sup>2</sup> For the interested reader a detailed analysis of what constitutes a subsidy is also found in Demers et al. (1998). There, the World Trade Organisation (WTO) agreement of the Uruguay round on "Subsidies and Countervailing measures" is examined comprehensively.

<sup>3</sup> We shall refer to market failures in more detail below.

### 2.2.1 Externalities and market failures

Market failures and externalities are closely linked concepts, thus it is important to discuss them both. In practice, the market economy is characterised by mixed goods which produce externalities or spill overs. The existence of these externalities influences the decisions of producers and consumers, resulting in an allocation of resources that differs from that which the perfectly competitive market would have produced in the absence of externalities. Externalities therefore, generate market failures, which give reasons to governments for corrective interventions. An externality formally arises when the production or consumption activities of one party enters directly as an argument into the production or utility function of another party. If the utility of a third party increases as a result of the externality, then an external benefit of economy is said to exist; if the utility of the third party falls, then an external cost is created.

Market failure refers to those situations where the conditions necessary to achieve market efficiency fail to materialise. It is an extremely important and frequent feature of observed markets. Left to itself the market system is unlikely to operate always efficiently. Tendencies exist to produce too much of some goods and too few of others. In extreme cases markets can fail to exist and certain goods are not produced at all. Thus government comes into the picture to restore equilibrium.

Subsidies to firms can be used as instruments for this corrective action. According to Fingleton et al. (1999, pp. 77-80) the following are some examples of externalities which create market failure conditions and make governments intervene through the use of subsidies.

#### ***Production externalities***

Firms may not appropriate all of the benefits of their production, as in the cases of R&D, leading to under-investment problems.

#### ***Agglomeration externalities***

In some industries the profitability of the firm is greater if it is close to its competitors or to its suppliers, therefore clusters of producers are more efficient. By aiding the firms, a government may make a cluster *sustainable* that would not otherwise be. If transport costs are a problem this could also be done using regional aid as a proxy (substitute) for aid to a specific industrial sector.

#### ***Inter temporal externalities***

If firms operate in industries where long-term investments are required, the firms' managers (or owners) may be *myopic* and less prone to take the risk. This may lead to under investment. State aid could enhance incentives to achieve optimal investments by subsidising long-term investments.

#### ***Environmental externalities***

If production imposes pollution costs to society, aid could be used to clean up the firms and their surrounding environment.

The above examples trigger government interventions with subsidies, for efficiency (allocative) reasons. In addition, as mentioned earlier, there are sometimes distributional reasons of society's welfare. Although there are many instruments available to achieve redistribution (e.g. taxes), in some specific instances subsidies may be preferred. One example is that of regional equality.

#### ***Regional equality***

State aid is often used to transfer resources from the richer regions of the economy to the poorer or disadvantaged ones. For example, if a region has an industry that goes into decline and the labour is immobile both geographically and in terms of skills, then the decline of the industry will have long-term negative impacts on the wealth of the region that solely market forces will not quickly rectify. Rather than make per capita payments to the poorer regions, the government may choose to grant direct subsidies to producers, in order to increase or maintain employment.

Of course it may also be so that the choice of aid as an instrument of redistribution is motivated by political factors and the creation of a perception (perhaps illusion) of equality. We will return to this matter later, when we discuss what role pressure groups might play in policy formulation and distribution of business subsidy appropriations.



## 2.3 Types of subsidies

Table 2 gives an overview of the different types of subsidies that EU member states give to the manufacturing sector firms. We present this table for two reasons: First, the manufacturing sector is the major recipient of business subsidies in the EU member states. Second, as will be evident below, business subsidy policies in all EU member states (national level) are interrelated with policies designed, launched and financed at EU level; in other words they are partly and some times even in toto financed from the EU budget. The table classifies the subsidies into four distinct groups. As one will notice programs which do not involve indirect transfer of funds to firms (i.e. advisory services) are not shown.

Grants in general constitute the most common type of subsidies (on average 58%) with the exception of France where tax exemptions come first (47%)<sup>4</sup>. Overall, Group A subsidies constitute 81% of all the subsidy types. Group C with soft loans and tax deferrals comes second with 12%. Aid for equity participation (Group B) represents only 4% of all subsidies distributed to the manufacturing sector. However, again in France, equity participation is relatively important. Finally, the share of guarantees compared to the overall level of subsidies is limited (3%). In Finland, the most common form of subsidies is direct transfers with 84% and soft loans with 13% (EC, 2000, pp. 29-30).

[Place Table 2 here]

## 2.4 Policies utilising business subsidies at EU and national level

Here we give a short list of policies at EU and national (Finnish) level where subsidies to firms are utilised as intervention tools. At EU level, aid is usually classified based on whether the policies which utilise it attempt to pursue general objectives (horizontal) or they are geared to specific industrial sectors and regions (vertical).

### a. Horizontal objectives

- R & D
- Environment
- SMEs
- Trade
- Energy savings
- Other objectives

### b. Vertical objectives

#### *Particular sectors*

- Shipbuilding
- Steel
- Other sectors

#### *Regional objectives*

- Regions falling under Article 87(3)(a)
- Regions falling under Article 87(3)(c)
- (only for Germany) Berlin and Zoenenrand

In many cases this classification is somewhat arbitrary. In some EU member states, aid for Research and Development is administered through specific R & D programmes, but in other states, aid to particular sectors is limited to SMEs. Furthermore, primary objectives cannot give a true picture of the final recipient firms: a large part of regional aid is in fact paid to SMEs, aid for R & D goes to particular sectors, and so on (Vanhalwyn, 1999, p. 36).

Based on the above classification, we conclude that industrial and regional policy at EU level *overlap*. The goals that are supposed to be achieved in implementing these separate policies are geared to the same target groups. For example, industrial policy is supposed to assist industrial firms in difficulties (in decline). At the same time regional policy is trying to revive and converge the economies of regions which are lagging behind the EU averages in socio economic development. But by pursuing these

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<sup>4</sup> Under tax exemptions one may also classify the Investment Tax Credit schemes (ITC) available in the US (see more on ITCs below).

regional goals they target the same firms since some of them are located in the same industrial declining regions.

It is also important to keep in mind that policies geared towards SMEs are also overlapping. Many of these SMEs are manufacturing firms in industrial declining regions. Due to the small size of these firms, aid is easily granted since it is assumed that it does not effect intra-country unfair competition vis-à-vis aid to large firms (article 87/88 of the EC Treaty). All this may produce an inefficient and ineffective system, if for example a firm is eligible for many different types of aid<sup>5</sup>.

A similar situation exists with the industrial policy in Finland where certain rules on regional criteria have been devised to distribute subsidies to firms and especially to industrial firms. Although not explicitly mentioned in the legislation<sup>6</sup>, one could argue that industrial policy is a policy mainly geared to firms in the industrial (manufacturing) sector. Regional policy is not focused on manufacturing firms only, but covers them as well if they are located in declining regions. Regional policy's target group may be wider in the sense that other economic sectors can be assisted and geographically larger areas are eligible for aid.

The Finnish ministry of Trade and Industry (KTM) is implementing both these policies, and to a certain extent together with other ministries such as the ministry of Interior (SM), the ministry of Labour (TM) and the ministry of Agriculture (MMM). We will concentrate our analysis on the business subsidies distributed by the KTM since they constitute approx. 55% of the total amount spent on firms (Venetoklis, 2000a, p. 3)<sup>7</sup>.

## 2.5 Literature review on business subsidies

The literature on business subsidy programs is plenty and diverse. Studies can be classified depending on the type of subsidy examined (i.e. R & D, Investment Tax Credit - ITC<sup>8</sup> -, fixed investment, etc), on the impact level (micro, macro), on the time perspective (ex ante, ex nunc, ex post), on the method of analysis (qualitative, quantitative), etc<sup>9</sup>.

Indicative scientific<sup>10</sup> studies reviewed here, including some which survey the literature, are by Chirinko (2000, 1993), Gravelle (1994), Gale (1990), Barkman and Fölster (1995), Roper and Hewitt-Dundas (1998), Venetoklis (2000a, 2000b).

Chirinko (2000) surveyed the US Investment Tax Credit impact studies which among others measured the marginal cost of funds and the additional investment per dollar of tax loss. He argued that the elimination of ITC in the US back in 1986 was welfare enhancing (p.13). Earlier, the same author (Chirinko, 1993) surveyed studies on ITC which applied a wide range of econometric models. The results again suggested limited impacts.

<sup>5</sup> For more on industrial and regional policy within the EU, see chapters 8 and 10 in McDonald and Dearden (eds.) (1994, pp. 116-135 and pp.157-186).

<sup>6</sup> The new law on the implementation of business subsidies (aid to business Act 150/1999) came into force in 2000.

<sup>7</sup> If we include the projects partly financed through EU Structural Funds, the percentage of business subsidies distributed by the KTM is even higher than the aforementioned 55%. We shall return to this in the last chapter.

<sup>8</sup> Direct transfers of subsidies to firms can occur in different formats. For example, one could be through transfer of funds literally from a government bank account to a firm bank account. Another way is through tax exemptions. In literature these are referred to as Investment Tax Credits (ITC). ITC are nothing more than a reduction in a firm's tax liabilities as a percentage of the price of a purchased asset. In other words the firm pays less than it would have done for the asset without the ITC. Under this context, we are reviewing studies on ITC since they may influence the behaviour of the recipient firm the same way as if the firm had received directly a grant. In both cases the firm first itself makes the initial outlay of funds and then reports the expenditure the relevant authorities (ministry or taxation office). The only difference is in the time of reimbursement. The ITC may be realised in the following financial year after the firm outlay, where as the direct grant is paid as soon as the firm submits the invoices showing the expenditure. ITC is a very popular government intervention tool in the US. In the study's empirical section (chapter 4) we examine only the former type of direct business subsidies, namely direct transfers of money from a government institution to a firm.

<sup>9</sup> See Venetoklis (2000b) for a detailed classification.

<sup>10</sup> Scientific studies are emphasised here for their results which are pessimistic and indicate poor impacts. However as has been noted by some authors (e.g. Barkman and Fölster (1995), Venetoklis (2000b)) usually this may not be the case if the commissioner is an organisation (ministry) which itself distributing subsidies. Then the results are much more encouraging. We shall refer to this oxymoron in chapter 4 where we discuss the phenomenon of information asymmetry within business subsidy programs, in connection to bureaucratic behaviour.

Gravelle (1994) also surveyed the literature on types of investment subsidies and their economic efficiency. She concluded among others that investment subsidies are not very successful as short-term counter cyclical devices; at best they are risky choices. If a firm faces credit rationing and financial constraints, having it subsidised, probably leads to inefficient allocation of its resources (p.121).

Gale (1990) examined whether a government intervention through the use of business subsidies increases efficiency. He reported that subsidies or guarantees, specifically aimed at credit rationed firms, may in fact worsen efficiency.

Roper and Hewitt-Dundas (1998) looked at the effect of grant support on small business performance during the period 1991 to 1995 in firms located in N. Ireland and in Ireland. The results indicated that grant aid had no effect on either the turnover growth or profitability of small businesses in either area. On the other hand subsidies did boost employment. The writers commented that although the employment growth is a positive outcome for job creation, it has potential worrying implications for the firms' longer-term competitive position through its (negative) effect on productivity.

Venetoklis (2000a) examined the impact of direct grants on the Value Added growth by using a large data set consisting of 36 000 firms around Finland 35%, of which had received subsidies. The results suggested that the impact, although positive, was much less in monetary terms than the subsidy funds distributed; and that, in turn, implied that the net welfare effect was negative.

The consensus of the evidence presented in these studies is that business subsidies - especially in the form of direct transfers (grants) - do not seem to achieve their predefined goals in terms of firm productivity growth, increased competitiveness, sustainable job creation, increased firm R&D investment, etc. As Clements et al. (1995, pp.18-23) put it

*“Concerns for the duration of any particular subsidy program arises because economic agents (firms) alter their behaviour in order to capture the benefits of subsidy programs. Beneficiaries may also resist exclusions from subsidy programs when their circumstances change. It is this behaviour that, over time, renders many subsidy programs ineffective and excessively costly”.*

Nevertheless, we see a perpetuation of these business programs, both in Finland and at EU level. In addition, we also show below that a great portion of business subsidies is distributed to the same firms which - as has been argued above - is ineffective and excessively costly. Hence, a question that rises is this: If the business subsidy policies have proved unfruitful why are they still adopted? This will be the subject of the following chapter.



### 3. Public Choice and Niskanen's model

In the previous chapter we concluded that, despite overwhelming evidence suggesting that business subsidy programs is a policy which is costly and ineffective, it is still implemented at EU and at national level in almost all countries including Finland. In Table 1 we also saw that in Finland, although their share of the yearly GDP has been diminishing, subsidies still constitute a substantial burden to the economy since they do not seem to generate the returns (economic or other wise) that would justify their continuation.

In attempting to explain this policy, it may not be enough to just describe the system, estimate the possible impacts and then simply comment on the results as has been the case until now. Why is the system as it is? If the subsidies are not effective in achieving the predefined goals, why are they designed and implemented as they are? Why are some firms receiving aid and some others not? Is it that wrong firms are chosen based on a predefined plan, or is it that what has just been hypothesised has nothing to do with how in reality the whole system works?

To answer these questions, one may need to utilise a positive theory of government behaviour in order to get deeper into the *behavioural* aspects of the people behind this system, of the ones who design and implement such a policy. We mentioned in section 2.2.1 that usually market failures are conditions that trigger government interventions. Thus, if business subsidy policies are indeed ineffective and inefficient, along the market failure phenomena one can now identify "government or non-market failures" (see for example Wolf (1979, 1987) cited in Cullis and Jones (1998, p. 352)). Consequently, when we see that such business subsidy appropriations are still spent year after year, this implies the existence of an *over supply* of this policy and of public funds<sup>11</sup>.

Hence, we shall attempt to explain the system by looking at the whole policy not from the demand side - that is from the recipient firms' point of view -, but from the supply side. We shall examine the reasons behind such a policy by analysing the government organisations which distribute business subsidies and which are responsible for their initial planning and then their implementation<sup>12</sup>. Our focus will be on the behaviour of the KTM units responsible for distributing business subsidies in Finland.

For this we shall use an approach which has - as many disciplines whose main target is human behaviour - many friends as foes. The approach utilises the theory of Public Choice.

#### 3.1 Public Choice theory

The neo-classical economic theory sees government basically, as a beneficent entity that functions to correct distortions in society, to achieve the socially desired distribution of income and to maximise social welfare. In other words, from this perspective the sole objective of the public sector is to promote the social welfare through *optimal* interventions into the economy (Oates, 1975, p. 45, cited in Cullis and Jones, 1992, p. 469)). Weber (1947) a proponent of a structured and well controlled government, became the father of a bureaucratic type of governance. For Weber the bureaucrat has as his mission to serve society to the best of his abilities, hence the origin of his other name: public or civil *servant*.

By contrast, the Public Choice literature is much more suspicious of the objective of the various actors in the policy process. These objectives are said to lie in quite specific *self-interest goals* (Cullis and Jones, 1992, p. 469). For example, politicians are said to be vote-maximisers; bureaucrats are likely to

<sup>11</sup> This in turn may be part of a more general problem in public sector economics and public administration, namely the growth of public expenditures (of the government) and the reasons behind it. We shall not approach the problem from such general level. However one can find in abundance literature on the topic. See for example Gemmel (1993), Hosley and Borcharding (1997), Levitt and Joyce (1987), Brown and Jackson (1990, pp. 118-153).

<sup>12</sup> This is just one more approach of explaining the factors influencing government subsidy policies. Another for example is to look at macroeconomic characteristics in countries exercising (business) subsidy policies. Clements et al. (1998) - a proponent of lower rather than higher subsidy levels - studied the economic determinants of governmental subsidies using panel data from 40 countries over an 18 year period (1975 - 1992). He found that countries which have a relatively small government, a small external current account deficit and a productive structure geared towards services and agriculture (rather than manufacturing), may find it easier to keep subsidy appropriations down. The paper also suggests that contrary to expectations, policies towards globalisation may not be obstacles to reducing subsidies.

be budget-maximisers; and pressure groups are concerned with narrow sectional interests and wealth maximisation. These theories are associated with the seminal works of Downs (1957, 1967), Buchanan and Tullock (1962) and Tullock (1965). What these scholars basically said was that individuals, regardless of whether they work in the public or private sector, have a set of preferences. They are assumed to behave in such a way as to maximise their objective (their utility) subject to a number of constraints, such as resource constraints, legal and organisational constraints, imperfect knowledge and imperfect foresight. To summarise, the Public Choice approach is defined by Mueller (1989, pp. 1-2) as follows:

*"Public choice can be defined as the economic study of non market decision making or simply the applications of economics to political science. The subject matter is the same as that of political science: the theory of the state, voting rules, voter behaviour, party politics, the bureaucracy, and so on. The methodology of public choice is that of economics, however. The basic behavioural postulate of public choice, as for economics, is that man is an egoistic, rational, utility maximiser"<sup>13</sup>.*

In this study we limit ourselves to bureaucratic behaviour and solely examine how it is related to business subsidy policies. Our hypothesis is that (at least) one reason for the apparent oversupply of subsidies lies in the pressure created within the ministries from budget maximising bureaucrats. Later we will also refer briefly to other potential reasons but the main objective is to test whether the theory of budget maximising bureaucratic behaviour is indeed the case within the major distributor of business subsidies to firms in Finland, the KTM.

### 3.2 Niskanen's model

Although the books of Downs, Buchanan and Tullock raised issues which are central to the Public Choice approach they did not create economic models of bureaucratic behaviour. This gap was filled with William Niskanen's seminal paper "Bureaucracy and representative government" (1971) which may be one of the most cited works in public sector economics. His attention centres on public agencies (ministries) and their budgets. He strips away the complexities of budgetary politics by building his model around just two actors, the bureau and its legislative sponsor(s). Niskanen makes certain assumptions about the conditions under which these two actors function (Mueller, 1989, pp. 458-459).

First, is that their relationship is one of *bilateral monopoly*. The sponsor can buy its required services *only* from the bureau and the bureau can sell the services *only* to its sponsor.

Second the bureau, being the sole supplier of these services to the sponsor, is assumed to hold a competitive advantage in their between negotiations on the level of money (budget) given to it by the sponsor. It knows the exact amount of costs involved in providing the services but the sponsor can rely only on the claims for production costs from the bureau. In other words there is an *information asymmetry* in force benefiting the bureau. This situation allows the bureau to present in the budget negotiations a "take it or leave it" option on the amount of requested budget.

Third, the sponsor is passive in their between relation and normally accepts the requests of the bureau.

Fourth, the bureaucrats in the bureau have as their main goal the maximisation of the budget received by the sponsor. This is because they can then satisfy their personal utility function through the maximisation of the bureau's budget. As de Bruin (1987, p.55) puts it, Niskanen's theory assumes that "the bureaucrat's utility function is a positive monotonic function of the size of the bureau's budget".

Analysis and critique on Niskanen's theory is found in many books on Public Finance and Public Choice (i.e. Brown and Jackson (1990, pp. 197-213), de Bruin (1987, pp. 53-60, ), Jackson (1982, pp. 121-141), McNutt (1996, pp. 108-136), Mueller (1989, pp. 250-259), Gunning (2000, chap. 14), Stiglitz (1986, pp. 170-174)). Below we describe the elements of Niskanen's theory and its basic

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<sup>13</sup> An interesting classification where economics and political science are again combined is mentioned by Buchanan (1989, p. 24). For this he uses two terms: "Homo economicus" and "Politics as exchange".

model<sup>14</sup>. Whenever appropriate, we also mention what would have been its equivalent element in the case of business subsidy policies in Finland. The sponsor in our case is the ministry of Finance (VM) with which the KTM negotiates when the budget is formulated<sup>15</sup>.

The model is built around four functions; the budget-output function (B), the cost-output function (C), the marginal value function (MV) and the marginal cost function (MC) as follows:

### I. The budget-output function (B)<sup>16</sup>

Let us denote  $B$  as the maximum budget the sponsor (VM) is willing to grant to the bureau (the KTM or better the department units of the KTM dealing with the business subsidy programmes) during a specific time period (i.e. one year – of the 4-year framework budgeted amounts). The budget includes the amount of moneys the departments will spend on business subsidies plus the other expenses needed to run the programme (i.e. administrative expenses, salaries, etc). The budget  $B$  is calculated using the equation

$B = aQ - bQ^2$  (1) where  $Q$  = the expected level of output for the bureau (for the department units of the KTM responsible for business subsidies)

### II. The cost-output function (C)<sup>16</sup>

Another important variable is the minimum total payment (cost) to factors during a specific period denoted by  $C$ . The total cost is represented by a cost-output function which is the minimum amount of money given to factors for inputs in order to produce a given output (assuming given input prices and level of technology). In the case of the KTM this cost could again be other expenses (salary + administrative) and the amount of subsidies to be distributed. It is denoted using the equation

$C = cQ + dQ^2$  (2) where  $Q$  = expected level of output as in (1)

### III. The constraints

The basic elements of Niskanen's theory have now been set. Now we introduce the constraints or limits under which the theory works. Bureaucrats maximise the total budget  $B$  of the bureau, subject to the constraint that the budget must be greater or equal to the minimum total costs at the equilibrium output, that is

$$B \geq C$$

Recall from (1) and (2) that

<sup>14</sup> The basic model deals with two entities, the bureau and its sponsor who finances all of the bureau's expenditures and other activities. Niskanen develops other models as well; among them for example is one in which he considers that the bureau's total budget function consists of the sponsor's contribution but also from other revenues which are generated by the bureau when it sells its services to the open market. We do not examine this model since it does not apply to the situation existing within the KTM units involved in distributing business subsidies (to a great extent that is).

<sup>15</sup> We shall analyse the budget formulation process and the negotiations between the KTM and the VM in chapter 4.

<sup>16</sup> Where do the budget function (1) and the total cost function (2) come from? Although not explicitly stated in Niskanen's original paper, apparently the bureau faces linear demand and supply curves (McLean, (1987, pp.100-102) with

$$P = a - bQ \text{ (1a) and}$$

$$UC = c + dQ \text{ (2a)}$$

where  $P$  = unit price,  $UC$  = unit cost,  $Q$  = quantity demanded/supplied and  $a, b, c$  and  $d$ , parameters with  $b, d > 0$ .

Hence, Budget (total revenue  $B$ ) is Price ( $P$ ) times Quantity ( $Q$ ),

$$B = P \cdot Q \text{ and from (1a)}$$

$$= (a - bQ) \cdot Q$$

$$= aQ - bQ^2 \text{ (1)}$$

Total cost  $C$  is Unit Cost ( $UC$ ) times Quantity ( $Q$ ),

$$C = UC \cdot Q \text{ and from (2a)}$$

$$= (c + dQ) \cdot Q$$

$$= cQ + dQ^2 \text{ (2)}$$

$$B=aQ-bQ^2, \text{ with } 0 \leq Q \leq a/2b$$

$$C=cQ+dQ^2, \text{ with } 0 \leq Q$$

The maximum value of  $B$  is found by equalising the first derivative of  $B$  to zero  
 $B'=0$ , or  $a-2bQ=0$  (from (1))

Therefore, the maximum level of  $B$  is achieved at output  $Q = a/2b$  which gives us the upper bound of output  $Q$ .

The lower bound is found where the maximum budget the sponsor (the VM) is willing to give to the bureau (to the units of the KTM dealing with business subsidies) equals their minimum total cost (payments) to factors needed to produce this output during a specific period (i.e. a year)

Therefore the lower bound of output is where  $B = C$  or

$$aQ-bQ^2 = cQ+dQ^2, \text{ hence}$$

$$Q=(a-c)/(b+d) \text{ (3)}$$

At that output  $Q$ , the budget which is received by the bureau (the KTM) equals the total costs needed to produce that output. In this case there is no "fat" in the budget and any cost-effectiveness analysis would not reveal any inefficiencies. However, the level of that output  $Q$  is greater than the one which corresponds to the "social optimum". The social optimum level of output  $Q$  is where

*the marginal value of an operation (MV) equals its marginal cost (MC)*

If we consider that the budget represents accurately the preferences of the citizens/voters for a specific governmental program (i.e. business subsidies), then the marginal budget (the first derivative of  $B$ ) would correspond to what the citizens expect to be the marginal value of the bureau's (the KTM) services (the business subsidy programme).

Within the marginal value concept is inherited the notion of the extra unit of production. However, here we have production of services, thus in practical terms it can not be applied. It is a theoretical concept and it refers to the maximum "price per service unit" the sponsor (the VM which represents the Government/Parliament which is in turn theoretically affected by the preferences of the citizens) is willing and ready to pay. Hence

$$MV=B'=a-2bQ \text{ with } 0 \leq Q \leq a/2b \text{ (4)}$$

Respectively, the marginal cost function is the addition to the total cost of producing one more unit of output and is the first derivative of  $C$ , or

$$MC=C'=c+2dQ \text{ with } 0 \leq Q \text{ (5)}$$

Again, as with (4) the extra cost per unit is a theoretical concept because the bureau is not producing clearly divisible units, but services (distribution of business subsidy programmes).

What is the social optimum output  $Q$ ? Since we should have  $MV=MC$  and from (4) and (5)

$$a-2bQ = c+2dQ \Rightarrow Q = (a-c)/(b+d) \text{ (6)}$$

The social optimum output for a bureau (the KTM) is *half as much* as the output level where the budget just covers the costs of production for that output (compare (6) with (3)). In other words, according to Niskanen all bureaux are inefficient and could cut their budget allocations by half (even from their lower bound) to reach social optimum output levels<sup>17</sup>. This of course is an artefact caused by the chosen functional form (see previous footnote).

The whole aforementioned description can be examined easier in Figures 1 and 2. There we see several equilibrium levels of bureau outputs. In Figure 1 the budget output function  $B$  and the Cost-output function  $C$  are shown. We have mentioned earlier that the sponsor is willing to give a maximum

<sup>17</sup> There is some critique to this statement. We shall discuss some of these arguments in chapter 5.



Budget  $B$  where  $B' = 0$  or  $Q_{max} = a/2b$  (upper bound) and where  $B = C$  so that the output of the bureau is at  $Q_{lmax} = (a-c)/(b+d)$  (lower bound)

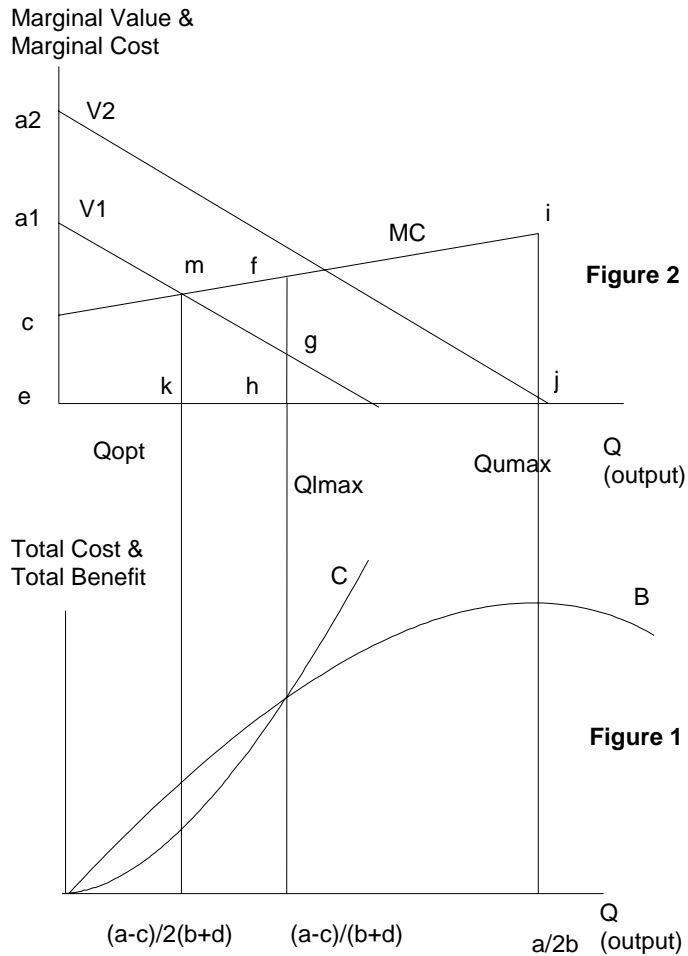
On the other hand, Niskanen claims that the social optimum level of output is where  $Q_{opt} = (a-c)/2(b+d)$

In Figure 2 Line  $V1$  represents the marginal valuation curve of the sponsors (the VM) or their demand curve.  $MC$  represents the marginal cost curve. Where is the equilibrium output of the bureau (the KTM)?

This will be at point  $h$  where  $B = C$  and where  $Q = (a-c)/(b+d)$ . The equilibrium output of the bureau is in the "budget constraints" region. At this point the area  $ea1gh = ecfh$ , i.e. the budget received equals total costs. There is no "fat" in the budget, no inefficiency. However, equilibrium output exceeds what is the socially optimum output level (where  $MC = MV$ ) at  $k$ . At  $h$  marginal costs  $hf$  exceed marginal valuation  $hg$  by  $gf$  of producing that  $h$  level of output.

It is now possible to make a distinction between efficiency and optimality. In a budget constraint equilibrium, a bureau's behaviour is efficient since it produces output at minimum feasible cost and a cost effectiveness analysis would not reveal any inefficiency. The bureau's behaviour is not however optimal since the marginal costs of producing the equilibrium output exceeds its marginal valuation. Consider now an increase in demand for the bureau's output which moves the marginal valuation curve higher from  $V1$  to  $V2$ . The maximum equilibrium attainable for this budget is at  $Q_{max}$  or where  $Q = a/2b$ . Here we have  $B > C$  and the area  $ea2j > ecij$ .

The budget received (i.e. the area under the  $V2$  curve (the demand curve) exceeds the costs of producing the level of output  $Q_{max} a/2b$ . This implies that there is "fat" which could be eliminated with cost – effectiveness means. This fat is consumed by the bureaucrat in the form of more employees, higher salaries, more official travelling, etc.



### 3.3 Literature review and critique on Niskanen's model

Some critique on Niskanen's model centres on the budget maximising assumption. Already very early, Migue and Belenguer (1974, cited in Wintrobe, 1997, p. 435) did not agree with the maximisation attempts for the *whole* budget but only for a *part* of it. They called this the discretionary budget or "slack", which is nothing more than the difference between the total budget and the minimum cost of production of the agreed output between the sponsor and the bureau. This assumption seems to be quite logical because bureaucrats – if they get this extra budget – could spend it as they wish: for example, on more staff (implying larger offices), on travel, on favoured programs, etc. Even Niskanen himself (1975, 1991) agreed that slack may be a better target for maximisation than the overall budget.

Jackson (1982, p. 133) and Kogan (1973) are also critical of the maximisation assumption but for other reasons. They basically claim that Niskanen's model may reflect his own experiences within US bureaucratic agencies<sup>18</sup> and that the motives of US bureaucrats do not necessarily coincide with their colleagues in Europe. For example, a civil servant in the UK or Finland may not necessarily pursue a bigger budget and through this, more power, prestige, etc. However, it is not perfectly clear why this should be the case.

Wilson (1989, p. 182) discusses the fact that some bureaux will even deny expansion and will not necessarily strive for higher budgets because this would probably reduce the bureau's autonomy. Hence autonomy is perhaps valued more than power, prestige, etc., which presumably come with bigger budgets.

Miller and Moe (1983) also attacked Niskanen's assumptions that the sponsor is passive; that is that only the bureau is actively pursuing its goals while the sponsor merely sits and watches the public money wasted. They claimed that the legislature is the actual body that finally determines and decides what will be given away to the bureau. In other words, legislature (the parliament) and the government - through the agency allocating the budget to the bureau (in the case of Finland the ministry of Finance) -, has the ultimate authority.

What do empirical studies say about the model? As Conybeare (1984, p. 486) put it, the results are contradictory.

According to Ma (2000), older studies during the 1970s and early 1980s seem to confirm Niskanen's hypothesis.

However, later ones give opposite results. For example, Johnson and Libecap (1989, cited in Wintrobe (1997, pp. 438-439)) analysed the budgets of 45 US agencies and approx. 15 000 salaries of their employees to determine the effect of agency growth on bureaucratic salaries. The tests yielded insignificant and sometimes even negative relationships (as budgets grew salaries diminished or vice-versa). Wintrobe comments that the results do not necessarily reject Niskanen's basic model, since growth in his model could only occur if bureaucrat's monopoly were even (stable) over time. The simplest explanation of bureaucratic growth, Wintrobe continues, is that it results from an increase in the *political demand* of the services of the bureau<sup>19</sup>.

The same argument against the static nature of Niskanen's model is found in Sorensen (1987, p. 67).

Young (1991) also reported that salaries and careers of bureaucrats are not significantly related to the size of their agency.

Hood et al. (1984) found mixed support for the link between budget increases and bureaucrat utility, at least with respect to staff members and salaries. Data from the UK for the period 1972 to 1983 suggested that, on aggregate, bureaucrats have been relatively unsuccessful in translating budget increases into staff and salary increases.

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<sup>18</sup> Niskanen wrote his paper based on his experiences whilst an analyst at the US Department of Defence (DoD) in the 1960s.

<sup>19</sup> This is an important remark and we shall discuss it further in the last section.

Also a survey by Sigelman (1986) found that bureaucrat managers did not generally support increases in their bureau budgets.

McGuire (1981, p.318) mentioned that according to Niskanen's theory the budget maximising agency will always increase its budget more than proportionally to a potential fall in the cost of production. Nevertheless McGuire's empirical evidence which measured the elasticity of apparent demand for public services did not reflect this theoretical effect. He explains these results in several ways. He argues that Niskanen's hypothesis is maybe in part or totally incorrect; alternatively, the bargaining power of the bureau - in relationship to the governmental sponsor - could be so weak that the motives of the bureaucrats are irrelevant<sup>20</sup>.

Finally, we searched for studies conducted in Finland testing empirically Niskanen's model. We were surprised to find none. This may be not so in general, but it may indeed be the case when it comes to adapting Niskanen's theory to business subsidy policies and the behaviour of bureaucrats involved in this process. Below we attempt to make this adaptation.

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<sup>20</sup> We discuss this explanation once more when we apply Niskanen's theory to the relationship existing between the KTM and the ministry of Finance (VM) during the budget formulation procedures. See section 4.3.1.



#### 4. Adaptation of Niskanen's model to the KTM business subsidy policy

We saw earlier that theoretical and empirical evidence suggests that direct business subsidies (grants) are in general not achieving their predefined goals; nonetheless, business subsidy programs perpetuate.

We then hypothesised that one reason for this inefficient and ineffective condition might be that the KTM (the bureau) attempts to maximise<sup>21</sup> the budget allocated for business subsidy programs in order for its bureaucrats involved in these programs to achieve prestige, status, job security, easier working conditions, etc. In other words we have used the reasoning behind Niskanen's theory described above.

In this section we attempt to give empirical evidence to support our hypothesis. It is important to emphasise that the evidence presented below is not necessarily causal, since it is only descriptive. However, as will be apparent below, it is a difficult task to adapt Niskanen's theory on real data due to the vagueness and theoretical nature of his model. What we attempt here is to provide a conceptual framework through which one can himself decide on whether the information presented constitutes a reasonable argument to support the hypothesis<sup>22</sup>.

Are the bureaucrats in the KTM attempting to maximise their budget and specifically the one referring to business subsidy programs? What strategies are they using? Are they successful in doing so? We shall answer these questions simply by looking on whether the assumptions for such behaviour according to Niskanen exist; that is, whether we have information asymmetry, bilateral monopoly and the sponsor (VM) is passive. In addition we shall examine whether the bureaucrat indeed behaves as to pursue maximisation of the bureau's (KTM's) budget. We shall thus present empirical evidence which would indicate the bureaucrats' *intentions* to maximise their budgets. Finally, we shall test whether any indications found of budget maximising behaviour result in a budget maximisation and eventual over supply of business subsidy direct appropriations.

##### 4.1 Information asymmetry

Policy planners, decision makers and implementers in the government and in the different ministries are supposed to make rational decisions and optimise social welfare. Theoretically, this is achieved only if they have access to complete and correct information on the effects of an implemented policy (or estimates on the effects of the about to be implemented policy).

Do we have such levels of information quality at the KTM in reference to business subsidy programs? We would argue no, not to the extent that it would ensure objective feedback on the programs' effects. Evidence suggests that within the KTM there is not a comprehensive monitoring and evaluation system which could generate such information. Although the KTM has been gathering data on the applications for grants and on the applicant firms for several years little has been done to analyse the data in such a way as to give objective feedback on what has been the influence of these business subsidy policies at micro level (firm level) and/or at macro level (regional level). Regardless of the numerous monitoring and evaluation studies written the last few years (mainly due to the evaluation obligations imposed by the EU), the usefulness of these studies is questionable for two

<sup>21</sup> The notion of maximisation of self interest through budget maximisation is not used here in a negative way. We are just attempting to shed light to a phenomenon by using one theory of bureaucratic behaviour first appearing some 30 years ago.

<sup>22</sup> Niskanen (1971, p.8) himself in his paper warned the reader that

*"Two characteristics of my approach should be understood: I develop a positive theory of the bureau and representative government. A positive theory, of course does not prove itself. Although I bring personal observations and casual evidence to bear in support of several of the behavioural hypotheses, this book does not present the set of critical tests that are ultimately necessary to confirm (or, more accurately, fail to disconfirm) this theory. The theory is developed primarily to interest others in taking seriously enough to participate in the complex process of making critical tests. As part of this process, at each stage of the development of this theory, I ask the reader to ask himself the following types of questions: Is this behavioural hypothesis consistent with my personal observations and understandings. Does this theory help organise my observation about related phenomena? This type of subjective empiricism is a relevant, but not, complete, substitute for the more formal objective tests that are yet to be performed. My own incentive to write this book is largely based on affirmative answers to both of these types of questions".*

reasons: one is that the results produced seem to be positively related (biased) with the commissioning agencies and second the methodologies used in measuring the impacts of business subsidy programs can easily be characterised as inadequate because they do not take into account the complexity of such measurements. Few studies that have utilised appropriate scientific methods and might have compensated for these reporting inadequacies - had they been conducted in more frequent intervals - are unfortunately done on an ad-hoc basis. Furthermore, even if they have shown insignificant impacts, they have been lost in the plethora of the other studies showing positive impacts, but which have used questionable measuring methods (Venetoklis, 2000b).

The information asymmetry problem is evident not only by analysing evaluation reports, but also by looking at the existing/planned data gathering mechanisms and the type of data gathered. If the data gathered is inadequate, regardless of the sophistication of methodologies applied analysing them, the result will suffer from internal and external validity<sup>23</sup>. For example, Rautkoski (2000) recently described the KTM's new database TUKI2000, which is designed to monitor and evaluate the effectiveness of business subsidy programs on the recipient firms during the period 2000 - 2006. The data gathered is based on the estimates of the recipient firms and of the KTM analysts at ex-ante level. The planned ex-post feedback after a two year period relies again on firm responses and estimations which as previously said suffer from validity problems (see Venetoklis, 2000b, pp 17-19). In the database there is no provision for data fields (variables) which would give a more objective picture on the development course of the recipient firm (i.e. annual balance sheet and profit and loss statement amounts).

One may conclude that because of all the above, information asymmetry exists in the KTM *within* as well, simply because there is no reliable data gathering mechanism nor a sound and comprehensive reporting system.

Finally, information asymmetry seems to exist not only between the bureau (KTM) and the governmental sponsor (the VM) or within the KTM itself, but also between the KTM and the median voter (the general public). Hynninen (2000, pp. 207-208) refers extensively on the problem of getting accurate and reliable information from the KTM on business subsidy programs partly financed through the EU. Among others he mentions that

*"... it is simply impossible for the citizen (or the journalist) to estimate how effectively not only the supported organisations but the financing administration works. It is impossible to see transparently if the money originally given by the citizens in the EU is used for the common good or it is just a free gift to local promoters without any social impacts, for example and especially in the form of new jobs created. Because of the structural secrecy one can not be sure if the information is valid or it is, at the utmost, a pure lie. There is no transparency in the information system. For example the figures of new jobs created have been mostly guesses, not data-based verifiable facts. There are masses of statistics created by the fund administration but the information or data is seldom based on reliable facts".*

#### 4.2 Bilateral monopoly

Does bilateral monopoly exist between the KTM and its sponsor, the VM? Niskanen assumed that bilateral monopoly exists between the bureau and the sponsor for the simple reason that once budget negotiations begin, the sponsor does not have bargaining power in getting the services offered by the bureau at better "prices". There is a single buyer and a single supplier of services needed. Had there been other bureaux offering exactly the same services, theoretically the sponsor could have bargained (or even received bids for) a price for the services in question at a lower level due to the competition that would exist among the service suppliers.

One could interpret that the business subsidy distribution system in Finland, as is currently operating, leaves very little room for bargaining manoeuvres by the VM. The system is very specialised in that each ministry or each subordinate agency handles and distributes subsidies of a specific type. For example the ministry of Labour is mostly involved in job related subsidies, the KTM is distributing more fixed asset investments to manufacturing firms, its agency TEKES is financing R&D projects in the

<sup>23</sup> Putting it differently, garbage in, garbage out.

technology sector, and so forth. It is true that some projects that are being financed by one ministry could have been financed by another ministry, since the type of investment and the objectives can be similar. However, in practice, the VM does not usually bargain the shifting of funds from one ministry to the other for the *same* type of subsidies. We can not explain why this is so, apart from the fact that for such an “open” system to exist, one would need vast organisational and structural changes in defining how to formulate the budget. And in any case, although the theoretical conditions of a bilateral monopoly seem to exist, they apparently do not influence negatively the negotiating power of the sponsor in the budget negotiations. On the contrary, as will be evident in section 4.3.1 below, the sponsor (VM) seems to be quite strong in determining the amounts of subsidies given to the KTM.

### 4.3 Budget maximisation strategies

In this section we discuss several hypotheses which, if proven, would indicate that the bureaucrats are pursuing a budget maximisation behaviour. Three types of analyses are presented. The first looks at whether there is a pattern between the subsidy amounts requested versus the ones finally allocated during the budget negotiations between the KTM, the ministry of Finance (the VM), the government and the Parliament. The second examines how the bureaucrats behave during the last month of the fiscal year in distributing business subsidy appropriations. Finally, with the third analysis we investigate different characteristics linked to subsidised and non-subsidised firms as well as multi recipient firms versus the firms having received aid once only during the period 1995 - 1999.

#### 4.3.1 Requested versus allocated appropriations (and the role of the sponsor)

What could a budget maximisation strategy mean in practice? One might follow the simple rule that it is getting *as much as possible* from available funds. We assume that the bureaucrats do not know in advance how much money they will receive the following financial year<sup>24</sup>, and they formulate their budget demands based on the amount of money received the current year. If we can find that they request at least as much as they have received the current year we may argue that this is one case where we have maximising behaviour for the received budget. Wildavsky (1964,1975, cited in Cullis and Jones, 1998, p. 370) claimed that the most important factor which determines what amount is to be allocated for a particular program in year  $t$ , is the amount allocated for the program in the year  $t-1$ . A known study – although rather old – by Davis et al. (1966) supported this.

The model of decision making that Wildavsky had in mind was one made up of sequential procedures. The outcomes of earlier decisions enter as *binding constraints* on current decisions. Thus last year's budget determines to a great extent this year's budget because of the large commitment of resources that are carried forward into the present from the past. The decision maker does not start with a clean sheet each time he plans for next year's budget, but instead carries forward a commitment of resources from previous decisions. This is the *incrementalism* concept that Wildavsky became famous for. The reason for such operations is simple. To start each budget with a clean sheet would be an immense task requiring abundance of human and computational resources (Brown and Jackson, 1990, p. 196).

To adapt this to our case, this implies that the request for subsidy funds does not depend on real needs<sup>25</sup> for business subsidies, but rather on the notion that since grants have been allocated once, they should continue to be spent at least at the same levels as previously. Of course in reality this never occurs. Budgets for a particular program never increase or stabilise perpetually, but rather fluctuate and may indeed sometimes decrease. However, the behaviour of budget maximising bureaucrats might influence the budget formulation in some instances, and create inefficiencies which would have probably not occurred had the budget been formulated based on real needs for business subsidies.

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<sup>24</sup> With the framework budgeting procedure implemented in Finland this assumption may not be applicable any more. Funds are preliminarily agreed in advance for the next 4 years. The new system came into power gradually since the beginning of the 1990s and in full force from 1996. Nevertheless, in practice the KTM concentrates on next year's budget only. The other three years' estimated appropriations do not differ significantly from the second year's (t+2) appropriations. See for example KTM (2000).

<sup>25</sup> The concept of *real needs* is discussed in the chapter 5.

Before we test this “requested versus allocated appropriations” hypothesis we must refer briefly to the budget formulation procedure at the KTM, and examine the relationship that exists between the bureau (the KTM) and the governmental sponsor (the VM) with which it negotiates the budget amounts. By doing this we shall also examine whether another of Niskanen’s assumptions, namely the passive role of the sponsor is indeed the case between the KTM and the VM.

### **Budget formulation at the KTM for fiscal year $t$**

*The administrative departments of the different units and agencies of the KTM submit to the ministry in October of year  $t-2$  proposals (estimates) for their operational and financial plans for the fiscal year  $t$ . The ministry then compiles all these estimates to one proposal called “frame proposal”.*

*This is then submitted to the ministry of Finance (VM) in December of the year  $t-2$ . The basis of this frame proposal is the previous year’s ( $t-3$ ) frame proposal and the current year’s ( $t-2$ ) budget.*

*The VM returns its observations and proposals for alterations to the KTM in February of year  $t-1$ . These are then discussed between the KTM and the VM in the so called governmental negotiations.*

*The Council of State (the Government) makes the final frame budgeting decisions for the fiscal year  $t$  in March of year  $t-1$ .*

*The KTM’s units and agencies submit once more<sup>26</sup> in April of year  $t-1$  to the ministry their budget proposals for the year  $t$  taking under consideration the budget frame appropriations agreed by the Council of State.*

*The Economic and Finance department of the KTM prepares now -based on the frame budgeting decisions taken by the Council of State (the Government) in March of  $t-1$  and the proposals of its units and agencies- an altered budget proposal. This is then examined by the KTM’s board of directors and the final budget proposal from the KTM’s point of view is then submitted to the VM by May of year  $t-1$ .*

*The VM gives back its comments and proposals for changes on the KTM’s budget proposal in July of  $t-1$ . The alterations are again examined by the KTM’s Board of Directors. The differences in certain appropriations between the two proposals are negotiated between the two ministries. Those matters for which there is no agreement, are again examined and negotiated within the government in August of  $t-1$  and then the final budget proposal for the year  $t$  is agreed.*

*After the final details are cleared the budget proposal is submitted to the Parliament for approval which is normally voted by December of year  $t-1$ .*

During the year  $t$  there are usually some extra budget appropriations decided depending upon unanticipated budgetary needs that may come up. Thus the final appropriations allocated for any fiscal year do not necessarily coincide with the voted appropriations by the parliament during the year  $t-1$ . For example during the fiscal year 2000 there were three extra budgets approved during the year. The total final budget allocated was approx. 10% higher than the one initially voted by the Parliament in December of 1999 (year  $t-1$ ).

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<sup>26</sup> Why once more? They had already submitted their proposals back in October of  $t-2$ . The answer is simple. The Council of State (the Government) budget frame proposals are an approximate guideline as to their *total* amounts. The KTM’s units submit now proposals which are broken down in more *detail*.



### **Requested versus allocated appropriations at aggregate level**

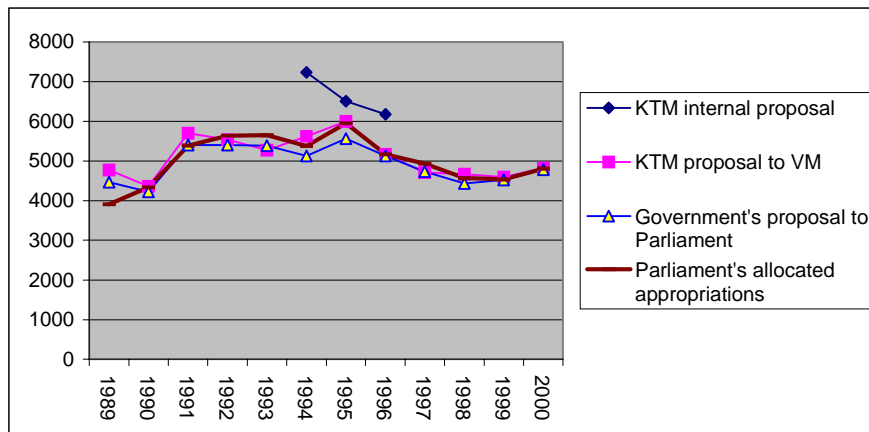
We begin the analysis by listing in Table 3, the budget appropriation at aggregate level for the KTM between 1989 and 2000. Based on the budget description above we list four different amounts. The Parliament's final approved appropriations, the Government's proposal, the KTM's proposal to the VM, and for three years only (1994-1996) the *internal* KTM proposals based on which the KTM makes its official proposals to the VM. We see in general that the amounts approved by the Parliament do not differ significantly from the proposed appropriations of the Government or from the KTM official proposals. The only proposals which seem to be significantly larger, are the ones from *within* the KTM. Unfortunately we were unable to examine whether this happened during 1994 to 1996 only or it is the practice every year, due to unavailability of data<sup>27</sup>. The graphical representation of Table 7 is Figure 3.

We also checked whether there are any trends in the amounts finally approved and the ones proposed, by matching the amounts approved in year  $t-1$  to the ones proposed for year  $t$ . In other words we shifted the last line of Table 3 one column to the right and redrew it in Figure 4<sup>28</sup>.

The lines may partly justify the hypothesis that last year's ( $t-1$ ) appropriations influence this year's ( $t$ ) requested amounts. The KTM proposals seem to be - in some years at least - as big as the  $t-1$  approved appropriations. What is clear, is that from *within* the KTM, the proposals are indeed higher than the approved ones for the year  $t-1$ ; even in our small three year sample we see the same trend downwards.

[Place Table 3 here]

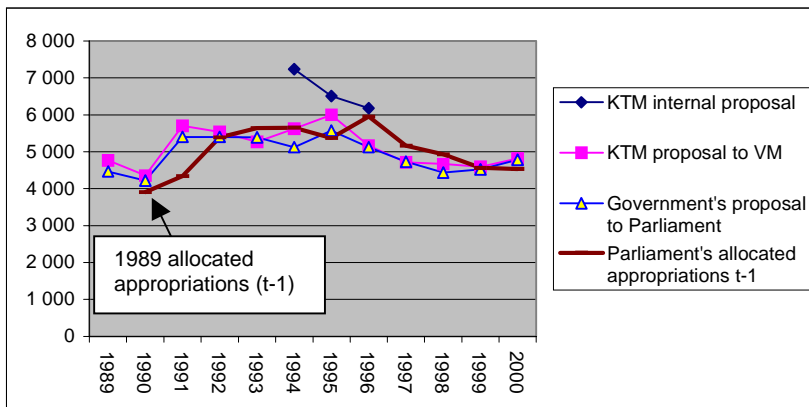
**Figure 3.** KTM aggregate budget appropriations requested and allocated (1989 – 2000, in FIM 1 000 000)



<sup>27</sup> The steep increase of appropriations for the year 1995 is due to one time outlay of FIM 1.4 billion (account moment 32.50.43) for potential losses in the agricultural sector due to the membership of Finland in the EU. These appropriations are not included in the KTM internal proposals nor in the KTM official proposals to the VM.

<sup>28</sup> To make things more comparable, at the same time, we deducted FIM 1.4 billion from the 1995 Government proposals and the 1995 approved appropriations (6969-1400=FIM 5 569 billion and 7348-1400=FIM 5 949 billion respectively).

**Figure 4.** KTM requested budget appropriations at year  $t$  versus allocated at year  $t-1$  (1989-2000, in FIM 1000 000)



### **Requested versus allocated appropriations at regional KTM office/TE-centre<sup>29</sup> level**

In this section we broke down the budgeted amounts in those that are mainly linked to activities at regional KTM office/TE-centre level. We attempted to *match* production costs with the budget received. Under costs we calculated their administrative expenses (32.02). Under budgeted amounts we gathered several types of subsidy appropriations, namely selected appropriations from moments 32.50 (Industrial development subsidies), 32.51 (enterprise policy subsidies), 32.52 (SME policy subsidies), 32.55 (Energy subsidies) and 32.85 (enterprise development and internationalisation subsidies). The detailed amounts are shown in Table 4 and Table 5; they list the government's proposals and the KTM's proposals respectively. Table 6 shows the aggregate amounts based on which the analysis was done. Its graphic representation is in Figure 5.

[Place Tables 4, 5 and 6 here]

We have chosen these subsidies because, in order to be distributed, they occupy a great deal of the time of the KTM officials at the regional offices. In their majority, these account moments are direct transfers of moneys given to firms. In addition, we have included other appropriations (account moments) as well which are distributed to firms indirectly, such as subsidised interest on loans, or moneys for organising seminars for entrepreneurs. These latter ones may be categorised as business subsidies too, since the participant receives valuable advice from the government agency for free. The names and number coding of all these accounting moments have been altered during the period examined but we have allocated the amounts so they can be compatible from year to year<sup>30</sup>.

The idea is twofold: (a) to check whether the previous year's appropriations are linked to the current year's requests by the KTM at regional level and (b) to see how the administrative expenses develop in comparison to the budgeted subsidy amounts distributed. The first analysis is done below. The second is conducted in sub-section 4.4 where we commend on whether the bureaucrat who pursues budget maximisation indeed succeeds in his attempts to maximise his budget and through this, his personal utility function as suggested by our hypothesis.

The descriptive analysis indicates that the bureaucrats are not very successful in this particular maximising strategy. First, the requested vis-à-vis allocated amounts do not differ significantly when it comes to subsidies for year  $t$  (Figure 5). This may be due to the financial discipline imposed by the Planning and Economics department of the KTM when handling the internal budget requests by the

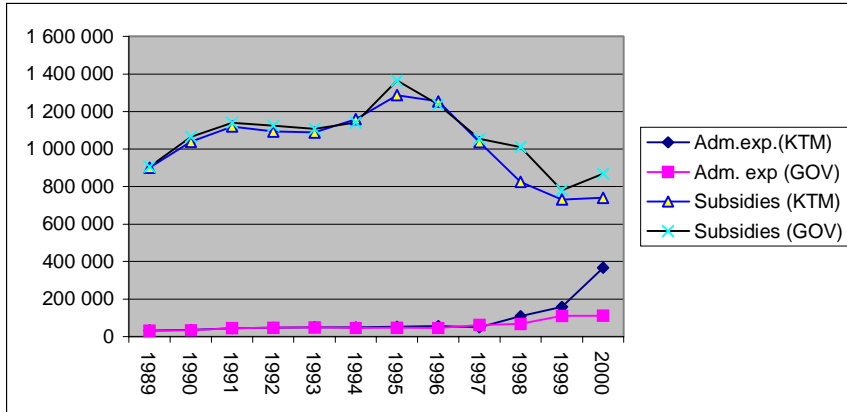
<sup>29</sup> Until 1996 there were about 15 KTM regional offices around Finland distributing business subsidies. Since then these regional offices together with the respective regional units from the ministries of Labour (TM) and Agriculture (MMM) were moved together under a new regional organisation named *Employment and Economic Development Centre* (Työvoima- ja elinkeinokeskus TE-keskus/centre).

<sup>30</sup> From 1999 a new accounting classification was put into force. As a result, some of the pre 1999 period accounts were joined together and others broken down. We altered the accounts for the years 1999 and 2000 to be compatible and comparable to the ones before 1999.

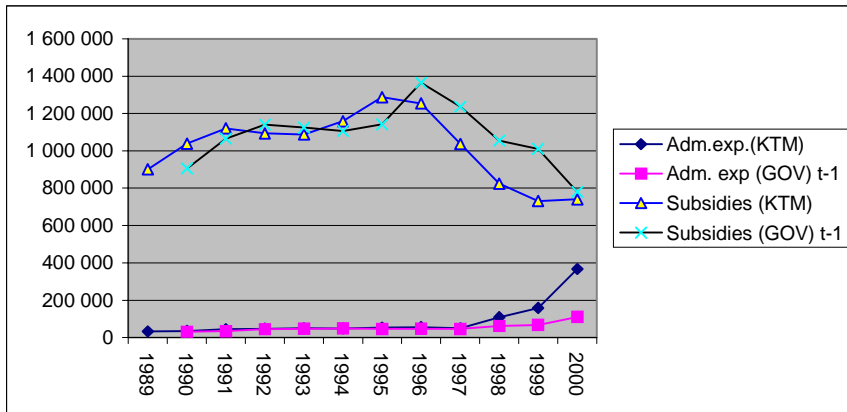
different units of the KTM. In fact we see that the amounts proposed by the government are in many years higher than the ones proposed by the KTM. We have not examined what has happened with the requested subsidy amounts *within*. Our guess is that these amounts are indeed higher than the ones actually proposed by the KTM to the VM, as was the case for the aggregate amounts for the years 1994-1996 (see Figures 3 and 4).

The same condition exist when we match the requested amounts from the KTM at year  $t$  with the proposed amounts by the government in year  $t-1$ . It seems that there is no connection between those two amounts (Figure 6).

**Figure 5.** KTM requested subsidy and administration appropriations versus allocated appropriations (1989 – 2000, in FIM 1000)



**Figure 6.** KTM requested subsidy and admin. appropriations at year  $t$  versus allocated at year  $t-1$  (1989 – 2000, in FIM 1000)



### 4.3.2 The December Syndrome

What are the spending patterns of bureaucrats during the fiscal year? The hypothesis is that if higher spending is evident by the end of the year this is an *indication* of budget maximisation strategy. Several authors have described this, apparently a common phenomenon in the public sector. For example Johnson (1991, pp. 292-293) writes:

*“The bureaucratic anthem that “we have to spend it or return it” echoes in every government building from Bangor to Bakersfield, and those innocent neophytes in the agency who ask “Why not return it ?” are given that cold bureaucratic stare and told that the accountants would not know how to handle such returns. Another reason of course is that senior bureaucrats are afraid that subsequent budgets will be reduced unless they spend all of their allocations before the end of the fiscal year”.*

Also Stiglitz (1986, p. 173) refers to the same situation:

*“Indeed one of the many concerns of the bureaucrat is that it come to be believed that he can do his job at a lower cost. A bureaucrat who failed to spend his entire budget would be in danger of having his budget cut next year. This is what gives rise to what are called “**spend-out problems**”- problems using up the congressional appropriations during the final months (days) of the fiscal year”.*

To test this hypothesis we analysed data received directly from the KTM. For the period 1995-1999 we received approx. 26 300 records with data on applications as well as positive and negative decisions for aid from 15 300 firms around the country.

We classified the data using the following categorical variables:

**AIDYN:** binary variable, 1: positive decision, 0: negative decision

**DECIMONT:** month (1-12) during which decision was made to grant or reject the application for aid

**MULTAPPC:** binary variable, 1: application coming from firms that submitted just this one application during the 5 year period, 2: application coming from firms which applied for aid more than once during the same 5-year period

Tables 7 to 10 cross-tabulate the application data based on these variables. In Table 7 we see that the success rate of the applications was on average 70%. In other words, more than two thirds of all applications submitted for aid to the regional offices of the KTM (nowadays the TE-centres) were successful; 62% of applications came from firms that had applied more than once for aid; the acceptance rate was slightly higher in those applications coming from multi applicant firms (73% to 66%). The frequency of decisions to grant or reject an application for aid broken down monthly is shown in Table 8. The decision activity varies across the year. Especially December accounts for almost 24%, or about one forth of all decisions made during the year<sup>31</sup>. Also note the success rate of applications during December. It is higher than the respective rates during the other months, at 78%. Table 9 joints the two previous tables together. It presents the monthly decision frequencies but now taking into account whether the firm had applied for aid more than once or not. The results show an interesting trend. In December the success rate of multi applicant firms jumps even higher to 81% vis-à-vis the single applicant firms whose success rate is little under the average, at 74%. In Table 10 we analyse the amounts of aid granted to firms again controlling for the frequency of applications submitted and the months during which the positive decisions were made. Always based on the received data from the KTM, the average amount of aid granted per application amounted to approx. FIM 174 000. It was almost twice as high for multi applicant firms than for the ones which applied once only (FIM 202 000 to FIM 120 000).

<sup>31</sup> This figure does not vary considerably when we conduct the same cross tabulation on a per year basis (1995-1999). Detailed calculations are not shown, but are available upon request.

[Place Tables 7, 8, 9 and 10 here]

Controlling for the month of decision we find once more that the amounts granted with decisions made during December for multi applicant recipients were on average the highest absolute amounts of aid (FIM 242 000). Even the respective decisions for single applicants were higher than the average for this sub-group (FIM 148 000). During the 5-year period under scrutiny approx. FIM 3.2 billion were granted. Of this, FIM 2.42 billion or 76% of the total was granted to multi applicant firms<sup>32</sup>. The December phenomenon is evident once more. Almost 33% of all aid granted (FIM 1.04 billion) was decided during the five Decembers under examination. The multi applicants alone received in December 26% of all the aid (FIM 828 million).

We have named the phenomenon described above, the “December syndrome“. What do these results imply? Officials attempt to *get rid* of the budgeted but still unallocated amounts of grants by the end of the year *t*. By doing so they try to avoid that the following year (in actual terms the year *t+2*) get less because they were not able to absorb the pre allocated amounts. In other words they pursue a budget maximising strategy<sup>33</sup>.

#### 4.3.3 Multi recipient firms and creaming

A third way of examining probable budget maximising strategies of bureaucrats is to look whether there are spending patterns of bureaucrats linked to specific firms. Do certain firms receive subsidies more often than others? If this is true what are their characteristics versus those that receive less often? Are those recipient firms “better“ than the others?

In public policy implementation theory the selection of “safe“ targets groups to implement the policy by public officials is called “creaming“. The logic is that public officials, pressed to show positive results on their activities, select recipients who may have more and better chances of achieving the predefined goals of the implemented policy. When they are confronted with more<sup>34</sup> firms than can be accommodated, bureaucrats “skim off the top“. Creaming might happen also when there are no controls for assessing success. In other words, when there are no clear information channels<sup>35</sup> to really judge on the worth of a policy as the situation seems to be with the current business subsidy policies (Lipsky (1980), pp.107-108).

Thus, below we hypothesise that those firms which are frequent recipient of subsidies, are in general in better financial conditions and with better growth potential than other firms.

For our analysis we classified the data based not only on whether the firm had applied once or more than once for aid (as was conducted in section 4.3.2), but now on whether it had received once or more than once aid. Where as the former analysis was based on the applications submitted, the

<sup>32</sup> Below we analyse the recipient firms only.

<sup>33</sup> One may defend this December Syndrome by saying that moneys had not been allocated to each of the regional offices till the end of the year, thus the officials although had made positive decisions earlier did not announce them to the applicant firms until they were assured that moneys were indeed available. This happened in 1996 according to KTM officials who were questioned. However, this tactic seemed to perpetuate in other years as well when theoretically the exact allocation of moneys was known already at the beginning of the year (Analysis of the December decision frequencies on a yearly basis is not shown here, but is available upon request).

In this context we should also mention that there are two types of expenditures in the budget as to the timing of their allocation: *Transferable appropriations* (siirtomääräraha) are those that can be allocated over one fiscal year period, normally in two to three years. If the whole amount is not absorbed (distributed) during the first year, what is left is transferred to the following year, and so on. *Estimated appropriations* (arviomääräraha) are those that must be absorbed (distributed) during one fiscal year. What is not spent, must be returned to the ministry coffers.

Business subsidies are classified - in their majority - under the second category of appropriations (arviomääräraha). The logic is that, normally, transferable appropriations are spent in total, but estimated appropriations are not; hence there are economies to the public moneys from the unallocated amounts. For example, based on KTM estimations, about 10% of TÉKES funding is not spent.

We would argue that these estimated appropriations do *not* produce real savings, regardless of the funds not distributed. The obligations to distribute these estimated appropriations *enhance* the December syndrome and in combination with the budget maximising behaviour of bureaucrats add to the creation of inefficient and ineffective allocation of resources.

<sup>34</sup> In our case this may not be completely correct. It seems as the December Syndrome has shown, that here we have *lack* of recipients.

<sup>35</sup> See section 4.1 on information asymmetry.

current one looks on aggregate amounts at firm level. In our sample there were approx. 15 300 firms applying for aid during 1995-1999. As mentioned earlier they had submitted 26 300 applications. Almost 50% were granted aid only once (42,1% +7,5%). 26% of these applicant firms never received aid through the KTM during the 5 year period (22,2% + 3,8%). Finally about 25% received aid more than once (Table 11).

How were the money distributed based on this classification? Table 12 shows that multiple receivers enjoyed a considerable advantage versus the firms which received aid once only. 70% of the total amount was distributed to 25% of the firms and only 30% to the rest 75%. On average these multi recipient firms received FIM 594 000, where as the ones that received aid once only got a little more than one fifth or FIM 129 000<sup>36</sup>. These results indicate a preference to a certain type of firms by the KTM firm analysts and distributors of aid.

[Place Table 11 and 12 here]

What are those firms' characteristics that weigh in the KTM analysts' decision to give them more often subsidies? How do these characteristics compare to the firms' characteristics when the KTM analysts decide to give or reject an application for aid?

### ***The empirical model and the variables utilised***

We analysed our data by running several logistic regression models. The structure of the models were defined as follows:

The (Prob)ability of an event occurring can be written as

$$\text{Prob}(\text{event}) = e^Z / (1 + e^Z) \text{ or}$$

$$\text{Prob}(\text{event}) = 1 / (1 + e^{-Z}), \text{ where}$$

$$Z = B_0 + B_1X_1 + B_2X_2 + \dots + B_pX_p$$

$X_1 \dots X_p$  are the independent variables

$B_1 \dots B_p$  are the coefficients of the independent variables estimated from the data

$p$  is the number of independent variables

The probability of an event *not* occurring can be written as

$$\text{Prob}(\text{no event}) = 1 - \text{Prob}(\text{event})$$

The odds of an event occurring are defined as the ratio of the probability that it will occur to the probability that it will not.

$$\text{Odds}(\text{event}) = \text{Prob}(\text{event}) / \text{Prob}(\text{no event}) \text{ or}$$

$$\text{Odds}(\text{event}) = e^{B_0 + B_1X_1 + B_2X_2 + \dots + B_pX_p}$$

The logit is defined as the log of the odds of an event occurring or  
 $\text{Log}(\text{Prob}(\text{event}) / \text{Prob}(\text{no event})) = B_0 + B_1X_1 + B_2X_2 + \dots + B_pX_p$

In other words the  $B$  coefficients show how much the *logged odds* of an event occurring change as the independent variable increases by one unit and all others stay the same. To find out what are the *odds*, we must use the EXPONENT of  $B$ , shown in the EXP(B) column in the model Tables 17, and 19.

<sup>36</sup> (FIM 201 mil. + FIM 780 mil)/(6458 + 1144)

### **Dependent variables<sup>37</sup>**

**AIDYN:** binary variable, 0: rejected, 1: received aid once or more than once between 1995-1999

**MULTREC:** binary variable, 0: received aid once, 1: received aid more than once between 1995-1999

### **Independent variables (all categorical)**

**SIC95AGG:** Standard Industrial Code (SIC) of firms at 2-digit level (sector)

**LEGATAGG:** Legal type of firms

**PIIRIAG2:** The TE-centre/KTM regional office in which firm's applications were handled

**NDECIAGE:** quartiles 25, 50, 75, >75 of firm age *at the time of decision*

**NVA95:** quartiles 25, 50, 75, >75 of Value added of firms for 1995

**NDVA97\_5, NDVA97\_6, NDVA96\_5:** quartiles 25, 50, 75, >75 for value added growth of firms between 1995-97, 1996-97 and 1995-96 respectively<sup>38</sup>

All sub-categories of these categorical variables are found in Tables 13, 14 and 15.

[Place Table 13, 14 and 15 here]

We linked the records of the KTM applications database with a financial statements database received through the Taxation Authorities. We ended up having three years of financial statements linked to the KTM subsidy database, namely for 1995, for 1996 and for 1997. We assumed that the KTM analyst when examining the application for subsidy from a firm, looks among others to the *earlier* financial statements of the applicant firm<sup>39</sup>. We thus divided our KTM database into three smaller databases and examined them separately. Since we had financial statements for 1995, 1996 and 1997 we divided our database into those decisions taken during 1996, 1997 and 1998. We then linked the financial statements of 1995 with the decisions of 1996, the financial statements of 1995 and 1996 with the decisions of 1997 and the financial statements of 1995, 1996 and 1997 with the decisions of 1998.

Four different models were run for each dependent variable, always taking under consideration the timing of decisions and the availability *at that time* of the financial statements of the firm. For example, when we examined the decisions during 1997 in our models we did not include variables such as NDVA97\_5, but rather NDVA96\_5, simply because the KTM analyst could not have known the value added for 1997 which is needed to calculate the NDVA97\_5 *at that time*<sup>40</sup>.

The independent variables chosen SIC95AGG (Industrial Code), LEGATAGG (Legal type), NDECIAGE (Age at time of decision) are standard for this type of analysis. As for the location of the firm we chose the PIIRIAG2 (TE-centre) categorical variable. We could have used instead the location

<sup>37</sup> It is important to discuss here a potential problem that derives from this classification. As noted earlier, in our sample we have some firms that have applied once and have received aid once and others that have applied once and have been rejected. Also there are firms which have applied more than once and have received aid each time and those that have applied and have been rejected each time. These firms are easily classified as having been rejected or have been granted aid (AIDYN=0/1) and received aid once or more than once (MULTREC=0/1). The problem surfaces when we attempt to classify firms which have applied more than once and in some cases they have received aid and in others they have been rejected. Do we classify them as rejected (AIDYN=0) or granted aid (AIDYN=1)? The division of the sample into *decision years* and the construction of models with data from those years can resolve to a situation where a firm is classified in one year's model under one category and in another year's model in another. For example if a firm had been given aid in 1996, her application was rejected in 1997 and was given aid again in 1998 she would have been classified as multi recipient in 1996 and 1998 but rejected in 1997. This approach however gives a more accurate picture of the *behaviour* of the KTM analysts (bureaucrats) the examination of which is of course our main target in this paper. Had we wanted to see the actual differences between firms receiving aid and those that had not, or between those that received aid once and those that received more than once, we would have excluded firms whose applications were sometimes rejected and sometimes approved and would have analysed them separately.

<sup>38</sup> The original VA95, DVA97\_5, 97\_6, 96\_5 and DECIAGE variables were continuous. We decided to categorise them into four quartiles, since the interpretation of the logistic regression models became much easier.

<sup>39</sup> This is the case in the majority of firms that have a twelve month accounting year ending on Dec 31. There are of course firms whose accounting year ends earlier. In reality that means that there could have been cases where the KTM analyst examined, for example, the financial statements of 1997 and made the decision also in 1997. With the data at hand, we could not control for such a possibility. In any case, the majority of firms close their books for the year on Dec 31, thus whatever omissions, we estimate them to be small.

<sup>40</sup> The exact formula for calculating this variable is as follows:

Value added for 95 (96 and 97 respectively) = Operating margin + Total Labour costs (Salaries, etc.) + Rents + Leasing costs (all figures for the respective year). For example, DVA97\_5 (growth of value added from 95 to 97) = VA97-VA95.

of the firm at prefecture level (lääni). However, with the PIIRIAG2 one can investigate for example the influence that the regional KTM office has in rejecting or accepting an application or can find out in which office there is a greater concentration of subsidies to the same firms.

The reason for selecting the other variables, dealing with value added (NDVA97\_5, NDVA97\_6, NDVA96\_5, NVA95) is this: Value added, as shown in footnote 40, incorporates some parts of other financial variables which are key to the KTM analyst's assessment tools for firm applications (i.e. operating margin, salaries (personnel), rents (tangible assets), etc.). We assume that the analyst looks at those variables' values and checks how they have fared through time before he makes a judgement on the application for subsidies. Thus, the growth of value added of the recipient or a rejected firm may be a good aggregate indicator capturing the development of the firm.

[Place Tables 16, 17, 18 and 19 here]

Information showing what influences the decision of the KTM analyst to give aid or not (dependent variable AIDYN) is shown in Tables 16 and 17. The respective information examining what influences the decision to give aid once or more than once (MULTREC) to the same firm is found in Tables 18 and 19.

In Tables 16 and 18 we give some descriptive information on the models, their method of analysis and their overall significance levels. In Tables 17 and 19 we show the coefficients of the independent variables listed above, their significance levels and how they relate to the binary dependent variables AIDYN and MULTREC respectively.

The models were created and run using the software package SPSS v.10 (Norusis,1999). The method "Enter" was used to run the models, thus all variables are listed regardless of whether their overall significance level is over or under the cut off point of 0.05. Out of every categorical variable specified in each model, SPSS creates automatically coding for dummy variables (1/0). We used the method "Indicator" to compare the values of these variables' coefficients. One can only discuss the sub-categories of these variables in reference to some *base* category. We chose their first sub-category as the category of *reference*.

The Nagelkerke  $R^2$  indicator is the equivalent to the  $R^2$  indicator for a normal regression model where the dependent variable is continuous and not binary as it is here. Its range is between 0 and 1. In general, the explanative powers of all the models are relatively low. The Nagelkerke  $R^2$  ranged between 0.061 and 0.146 for models 1-4, and slightly higher for models 5-8, between 0.131 and 0.155, or the models never explained more than 14.6% and 15.5% of the variability of the two dependent variables. That indicates that there are other factors (variables) which, had we included in our models, would have probably increase their explanatory power. In plain words there are other reasons (as well) which influence the decision (behaviour) of the KTM analysts (a) to give subsidies to firms (AIDYN=1) or reject applications for subsidies (AIDYN=0) and (b) to give subsidies to the same firms (MULTREC=1) more often than to some other firms just once (MULTREC=0). For example for the latter models (5-8) there might be a link between the type of project financed and the repeater recipient. Or there might be some connection between the analyst himself and the firm assisted<sup>41</sup>. We did not incorporate all these potential factors, due to difficulties in manipulating the existing data; maybe one could do so in a future study.

Model chi-square test (model sig.) examines the null hypothesis that none of the coefficients of the independent variables are linearly related to the log odds of the dependent variable. As can be seen from Tables 16 and 18 at least one variable's coefficient is significant (sig.<0.05) in all models.

The "predicted %" assesses how well the model fits when the observed to the predicted outcomes are compared. Most of the models improve slightly the chances of predicting correctly an outcome in one of the two groups (AIDYN 0/1, MULTREC 0/1) compared to just choosing one group by chance alone.

The Hosmer and Lemeshow goodness of fit test examines whether there is a significant difference between the observed values and model predicted values of the dependent variable. If the "sig." value

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<sup>41</sup> See for example Venetoklis (1999, pp. 52-55) where the KTM analyst comes out to be significant factor in whether a firm receives subsidies or not.



is less than the cut off significance level of 0.05, then we have a model which predicts values significantly different from what they are supposed to be. In all eight models the test had  $\text{sig.} > 0.05$ . and based on this, all models seemed to fit reasonably well.

### **General analysis of the models**

Models 1-4 (Dependent variable: AIDYN – Table 17)

Examining these models one sees certain trends. First the age of the firm (NDECIAGE) turns out *without* any statistically significant coefficients. What comes out significant in all models is the TE-centre (PIIRIAG2) through which the applications were handled. The other variables show mixed results. For example the value added/value added growth (NVA95<sup>42</sup>, NDVA97\_5, NDVA97\_6, NDVA96\_5) of the firm has a significant coefficient in models 1 and 3 but not in models 2 and 4. The firm sector (SIC95AGG) is also significant in models 1, 3 and 4. The legal type of the firm (LEGATAGG) seems to influence whether it will receive aid or not in decisions made during 1998 (models 3 and 4) but not during 1996 and 1997 (models 1 and 2).

Models 5-8 (Dependent variable: MULTREC – Table 19)

Here we also see some trends but in some variables opposite to the ones in models 1-4. For example the age of the firm (NDECIAGE) now turns out statistically significant for all models. The same applies for the value added growth of the firm (NVA95, NDVA97\_5, NDVA97\_6, NDVA96\_5) and the legal status of the firm (LEGATAGG). The KTM regional office (PIIRIAG2) seems to influence the decision to give aid more than once to the same firms in decisions made during 1998 but not during 1997 and 1996. The industrial sector of the firm is also significant in models 1, 3 and 4 but not in the decisions made during 1997 (model 2).

In the two aforementioned groups of models, two models stand out in resembling closer the decision making process of the KTM analysts, models 4 and 8. The reason is that in these two models the Value Added growth of the firm NDVA97\_5 represents growth for a period of two years from 1995 to 1997. In the other models the value added growth period is only a year, from 1995 to 1996 or from 1996 to 1997 or it is static (NVA95). And even though this two year period is still too short to make any solid judgements about the firm in question, it is nevertheless better than the other variables we have utilised. For this we shall discuss below model 8 in detail. One can then apply the interpretation for model 4, or for any other model as well.

### **Detailed analysis**

In model 8 three variables turn out with statistically significant coefficients. The value added growth of a firm between 1995 and 1997 (NDVA97\_5), the industrial sector of the firm (SIC95AGG) and its legal status (LEGATAGG).

Let us begin with NDVA97\_5. Looking at Table 15 under model 8 in the bottom right half, we find all the sub-categories for this variable. We see that its reference category (1<sup>st</sup> quar. (R)) includes firms which have had negative or no value added growth between 1995 and 1997 (up to FIM –2 000). The first sub-category under the (R)eference, NDVA97\_5(1), has a B with a negative sign, but because it is not significant ( $\text{sig.} = 0.06^{43}$ ) we continue with the following sub-category. The second category underneath the (R)eference, includes firms which have had value added growth from FIM 374 000 up to FIM 1 272 000 between 1995 and 1997. This category corresponds in Table 19 to NDVA97\_5(2). Note that its B coefficient is statistically significant ( $\text{sig.} = 0.014$ ) and amounts to 0.476. B is difficult to interpret because it represents changes in logged odds. We thus turn to the respective value of EXP(B). It is 1.61. This can be interpreted as follows. Other things being equal, if a firm's Value Added growth had been between FIM 374 000 and 1 272 000 during 1995 to 1997, then the odds of that firm receiving aid more than once by the KTM, during the 1998 decisions were increased by 1.6 times compared to a firm that had for the same period negative or little value added growth. If the firm

<sup>42</sup> Model 1 (and 5) referred to decisions made in 1996. In our data set we lacked financial information for the years earlier than 1995, thus could not calculate the value added growth amount as we did for the other models. For this, we had to settle for the fixed variable value added for 1995 which shows a static picture of the firm for the previous year of the decision.

<sup>43</sup> One may argue that the cut off point at the significance level of 0.05 is arbitrary; indeed at the significance level of 0.10 this result would have been interpreted as significant.

belonged to the third group (NDVA97\_5(3), Value Added growth > FIM 1 272 000) then its odds for more subsidies increased by 1.8 times, again compared to the reference category.

The age variable (NDECIAGE) can also be explained the same way. In Table 15 we see that under model 8, the reference category represents firms which are up to 7 years old at the time of decision (1<sup>st</sup> quar (R)). The next sub-category includes firms with ages between 7 and 11, the third between 11 and 19.5 and the fourth from 19.5 onwards. In Table 19 the respective 7 to 11 sub-category is represented as NDECIAGE(1) with a positive B (0.913), significant (sig=0.05) and EXP(B) 2.49. Other things being equal, the odds of a firm receiving money more than once, for the period in question and during the decisions made in 1998, increased by 2.49 times when the firm was between 7 and 11 years old, if compared to the firms which were younger (7 or less years old). The increase of odds for firms between 11 and 19.5 years were almost the same (2.38 times), but for those that were older than 19.5 years the odds jumped to 3.42 times.

The Legal status of the firm (LEGATAGG) also seemed to play a role in getting repeatedly money. If a firm was an Ltd (Oy) its odds increased by 1.5 times compared to a firm that was a Personal company (Ky). On the other hand when the firm was something other than Oy and Ky, the odds decreased by 0.4 times since the B coefficient was negative (-0.890).

Finally, the industrial sector of the firm (SIG95AGG) was also influential, as expected. The reference category was "4:Manufacturing (R)". This first sub-category under this, was "6:Construction(1)". In the model Table 19 it is represented by SIC95AGG(1), its B coefficient is negative (-0.863), significant (sig=0.006) and its EXP(B) is 0.422. This means that the odds of firms in Construction to receive repeatedly aid from the KTM *decrease* by .4 times compared to the firms who are in Manufacturing. The odds for the ones who are in Real Estate (SIC95AGG(3)) decrease by 0.6 times and the odds of the firms who belong to all other industrial sectors except the ones just mentioned (SIC95AGG(4)) also decrease by 0.47 times in getting repeatedly subsidies.

### **General comments**

To recap, we see several opposing trends in the two groups of models. When the issue is to give aid or not, the KTM regional office seems to play a significant role in granting subsidies or rejecting an application, closely followed by the firm's industrial sector. What does not seem to play a role, in most cases, is the age of the firm and the value added growth of firms.

On the contrary when the question is to grant subsidies once or more than once, the value added growth of the firm during the last few years plays a positive role (the higher the growth, the higher the odds of getting aid again); also the age of the firm is positively related to the odds of getting aid again (the older the firm the higher odds it has of getting money again and again). Finally if you are an Ltd your odds increase as well<sup>44</sup>.

Why the results turn out this way for the first group of models (1-4)? Why age does not seem to matter when a firm is given aid or rejected? Why having your application handled by one KTM regional office on average increases or decreases the odds of getting aid versus another office? Could it be because of the specific development/operational plans and their objectives in each of these offices? It is quite hard to model such behaviour unless one classifies each of these operational plans in some comprehensive way. The only straight forward result seems to be that the industrial sector of the firm plays a positive role; that is the odds of a firm of getting aid decrease if she is not in the Manufacturing sector. That is expected since KTM primarily distributes subsidies to firms in this sector.

For the second group of models (5-8) things may be explained easier. There we see a clear preference by the decision makers to give *more and repeatedly* subsidies to firms which are in the Manufacturing sector, are older, they operate as Ltds (Oy) and have been growing at a faster rate than other firms. In other words, our hypothesis of the "creaming" policy implementation seems to find strong support from the logistic regression models analysed. One may thus interpret this selective distribution of subsidies as one more strategy by bureaucrats to secure the continuation of subsidy payments (by ensuring good results) and thus maximise the bureau's budget in the long run.

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<sup>44</sup> Although not tested, we would guess that the legal status correlates positively with the size of the firm (amount of personnel).

Finally, it should be emphasised here that the KTM officials do nothing wrong by choosing “better firms” for receiving repeatedly subsidies. The notion of creaming is imbedded in the Law for business subsidies. It is stated in the Law under which this study was conducted (L 1136/1993)<sup>45</sup>, and in the one which is currently in force (L 150 /1999)<sup>46</sup>. It is also mentioned in the frame budgeting planning document for the period 2002-2005 (KTM, 2000)<sup>47</sup>.

However, the distribution of the aid to a certain type of firms does not necessarily maximise society's welfare. It is not certain that these (better) firms are indeed of real need for such subsidies. Is the found value added growth due to the subsidies received or is the decision to give subsidies due to the value added growth of the firms? If firms have already been growing at a fast rate for some time, they may not be in need of any extra subsidies any more. Their growth could have carried forward regardless of the subsidies given to them. Consequently, these moneys could have been given to other less fast growing firms to assist them in their growth efforts.

#### 4.4 Budget maximisation success

Whether the budget is indeed maximised is examined in this section. How does one measure maximisation? For example Niskanen – as described in chapter 3 - presented a theoretical mathematical analysis of the topic. Another way of testing whether the budget maximising attempts of the KTM bureaucrats have been successful is by examining the level of administrative expenses (salaries, etc.) and how they relate to the subsidy amounts as well as to the total budget allocation of the bureau under scrutiny. This has been the most common approach of the empirical studies reviewed earlier. In Table 6 we already showed the administrative expenses at Regional KTM offices/TE-centres and respectively the amounts of subsidies that have been spent through these offices (Figures 5 and 6 found earlier, are graphical representations of Table 6).

The analysis reveals an interesting trend. From 1990 to 1991 we see a substantial increase of administrative expenses, but from then onwards and up until 1996 these expenses have stayed relatively flat. In 1997 we see another substantial upsurge, which continues to this day. The respective subsidy appropriations have not had the same development. From 1990 and till 1994 they have also stayed rather stable. We see an increase in 1995 and then cuts are evident till 1999. In 2000 we again observe an increase.

Before we proceed with our conclusions, it is important to refer to some limitations of this analysis. First, the jump in administrative expenditures the last couple of years is due to the altered payment system of personnel salaries of the TE-centres. The KTM is responsible for the salaries not only of its own unit (the former KTM regional offices) but also of the units of the ministry of Labour (TM) and the ministry of Agriculture (MMM)<sup>48</sup>. Second, we have not included in the administrative expenses listed, the ones at the KTM's headquarters by the unit that is responsible for the management, planning, monitoring and implementation procedures at TE-centre level. Third, the development of subsidy appropriations may not be the most accurate one; we chose to include certain moments which we believed that could be attributed to these lower level activities. This may not be absolutely correct. Finally, we do not include the appropriations which have been used for business subsidies through the EU Structural Funds after 1994. In reality the decrease of business subsidies is not that much as shown here due to the EU Structural Funds. But then, the same applies for the increase after 1999.

Finally, one needs to keep in mind that this is not a causal analysis. We do not have enough observations to run regressions and see for example, the elasticity of administrative expenses in connection to changes in the subsidies distributed. Niskanen's theory would have been clearly supported had we seen increases of subsidies followed by equivalent increases in administrative

<sup>45</sup> ...Condition for granting regional investment is that the firm is deemed to have the prerequisites for continuous profitable operations (Section 4) ...A prerequisite for granting such small business aid is that the firm is judged to have the preconditions for continual profitable operations (Section 7).

<sup>46</sup> ...To be eligible for aid, the firm must be deemed to have the necessary prerequisites for continuous and profitable operations. (Sections 7).

<sup>47</sup> In the section on enterprise policy, on the paragraph referring to direct subsidies it reads that “...(direct) subsidies are to be given to firms that have good growth potential, focusing on projects of start up firms and of firms in their growth phase...” (p. 19).

<sup>48</sup> The regional units of the TM and the MMM together with the KTM units are stationed together in these TE-centres. All handle applications for subsidies from firms. What differs among them is the type of projects financed and the source of subsidy appropriations.

expenses. This has not been the case here. On the other hand, the opposite has not happened either. The decreases of subsidies has not been followed by equivalent decreases of administrative expenses. And if we check the ratio of administrative expenses to subsidies distributed, it stays at all times above 3% and in later years even increases. To put it differently, the appropriations that are of most practical importance to bureaucrats have not decreased despite the reduction in activity<sup>49</sup>.

To conclude, despite the above limitations the trends shown may indicate that bureaucrats have succeeded in satisfying their utility function although budget maximisation has truly not been achieved.

### ***Niskanen's theory and business subsidies in Finland: An overall assessment***

To recap, in testing Niskanen's theory we examined whether its four assumptions were relevant within the context of the KTM's business subsidies policy. Information asymmetry as well as bilateral monopoly were found to exist between the KTM and its sponsor, the VM. However, contrary to Niskanen's assumption, the VM is active in their between budget negotiations. Frequently the VM is the one that defines the level of many types of appropriations. Testing the potential budget maximising behaviour of the bureaucrats, we noticed that there were attempts to get rid of the unallocated appropriations by year's end (December syndrome) and to distribute subsidies to better firms (Creaming). Finally, we saw above that administrative expenses have stayed flat or even grown in the period examined, regardless of fluctuations of the respective subsidy appropriations. Hence, although budget maximisation has not been achieved, bureaucrats seem to have succeeded in keeping the appropriations of most importance to them stable. Overall we believe we have found evidence supporting<sup>50</sup> Niskanen's theory when applied to the business subsidy programs in Finland, as implemented by the KTM.

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<sup>49</sup> One may argue that it is much more difficult to conduct such administrative cuts in the public sector because once a person gets a permanent position in the ministry (a "virka") it is very hard to be laid off. On the other hand, internal transfers are allowed and this could have proved to be a more efficient measure in times of reduced output (decreased subsidies).

<sup>50</sup> Partly, at least.

## 5. Discussion

This chapter discusses first the model framework used in this study and then the policy implications of the empirical analysis. We initially refer to certain limitations and potential extensions that are evident from our previous attempts to adapt Niskanen's bureaucratic behaviour model to the KTM business subsidy policies. We then discuss several recommendations that might eliminate to some extent inefficiencies of the current business subsidy programs. Finally, we conclude with a look into the future.

### 5.1 Limitations and extensions

#### *Measurement problems*

As we saw in chapter 3, Niskanen introduced the concepts of costs (C) and output (Q) associated with a policy program. How do we define and measure those two concepts in monetary terms? As far as costs are concerned they can be defined and calculated in a rather straightforward fashion. Costs could include salaries and other administrative expenses plus subsidies distributed. To put it differently, all costs are explicitly budgeted. The problem - and limitation in this respect - lies with defining and measuring output.

How do we define output based on Niskanen's model? Would output be the value of the operations through which the subsidies are distributed or is output the potential revenue that the subsidies would theoretically generate when given to firms? Could this output be measured for example in the form of value added?<sup>51</sup>

This is a very difficult question because the public sector produces services (outputs) which are quite hard to quantify vis-à-vis a private market firm which produces, say, a unit of product and finally a positive cash flow and profit. If output is assumed to be the accounting value of operations, then it is calculated as subsidies plus other expenses; in other words it equals the costs above, and it is this kind of measurement usually adopted in the case of public services. However, the true impact - and output - of a business subsidy is a more complicated issue. If output is defined as value added generated in the long run, it is then the direct value added in recipient firms plus the indirect value added in other firms influenced by the receipt of subsidies by the recipient firms (regional spill overs). The EU itself recommends a whole range of different indicators evaluating business subsidy programs and these could also be utilised in measuring output<sup>52</sup>. Because different approaches give different output measurements, one may claim that we can never be sure that the output reflects the true value of the program operations, and consequently one can not judge whether or not the amounts received and distributed have in fact been utilised in a truly effective and efficient way.

Another measurement problem is linked to the demand for business subsidies by the firms. We discussed earlier that subsidies distributed do not necessarily reflect the real needs of the recipient firms. We did this, first by reviewing literature indicating ineffectiveness of directly given subsidies and second by finding that the majority of business subsidies to firms in Finland are spent repeatedly on the *same* firms. But how can one estimate this demand and then translate it in business subsidy appropriations? It is quite difficult to calculate the approximate amount of funds that would be necessary to "satisfy" the lack of capital in a certain area, in a region or in a specific industrial sector. One would probably have to have adequate knowledge of the socio-economic conditions at the respective region or sector during a certain period of time, forecast short to medium term economic trends, have data on investment patterns of previous years, survey the potential recipients on their investment plans, check their financial and market conditions in which they operate, etc. If that were to occur, one would need to utilise a great deal of human and financial resources which, unfortunately, are scarce.

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<sup>51</sup> Value added has been the indicator utilised by Venetoklis (2000a).

<sup>52</sup> See EC (1999, p. 41).

### ***External validity in regression models***

In the section analysing the decisions giving subsidies to firms one notes the relatively small amount of firms included in the estimated logistic models. For example, our total sample consisted of approx. 11 350 firms of which 3 750 received aid more than once and the rest once (Table 12). In the models 5-8, the amount of firms analysed did not exceed 1 600. Why the rest of the firms were not analysed? The problem is related to the database at hand and the variables included in the models. In some firm records the values of the variables utilised were simply missing, thus were excluded from the analysis automatically (SPSS requires complete data set for its logistic regression analysis). The other problem was that some firms were established and received subsidies later than the first year of the period examined. For example they could have been established in 1996 and we measured value added growth between 1995 and 1997. Finally there could have been cases of multi recipient firms that received aid in 1995 and 1999 only, thus were by definition excluded from our analysis (we looked at decisions during 1996-1998). All this produces selection biases and makes general inferences of the results to a larger population - other than the one analysed - difficult.

### ***Internal pressure groups***

The analysis in chapter 4 concentrated on efforts to adapt Niskanen's model into the business subsidy policies at the KTM. In this respect we discussed, among others, the budget formulation process and gave some evidence (a) on the information asymmetry problem, (b) on the intentions of bureaucrats to maximise their budget and finally (c) on whether the budget is in indeed maximised. The results indicate that information asymmetry is very much in existence and that there are clear intentions for budget maximisation, but the success of such efforts are not that clear.

Why and how does the budget maximising behaviour of the bureaucrat influence in practice the design and implementation of the business subsidy programs? Our hypothesis stems logically from the fact that once enough money is received and distributed, the activity of the department responsible for the subsidies is increased, thus it gives status and security to the bureaucrats within. We would add that the whole idea is closely linked to *internal* pressure groups. Bureaucrats within these departments create a pressure group themselves and irrespective of the real needs for subsidies, push for the proliferation of these programs.

This group holds the data that could be used in measuring the real effects of business subsidy policies and guards them with vigour. The fact that detailed information on business subsidy applications has been gathered for years now, but not analysed to any meaningful manner may also indicate the motivations of this pressure group. One could use the classic principal – agent problem in microeconomics as a metaphor. In our case the sponsor (the VM) is the principal and the bureau (the KTM) is acting as its agent. The principal can make rational decisions only if he is fully informed by his agent. However, the possibility exists that once the principal is fully informed he will act in such a way that the utility of the agent will be reduced (the principal will reduce the appropriations for subsidies). Thus the agent prefers not to conduct any rigorous analysis of the impacts of business subsidies and in parallel establish conditions of information asymmetry which favour himself.

A problem of course is that it is very difficult to measure the assumed influence of this group on the budget formulation. We saw earlier that in the negotiations between the VM and the KTM it seems that the VM holds the final say on the amounts to be allocated – at least as to the amounts of subsidies themselves. Cuts have indeed been implemented, mostly due to the initiative of the KTM budget department and then by the VM. As mentioned in chapter 2, Muller and Moe (1983) challenge the passive role of the sponsor that Niskanen puts forward, and these cuts support them<sup>53</sup>.

Hence, we would argue that the proliferation of business subsidy programs, irrespective of real subsidy demands at firm level, gives an extra negotiating *weapon* to bureaucrats for at least *sustaining* their level of administrative expenses. Again, what level the subsidies need to reach in order to give the intended security, status, power, etc., that Niskanen claims bureaucrats pursue, is very difficult to calculate.

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<sup>53</sup> Especially after 1995 these cuts have been part of a general policy of fiscal consolidation by the Finnish government.

### **External pressure groups**

Furthermore, one can not discount external pressure groups as well, that is the (potential) recipient firms, or their representative lobbying organisations. Because of the potential gains that are at stake in the form of grants (free moneys) these groups can become a very important influence in policy planning and implementation of business subsidies. Regardless of the fact that specifically this type of business subsidies lobbying can potentially produce rent seeking activities which are socially bad<sup>54</sup>, the government can succumb to these pressures and allocate subsidies to certain small group of firms.

Recall that in our data we had approximately 11 350 firms receiving subsidies during the period 1995-1999. Although a seemingly small group, it can indeed become quite effective in lobbying for the continuation and even the increase of the subsidies to the sectors and the regions they belong to. One may even go as far and think of the *people* that work for these firms as indirect recipient of these subsidies as well. We calculated the amount of employees in those recipient firms based on the data the KTM provided. On average there were approx. 8,3 employees per firm, excluding the outliers. We thus have already a potential powerful pressure group of about 100 000 people. And in this group we do not include their dependants nor those people whom they might influence in their voting patterns<sup>55</sup>.

### **The median voter**

What about the median voter? He is supposed to be the real decision maker, the one who influences and pressures the politicians towards one policy instead of another or to several policies of different financial dimensions. Why is the median voter not reacting and pressing the sponsors to cut these moneys? The answer is simple. Business subsidy financing is a special type of budget appropriation which does not influence the citizen in his everyday life since the amounts involved are relatively small compared to the total national budget (less than 1% of the GDP - see Table 1). Also, the information asymmetry that exists adds to the ignorance and apathy of the median voter. The allocative role of the government could thus be based also on the passive acceptance of society for these expenditures. Finally it may very well be that it is acceptable to society to give subsidies to firms in declining industrial sectors or in remote and underdeveloped regions around the country due to society's altruistic need for a just redistribution of her resources (see chapter 2 on the roles of the Government).

### **Other behavioural theories of bureaucracy**

Is Niskanen's model a reasonable description of bureaucratic behaviour when one examines the design and implementation policy of business subsidies to firms? The evidence presented thus far may give some support but is – as most empirical studies – inconclusive. In our attempt to explain bureaucratic behaviour we have touched only a small part of a long list of theories and empirical studies connected to it. We shall not attempt to review all these remaining theories due to time and space limitations. Below, we refer just to one which assumes that bureaucrats behave as they do because of the constraints in which they operate<sup>56</sup>.

Brown and Jackson (1990, p. 203) comment that the description of bureaucratic behaviour lies within the "precinct of allocative efficiency of public moneys". As the system in which the bureaucrats operate allow them to pursue their own objectives, only *by accident* will recourses be allocated according to the preferences of the median voter. We mentioned earlier that the amounts of subsidies compared to the total budget are quite small and are geared to a relatively small sector of the population, thus the indifference of the median voter to push for a different policy. In addition there may also be practical problems in the implementation of such policies. Brown and Jackson point out that although

<sup>54</sup> The notion of "rent seeking" was first introduced by Tullock (1967) and is central to the theory of Public Choice. It represents socially costly pursuit of wealthy transfers (Tollison, 1997, p. 506). A better definition describing precisely the economic behaviour was suggested by Bhagwati (1982) as "Directly Unproductive Profit seeking" (DUP). However, the original - rather confusing terminology - has persisted through the years.

<sup>55</sup> It would be interesting for example to investigate based on a regional distribution, the number of people in firms, the amount of aid given to these firms and the voting base - limits in the respective voting districts. A hypothesis would be that concentration of voters will influence positively the distribution of subsidy amounts. The hypothesis on the connection between political decision making and interest groups is nothing new. See for example, Michell and Munger (1991).

<sup>56</sup> For a thorough review of bureaucratic behavioural theories see the recent papers by Wintrobe (1997) and Moe (1997).

accountability and control for any policy may exist *de jure* they are weak *de facto*. And that is because the policies are implemented and services delivered by lower levels of the organisation. At each stage of the implementation process someone has to interpret some piece of the relevant legislation which is usually formulated in a vague and imprecise way. Successive interpretations can then result in cumulative deviations from the intentions of the original legislation. Thus the services which are delivered are not exactly those planned.

Wilson (1989, p. 115) uses similar reasoning. He defends many public policies and actions by bureaucrats which may look or even prove to be unproductive, inefficient and ineffective. He argues that government agencies tend to be driven by the *constraints* of their organisation, not the *tasks* of the organisation. Whereas private business management focuses on the bottom line (profits that is) government agencies focus on the top line (constraints – limitations). Wilson mentions that the key constraints are three. Government agencies (a) can not lawfully retain and devote to the private benefit of their members the earnings of the organisation (b) cannot allocate the factors of production in accordance with the preference of the organisations' administrators and (c) must serve goals not of the organisation's own choosing. Control over revenues, productive factors, and agency goals is all vested, to an important degree, in entities external to the organisation, that is legislature, politicians and interest groups. Wilson (1989, pp. 331-332) continues by saying that if one were to examine bureaucratic organisation and find inefficiencies he should attempt to evaluate them not purely by whether the pre-defined goals are achieved or not, but also include the constraints that the bureaucrats operate under. To evaluate the efficiency of a government agency one must first judge the value of the constraints under which it operates; and to improve efficiency one must decide which constraints one is willing to sacrifice.



## 5.2 Recommendations

We have argued in this study that direct subsidies to firms are for many different reasons ineffective and inefficient. Strong evidence supporting our position is found in the international literature (see section 2.5) as well as in a recent survey of studies which evaluate business subsidy programs to firms (Venetoklis, 2000b).

Basically the policy creates rent-seeking activities by the recipient side. Activities, that otherwise would have been diverted for productive operations, are now used to prepare, lobby and "hunt" for free moneys. The situation is obvious from Tables 3-6. Almost two thirds (63%) of all applications have come from the same firms during the period under scrutiny (1995-1999). In Table 12 we also saw that those firms that receive grants more than once, receive on average about three and a half times *more* subsidies than the ones which receive subsidies once only (FIM 596 000 to FIM 129 000). This situation may be attributed not only due to the firms' own initiative, but as shown earlier, due to the bureaucrats' own budget maximising strategies as well.

Thus, we may pose the following question: Is the time ripe for swift changes in the ways business subsidy policies are implemented in Finland? Below we list some recommendations that may assist towards this direction.

### ***Reduction in direct subsidies to firms***

There should be a considerable reduction in direct subsidies to firms. As empirical studies have shown earlier, direct transfers do not achieve the predefined goals they are supposed to. Rather they produce rent seeking activities within the firms and through lobbying groups which are a waste of society's resources<sup>57</sup>.

Niskanen, in his analysis on budget maximisation claimed that all bureaux could reduce their output (Q) by as much as half and still achieve a real optimum level where marginal costs equals marginal value. In our sample the total amount of subsidies decided to be distributed between 1995-1999 amounted to approx. FIM 3.2 billion. Can this amount be reduced and if yes, by how much? Consider the multi recipient firms in our sample. From Table 12 we saw that they received FIM 2.2 billion but constituted 25% of all the recipient firms. We calculated that had they received aid once only like the rest 75% of the recipient firms, the total amount of subsidies would have dropped to FIM 1.66 billion<sup>58</sup>.

Of course it is a coincidence that the amount is half than the previous total, just like Niskanen calculated. It is also true that Niskanen's proposal to reduce output by half to achieve optimality, results from his abstract model specification. However, the point is that one can indeed reduce direct subsidies across the board, by simple rules such as one project financed only per firm per programming period. This would not only save public moneys but would eliminate potential injustices and breach of rules on unfair competition among SMEs, some of which enjoy more often state subsidies.

Mueller (1989, p.245) discusses the problems of eliminating programs which initialise rent seeking<sup>59</sup> activities. He claims that "...to temper the resistance of these pressure/interest groups to the losses they would experience by eliminating<sup>60</sup> those programs that facilitate rent seeking, even greater gains must be offered."

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<sup>57</sup> The case of Start Up (initial) capital for new firms may be a different story. This has to be investigated in depth and we do not take a stand at the moment.

<sup>58</sup> In order to be conservative, we chose the one project per firm which received the highest subsidy.

<sup>59</sup> Why are firms so eager to receive subsidies which subsequently create these rent seeking activities? A simple numerical example may explain the magnitude of the whole activity. Consider a firm that receives a subsidy of say FIM 200 000. If that firm has an operating profit margin of 30%, to generate the same amount of funds it should have been able to have additional sales of approx. FIM 670 000. If the margin is 20%, the extra sales needed would go up to FIM 1 000 000. If the margin is even lower, 10%, the sales would have to increase by FIM 2 000 000. For an SME, and specifically a micro firm which make the majority of TE-centres' clientele, these amounts could constitute a great portion of its total yearly turnover. It is thus of no wonder that some firms are so actively seeking these subsidies. It is simply the easiest way of getting money.

<sup>60</sup> Or in our case reducing.

This means that, were we to decide and cut back drastically the direct subsidies to firms, we need to convince the end - receivers of the value of the substituting services they will receive instead (i.e. the value from advisory services or loans). Drastic cut backs would of course also depend on the real power and pressure of these groups in actually influencing the formulation of the subsidies budget.

During the second half of the 1990s, the KTM has shifted its subsidy policy from traditional manufacturing and regional investment projects to high-tech investments. TEKES's budgeted appropriations will have increased three-fold between those in 1995 and the ones planned for 2005 (KTM, 2000). However, as we will show below, the direct subsidies for traditional investments have in reality not been reduced due to their being partly financed by the EU Structural Funds.

### ***New direct subsidy tools***

If direct transfer of subsidies are to continue – as the case seems to be (see below) - they should be (a) short term and (b) limits should be imposed as to how often firms are to be recipients of these direct transfers. Otherwise, competition would eventually be distorted<sup>61</sup>.

Vedung (1998) notes that governments have three tools to pursue their policies, namely “carrots, sticks and sermons”. In a free economy one can not force (threaten to beat with a stick) a firm to create new jobs or to invest more. It may attempt to give it advice (sermons) and indeed this might work. In our case, it may encourage the firm by other means as well, namely by giving it financial incentives such as subsidies. Vedung has classified subsidies as a “carrot”. We would argue that in reality if a subsidy is examined in isolation it is not a real incentive, at least not when the recipient is a firm. The reason is simple. The subsidy is usually given at the *beginning* of whatever investment is in question. The subsidy is free money and the firm does not have any real obligation towards the distributor of the aid. Unless it does something against the law, it does not have to repay the money back to the ministry, hence its incentive as far as achieving the predefined goals of the investment - based on which the subsidy was given - is not that high. One may say that the subsidy as an incentive can not be examined in isolation but collectively. In most cases the investment is financed from many different sources of which only one is the subsidy; and for these other sources (banks, venture capitalists, etc.) the firm does have obligations.

Nevertheless, we would still argue that a real “carrot” would be to give the subsidy as a reward only *after* the predefined goals have been achieved. Hence, subsidies could also become more focused, in that the KTM may attempt to increase *in advance* the likelihood that the predefined goals that have been set by the firm and presented to the KTM, will be reached. Capital may be given to firms initially not as grants, but in the form of interest subsidised loans. In due course if the project succeeds the firm's obligation can be converted into a grant. If not, the firm will be forced to repay the capital plus part of the interest<sup>62</sup>.

If a subsidy is applied in this form, many things could be accomplished concurrently. For one, there would most likely be growth of positive impacts and concrete results. Second, firms would carry the risk of the investment all the time. And third, rent seeking activities<sup>63</sup> - as we saw a negative consequence of subsidy policies - would be avoided. By achieving the predefined goals of the agreement without aid for some time, the recipient firm would indeed show competitiveness, economic vitality and self-sustaining abilities.

### ***Enhancement of advisory and information services and loans schemes***

Advisory services on marketing and financial schemes should be developed further. In some countries such as the US and Canada direct transfer of subsidies to firms have been eliminated altogether (Virtanen et al., 2000). Results from scientific studies on the impacts of such non-financial support schemes indicate that, if they are designed and implemented correctly, they can be quite effective in

<sup>61</sup> Some may claim that distortion of competition is not a problem since the issue here is a relatively small amount of subsidies to a particular firm. Also the likelihood that intra-EU Member State competition will be affected is not a problem because of the relative small markets that the recipient firms (mostly SMEs) operate. This in fact is the basic logic behind the EU derogation rules on competition which allow these firm subsidies (Articles 87(a) and 87(c) of the EC Treaty).

<sup>62</sup> We first presented this idea in Venetoklis (1999, p. 65) as *forgivable loans*.

<sup>63</sup> Rent seeking activities especially among the repeater applicants and recipients.

achieving their predefined goals<sup>64</sup>. In the UK where one finds both direct transfer of subsidies and advisory services schemes, studies on the impacts of the latter seem to show very positive results<sup>65</sup>.

Some agencies under the KTM have for a long time been offering these advisory services and loans. They include TEKES, FINNVERA, FIDE Ltd and FINNFUND<sup>66</sup>. In fact advisory services are more or less indirectly offered as well at the TE-centres when the KTM firm analyst negotiates with the applicant firm on its potential investment.

### **Concluding remarks and the future**

What would be the potential result of such policy changes? The most important one would be a considerable reduction of public funds spent for business subsidy programs. Another could be that internal pressure group of bureaucrats would not react negatively to such changes. Most probably their duties and activities would simply not change too much. Although the total budget appropriations for subsidies would decrease, administration expenses would not, and that is very vital not only from the recipient bureaucrats' point of view but also from the administrators' side. We are convinced that this internal pressure group can be very crucial in implementing any policies by the ministry. The key issue is to create an environment where the goals and objectives of the ministry (the bureau) can be a part of the utility function of each of its employees (bureaucrats).

We believe that these changes are inevitable, simply because of their potential public savings. Even if they do not occur in the near future as many programs and appropriations have already been decided, these changes may be the direction towards where the ministry should be heading, in the long run.

In the KTM the attitude is beginning to change. With the framework regulation on business subsidies (L 786/97), evaluation of business subsidy programs has become an integrated part of the whole implementation operation. The ministry is now obliged to evaluate objectively its operations both with its own resources and with the assistance of outside expert organisations. Lately, concrete proof of this is found in the ministry' attempts to change its structure so as to incorporate evaluation procedures. The memorandum of a working group initiated by the KTM itself (KTM, 2001) has presented a list of several recommendation covering comprehensively all areas of evaluation operations on business subsidy programs. Among others, the group recommends to improve the quality of the gathered data for monitoring and evaluating purposes, to utilise the databases with the co-operation of Statistics Finland, to develop a standardised system of evaluation and monitoring indicators, to create a guide on impacts methodologies, to strengthen the evaluation abilities within the different KTM units, to establish an independent evaluation unit within the KTM, and to integrate the results from evaluations on business subsidy programs in the planning and decision making process of the ministry.

If all the aforementioned recommendations are in fact implemented, there could be a substantial improvement in the information asymmetry that exists today, and the influence of internal and external groups will be reduced. More importantly, there will be savings in the public resources and what ever public funds are finally spent as business subsidies will have a better chance of becoming effective and efficient in their utilisation.

Nevertheless when we attempt to look into the future realistically, we note some past and present trends which could prove our recommendations unrealisable. For one, although there are official announcements that business subsidy levels have been reduced, in reality, firms are still targets of continuous and substantial flows of direct subsidies. During 1995, when the new government made its programming declarations, it was announced that business subsidy appropriations through the KTM

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<sup>64</sup> See Youtie and Shapira (2000) for a list of 29 studies on the Manufacturing Extension Program (MEP) in the US. Manufacturing Extension Program is a federal funded program with which government agencies through their business advisors provide free management and financial related guidance to small and medium sized manufacturing firms. See also Industry Canada (2000) on advisory and information services provided to firms by the Canadian ministry of Industry.

<sup>65</sup> See for example Wren and Storey (2000) who assess the direct impact of subsidised 'soft' support on the performance of SMEs. See also Robson and Bennet (2000) who assess the effects of differences in types of clients on the use and impact of business advice by SMEs in Britain during 1997.

<sup>66</sup> TEKES is the Finnish National Technology Agency financing applied and industrial R&D projects. FINNVERA is the Finnish Export Credit Agency providing export guarantees and insurance. FIDE Ltd provides companies with interest equalisation offers so they can utilise OECD-term export credits. FINNFUND is an investment finance company financing profitable enterprises with projects in emerging countries.

would be reduced by FIM 1.7 billion before the end of the year 1999. In KTM tables (not shown here) one sees that indeed subsidies have been reduced since 1995 and the reductions total the declared 1999 target. What is *not* mentioned is that although subsidy appropriations from national sources have been reduced as promised, the aggregate subsidy amounts *given* to firms have not been reduced by the same extent. In Table 20 the EU Structural Funds and the equivalent national subsidies are displayed. For the KTM, the EU figure during the period 1995-1999 amounts to FIM 1.34 billion. In other words, business subsidies have not been reduced by FIM 1.7 billion but by FIM 360 million.

[Place Table 20 here]

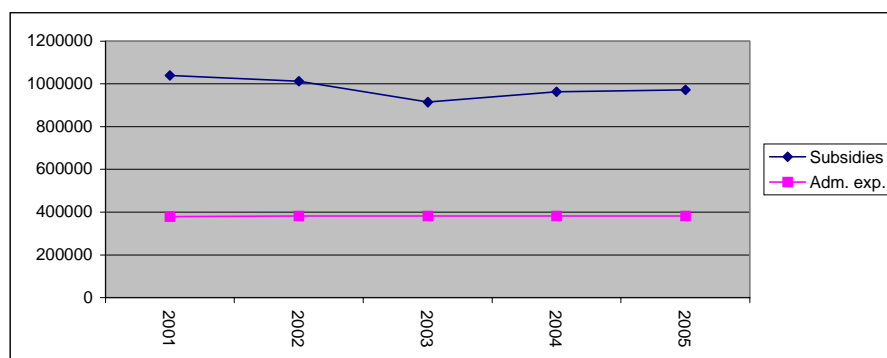
Second, examining the EU programming period 2000-2006, we see already decisions to give Finland Structural Funds amounting to about Euro 1.805 billion (EC, 1999b). The distribution is as follows: Objective 1: Euro 913 million, Objective 2: Euro 459 million, Objective 3: Euro 403 million and Transitional support of ex- Objectives 2 and 5(b): Euro 30 million. Of these amounts a substantial chunk will be given as direct subsidies to firms. Also an additional Euro 254 million will keep coming directly from the EU through the four Community Initiatives (EC, 2001): Interreg: Euro 129 million, Urban: Euro 5 million, Leader+: Euro 52 million and Equal: Euro 68 million. Finnish firms will be eligible for part of these amounts as well.

Third, as far as the national business subsidies policy is concerned, the country's political leadership has expressed its commitment to the continuation of these programs. The Prime Minister (Lipponen, 2000) has indicated publicly the intention of the government to distribute direct business subsidies to firms and emphasised "the importance of direct subsidies to regional development for many years to come". In the latest of the KTM's frame budgeting plan, direct subsidies are not to be reduced any more (KTM, 2000, pp. 33-34). Table 21 and Figure 7 show that between 2001 and 2005 subsidy appropriations will fluctuate between FIM 900 million and FIM 1 billion. And these amounts do not include the part of subsidies coming through the EU structural funds. Note also the administrative expenditures which stay flat but a step higher than the previous 5-year period.

To conclude, as Wilson (1989, p.69) put it, bureaucratic organisations are established to *resist* uncertainty and risk. By design, they are all enemies of change, at least up to a point<sup>67</sup>, because changes simply pose threats to their very existence. If this holds true, and taking into account the previous observations we may say that Niskanen's budget maximising bureaucrats have at last prevailed.

[Place Table 21 here]

**Figure 7.** Subsidy and administrative appropriations 2001-2005, in FIM 1000



<sup>67</sup> Read for example the so called Relander report (Council of State, 1994). The report - a product of working group consisting of senior officials from several ministries - proposed clear and well defined guidelines based on which the Finnish subsidy system and the public organisations involved in it were to develop. After seven years how many of those guidelines have been implemented and to what extent?

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## Tables

**Table 1.** Overall subsidies\* in the EU Member States as % of GDP and relative to government expenditure

	Subsidies as % of GDP**	Subsidies as % of Government Expenditure**
Austria	0,65	1,23
Belgium	1,18	2,26
Denmark	0,94	1,59
Germany	1,45	2,95
Greece	1,24	2,25
Spain	0,98	2,22
Finland	0,47	0,85
France	1,13	2,08
Ireland	0,99	2,66
Italy	1,57	3,04
Luxembourg	0,53	1,27
Netherlands	0,62	1,24
Portugal	1,63	3,44
Sweden	0,78	1,24
UK	0,52	1,20
EUR 15	1,12	2,35

Source: EC (2000, p. 54.)

\* Agriculture produce subsidies not included

\*\* Average for the period 1996-1998 in 1997 prices

**Table 2.** State aid to manufacturing sector 1996-1998. Breakdown according to type of aid

	TYPE OF AID							TOTAL*
	GROUP A		GROUP B	GROUP C		GROUP D		
	Grants	Tax exemptions	Equity partic.	Soft loans	Tax deferrals	Guarantees		
A	76	0	0	19	0	5	100	
B	60	28	4	4	1	3	100	
DK	63	31	0	6	0	1	100	
G	58	12	0	23	1	5	100	
GR	97	0	0	3	0	0	100	
E	88	<1	3	9	0	0	100	
FIN	84	3	1	13	0	1	100	
F	28	47	13	9	1	3	100	
IRL	60	29	7	0	0	4	100	
I	55	37	4	1	0	2	100	
LUX	93	6	0	2	0	0	100	
NL	66	19	0	5	8	2	100	
POR	84	7	2	7	0	0	100	
S	60	18	3	18	0	0	100	
UK	94	1	0	2	1	1	100	
EUR 15*	58	23	4	11	1	3	100	

Source (EC, 2000)

\* totals may not added exactly due to rounding errors

**Table 3.** Appropriation proposals at different stages of budget formulation (in FIM 1 000 000)

Year	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
KTM internal proposal						7 236	6 504	6 182				
KTM to VM	4 767	4 357	5 705	5 538	5 269	5 626	6 000	5 167	4 714	4 664	4 591	4 822
Govern. to Parliament	4 464	4 220	5 401	5 402	5 390	5 126	6 969	5 126	4 729	4 438	4 519	4 783
Approved appropr.	3 910	4 337	5 392	5 638	5 650	5 375	7 349	5 166	4 930	4 565	4 536	4 809

**Table 4.** Government's proposed appropriations for salaries and business subsidies distributed at regional/TE-Centre level (FIM 1 000)

Year	1989	1990	1991	1992	1993	1994	1995	1996*	1997*	1998*	1999**,**	2000**,**
Administrative expenses												
02.01	18 864	20 639	29 489									
02.21				46 700	48 000	45 000	46 303	45 186	28 000			
02.28	1 000	1 000	1 000									
02.29	10 835	11 680	13 000									
02.70			700									
02	30 699	33 319	44 189	46 700	48 000	45 000	46 303	45 186	28 000	0	0	0
03.21*												
03*	0	0	0	0	0	0	0	0	32 965	67 500	126 524	350 690
									32 965	67 500	126 524	350 690
02 + 03	30 699	33 319	44 189	46 700	48 000	45 000	46 303	45 186	60 965	67 500	126 524	350 690
Subsidies to firms												
02.21*								3 075	3 200			
03.21*										42 700	67 500	10 000
03.61*									25 000			
03.61	0	0	0	0	0	0	0	3 075	28 200	42 700	67 500	10 000
50.24	22 000											
50.30	26 919											
50.41								33 000	33 000	28 000		
50.42 (80.43)							150 000	129 800	100 000	47 000	35 000	
50.43	5 300								50 000	265 000	162 000	75 000
50.46 (80.42)												
50.47	1 900											
50.48	40 000											
50	96 119	0	0	0	0	0	150 000	162 800	183 000	340 000	197 000	75 000

Table 4. (cont.) (Government requests)

Year	1989	1990	1991	1992	1993	1994	1995	1996*	1997*	1998*	1999**,**	2000**,**
51.21												
51.41	20											
51.44		40 000	40 000									
51.45	11 077											
51.46	3 000	3 000	14 300	14 300	8 000							
51.47	37 000	52 000	50 000	50 000	52 000							
51.48 (30.44)	148 312	155 000	165 000	165 000	150 000	110 000	160 000	48 000	24 000	16 300	8 000	9 000
51.49 (30.45)	430 000	530 000	545 000	530 000	410 000	527 000	467 000	456 000	400 000	325 000	235 000	200 200
51.50 (51.50)					40 000	35 000	48 000	25 000	40 000	35 000	19 000	10 000
51.52					5 000		2 000					
30.62												319 700
51	629 409	780 000	814 300	759 300	660 000	677 000	677 000	529 000	464 000	376 300	262 000	538 900
52.24		28 000	27 000	38 364	40 345	40 000	52 000	52 000				
52.25			5 000									
52.30		100			9 000	13 000	19 000	19 000	19 000	10 000	10 000	10 000
52.40 (30.47)		4 500										
52.43		1 657	6 200									
52.47		34 257	38 200	38 364	49 345	53 000	71 000	71 000	71 000	10 000	10 000	10 000
52	0											
55.40 (60.40)	80 000	69 000	37 000	35 000	80 500	120 000	208 800	198 000	130 000	78 000	70 000	111 000
55.42	32 000	34 100	35 080	39 000	42 000	15 000						
55.45 (60.45)		17 000	19 600	15 000	14 000	12 000	10 500	5 800	5 400	3 500	1 800	1 300
55	112 000	120 100	91 680	89 000	136 500	147 000	219 300	203 800	135 400	81 500	71 800	112 300
85.40 (50.40)	68 000	130 500	195 000	237 350	260 000	264 000	247 000	267 000	173 000	159 000	172 000	122 000
85	68 000	130 500	195 000	237 350	260 000	264 000	247 000	267 000	173 000	159 000	172 000	122 000

\* Account moments 02.21 and 03.21 for the years 1996-2000 contain both administrative expenses AND subsidies to firms

\*\* The accounting representation of the moments after 1998 has changed (in parenthesis the respective new moment codes) . We altered and broken down the 1999 and 2000 moment accounts to be compatible with the ones of the previous years

**Table 5.** KTM's requested appropriations for salaries and business subsidies distributed at regional/TE-Centre level (FIM 1000)

Year	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Administrative expenses												
02.01	19 154	21 395	28 233									
02.21				46 500	49 200	47 870	51 785	54 500	49 000			
02.28	1 000	1 000	1 000									
02.29	11 411	12 042	13 800									
02.70			700									
02	31 565	34 437	43 733	46 500	49 200	47 870	51 785	54 500	49 000	0	0	
03.21* (10.22)										107 700	158 014	366 400
03*	0	0	0	0	0	0	0	0		107 700	158 014	366 400
02 + 03	31 565	34 437	43 733	46 500	49 200	47 870	51 785	54 500	49 000	107 700	158 014	366 400
Subsidies to firms												
02.21*												
03.21*												
03.61*												
03.61	0	0	0	0	0	0	0	0	0	0		
50.24	23 100							30 000				
50.30	26 510											
50.41									33 000	33 000		
50.42 (80.43)								130 000	100 000	10 000	35 000	
50.43	5 300											
50.46 (80.42)									50 000	75 000	162 000	75 000
50.47	2 000											
50.48	42 000											
50	98 910	0	0	0	0	0	0	194 000	183 000	118 000	197 000	75 000

Table 5. (cont.) (KTM requests)

Year	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
51.21												
51.41	20											
51.44		41 200	40 000									
51.45	11 077											
51.46	2 500	3 000	16 500	14 300								
51.47	35 000	48 410	50 000	60 000								
51.48	148 312	140 401	165 380	100 000	150 000	110 000	178 000	48 000	24 000	16 300	16 000	9 000
(30.44)												
51.49 (30.45)	415 000	473 800	546 000	574 425	520 000	545 000	507 000	470 000	410 000	350 000	235 000	72 000
51.50 (51.50)						53 000	38 000	25 000	40 000	35 000	19 000	10 000
51.52						5 000	2 000					
30.62												319 700
51	611 909	706 811	817 880	748 725	670 000	713 000	725 000	543 000	474 000	401 300	270 000	410 700
52.24		36 000	33 000	40 000	42 000	45 000	52 000	52 000	52 000	50 800	40 000	
52.25			8 000									
52.30		1 000										
52.40 (30.47)		5 080			6 000	18 000	19 000	19 000	19 000	19 000	10 000	8 000
52.43		4 780										
52.47		1 657	6 200									
52	0	48 517	47 200	40 000	48 000	63 000	71 000	71 000	71 000	69 800	50 000	8 000
55.40 (60.40)	80 000	69 000	45 000	35 000	48 000	90 000	228 000	205 000	130 000	83 000	70 000	111 000
55.42	34 000	35 500	39 700	39 000	47 000	15 000						
55.45 (60.45)		17 000	19 600	15 000	14 000	12 000	10 500	5 800	5 400	3 500	1 800	13 000
55	114 000	121 500	104 300	89 000	109 000	117 000	238 500	210 800	135 400	86 500	71 800	124 000
85.40 (50.40)	76 000	161 500	150 000	215 350	260 000	266 000	252 000	235 000	173 000	149 000	142 000	122 000
85	76 000	161 500	150 000	215 350	260 000	266 000	252 000	235 000	173 000	149 000	142 000	122 000

**Table 6.** Administrative expenses and business subsidies to KTM units at TE-centres 1989-2000 (National contributions only, requested and allocated in FIM 1 000 000)

Year	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998*	1999*	2000*
Adm. Exp. (KTM)	31	34	43	46	49	47	51	54	49	107 *	158 *	366 *
Adm. Exp. (GOV)	30	33	44	46	48	45	46	45	60	67 *	109 *	111 *
Subsidies (KTM)	900	1 038	1 119	1 093	1 087	1 159	1 286	1 253	1 036	824	730	739
Subsidies (GOV)	905	1 064	1 139	1 124	1 105	1 141	1 364	1 236	1 054	1 009	780	868

\* For the years 1998 – 2000 the administrative expenses both requested by the KTM and proposed by the Government are inflated. They include, in addition to the expenses allocated to the KTM units within each TE-centre the expenses of the other ministry units as well, such as the ministry of Labour (TM) and the ministry of Agriculture (MMM). We were unable to separate those units' individual administrative expenses and that is why they are reported in aggregate. In the framework budget plan for the period 2001-2005 those same amounts are stabilised around FIM 380 million per year. See Table 21 below.



**Table 7.** Multiple applications for aid

			AIDYN		Total
			0	1	
MULTAPPC	1	N	3 403	6 458	9 861
		% within MULTAPPC	34,5%	65,5%	100,0%
		% within AIDYN	43,3%	35,0%	37,5%
	2	N	4 464	11983	16 447
		% within MULTAPPC	27,1%	72,9%	100,0%
		% within AIDYN	56,7%	65,0%	62,5%
Total		N	7 867	18 441	26 308
		% within MULTAPPC	29,9%	70,1%	100,0%
		% within AIDYN	100,0%	100,0%	100,0%

Table 8. Monthly frequency of decisions

		AIDYN		Total
		0	1	
DECIMONT	1	N	67	24
		% within DECIMONT	73,6%	26,4%
		% within AIDYN	,9%	,1%
	2	Count	128	343
		% within DECIMONT	27,2%	72,8%
		% within AIDYN	1,6%	1,9%
	3	Count	727	1008
		% within DECIMONT	41,9%	58,1%
		% within AIDYN	9,2%	5,5%
	4	Count	682	1437
		% within DECIMONT	32,2%	67,8%
		% within AIDYN	8,7%	7,8%
	5	Count	756	1961
		% within DECIMONT	27,8%	72,2%
		% within AIDYN	9,6%	10,6%
	6	Count	1133	2535
		% within DECIMONT	30,9%	69,1%
		% within AIDYN	14,4%	13,7%
	7	Count	534	1144
		% within DECIMONT	31,8%	68,2%
		% within AIDYN	6,8%	6,2%
	8	Count	628	1291
		% within DECIMONT	32,7%	67,3%
		% within AIDYN	8,0%	7,0%
	9	Count	523	1160
		% within DECIMONT	31,1%	68,9%
		% within AIDYN	6,6%	6,3%
	10	Count	611	1133
		% within DECIMONT	35,0%	65,0%
		% within AIDYN	7,8%	6,1%
	11	Count	719	1481
		% within DECIMONT	32,7%	67,3%
		% within AIDYN	9,1%	8,0%
	12	Count	1359	4924
		% within DECIMONT	21,6%	78,4%
		% within AIDYN	17,3%	26,7%
Total		Count	7867	18441
		% within DECIMONT	29,9%	70,1%
		% within AIDYN	100,0%	100,0%

**Table 9.** Multiple applicants by decisions by month of decision

			AIDYN		Total	
MULTAPPC				0	1	
1	DECIMONT	1	N	23	9	32
			% within DECIMONT	71,9%	28,1%	100,0%
			% within AIDYN	,7%	,1%	,3%
		2	N	65	156	221
			% within DECIMONT	29,4%	70,6%	100,0%
			% within AIDYN	1,9%	2,4%	2,2%
		3	N	360	403	763
			% within DECIMONT	47,2%	52,8%	100,0%
			% within AIDYN	10,6%	6,2%	7,7%
		4	N	314	556	870
			% within DECIMONT	36,1%	63,9%	100,0%
			% within AIDYN	9,2%	8,6%	8,8%
		5	N	329	669	998
			% within DECIMONT	33,0%	67,0%	100,0%
			% within AIDYN	9,7%	10,4%	10,1%
		6	N	494	933	1427
			% within DECIMONT	34,6%	65,4%	100,0%
			% within AIDYN	14,5%	14,4%	14,5%
		7	N	200	381	581
			% within DECIMONT	34,4%	65,6%	100,0%
			% within AIDYN	5,9%	5,9%	5,9%
		8	N	263	439	702
			% within DECIMONT	37,5%	62,5%	100,0%
			% within AIDYN	7,7%	6,8%	7,1%
		9	N	237	406	643
			% within DECIMONT	36,9%	63,1%	100,0%
			% within AIDYN	7,0%	6,3%	6,5%
		10	N	246	400	646
			% within DECIMONT	38,1%	61,9%	100,0%
			% within AIDYN	7,2%	6,2%	6,6%
		11	N	304	511	815
			% within DECIMONT	37,3%	62,7%	100,0%
			% within AIDYN	8,9%	7,9%	8,3%
		12	N	568	1595	2163
			% within DECIMONT	26,3%	73,7%	100,0%
			% within AIDYN	16,7%	24,7%	21,9%
	Total		Count	3403	6458	9861
			% within DECIMONT	34,5%	65,5%	100,0%
			% within AIDYN	100,0%	100,0%	100,0%

Table 9 (cont.)

			AIDYN	Total		
MULTAPPC			0	1		
2	DECIMONT	1	N	44	15	59
			% within DECIMONT	74,6%	25,4%	100,0%
			% within AIDYN	1,0%	,1%	,4%
		2	N	63	187	250
			% within DECIMONT	25,2%	74,8%	100,0%
			% within AIDYN	1,4%	1,6%	1,5%
		3	N	367	605	972
			% within DECIMONT	37,8%	62,2%	100,0%
			% within AIDYN	8,2%	5,0%	5,9%
		4	N	368	881	1249
			% within DECIMONT	29,5%	70,5%	100,0%
			% within AIDYN	8,2%	7,4%	7,6%
		5	N	427	1292	1719
			% within DECIMONT	24,8%	75,2%	100,0%
			% within AIDYN	9,6%	10,8%	10,5%
		6	N	639	1602	2241
			% within DECIMONT	28,5%	71,5%	100,0%
			% within AIDYN	14,3%	13,4%	13,6%
		7	N	334	763	1097
			% within DECIMONT	30,4%	69,6%	100,0%
			% within AIDYN	7,5%	6,4%	6,7%
		8	N	365	852	1217
			% within DECIMONT	30,0%	70,0%	100,0%
			% within AIDYN	8,2%	7,1%	7,4%
		9	N	286	754	1040
			% within DECIMONT	27,5%	72,5%	100,0%
			% within AIDYN	6,4%	6,3%	6,3%
		10	N	365	733	1098
			% within DECIMONT	33,2%	66,8%	100,0%
			% within AIDYN	8,2%	6,1%	6,7%
		11	N	415	970	1385
			% within DECIMONT	30,0%	70,0%	100,0%
			% within AIDYN	9,3%	8,1%	8,4%
		12	N	791	3329	4120
			% within DECIMONT	19,2%	80,8%	100,0%
			% within AIDYN	17,7%	27,8%	25,1%
	Total		Count	4464	11983	16447
			% within DECIMONT	27,1%	72,9%	100,0%
			% within AIDYN	100,0%	100,0%	100,0%

**Table 10.** Aid granted per month (\*FIM 1 000)

DECIMONT	MULTAPPC	N	Mean*	Sum*	% of Total Sum
1	1	9	39	358	,0%
	2	15	43	659	,0%
	Total	24	42	1 017	,0%
2	1	156	80	12 613	,4%
	2	187	226	42 359	1,3%
	Total	343	160	54 973	1,7%
3	1	403	133	53 863	1,7%
	2	605	187	113 676	3,5%
	Total	1008	166	167 539	5,2%
4	1	556	110	61 492	1,9%
	2	881	239	210 970	6,6%
	Total	1437	189	272 462	8,5%
5	1	669	97	65 413	2,0%
	2	1292	158	205 297	6,4%
	Total	1961	138	270 710	8,4%
6	1	933	104	97 680	3,0%
	2	1602	169	271 040	8,4%
	Total	2535	145	368 720	11,5%
7	1	381	108	41 385	1,3%
	2	763	191	145 872	4,5%
	Total	1144	163	187 257	5,8%
8	1	439	108	47 619	1,5%
	2	852	188	160 285	5,0%
	Total	1291	161	207 904	6,5%
9	1	406	90	36 787	1,1%
	2	754	193	145 751	4,5%
	Total	1160	157	182 538	5,7%
10	1	400	135	54 320	1,7%
	2	733	185	136 212	4,2%
	Total	1133	168	190 533	5,9%
11	1	511	140	71 547	2,2%
	2	970	195	189 735	5,9%
	Total	1481	176	261 282	8,1%
12	1	1595	148	237 569	7,4%
	2	3329	242	807 250	25,1%
	Total	4924	212	1 044 820	32,6%
Total	1	6458	120	780 651	24,3%
	2	11983	202	2 429 112	75,7%
	Total	18441	174	3 209 763	100,0%

**Table 11.** Frequency of subsidy applications per firm (1995-1999)

Frequency of applications per firm	Frequency	Percent
Applied once, granted once	6458	42,1
Applied>once, granted>once	3750	24,4
Applied once, rejected	3403	22,2
Applied>once, rejected every time	587	3,8
Applied>once, granted once	1144	7,5
Total	15342	100,0

**Table 12.** Distribution of subsidies based on frequency of receipt (in FIM 1 000)

Multiple receivers	N	Mean*	Sum*	% of Total Sum
Applied once, granted once	6 458	120	780 651,00	24,3%
Applied>once, granted>once	3 750	594	2 228 089,00	69,4%
Applied>once, granted once	1 144	175	201 022,00	6,3%
Total	11 352	174	3 209 763,00	100,0%

**Table 13.** Sub-categories of variables in logistic regression models 1-8

SIC95AGG	LEGATAGG	PIIRIAG2
4: Manufacturing (R)*	1: Partnership (Ky) (R)*	011: Pirkanmaa (R)*
6: Construction (1)	2: Ltd. (Oy) (1)	021: Kainu (1)
7: Wholesale and Retail Trade (2)	999: Other (2) includes	031: Keski-Suomi (2)
11: Real Estate (3)	Personal Enterprise (Toiminimi)	041: Pohjois-Savo (3)
999: Other (4) includes	Partnership (Ay)	051, 052: Kaakkois-Suomi (4)
1: Agriculture, Hunting and Forestry		061, 062: Lappi (5)
2: Fishing		071: Etelä-Savo (6)
3: Mining and Quarrying		081, 083: Pohjois-Pohjanmaa (7)
5: Electricity, Gas and Water Supply		09, 092, 093: Häme (8)
8: Hotel and Restaurants		101: Pohjois-Karjala (9)
9: Transport, Storage and Communication		111: Satakunta (10)
10: Financial Intermediation		121: Varsinais-Suomi (11)
12: Public Administration and Defence		131: Uudenmaa (12)
13: Education		141,142: Pohjanmaa (13)
14: Health and Social work		151: Etelä-Pohjanmaa (14)
15: Other Community, Social and Personal Service Activities		
16: Private Households with Employed Persons		
17: Extra-Territorial Organisations and Bodies		
18: Industry Unknown		

\* (R) is the (R)eference category from which all the contrasts are made. The number in parenthesis next to each sub-category is to assist in finding the equivalent variable in the model table



**Table 14.** Sub-categories of variables in logistic regression models 1-4 (Dependent variable: AIDYN)

	Model 1	Model 2	Model 3	Model 4
	NDECIAGE*	NDECIAGE*	NDECIAGE*	NDECIAGE*
TOTAL				
1 <sup>st</sup> quart.(R)	<= 5	<= 6	<= 7	<= 7
2 <sup>nd</sup> quar (1)	9	10	11	11
3 <sup>rd</sup> quar.(2)	18	19	19	19
4 <sup>th</sup> quar (3)	>18	> 19	> 19	> 19
AIDYN=0				
1 <sup>st</sup> quart.(R)	<= 5	<= 5	<= 6	<= 6
2 <sup>nd</sup> quar (1)	9	10	11	11
3 <sup>rd</sup> quar.(2)	19	17	18.25	18
4 <sup>th</sup> quar (3)	>19	> 17	> 18.25	> 18
AIDYN=1				
1 <sup>st</sup> quart.(R)	<= 5	<= 6	<= 7	<= 7
2 <sup>nd</sup> quar (1)	9	10	11	11
3 <sup>rd</sup> quar.(2)	18	20	19,75	19.5
4 <sup>th</sup> quar (3)	> 18	> 20	> 19.75	> 19.5
	NVA95**	NDVA96_5**	NDVA97_6**	NDVA97_5**
TOTAL				
1 <sup>st</sup> quart.(R)	<= 530	<= -89	<= -29	<= -7
2 <sup>nd</sup> quar (1)	1736	131	176	320
3 <sup>rd</sup> quar.(2)	5212	668	835	1206
4 <sup>th</sup> quar (3)	> 5212	> 668	> 835	> 1206
AIDYN=0				
1 <sup>st</sup> quart.(R)	<= 362	<= -92	<= -13	<= -21
2 <sup>nd</sup> quar (1)	1393	77	137	199
3 <sup>rd</sup> quar.(2)	5624	483	825	937
4 <sup>th</sup> quar (3)	> 5624	> 483	> 825	> 937
AIDYN=1				
1 <sup>st</sup> quart.(R)	<= 619	<= -90	<= -38	<= -2
2 <sup>nd</sup> quar (1)	1833	140	192	374
3 <sup>rd</sup> quar.(2)	5175	702	836	1272
4 <sup>th</sup> quar (3)	> 5175	> 702	> 836	> 1272

\* years

\*\* FIM 1 000

**Table 15.** Sub-categories of variables in logistic regression models 5-8 (Dependent variable: MULTREC)

	Model 5	Model 6	Model 7	Model 8
	NDECIAGE*	NDECIAGE*	NDECIAGE*	NDECIAGE*
TOTAL				
1 <sup>st</sup> quart.(R)	<= 5	<= 6	<= 7	<= 7
2 <sup>nd</sup> quar (1)	9	10	11	11
3 <sup>rd</sup> quar.(2)	18	20	19.75	19.5
4 <sup>th</sup> quar (3)	> 18	> 20	> 19.75	> 19.5
MULTREC=0				
1 <sup>st</sup> quart.(R)	<= 4	<= 5	<= 6	<= 6
2 <sup>nd</sup> quar (1)	9	9	10	10
3 <sup>rd</sup> quar.(2)	17	19	17	17
4 <sup>th</sup> quar (3)	> 17	> 19	> 17	> 17
MULTREC=1				
1 <sup>st</sup> quart.(R)	<= 5	<= 6	<= 7	<= 7
2 <sup>nd</sup> quar (1)	9	10	11	11
3 <sup>rd</sup> quar.(2)	19	20	21	21
4 <sup>th</sup> quar (3)	> 19	> 20	> 21	> 21
	NVA95**	NDVA96_5**	NDVA97_6**	NDVA97_5**
TOTAL				
1 <sup>st</sup> quart.(R)	<= 619	<= -90	<= -38	<= -2
2 <sup>nd</sup> quar (1)	1833	140	192	374
3 <sup>rd</sup> quar.(2)	5175	702	836	1272
4 <sup>th</sup> quar (3)	> 5175	> 702	> 836	> 1272
MULTREC=0				
1 <sup>st</sup> quart.(R)	<= 347	<= -61	<= -45	<= -15
2 <sup>nd</sup> quar (1)	1012	63	80	160
3 <sup>rd</sup> quar.(2)	2995	369	431	799
4 <sup>th</sup> quar (3)	> 2995	> 369	> 431	> 799
MULTREC=1				
1 <sup>st</sup> quart.(R)	<= 936	<= -106	<= -36	<= 16
2 <sup>nd</sup> quar (1)	2517	231	305	512
3 <sup>rd</sup> quar.(2)	6291	903	1050	1528
4 <sup>th</sup> quar (3)	> 6291	> 903	> 1050	> 1528

\* years

\*\* FIM 1 000

**Table 16:** Logistic regression models 1-4 : Indicators and general information (Dependent variable: AIDYN)

	Model 1	2	3	4
Decision Year	1996	1997	1998	1998
Stepwise method	Enter	Enter	Enter	Enter
Contrast method	Indicator	Indicator	Indicator	Indicator
Reference sub-category	First	First	First	First
Total observations (N)	1832	1588	1502	1500
Rejected	403	366	342	343
Receivers of aid	1429	1222	1160	1157
%	78.0	77.0	77.2	77.1
% predicted	78.3	77.0	77.1	77.2
Nagelkerke R <sup>2</sup>	.061	.067	.146	.144
Model sig.	.000	.000	.000	.000
Hosner & Lemeshow test sig.	.561	.881	.114	.585

Table 17. Logistic regression models 1-4 (Dependent variable: AIDYN)

	Model 1 (1996)			Model 2 (1997)			Model 3 (1998)			Model 4 (1998)		
	B	Sig.	Exp(B)	B	Sig.	Exp(B)	B	Sig.	Exp(B)	B	Sig.	Exp(B)
SIC95AGG	,029	,205										
SIC95AGG(1)	-,241	,341	,786	-,423	,085	,655	-,871	,001	,418	-,877	,000	,416
SIC95AGG(2)	-,468	,005	,627	-,311	,093	,733	-,712	,000	,491	-,692	,001	,501
SIC95AGG(3)	-,028	,875	,972	-,269	,124	,764	-,736	,000	,479	-,747	,000	,474
SIC95AGG(4)	-,439	,055	,645	-,224	,365	,799	-,1,047	,000	,351	-,986	,000	,373
LEGATAGG	,852	,617						,044			,015	
LEGATAGG(1)	,050	,771	,1,052	,160	,348	,1,174	,418	,020	,1,520	,470	,008	,1,600
LEGATAGG(2)	-,133	,719	,876	,223	,555	,1,250	,012	,972	,1,012	-,002	,996	,998
PIRIAG2		,000			,000			,000			,000	
PIRIAG2(1)	,104	,833	,1,110	-,1,036	,032	,355	-,316	,514	,729	-,263	,582	,769
PIRIAG2(2)	,537	,260	,1,712	-,1,365	,005	,255	,978	,062	,2,658	,985	,060	,2,677
PIRIAG2(3)	,462	,279	,1,587	-,1,289	,001	,276	,398	,349	,1,488	,439	,301	,1,551
PIRIAG2(4)	-,802	,009	,448	-,1,472	,000	,230	,452	,181	,1,572	,472	,163	,1,604
PIRIAG2(5)	,453	,145	,1,572	-,1,328	,000	,265	-,340	,263	,712	-,341	,260	,711
PIRIAG2(6)	,018	,961	,1,018	-,1,391	,000	,249	-,190	,604	,827	-,187	,609	,830
PIRIAG2(7)	,082	,798	,1,085	-,1,660	,000	,190	-,227	,479	,797	-,263	,411	,769
PIRIAG2(8)	-,020	,937	,980	-,844	,016	,430	,633	,033	,1,883	,612	,040	,1,845
PIRIAG2(9)	,110	,801	,1,117	-,1,566	,000	,209	,116	,799	,1,122	,100	,824	,1,106
PIRIAG2(10)	-,495	,071	,610	-,1,392	,000	,249	,347	,304	,1,414	,325	,329	,1,383
PIRIAG2(11)	-,717	,010	,488	-,1,219	,001	,296	-,492	,100	,612	-,525	,079	,592
PIRIAG2(12)	-,375	,106	,687	-,944	,005	,389	,623	,029	,1,864	,620	,029	,1,860
PIRIAG2(13)	-,073	,809	,930	-,465	,267	,628	,1,266	,003	,3,545	,1,367	,002	,3,923
PIRIAG2(14)	-,629	,018	,533	-,1,892	,000	,151	-,1,210	,000	,298	-,1,220	,000	,295
NDECIAGE	,538	,538			,606			,872			,648	
NDECIAGE(1)	,205	,549	,1,227	,339	,429	,1,404	,096	,848	,1,101	,057	,908	,1,059
NDECIAGE(2)	,274	,406	,1,316	,460	,263	,1,584	,170	,725	,1,186	,184	,701	,1,202
NDECIAGE(3)	,085	,799	,1,088	,484	,241	,1,623	,242	,619	,1,274	,294	,541	,1,342
NVA95		,000										
NVA95(1)	,646	,000	,1,909									
NVA95(2)	,696	,000	,2,006									
NVA95(3)	,406	,024	,1,501									
NDVA96_5		,217										
NDVA96_5(1)		,620	,915	-,089	,620	,915		,048			,277	
NDVA96_5(2)		,282	,1,209	,189	,282	,1,209		,015	,635		,314	,1,203
NDVA96_5(3)		,199	,1,258	,230	,199	,1,258		,756	,942		,070	,1,400
NDVA97_6												
NDVA97_6(1)												
NDVA97_6(2)												
NDVA97_6(3)												
NDVA97_5												
NDVA97_5(1)												
NDVA97_5(2)												
NDVA97_5(3)												
Constant	,948	,013	2,581	1,834	,000	6,258	1,218	,028	3,382	,744	,171	2,105

**Table 18:** Logistic regression models 5-8: Indicators and general information (Dependent variable: MULTREC)

	Model 5	6	7	8
Decision Year	1996	1997	1998	1998
Stepwise method	Enter	Enter	Enter	Enter
Contrast method	Indicator	Indicator	Indicator	Indicator
Reference sub-category	First	First	First	First
Total observations (N)	1429	1222	1160	1157
Once received aid	509	402	352	350
Multiple receivers of aid	920	820	808	807
%	64.4	67.1	69.7	69.7
% predicted	68.2	70.5	71.6	72.5
Nagelkerke R <sup>2</sup>	.135	.155	.131	.132
Model sig.	.000	.000	.000	.000
Hosner & Lemeshow test sig.	.190	.934	.091	.731

Table 19. Logistic regression models 5-8 (Dependent variable: MULTREC)

	Model 5 (1996)			Model 6 (1997)			Model 7 (1998)			Model 8 (1998)		
	B	Sig.	Exp(B)	B	Sig.	Exp(B)	B	Sig.	Exp(B)	B	Sig.	Exp(B)
SIC95AGG		,001			,069			,002		,863	,005	
SIC95AGG(1)	-,647	,012	,524	-,538	,054	,584	-,924	,003	,397	-,863	,006	,422
SIC95AGG(2)	-,249	,170	,780	-,408	,038	,665	-,228	,290	,796	-,188	,385	,829
SIC95AGG(3)	-,382	,026	,683	-,089	,642	,915	-,404	,040	,668	-,390	,049	,677
SIC95AGG(4)	-,897	,000	,408	-,453	,089	,636	-,802	,004	,449	-,751	,007	,472
LEGATAGG		,001			,001			,000			,000	
LEGATAGG(1)	,419	,015	1,520	,448	,018	1,566	,390	,046	1,477	,451	,021	1,570
LEGATAGG(2)	-,724	,068	,485	-,763	,058	,466	-,917	,017	,400	-,890	,021	,411
PIIRIAG2		,038			,001			,114			,168	
PIIRIAG2(1)	,874	,078	2,396	1,225	,014	3,406	1,847	,022	6,342	1,971	,016	7,179
PIIRIAG2(2)	,815	,037	2,260	,927	,079	2,528	,455	,273	1,577	,491	,242	1,633
PIIRIAG2(3)	,447	,207	1,564	,232	,514	1,261	,461	,244	1,586	,466	,241	1,593
PIIRIAG2(4)	,548	,125	1,730	-,031	,926	,969	,196	,552	1,216	,231	,484	1,260
PIIRIAG2(5)	,678	,015	1,969	,698	,032	2,010	,700	,053	2,014	,668	,065	1,950
PIIRIAG2(6)	,227	,509	1,254	,653	,080	1,921	,132	,736	1,141	,215	,581	1,239
PIIRIAG2(7)	,315	,287	1,371	,275	,409	1,317	,172	,627	1,188	,199	,573	1,220
PIIRIAG2(8)	,331	,165	1,393	,315	,234	1,370	,536	,057	1,709	,546	,052	1,726
PIIRIAG2(9)	,053	,894	1,054	-,006	,989	,994	,971	,086	2,641	1,045	,063	2,843
PIIRIAG2(10)	,065	,816	1,068	,548	,099	1,730	,282	,376	1,326	,270	,397	1,310
PIIRIAG2(11)	-,319	,280	,727	-,608	,034	,544	-,147	,657	,863	-,025	,941	,976
PIIRIAG2(12)	-,093	,679	,911	-,030	,902	,970	,428	,118	1,534	,467	,088	1,595
PIIRIAG2(13)	,566	,060	1,762	,863	,009	2,371	,942	,006	2,565	,931	,007	2,538
PIIRIAG2(14)	,314	,267	1,370	,032	,926	1,032	,445	,208	1,560	,454	,201	1,575
NDECIAGE		,045			,004			,028			,017	
NDECIAGE(1)	,426	,228	1,531	1,263	,015	3,534	1,011	,032	2,749	,913	,050	2,492
NDECIAGE(2)	,769	,026	2,159	1,577	,002	4,842	,888	,053	2,431	,871	,056	2,388
NDECIAGE(3)	,591	,089	1,806	1,589	,002	4,897	1,214	,009	3,368	1,231	,008	3,426
NVA95		,000										
NVA95(1)	,592	,000	1,807									
NVA95(2)	1,026	,000	2,791									
NVA95(3)	1,220	,000	3,387									
NDVA96_5					,000							
NDVA96_5(1)				-,982	,000	,374						
NDVA96_5(2)				,041	,824	1,042						
NDVA96_5(3)				,449	,022	1,567						
NDVA97_6												
NDVA97_6(1)								,000			,000	
NDVA97_6(2)								,018	,646		,060	,706
NDVA97_6(3)								,341	1,197		,014	1,610
NDVA97_5								,002	1,897		,002	1,841
NDVA97_5(1)												
NDVA97_5(2)												
NDVA97_5(3)												
Constant	-1,050	,008	,350	-1,042	,064	,353	-,714	,185	,490	-,873	,102	,417

**Table 20.** EU Structural Funds and their national contributions per ministry 1995-1999 (in FIM 1 000 000)

Year	1995		1996		1997		1998		1999		Totals	
	EU	Nat.	EU	Nat.	EU	Nat.	EU	Nat.	EU	Nat.	EU	Nat.
Ministry												
SM	128	55	301	63	110	79	147	82	149	82	835	361
VM	1	2		1					1		2	3
OPM	82	132	137	173	143	193	173	302	127	238	662	1038
MMM	630	1250	632	1321	611	1443	749	1446	735	1507	3357	6967
LM	12	15	25		23	45	17	36	27	39	104	136
KTM	212	103	263	211	344	299	357	357	171	448	1347	1417
STM	7	13	10	13	16	19	17	20	9	16	59	82
TM	614	835	616	760	559	707	774	755	257	584	2821	3641
YM	15	27	34	21	45	14	54	39	76	51	223	152

Source: VM (2000, p.35)

**Table 21.** Budgeted appropriations planned in reference to business subsidies 2002-2005 (FIM 1 000)

Year	2001 (TA)	2002	2003	2004	2005
Administrative expenses at TE-centres*					
10.22	378 612	381 912	381 912	381 912	381 912
Subsidies to firms					
30.44	20 001	10 001	0	0	0
30.45	97 998	96 000	84 001	91 998	92 997
30.46	154 999	105 002	0	0	0
30.47	21 173	21 173	21 173	21 173	21 173
30.48	31 001	58 001	81 998	101 999	117 000
30.50	3 003	999	0	0	0
30.62	478 929	501 475	506 653	526 631	520 929
30	807 103	792 649	693 825	741 801	752 099
		0	0	0	0
50.40	105 002	110 002	110 002	110 002	110 002
50	105 002	110 002	110 002	110 002	110 002
		0	0	0	0
60.40	126 002	110 002	110 002	110 002	110 002
60	126 002	110 002	110 002	110 002	110 002
		0	0	0	0
Totals	1 038 107	1 012 653	913 829	961 805	972 103

Source: KTM (2000, pp. 33-34)

\* These expenses include in addition to the KTM's unit expenses, the respective ones for the units of MMM and the TM.



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