Box 1   Trends in capital formation and the capital stock

The estimation of the value of capital stock in an economy requires ample data sources and sound calculation practices such as described in the latest edition of the *System of National Accounts* (2008 SNA). This system provides a statistical framework for the calculation of a comprehensive, consistent and flexible set of macroeconomic accounts for policymaking, analysis and research. All new capital formation undertaken in a given period can be aggregated fairly easily given the availability of appropriate data sources. However, estimating the total value of a stock of assets with different characteristics and of different maturities requires more advanced estimation techniques.

The method most commonly used to derive estimates of consumption of fixed capital and the capital stock of fixed assets associates a stream of future earnings with the decline in value of a fixed asset used in the production process. It is recommended that independent estimates of consumption of fixed capital be compiled in conjunction with estimates of the capital stock. These estimates can be compiled from data on gross fixed capital formation in the past combined with estimates of the rates at which the efficiency of fixed assets decline over their service lives.

To compile estimates of the consumption of fixed capital requires estimates of the capital stock excluding the effects of price changes, even if no estimation of capital services or productivity measures is contemplated. The levels of the capital stock are typically derived by cumulating capital formation in successive periods and then subtracting the amount of capital that has been exhausted. It is not meaningful to aggregate estimates of capital formation at historical purchase prices since the effect of rising prices will overstate the amount of 'new' capital relative to 'old' capital. The preferred technique is to estimate all capital still in stock at the price of a single year and then to revalue this amount to the price prevailing at the end of the accounting period. This should be done at the most detailed level possible.
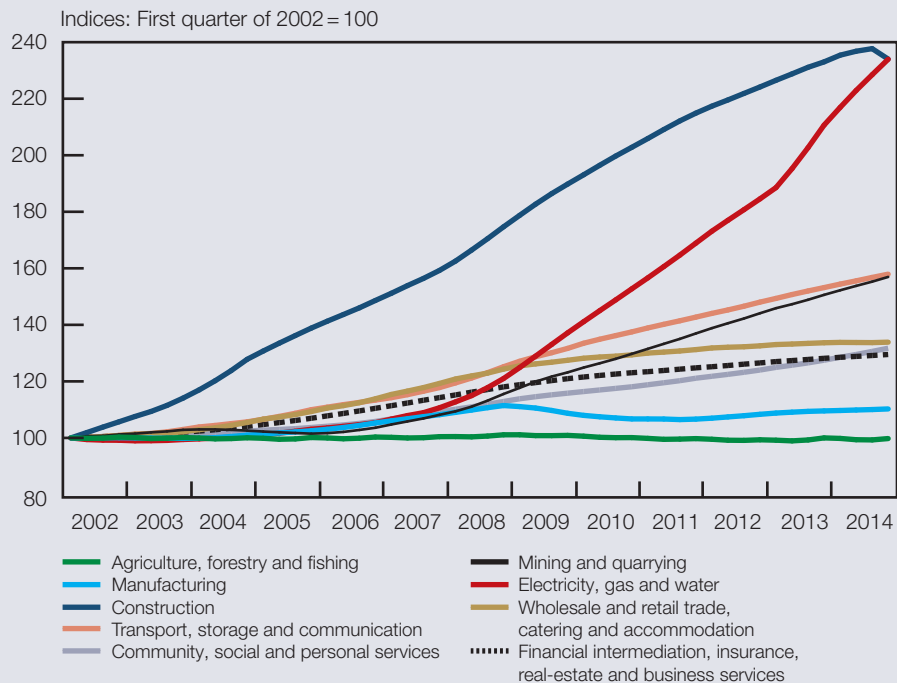
Consistent with the aforementioned estimation procedure, data published by the South African Reserve Bank indicate that real gross fixed capital formation in South Africa has more than doubled since 2000, amounting (at constant 2010 prices) to R622 billion in 2014. Real gross fixed capital formation in South Africa averaged R276 billion between 1960 and 2014, reaching an all-time high of R624 billion in 2013 and a record low of R75 billion in 1962, as indicated in Figure B1.1. A quarterly graph on this indicator is available in the national accounts rebasing and benchmarking supplement to this *Quarterly Bulletin*. In the supplement, various investment initiatives of a capital nature that were implemented over the years are being juxtaposed alongside the line indicating the evolution of fixed capital formation since 1960.

Figure B1.1: Real gross fixed capital formation
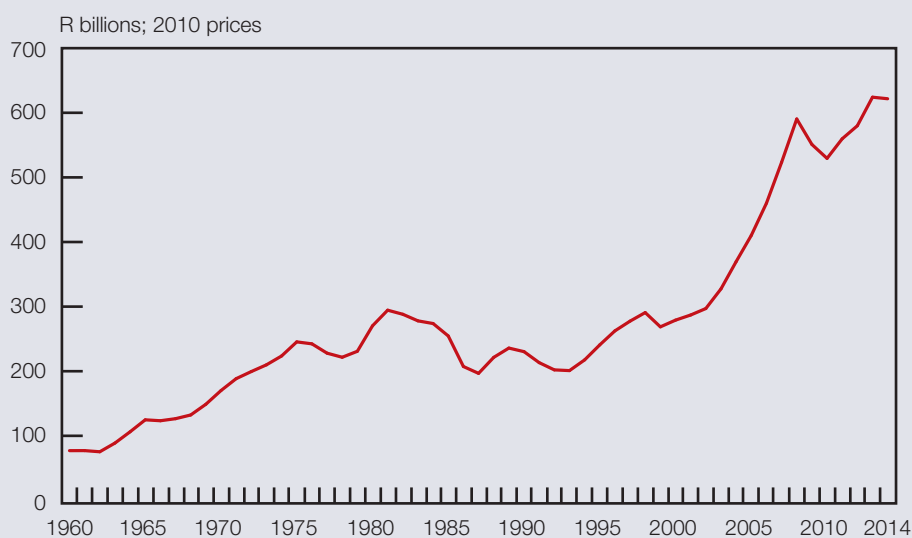
Estimates of the evolution of the real fixed capital stock in South Africa are also available for the different sectors in the economy, as indicated in Figure B1.2. Changes in the level of the capital stock differ considerably between the different sectors in the economy due to sector-specific influences impacting each sector uniquely. Gains in the real fixed capital stock in the construction sector, for instance, far outpaced that in any other sector in the economy during the period 2002 to 2014. Contrary to these gains, the level of the real fixed capital stock in the agriculture, forestry and fishing sector remained essentially constant over this period. This development does not augur well for increased agricultural output. Of similar concern is the stagnation in the level of the real fixed capital stock in the manufacturing sector since the financial crisis in 2007/08. Growth in the real fixed capital stock in the electricity-generating sector accelerated meaningfully from 2009 as Eskom engaged in massive investment of a capital nature in an effort to increase its generating capacity.
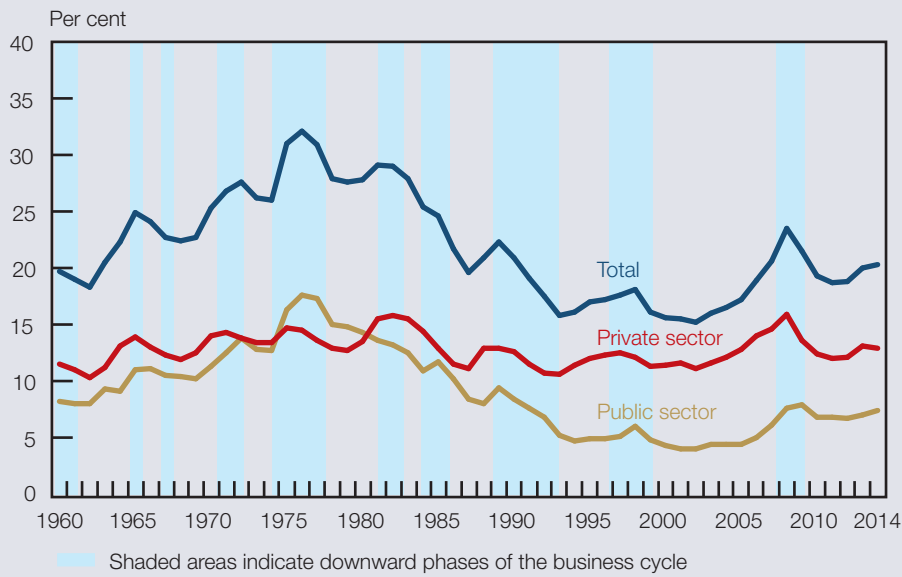
Figure B1.2: Real fixed capital stock

Indices: First quarter of 2002 = 100

Legend:
- Agriculture, forestry and fishing
- Manufacturing
- Construction
- Transport, storage and communication
- Community, social and personal services
- Mining and quarrying
- Electricity, gas and water
- Wholesale and retail trade, catering and accommodation
- Financial intermediation, insurance, real-estate and business services

Real fixed capital formation by the public sector, expressed as a percentage of gross domestic product, declined significantly from around 18 per cent in 1976 to around 4 per cent in 2001. Subsequently, this contribution doubled to around 8 per cent in 2009, again declining, on balance, to 7,4 per cent in 2014. The contribution of real fixed capital formation in the private sector has historically been more constant, fluctuating between 10,3 per cent in 1962 to 15,9 per cent in 2008, and averaging 12,8 per cent during the past 50 years. The average contribution of real fixed capital formation by the public sector to gross domestic product over this period is lower at 9,1 per cent. The average ratio of total real fixed capital formation to gross domestic product during this extended period amounted to 22 per cent, with the rate being somewhat lower at 20,3 per cent in 2014. Not surprisingly, this percentage has been cyclically sensitive, almost consistently declining during downward phases of the business cycle as indicated in Figure B1.3.

When expressing the capital-labour ratio, that is, an indicator that characterises the quantity of fixed production assets per worker employed in the production process, the uniqueness of the various sectors in the economy becomes evident. These differences between industries are the result of factors such as differences in production processes, in engineering and design features, and the different prices of fixed capital stock. Increases in the capital-labour ratio not only result from the introduction of new systems for the mechanisation and automation of production but also from the application of technology involved in the control of production processes. A rise in the capital-labour ratio is normally associated with increased labour productivity, more profitable production techniques, reduced unit costs, and an improvement in the quality of the final product that has been produced. Economic gains are maximised when labour productivity increases at a faster pace than the capital-labour ratio. Under such a scenario, the rise of the capital-labour ratio is accompanied by an increase in capital productivity.

Figure B1.3: Gross fixed capital formation as percentage of gross domestic product

Per cent

Total

Private sector

Public sector

Shaded areas indicate downward phases of the business cycle

Most evident from Figure B1.4 is the pronounced rise in the capital-labour ratio in the construction sector relative to that in the other sectors. This rise in the ratio resulted from capital investment in the sector taking place at a faster pace compared with employment gains in the sector. The community, social and personal services sector on the contrary has, on balance, experienced a decline in the ratio during the past decade, as investments in capital stock in the sector lagged that in other sectors in the economy. Following massive investment of a capital nature in the electricity, gas and water sector during the past five years or so, the capital-labour ratio increased substantially. Capital productivity in this sector will, however, only benefit once the new electricity-generating capacity invested in becomes operational in coming years.

Figure B1.4: Capital-labour ratio

Ratio

Agriculture, forestry and fishing
Manufacturing
Construction
Transport, storage and communication
Community, social and personal services
Mining and quarrying
Electricity, gas and water
Wholesale and retail trade, catering and accommodation
Financial intermediation, insurance, real-estate and business services