

6 Bibliography

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Appendix A: Alternative Definitions of Productivity

The UK's official productivity estimates

The current methodology used to measure productivity in the UK is reported in 'UK official productivity estimates: review of methodology', *Economic Trends*, September 2004. This appendix summarises the method used to construct the official measures and locates the measure used in the analysis presented in this report within the context of these measures.

Issues in measuring productivity

By 'productivity' here we mean simply a measure of the ratio of value added to labour input. This is to be distinguished from the growth in 'total factor productivity', which seeks to measure the increase in output that cannot be accounted for by changes in inputs (whether labour, capital or other kinds of input). The issues we are concerned with here relate to the measurement of the numerator, value added, and the denominator, labour input.

The treatment of value added is reasonably straightforward. The measure used is gross value added at basic prices. There are some difficulties in obtaining a measure of gross value added at fine levels of industrial or geographical disaggregation, because a 'reporting unit' for business survey purposes may cover a number of local units in different locations or sectors. Another difficulty associated with geographical disaggregation is that the UK regional accounts have typically produced estimates of value added on a 'residence' rather than 'workplace' basis (because a key data source was coded in that way), whereas our interest here is clearly in the workplace definition. A third difficulty with geographical disaggregation is that there are no official regional price indices, so that comparisons across regions are not adjusted for price differences, and there are no official inflation-adjusted time series for value added below the national level. However, none of these issues present difficulties for the present study, which is only concerned with national measures at a reasonably broad level of industrial disaggregation.

The main difficulties in measuring productivity relate to the treatment of labour input. The principal difficulties are:

- the measure of labour input most likely to be consistent with the measure of value added is the number of jobs reported in business surveys, but this headcount measure of labour input is distorted by changes in hours worked and the possibility that some workers have more than one job
- business surveys do not capture self-employment
- the Labour Force Survey, which surveys households, provides estimates of the number of workers (thereby avoiding the problem of double-jobbing) and the number of hours worked (avoiding the problem of changes in hours), but is not well-suited to industrial disaggregation (partly because the industry classification is self-reported by households and therefore less reliable, and partly because disaggregation would involve splitting workers with multiple jobs among industries)
- because it covers only a sample of households, the Labour Force Survey estimates become less robust as the level of required geographical detail increases
- estimates of actual hours worked are not regarded as very reliable, and are generally regarded only as indicative of changes over a long period of time

The official measures currently used The headline whole-economy productivity measures are:

- GVA per worker
- GVA per hour worked

In both cases GVA is measured at basic prices and converted to an index (selected year = 100).

In the case of GVA per worker, labour input is measured as ‘LFS workers’, ie a measure of the number of workers taken from the Labour Force Survey and covering employees, the self-employed, unpaid family workers, government-supported trainees and HM forces. It is also converted to an index.

In the case of GVA per hour worked, labour input is measured by the LFS measure of actual hours worked (converted to an index).

At the industry level, the preferred productivity measures are:

- ‘output’ (ie GVA) per job (sometimes called ‘per filled job’)
- ‘output’ (ie GVA) per hour worked

Again, in both cases GVA is measured at basic prices and converted to an index (selected year = 100).

The measure of the number of jobs is calculated in a special way, and for this reason it is referred to as ‘productivity jobs’. The calculation is designed to make use of the industrial disaggregation for employees available from business surveys, but to enforce consistency with the LFS measure of jobs. This is achieved by taking the estimate of the number of employees from business survey sources for each industry multiplying by a scaling factor so that the total jobs across industries equals the LFS estimate for employee jobs plus second jobs. For the other elements of jobs (ie apart from employees) the information mainly comes from the LFS.

There is an analogous ‘productivity hours worked’ measure, used as labour input for the output per hour worked estimate. This is calculated by taking LFS data on actual hours worked per job in each industry and multiplying by the productivity jobs measure. The result is then scaled to the LFS total hours worked. There are, therefore, two issues relating to the reliability of this measure: the reliability of the LFS estimate of actual hours worked, and the reliability of the industrial disaggregation of the LFS.

The treatment in MDM

In our modelling we require long and, as far as possible, consistent time series of employment at a detailed level by industry and region. We therefore use the business survey-based data for the number of employee jobs, and the LFS-based measure for self-employment. Our measure of productivity is GVA per job, but it differs from the ONS’s current methodology in that we do not scale the number of jobs to the LFS measure.

Comparison of the ONS and MDM measures

Over the period 1994-2004, the trend¹⁷ growth rate in the whole-economy MDM measure of jobs was 1.2% pa, whereas the trend for the ONS measure of productivity

¹⁷ Trend growth is calculated by fitting $\log(y(t))=a+b*(time)$ and converting from the exponential growth rate, b, to a conventional growth rate, g, using the formula $g=\exp(b)-1$.

jobs was 1.0% pa. Hence, the productivity estimate from the MDM data (1.6% pa) is slightly lower than the ONS measure of output per job (1.9% pa)¹⁸.

¹⁸ In principle the difference should be $1.2 - 1.0 = 0.2$ percentage points; this discrepancy is due to the fact that the trend growth rates reported above are fitted independently for each series, and so minor differences can arise.