Chapter Title: Measuring Public-Sector Output: The Swedish Report

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14 Measuring Public-Sector Output: The Swedish Report

Richard Murray

This paper relates the large scale effort to measure productivity in the production of public-sector goods and services in Sweden. It is organized as follows: First, there is a methodological part dealing with problems of measuring output in the public sector and how they are addressed in this study. This is undertaken in the context of national accounting and deals with the problems of aggregation in choosing final output, of weighting outputs and of the treatment of quality. Next, results of the study are presented. The huge drop in productivity is analyzed, and some main conclusions as to its causes are suggested. Finally, macroeconomic implications are briefly discussed.

The Swedish study was organized by a subgroup to the Expert Group on Public Finance (ESO) under the Ministry of Finance. Several of the studies were contracted out to independent researchers, agencies, and public organizations. But the conceptual framework of the study was closely controlled by the subgroup. Dr. Ingvar Ohlsson headed this group, which was set up in 1982. A summary in English was published in 1987 (Ohlsson 1987).

All segments of the public sector were to be covered. Comprehensive or sample measurements were taken for roughly 70 percent of the sector, incorporating the municipal, county, and national levels (including the national social security administration). However, only the nonprofit activities were included. Public utilities like railroads, telecommunications, power and heat, and housing were omitted for they are reasonably well covered by the national accounts as of today. An effort was made to extend the measurements as far back as 1960 and to make them cover the period up to 1980. In the vein of the national accounts, measurements were undertaken with a base year for weights and price indexes. That base year was set to 1980, the end of the

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period. Since the first report appeared, a series of productivity measurements extending the period up to 1985 were undertaken (see Murray 1987).

The framework of the study is the national accounts scheme. Its concepts, theory, principles, and practices were consequently adopted as guidelines for the study. As anyone familiar with compiling national accounts statistics knows, this includes many approximations and deviations from strict principles.

Even though the United Nations has set standards for accounting, there are ambiguities stemming from a compromise of purposes for these accounts. The basic purpose has been to measure economic activity for business cycle analyses. This purpose comes very close to analyzing the laws of production and the measurement of productivity. A different purpose is to measure income, welfare, or even the quality of life. It is important to recognize that the national accounts, according to the U.N. definitions, strike a compromise between these two extremes. The stress is on production, but production should be measured in a way that is relevant to welfare.

Therefore, it is output—not outcome, nor throughput—that is to be measured and with consumer evaluation as the measuring rod—even for the public nonprofit, nonmarketable goods and services.

14.1   Including the Public Sector in GNP

When calculating GNP we add up value added in all sectors of the economy. The government nonprofit sector is included with the sum of its wage bill. There are two corrections we want to make to this calculation: (1) the capital stock of the government ought to have a rental value that should be added to value added from the public sector; and (2) the change in productivity—value added in relation to labor input—should be reflected in the value added by the public sector.

As seen in table 14.1, GNP rose according to official estimates by 2.0 percent per year 1970–80. Adding the rental value of capital in the government sector makes the growth increase to 2.1 percent. Assuming hypothetically that the government sector had a 2 percent growth of value added per year in relation to the input of labor and capital reduces value added in 1970 by 17.071 billion Swedish kronor (SEK) in 1980 prices. Growth goes up to 2.5 percent per year. It is clear that productivity in the government sector matters.

In order to include the government sector in a full account of GNP, one needs figures on value added for the government sector. Lacking this information, we may instead try to measure aggregate final output of government, calculate the rate of total factor productivity change for the sector as a whole, and from this infer the rate of change of value-added productivity.

14.2   Aggregation Poses Problems

Aggregation poses several problems of measurement: (1) What outputs are to be measured and included? When aggregating one runs the risk of double

Table 14.1   **Correcting GNP for the Rental Value of Capital and the Change in Productivity (billions of SEK, 1980 prices)**

	1970	1980
1. GNP at market prices, official figures	432.647	525.099
2. Of which: Government nonprofit organizations	81.535	116.036
3. Capital stock of government organizations	224.838	364.354
4. 6% interest on capital stock	13.498	21.861
5. GNP adjusted for interest on capital stock of government (1 + 4)	446.137	546.960
6. Of which: government nonprofit organizations	95.025	137.897
7. 2% productivity growth per year of government nonprofit organizations	− 17.071	. . .
8. GNP adjusted for capital stock and productivity increase (rows 1 + 4 + 7)	429.066	546.960

counting. Which outputs are intermediate and which are final? (2) How does one sum pears and apples? By kilos or by kronor? What weights should be used in adding outputs of different kinds? (3) How should quality be incorporated in the output measurement? These questions become especially tricky where public-sector output is concerned, but they are also relevant to other sectors of the economy.

The first question is, What is to be counted as output? Outputs that directly benefit consumers and producers outside the government sector should be included. They are final in relation to the government sector. Intermediate outputs within the government sector should be excluded. There is, however, a problem of aggregating the government and private sectors. Those outputs from the government sector that we consider here are typically free of charge. Still they may benefit private producers. That means that value added in the private sector is overstated and that we would be counting this production twice if we were to include this output in the government aggregate. Some other government outputs—like environmental regulation—might not show up in the value of production in the private sector or might even reduce its reported value while benefiting citizens and consumers.

A very preliminary investigation on who are the beneficiaries of the government subsidized output sheds some light on how large this problem might be.

In table 14.2 government output is measured in input terms, equivalent to what is called public consumption. That part of government output that directly benefits the private sector—part of the consumption of roads, harbors, employment agencies, and so on—has diminished in share although it has grown in volume. Recalculating the growth of GNP by subtracting this part of the contribution of the public sector to GNP from that of the private sector *increases* the growth of GNP by 0.14 percent over the ten years.

A similar calculation was undertaken by Kuznets (1971). He included a much larger part of the government output in what was to be subtracted from

Table 14.2   **The Destination of Government Output, Percentage of Public Consumption (nominal prices)**

	1970	1975	1980
Input into production:			
Private industry	8.5	8.0	7.6
Government	3.0	2.5	2.2
Consumption:			
Individual goods	61.6	63.7	68.0
Collective goods	26.9	25.8	22.2

GNP as sheer costs to keep society functioning. General administration, police, military defense, and so on were looked on as a prerequisite for other kinds of economic activities. Kuznets found that over 100 years the growth of the U.S. economy was lowered by 7 percent.

How does one add the output from different government branches or different outputs within the same agency? Consumer evaluation should be the guidepost, but this creates new problems because there are no market prices for these outputs.

It has been suggested (Ohlsson 1987, 38) that nominal user fees could be used as weights in case "the market" is in equilibrium, that is, that there are no unsatisfied wants manifesting themselves in queues. Because over 60 percent of public consumption is individualistic in nature (see table 14.2, above), this argument carries a substantial weight.

Consider the case of health care in Sweden, which is to a very small extent financed by a user fee of about 60 SEK per visit. There are queues in some areas of health care, but on the whole the demand is met by an ample supply. The logic of such weights would be a drastically reduced health care. At the price of 60 SEK per visit, Swedish hospitals cannot carry their costs. The prices would seem to indicate that health care is supplied far beyond what is optimal. Libraries, museums, schools, and such would be valued nil, also implying that a sharply reduced level of spending would come closer to the optimum.

Because there is very little political and public support for cutbacks on government output, these services must be more highly valued than is reflected in the user fees. Evidently there are collective evaluations even concerning individual public goods.

How to incorporate changes in quality is a well-known problem in the construction of price indexes. This becomes more problematic if there are no prices from which to infer the characteristics that command the willingness of the consumers to pay. However, techniques like conjoint analysis (Cattin and Wittink 1982; McFadden 1976) could be applied to public-sector output to reveal consumer evaluations.

What counts as quality are only those characteristics of a good that appeal

to the consumer. But who is the consumer? There might be a genuine conflict of interests between citizens/consumers and politicians/principals. (This conflict is also relevant in the identification of outputs and in the choosing of weights but is best treated in connection with quality.) Although politicians may rate the accuracy of the Swedish internal revenue service highly, citizens might have an opposite view. There are merit want goods that would not even qualify as outputs in the eyes of all citizens, like advertisements on the dangers of smoking. In these cases we are apt to take the view of the politicians and regard them as the final consumers.

14.3   Practical Solutions

14.3.1   Final Output

It is easier to conceptualize final output than to measure it. The goods we are envisaging might well be consumed by specific individuals or organizations outside the government sector, but they are ordered and paid for by quite different bodies. There is no connection between payment and consumption, which makes identification of outputs much more complicated than of goods on a market. Payment to government organizations is for resources and activities and not for outputs. Because the financing bodies pay for office spaces, traveling, coffee breaks, staff meetings, and data machines as well as for operations, teaching, land surveys, and court proceedings, asking what the principal is paying for in order to determine what are the final outputs is not at all helpful. From that point of view it is not apparent why the latter should qualify as outputs and why the former would not. This causes a well-known lack of goal consciousness on behalf of government organizations and their staff and also makes it a cumbersome, sometimes delicate and questionable, exercise to choose the final outputs.

Despite the funny way government production is financed, it was of considerable help to think about what the principal was purchasing. Would he be purchasing coffee breaks? Would he be purchasing capacity without production? Other questions that were asked: What are the ends that the services to identify should serve? What outputs serve the outside world? These questions guided the choice of output indicators in the Swedish report.

Applying, for example, the question of what the principal is purchasing clarifies what are the outputs in the following instances: Is the end product of the internal revenue service the tax receipts it collects? Is the output of the social security service the benefits that are paid out? Of course not. Output is instead the handling of these payments. Agencies are doing a good job when they collect or pay the correct amount, without delay and at low administrative costs.

But there are instances that are more ambiguous. From the point of view of the agency, informing citizens on their rights might look very much as an end

product, especially because the agency is instructed to carry out this activity. However, from the point of view of the citizens, information is a prerequisite for the exercising of rights, just like information on prices and qualities in a market. So we chose not to include information in the output when seen as a supporting service.

On occasion, we were forced to measure a host of outputs from one agency in order to capture it fully. However, this ran the risk of including intermediate products. Again, what are the outputs of the internal revenue service? Is it the handing out of forms to citizens, the information on how to fill in these forms correctly, the collection and the scrutinizing of the forms, and investigations into the accounting books of the firms, the processing of bank accounts, checks on employers payments of benefits to employees, and so on? In this case all these activities add up to one final product: the completion of the informational basis necessary for taxing and billing the citizens. The end product then is the complete processing of the tax form of a citizen or a company. All activities within the internal revenue service contribute to this end. But instead of measuring them all and then aggregating them in relation to their contribution, it is preferable to measure the final output directly. This is what has been done wherever possible. In the case of the internal revenue service tax forms processed are counted as final output.

Agency representatives, personnel, ministerial supervisors, and politicians often see the identification of an agency's final output as an oversimplification. It is much easier to gain the acceptance from the man in the street, who has an exceptional and under-utilized talent for disentangling the relevance. If it is possible to find a measure for the aggregate output, it simplifies matters a great deal. Government production is often hierarchical: parliament formulates the policies; ministries issue goals for production; national government agencies survey county or municipal government organizations doing the actual production—teaching, day nursing, medical care, and so on. Wherever it has been possible to identify and measure final output (like the number of children trained at school) for the whole chain of producers, that is what was done. Of course, in that way it is not possible to distinguish the contribution to the final output at each level. And the efforts of parliament, ministries, and supervising bodies are all reduced to input and resource consumption (which may not appeal to their idea of their own importance). In this way the measurement of the national government was reduced to one third of total employment. Two thirds were allocated as inputs to final outputs from the local governments. To take the most brutal example: all the administration of building control and financing and community planning was seen as input to a very crude indicator of the governmental output "physical planning": the total volume of construction.

On occasion it was not possible to find an acceptable measure of final output. For example, what is the final output of the military? There are a multitude of activities that add up to the capacity to defend the country against

military intrusion. One such activity is the training of military personnel. That output may be measured. But there are also other activities, like additions to the stock of weapons and systems, maintenance and the repair thereof, planning, surveillance, and spying. In these cases there is no other way but to measure these intermediate outputs and add them up. In the case of defense, the productivity in training of recruits and pilots served as representative indicators for the whole sector.

Representative parts of sector production were used in some other instances: productivity change for Statistics Sweden was calculated on a sample of 20 percent of its products, for hospitals on 30 percent of the clinics, and for libraries on public libraries of local communities only. But, aside from these examples, most of the calculations were based on aggregate output statistics and aggregate resource consumption.

Of course, there is a risk of double counting when calculations are based on intermediate outputs. Adding intermediate outputs instead of adding value added or estimating overall productivity change from a partial productivity measure is quite tricky. There are instances when the change of productivity of an internal process is a good approximation to the change of productivity in the overall operation. And there are instances when this is not so. As an example one might think of a partial productivity measure like number of pupils trained per teacher. If the number of teachers and other resources remained the same and teacher productivity increased by 4 percent, it is very likely that overall productivity would also increase by 4 percent. However, if the number of pupils remained the same and the number of teachers decreased by 4 percent, while other resources remained the same, the teacher productivity increase would overstate the overall productivity increase.

From the point of view of the agency, it might be very relevant indeed to include every activity that adds to the workload. However, that may end up relating input to input.

The dangers in adding intermediate outputs or in inferring from productivity change in intermediate production to overall productivity change call for a quest for final outputs as far as possible. Among the 14 national government agencies in the Swedish study, the number of output indicators varied from 2 to 3 to 40. In other sectors the variation is even greater. Community planning rested on only one crude measure, as previously mentioned; the health sector built on over 300 measures: the output of the sample of clinics was treated as unique to each clinic and given a separate weight. In appendix A, I provide a sample of output indicators.

14.3.2 Weights

Determining weights for the nonmarketed services of the public sector is in principle a matter of social benefit analyses. Such analyses provide values that could serve as weights in a measurement of government output that is truly welfare oriented. However, except for cases such as labor market policies,

roads, education, and some others, estimates of social benefits have not been performed successfully. Therefore vast areas are left without weights.

Discarding the need to aggregate dissimilar services and concentrating on services with similar aims, it would be quite satisfactory to have estimates of service effectiveness. All government goods and services that aim, for example, primarily at saving lives could be given weights according to their effectiveness in this respect. Such weights would indicate the relative contribution to the common aim.

This works in only a few instances and on an almost microlevel, because the intended effects are so specific to the services produced. Within the health-care sector many other goals are pursued beside saving lives, like getting people back to work, or curing for a better life or preventing possible ills. If several goals are to be included, we are back to weighing social benefits.

In some instances weights were judged by service effectiveness. An example is the use of flight simulators in the training of air force pilots. For those parts of the training where simulators were used, they were deemed by professional teachers to teach the same things that would otherwise be trained in the air at a much higher cost. Those hours were added with the same weights, which contributed substantially to a productivity increase in the training of air force pilots. A second example is the customs authority that completely changed its style of work from storing and inspecting goods themselves to a system of self-declarations by importers. Output in terms of possibilities to levy taxes and duties remained the same. Regarding these different forms of outputs as equivalent makes the customs authority register a substantial increase in productivity. In addition, importers benefited from speedier deliveries.

Also, in cases where we use highly aggregated measures of output there is an implied cost-effectiveness weighting: tax forms are divided up in only two types, each with a separate weight, but within each type all tax forms are treated as equal.

In the public sector we have substituted politicians for the market. An interesting approach is to regard politicians' decisions as the revealed preferences of the electorate. Marginal costs of production are then the prices at which the substitute (representative?) consumers (politicians!) would go shopping. They would buy health care up to the point where its additional value equals its marginal cost. Values would thus be reflected in marginal costs.

Of course, this is based on a very optimistic view of the rationality of the political and administrative process governing the production process in the public sector. But there seems to be no other comprehensive approach that could compete with it.

However, it has one severe drawback, for it leaves no room for productivity increases via a more efficient output mix. Suppose that very many elderly people are taken care of at regular hospitals at a very high cost and that one finds out that many of them might be better taken care of at retirement homes

at a lower cost. Moving some of the elderly patients out of the hospitals and into retirement homes increases unit costs both at the hospitals and at the retirement homes because those patients that are transferred cost more than the average at the retirement homes and less than the average at the hospitals. Productivity decreases in both places. However, realizing that the value of a place in a retirement home is just as high or even higher than the value of a place in a hospital would cause productivity to go up in both places.

The revealed preference approach has still another major drawback. It is that government policies cannot be evaluated from the outside. What politicians do is the best that can be done—as Dr. Pangloss might have said. Consequently, wherever possible we tried to insert weights that reflected the social benefit or the service effectiveness. For the remainder, that is, the main body of weights, we made do with marginal costs as weights.

Using unit costs from a specific base year as weights implies another interpretation of the change in productivity aside from the change in welfare. The aggregate government output equals the change in costs assuming constant unit costs. Productivity then reflects the change in productive capacity.

14.3.3   Quality

Realizing that quality lies at the heart of the service makes it easier to spot the important variables. The main qualitative aspect of weather forecasts is that they are correct: the percentage of correct prognosis in terms of temperature, wind, and rain can be measured. Social security checks should be correct in relation to legislation: random samples can be evaluated. Roads should be safe: the rate of accidents is recorded. We have recorded such quality indicators, which is half the problem. The other half is how to adjust output for quality.

Dealing with quality includes the choice of output measures. One may distinguish between three kinds of output variables: throughput, output, and outcome. Throughput measures work loads and may even come close to input, like the number of cases in the in file. Output is the goods or services delivered, like the number of cases handled. Outcome is the result from the point of view of the principal or the customer, for example, the reception of valuable advice.

National accounts have no standard in this respect, for they measure whatever has a price tag. Therefore, for government output one has to think about and try to find out what would have a price tag if these goods and services were sold on a market.

Let us take the example of crime investigation: A crime is reported to the police, it is registered, and there is a good chance that it will be investigated by the police, and a lesser chance that it might be solved. Output could be measured by the number of reports. This is throughput. Or it could be measured by the number of cases investigated—this is output. Or it could be measured as the number of cases solved—this is output with an eye to outcome.

The man in the street is interested in nailing the criminal—solving the crime. So are the principals, although they realize that it will not be possible ever to solve each and every crime.

Suppose we were to measure the number of investigations as output and then would like to adjust that measure with a measure of the quality of that output. Various candidates could be the number of hours spent on a case, the qualification of the personnel, the number of pages of written report on a case, and the percentage of cases solved. The percentage of cases solved no doubt comes closest to the result of fulfilling the objective of the principal. So why not include the quality aspect of output in the measure, that is, counting as output the number of cases solved! That is exactly what we did.

Market prices reflect the value of the output to the consumer, if markets are in equilibrium. Using prices as weights incorporates quality in the output measure. This is however, an individual evaluation, which does not encompass distributional aspects and externalities. To parallel the measurement of marketed outputs, such considerations should not enter into the measurement of government output, either. We may stop investigating whether in the long run the outputs of the police in terms of solved crimes actually produce fewer crimes, as long as there is a demand for solving crimes by both principals and citizens. This is analogous to not investigating whether cars make people happier: people buy them; that is enough for national accounts' purposes.

Far from being neglected, quality has in many ways been included in the measurements of public-sector output in the Swedish study. Here are some examples:

Measurements have favored *outcome* indicators that have a reasonably close connection to the output. For example, number of treated patients is preferred in relation to hospital days. This statistic has its drawbacks but it captures the shortening of hospital stays. The output of highway authorities is measured by the number of miles traveled by various vehicles on those highways rather than by the number of miles of roads maintained and built. Whether highway authorities build roads for which there is demand or roads that are wasted is included in the measure in this way.

Another way to treat quality change is to separate services of different qualities, assign different weights and then aggregate. For example, treated patients are divided into 312 different outputs according to the type of clinic, each with a different weight. Changes in the composition of treatments— more or less qualified—are thereby captured. Quality adjustment is a very similar exercise. The social insurance office increased the quality of their benefit payment by acquiring more accurate and up-to-date information on the incomes of the insured. Before this was done, output was regarded as one type of output, afterward as another kind; they were also assigned different weights. Moreover, added features may be included as new outputs, for example, separate rooms at hospitals and lunches at school.

Sometimes quality may be transformed into quantity. The main output of

Statistics Sweden consists of several statistical products that remain fairly constant. However, their precision changes according to enlargement of samples or new sampling techniques. Most qualitative changes may be recalculated in terms of the size of the sample and measured as such.

Closely related to these ways of dealing with quality is the technique to discard all those costs associated with quality increase. The costs of health care, education, leisure activities, and some other qualitative improvements of prisons were excluded from total costs. These were considered as important improvements in prisons both from a humane perspective and from a therapeutic point of view. However, the effect on the tremendous productivity decline was negligible, and criminal recidivism remained unaltered.

All these methods produce output measures either that incorporate quality or that deduct the costs associated with quality. Of crucial importance when adjusting for quality, however, is what weights are used. More often than not the weights are unit costs or marginal costs associated with the change in quality. This practice rests on the assumption that those costs would not have been incurred had the qualitative increase not been valued at least as high as that cost. The measure of output in that case is biased downward. On the other hand, the rationality assumption might be totally false and the output measure could be biased upward.

Quality poses a measurement problem only insofar as it changes. One way of controlling for quality is merely to look for indicators that might tell whether quality has been changing. One may look at the effects of government programs, like health indicators, recidivism of criminals, scores in student achievement tests, and road traffic accidents. Of course, these indicators may be influenced by other factors than the quality of government output. The evidence must therefore be interpreted with care.

Throughout the study checks on quality were performed. Some indicated a definite quality increase, like road safety and precision in weather forecasts, that could not be incorporated in any reasonable way in the output measure. Most of the checks indicated no change, which made it possible to leave output measures as they were.

14.4   Other Methodological Problems and Their Solutions

I will now briefly mention some other methodological problems and how they were addressed in order that the reader may correctly appraise the results of the study that are to be presented subsequently.

Two aggregated measures for the government sector as a whole were presented: One covered the measured parts of the government sector, where each measured entity was weighted by its cost share in 1980. Another was for the government sector as a whole, where measured entities were weighted according to the share of public consumption that the purposes they represent commanded. Aggregation for the government sector as a whole was undertaken

only for the period 1970–80, where the coverage was best. The two measures for the sector as a whole came out almost identical. This is in large part due to the 70 percent coverage of the measurements. Therefore, only the latter, representative, productivity measure is presented in the following.

The denominator in the productivity expression has been calculated along the lines of the national accounts. For some branches the cost is set equivalent to public consumption in fixed prices. It includes depreciation of capital but no interest charge. For others the cost in fixed prices is calculated from costs in nominal prices deflated by implicit price indexes for various inputs in the national accounts. Deflating costs by the consumer price index would have produced different results.

Sensitivity tests have been performed in very many ways. Different ways of measuring output, different systems of weights, different deflators, and so on, have been tried. Of course, results are influenced, but on the whole the results are quite robust for variations that are reasonable and compatible with the general approach. Needless to say, the quoted figures are not exact. An interval of ±0.5 percentage points should be added to the stated figures on the average yearly growth rate of a sector. In the aggregate the confidence interval is likely to be smaller.

14.5   Productivity in the Government Sector of Sweden 1960–1985

This study is unique in that it covers a very long period of time, 25 years, and most of the government sector, whether national, county, or local.[1] The 1960–85 time period includes those years in which the large public sector, the welfare state, was created in the industrialized countries. There are reasons to believe that the patterns that emerge in the Swedish Report are indicative of what has been going on in other countries as well.[2] What we are witnessing is not some special political effect of a social democratic regime.

1. References, necessarily in Swedish, are given to all separate studies in the reference list.
2. For the Netherlands there is a study that resembles the Swedish (Goudriaan, de Groot, and van Tulder 1987). It covers the period 1975–83, 56 percent of the government output–32 large, publicly provided services within the six subsectors: ten health services, seven types of education, five social and cultural services, three modes of public transport, four services of the police and justice system, and three executive branches of the tax and social security administration, and costs are deflated by consumer prices. In eight years costs per unit increased on the average by 4 percent.
    In Denmark partial analyses of local public services point in the same direction (Mikkelsen 1982).
    The conclusion from ad hoc studies for a few areas in the United States is that state and local government productivity has remained stagnant or decreased over the past several decades (Fisk 1983).
    Crude labor-output relations over the years 1960–80 for a few public services in some industrialized countries indicate productivity decrease (Maddison 1984).
    The only puzzling exception is the U.S. federal government, which, since 1967 and up to 1986, has recorded a yearly productivity increase of 1.5 percent. Measurements cover two-thirds of the employment, are made to a large extent on an intermediate level, and outputs are related only to labor inputs (Bureau of Labor Statistics 1988).

Table 14.3   **Productivity Growth in the Government Sector of Sweden 1960–1980 (yearly change in percent)**

	1960–65	1965–70	1970–75	1975–80	1970–80
General administration	. . .	− 3.7	− 5.5	+ 4.5	− 0.6
Justice & police	. . .	− 2.7	− 6.1	+ 3.1	− 1.6
Defense	. . .	. . .	− 0.1	− 1.0	− 0.6
Education	− 3.2	− 6.3	+ 0.2	− 3.2	− 1.5
Health care	− 3.6	− 3.7	− 1.4	− 2.2	− 1.8
Social security	− 0.4	− 2.6	− 4.8	− 0.2	− 2.5
Social welfare	. . .	. . .	− 2.8	− 0.4	− 1.6
Community planning	. . .	. . .	+ 0.2	− 8.9	− 4.5
Libraries	− 4.9	+ 3.0	+ 1.1	− 1.8	− 0.3
Economic services	+ 1.5	+ 2.1	+ 0.1	+ 0.4	+ 0.2
Total	. . .	. . .	− 1.4	− 1.6	− 1.5

Table 14.4   **Productivity Growth for Selected Branches of the Government 1980–1985 (yearly change in percent)**

Branch	Growth
National government administration (1980–83)	3.5
Primary schools	− 0.3
Secondary schools	− 1.8
Colleges	− 1.7
Health care (1980–84)	− 2.2
Social welfare (1980–84)	+ 2.0
Libraries	− 2.9

I will now discuss results from the Swedish study, as presented in tables 14.3, 14.4, and 14.5. The general picture of Swedish public-sector productivity is one of decline. With few exceptions, all the studied government branches and individual agencies show a negative productivity change. In business it may happen that the productivity of a branch decreases, but only for a short period of time. After such a period, forces are set in motion—that is, competition—to correct the course, and the branch gets back on the track of productivity increase. In government production the reverse seems to be true: productivity may increase, but only for short periods of time. Then it is typically followed by continual productivity decreases.

There are exceptions, but they are few: the National Agency for Roads (the main part of economic services), the Board of Customs, the National Housing Board, the Meteorological Institute, Statistics Sweden, the Salaries and Pensions Board, and county-council-operated psychiatric care. These activities have experienced a positive productivity change on the average throughout the period.

Over time there are some sparks of light. The productivity of the national

Table 14.5   **Productivity Growth in the National Government Administration, 1960–85 (yearly change in percent)**

Agency	1960–65	1965–70	1970–75	1975–80	1981	1982	1983	1984	1985
National Labor Market Board	− 1.9	− 7.4	− 3.5	1.9	22.8	13.1	2.4	− 2.9	
National Housing Board	5.0	− 0.6	6.6	2.0	5.2	− 8.2	2.9	− 1.3	
Courts	− 5.4	− 0.9	1.3	2.8	− 1.2	11.2	− 0.9	− 0.2	− 3.0
Prisons	− 5.6	− 6.0	− 11.0	0.3	− 0.2	3.2	− 9.7	− 4.5	
Enforcement service		− 4.1	− 4.9	3.1	0.8	3.4	− 5.8	− 3.0	1.3
National Board of Agriculture	− 5.0	− 1.6	0.6	1.1					
National Land Survey	− 4.0	0.3	− 2.9	2.5	− 2.3	5.8	− 1.3	4.0	7.3
Police		− 1.8	− 6.2	3.6	− 0.5	3.7	− 3.6	0.9	− 5.5
Social security	− 1.0	− 2.6	− 4.8	− 0.2	− 0.7	0.2	3.5	3.8	
Tax administration	− 2.9	− 7.1	− 6.4	5.1	10.9	2.9	− 1.3	− 12.0	− 6.7
Board of Customs	5.0	5.2	− 4.3	4.1	− 0.5	4.3	8.9	2.0	− 4.4
Meteorological Institute	− 3.1	4.2	− 3.7	4.7					
Patent & Registration Office			− 4.3	− 3.2					
Statistics Sweden			2.4	1.0					
Salaries & Pensions Board (not included in the aggregate)				1.2	3.6	2.4	8.3	− 0.5	− 0.5
Total	− 2.0	− 3.3	− 5.2	2.5					

government administration plunges very deep in the years 1960–75, but from 1975 and on, there is a marked increase in productivity (tables 14.4 and 14.5). Social welfare turns from productivity decline in the early 1970s to productivity increases in the early 1980s.

Studying the trends more closely, one finds a very definite relationship between the growth of output and the rate of productivity change. A faster increase in output is connected with a lesser decline of productivity or even with an increase in productivity. We can also see that there are instances when agencies have absorbed large increases in work loads despite an unchanged capacity, indicating that they have had an excess capacity. For example, the employment agency managed to handle a 23 percent increase in the number of job seekers in 1981 with constant resources.

Decreases in output invariably lead to declining productivity. Resources are not cut back in proportion to diminishing work loads, if at all. In the 1980s there are some examples of national government agencies that manage to decrease inputs in relation to a decrease in outputs, for example, the housing board, the enforcement service, and the social insurance offices.

The sluggish response of government production units has been observed by many others. It causes substantial cost increases because "demand" for, and output from, the public sector varies a great deal. This we now know, thanks to the studies performed on public-sector output. The pattern of demand is very clearly countercyclical. Increases in demand, for reasons to be investigated by future researchers, take place in periods of recession; demand stagnates in periods of boom. This increases the cost of sluggish response in adjusting the resource requirements.

In addition to different conditions of survival, are there different demands on private and public organizations that explain the sluggish response? When facing a rising demand, a private firm may either raise the price or refuse to serve some customers if production capacity is not adequate. A public organization cannot do that. It does not control price. It has an obligation to serve and treat all alike. There is a case for running the show permanently with excess capacity, but not with a continuously growing excess capacity, which is what the productivity decline seems to indicate.

What characterizes those activities that have had a long-run increase in productivity? Roads have had the most spectacular growth in demand. Output, measured by vehicle miles, has risen steadily with an average of 4.5 percent per year. This, plus the technical advance in road construction and maintenance, should be enough to boost productivity to the highest levels. It is a real surprise that productivity under these circumstances increases by only 0.4 percent per year. It makes a great difference whether capital costs are included or not. If costs are calculated as the sum of consumption and investments, productivity increases at roughly 4 percent per year. But this is due to a sharp decline in road investments. If, instead, depreciation on the accumulated capital stock is included (as it should be), the rise in productivity almost disap-

pears. An increase in quality in terms of safer roads and roads that save fuels, time, and wear and tear is not included in the measurement.

The board of customs has also faced a steadily rising demand of 3–4 percent per year in the number of shipments to be declared, and the number of vehicles and passengers crossing national borders. But there are also examples of radical changes in work styles. In addition to the previously mentioned introduction of a self-declaration system, Sweden and its neighbors share the responsibility for border control. These changes in work style show up in a productivity increase.

Periodically there has been a large increase in the demand for meteorological forecasts. A large part of the production is sold on an almost commercial basis. Production has been heavily computerized. This shows up in a productivity increase, but only of 0.5 percent per year. The importance of computerization lies in dramatically increased capacity to process large amounts of information, which has resulted in more correct prognoses.

In conjunction with massive housing programs, the output of the housing board in terms of mortgages handled has increased steadily at a rate of more than 5 percent per year. For some reason this agency has not received much political attention and consequently not much resources. Very little technical change has taken place. The central part of the agency has diminished in relation to the local parts. Increased productivity of around 3 percent per year is best interpreted as the exploitation of economies of scale.

Even in-patient psychiatric care at hospitals has expanded strongly in the period, at roughly 5 percent per year, measured as the number of patients admitted. The productivity increase of 2.2 percent per year originates out of a shortening of the average length of stay from 300 days to 100 days, mainly because of the use of psychiatric drugs, that is, an example of technological advance.

It is very difficult indeed to see in what way these areas differ fundamentally from other areas of government production. They have all experienced a strong expansion of demand, but so have some other areas. It is evident, though, that a strong increase in output helps productivity growth. The question remains, What makes productivity decrease? From economic theory it is very difficult to deduce the causes of technological retrogression.

Of course, there is the possibility that there are diseconomies of scale and an increasing marginal cost of output. Because production in the government sector more often than not is organized by a single producer, it might be especially susceptible to diseconomies of scale. In addition to too-large production units there is the diseconomy of stretching government programs to cover ever-larger proportions of the population. Travel assistance to the handicapped and the elderly is less costly to organize in densely populated areas. The costs increase as this service is offered in more sparsely populated areas. The cost of secondary education increases more than in proportion to the number of students as enrollment approaches 100 percent. Reaching the very last

households with TV programs is very costly in relation to average cost, clearly. This hypothesis needs to be tested empirically.

Another hypothesis is that regulation has increased within government operations and that this has caused a falling productivity. The productivity increase of the National Housing Board is evidence that this need not be so. Its operations have been bounded by an ever more complicated legislation. General regulation in areas such as environment, employment, and taxes should have harmed the private sector as well, but we see no sign of that in terms of productivity decline. Shortened work hours do not in themselves cause productivity to decrease, because we have deflated costs with an index of the effective wage rate. However, indirectly this might increase costs, for example, by raising the number of square meters of office space needed per employee. This should happen in private and government organizations alike. But we know that government organizations utilize a lot more office space than private organizations, in for example, dentistry, schools, hospitals, and consultancy.

An hypothesis connected with the former is that agencies do not adapt their input mix to changes in relative prices of inputs. This is either because of general lack of cost consciousness or because of detailed regulation regarding what inputs to use. Such a hypothesis is not supported by evidence from the study of state agencies. In the aggregate of these agencies there is a substantial change in the input mix, and it is in line with the changes in relative prices (see table 14.6). The labor share diminishes from 81.4 percent in 1960 to 73.7 percent in 1980, while, for example, office space increases from 4.1 percent to 10.0 percent. At the same time, wages increased by 456 percent and rents by 300 percent. For all but one agency the growth in labor productivity is larger than that in total factor productivity. This demonstrates, contrary to this hypothesis and some popular beliefs, that state agencies do plan their resource mix in accordance with the relative prices of inputs and that there are possibilities for input substitution.

Most importantly, though, is that the measurements of output in the government sector might have missed an important qualitative improvement of the services. All the studies made serious efforts to detect qualitative change. But,

Table 14.6   **Input Shares and Price Change on Inputs (%)**

	Input Shares		Price Change
	1960	1980	1960–80
Labor	81.4	73.7	+456
Intermediary inputs	14.3	15.0	+400
Office space	4.1	10.0	+300
Capital	0.2	1.4	+257

of course, they are hampered by a lack of data. As far as one may judge from the evidence at hand, though, the qualitative changes left out ought not affect the conclusions dramatically.

The most difficult area to judge in this respect is health care. In order that the 3 percent decrease in productivity be compensated by a quality increase the value of the health-care services must on the average be twice as high in 1985 as they were in 1960. Although the measures employed capture some elements of quality like the shortening of hospital stays and the shift of work loads from more costly clinics to less costly, there are shortcomings in the measures of output. We know of spectacular advances in medicine in very narrow disciplines that have not been accommodated. We know that the measurements of output would be better if made in diagnostically related groups; then we would, for example, capture the productivity increase in the treatment of ulcer with drugs instead of by surgery. But over the period there are no clear signs of improved health, fewer sick days, or longer life expectancy, and so on. This is astounding, because it is not only a matter of the quality of health care but should also be influenced by the massive quantitative increase in output—roughly 65 percent from 1960 to 1985. Have conditions that influence health really undergone such a dramatic deterioration?

In education one source of decreasing productivity is claimed to be the diminishing size of classes. Also, it is claimed that decreasing the student-teacher ratio should be a qualitative improvement (although educational research does not support that contention). There are some studies of student achievement that roughly cover the period of investigation, and they show no sign of improvement.

Qualitative changes in social welfare services have been investigated thoroughly in connection with the Swedish study particularly in two areas: child care and elderly care. A host of qualitative indicators has been analyzed, but with no definite answer.

And so the story goes. In area on area, with few exceptions, there is no evidence of a qualitative change that would upset our measurements. Enforcement services collect slightly less SEK out of what they should collect; criminals go back into crimes to the same extent after treatment in prisons; crimes committed continue to increase despite an increased police output; and so on.

Except for in the areas mentioned there is no evidence to support the belief that quality has increased. This is a bold statement, and it needs reexamination from another point of view. Agencies often point to added features of the output. At the hospitals, patients are nowadays lodged in rooms of their own or in smaller groups than before. Citizens today receive advance notice that their passports expire. These are examples of valuable improvements in output. There are many more.

An hypothesis is that the increase in costs and lowered productivity may have been caused by a proliferation of added features of government output. Because there is no real market—but the willingness of the politicians to raise

the taxes—in which to test the value of the products, new features and new products may be launched even if their value is far below the added cost.

Substantial effort has been put into investigating this issue. One case is that of prisons. It has been said that costs have increased because of a series of improvements, like the introduction of vocational training, leisure activities, extra costs incurred with more lenient rules for prisoners to leave the prisons temporarily, and so forth. Interestingly enough, the costs that were identified by the prison authorities were of a rather smallish nature. Out of a total increase of unit costs by 252 percent these costs were calculated to add 28 percentage points. The investigators identified other sources of cost increase that were much more important (see table 14.7). Fewer clients per supervisor added 38 percentage point and reduced crowdedness 35 percentage points. However, the main part of the cost increase remained unexplained.

Libraries are another example. It has been contended that libraries nowadays are much more than book-lending machines. They serve the general public with information, they arrange cultural events, they serve as public sitting rooms where people go to read newspapers. The extra cost for these by-products is, however, estimated at only 3 percent of total operating costs of libraries. It is negligible in relation to the 25 percent decrease in productivity.

If classes in primary schools had not become smaller productivity would still have declined -1.7 percent per year. Not accounting for this "quality increase," productivity dropped -2.8 percent. Excluding the cost of increased room standard at hospitals reduces the productivity decline by 0.1 percent per year. Hence, although the costs incurred from added features on occasion may be quite impressive, they are far from explaining the long-run productivity decline.

What other causes of productivity decline are there? Excess capacity is one piece of evidence that slack exists. Another is the productivity increase brought about by less lenient budgetary appropriations to state agencies that occurred in the period 1975–80. It is very difficult to pinpoint slack in an organization, because it does not show up with personnel just sitting around doing nothing. Slack may just as well consist in a hectic life at the workplace, because of disorganization and inappropriate priorities. It is not until people in the organization receive a clear understanding of what their goals are that it

Table 14.7   **Prisons, Unit Cost Increase in Fixed Prices, 1960–1980 (%)**

Total cost increase	+ 252
Of which:	
Vocational training, health care, leisure activities, permissions to leave	+ 28
Reduced size of prisons	+ 10
Reduction in the number of clients per supervisor	+ 38
Reduction of crowdiness	+ 35
Unexplained	+ 141

becomes possible to organize the work in a suitable way and to make the right priorities.

Even in such a labor intensive business as child care there may be slack. This is exposed by large differences in unit costs among different day-care centers. The range may be up to 50 percent and increases when it is calculated on hours of child care instead of the number of places. Also, comparing the actual number of people at work, including all kinds of personnel, with what has been recommended nationally disguises a slack of 45 percent.

14.6   Some Tentative Conclusions

We may conclude that there has been a long period of productivity decline in the public sector of Sweden. This period coincides with the buildup of the welfare state. Being able to measure outputs instead of just inputs, we may observe that there has been a real expansion of government services, but not in proportion with the increase in resources spent. Productivity decline means that services become more costly. We have measured only the average cost. Measurement of the marginal cost of output would have shown an even steeper upward slope.

It might be said that our measures understate the increase in output by not capturing qualitative improvements, added features, and new products and that they do not include the advantages of an improved allocation of outputs in relation to effectiveness or values of services. But if that is so, we must conclude that when our measures of output are compared with the ultimate state of affairs—that is, with the general health of the population, the attainment of students, the crime propensity, tax receipts per SEK spent on tax administration, and so on—output seems to be less and less effective.

The reasons for the general productivity decline seem to be a blend of sluggish response in resource use to variations in demand, in diseconomies of scale, rising marginal costs of government programs as they are made more comprehensive, additions of new outputs and features with little effectiveness, and increasing slack.

All these reasons are susceptible to manipulation. Beginning in 1975, the state government embarked on a fiscal policy of selective restraint. Although the budget deficit exploded at that time, state government agencies were forced by, on the one hand, less permissive appropriations in real terms—a substantial wage inflation occurred at the time—and on the other hand, by a rapid increase in demand (work loads) to increase productivity. In the 1980s these agencies experienced zero growth of real resources. Public consumption of local governments grew at a faster rate than of the state government in the late 1970s and in the beginning of the 1980s. Productivity continued to decline, though slightly less in schools, and there was in fact a productivity improvement in social welfare services. In health care productivity declined at an unchanged speed.

The achievement is also discouraging in comparison to the private service industry (table 14.8). Private service industries as measured in the national accounts may have a 1–2 percent increase in productivity per year.[3] Some public sector services belong in fact to the private sector in that they are financed on a commercial basis. Those branches with a large public share are shown separately in table 14.8.

Two of the branches have experienced a long-run positive productivity development—transportation and telecommunications. In transportation there is a fairly large share of private firms, enough to make competition real. In telecommunications there have been strong technological developments, but there are reasons to believe that a large part of the productivity increase stems from economies of scale or scope. The other branches are housing, with a majority share of public housing and heavily regulated, postal services (100 percent public) and sanitation, water and sewage (mainly public). The Swedish study found productivity decreases for all three branches. This reinforces the impression of a specific productivity problem in the public sector.

14.7   Some Macroeconomic Implications

The aggregated productivity decline for the public sector in Sweden in the 1970s is − 1.5 percent per year. Is this sufficient to cause any alarm?

In table 14.9 the productivity decline in the 1970s is used to recalculate the GNP. The figures sum up to the conclusion that GNP rose 25 percent less than officially recorded if account of the productivity decline is taken. The officially recorded growth is 2.0 percent per year. Decreasing the growth of public consumption by 1.5 percent yearly reduces the growth of GNP to 1.5 percent per year.

Knowing that the change in value-added productivity and total factor productivity come out almost alike when the share of intermediary inputs is small, one might recalculate GNP in value added terms taking the change in total factor productivity to be equal to the change in value-added productivity in the public sector. Another way of doing this is to calculate the change in value-added productivity in the public sector by setting the value of its output equal to the unit cost in 1980. It produces exactly the expected result. In particular, the decline of value-added productivity in the public sector as a whole is somewhat larger, − 1.8 percent per year over the period 1970–80.

Accumulating the increased cost of the public-sector production, due to decreased productivity, to borrowing requirements and adding to that also an interest charge of 10 percent—all in nominal terms—adds up to 106.7 billion

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3. There are deficiencies in the measures of output of the private service industry that may make many of those of the public sector in the Swedish report compare quite favorably. Note that the measured productivity in table 14.8 is not value-added productivity, but, in line with all other calculations, total factor productivity. In comparison this measure of productivity produces smaller variations than value-added productivity.

Table 14.8   **Productivity Growth in Private Services, 1965–1980 (yearly change in percent)**

	1965–80
Total	1.1
Of which:	
Transportation	2.2
Postal services	− 1.5
Telecommunications	1.3
Housing	− 1.1
Sanitation, water, & sewage	− 0.7

Table 14.9   **A Recalculation of GNP, 1980 Prices (billions of SEK)**

	1970	1975	1980
Private consumption	230.892	259.903	270.049
Investments	113.590	121.556	111.891
Export-import	− 23.429	− 19.827	− 9.997
Public consumption, assuming:			
Constant productivity	111.594	129.914	153.156
Productivity decline 1.5% per year	17.774	10.646	. . .
GNP, assuming:			
Constant productivity in public consumption	432.647	491.546	525.099
Productivity decline of 1.5% per year in public consumption	450.421	502.192	525.099

SEK. During the 1970s the state government debt increased by 192 billion SEK. We may conclude that the productivity decline caused more than half of that.

The increased cost of production is 21 billion SEK. One can add to that 8.6 billion SEK of added interest payments on the accumulated state government debt. Had these costs not been incurred the tax ratio could have been lowered from 49.5 percent to 43.8 percent of GNP. In addition to this impressive amount, there is the deadweight loss of taxes.

This exercise in calculation leads to a final conclusion. Suppose output measures have completely neglected quality improvements and that productivity has in fact been constant or even increased. Of course, this would affect the rate of growth. However, the effect on the tax rate would be the same: quality improvement must be paid for just as well as productivity decline. Therefore, we may conclude, that this development, no matter whether it is caused by productivity decline or by quality improvement, cannot go on very

much longer. The development of the welfare state undermines its own foundations. Either taxes must be raised continuously or the volume of output must be reduced, implying that some people will not be served. With present day resources the -2.2 percent productivity decrease in health care implies that in 20 years only two-thirds of the patients may be treated.

Despite its shortcomings the Swedish study has provided many valuable insights into the public sector. It seems to be the case that the public sector generally, but with notable exceptions, has a mounting problem of production efficiency. This observation has caught political attention and administrative solutions are to a large extent sought in the application of output measurements and productivity monitoring along the same methodological lines that the study employed.

The study has made quite clear the implications of declining productivity in the public sector for the Swedish economy as a whole. It has shown that it is both conceptually and practically possible to incorporate the public sector within the national accounts on a more realistic basis than on the zero-productivity-change assumption. This requires, though, that one sticks to the original purpose of national accounts—that of describing production—and abstains from ambitions to measure the well-being of nations. Of course, there are many improvements to be made in the measurements of public-sector outputs, just as there are improvements to be made in the measurement of private-sector outputs.

Appendix A
Sample of Output Indicators

Branch	*Indicator*
Health care	Patients admitted
	Outpatient visits
	Bed days for inpatients
Education	Hours of attendance at school by pupils
Social welfare	Children admitted to day-care centers
	Hours of care of elderly people
	Number of recipients of benefits
	Bed days
Defense	Hours of attendance at flight training
	Days of training of conscripts
Roads	Vehicle-miles
Public libraries	Book loans
Community planning	Volume of building construction

Labor market board	Job applicants
	Hours of attendance at training
Housing board	Housing loans processed
	Housing loans administered
Courts	Sentencing of offenders
Prisons	Internment places used
Land survey	Number of maps
	Revenue in fixed prices (deflated by user charges)
Tax administration	Income tax returns processed
Enforcement service	Proceedings
Board of agriculture	Consultations with farmers
	Inspections carried out
Customs authorities	Customs declarations
Social insurance offices	People insured
	Number of disbursements
Police	Crimes solved
	Patrol hours
Meteorological Institute	Prognoses made
	Revenue in fixed prices (deflated by user charges)

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