

PART I

Capital Stocks and Capital Services – Concepts

Chapter 2

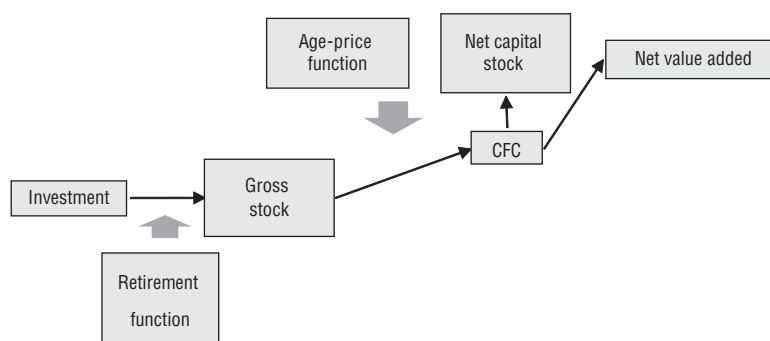
Introduction

One of the main objectives of the present *Manual* is to present an integrated and consistent approach towards capital measurement that encompasses different measures of capital stocks (gross, net and productive stock) alongside with the relevant measures of economic flows (investment, depreciation and capital services).

Capital stock featured in two places in the 1993 SNA, as part of compilation of balance sheets and as a tool to derive estimates of depreciation or consumption of fixed capital (CFC). How is gross capital stock estimated? Basically by cumulating gross fixed capital formation (GFCF) year by year and deducting retirements. Because it makes no sense to aggregate expenditures undertaken in different years without adjusting for the difference in prices between those years, all capital stock figures are in “constant prices”. These prices may be the prices of the current year, in which case past expenditures are adjusted to the current price level or may be expressed at the prices of a given year, usually the one which is the base year for constant price national accounts.

Retirements are calculated by postulating a life length or more precisely a retirement function that is applied to investment flows. When these investment flows, corrected for retirement are cumulated, one obtains the gross capital stock (Figure 2.1). Consumption of fixed capital or depreciation is calculated by superimposing a pattern of decline in value over this time. This is called an age-price profile or age-price function. The relevant factor for each cohort of assets is applied so that the aggregate stock figure reflects both the chosen price level and also the fact that similar assets of different ages have different values. This gives rise to the net or wealth capital stock.

Figure 2.1. **Capital measures in the 1993 SNA**



Once net capital stock figures on a consistent basis exist for two successive years, it is possible to calculate the difference between them and after deducting new investment and allowing for disposals, this is what appears as the estimate of CFC or depreciation as currently recommended in the SNA. All these calculations need to be carried out in constant prices.

In the 1993 SNA, there was no explicit link between capital stock and value added except the entry of consumption of fixed capital to explain the difference between gross value added and net value added. Yet it has always been recognised that operating surplus

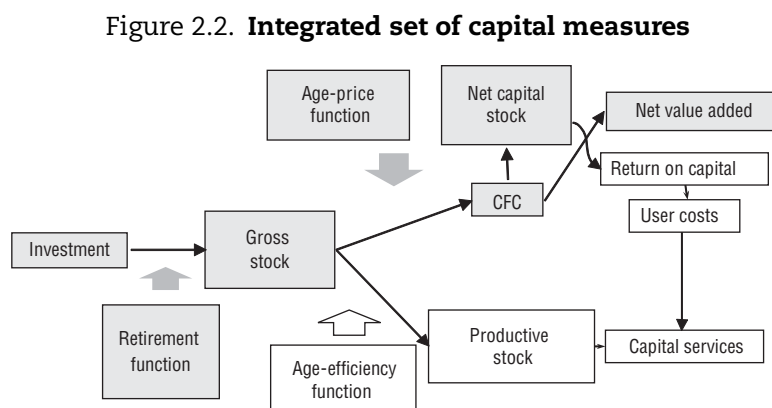
is income deriving from the use of capital in production just as compensation of employees is income deriving from the use of labour. There is increasing interest in exploring exactly how different levels and types of capital stock influence the level of operating surplus. This has led to more attention being paid to capital services because of its application to productivity studies. Capital services can be integrated with national accounts practice of determining depreciation in a way which allows for deeper analysis and possible improvements in the underlying data on capital stock.

Capital services and their price, the user costs of capital do not replace well-established measures like the net and the gross capital stock – they complement them.

Whereas the introduction of costs of capital services into the accounts has been of interest in itself, they should also be internally consistent with measures of the net capital stock so that the volume and price measures of capital services, depreciation and net income aggregates in the national accounts as well as balance sheets are fully integrated. This allows researchers and statistical offices to produce consistent indicators of multi-factor productivity (see OECD (2001a)) which are of significant analytical interest.

Figure 2.2 illustrates the additional elements that capital services bring into the picture. One important element is the age-efficiency profile or age-efficiency function which depicts an asset's loss in productive efficiency as the asset ages. When past investment flows are corrected for retirements and for the loss in productive efficiency, their cumulative value is the productive stock. Capital services, the flow of productive services from capital assets to production, are proportional to the productive stock and can be derived from the former. Finally, the price of capital services – its user costs or rental price – is estimated by combining information on the required return to capital, on depreciation and on revaluation. Given the price of capital services – the user costs – and the quantity of capital services derived from the productive stock, the total value of capital services can be computed. All this will be dealt with in much greater detail below but it should be underlined here that the total value of capital services brings together again the price and quantity side of capital measurement. Consistency between these two aspects of capital is therefore required.

Thus, capital services are not simply an add-on to measures of the net capital stock – they are its analytical counterpart that comes along with the two basic roles of capital – a measure of wealth and income and a measure of the contribution of capital to production.



The different measures of capital stocks and flows are directly related to these purposes, as shown in the table below. A more detailed description will be delivered later but a number of indications can be given immediately:

- The net capital stock measures the (market) value of capital, and is therefore a measure of wealth. Its evolution over time is governed by flows of investment and depreciation. A more telling terminology for the net stock is the “wealth stock”. The “net” language distinguishes the depreciated capital stock from the un-depreciated or gross stock. More on the net/wealth stock can be found in chapter Chapter 6.
- Table 2.1 shows no entry for the gross capital stock. This is because the gross stock, if computed at all, constitutes an intermediate step towards calculating the net and the productive stock rather than a stock measure in its own analytical right. However, the gross stock is a well-known statistic and more will be said in section 3.2. Chapter 4.
- The productive stock exists for each type of capital used in production. Past investment for every group of assets is cumulated after correcting for the efficiency loss that has occurred since it was new. The productive stock is first of all a vehicle to derive measures of capital services, the flow of productive services provided by capital during one period. Commonly, the assumption is made that the flow of capital services is in a fixed proportion to the productive capital stock – by implication, the rate of change of capital services can be read from the rate of change of the productive capital stock. The productive stock is discussed at greater length in Chapter 7.
- Despite two distinct perspectives, income/wealth and production/productivity, the two spheres are linked. For example, the depreciation profile is not independent from the efficiency profile and depreciation measures not only enter the net capital stock, they are also part of user costs that form the basis for aggregation weights of the productive stock.

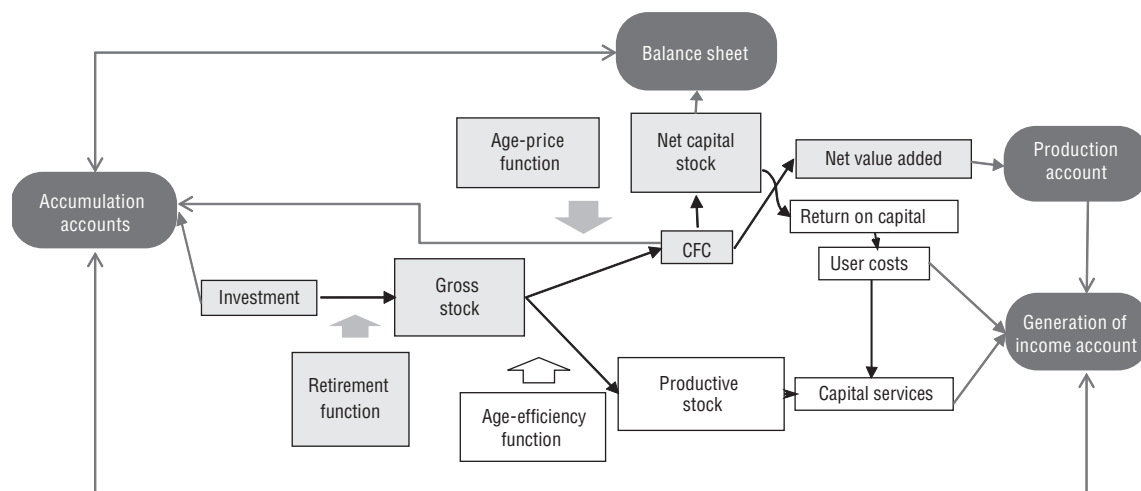
Figure 2.3 showed the various elements of an integrated system of capital measures. It is useful to go further and place this integrated system in the broader context of a system of national accounts, noting that capital services have not been recognised in the 1993 SNA and are not a compulsory part of the 2008 SNA. The basic links are shown in Figure 2.3. Stocks and flows of capital and investment appear in transaction accounts (production account and generation of income accounts), in accumulation accounts and in balance sheets. While most of these links have existed in the 1993 SNA, the proposed recognition of the value of capital services and their break-down into capital services prices and volumes in the generation of income accounts are new and described in greater detail in

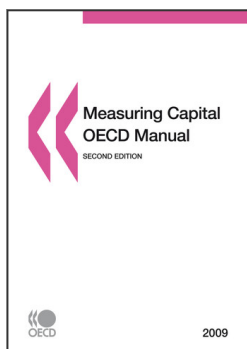
Table 2.1. **Two aspects of capital**

	Income and wealth perspective	Production and productivity perspective
Basic flow	Investment	Investment
Aggregation across assets of different age based on	Depreciation profile (Age-price profile)	Age-efficiency profile
Resulting stock for each class of assets	Net capital stock by asset type	Productive stock by asset type
Derived flow	Depreciation	Capital services by type of asset
Aggregation across different classes of assets based on	Market prices	Capital service prices
Resulting stocks	Total net capital stock	Productive stock for each type of asset
Derived measure	Balance sheet entry, national wealth, net measures of income	Capital services, multi-factor productivity

Section 16.1.1. A more detailed example of a system of stock and flow measures of capital that is fully integrated into a system of national accounts is given in Jorgenson and Landefeld (2006).

Figure 2.3. **Capital measures in a system of accounts**





From:
Measuring Capital - OECD Manual 2009
Second edition

Access the complete publication at:
<https://doi.org/10.1787/9789264068476-en>

Please cite this chapter as:

OECD (2009), "Introduction", in *Measuring Capital - OECD Manual 2009: Second edition*, OECD Publishing, Paris.

DOI: <https://doi.org/10.1787/9789264068476-5-en>

This work is published under the responsibility of the Secretary-General of the OECD. The opinions expressed and arguments employed herein do not necessarily reflect the official views of OECD member countries.

This document and any map included herein are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

You can copy, download or print OECD content for your own use, and you can include excerpts from OECD publications, databases and multimedia products in your own documents, presentations, blogs, websites and teaching materials, provided that suitable acknowledgment of OECD as source and copyright owner is given. All requests for public or commercial use and translation rights should be submitted to rights@oecd.org. Requests for permission to photocopy portions of this material for public or commercial use shall be addressed directly to the Copyright Clearance Center (CCC) at info@copyright.com or the Centre français d'exploitation du droit de copie (CFC) at contact@cfcopies.com.