

DEFINING AND MEASURING PRODUCTIVITY

Productivity isn't everything, but in the long run it is almost everything. A country's ability to improve its standard of living over time depends almost entirely on its ability to raise its output per worker.

Paul Krugman, *The Age of Diminishing Expectations* (1994)

Productivity is commonly defined as a ratio between the output volume and the volume of inputs. In other words, it measures how efficiently production inputs, such as labour and capital, are being used in an economy to produce a given level of output. Productivity is considered a key source of economic growth and competitiveness and, as such, is basic statistical information for many international comparisons and country performance assessments. For example, productivity data are used to investigate the impact of product and labour market regulations on economic performance. Productivity growth constitutes an important element for modelling the productive capacity of economies. It also allows analysts to determine capacity utilisation, which in turn allows one to gauge the position of economies in the business cycle and to forecast economic growth. In addition, production capacity is used to assess demand and inflationary pressures.

There are different measures of productivity and the choice between them depends either on the purpose of the productivity measurement and/or data availability. One of the most widely used measures of productivity is Gross Domestic Product (GDP) per hour worked. This measure captures the use of labour inputs better than just output per employee. Generally, the default source for total hours worked is the OECD Annual National Accounts database, though for a number of countries other sources have to be used. Despite the progress and efforts in this area, the measurement of hours worked still suffers from a number of statistical problems. Namely, different concepts and basic statistical sources are used across countries, which can hinder international comparability. In principle, the measurement of labour inputs should also take into account differences in workers' educational attainment, skills and experience. Accordingly, the OECD has started to develop adjusted labour input measures.

To take account of the role of capital inputs, an appropriate measure is the flow of productive services that can be drawn from the cumulative stock of past investments (such as machinery and equipment). These services are estimated by the OECD using the rate of change of the 'productive capital stock', which takes into account wear and tear, retirements and other sources of reduction in the productive capacity of fixed capital assets. The price of capital services per asset is measured as their rental price. In principle, the latter could be directly observed if markets existed for all capital services. In practice, however, rental prices have to be imputed for most assets, using the implicit rent that capital goods' owners 'pay' to themselves (or the 'user costs of capital').

After computing the contributions of labour and capital to output, the so-called multi-factor productivity (MFP) can be derived. It measures the residual growth that cannot be explained by the rate of change in the services of labour, capital and intermediate outputs, and is often interpreted as the contribution to economic growth made by factors such as technical and organisational innovation.

Against this background, a broad overview of productivity indicators is presented in four areas. International comparisons of economy-wide indicators of productivity growth are first presented followed by international comparisons of income and productivity levels, including a measure of productivity heterogeneity by enterprise size classes. Thirdly, productivity growth indicators by industry and services are examined. Finally, the impact of labour productivity on unit labour costs is discussed.

Unless noted otherwise, GDP refers to the total economy.