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PRICES AND QUANTITIES IN PRODUCTIVITY MEASUREMENTS FOR THE GOVERNMENT SECTOR IN SWEDEN.

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By

Jüri Kôll

STATISTICS SWEDEN
Jüri Kôll

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PRICES AND QUANTITIES IN PRODUCTIVITY MEASUREMENTS FOR THE GOVERNMENT SECTOR IN SWEDEN.

The problem

The main aim of the project presented in this paper is to produce productivity figures on the macro-level and to replace the assumption sofar used in national accounts in Sweden that the productivity change in the government sector equals 0.

To calculate productivity changes one needs data both on the output and on the costs to produce that output. In the government sector, data on output are usually missing. To produce productivity data in spite of that, one either needs to estimate the total production and the costs of that production, or the costs of one well-defined unit of production in two subsequent periods. The second alternative opens up some practical statistical procedures and permits us to use the knowledge built up by price-index calculations.

The difficulties

Data on the output.

To produce data on productivity, data on the produced amount of the product in two different periods is needed. The product must be well-defined. The costs for that production for the two different periods in fixed prices are also needed. Instead of the total production and the costs for that, we can use the mean value of the costs to produce one unit of the product in question in the two different periods.

A well-defined product can be described as a standardized product, with a defined quantity, quality and price. The services in the government sector are usually not well-defined products. They are neither standardized nor do they have a price-tag in the form of a market price. Instead they are specific, usually depending on the circumstances in the specific case, and varying both in quantity and in quality from case to case.

The pressure to keep down the costs in the government sector is increasing, as is the awareness of costs, cost-structure etc. At the same time there are efforts to increase the competition. The awareness of costs and the increasing competition tend to push the markets towards standardized products.
But the real incentive to provide a standardized product will arise first when the income for the producer is directly linked to the price and the costs for that product. That means that as long as the government sector does not act in the same way as the business sector, we will not get as standardized products in the government sector as in the business sector. But in order to minimize the problems in comparing production in two different periods, we have to split the activities into as standardized products as possible.

Data on production costs.

Complete data on production costs are usually available for such units in the government sector that have their own budgets. These units may in some cases be units with a homogeneous production, but usually they are involved in many separate kinds of activities. In Sweden complete data are very rarely available on the total production costs for a homogeneous production or for a unit of that production.

So when we try to minimize the problems of comparing the quantity and quality of a production in two different periods by comparing the production costs for a unit of production, we create a new problem, i.e. how to get the production costs for that standardized product. However the trend towards increased effectiveness and a greater degree of competition in the government sector will make it more common to monitor the production costs for all kinds of production. So it may be is an easier task for us to split the production cost on homogeneous products in an objective and reliable way, than to get the agencies involved to give us objective and reliable data on changes in production quantity and quality.

The productivity estimates produced by ESO in the early eighties.

In the early eighties, a state committee known under its acronym ESO carried out studies on the productivity in some areas of the general government, mostly services to households - the studied services included
- health care
- social care
- education
- roads and
- parts of the national defense.

These studies were based on estimates of the volume of production by indicators of the volume of output, and an estimation of the costs of the output.

The indicators used were available data, more or less directly linked to the volume of output by each producer. These indicators were in some cases the same as the products asked for by the consumer, for instance, a place for your child at a day care institution, but in other cases the indicators and the desired products differed, as in medical care where the service asked for is the treatment, but the indicators are the number of patients or bed-days.

Some examples of indicators used in these studies were:
- number of patients in hospitals
- number of bed-days in hospitals
- number of visitors at medical clinics
- number of children at day care institutions
- number of hours of domestic help for elderly people
- number of lectures each week multiplied with the number of pupils in regular schools
- number of students in colleges and universities

The indicators were the best measures available for the output of services in general government. The proceeding involved two main risks. Firstly the output measures were not adjusted for changes in quality, secondly various structural changes occur within the broadly defined products. The effect of these changes was not taken into account. How great the effect is depends to a great extent on how homogeneous the product behind each indicator are.

The information about the costs was usually taken from the official annual reports of the respective producer, the financial statistics for the local government authorities or from national accounts data.

Price index series from the producer price index, deflators from national accounts and other available indices were used for the fixed-price calculations.

The ESO-studies covered about 70 per cent of the general government production of services. The results indicated a 1.5 per cent yearly decline in productivity during the seventies.

The productivity measurements in Statistics Sweden.

For a long period of time Statistics Sweden has needed to monitor the changes in its own productivity and several attempts have been made to measure these changes. In 1985 we began to measure the productivity product by product. By products we mean the administratively defined products in our accounting system. Each statistical survey is usually a product.

For each product we began with the costs for two subsequent financial years (the Swedish government financial year last from 1st July to 30th June the next calendar year). The costs were recalculated to fixed prices by using the changes in unit prices between the years in question. For each product, which had had a change in the volume of output between the years in question, we had to calculate the costs for that change. That cost we then had to add to or deduct from the second year's costs to get the costs for equal-sized production both years. The change in costs in fixed prices for the same production gives the change in productivity.

In the beginning the aim was to get both the changes in volume and the changes in quality valued at their costs. In practice, we were able to value the quality-changes at their costs for only a few products. Consequently we decided that the changes in quality should not be included in the productivity figures, but should be shown separately.

The valuation of the changes in quantity was made by the staff producing the statistics in question. The same applied to the quality changes. The quality

changes were reported as an increase, decrease or no change in eight quality aspects.

Of course, there are risks involved when the producer values the changes. The valuation is effected by the producers point of view and in some cases there may be tactical valuations. The valuation of quality and volume changes is the weak spot of this method.

The results.

The decrease in costs, adjusted for the change in volume, has for Statistics Sweden's production been estimated to 6.3 per cent from 1984/85 to 1987/88. This corresponds to an increase in productivity by 6.7 per cent. As only products being produced during the whole period of time were included in that estimation and all ad-hoc work and development projects were excluded, the productivity figure covers only some 65 per cent of all the activities in Statistics Sweden.

The productivity measurement with a sample of products in the government sector.

From the ESO study and the productivity measurements at Statistics Sweden we have learned that:

- a split into homogeneous products is needed

- quality changes and structural changes can not be ignored

- it is difficult to get an objective valuation of changes in production volume and even harder to get a valuation of changes in production quality.

Taking into account these experiences and our basic knowledge that it is often more efficient to measure a sample than to try to measure the whole population, we have made the following proposals for the tests in the next stage. There are two main ideas behind our proposals. The first is that in a conflict between sampling errors and measurement errors it is more important to control the errors in measuring the output and the costs. The other is that there is a lot of similarity between price measurements and productivity

measurements; both measurements are effected by changes in both quality and quantity.

One of the models we want to test in the next stage can be defined by the following statements:

The productivity measurement will be made on a sample of products, at the specific producer units for these products.

Products with measurable (small) quality changes or no changes at all will be included.

Products with significant unmeasurable quality changes will be replaced by similar products (at other producer units) without significant quality changes. (This proceeding is of a kind frequently used in price statistics.)

The products involved have to be homogeneous and there ought to be many producers of the same product. Large parts of the government sector, mostly in local government, fit that description.

Costs in fixed prices for the production of one unit of the chosen products will be collected.

The assumption behind the proposed procedure is that it might be easier to collect the costs of the production of one unit in fixed prices for the chosen products, than to estimate the size of significant quality and quantity changes properly. We can then:

- avoid that a subjective valuation of quality changes effects the figures

- replace units where the valuation of the changes in volume and quality is difficult with units where the difficulties are less

- focus more on measuring errors by using a sample

- use the experiences from the price-data collection for price indexes.

If necessary funds become available, we will be able to check if and for which parts of the general government this procedure will be useful.