

# Public service productivity estimates: frequently asked questions

## What is productivity?

Productivity is output divided by input. For example, in a simple case where output consists of only one good, say steel measured in tonnes, and there is just one input, say labour measured in hours, productivity would be the number of tonnes of steel produced per hour. In more realistic cases, there are usually many outputs and inputs that have to be added together. Outputs, inputs and productivity are produced as indices that show the change relative to a base year in which the index is set to 100. Movements in the productivity index show how total output is moving relative to inputs.

## Does productivity measure value for money?

No. But it does provide important relevant information. What end-users or government has to pay for an output depends broadly on two considerations. The first is how much input is needed to produce a unit of output. The greater productivity is, the less input is needed to produce a given amount of output. So rising productivity can be an indication of a reduction in inputs and associated costs, leading to a reduction in what end-users have to pay. What end-users actually have to pay depends also on how much the producers of the output have to pay for the inputs they use. What end-users pay may remain constant with greater productivity if the cost of inputs rises.

Returning to the simple steel case above, the cost of a tonne of steel depends both on how much steel is produced in an hour (productivity) and how much you have to pay for an hour of labour.

## Does productivity measure efficiency?

Yes, up to a point. What a productivity measure shows is how much input is needed to produce a given quantity of output. What a single measure cannot show is whether this is the best that could be done with current technology, that is, whether existing practice is best practice. Answering that question would require finding out what best practice is, which would involve detailed service-based analysis. But if existing practice changes over time to get closer to best practice, then this would show up as a rise in productivity.

## How do we measure output of individual public services?

Public services are usually provided free of charge to households, so there is no market in which the cost of a given quantity of service is provided through a market transaction.

We use data from administrative sources that records the amount of certain activities which make up the service output. For example, in healthcare, there are detailed records of health procedures carried out, broken down into well-defined Health Resource Groups (HRGs); in education, there are pupil attendance records separately available for primary and secondary education; for adult social care, there are records of numbers of people being looked after in care homes and of attendances at various day-care settings. For education and healthcare, these quantity measures are supplemented by quality measures.

## How do we add together different outputs to derive an index of overall output?

To get the overall output of goods produced in the market sector, national income accountants use the sum of the individual outputs weighted by their price in a given year. In this method, outputs with higher prices count for more in the total output than outputs with lower prices.

To get the increase in real output between two (consecutive) years, the output in the second year is weighted using the price of each output in the first year so the total output in both years is comparable. The increase in real outputs is found by subtracting the total output in the first year from the second year. Most public services do not have a market price to use as a weight, as they are not sold on a market. What we do in this case is find the cost of producing a unit of activity as defined above, and use these costs as weights instead of prices. To get the overall service output we add together the amount of each activity multiplied by their cost weight in the previous year.

## Do the output measures account for quality change?

The education and healthcare measures are adjusted for quality change. In education, this means we adjust the quantity measure in the light of information on changes in academic attainment. For healthcare, the activity measures are adjusted to take account of health gain, post-operative mortality, the age-mix of the treated population, patient experience and a measure of the proportion of people on GPs' lists who are receiving appropriate treatment for certain named conditions.

## Why adjust output measures for quality change?

In the market sector, higher-quality variants of outputs (for example, bigger and more luxurious cars) can be picked out. The higher-quality outputs sell for more than the lower quality because of the way the buyers value the higher quality. So quality is accounted for by the price differential.

This is much harder to do for public services because service users do not pay directly for the services, and there is no user-driven differential to use. We have therefore used quality adjustments based on how far outcomes can be attributed to the delivery of public services. These only apply in healthcare and education in current methodologies.

## **Do these public service output statistics measure simply what is produced by the public sector?**

No. They measure the amount of output/service the public sector either produces itself or buys in to deliver public services to households. For most areas of government spending, most of the output is produced by the public sector, for example, healthcare delivered in NHS hospitals or education delivered by state schools. However, sometimes the public sector provides services to households by buying in the service, for example, if the NHS uses independent treatment centres to deliver knee operations or cataract treatments. These outputs are also included in our figures.

## **What about services like defence that are not directly provided to households?**

It is difficult to find a sensible measure of activity for something like defence or police expenditure. For these services we follow the international convention that the amount of output produced is equal to the amount of input that is used up in this activity. This means that, by definition, productivity cannot change for these services.

## **What inputs do we measure?**

All inputs are measured:

- labour inputs, ideally measured in hours worked, are differentiated by type of labour, for example, we distinguish between doctors, nurses and other staff in healthcare, and between teachers and teaching assistants in education
- goods and services used up in production, such as heating and lighting costs, textbooks, bandages and dressings
- the cost to the government of the activities performed by private sector providers of healthcare, such as independent treatment centres or hospitals made available under the private finance initiative
- an estimate of the annual use of fixed capital assets, such as the school and hospital buildings and the IT equipment

## **How do we measure inputs into public services?**

For some labour inputs we can get figures of actual workforce numbers, for example, for the numbers of teachers.

For some areas of labour and all areas of goods and service and fixed capital assets, the quantity of inputs is not directly available. In these cases, we estimate the quantity of input by taking figures for total spending on an input area and dividing by an appropriate price index.

## How do we add the different inputs up to get an overall inputs index?

For the inputs for which we have direct quantity measures, for example teachers and teaching assistants, the input quantities are weighted by the full cost of using that kind of input. For those measured by deflating expenditure, the component parts have already been accounted for by the construction of the price index used to deflate. So, in effect, the inputs are added together using cost weights.

## Can we use these figures to compare public with private productivity?

The ONS public service productivity statistics refer to services provided to households through the agency of government. Some of these services may be provided by the private sector but paid for by government, for example, knee operations performed for the NHS by independent treatment centres. Moreover, these ONS statistics refer to total output (value added plus goods and service inputs) whereas most other published productivity estimates only look at value added. The closest to a direct comparison is to compare productivity growth in those industries, such as healthcare and education, where production is dominated by public sector producers, with growth in industries in the market sector, such as manufacturing, where production is almost entirely by private sector producers

## Can we use these figures to compare the efficiency of public sector production of public services with the efficiency of using the private sector to acquire those services instead?

To do this would require separate productivity figures for publicly produced and provided services on the one hand and the same service privately produced under contract with government on the other; for example, productivity figures for NHS cataract operations compared with privately performed cataract operations under contract to the NHS. Statistics are not available at a sufficient level of detail from the private sector, particularly on the input side, to be able to make this comparison.

## Can we use these figures to compare UK output with that of other countries?

Comparing the level of real spending, whether for the whole economy (gross domestic product (GDP)) or for components of expenditure, such as household consumption, in two (or more) different countries, has well-known problems. Simply comparing total spending by converting into, say, dollars at current exchange rates does not give a sensible answer, because the differences in prices between currencies need not be the same as the difference in exchange rates.

Alcohol in France, for example, is relatively cheap, whereas in Sweden it is relatively expensive. So alcohol in any common currency costs different amounts in the two countries. The solution to the problem is to calculate special "purchasing power parities" (PPPs) that take account of the actual price differences.

In public services, the problems are compounded by the fact that the quantity of activity in areas like healthcare is measured differently in different countries. So far, the Organisation for Economic Co-operation and Development (OECD), which leads on the calculation of PPPs, has effectively valued the inputs into public services (for example, using the earnings of health professionals, etc for healthcare) rather than the outputs. This may change in the future as output prices and costs are developed for measures of healthcare output.

### **Can we use these figures to compare UK productivity growth with that of other countries?**

Very few other countries calculate multi-factor productivity estimates (that is, not just output per person) in public services. As yet, therefore, no systematic comparisons are possible.