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FINNISH EXPERIENCES IN MEASURING AND PROMOTING PRODUCTIVITY IN THE PUBLIC SECTOR

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Abstract: This paper presents a survey of the studies that have investigated productivity and efficiency in the Finnish public sector. The paper outlines methods that have been used in these studies and presents summaries of main findings. In addition suggestions and reflections on how to take quality into account in productivity studies are offered. The implications of recent public management reforms in Finland for productivity are also discussed. The paper offers tentative evidence that these reforms may have significant positive effects on public sector productivity.

Key words: productivity development, efficiency, quality, public management reforms

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Tiivistelmä: Tutkimuksessa luodaan katsaus suomalaisiin julkisen sektorin tuottavuutta ja tehokkuutta koskeviin tutkimuksiin ja selvityksiin. Katsaus esittelee tutkimuksissa sovellettujen menetelmien pääpiirteet ja tutkimusten keskeiset tulokset. Lisäksi pohditaan, kuinka julkisten palvelujen tuottavuustutkimuksissa sovellettavia menetelmiä voitaisiin kehittää niin, että palveluiden laatu otettaisiin huomioon. Kirjoituksessa tarkastellaan myös Suomessa viime vuosina toteutettujen julkisen sektorin hallinnonuudistusten vaikutuksia tuottavuuteen. Julkisen sektorin tuottavuutta koskevat tutkimukset viittaavat siihen, että uudistuksilla on merkittävä tuottavuutta kohottava vaikutus.

Asiasanat: tuottavuuskehitys, tehokkuus, laatu, hallinnonuudistukset

Contents

1. Introduction

Since the late 1980s the governance of Finland's public sector has been subject to numerous reforms. In these reforms emphasis has been on decentralization, creating a service-oriented public administration, and a shift from the control of inputs to output oriented budgeting and management. Although market type mechanisms have in recent years been given a lot of attention the main thrust in reforms has been in modernizing the public sector concentrating mainly on the introduction of various forms of output-oriented performance management and renewing budget systems in an effort to control public expenditures. Among numerous reforms that were carried out during last ten years there are three which can be considered most important in terms of their effects. First, management by results was introduced for government agencies in an attempt to replace input regulation and administrative rule steering by output and results oriented steering. Secondly, the 1993 reform of local government funding, which replaced open matching grants by block grants, delegated power to municipalities and increased their financial responsibilities. In the third major reform many state agencies were changed into public corporations and state owned companies.

An important objective of the reforms has been to increase cost and resource consciousness of managers of government agencies and public service producers. A major purpose of the reforms has been to provide incentives for public sector officials and service providers to increase cost efficiency and productivity.

The implementation of public sector management reforms in Finland has been shaped by the severe recession that Finland experienced in the beginning of this decade. Government activities had to be focused on dealing with the massive public debt in the face of mass unemployment and a major banking crisis. The economic situation prompted the search for ways of promoting public sector productivity and efficiency to prevent harmful effects of public spending cuts.

Since productivity and efficiency gains are so important goals of public sector management reforms it is essential that one tries to evaluate performance of the public sector in terms of these criteria. In this article we review studies which have focused on productivity development and efficiency of Finnish public sector and assess whether available evidence is consistent with the hypothesis that public sector management reforms lead to improved performance.

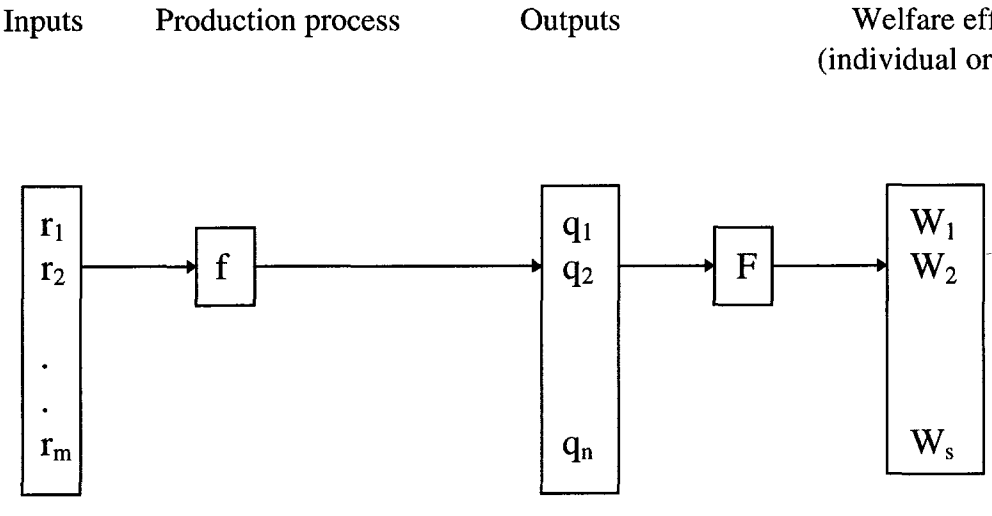
In this paper we consider different approaches which have been used to measure productivity and efficiency of the Finnish public sector. The first approach is based on an aggregate output index. The second approach is to use either production or cost function for assessing productivity development. The third method is to apply data envelopment analysis for comparing the technical

efficiency of different service providers at a certain time period. The fourth method discussed in this paper attempts to measure the development of productivity over time by means of Malmquist index approach. Finally, we propose a general approach how to take quality into account in productivity measures. In this paper we concentrate on the measurement of productive efficiency in the public sector. In public finance there is also the efficiency problem created by the financing of the public sector, i.e. the dead weight loss or excess burden of taxation. This is not considered in this paper.

2. The General Problem of the Measurement of Government Output

2.1 Conceptual Issues

Some decades ago it was not too misleading to consider government as a consumer of resources without much productive role. Today, however, government is also an important producer of services. Therefore an important objective for government is to produce as high an output as possible with the means provided by citizens. This is specially important in modern welfare states, where a large part of national resources is allocated by the public sector. In Finland the share of general government in the GDP is 19.1 %, public consumption consists of 21.8 %, public investment 2.9 %, public transfers 29.0 %, total taxes (including social security contributions) 46.8 % and total government outlays 56.2 % of GDP in 1995. Share of public employment of total employment was 22.4 % in 1995. The size of the public sector in relation to GDP has consistently risen during the past decades. The high share of public sector production has created a demand for measuring productivity, efficiency and effectiveness of government activities. It has become customary to illustrate these concepts with the help of the following simple diagram (see e.g. Hjerppe 1980):



Productivity is the relationship between inputs and outputs. Outputs are the immediate consequences of the public production. When value of output is related to the cost of inputs, we can speak of efficiency. When we look at the maximum outputs (without taking into account the value of outputs) from given inputs we can use the term technical efficiency. If we consider how given output is produced with the minimum cost, we use the concept cost efficiency.

Public sector outputs are related to the results, which measure the change in the utility to citizens. When we relate the value of output to the results we may speak of effectiveness of public production. When we relate results to the cost of inputs we can speak of general benefit-cost ratio. Results can also be measured by some non-utilitarian indicators like literacy rate, infant mortality or life expectancy. If measured in this way public sector outputs have presumably some effects on the results, but these are affected also by other factors. For example the current health level is affected by the previous level of health capital, not only the activities of the health sector.

Quality can be considered either as a component of the price or value of the output or as a component of the volume of output. In a market situation better quality is reflected in the higher price of a commodity. In public services, better quality can be thought as more valuable than lower quality service. If, on the other hand the quality is seen as a component of quantity of output, then the volume of output must be adjusted upwards in order to reflect better quality.

Basic concepts of productivity measurement are in principle straightforward. Productivity measures show always a relationship between inputs and outputs. In an unlikely case of using one input to produce one output the ratio of output to input would be very easy to compute. In practice one typically uses multiple inputs to produce multiple outputs so that productivity measures have to be based on ratios between weighted outputs and inputs. Both outputs and inputs must be aggregated in some economically sensible fashion so that the ratio between two scalars is obtained.

Normally the primary aim of productivity studies is to assess how productivity differs over time. Usually one is also interested in establishing likely causes for observed productivity development. In establishing these one can start from the general notion that productivity varies due to changes in production technology, differences in the efficiency of production process, and differences in the environment in which production occurs (see Lovell 1993). Often one is also interested in assessing productivity improvement potential in a certain industry. This can be estimated by studying differences in productivity of production units who provide similar or identical outputs.

We can divide productivity and efficiency studies into two broad categories. Firstly, there are studies which estimate productive efficiency and its development with common set of weighs or at least common formulas for constructing weights. Secondly there are studies based on non-parametric methods where weights vary from one unit to another and in the case of estimating productivity development vary also from one year to another. These

kind of measures have recently become increasingly popular since for public sector production the main difficulty is how to obtain reliable and valid output measures. For many public services there are no price data which could be used for constructing the measure of aggregate output. Non-parametric methods provide a way of circumventing the aggregation problem since they do not require the specification of a priori weights for different outputs and productivity measurement can be carried out without price or cost data.

Studies with common set of weights can apply different kinds of methods for constructing output weights. Earlier Finnish studies applied often relatively straightforward methods. Output was estimated on the basis of few available output indicators. Weights applied to different output indicators were based on estimated unit costs for different output categories in the base year.

In this paper we describe different efforts to analyze the productivity of the public sector in Finland. We mainly concentrate on the various DEA-type studies, which have been carried out in the Government Institute for Economic Research. We do, however, review briefly also some other efforts since 1960s which are relevant to our topic.

2.2 Brief Historical Overview

The problem of productivity improvement and output measurement of government services has been a long-term concern in Finland. Since 1960s various attempts have been made to improve performance in government.

In 1960s the efforts were inspired by the development of planning-programming-budgeting systems in the US administration. Attempts were made to introduce performance measurements in the planning systems of the government. It is hard to make an overall assessment of these efforts, but at least the achievements were important in reforming the thinking of budgeting and performance improvements in the state government. Since then numerous attempts have been made to reform the state administration and to improve the productivity in government activities. The most recent trends include outcome oriented budgeting and control systems and the introduction of various quasi-market elements such as purchaser-provider systems in the government activities.

Starting from the 1960s attempts were made to find appropriate indicators of output at the agency level. These efforts did not lead to a systematic measurement of government output as a whole. The national accounting practice of measuring output by the use of inputs (mainly labor input) remained intact.

At the more macro level at the beginning of the 1970s there was a committee working on social indicators (Talousneuvosto 1992). Social indicators were developed in order to complement the traditional GDP calculations. The relationship between indicators and government activities was the underlying goal. The ultimate aim was to look at how government activities e.g. in the field of education and health affected to the state of social indicators. These discussions continued later in international framework, e.g. in OECD, which also developed a set of social indicators. No systematic assessment of social indicators followed from these exercises, even though they may have left impact on how various government programs were evaluated. The principal reason for this was perhaps that the whole effort was too ambitious. Another possible explanation of this partial failure may be the fact that the productivity measurement has been considered problematic because it is conceptually difficult to draw the line between outputs of government agencies, social indicators and individual welfare measurements. The problem of social indicators has been the lack of appropriate general theory and the impossibility of measuring social welfare (Hjerppe 1982). Since then, however, various social indicators like life expectancy literacy and infant mortality rate have been extensively used in various applications. One of the most well known current application is the Human Development Index which has been published by the UNDP (see e.g. Human Development Report 1990). The problem in a developed country like Finland is that since literacy rate is practically 100% and infant mortality rate is very low, these indicators are not any more sufficient to judge the developments in the fields of education and health.

Although the importance of productivity of public services and government activities was stressed in many planning and budget documents in early 1980s it was only in the late 1980s when a more concerted effort to assess productivity in the public sector was launched. In 1989 Ministry of Finance set a productivity project. The purpose of the project was to investigate how productivity measurements for public sector activities could be carried out.

It was already mentioned that in national accounts government output is measured by the labor input. This cannot be considered as satisfactory, since there has been extensive technological development inside the government sector. For example the use of computers is very common and the computer technology advances rapidly. The interesting question is whether this development has had any effect on the productivity in the public sector? How big is this effect ? We may even ask whether this is positive or negative? We see that it would be rather important to be able to tell something about this, since in Finland public consumption is about 20 % of GDP.

These kind of thoughts have been in the background which have led to the development of efforts to development of aggregate output indices of the public

sector. In fact it has been thought that one can use the analogy between public and private services. There are numerous examples of services which can be performed either in the public or in private sector. Therefore it would seem natural to evaluate physically similar services as elements of output in both cases. The principal difference and difficulty, however, is in the valuation of the services. In the case of private sector one can usually assume that the price system reflect the preferences and utilities of consumers. In public sector this link is missing. The decisions to produce depend on the political decision making. In fact in the theoretical literature on public choice, the median voter model has been very popular one. In this model the decision is assumed to reflect the preferences and the utility of the median voter, since this voter is decisive in the case of single peak preferences.

3. Public Sector Productivity Development and Efficiency Variation in Finland

The next sections present an overview of studies which have investigated productivity of public sector service provision or other government activities. The studies are divided according to the methodology that has been applied in constructing productivity measures.

3.1 Simple Ratio-analyses of Productivity

This section presents a short review of studies which have investigated productivity development in the Finnish public sector by calculating ratios between simple input and output measures without modeling the production process. These analyses have usually estimated output of a certain government sub-sector by a so-called output indicator method, where a varying number of output indicators have been computed and these have been aggregated by applying weights based on estimated unit-costs or measures of labor input. Thus acquired measures of output have then been divided either by operating costs or working years involved to give the measure of productivity.

There were only occasional attempts to evaluate productivity development before 1990s. These were usually carried out inside the institutions concerned. As a rule these studies did not pay attention to inputs other than labor and were confined to assessing the development of labor productivity. The knowledge of productivity development of public sector institutions in the 1970s or earlier is very thin.

Hjerppe (1980) made a rough calculation of productivity development in educational sector in Finland for the period 1960-1975. The labor input during this period increased by an average 4.2 percent annually. Using the number of students as a measure of output indicates that the annual increase in output was only 0.4 percent. Accordingly the productivity of labor in the educational sector decreased on the average by 3.4 percent annually. In another exercise Hjerppe (1982) constructed output indexes for health centers and hospitals based on the bed days and patient visits and estimated productivity development by comparing the development of these indexes to the index of the labor input or to the volume of current costs. According to Hjerppe's estimates there were hardly any change in the labor productivity of health centers in the period 1973-1980. Cost productivity (i.e. the sum of weighted bed days and patient visits divided by operating costs deflated at 1973 prices) decreased by 10 per cent that is by 1.5 percent on average annually. According to Hjerppe's calculations there was a much steeper negative productivity trend for hospitals than for health centres.

Personnel productivity for hospitals decreased on average by 4,7 per cent between 1973 and 1979.

Häkkinen and Luoma (1989) studied productivity development of Finnish health centers from 1975 to 1986 using more detailed output data than Hjerppe. According to their study total productivity declined on average by 3 percent and labor productivity by 2.8 percent a year. They also found differences in the development of productivity between provinces.

Luoma and Järviö (1992) studied productivity development of Finnish health centers from 1980 to 1990. Output data used in this study consists of number of different services provided by health centers measured by outpatient visits and inpatient days. For estimating productivity change ten output categories based on different type of visits and bed days were formed. Input data consisted of operating costs of health centers, which were deflated by the price index of municipal health expenditure (based on input prices of municipal health services) to give an input measure.

From 1980 to 1990 the average annual decrease of cost productivity of health centers, with output measured by Paasche quantity index and input measured by deflated operating costs, was 3.1 percent (using 1990 as the base year). During late 80s cost productivity decreased much more rapidly than in early 80s. From 1980 to 1985 the average annual fall in productivity was 2.2 percent and from 1985 to 1990 4.0 percent.

Alander et al. (1990) have studied the development of productivity of Finnish hospitals in 1981-86 and cross-sectional differences in hospital productivity in 1986. Total output of hospitals was defined as a weighted sum of inpatient days and outpatient visits by specialty. Total productivity fell on average by 4 percent annually and labor productivity correspondingly by 3.1 percent.

The results of all above referred studies suggest a significant negative productivity trend for public health care in Finland in the 1970s and 1980s. How robust are these estimates? There are several reasons why the estimates are necessarily not exact. First, output measures used have been relatively crude. Secondly, statistics which has been gathered from health services have changed somewhat over the study period. Thirdly it is possible that over the years there has occurred changes in the patient mix of health centers and hospitals. These kind of potential changes are not taken into account in the studies. Fourth, studies have not included any measures of possible quality changes.

Östring (1994) has assessed productivity development of National Board of Patents and Registration (NBPR), Finnish customs and tax administration. Output measure for NBPR was calculated as the weighted sum of end products of

different departments. The weights were based on estimated unit costs of different outputs in the base year 1992. Cost productivity and labor productivity in years 1988-1992 was computed by dividing the weighted output by deflated costs and man years. On average cost productivity increased by 4.2 per cent and labor productivity by 9.2 per cent a year. Annual productivity changes showed very large variation.

Productivity calculations in tax administration include the activities of both central and local tax administration and cover the period from 1980 to 1993. For calculating the aggregate output weights, which describe how time consuming the handling of different kind of tax declarations are, are used. Cost productivity and labor productivity figures, which have been obtained in the similar fashion as in the case of NBPR, indicate a slight increase in productivity. Average annual increase is 0.7 per cent for cost productivity and 0.9 for labor productivity. Productivity development seems to be somewhat better since 1987 than in the early 1980s.

Productivity calculations for Finnish customs for the period 1980-1992, applying similar methods as in the case of NBPR, indicate a clear improvement in productivity. The average annual increase in cost productivity is 2.4 per cent and in labor productivity 2.9 per cent. Again productivity development is getting slightly better towards the end of the period.

In recent years the measurement of public sector productivity has been stimulated by the Finnish National Productivity Programme. It started in 1993 and includes several projects of which one is the project for developing productivity statistics. The aim of this project, which is carried out in Statistics Finland, is to introduce productivity measures for the bulk of public services and set up systematic data-collection on productivity changes in the public services. Until now, only preliminary results for the productivity of central government sector for the period 1994-1995 have been produced. They show a slight decrease in total productivity by 0.5 percent (Niemi 1997). Labor productivity according to these calculations rose by 3 percent. Calculations covered about 44 per cent of central government activity measured by the labor input share.

3.2 Productivity Studies Based on Cost or Production Function Approach

There are only a few attempts which have applied cost or production function approach and econometric methods for evaluating productive performance in the public sector.

Lehto (1989,1990, 1991) has carried out productivity studies of Finnish State Railways and Finnish Customs. According to his results total productivity of Finnish Customs developed quite favorably. The average annual increase in productivity was 3,9 per cent when output weights based on estimates provided by Customs were used. The estimated annual increase was much smaller, 2 per cent, when weights were base on cost elasticities based on estimated cost function. For the Finnish State Railways the average annual increase in productivity from 1970 to 1980 was 2,3 per cent.

Talvitie and Sikow (1992) have estimated productivity development in highway construction over time and compared productive efficiency of regional units of the Finnish highway agency. The cost function is used to analyze the road construction process. The hypotheses concerning economies of scale, both at the project level and at the region level, indicate increasing returns to scale. It is shown, in particular, that if economies of scale are present and they are not taken advantage of in the production, a "technological gap" develops. This means that the agency may appear to be performing in a cost-effective manner when it could, in fact, be performing much better by exploiting advantages of increasing returns to scale. The method is applied and demonstrated using data from the Finnish Highway Administration.

3.3 Studies on Efficiency Differences in Government Agencies and Public Services

During recent years a considerable research effort has been directed to measuring differences in productive efficiency of service producers. The aim has been to identify efficient producer behavior and estimate potential for efficiency improvement. These goals have been pursued by constructing production frontiers and measuring distance to these frontiers. A popular method for doing this has been data envelopment analysis. It utilizes analytical and computational techniques which are based on linear programming. In Finland various studies have been carried out where efficiency indexes for municipal services and government agencies have been calculated. These studies have usually utilized output and input data from early 1990s.

There are a number of consideration which one should bear in mind when interpreting the results of DEA and which makes summarizing and comparing results from different studies difficult. First, variation in DEA scores depends on the number of units that are included in the analysis as well as the number of different output variables and input variables that are used in calculating DEA scores. With relatively small number of units and large number of different output and input categories it is usual that a large proportion of units will get the DEA score of one. Secondly, efficiency variation depends on the assumption

what kind of scale properties best describe the production process. Thirdly, the DEA score of one does not necessarily indicate efficiency, but DEA score of less than one necessarily implies inefficiency (given that data used is reliable and that all relevant inputs and outputs are included).

The main message from the DEA efficiency studies of the Finnish public sector is that efficiency differences both among municipal service producers and among government agencies were considerable in the early 1990s. Some summary statistics from these kind of studies are shown in table 1. Many studies have calculated efficiency scores with several alternative output and input specifications. From these we have chosen the specification which can be considered as the most basic and presented results for only that alternative.

Table 1. Summary statistics for efficiency studies of public production.

Reference	Main efficiency results		Sample, further results and comments
	Mean Standard deviation Minimum		
	CRS[1]	VRS[2]	
Kirjavainen & Loikkanen (1993)	81.9 11.0 43.8	84.1 10.7 58.4	291 senior secondary schools. 5 output and 5 input variables. Quartiles (VRS): 75.8, 82.6 and 94.0.
Luoma & Järviö (1994)	87.0 n.a. 48.4	94.6 n.a. 68.6	224 health centers. 10 output variables. Operating costs as an only input variable. CRS results calculated by applying minimum bounds for output weights. Input saving potential (CRS) 13 %.
Martikainen (1994)	69 n.a 27	75 n.a 34	232 police districts. 9 output variables. Labor input as an only input variable. Quartiles (CRS): 56, 67 and 84. Input saving potential, 29 % (CRS), 18 % (VRS).
Martikainen (1995)	88.0 n.a. 63.5	91.8 n.a 67.4	33 land survey offices. 6 output variables. Number of working days as an input variable. Input saving potential 12.8 % (CRS), 9.3% (VRS).
Martikainen (1996)	84.5 n.a. 56.3		176 local tax offices. Three output variables. Two input variables.
Linna & Häkkinen (1996)	84.4 11.5 45.3		53 specialty departments of university hospitals + 40 central and local hospitals. Eight output variables. Net operating costs used as a sole input variable. Cost saving potential estimated to be 13-17 % of operating costs. CRS results calculated by applying minimum bounds for output weights. Quartiles: 77.5, 86.3 and 92.6.
Niemi, Luoma, Sarho & Östring (1994)	88.0 n.a. 59.0		71 district courts. 10 output variables. Personnel costs as the only input variable. Input saving potential 11.9 %.

[1]DEA scores calculated with constant returns to scale assumption.
[2]DEA scores calculated with variable returns to scale assumption.
n.a. = not available.

Although, for above mentioned reasons, the results obtained by DEA have to be interpreted cautiously, all of the DEA studies reported in table 3 point to the conclusion that there are large efficiency variation among public producers and institutions. Thus results would also indicate considerable output expansion or input saving potential in the public production, which could be achieved if

inefficient units could increase their productive efficiency to the level achieved by the best practice units. A typical estimate of input or cost saving potential has been between 10 and 15 per cent.

3.4 Explaining Efficiency Differences

The observation that there are significant differences between service units producing similar or identical outputs leads naturally to the question, what are reasons for the differences. Studies that have attempted to answer this question are relatively few in Finland. However Luoma et. al (1996) have conducted a study which attempted to find out how different factors affect efficiency variation between health centers and Kirjavainen and Loikkanen (1996) did a similar study on senior secondary schools.

The study of Luoma et. al. (1996) examined productive efficiency of Finnish health centers by applying data envelopment analysis (DEA) and econometric methods. The Tobit model was used in an attempt to find out how various economic, structural and demographic factors affect efficiency. The dependent variable of the model, the coefficient of inefficiency, was obtained by deducting the DEA-efficiency score from one. According to the results a high percentage of a funding coming from the central government matching grants and high taxable income per inhabitant are significant predictors of inefficiency. The results suggest that more generous resources tend to increase inefficiency since they may lessen incentives for tight cost and performance control. A high share of doctors and low share of administrative, maintenance and support personnel promote efficiency. This finding indicates that cost inefficiency of health centers is not only due to technical inefficiency but also to allocative inefficiency.

The results of Kirjavainen and Loikkanen (1996) obtained by similar kind of methods give a somewhat different picture. For instance, they did not find evidence that a high share of funding coming from central government matching grants was associated with inefficiency. However, the reason may be that Kirjavainen and Loikkanen did not include among regressors the income level of the population which is highly (negatively) correlated with matching grant variable. It is of course possible that the effect of financial incentives on schools and health centers is different.

3.5 Productivity Development of Public Services and Government Activities Estimated by Malmquist-Index Approach

Non parametric methods utilizing linear programming techniques have recently also been applied to measuring productivity development of service providers and

government agencies. Some results obtained by this kind of method known as Malmquist productivity index are presented in table 2. Average changes in productivity are shown separately for 1980s and 1990s, since there are interesting differences in productivity development between these periods.

Table 2. Productivity development in public services and government activities. Main results of studies based on Malmquist-index approach.

Service/activity	Average annual productivity change			
	1980s		1990s	
	Time period	Productivity change	Time period	Productivity change
Hospitals	80-85	- 3.9 %	90-93	+ 5.2 %
	85-90	- 4.1 %		
Health centres[2]	88-90	- 2.9 %	90-94	+ 2.3 %
Old people'shomes[3]	86-91	- 2.8 %	91-93	+ 0.5 %
Theatres[4]	87-90	- 3.3 %	90-95	+ 3.0 %
Land survey offices[5]			91-93	+ 10.4 %
Tax offices[6, 7]			92-95	+ 0.9 %
Employment offices[7]			92-93	+ 26.0 %

Sources: [1]Kangasniemi 1995, [2]Luoma et. al. 1996b, [3]Luoma et. al 1996a, [4]Kokkinen 1997, [5]Martikainen 1996, [6]Martikainen 1997, [7]Martikainen and Luoma 1997.

The average results shown in the table 2 have been calculated in different ways. Some studies has used a simple arithmetic average of productivity change, some have calculated the average change in productivity by weighting the units by their size and in some studies a composite unit has at first been formed by aggregating outputs and inputs of all units and then calculating the productivity change for this composite unit. Input measures used in the studies referred have mostly been based on deflated operating costs. In the case of old people' homes and land survey offices labor inputs measures have been used.

There are noticeable differences between the development on municipal service production in the 1980s and 1990s. All the studies conducted on these services indicate a considerable productivity decline in the eighties but show a positive productivity development in the nineties. Yearly productivity figures provide evidence that break in the trend occurred in the beginning of the present decade. The eighties was an expansion period for welfare services in Finland. The nineties brought a deep recession and with it a collective understanding that it was necessary to make cuts in public expenditure. This made municipal decision makers a lot more cost and resource conscious about municipal services. And indeed after a long continuous growth in public costs of municipally provided

welfare services cuts in expenditure and inputs for these services were made. A by-product of this was improved productivity development. For instance the expenditure on public health services decreased by 18 per cent in real terms between 1991 and 1995 (Asikainen et. al 1996).

When Malmquist index is used for productivity measurement one can decompose productivity changes into changes in efficiency and shift in the frontier production function. According to the studies referred to in table 2 positive productivity changes in public sector activities in the 1990s result mainly from the shift in the production frontier. Only in few cases there is evidence that individual production units have moved closer to the best practice units. Efficiency variation has not narrowed down to a significant degree in any of the activities studied. It may also be noted that behind the average productivity changes reported in table 2 there is large variation in productivity change figures among individual production units.

Although, it seems a plausible explanation that it was the deep recession which made the difference, there are other changes which contributed to breaks in trends in expenditure and productivity development. In 1993 the system how central government financed local government service production was changed radically. Until that date central government grants had been given to service providers (hospitals, health centers, schools) as a specified proportion of the costs that service providers incurred in producing services. Since 1993 central government grants have been paid directly to municipalities in the form of block grants which are based on specific criteria like number of inhabitants of the municipality in a certain age-range. From the economic perspective the most important feature of the reform is that after the 1993 municipalities have had to face the full marginal costs of inputs for municipal services, whereas before their marginal costs were reduced by the proportional state subsidy rate which they were entitled to. For social and health services the proportion of costs financed by central government matching grant depending on the tax base of the municipality varied from 29 to 66 per cent and for education from 50 to 86 per cent.

4. Comparison of Public Sector Efficiency and Productivity in Finland to Other Nordic Countries

Due to the paucity of available evidence there are only very limited possibilities to compare productivity and efficiency of the Finnish public sector to other countries. The common method is to compare the share of the services to the GDP. This kind of comparisons are, however, quite crude ones and very little can be usually inferred on this basis.

We should mention in this context the so called KRON-project where some of the key public services in four Nordic countries (Denmark, Finland, Norway and Sweden), were compared. The study started in 1983 by the initiative of the Swedish authorities. The studies continued up till 1987. The services which were compared were various child care services, social services, health care, primary schools, police, courts, and road operation.

The results of these studies showed that in general the cost of services was larger in Sweden. The costs in other three countries were approximately on the average at the same level, even though the unit costs varied between countries depending on the services. The costs in Finland, Denmark and Norway were in most cases around 60-80 per cent of those in Sweden. The general explanation of this was that in Sweden the public service systems were most comprehensive in all of the four countries compared. There were some exceptions, however. For example, repair and maintenance costs of roads was more expensive in Finland than in Sweden. This was explained partly by the different approaches to road construction: it was argued that Finland puts less money to road at the construction phase and therefore the costs of repair and maintenance become relatively larger later.

The results of the studies referred above about productivity development of public welfare services make possible to do some comparisons between Finland and Sweden. A main impression from that comparison is that although both countries experienced productivity decline in public health and welfare services in the 1980s, the decline in Finland was more pronounced. This would indicate that the cost difference observed in the KRON-project between Finland and Sweden should have narrowed in the late 1980s.

Perhaps the best possibilities to compare productivity development between Finland and Sweden over a relatively long period are in public health services. On the basis of evidence from studies referred in previous sections one can infer that productivity of health centers and hospitals in Finland declined from 1975 to 1990 continuously by several percentages a year on average. Evidence provided

by studies of Hjerppe (1982), Häkkinen and Luoma (1989), Luoma and Järviö (1992) and Kangasniemi (1995) suggests that the average fall in public health care productivity in Finland would be well over 3 percent a year, perhaps around 4 percent. Sweden also experienced a negative productivity development in public health care in that period, but especially in the 1980s the decline was much more modest. From 1975 to 1980 productivity declined by 2.2 percent a year on average, from 1980 to 1985 by 0.2 percent and from 1985 to 1990 by 1,4 percent (Murray 1997). An interesting observation is that after a long period of productivity decline, health care productivity has improved in both countries after 1990.

For the tax administration it is also possible to compare productivity changes over a reasonably long period. Productivity development has been somewhat more favourable in Sweden than in Finland since 1980. In Swedish tax administration productivity increased by 16 percent from 1981 to 1991 (Murray 1996), which means a 1.5 percent average annual increase in productivity. For the Finnish tax administration the average annual growth of productivity is 0.9 percent for the period 1980-1993.

Overall there seems to be some noteworthy similarities in productivity development of public welfare services in Finland and Sweden. The time pattern of productivity change is roughly similar. After the long period of declining or stagnant productivity development the trend seems to have changed in early 1990s. The Finnish evidence is also consistent with the explanation that Murray (1996) has suggested for the pattern of productivity development in the Swedish public sector. When budgets get tighter and resources scarcer public sector organizations start to pay attention how effectively the resources are used and this will be shown in the improved productivity development.

5. Future Challenges for Public Sector Productivity Measurement

Until now productivity measurement of public sector activities has been based on specific studies which have assessed productivity development of certain sub-areas and particular type of services. There is a clear need to organize productivity measurement on a more systematic and continuos basis. Hopefully, this will be accomplished by the Finnish National Productivity Programme project carried out in Statistics Finland.

In recent years discussions about public services have emphasized the quality aspects of these services. One of the major challenges for productivity measurement is how to take into account quality attributes of public service provision. This poses both definitional and operational problems, but these problems are by no means insurmountable. Methods exist by incorporating quality and consumer satisfaction into productivity measures (see e.g. Färe et al 1995, 1996), Olesen and Pedersen 1995).

The measurement and definition of the quality of services is important. The question is how to do this. We assume that the most important characteristics of the quality is related to how well services are delivered. The second important characteristics is the capacity and access to the services. The third important characteristic is the waiting time. Capacity can be measured by the quantity of the services per capita (e.g. hospital beds per capita, the number of student seats in a school etc.). Access to the services can be measured e.g. by the distance to the services. The waiting time has two dimensions: a) in some cases one needs to order a service in advance e.g. a specialized treatment in a hospital has to be ordered sometimes well in advance. This waiting time is determined by the capacity of the service system. The other component of the waiting time consists of actual service time in order to get the service. This is sometimes considered by the consumer a very important component. It can be measured by the average length of queues and the time consumed when a consumer is actually served. This is determined by the efficiency of the person supplying the service.

We see that all these components of the quality basically determine the transactions costs related to the service. The transactions costs are a convenient measure because they reflect the efficiency of the service system. By this way we can relate the problem of quality to the transactions costs theory (Williamson 1985) The total volume of the service is then determined by the sum of the quantity provided (e.g. the number of treatments per year) plus the transactions costs involved when people use the services.

Large part of transaction costs are shadow costs related to the use of time by the client. In modern service systems it is customary to transform services more and more on the self-service basis. In these cases it might look that the efficiency is increased when the costs of the providers of the services are reduced. But this may be wrong if at the same time the transactions cots of the clients have increased due to the transfer to the self service methods of production. In terms of the national economy efficiency improvement has to be judged taking into account also the shadow transaction costs by consumers. These can be measured by the time used to travel to the service location plus the waiting time multiplied by the value of time (e.g. wage rate) of the consumer.

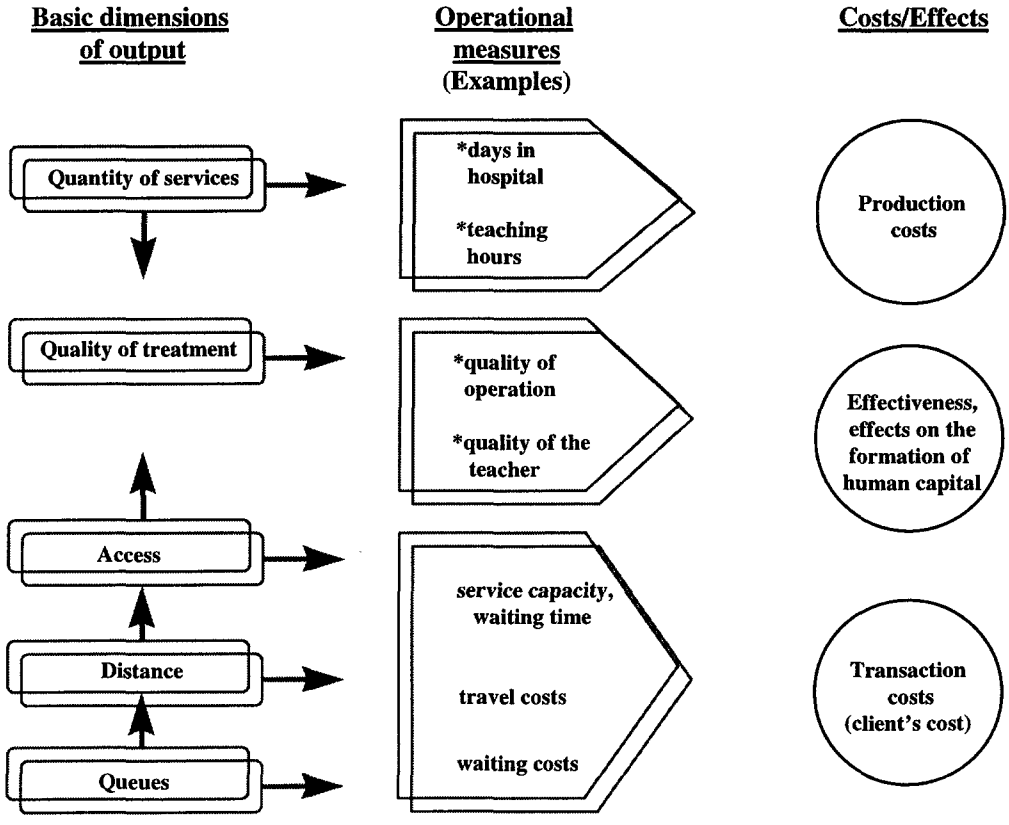
In fact what we argue here is that the costs of services can be divided into two basic components: the production costs and transactions costs. The quantity of services (days in hospital, days at the homes for the elderly, teaching hours) is determined by the productions costs (labor costs, capital costs and intermediate input costs). The quality of services is determined by two components: the quality of treatment (which depends on the skills of the physician, teacher, nurse etc.) and the transaction costs to the consumer or client. These transactions costs are determined first by the availability of or the access to the services. This depends greatly on the capacity of the service network, which determines to a large extent how long the consumer has to wait in order to receive treatment. The second component depends on the distance to the service, which determines, for example, the traveling costs of the consumer seeking the service. The third component is the actual waiting time cost in order to receive treatment. This means the actual waiting time spent when the consumer has arrived to have the service but has to stay in a queue before he/she gets the treatment (this is actually often the most important aspect of quality for many consumers).

Both the quantity and the quality of the service determine the effectiveness of the service. By the effectiveness we measure the effects of the outputs to the final goals of the service. In the case of health, education, day care and care for the elderly we are ultimately interested in the effects of the output on the human capital formation.

The concept of human capital is normally conceptually related to the returns on the human capital. It is a somewhat philosophic question whether we include in the returns only the increase in the productive or earnings capacity or whether we would also like to include to the returns the increase in the general well-being of the consumer. For instance, it is often argued that more educated people can enjoy more about reading or about listening to the music etc. The problems is that it is usually difficult to measure this enjoyment part, and therefore the measurement of the returns to human capital are normally restricted to the estimation of the increase in the earnings capacity. An example of this is the estimation of the wage equation, which shows how much wages rise due to

increased education (the classical example of the 'basic' earnings function is Mincer (1974), see also e.g. Psacharaopoulos 1994).

Figure 1. Basic dimensions, operational measures and effects of output.



In Finland there exists numerous interview studies from the years 1986 to 1994 which report the quality of the services in the Finnish health centres (these are summarised in Kivinen and Hilander-Sihvonen (1997) who also conducted their own study). It is interesting to note that contents of most of these studies can be put into the framework which we present in the figure 1. These studies contain variables which describe quality of treatment, access to services and the use of time variables. The actual specification of variables may vary from study to study. The overall impression is that in general people are satisfied with the quality of treatment. Sometimes they would like to have more information about availability of services (access). Most of the complaints concern the use of time: too long queuing times and shortage of time for treatment.

6. Summary and Conclusions

Since the late 1980s the management of public sector in Finland has been reformed quite thoroughly. A major driving force in the reform process has been the conception that public expenditure could be reduced by adopting efficiency systems prevalent in the private sector. The importance of productivity has been emphasized earlier, but with rapid economic growth of previous decades it was far easier to solve problems in public service production by increasing resources than by taking measures to increase efficiency in the service production

With the economic downturn of the 1990s the situation has radically changed. It brought a pressure on state and municipal decision makers to improve public sector efficiency and resulted in increasing cost and productivity awareness at all levels. At the same time there has occurred changes in public administration and public service provision which rely heavily on management by results, economic incentives and delegation of power.

In this article we have reviewed the studies which have investigated public sector productivity in Finland. Although, there is no systematic evaluation of productivity development in Finnish public sector, studies that have been carried out, provide enough evidence, that we can form a stylized picture of main trends.

There is clear evidence that during recent years productivity development has significantly improved. This is especially true for local government activities, such as health care, social services and education. In these services available evidence without exception points towards productivity decline in 1970s and 1980s, but during the recent decade most studies provide evidence of significant productivity improvements. At this moment we are not able to assess to what extent the change in productivity development has been the result of public management reforms and to what extent it can be explained by the deep recession that Finland experienced in the early 1990s. Also, in spite of the improved average productivity, there seems to remain significant differences in productive efficiency between the different units producing similar services.

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