
G Retail productivity

G.1 What is productivity?

Productivity is a measure of how efficiently an individual business, industry or economy uses its resources to produce output. It can be measured as the ratio of outputs produced to the inputs used.

Single factor productivity accounts for one type of input only. Capital productivity measures output as a ratio to capital input whereas labour productivity measures output as a ratio to labour input. Single factor productivity growth serves only as a partial measure of how an economic entity has become more (or less) efficient because it does not take into account any changes in the use of other inputs. An increase in labour productivity based on hours worked, for instance, may not necessarily be due to more efficient use of labour, but may be due to increased use of other inputs such as capital, intermediate goods or human capital.

Multifactor productivity (MFP), on the other hand, is based on more than one type of input. It is measured as the unexplained or residual output growth, after increases in multiple inputs have been taken into account. MFP is often associated with technical improvement, which refers not only to technological advancement in the narrow sense, but includes more broadly, efficiency improvements from applied expertise or from ‘working smarter’ (for example, improving firm management strategies). Since it is a residual term, MFP will also capture all other factors which impinge on output growth such as efficiency gains from economies of scale.

G.2 Measuring output in retail

Retail is part of the distribution sector and the output it produces is not the goods which it obtains from wholesalers or producers and then on-sells to the final consumer; rather, it is the bundle of services in sourcing, displaying and selling those goods. As is the case with other service industries, improvements (or otherwise) in the *quality* of retail service (such as convenience to consumers) are often difficult to capture in output measures.

It is difficult to isolate the value of the retail services from the final price which a consumer pays for a good (Triplett and Bosworth 2004). Measures of retail output based on the retail margin (total sales less cost price of goods) assume that the margin is proportional to the value of the retail service to consumers. However, retail margins are influenced, not only by volume or quality of sales service, but also by such factors as the level of market competition and extent of economies of scale. Indeed, retail is a dynamic industry and its changes and innovations may not be captured by what is often a fairly stable real retail margin (Ratchford 2004). Nevertheless, retail margin serves as a starting point for measuring retail output.

In this report, the Commission uses a gross value added (GVA) measure of retail output. Generally, GVA refers the value of output produced in basic price terms (that is, less taxes plus subsidies), less the cost of intermediate inputs (which include materials, energy and business services used in the process of production, other than capital and labour). For the retail industry, this is equivalent to total sales, less the cost to the retailer of the goods sold, less intermediate inputs. A chain volume measure of GVA is used, which means that as far as possible, the effect of ‘pure’ price changes are removed so that all that is captured are quantum changes and, ideally, changes in quality.

G.3 Decomposing output growth

Growth accounting addresses the question of what contributes to output growth. It involves attributing percentage point growth in retail output to different inputs (labour and capital); the residual output growth, or MFP, represents how efficiently they are combined or managed. The contributions of labour and capital are determined by multiplying the rate of growth for each input by its income share. Estimates of these contributions and of MFP are based on the neo-classical Cobb-Douglas production function (see box G.1) and assume that there are constant returns to scale, and that capital and labour are paid according to their marginal products.

Box G.1 Growth accounting in a Cobb-Douglas model

In the Cobb-Douglas production function, output produced at time t (Y_t) is a function of inputs, capital (K_t) and labour (L_t), and A_t , which represents technical know-how:

$$Y_t = L_t^{(1-\alpha)} \times K_t^\alpha \times A_t$$

where α is the capital share and $(1 - \alpha)$ is the wage share.

Taking logs and the time derivative, *growth* of output can be represented as follows:

$$y = \alpha k + (1 - \alpha) l + a$$

where the use of the lower case denotes *growth* in income (y), capital (k) and labour (l); growth in the variable A_t , denoted by a , is multifactor productivity growth.

That is, output growth is the sum of weighted growth in capital and labour inputs, and MFP growth. The break-down of retail output growth into these three components is shown below in figure G.1.

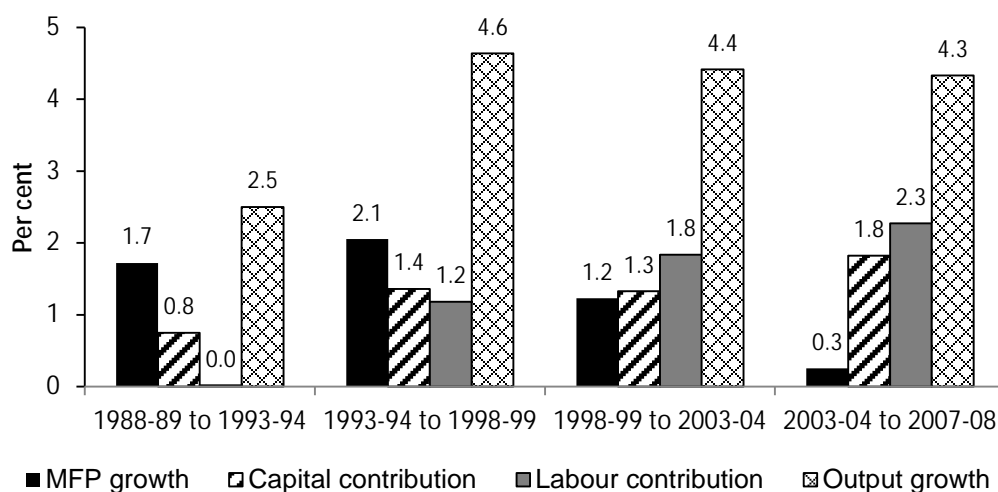
Labour productivity (LP) growth is equal to the growth in output minus growth in labour inputs. So rearranging the equation above,

$$LP \text{ growth} = a + \alpha(k - l)$$

That is, labour productivity growth is the sum of a or MFP growth and capital deepening, represented by $\alpha(k - l)$. This breakdown is used as the basis for analysis of productivity trends in chapter 3.

The contribution of labour and capital inputs to retail output growth over the ABS market sector productivity cycles is shown in figure G.1. Even though there has been a significant *growth* in capital inputs in the retail industry since the mid-90s (as shown in chapter 3), its *contribution* to output growth has been relatively less than that of labour input. Retail remains a highly labour-intensive industry, with a labour income share of around 70 per cent.

Figure G.1 Input contributions to retail output growth^{a,b}



^a Includes motor vehicle and parts retailing and fuel retailing. ^b Output growth is the sum of the weighted growth of capital and labour inputs and MFP growth. Figures may not add due to rounding.

Data source: ABS (*Experimental Estimates of Industry Multifactor Productivity, Australia: Detailed Productivity Estimates*, Cat. no. 5260.0.55.002).

Growth in MFP was the most important contributor to retail output growth during the late 1980s and 90s. Johnston et al. (2000) attribute this to immediate trends occurring in the sector at the time which include rationalisation, the adoption of ICT and associated innovations and improvements in supply chains. These changes were driven by a higher degree of competition and higher demand growth sustained by rising incomes.

Since then, MFP growth has slowed and has become a less significant contributor to retail output growth. The main drivers behind the output growth in the most recent period, 2003-04 to 2007-08, were the growth in labour and capital inputs. Data for the most recent years, however, suggest that this decline in MFP growth may have been overstated (refer to chapter 3, footnote 5). Since 2007-08, there has been some labour shedding by the industry which has over-shadowed the decline in output growth and, based on the data currently available, MFP growth has subsequently improved (ABS 2010e).