

1993 SNA Rev 1 – Preliminary draft

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General Notes to the Readers of the Preliminary Draft Chapters

The preliminary draft of chapters of the 1993 Rev1 are posted on the UN web site at <http://unstats.un.org/unsd/sna1993/draftingPhase/ChapterIssueMatrix.asp> for a period of 60 days during which comments from anyone interested in the SNA are welcome. It is hoped that members of the Advisory Expert Group (AEG) and national accounts staff in countries will be particularly willing and eager to offer comments. The preliminary draft will be revised in light of these comments to form the final draft. Because of the tight time table to produce the final draft, readers are informed that deadlines for comments cannot be extended. The deadline for each chapter is given on the page specific to each chapter

A comparison between each draft chapter and the corresponding chapter (if it existed) of the 1993 SNA is available. See the second section of this web page entitled "Reference text of the 1993 SNA"

In the draft chapters, definitions of national accounting concepts and terms are in bold italics. These definitions will also be extracted to form a glossary of key terms.

References to other chapters and other paragraphs in the updated *1993 SNA* are highlighted in yellow ***but have not yet been updated***. Final cross references will be inserted when the paragraph numbers have been finalized.. References to other manuals are highlighted in turquoise. If there are other citations that would be useful, please submit these suggestions along with comments. .

The tables in the text have been reformatted. They appear inset into portrait pages. Most tables appear on successive left- and right-hand side pages. Within each chapter, a table may appear in several places with alternative detail in each appearance to draw attention to the section currently being discussed in the text. The full detail of each table will appear in an annex and this annex will be available electronically in Excel format so that users can see the embedded formula used to derive the tables.

The code numbers for transactions, flows, sectors, etc. have been suppressed in both the text and the tables for the moment. Discussions continue about changes to the existing codes for the 1993 SNA and until this is settled it is difficult to envisage the format of codes for a somewhat amended hierarchy. They will be inserted at a later stage.

The data values in the tables are being reviewed. Where new entries have been added, at present the entries are usually blank but this needs to be rectified. In general, (excepting this case) a blank entry signifies that no entry is possible. A possible entry of zero value appears as a zero. The occurrence of blanks and zeroes is being verified also.

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Note by the editor:

I have reversed the order of the chapter so that the discussion of valuation, the interpretation of value added and the definition of GDP come before the detailed discussion of the entries in the account. This is consistent with the ordering of other chapters. Further, I think it is better to discuss what is meant by basic and producers' prices before using them in the description of output, intermediate consumption etc.

I have included more text on the nature of services. The existing definition was a problem for the financial services task force and it does not fit with including some services as capital.

Please look carefully at the start of section E. The AEG agreed not to impute change of ownership when goods were sent abroad for processing and agreed this basis of recording should apply within the national economy also. This has implications for the definition of output that I have tried to capture in this section.

The discussion on refining the market/non-market distinction (reported on the web site) allows for the exceptional inclusion of output for own intermediate use. This is reflected at various places in section E.

Within section F:

- a) I have removed the sections on leasing which I think are more closely associated with intermediate consumption. Under intermediate consumption there is a reference to the section in chapter 17 which is where the substantive discussion on leasing will be.*
- b) New text has been provided for all the financial services.*
- c) I have removed the discussion on originals and copies which appears now in chapter 10.*
- d) I have left the paras referring to R&D as "to follow" until we have a decision on this issue.*

I have reduced the text in section H on consumption of fixed capital. The previous recommendations have been superseded by both the measuring capital manual and the capital services chapter.

Anne Harrison

Chapter 6: The Production Account

A. Introduction

- 6.1 The production account is the starting point for the sequence of accounts for institutional units and sectors displaying how income is generated, distributed and used throughout the economy. Activities defined as production therefore determine the extent of GDP and the level of income for the economy. In concept, the economy-wide production account is the aggregation of a similar account for each production unit. Importantly, while production accounts can be compiled for an individual institutional unit as well as for sectors, they can also be compiled for establishments and thus for industries. It is this feature that allows the study of industrial activity in the economy and permits the compilation of supply and use tables and input-output tables.
- 6.2 The production account is linked to the definition of production. ***Production is an activity, carried out under the responsibility, control and management of an institutional unit, that uses inputs of labour, capital, and goods and services to produce outputs of goods and services.*** The production account shows the output of production and the various inputs to it. To do this, three concepts need clarifying.
- 6.3 The first concept to be clarified is what constitutes production within the System. This delineation is referred to as the production boundary of the System. Thereafter several key types of production need to be identified depending on whether production is for sale, for own use or is made available to others at little or no cost.
- 6.4 The next concept to be addressed is how output is to be valued. Key to this question is the role played by the various types of taxes imposed by government on products and on the activity of production.
- 6.5 The third major concept to be considered is how the production process adds to the value of goods and services and leads to the generation of income. Does the whole contribution of labour and capital add to the value of these goods and services or should the fact that most capital declines in value as it is used need to be taken into account?
- 6.6 The general format of an account in the sequence of accounts is to show how resources are received and, after uses are deducted, a balancing item is left. Because the production account is the first in the sequence of accounts, it is the first time the concept of a balancing item appears. The importance of balancing items in general and the one in this account in particular is also discussed before considering each of the entries of the production account in turn.
- 6.7 The production account for institutional units and sectors is illustrated in table 6.1. It contains only three items apart from the balancing item. The output from production is recorded under resources on the right-hand side of the account. This item may be disaggregated to distinguish different kinds of output. For example, non-market output should be shown separately from market output in the sector accounts, when possible. The inputs recorded under uses on the left-hand side of the account consist of intermediate consumption and consumption of fixed capital. Both of these may also be disaggregated.
- 6.8 The balancing item in the production account is value added. It can be measured either gross or net, that is, before or after deducting consumption of fixed capital:

- (a) *Gross value added is the value of output less the value of intermediate consumption;*
- (b) *Net value added is the value of output less the values of both intermediate consumption and consumption of fixed capital.*

6.9 As value added is intended to measure the value created by a process of production, it ought to be measured net, since the

consumption of fixed capital is a cost of production. However, as explained later, consumption of fixed capital can be difficult to measure in practice and it may not always be possible to make a satisfactory estimate of its value and hence of net value added. Provision has therefore to be made for value added to be measured gross as well as net. It follows that provision has also to be made for the balancing items in subsequent accounts of the System to be measured either gross or net of the consumption of fixed capital.

B. The concept of production

1. Production as an economic activity

6.10 Production can be described in general terms as an activity in which an enterprise uses inputs to produce outputs. The economic analysis of production is mainly concerned with activities that produce outputs of a kind that can be delivered or provided to other institutional units. Unless outputs are produced that can be supplied to other units, either individually or collectively, there can be no division of labour, no specialization of production and no gains from trading. ~~There are two main kinds of output, namely goods and services.~~

and it is necessary to examine ~~their~~ characteristics in order to be able to delineate activities that are productive in an economic sense from other activities. ~~Collectively, goods and services are described as products.~~

6.11 ~~In the System, it is seldom if ever necessary to make a clear distinction between goods and services but in making the link to other data sets it is often necessary to understand which products have been treated as goods and which as services..~~

Table 6.1: Production account

Uses	S.11	S.12	S.13	S.14	S.15	S.1			
	Non-financial corporations	Financial corporations	General government	Households	NPISHs	Total economy	Rest of the world	Goods and services	Total
Transactions and balancing items									
Output								3 604	3 604
Market output								3 228	3 228
Output for sale								3 057	3 057
Output for own use								171	171
Non-market output								376	376
Intermediate consumption	899	29	252	694	9	1 883			1 883
Taxes less subsidies on products								133	133
Value added, gross / Gross domestic product	854	73	188	575	31	1 721			1 721
Consumption of fixed capital	137	10	30	42	3	222			222
Value added, net / Net domestic product	717	63	158	533	28	1 499			1 499

~~6.12 Industrial classifications, such as ISIC, identify a group of manufacturing industries. However, many of these industries also produce services. For example, some aircraft engine manufacturers may both fabricate aircraft engines and repair and service existing engines. When goods despatched to another unit for processing do not change ownership, the work done on them constitutes a service even though it may be undertaken by a manufacturing industry. The fact that the processing is classified as a service does not prevent the processor from being classified within manufacturing.~~

~~6.13 Similarly, some service-producing industries may produce products that have many of the characteristics of goods. For convenience, the products of these industries are described in the System as knowledge-capturing products.~~

6.14 **Products are goods and services (including knowledge-capturing products) that result from a process of production.**

Goods

6.15 **Goods are physical, produced objects for which a demand exists, over which ownership rights can be established and whose ownership can be transferred from one institutional unit to another by engaging in transactions on markets.** They are in demand because they may be used to satisfy the needs or wants of households or the community or used to produce other

goods or services. The production and exchange of goods are quite separate activities. Some goods may never be exchanged while others may be bought and sold numerous times. The production of a good can always be separated from its subsequent sale or resale.

Services

6.16 The production of services must be confined to activities that are capable of being carried out by one unit for the benefit of another. Otherwise, service industries could not develop and there could be no markets for services. It is also possible for a unit to produce a service for its own consumption provided that the type of activity is such that it could have been carried out by another unit.

6.17 Services are the result of a production activity that change the conditions of the consuming units, or facilitate the exchange of products or financial assets. These types of service are known as transformation services and margin services respectively. **Transformation services are outputs produced to order and typically consist of changes in the conditions of the consuming units realized by the activities of producers at the demand of the consumers.** Transformation services are not separate entities over which ownership rights can be established. They cannot be traded separately from their production. By the time their production is completed, they must have been provided to the consumers.

Table 6.1: Production account

	Transactions						Resources		
	S.11 Non-financial corporations	S.12 Financial corporations	S.13 General government	S.14 Households	S.15 NPISHs	S.1 Total economy	Rest of the world	Goods and services	Total
Transactions and balancing items									
Output	1 753	102	440	1 269	40	3 604			3 604
Market output	1 753	102	80	1 269	24	3 228			3 228
Output for sale	1 722	102	80	1 129	24	3 057			3 057
Output for own use	31	0	0	140	0	171			171
Non-market output			360		16	376			376
Intermediate consumption								1 883	1 883
Taxes less subsidies on products						133			133

6.18 The changes that consumers of services engage the producers to bring about can take a variety of different forms as follows:

- (a) Changes in the condition of the consumer's goods: the producer works directly on goods owned by the consumer by transporting, cleaning, repairing or otherwise transforming them;
- (b) Changes in the physical condition of persons: the producer transports the persons, provides them with accommodation, provides them with medical or surgical treatments, improves their appearance, etc.;
- (c) Changes in the mental condition of persons: the producer provides education, information, advice, entertainment or similar services in a face to face manner.

6.19 The changes may be temporary or permanent. For example, medical or education services may result in permanent changes in the condition of the consumers from which benefits may be derived over many years. On the other hand, attending a football match is a short-lived experience. In general, the changes may be presumed to be improvements, as services are produced at the demand of the consumers. The improvements usually become embodied in the persons of the consumers or the goods they own and are not separate entities that belong to the producer. Such improvements cannot be held in inventories by the producer or traded separately from their production.

6.20 A single process of production may provide services to a group of persons, or units, simultaneously. For example, groups of persons or goods belonging to different institutional units may be transported together in the same plane, ship, train or other vehicle. People may be instructed or entertained in groups by attending the same class, lecture or performance. Certain services are provided collectively to the

community as a whole, or large sections of the community: for example, the maintenance of law and order, and defence.

6.21 ***Margin services result when one institutional unit facilitates the change of ownership of goods, knowledge-capturing products or financial assets between two other institutional units.*** Margin services are provided by wholesalers and retailers and by many types of financial institutions. Margin services resemble transformation services in that they are not separate entities over which ownership rights can be established. They cannot be traded separately from their production. By the time their production is completed they must have been provided to the consumers.

Knowledge-capturing products

6.22 ***Knowledge-capturing products concern the provision, storage, communication and dissemination of information, advice and entertainment in such a way that the consuming unit can access the knowledge repeatedly.*** The industries that produce these products are those concerned with the provision, storage, communication and dissemination of information, advice and entertainment in the broadest sense of those terms including the production of general or specialized information, news, consultancy reports, computer programs, movies, music, etc. The outputs of these industries, over which ownership rights may be established, are often stored on physical objects (whether on paper or on electronic media). that can be traded like ordinary goods. They have many of the characteristics of goods in that ownership rights over these services can be established and they can be used repeatedly. Whether characterized as goods or services, these products possess the essential common characteristic that they can be produced by one unit and supplied to another, thus making possible division of labour and the emergence of markets.

2. The production boundary

6.23 Given the general characteristics of the ~~goods and services produced as~~ outputs, it becomes possible to define production. A general definition of production is given

first, followed by the rather more restricted definition that is used in the System. Following this there is a discussion of the production boundary as it affects household activities and not-observed activities.

The ~~general~~ production boundary

- 6.24 Economic production may be defined as an activity carried out under the control and responsibility of an institutional unit that uses inputs of labour, capital, and goods and services to produce outputs of goods or services. There must be an institutional unit that assumes responsibility for the process and owns any goods or knowledge-~~embodying services~~ produced as outputs or is entitled to be paid, or otherwise compensated, for the transformation or margin services provided. A purely natural process without any human involvement or direction is not production in an economic sense. For example, the unmanaged growth of fish stocks in international waters is not production, whereas the activity of fish farming is production.
- 6.25 While production processes that produce goods can be identified without difficulty, it is not always so easy to distinguish the production of services from other activities that may be both important and beneficial. Activities that are not productive in an economic sense include basic human activities such as eating, drinking, sleeping, taking exercise, etc., that it is impossible for one person to obtain another person to perform instead. Paying someone else to take exercise is no way to keep fit. On the other hand, activities such as washing, preparing meals, caring for children, the sick or aged are all activities that can be provided by other units and, therefore, fall within the ~~general~~ production boundary. Many households employ paid domestic staff to carry out these activities for them.

~~The production boundary in the System~~

- 6.26 ~~The production boundary in the System is more restricted than the general production boundary.~~ For reasons explained below, activities undertaken by households that produce services for their own use are excluded from the concept of production in

the System, except for services provided by owner-occupied dwellings and services produced by employing paid domestic staff. Otherwise, the production boundary in the System is the same as the more general one defined in the previous section.

6.27 ~~The production boundary of the System includes the following activities:~~

- (a) *The production of all goods or services that are supplied to units other than their producers, or intended to be so supplied, including the production of goods or services used up in the process of producing such goods or services;*
- (b) *The own-account production of all goods or knowledge-embodiment services that are retained by their producers for their own final consumption or gross capital formation;*
- (c) *The own-account production of housing services by owner occupiers; and*
- (d) *The production of domestic and personal services by employing paid domestic staff.*

The production boundary within households

The exclusion of most services produced for own use by households


- 6.28 The production of services by members of the household for their own final consumption has traditionally been excluded from measured production in national accounts and it is worth explaining briefly why this is so. It is useful to begin by listing those services for which no entries are recorded in the accounts when they are produced by household members and consumed within the same household:

- (a) The cleaning, decoration and maintenance of the dwelling occupied by the household,

including small repairs of a kind usually carried out by tenants as well as owners;

- (b) The cleaning, servicing and repair of household durables or other goods, including vehicles used for household purposes;
- (c) The preparation and serving of meals;
- (d) The care, training and instruction of children;
- (e) The care of sick, infirm or old people;
- (f) The transportation of members of the household or their goods.

6.29 In most countries a considerable amount of labour is devoted to the production of these services, and their consumption makes an important contribution to economic welfare. However, national accounts serve a variety of analytical and policy purposes and are not compiled simply, or even primarily, to produce indicators of welfare. The reasons for not imputing values for unpaid domestic or personal services produced and consumed within households may be summarized as follows:

- (a) The own-account production of services within households is a self-contained activity with limited repercussions on the rest of the economy.  decision to produce a household service entails a simultaneous decision to consume that service. This is not true for goods. For example, if a household engages in the production of agricultural goods, it does not follow that it intends to consume them all. Once the crop has been harvested, the producer has a choice about how much to consume, how much to store for future consumption or production, and how much to offer for sale or barter on the market. Indeed, although it is customary to refer to the own-account production of goods, it is not possible to

determine at the time the production takes place how much of it will eventually be consumed by the producer. For example, if an agricultural crop turns out to be better than expected, the household may dispose of some of it on the market even though it may have originally supposed it would consume it all. This kind of possibility is non-existent for services.

- (b) As the vast majority of household services are not produced for the market, there are typically no suitable market prices that can be used to value such services. It is therefore extremely difficult to estimate values not only for the outputs of the services but also for the associated incomes and expenditures that can be meaningfully added to the values of the monetary transactions on which most of the entries in the accounts are based.
- (c) With the exception of the imputed rent of owner-occupied dwellings, the decision to produce services for own consumption is not influenced by and does not influence economic policy because the imputed values are not equivalent to monetary flows. Changes in the levels of household services produced do not affect the tax yield of the economy or the level of the exchange rate, to give two examples.

6.30 Thus, the reluctance of national accountants to impute values for the outputs, incomes and expenditures associated with the production and consumption of services within households is explained by a combination of factors, namely the relative isolation and independence of these activities from markets, the extreme difficulty of making economically meaningful estimates of their values, and the adverse effects it would have on the usefulness of the accounts for policy purposes and the analysis of markets and market disequilibria.

6.31 The exclusion of household services from ~~the production boundary~~ has consequences for labour force and employment statistics. According to International Labour Organization (ILO) guidelines, economically active persons are persons engaged in production included within the boundary of production of the System. If that boundary were to be extended ~~to include~~ the production of own-account household services, virtually the whole adult population would be economically active and ~~unemployment eliminated~~. ~~In practice, it would be necessary to revert to the existing boundary of production in the System, if only to obtain meaningful employment statistics.~~

Own-account production of goods

6.32 ~~Although services produced for own consumption within households fall outside the boundary of production used in the System, it is nevertheless useful to give further guidance with respect to the treatment of certain kinds of household activities which may be particularly important in some developing countries.~~ The System includes the production of all goods within the production boundary. The following types of production by households are included whether intended for own final consumption or not:

- (a) The production of agricultural products and their subsequent storage; the gathering of berries or other uncultivated crops; forestry; wood-cutting and the collection of firewood; hunting and fishing;
- (b) The production of other primary products such as mining salt, cutting peat, the supply of water, etc.;
- (c) The processing of agricultural products; the production of grain by threshing; the production of flour by milling; the curing of skins and the production of leather; the production and preservation of meat and fish products; the preservation of fruit by drying, bottling, etc.; the production of dairy products such as butter or cheese; the production of beer, wine,

or spirits; the production of baskets or mats; etc.;

- (d) Other kinds of processing such as weaving cloth; dress making and tailoring; the production of footwear; the production of pottery, utensils or durables; making furniture or furnishings; etc.
- (e) The supply of water is also considered a goods-producing activity in this context. In principle, supplying water is a similar kind of activity to extracting and piping crude oil.

6.33 It is not feasible to draw up a complete, exhaustive list of all possible productive activities but the above list covers the most common types. When the amount of a good produced within households is believed to be quantitatively important in relation to the total supply of that good in a country, its production should be recorded. Otherwise, it may not be worthwhile trying to estimate it in practice.

Services of owner-occupied dwellings

6.34 The production of housing services for their own final consumption by owner occupiers has always been included within the production boundary in national accounts, although it constitutes an exception to the general exclusion of own-account service production. The ratio of owner-occupied to rented dwellings can vary significantly between countries, between regions of a country and even over short periods of time within a single country or region, so that both international and intertemporal comparisons of the production and consumption of housing services could be distorted if no imputation were made for the value of own-account housing services. The imputed value of the income generated by such production is taxed in some countries. There is further discussion of the services provided by owner-occupied dwellings in **chapter 17**.

Production of domestic and personal services by employing paid domestic staff

- 6.35 Although paid domestic staff produce many of the services excluded from the production boundary of the System when undertaken by household members, paying a person who comes to the house to wash, cook or look after children, for example, is as much a market activity as taking clothes to a laundry, eating at a restaurant or paying a nursery to care for children. By convention, though, only the wages of the domestic staff are treated as the value of output. Other materials used in their work are treated as household consumption expenditure because of the difficulty of identifying what is used by the staff and what by household members.

“Do-it-yourself” decoration, maintenance and small repairs

- 6.36 “Do-it-yourself” repairs and maintenance to consumer durables and dwellings carried out by members of the household constitute the own-account production of services and are excluded from the production boundary of the System. The materials purchased are treated as final consumption expenditure.
- 6.37 In the case of dwellings, “do-it-yourself” activities cover decoration, maintenance and small repairs, including repairs to fittings, of types that are commonly carried out by tenants as well as by owners. On the other hand, more substantial repairs, such as re-plastering walls or repairing roofs, carried out by owners, are essentially intermediate inputs into the production of housing services. However, the production of such repairs by an owner-occupier is only a secondary activity of the owner in his capacity as a producer of housing services. The production accounts for the two activities may be consolidated so that, in practice, the purchases of materials for repairs become intermediate expenditures incurred in the production of housing services. Major renovations or extensions to dwellings are fixed capital formation and recorded separately.

The use of consumption goods

- 6.38 The use of goods within the household for the direct satisfaction of human needs or wants is not treated as production. This applies not only to materials or equipment purchased for use in leisure or recreational activities but also to foodstuffs purchased for the preparation of meals. The preparation of a meal is a service activity and is treated as such in the System and in the International Standard Industrial Classification (ISIC). It therefore falls outside the production boundary when the meal is prepared for own consumption within the household. The use of a durable good, such as a vehicle, by persons or households for their own personal benefit or satisfaction is intrinsically a consumption activity and should not be treated as if it were an extension, or continuation, of production.

The “non-observed” economy

- 6.39 There is considerable interest in the phenomenon of the non-observed economy. This term is used to describe activities that, for one reason or another, are not captured in regular statistical enquiries. The reason may be that the activity is informal and thus escapes the attention of surveys geared to formal activities; it may be that the producer is anxious to conceal a legal activity, or it may be that the activity is illegal. Chapter 24 discusses measurement of the informal economy within households.
- 6.40 Certain activities may clearly fall within the production boundary of the System and also be quite legal (provided certain standards or regulations are complied with) but deliberately concealed from public authorities for the following kinds of reasons:
- (a) To avoid the payment of income, value added or other taxes;
 - (b) To avoid the payment of social security contributions;
 - (c) To avoid having to meet certain legal standards such as minimum wages,

- maximum hours, safety or health standards, etc.;
- (d) To avoid complying with certain administrative procedures, such as completing statistical questionnaires or other administrative forms.
- 6.41 Because certain kinds of producers try to conceal their activities from public authorities, it does not follow that they are not included in national accounts in practice. Many countries have had considerable success in compiling estimates of production that cover the not-observed economy as well as the ordinary economy. In some industries, such as agriculture or construction, it may be possible by using various kinds of surveys and the commodity flow method to make satisfactory estimates of the total output of the industry without being able to identify or measure that part of it that is not observed. Because the not-observed economy may account for a significant part of the total economy of some countries, it is particularly important to try to make estimates of total production that include it, even if it cannot always be separately identified as such.
- 6.42 There may be no clear borderline between the not-observed economy and illegal production. For example, production that does not comply with certain safety, health or other standards could be described as illegal. Similarly, the evasion of taxes is itself usually a criminal offence. However, it is not necessary for the purposes of the System to try to fix the precise borderline between not-observed and illegal production as both are included within the production boundary in any case. It follows that transactions on unofficial markets that exist in parallel with official markets (e.g., for foreign exchange or goods subject to official price controls) must also be included in the accounts, whether or not such markets are actually legal or illegal.
- 6.43 There are two kinds of illegal production:
- (a) The production of goods or services whose sale, distribution or possession is forbidden by law;
- (b) Production activities that are usually legal but become illegal when carried out by unauthorized producers; e.g., unlicensed medical practitioners.
- 6.44 Examples of activities that may be illegal but productive in an economic sense include the manufacture and distribution of narcotics, illegal transportation in the form of smuggling of goods and of people, and services such as prostitution.
- 6.45 Both kinds of illegal production are included within the production boundary of the System provided they are genuine production processes whose outputs consist of goods or services for which there is an effective market demand. The units that purchase smuggled goods, for example, may not be involved in any kind of illegal activities and may not even be aware that the other party to the transaction is behaving illegally. Transactions in which ~~illegal goods or services~~ are bought and sold need to be recorded not simply to obtain comprehensive measures of production and consumption but also to prevent errors appearing elsewhere in the accounts if the funds exchanged in illegal transactions are presumed to be used for other purposes. The incomes generated by illegal production may be disposed of quite legally, while conversely, expenditures on illegal goods and services may be made out of funds obtained quite legally. The failure to record illegal transactions may lead to significant errors in the financial account and also the external account of some countries.
- 6.46 Illegal production does not refer to the generation of externalities such as the discharge of pollutants. Externalities may result from production processes that are themselves quite legal. Externalities are created without the consent of the units affected and no values are imputed for them in the System.
- 6.47 Regular thefts of products from inventories are not included in the value of output. If stolen products are resold, the "margin" on them is equal to the whole of the selling price, when they are obtained without cost to the seller.

C. Basic, producers' and purchasers' prices

6.48 More than one set of prices may be used to value outputs and inputs depending upon how taxes and subsidies on products, and also transport charges, are recorded. Moreover, value added taxes (VAT), and similar deductible taxes may also be recorded in more than one way. The methods of valuation used in the System are explained in this section.

1. Basic and producers' prices

6.49 The System utilizes two kinds of output prices, namely, basic prices and producers' prices:

(a) *The basic price is the amount receivable by the producer from the purchaser for a unit of a good or service produced as output minus any tax payable, and plus any subsidy receivable, by that unit as a consequence of its production or sale. It excludes any transport charges invoiced separately by the producer;*

(b) *The producer's price is the amount receivable by the producer from the purchaser for a unit of a good or service produced as output minus any VAT, or similar deductible tax, invoiced to the purchaser. It excludes any transport charges invoiced separately by the producer.*

Neither the producer's nor the basic price includes any amounts receivable in respect of VAT, or similar deductible tax, invoiced on the output sold.

6.50 Unlike the basic price, the producer's price includes taxes on products, (taxes payable per unit of output) and excludes subsidies on products (subsidies receivable per unit of output). The producer's price is the price, excluding VAT, that the producer invoices to the purchaser. The basic price measures the amount retained by the producer and is, therefore, the price most relevant for the producer's decision-taking. It is becoming

increasingly common in many countries for producers to itemize taxes separately on their invoices so that purchasers are informed about how much they are paying to the producer and how much as taxes to the government.

6.51 When output is recorded at basic prices, any tax on the product actually payable on the output is treated as if it were paid by the purchaser directly to the government instead of being an integral part of the price paid to the producer. Conversely, any subsidy on the product is treated as if it were received directly by the purchaser rather than the producer.

6.52 Both producers' and basic prices are actual transaction prices that can be directly observed and recorded. Basic prices are often reported in statistical inquiries and some official "producer price" indices actually refer to basic prices rather than to producers' prices as defined here.

VAT and similar deductible taxes

6.53 Many countries have adopted some form of VAT. VAT is a wide-ranging tax usually designed to cover most or all goods and services. In some countries, VAT may replace most other forms of taxes on products, but VAT may also be levied in addition to some other taxes on products, such as excise duties on tobacco, alcoholic drink or fuel oils.

6.54 VAT is a tax on products collected in stages by enterprises. Taxes that are narrower in scope than VAT but may also be deductible by producers exist in some countries. They are treated in the System in the same way as VAT. Producers are required to charge certain percentage rates of VAT on the goods or services they sell. The VAT is shown separately on the sellers' invoices so that purchasers know the amounts they have paid. However, producers are not required to pay to the government the full amounts of the VAT invoiced to their customers

because they are usually permitted to deduct the VAT that they themselves have paid on goods and services purchased for their own intermediate consumption, resale or gross fixed capital formation. Producers are obliged to pay only the difference between the VAT on their sales and the VAT on their purchases for intermediate consumption or capital formation, hence the expression value added tax. The percentage rate of VAT is liable to vary between different categories of goods and services and also according to the type of purchaser. For example, sometimes goods purchased by visiting non-residents, which count as exports, may be exempt from VAT.

6.55 The following terminology needs to be defined:

- (a) ***Invoiced VAT is the VAT payable on the sales of a producer***; it is shown separately on the invoice that the producer presents to the purchaser;
- (b) ***Deductible VAT is the VAT payable on purchases of goods or services intended for intermediate consumption, gross fixed capital formation or for resale that a producer is permitted to deduct from his own VAT liability to the government in respect of VAT invoiced to his customers***;
- (c) ***Non-deductible VAT is VAT payable by a purchaser that is not deductible from his own VAT liability, if any***.

Thus, a market producer is able to recover the costs of any deductible VAT payable on his own purchases by reducing the amount of his own VAT liability in respect of the VAT invoiced to his own customers. On the other hand, the VAT paid by households for purposes of final consumption or fixed capital formation in dwellings is not deductible. The VAT payable by non-market producers owned by government units or NPISHs may also not be deductible.

Gross and net recording of VAT

6.56 There are two alternative systems that may be used to record VAT, i.e., the “gross” or “net” systems. Under the gross system, all transactions are recorded including the amounts of any invoiced VAT. Thus, the purchaser and the seller record the same price, irrespective of whether or not the purchaser is able to deduct the VAT subsequently.

6.57 While the gross system of recording seems to accord with the traditional notion of recording at “market” prices, it presents some difficulties. Practical experience with the operation of VAT over many years in a number of countries has shown it may be difficult, if not impossible, to utilize the gross system because of the way business accounts are computed and records are kept. Sales are normally reported excluding invoiced VAT in most industrial inquiries and business surveys. Conversely, purchases of goods and services by producers are usually recorded excluding deductible VAT. Although the gross system has been tried in some countries, it has had to be abandoned for these reasons. Further, it can be argued that the gross system distorts economic reality to the extent that it does not reflect the amounts of VAT actually paid by businesses. Large amounts of invoiced VAT are deductible and thus represent only notional or putative tax liabilities.

6.58 The System therefore requires that the net system of recording VAT should be followed. In the net system:

- (a) Outputs of goods and services are valued excluding invoiced VAT; imports are similarly valued excluding invoiced VAT;
- (b) Purchases of goods and services are recorded including non-deductible VAT.

Under the net system, VAT is recorded as being payable by purchasers, not sellers, and then only by those purchasers who are not able to deduct it. Almost all VAT is

therefore recorded in the System as being paid on final uses, mainly on household consumption. However, small amounts of VAT may be paid by businesses in respect of certain kinds of purchases on which VAT may not be deductible.

6.59 The disadvantage of the net system is that different prices must be recorded for the two parties to the same transaction when the VAT is not deductible. The price recorded for the producer does not include invoiced VAT whereas the price recorded for the purchaser does include the invoiced VAT to the extent that it is not deductible. Thus, in aggregate, the total value of the expenditures recorded for purchasers must exceed the total value of the corresponding sales receipts recorded for producers by the total amount raised as non-deductible VAT.

6.60 The producer's price thus defined is a hybrid that excludes some, but not all, taxes on products. The basic price, which does not include any taxes on the output (but includes subsidies on the output) becomes a clearer concept in these circumstances and is the preferred method for valuing the output of producers.

2. Purchasers' prices

6.61 *The purchaser's price is the amount paid by the purchaser, excluding any deductible VAT or similar deductible tax, in order to take delivery of a unit of a good or service at the time and place required by the purchaser. The purchaser's price of a good includes any transport charges paid separately by the purchaser to take delivery at the required time and place.*

6.62 When a purchaser buys directly from the producer, the purchaser's price may exceed the producer's price by:

- (a) The value of any non-deductible VAT, payable by the purchaser; and
- (b) The value of any transport charges on a good paid separately by the purchaser and not included in the producer's price.

It follows that the purchaser's price may exceed the basic price by the amount of the two items just listed plus the value of any taxes less subsidies on the product (other than VAT).

6.63 For certain purposes, including input-output analysis, it may be convenient to consider that the purchase of a product consists of two separate transactions. The first of these is the purchase of the product from the producer and the second is the margin paid to the wholesaler or retailer of the product. The margin represents the difference between the price paid by the final purchaser of a product after it has passed through the wholesale and retail distribution chains with the producer's price received by its original producer.

6.64 The traditional concept of the "market" price becomes somewhat blurred under a system of VAT or similar deductible taxes because there may be two different prices for a single transaction: one from the seller's point of view and another from the purchaser's, depending upon whether or not the tax is deductible. It is recommended in the System that the term "market prices" should be avoided and the price basis used, (basic, producer's or purchaser's), be specified to avoid ambiguity.

D. Value added and GDP

1. Gross and net value added

6.65 The balancing item of a current account is the excess of resources over uses. The rationale for dividing transactions into sets

of accounts is that the balancing item of each account is of economic interest. The balancing item of the production account is value added, so called because it measures the value created by production. Because a

production account may be compiled for an institutional unit or sector, or establishment or industry, so value added may be derived for any of these. Value added is of analytical interest because the sum of value added for all resident units leads to the first definition of gross domestic product (GDP).

6.66 Value added represents the contribution of labour and capital to the production process. Once the amount of value added appropriated by government in the form of other taxes on production is deducted from value added, the compensation of labour and capital is revealed. However, capital in the form of fixed capital formation has a finite life length. Some part of value added should therefore be regarded as the reduction in value of fixed capital due to its use in production. This allowance is called the consumption of fixed capital.

6.67 The consumption of fixed capital is one of the most important elements in the System. In most cases, when a distinction is drawn between “gross” and “net” recording, “gross” means without deducting consumption of fixed capital while recording “net” means after deducting consumption of fixed capital. In particular, all the major balancing items in the accounts from value added through to saving may be recorded gross or net, that is, before or after deducting consumption of fixed capital. It should also be noted that consumption of fixed capital is typically quite large compared with most of the net balancing items. It may account for 10 per cent or more of GDP.

6.68 The consumption of fixed capital is one of the most difficult items in the accounts to **measure conceptually** and to estimate in practice. Further, consumption of fixed capital does not represent the aggregate value of a set of transactions. It is an imputed value whose economic significance is different from entries in the accounts based mainly on market transactions. For these reasons, the major balancing items in national accounts have always tended to be recorded both gross and net of consumption of fixed capital. This tradition is continued in the System where provision is made for balancing items from value added through to

saving to be recorded both ways. In general, the gross figure is the easier to estimate and so may be more reliable, but the net figure is usually the one that is conceptually more appropriate and relevant for analytical purposes.

6.69 As stated above:

(a) Gross value added is defined as the value of output less the value of intermediate consumption;

(b) Net value added is defined as the value of output less the values of both intermediate consumption and consumption of fixed capital.

To avoid repetition, only gross value added will be cited in the following sections when the corresponding conclusions for net value added are obvious.

2. Alternative measures of value added

6.70 In the System, the intermediate inputs are valued and recorded at the time they enter the production process, while outputs are recorded and valued as they emerge from the process. Intermediate inputs are normally valued at purchasers’ prices and outputs at basic prices, or alternatively at producers’ prices if basic prices are not available. The increase between the value of the intermediate inputs and the value of the outputs is the gross value added against which must be charged the consumption of fixed capital, taxes on production (less subsidies) and compensation of employees. The positive or negative balance remaining is the net operating surplus or mixed income.

6.71 As indicated above, alternative measures of gross value added may be obtained by associating different sets of prices with a sets of quantities of inputs and outputs. The various measures that may be derived using the different sets of prices recognized in the System are considered below.

Gross value added at basic prices

6.72 *Gross value added at basic prices is defined as output valued at basic prices less*

intermediate consumption valued at purchasers' prices. Although the outputs and inputs are valued using different sets of prices, for brevity the value added is described by the prices used to value the outputs. From the point of view of the producer, purchasers' prices for inputs and basic prices for outputs represent the prices actually paid and received. Their use leads to a measure of gross value added that is particularly relevant for the producer.

Gross value added at producers' prices

6.73 *Gross value added at producers' prices is defined as output valued at producers' prices less intermediate consumption valued at purchasers' prices.* As already explained, in the absence of VAT, the total value of the intermediate inputs consumed is the same whether they are valued at producers' or at purchasers' prices, in which case this measure of gross value added is the same as one that uses producers' prices to value both inputs and outputs. It is an economically meaningful measure that is equivalent to the traditional measure of gross value added at market prices. However, in the presence of VAT, the producer's price excludes invoiced VAT, and it would be inappropriate to describe this measure as being at "market" prices.

6.74 Both this measure of gross value added and that described in the previous section use purchasers' prices to value intermediate inputs. The difference between the two measures is entirely attributable to their differing treatments of taxes or subsidies on products payable on outputs (other than invoiced VAT). By definition, the value of output at producers' prices exceeds that at basic prices by the amount, if any, of the taxes, less subsidies, on the output so that the two associated measures of gross value added must differ by the same amount.

Gross value added at factor cost

6.75 Gross value added at factor cost is not a concept used explicitly in the System. Nevertheless, it can easily be derived from either of the measures of gross value added presented above by subtracting the value of any taxes, less subsidies, on production

payable out of gross value added as defined. For example, the only taxes on production remaining to be paid out of gross value added at basic prices consist of "other taxes on production". These consist mostly of current taxes (or subsidies) on the labour or capital employed in the enterprise, such as payroll taxes or current taxes on vehicles or buildings. Gross value added at factor cost can thus be derived from gross value added at basic prices by subtracting "other taxes, less subsidies, on production".

6.76 The conceptual difficulty with gross value added at factor cost is that there is no observable set of prices such that gross value added at factor cost is obtained directly by multiplying this set of prices by the sets of quantities of inputs and outputs that define the production process. By definition, "other taxes or subsidies on production" are not taxes or subsidies on products that can be eliminated from the input and output prices. Thus, despite its traditional name, gross value added at factor cost is not strictly a measure of value added.

6.77 Gross value added at factor cost is essentially a measure of income and not output. It represents the amount remaining for distribution out of gross value added, however defined, after the payment of all taxes on production and the receipt of all subsidies on production. It makes no difference which measure of gross value added is used because the measures considered above differ only in respect of the amounts of the taxes or subsidies on production that remain payable out of gross value added.

3. Gross domestic product (GDP)

6.78 The underlying rationale behind the concept of gross domestic product (GDP) for the economy as a whole is that it should measure the total gross values added from all institutional units resident in the economy. However, while the concept of GDP is based on this principle, GDP as defined in the System is such that an identity exists between a measure built on value added, a measure built on income and one based on final expenditures. To achieve this, it is important that the same

contribution to GDP is made by taxes on production under all three measures. The expenditure measure of GDP includes all taxes on production and taxes on imports since ultimately these are included in the purchasers' prices of the final users.

6.79 Given this definition of GDP, the following identities hold when the summations are taken over all resident producers:

- (a) GDP =
the sum of the gross values added at producers' prices
+taxes, less subsidies, on imports
+non-deductible VAT;
- (b) GDP =
the sum of the gross values added at basic prices
+all taxes, less subsidies, on products
- (c) GDP =
the sum of the gross values added at factor cost
+all taxes, less subsidies, on products;
+all other taxes, less subsidies, on production.

In cases (b) and (c), the item taxes, less subsidies, on products includes taxes and subsidies on imports as well as on outputs.

4. Domestic production

6.80 It should be noted, however, that GDP is not intended to measure the production taking

E. The measurement of output

1. Production versus output

6.81 Production is an activity carried out by an establishment. It may not always be clear whether an establishment is producing a good or is providing a service. For example, an oil refinery processing crude oil that it owns is producing a good, refined petroleum; if the same refinery processes crude oil belonging to another unit, then it is providing a refinery service to that unit. This lack of clarity may often appear for goods passing between establishments of the same enterprise and it is important to know

place within the geographical boundary of the economic territory. Some of the production of a resident producer may take place abroad, while some of the production taking place within the geographical boundary of the economy may be carried out by non-resident producer units. For example, a resident producer may have teams of employees working abroad temporarily on the installation, repair or servicing of equipment. This output is an export of a resident producer and the productive activity does not contribute to the GDP of the country in which it takes place. Thus, the distinction between resident and non-resident institutional units is crucial to the definition and coverage of GDP. In practice, of course, most of the productive activity of resident producers takes place within the country in which they are resident. However, producers in service industries that typically have to deliver their outputs directly to their clients wherever they are located are increasingly tending to engage in production in more than one country, a practice that is encouraged by rapid transportation and instantaneous communication facilities. Geographical boundaries between adjacent countries are becoming less significant for mobile service producers, especially in small countries bordered by several other countries.

when to record the output of a good and when of a transformation service. The defining principle is that of economic ownership. If an establishment has no discretion about the level of production, the price to be charged for the good or the destination of the good, there is evidence that the establishment has not taken economic ownership of the goods being processed and the value of the output should be treated as the processing element only. This is the case for the refinery service cited above. However, if an establishment receives coal from another establishment in

the same enterprise, uses it to generate electricity and then sells the electricity on the open market, it follows that the electricity generator does not take economic ownership of the coal. In such a case, the value of electricity generated should be measured including the cost of the coal consumed in the process even though there is no legal change in ownership since both establishments belong to the same enterprise.

6.82 In general, all goods and services that are produced and used by the same establishment are excluded from the measure of output. However, there are exceptions here also. For example, output is recorded if the goods and services being produced are used for capital formation of the establishment. Similarly output is recorded for products entering inventories even if eventually they are withdrawn from inventories for use as intermediate consumption in the same establishment. If the establishment is a household unincorporated enterprise growing maize, the value of maize produced includes maize kept for household consumption.

6.83 An establishment may produce goods and services that are used as its own intermediate consumption. An example is unglazed china that is only delivered to other units after glazing. In general the unglazed china is not recorded as output but if there is some china remaining unglazed at the end of the production period, it should be recorded as being produced and entering inventories. In the subsequent period, the unglazed china is withdrawn from inventories and the act of glazing constitutes output in the second period.

6.84 Exceptionally, there may be some production that is used as intermediate consumption where it may be desirable to record this as both output and intermediate consumption. An example may be transport services provided by a retailer. Some may be charged for explicitly and therefore clearly form part of output. Some may be used on own account but it may be desirable in order to have a comprehensive picture of transportation services to show these explicitly.

6.85 Although production is related to activities and thus the output of one production process is one set of products, output is measured for an establishment and may include the output of several production processes. Thus *output is defined as the goods and services produced by an establishment,*

a. excluding the value of any goods and services used in an activity for which the establishment does not acquire economic ownership, and

b. excluding the value of goods and services consumed by the same establishment except for goods and services used for capital formation (fixed capital or changes in inventories), own final consumption or, in clearly specified circumstances, for own intermediate consumption

2. Time of recording

6.86 The output of most goods or services is usually recorded when their production is completed. However, when it takes a long time to produce a unit of output, it becomes necessary to recognize that output is being produced continuously and to record it as "work-in-progress". For example, the production of certain agricultural goods or large durable goods such as ships or buildings may take months or years to complete. In such cases, it would distort economic reality to treat the output as if it were all produced at the moment of time when the process of production happens to terminate. Whenever a process of production extends over two or more accounting periods, it is necessary to calculate the work-in-progress completed within each of the periods in order to be able to measure how much output is produced in each period.

6.87 On the other hand, goods and services may be completed in an accounting period but not delivered (sold) to a user. Output is recorded when the work is completed and not when sold. There is thus a significant difference between the value of output in a

period and the value of sales, the difference being accounted for by changes in inventories of finished goods and work-in-progress.

3. Valuation of output

6.88 Goods and services produced for sale on the market at economically significant prices may be valued either at basic prices or at producers' prices. The preferred method of valuation is at basic prices, especially when a system of VAT, or similar deductible tax, is in operation. Producers' prices should be used only when valuation at basic prices is not feasible.

6.89 Output produced for own use should be valued at the average basic prices of the same goods or services sold on the market, provided they are sold in sufficient quantities to enable reliable estimates to be made of those average prices. If not, the output should be valued by the total production costs incurred, including the value of capital services, and any taxes (less subsidies) on production other than taxes or subsidies on products.

6.90 The non-market output produced by government units and NPISHs that is supplied free, or at prices that are not economically significant, to other institutional units or the community as a whole is valued by total production costs, including consumption of fixed capital, and a return to capital and taxes (less subsidies) on production other than taxes or subsidies on products.


4. Market and non-market output

6.91 A fundamental distinction is drawn in the System between market output and non-market output because of the way the output of each is valued. Market output is the normal situation in a market economy where producers make decisions about what to produce and how much to produce in response to expected levels of demand and expected costs of supply. The determining factor behind production decisions is that economically significant prices prevail. ***Economically significant prices are prices that have a significant effect on the***

amounts that producers are willing to supply and on the amounts purchasers wish to buy. These prices normally result when:

- a. ***The producer has an incentive to adjust supply either with the goal of making a profit in the long run or, at a minimum, covering capital and other cost; and***
- b. ***Consumers have the freedom to purchase or not purchase and make the choice on the basis of the prices charged***

There is further discussion on economically significant prices in chapter 20..

6.92 Non-market output is output that takes place in the absence of economically significant prices.  price is said to be not economically significant when it has little or no influence on how much the producer is prepared to supply and is expected to have only a marginal influence on the quantities demanded. It is a price that is not quantitatively significant from the point of view of either supply or demand. Such prices are likely to be charged in order to raise some revenue or achieve some reduction in the excess demand that may occur when services are provided completely free, but they are not intended to eliminate such excess demand. Once a decision has been taken on administrative, social or political grounds about the total amount of a particular non-market good or service to be supplied, its price is deliberately fixed below the equilibrium price that would clear the market. The difference between a price that is not economically significant and a zero price is, therefore, a matter of degree. The price merely deters those units whose demands are the least pressing without greatly reducing the total level of demand.

6.93 Non-market output may be produced for two reasons:

- (a) It may be technically impossible to make individuals pay for collective services because their consumption

cannot be monitored or controlled. The pricing mechanism cannot be used when transactions costs are too high and there is market failure. The production of such services has to be organized collectively by government units and financed out of funds other than receipts from sales, namely taxation or other government incomes;

- (b) Government units and NPISHs may also produce and supply goods or services to individual households for which they could charge but choose not to do so as a matter of social or economic policy. The most common examples are the provision of education or health services, free or at prices that are not economically significant, although other kinds of goods and services may also be supplied.

Market output

- 6.94 **Market output consists of output for sale and output for own use.** The term output for sale is an abbreviation for production delivered to, or intended to be delivered to, other units at economically significant prices.

Output for sale

- 6.95 Output for sale consists of products that have been delivered to other units at economically significant prices or are intended to be delivered to other units at economically significant prices when the product is complete. The value of output for sale is determined as the sum of the following items:

- (a) The value of goods and services sold at economically significant prices;
- (b) The value of goods or services bartered in exchange for other goods, services or assets;
- (c) The value of goods or services used for payments in kind, including compensation in kind;

- (d) The value of goods or services supplied by one establishment to another belonging to the same market enterprise to be used as intermediate inputs where a change of economic ownership is involved;
- (e) The value of changes in inventories of finished goods and work-in-progress intended for one or other of the above uses;
- (f) The margins charged on the supply of goods and services, transport margins, margins on the acquisition and disposal of financial assets etc.

Recording of sales

- 6.96 The times at which sales are to be recorded are when the receivables and payables are created: that is, when the ownership of the goods passes from the producer to the purchaser or when the services are provided to the purchaser. The goods or services are valued at the basic prices at which they are sold. If valuation at basic prices is not feasible, they may be valued at producers' prices instead. For some margin services, especially those concerning financial assets, the value of the service provided may be implicit. If it is necessary to value the sale of goods at producers' prices rather than basic prices, then the implicit value of margin services should also include any applicable taxes on products.

- 6.97 The values of sales are determined by the amounts receivable and payable by the producers and purchasers, suitably adjusted for trade and transport margins. The amounts receivable and payable do not always coincide with the amounts actually received and paid. The amount payable should be shown in the production account and the difference between amounts payable and paid should be shown as trade credits in the financial account. Subsequent payments of these amounts outstanding are recorded as financial transactions and not as part of the production account. If payments made in advance or in arrears attract interest charges, these should be shown as separate transactions and not included in the value of sales.

Recording of barter

- 6.98 Barter occurs when goods and services are exchanged for other goods, services or assets. The value of goods or services bartered should be recorded when the ownership of the goods is transferred or the services are provided: they should be valued at the basic prices that would have been received if they had been sold.

Recording of compensation in kind or other payments in kind

- 6.99 Goods or services provided to employees as compensation in kind, or used for other payments in kind, should be recorded when the legal ownership of the goods is transferred or the services are provided. They should be valued at the basic prices that would have been received if they had been sold.

Recording of intra-enterprise deliveries

- 6.100 Intra-enterprise deliveries are only recorded when there is a change in economic ownership. When deliveries are recorded, they should be valued at the basic prices that would have been received if they had been sold.

Changes in inventories of finished goods

- 6.101 The basic principle underlying the measurement of changes in inventories of finished goods is that output should be recorded at the time it is produced and valued at the same price whether it is sold or otherwise used or entered into inventories for sale or use later. In effect, goods only enter inventories when they are not immediately used for sale or other use in the period they are produced. Similarly, goods are withdrawn from inventories when the demand for the goods exceeds the amount produced in a period. No output is recorded when goods produced previously are withdrawn from inventories and sold or otherwise used. Inventories of finished goods therefore explain the difference between production and sales (or other use) in a single period. It follows that entries into inventories must be valued at the basic

prices prevailing at the time of entry, while withdrawals must be valued at the prices at which they are then sold. This method of valuing changes in inventories, which may be described as the “perpetual inventory method” or PIM, is not always easy to implement in practice, however, and it sometimes leads to results that may be counter intuitive.

- 6.102 When prices are stable, the measurement of changes in inventories is relatively simple. However, when there is inflation (or deflation), significant price increases (decreases) may occur while goods are held in inventories. Holding gains (losses) accruing on goods held in inventories after they have been produced must not be included in the value of output. It follows from the valuation method used that, when prices are changing, goods entering and leaving inventories at different times are valued at different prices, even within the same accounting period (as also are goods sold at different times). This requires all entries to, and withdrawals from, inventories should in principle be recorded continuously as they occur, and helps explain the complexity of the perpetual inventory method. The perpetual inventory method ensures their exclusion by valuing goods withdrawn from inventories at the prices prevailing at the time they are withdrawn and not at the prices at which they are entered, or their “historic costs”. This method of valuation can lead to much lower figures for both output and profits in times of inflation than those obtained by business accounting methods based on historic costs. Further discussion on the valuation of inventories appears in [chapter 10](#).

- 6.103 It follows from the general principles outlined in the previous section that:
- (a) Goods entering inventories are valued at the basic prices prevailing at that time: that is, at the prices at which they could have been sold when first produced;
 - (b) Goods withdrawn from inventories are valued at the basic prices prevailing at that time: that is, at the prices at which they can then be sold.

6.104 Goods held in inventories are subject to deterioration through the passage of time and are at risk from theft or accidental damage. Recurrent losses due to normal rates of wastage, theft and accidental damage are treated in the same way as withdrawals from inventories and thus reduce the value of output. The total value of the changes in inventories of finished goods recorded within a specified accounting period is then given by:

the sum of the values of all goods entering inventories

less the sum of the values of all goods withdrawn from inventories

less the value of any recurrent losses of goods held in inventories.

Changes in inventories of work-in-progress

6.105 When the process of production takes a long time to complete, output must be recognized as being produced continuously as work-in-progress. As the process of production continues, intermediate inputs are continually being consumed so that it is necessary to record some corresponding output to avoid obtaining meaningless figures for value added by recording the inputs and outputs as if they took place at different times, or even in different accounting periods. Work-in-progress is essentially incomplete output that is not yet marketable: that is, output that is not sufficiently processed to be in a state in which it can easily be supplied or sold to other institutional units. It is essential to record such output whenever the process of production is not completed within a single accounting period so that work-in-progress is carried forward from one period to the next. In this case, the current value of the work-in-progress completed up to the end of the first period is recorded in the closing balance sheet, which also serves as the opening balance sheet for the next period.

6.106 Work-in-progress may need to be recorded in any industry, including service industries such as the production of movies, depending upon the length of time it takes to produce a

unit of output. It is particularly important in industries with long gestation periods, such as certain types of agricultural production or durable producers' goods production, where the period of production may extend over several years.

6.107 Work-in-progress is treated in the System as one component of inventories of outputs held by producers. However, the borderline between inventories of partially completed structures and gross fixed capital formation may not always be clear. Gross fixed capital formation is undertaken by users of fixed assets so that gross fixed capital formation cannot be recorded until the legal ownership of the assets is transferred from their producers to their users. This transfer does not usually occur until the process of production is completed. However, when a contract of sale has been concluded in advance, the transfer of legal ownership may be deemed to occur in stages as value is put in place. In such cases, stage payments made by the purchaser can often be used to approximate the value of the gross fixed capital formation although stage payments may sometimes be made in advance or in arrears of the completion of the stage, in which case short-term credits are also extended from the purchaser to the producer, or vice versa. In the absence of a contract of sale, the output produced must be treated as additions to the producer's inventories, i.e., as work-in-progress, however large the partially completed structure may be. When the production process is terminated, the whole of the work-in-progress accumulated up to that point is effectively transformed into inventories of finished product ready for delivery or sale. When a sale takes place, the value of the sale must be cancelled by a withdrawal from inventories of equal value so that only the additions to work-in-progress recorded while production was taking place in the period in question remain as measures of output. In this way, the output is distributed over the entire period of production.

6.108 Additions to, and withdrawals from, work-in-progress are treated in the accounts in the same way as entries to, and withdrawals from, inventories of finished goods. They must be recorded at the times they take

place and at the basic prices prevailing at those times. However, further explanation is needed of the valuation in view of the special characteristics of work-in-progress. This explanation appears in [chapter 19](#).

Output for own use

6.109 ***Output for own use consists of products retained by the producer for his own use as consumption or capital formation.*** The value of output for own use is determined as the sum of the following:

- (a) The value of goods produced by an unincorporated enterprises and consumed by the same household;
- (b) The value of services provided to households by paid domestic staff;
- (c) The value of the imputed services of owner-occupied dwellings;
- (d) The value of the fixed assets produced by an establishment that are retained within the same enterprise for use in future production (own-account gross fixed capital formation);
- (e) The value of changes in inventories of finished goods and work-in-progress intended for one or other of the above uses;
- (f) In specified cases, the value of goods and services for intermediate consumption in the same establishment or enterprise.

Goods produced by households

6.110 All goods produced by households are within the production boundary and those that are not delivered to other units should be treated as either being consumed immediately or stored in inventories for later use.

Services of domestic staff

6.111 Paid domestic staff (child minders, cooks, gardeners, chauffeurs, etc.) are formally treated as employees of an unincorporated enterprise that is owned by the household.

The services produced are consumed by the same unit that produces them and they constitute a form of own-account production. By convention, any intermediate costs and consumption of fixed capital incurred in the production of the domestic services are treated not as intermediate consumption of the output of the domestic services but as final consumption expenditure of the household. Thus the value of the output produced is deemed to be equal to the compensation of employees paid, including any compensation in kind such as food or accommodation.

Services of owner-occupied dwellings

6.112 Households that own the dwellings they occupy are formally treated as owners of unincorporated enterprises that produce housing services consumed by those same households. When well-organized markets for rented housing exist, the output of own-account housing services can be valued using the prices of the same kinds of services sold on the market in line with the general valuation rules adopted for goods or services produced on own account. In other words, the output of the housing services produced by owner occupiers is valued at the estimated rental that a tenant would pay for the same accommodation, taking into account factors such as location, neighbourhood amenities, etc. as well as the size and quality of the dwelling itself. The same figure is recorded under household final consumption expenditures. In many instances, no well-organised markets exist and other means of estimating the value of housing services must be developed. The issue is discussed further in [chapter 17](#).

Own capital formation


6.113 Goods or services used for own gross fixed capital formation can be produced by any kind of enterprise, whether corporate or unincorporated. They include, for example, the special machine tools produced for their own use by engineering enterprises, or dwellings, or extensions to dwellings, produced by households. A wide range of construction activities may be undertaken for the purpose of own gross fixed capital

formation in rural areas in some countries, including communal construction activities undertaken by groups of households.

Changes in inventories

- 6.114 Additions to work-in-progress on structures intended for own use are treated as acquisitions of fixed assets by their producers. Goods or services produced for own final use may be placed in inventories of finished products for use later. They are valued at the basic prices of similar products sold on the market at the time they enter inventories or by their costs of production if no suitable basic prices are available.

Own intermediate consumption

- 6.115  unusual to record goods and services used as intermediate consumption within the same establishment but there are occasions where it may be desirable. If such recording is made, the goods and services in question add to both intermediate consumption and output so value added is unaffected by this practice
- 6.116 If an activity such as delivery services is of particular interest and there is a diversity of practice about whether it is treated as secondary output (that is, is charged for) or as being for own use (not charged for) then it may be desirable to show all delivery services as if they were secondary products with the output shown as own intermediate consumption where appropriate.
- 6.117 If a product is delivered by one establishment to another within the same enterprise, it is shown as output of the first establishment and intermediate consumption of the second. However, if a production account is being compiled for the enterprise, it may be preferable to show the product as both output and intermediate consumption of the enterprise rather than to consolidate it out. This may be the case particularly for ancillary services provided by a separate establishment.
- 6.118 In some cases, part of the current output may be placed in inventories for use as intermediate consumption in future. An

example is agriculture where some of the current crop may be used for seed in future

Valuation of output for own use

- 6.119 Output for own use should be valued at the basic prices at which the goods and services could be sold if offered for sale on the market. In order to value them in this way, goods or services of the same kind must actually be bought and sold in sufficient quantities on the market to enable reliable market prices to be calculated for use for valuation purposes. The expression “on the market” means the price that would prevail between a willing buyer and willing seller at the time and place that the goods and services are produced. In the case of agricultural produce, for example, this does not necessarily equate to the prices in the local market where transportation costs and possibly wholesale margins may be included. The nearest equivalent price is likely to be the so-called “farm gate” price; that is, the price that the grower could receive by selling the produce to a purchaser who comes to the farm to collect the produce.
- 6.120 When reliable market prices cannot be obtained, a second best procedure must be used in which the value of the output of the goods or services produced for own use is deemed to be equal to the sum of their costs of production: that is, as the sum of:
- a. Intermediate consumption;
 - b. Compensation of employees;
 - c. Consumption of fixed capital;
 - d. A return to fixed capital;
 - e. Rent on land used in the production, if any;
 - f. Other taxes (less subsidies) on production.
- 6.121 For unincorporated enterprises, it may not be possible to estimate compensation of employees, consumption of fixed capital and a return to capital separately in which case

an estimate of mixed income, covering all these items, should be made.

- 6.122 It will usually be necessary to value the output of own-account construction on the basis of costs as it is likely to be difficult to make a direct valuation of an individual and specific construction project that is not offered for sale. When the construction is undertaken for itself by a business enterprise, the requisite information on costs may be easily ascertained, but not in the case of the construction of dwellings by households or communal construction for the benefit of the community undertaken by informal associations or groups of households. Most of the inputs into communal construction projects, including labour inputs, are likely to be provided free so that even the valuation of the inputs may pose problems. As unpaid labour may account for a large part of the inputs, it is important to make some estimate of its value using wage rates paid for similar kinds of work on local labour markets. While it may be difficult to find an appropriate rate, it is likely to be less difficult than trying to make a direct valuation of a specific construction project itself. The fact that an imputation is made for the value of labour input is a means to approximate the market price for the construction. It does not imply that these labour costs should also be treated as compensation of employees. As explained in [chapter 7](#), when labour is provided on a voluntary basis to a producer unit other than the labourer's own household, no imputation for compensation of employees is made. If labour is provided for a nominal payment, only the nominal payment is recorded as compensation of employees.

Non-market output

- 6.123 *Non-market output consists of goods and individual or collective services produced by non-profit institutions serving households (NPISHs) or government that are supplied free, or at prices that are not economically significant, to other institutional units or the community as a whole.* Although this output is shown as being acquired by government and NPISHs in the use of income account, it should not be confused with production for own use.

The expenditure is made by government and by NPISHs but the use of individual goods and services is by households, and the use of collective services by either households or corporations. Thus non-market output should never be confused with output for own use where the producer unit not only has imputed expenditure on the output but also actually uses the output. [Chapter 9](#) discusses the difference between expenditure and use in more detail.

- 6.124 As explained above, government units or NPISHs may engage in non-market production because of market failure or as a matter of deliberate economic or social policy. Such output is recorded at the time it is produced, which is also the time of delivery in the case of non-market services. In general, however, it cannot be valued in the same way as goods or services produced for own final consumption or own capital formation that are also produced in large quantities for sale on the market. There are no markets for collective services such as public administration and defence, but even in the case of non-market education, health or other services provided to individual households, suitable prices may not be available. It is not uncommon for similar kinds of services to be produced on a market basis and sold alongside the non-market services but there are usually important differences between the types and quality of services provided. In most cases it is not possible to find enough market services that are sufficiently similar to the corresponding non-market services to enable their prices to be used to value the latter, especially when the non-market services are produced in very large quantities.

- 6.125 The value of the non-market output provided without charge to households is estimated as the sum of costs of production, as follows:

- a. Intermediate consumption;
- b. Compensation of employees;
- c. Consumption of fixed capital;
- d. A return to fixed capital;

e. Rent on land used in the production, if any;

f. Other taxes (less subsidies) on production.

6.126 If the output is made available at **nominal** cost, the prices are not economically significant prices and may reflect neither relative production costs nor relative consumer preferences. They therefore do not provide a suitable basis for valuing the outputs of the goods or services concerned. The non-market output of goods or services sold at these prices is valued in the same way as goods or services provided free, i.e., by their costs of production. Part of this output is purchased by households, the remainder constituting final consumption expenditures by government units or NPISHs.

6.127 Government units and NPISHs may be engaged in both market and non-market production. Whenever possible, separate establishments should be distinguished for these two types of activities, but this may not always be feasible. Thus, a non-market establishment may have some receipts from sales of market output produced by a secondary activity: for example, sales of reproductions by a non-market museum. However, even though a non-market establishment may have sales receipts, its

total output covering both its market and its non-market output is still valued by the production costs. The value of its market output is given by its receipts from sales of market products, the value of its non-market output being obtained residually as the difference between the values of its total output and its market output. The value of its receipts from the sale of non-market goods or services at prices that are not economically significant remains as part of the value of its non-market output.

Market and non-market producers

6.128 *Market producer are establishments, all or most of whose output is either output for sale or output for own use. Non-market producers consist of establishments owned by government units or NPISHs that supply goods or services free, or at prices that are not economically significant, to households or the community as a whole.* These producers may also have some sales of secondary market output whose prices are intended to cover their costs or earn a surplus: for example, sales of reproductions by non-market museums. Though government and NPISHs may have establishments undertaking market production, including own account capital construction, most of their activity will be undertaken on a non-market basis.

F. The output of particular industries

1. Introduction

6.129 In general, the rules governing the recording and valuation of output are not sufficient to determine the way in which the output of certain kinds of industries, mostly service industries, such as wholesale and retail trade and financial institutions, is measured. The following sections provide further information about the measurement of the output of a number of specific industries. For convenience, the industries concerned are given in the same order as they appear in the ISIC.

2. Agriculture, forestry and fishing

6.130 The growth and regeneration of crops, trees, livestock or fish which are controlled by, managed by and under the responsibility of institutional units constitute a process of production in an economic sense. Growth is not to be construed as a purely natural process that lies outside the production boundary. Many processes of production exploit natural forces for economic purposes: for example, hydroelectric plants exploit rivers and gravity to produce electricity.

6.131 The measurement of the output of agriculture, forestry and fishing is complicated by the fact that the process of production may extend over many months, or even years. Many agricultural crops are annual with most costs incurred at the beginning of the season when the crop is sown and again at the end when it is harvested. However, immature crops have a value depending on their closeness to harvest. The value of the crop has to be spread over the year and treated as work-in-progress. Often the final value of the crop will differ from the estimate made of it and imputed to the growing crop before harvest. In such cases revisions to the early estimates will have to be made to reflect the actual outcome. When the crop is harvested, the cumulated value of work-in-progress is converted to inventories of finished goods that is then run down as it is used by the producer, sold or is lost to vermin.

6.132 Some plants and many animals take some years to reach maturity. In this case, the increase in their value is shown as output and treated as increases in fixed capital or inventories depending on whether the plant or animal yields repeat products or not. (There is more discussion of this distinction in [chapter 10](#).) The value of the increase in the plants or animals should take account of the delay before the yield from them is realised as explained in [chapter 19](#). Once the plant or animal has reached maturity, it will decline in value and this decline should be recorded as consumption of fixed capital (see below).

3. Machinery, equipment and construction

6.133 The production of high value capital goods such as ships, heavy machinery, buildings and other structures may take several months or years to complete. The output from such production must usually be measured by work-in-progress and cannot be recorded simply at the moment in time when the process of production is completed. The way in which work-in-progress is to be recorded and valued is explained in [chapter 19](#).

6.134 When a contract of sale is agreed in advance for the construction of such products, the output produced each period is treated as being sold to the purchaser at the end of each period, that is, as a sale rather than work-in-progress. In effect, the output produced by the construction contractor is treated as being sold to the purchaser in stages as the latter takes legal possession of the output. It is recorded as gross fixed capital formation by the purchaser and not as work-in-progress by the producer. When the contract calls for stage payments, the value of the output may often be approximated by the value of stage payments made each period. In the absence of a contract of sale, however, the incomplete output produced each period must be recorded as work-in-progress of the producer. In the case of dwellings built speculatively, they remain in the inventories of the construction company until sold, changing status within inventories from work-in-progress to finished products if they remain unsold on completion.

4. Transportation and storage

Transportation

6.135 The output of transportation is measured by the value of the amounts receivable for transporting goods or persons. In economics a good in one location is recognized as being a different quality from the same good in another location, so that transporting from one location to another is a process of production in which an economically significant transformation takes place even if the good remains otherwise unchanged. The volume of transport services may be measured by indicators such as tonne-kilometres or passenger-kilometres, which combine both the quantities of goods, or numbers of persons, and the distances over which they are transported. Factors such as speed, frequency or comfort also affect the quality of services provided. Transportation is a typical service activity in that the output produced consists of transformations of persons or goods that do not themselves form part of the output of the service producers. While the services performed are easily identified and quantified, they are not

separate entities from the goods or persons in which they are incorporated.

Storage

6.136 Although the production of storage for the market may not be very extensive, the activity of storage is important in the economy as a whole as it is carried out in many enterprises. During storage the inventories of goods have to be physically stored somewhere. Many goods have to be stored in a properly controlled environment and the activity of storage can become an important process of production in its own right whereby goods are “transported” from one point of time to another. In economics, it is generally recognized that the same goods available at different times, or locations, may be qualitatively different from each other and command different prices for this reason. The increase in price of a product due to the fact that it has been in storage and storage costs have been incurred is a production process.

6.137 When goods are first produced, they may be held in store for a time in the expectation that they may be sold, exchanged or used more advantageously in the future. If the increase in value simply reflects general inflation, then there is no further production during the period in addition to the costs of storage just described. However, there are two reasons why the increase in value can be construed as further production. The first is that the quality of the good may improve with the passage of time (such as wine) or there may be seasonal factors affecting the supply or the demand for the good that lead to regular, predictable variations in its price over the year, even though its physical qualities may not have changed otherwise. In both these circumstances, storage can be regarded as an extension of the production process over time. The storage services become incorporated in the goods, thereby increasing their value while being held in store. Thus, in principle, the values of additions to inventories should include not only the values of the goods at the time they are stored but also the value of the additional output produced while the goods are held in store.

6.138 However, most manufactured goods are produced and sold continuously throughout the year and are not subject to regular changes in supply or demand conditions. Nor do they “mature” while being stored. Changes in the prices of such goods while in inventories cannot be treated as additions to work-in-progress. In order to estimate the increase in the value of goods stored over and above the storage costs, use may be made of the expected real holding gain over a pre-determined period. Any variation in actual holding gain (or loss) from the expectation or any gain that occurs outside the pre-determined period continues to be recorded as a holding gain or loss.

5. Wholesale and retail distribution

6.139 Although wholesalers and retailers actually buy and sell goods, the goods purchased are not treated as part of their intermediate consumption when they are resold with only minimal processing such as grading, cleaning, packaging, etc. Although they have legal ownership of the goods, because they use the goods in a production process only in a passive way, they may be considered not to take economic ownership of the goods. Instead, wholesalers and retailers are treated as supplying services to their customers by storing and displaying a selection of goods in convenient locations and making them easily available for customers to buy. Their output is measured by the total value of the trade margins realized on the goods they purchase for resale. *A trade margin is defined as the difference between the actual or imputed price realized on a good purchased for resale and the price that would have to be paid by the distributor to replace the good at the time it is sold or otherwise disposed of.* The margins realized on some goods may be negative if their prices have to be marked down. They must also be negative on goods that are never sold because they go to waste or are stolen.

6.140 The standard formula for measuring output has to be modified for wholesalers or retailers by deducting from the value of the goods sold or otherwise used the value of the goods that would need to be purchased to replace them. The latter include the

additional goods needed to make good recurrent losses due to normal wastage, theft or accidental damage. In practice, the output of a wholesaler or retailer is given by the following identity:

the value of output = the value of sales;

plus the value of goods purchased for resale and used for intermediate consumption, compensation of employees, etc.;

minus the value of goods purchased for resale;

plus the value of additions to inventories of goods for resale;

minus the value of goods withdrawn from inventories of goods for resale;

minus the value of recurrent losses due to normal rates of wastage, theft or accidental damage.

6.141 The following points should be noted:

- (a) Goods sold are valued at the prices at which they are actually sold, even if the trader has to mark their prices down to get rid of surpluses or avoid wastage. Allowance should also be made for the effect of reductions in price due to loyalty programmes or other schemes to offer reduced prices to certain customers in certain circumstances.
- (b) Goods provided to employees as remuneration in kind should be valued at the current purchasers' prices payable by the traders to replace them; that is, the realized margins are zero. Similarly, goods withdrawn by the owners of unincorporated enterprises for their own final consumption should be valued at the current purchasers' prices payable by the traders to replace them.
- (c) Goods purchased for resale should be valued excluding any transport charges invoiced separately by the suppliers or paid to third parties by wholesalers or

retailers: these transport services form part of the intermediate consumption of the wholesalers or retailers.

- (d) Additions to inventories of goods for resale should be valued at the prices prevailing at the time of entry.
- (e) Goods withdrawn from inventories of goods for resale should be valued at the prices prevailing at the time they are withdrawn (as distinct from the prices at which they were originally purchased and entered inventories). The value of goods withdrawn from inventories include the value of recurrent losses due to normal rates of wastage, theft or accidental damage; goods lost are valued in the same way as goods withdrawn for sale.

6.142 The margins realized on goods purchased for resale thus vary according to their eventual use. The margins realized on goods sold at the full prices intended by the traders could be described as the normal margins. In fixing these margins, traders take account not only of their ordinary costs such as intermediate consumption and compensation of employees but also of the fact that some goods may ultimately have to be sold off at reduced prices while others may go to waste or be stolen. The margins realized on goods whose prices have to be marked down are obviously less than the normal margins and could be negative. The margins on goods used to pay employees as compensation in kind or withdrawn for final consumption by owners are zero because of the way these goods are valued. Finally, the margins on goods wasted or stolen are negative and equal to the current purchasers' prices of replacements for them.

6.143 The average margin realized on goods purchased for resale may be expected to be less than the normal margin, possibly significantly less for certain types of goods such as fashion goods or perishable goods. Finally, it should be noted that margins are defined to exclude holding gains or losses on goods for resale while they are being held in inventories by wholesalers or retailers. As in the case of other types of production, holding gains and losses are

excluded from output by valuing all entries to, or withdrawals from, inventories at the prices prevailing at the times the entries or withdrawals take place.

6. Output of the central bank

6.144 Before discussing financial services more generally, it is helpful to discuss the output of the central bank. There are three broad groups of central banks services. These are monetary policy services, financial intermediation and borderline cases. Monetary policy services are collective in nature, serving the community as a whole, and thus represent non-market output. Financial intermediation services are individual in nature and in the absence of policy intervention in the interest rates charged by the central banks, would be treated as market production. The borderline cases, such as supervisory services may be classified as market or non-market services depending on how they are paid for.

6.145 In principle, a distinction should be made between market and non-market output but in practice the possible resource intensiveness of the exercise and the relative importance of making the distinction should be considered before implementing the conceptual recommendations.

6.146 As long as it can be identified as a separate institutional unit, the central bank is always included in the financial institutions sector and never in general government. However, collective consumption is always recorded as expenditure by general government but government does not incur the costs incurred by the central bank. The recommendation, therefore, is that a current transfer of the value of the non-market output should be recorded as payable by the central bank and receivable by the general government and a purchase of the non-market output of the central bank by government should also be recorded.

6.147 If the interest rates charged by the central bank are artificially high or low because of policy intervention, the excess over the reference rate should be treated as a tax or a subsidy as appropriate collected (paid) by

the central bank on behalf of government and thus shown directly in the accounts for general government under the heading of other taxes (subsidies) on production.

6.148 Remaining market services, if significant, are recorded as payable by the units to whom they are delivered.

7. Financial services other than those associated with insurance and pension funds

6.149 A comprehensive discussion of the contribution of financial assets and liabilities to the generation and distribution of income and changes in wealth in an accounting period is given in chapter 17. What follows is a summary of the main aspects affecting the measurement of the output of financial services. Financial services are the result of risk management, liquidity transformation, auxiliary financial activities and the services provided by insurance companies and pension funds.

6.150 Risk management and liquidity transformation are productive activities in which an institutional unit incurs financial liabilities for the purpose of acquiring mainly financial assets. Corporations engaged in these activities obtain funds, not only by taking deposits but also by issuing bills, bonds or other securities. They use these funds as well as own funds to acquire mainly financial assets not only by making advances or loans to others but also by purchasing bills, bonds or other securities. Auxiliary financial activities facilitate risk management and liquidity transformation activities. Financial auxiliaries, which are the units primarily engaged in auxiliary financial activities, typically act on behalf of other units and do not put themselves at risk by incurring financial liabilities or by acquiring financial assets.

6.151 Financial services are produced almost exclusively by financial institutions because of the usually stringent supervision of the provision of those services. Similarly, financial institutions rarely produce other services. If a retailer wishes to offer credit facilities to its customers, for example, the credit facilities are usually offered by a

subsidiary of the retailer, the subsidiary being treated as a financial institution in its own right regardless of the classification of the parent. Financial institutions may also create subsidiaries dealing with only particular forms of financial services. For example, a credit card operation may be associated with a given bank but may be institutionally separate.

6.152 Financial services may be paid for explicitly or implicitly. Some transactions in financial assets may involve both explicit and implicit charges. Four main ways in which financial services are provided and charged for may be considered:

- (a) Financial services provided in return for explicit charges;
- (b) Financial services provided in association with interest charges on loans and deposits;
- (c) Financial services associated with the acquisition and disposal of financial assets and liabilities in financial markets;
- (d) Financial services associated with insurance and pension schemes.

The following sections look at each of these in turn. In [chapter 17](#) there is an overview of the transactions and other flows associated with each type of financial instrument. The recording of investment income is described in [chapter 7](#) and the acquisition and disposal of financial assets and liabilities in [chapter 11](#). Changes in the value of financial assets and liabilities not arising from transactions are described in [chapter 12](#).

Financial services provided in return for explicit charges

6.153 Many services come under this heading and may be provided by different categories of financial institutions. Deposit taking institutions, such as banks, may charge households to arrange a mortgage, manage an investment portfolio, give taxation advice, administer an estate, and so on. Specialised financial institutions may charge

non-financial corporations to arrange a flotation of shares or to administer a restructuring of a group of corporations. However, the most pervasive and probably largest direct fee is likely to be that charged by credit card issuers to the units that accept credit cards as a means of payment for the goods and services they provide. The charge is usually calculated as a percentage of the sale; in the case of retailers the sale value corresponds to turnover and not output. Although the percentage is usually small in absolute terms, maybe one or two percent, the fact that it is applied to such large totals means that the total value of the charge is very large. The charge represents output of the credit card companies and intermediate consumption of the corporations that accept credit cards as means of payment. Ignoring the role of the credit card company does not affect the measurement of the expenditure (usually final consumption or exports) on the goods and services concerned but does underestimate the costs of the provider of goods and services and the output of the credit card company. This in turn leads to a misallocation of value added from the credit card company to the provider of the goods and services paid for by credit card.

6.154 The example of the credit card company is one that clearly demonstrates that a financial corporation may provide services that are paid for by different means by different customers or in different circumstances. The fee charged to the corporations accepting a credit card as means of payment has just been discussed. A card holder may also be charged an explicit fee, usually each year, for holding the card. In addition, if a card holder uses the credit facilities offered by the card, he will pay indirect charges associated with interest payable on the outstanding credit (which is treated as a loan in the System).

Financial services provided in association with interest charges on loans and deposits

6.155 One traditional way in which financial services are provided is by means of financial intermediation. This is understood to refer to the process whereby a financial

institution such as a bank would accept deposits from units wishing to receive interest on funds for which the unit has no immediate use and lend them to other units whose funds are insufficient to meet their needs. The bank thus provides a mechanism to allow the first unit to lend to the second. Each of the two parties pay a fee to the bank for the service provided, the unit lending funds by accepting a rate of interest lower than that paid by the borrower, the difference being the fee implicitly charged by the bank. From this basic idea the concept emerges of a “reference” rate of interest, the difference between the reference rate and the rate actually paid representing a financial intermediation service charge indirectly measured (FISIM).

6.156 However, it is seldom the case that the amount of funds lent by a financial institution exactly matches the amount deposited with them. Some money may have been deposited but not yet loaned; some loans may be financed by the bank’s own funds and not from borrowed funds. However, the depositor of funds receives the same amount of interest and service whether or not his funds are on lent, and the borrower pays the same rate of interest and receives the same service whether his funds are provided by intermediated funds or the bank’s own funds. For this reason an indirect service charge is to be imputed in respect of all loans and deposits offered by a financial institution irrespective of the source of the funds. The reference rate applies to both interest paid on loans and interest paid on deposits so that the amounts of interest recorded as such in the System are calculated as the reference rate times the level of loan or deposit in question. The difference between these amounts and the amounts actually paid to the financial institution are recorded as service charges paid by the borrower or depositor to the financial institution. For clarity the amounts recorded in the System as interest are described as “SNA interest” and the total amounts actually paid to or by the financial institution are described as “bank interest”. The implicit service charge is thus the sum of the bank interest on loans less the SNA interest on the same loans plus the SNA interest on deposits less the bank interest on

the same deposits. The service charge is payable by or to the unit in receipt of the loan or owning the deposit as appropriate.

6.157 These indirect charges in respect of interest apply only to loans and deposits and only when those loans and deposits are provided by, or deposited with, financial institutions. The financial institutions in question need not be resident; nor need the clients of the financial institution be resident. Thus imports and exports of this type of financial service are possible. Nor need the financial institution necessarily offer deposit-taking facilities as well as making loans. The financial subsidiaries of retailers are examples of financial institutions that make loans without accepting deposits. A money lender who has sufficiently detailed accounts to be treated as an actual or quasi-corporation may receive this sort of charge; indeed since money lenders usually charge especially high rates of interest, their service charges may exceed the SNA interest payments by significant amounts.

6.158 The reference rate to be used in the calculation of SNA interest is a rate between bank interest rates on deposits and loans. However, because there is no necessary equality between the level of loans and deposits, it cannot be calculated as a simple average of the rates on loans or deposits. The reference rate should represent a risk-free rate of interest such as that prevailing for inter-bank borrowing and lending. However, different reference rates may be needed for each currency in which loans and deposits are denominated, especially when a non-resident financial institution is involved. The fact that the inter-bank rate may be considered as the reference rate implies that, for banks within the same economy, there is often little if any service provided in association with banks lending to and borrowing from other banks.

6.159 Banks may offer loans that they describe as being fixed interest loans. This is to be interpreted as a situation where the level of bank interest is fixed but as the reference rate changes, the level of SNA interest and the service charge will vary.

6.160 When an enterprise acquires a fixed asset under the terms of a financial lease, a loan is imputed between the lessor and the lessee. Regular payments under the lease are treated as being payments of interest and repayment of capital. When the lessor is a financial institution, the interest payable under the terms of a financial lease corresponds to bank interest and should be separated into SNA interest and financial service charge as for any other loan.

Financial services associated with the acquisition and disposal of financial assets and liabilities in financial markets

6.161 Debt securities such as bills and bonds are other forms of financial assets that give rise to interest payments, interest being payable to the owner of the security by the issuer. As described in chapter 17, some of these interest charges may themselves be imputed from changes in the value of securities as they approach maturity. However, the service charge made by the financial institution offering a security is not linked to the payment of interest, no matter how it is calculated. Instead, a charge is levied any time a security is bought, the purchase price (or ask price) representing the estimated market value of the security plus a margin. Another charge is levied when a security is sold, the price offered to the seller (the bid price) representing the market value less a margin.

6.162 Prices of securities may change rapidly and to avoid including holding gains and losses in the calculation of the service margins, it is important to calculate the margins on sales and purchases in terms of mid-prices. The mid-price of a security is the average at a given point in time between the bid and ask price. Thus the margin on the purchase of a security is the difference between the ask price and mid-price at the time of the purchase and the margin on a sale is the difference between the mid-price and the bid price at the time of the sale.

6.163 It is important when measuring interest as the increase in value of a security between the date it is purchased and the date it matures (or is subsequently sold) to measure from one mid-point value to another and to

treat the differences between mid-point price and bid or ask price at the time of purchase, sale or redemption as a service margin. Ignoring the margins understates the value of output of financial institutions and may understate interest payments also.

6.164 Equities and investment fund shares or units give rise to property income other than interest but like debt securities, they are offered for sale and purchase at different prices. The difference between the buying price and mid-price and the mid-price and selling price should be treated as the provision of financial services as in the case of securities. The same principles apply for the same reason.

6.165 Although no property income flows are involved, margins between buying and selling prices also apply to foreign currencies (including transactions denominated in foreign currencies such as payments for imports and exports as well as the acquisition of physical notes and coins of a foreign currency). Again these margins should be treated as the provision of financial services in a manner similar to that described for securities.

8. Financial services associated with insurance and pension schemes.

6.166 Five types of activities are covered under this heading:

Non-life insurance;

Life insurance and annuities;

Reinsurance;

Pension schemes;

Standardised guarantee schemes.

6.167 All these schemes lead to redistribution of funds, which are recorded in either the secondary distribution of income account or the financial account. For non-life insurance and standardised guarantee schemes, most of the redistribution takes place between different units in the same period. Many client units pay relatively small policy premiums or fees and a small number of

them receive relatively large claims or payments. For life insurance, annuities and pension schemes, the redistribution is primarily, though not entirely, between different periods for a single client. In fulfilling their responsibilities as managers of these funds, insurance companies, pension funds and standardised guarantees schemes are involved in both risk management and liquidity transformation, the prime functions of financial institutions.

plus the property income earned on them less the expected claim will leave a margin that the insurance company can retain; this margin represents the output of the insurance company. Output for a non-life insurance company on a particular class of policies is defined as the sum of the premiums earned in the period plus the sum of the property income earned on these premiums less the expected claims on the policies.

6.168 The detailed recording for each of these activities, including the measurement of output, the recording of flows between the insurance corporations or pension funds on the one hand and policy holders or beneficiaries on the other, and the implications for changes in the balance sheets of both sets of institutions are described in chapter 17. What follows is a summary of the key features of measuring output for the various activities listed above.

6.170 *More on this and following heading to follow with chapter 17 when that is complete.*

Non-life insurance

Life insurance and annuities

6.171

Reinsurance

6.172

Pension schemes

6.169 Under a non-life insurance policy, the insurance company accepts a premium from a client and holds it until a claim is made or the period of the insurance expires. In the meantime, the insurance company invests the premium and the property income is an extra source of funds from which to meet any claim due. The property income represents income foregone by the client and so is treated as an implicit supplement to the actual premium. The insurance company sets the level of the actual premiums to be such that the sum of the actual premiums

6.173

Standardised guarantee schemes

6.174

9. Research and development

6.175 *To follow in the light of final recommendation on treatment of R&D*

G. Intermediate consumption

1. Coverage of intermediate consumption

having been transformed and incorporated into the outputs, for example, grain may be transformed into flour which in turn may be transformed into bread. Other inputs are completely consumed or used up, for example, electricity and most services.

6.176 *Intermediate consumption consists of the value of the goods and services consumed as inputs by a process of production, excluding fixed assets whose consumption is recorded as consumption of fixed capital.* The goods or services may be either transformed or used up by the production process. Some inputs re-emerge after

6.177 Intermediate consumption does not include expenditures by enterprises on valuables consisting of works of art, precious metals and stones and articles of jewellery

fashioned out of them. Valuables are assets acquired as stores of value: they are not used up in production and do not deteriorate physically over time. Expenditures on valuables are recorded in the capital account. Intermediate consumption also does not include costs incurred by the gradual using up of fixed assets owned by the enterprise: the decline in their value during the accounting period is recorded as consumption of fixed capital. However, intermediate consumption does include the rentals paid on the use of fixed assets, whether equipment or buildings, that are leased from other institutional units, and also fees, commissions, royalties, etc., payable under licensing arrangements, as explained above.

6.178 Where ancillary services are not shown as the output of a separate establishment, intermediate consumption includes the value of all the goods or services used as inputs into ancillary activities such as purchasing, sales, marketing, accounting, data processing, transportation, storage, maintenance, security, etc. In this case, the goods and services consumed by these ancillary activities are not distinguished from those consumed by the principal (or secondary) activities of a producing establishment. When a unit provides only ancillary services, it continues to be shown as a separate unit as long as the necessary information is available. There is more discussion of the treatment of ancillary activities in [chapter 5](#).

2. The timing and valuation of intermediate consumption

6.179 The intermediate consumption of a ~~good or service~~ is recorded at the time when the ~~good or service~~ enters the process of production, as distinct from the time it was acquired by the producer. In practice, establishments do not usually record the actual use of goods in production directly. Instead, they keep records of purchases of materials and supplies intended to be used as inputs and also of any changes in the amounts of such goods held in inventories. An estimate of intermediate consumption during a given accounting period can then be derived by subtracting the value of

changes in inventories of materials and supplies from the value of purchases made. Changes in inventories of materials and supplies are equal to entries less withdrawals and recurrent losses on goods held in inventories. Thus, by reducing the value of changes in inventories, recurrent losses increase intermediate consumption. Goods entering and leaving inventories are valued at the purchasers' prices prevailing at the times the entries, withdrawals or recurrent losses take place. This is exactly the same method as that used to value changes in inventories of goods produced as outputs from the production process. Thus, the earlier discussion of the properties and behaviour of the PIM applies to inventories of inputs.

6.180 A good or service consumed as an intermediate input is normally valued at the purchaser's price prevailing at the time it enters the process of production; that is, at the price the producer would have to pay to replace it at the time it is used. As explained in more detail [in paragraphs 6.215 to 6.217](#), the purchaser's price, at least in the case of certain goods, can be regarded as being composed of three elements:

- (a) The basic price received by the producer of the good or service;
- (b) Any transportation costs paid separately by the purchaser in taking delivery of a good at the required time and location plus the cumulative trade margin on a good that passes through the chain of wholesale or retail distribution;
- (c) Any non-deductible tax (less subsidy) on the product payable on the good or service when it was produced or while in transit to the purchaser.

For purposes of the System's input-output tables, it may be necessary to distinguish all three elements but this is not necessary in the accounts for institutional sectors or the central supply and use table.

6.181 Intermediate inputs obtained from other establishments belonging to the same enterprise should be valued at the same

prices as were used to value them as outputs of those establishments plus any additional transport charges not included in the output values.

6.182 When goods or services produced within the same establishment are fed back as inputs into the production within the same establishment, they are only recorded as part of the intermediate consumption if they have been recorded as part of the output of that establishment. There is discussion on when this might be appropriate in section E. Deliveries of goods and services between different establishments belonging to the same enterprise are recorded as outputs by the producing establishments and intermediate inputs by the receiving establishments only when there is an effective change of economic ownership to the receiving establishment .

3. The boundary between intermediate consumption and compensation of employees

6.183 Certain goods and services used by enterprises do not enter directly into the process of production itself but are consumed by employees working on that process. In such cases it is necessary to decide whether the goods and services are intermediate consumption or, alternatively, remuneration in kind to employees. In general, when the goods or services are used by employees in their own time and at their own discretion for the direct satisfaction of their needs or wants, they constitute remuneration in kind. However, when employees are obliged to use the goods or services in order to enable them to carry out their work, they constitute intermediate consumption.

6.184 It is immaterial to the employer whether they are treated as intermediate consumption or compensation of employees because they are both costs from the employer's viewpoint and the net operating surplus is the same. However, reclassifying such goods and services from remuneration in kind to intermediate consumption, or vice versa, changes value added and balance of primary incomes, and hence GDP as a whole.

6.185 The following types of goods and services provided to employees must be treated as part of intermediate consumption:

- (a) Tools or equipment used exclusively, or mainly, at work;
- (b) Clothing or footwear of a kind that ordinary consumers do not choose to purchase or wear and which are worn exclusively, or mainly, at work; e.g., protective clothing, overalls or uniforms. However, uniforms or other special clothing that employees choose to wear extensively off-duty instead of ordinary clothing should be treated as remuneration in kind;
- (c) Accommodation services at the place of work of a kind that cannot be used by the households to which the employees belong: barracks, cabins, dormitories, huts, etc.;
- (d) Special meals or drinks necessitated by exceptional working conditions, or meals or drinks provided to servicemen or others while on active duty
- (e) Transportation and hotel services provided while the employee is travelling on business;
- (f) Changing facilities, washrooms, showers, baths, etc. necessitated by the nature of the work;
- (g) First aid facilities, medical examinations or other health checks required because of the nature of the work.

Employees may sometimes be responsible for purchasing the kinds of goods or services listed above and be subsequently reimbursed in cash by the employer. Such cash reimbursements must be treated as intermediate expenditures by the employer and not as part of the employee's wages and salaries.

6.186 The provision of other kinds of goods and services, such as meals, ordinary housing services, the services of vehicles or other durable consumer goods used extensively

away from work, transportation to and from work, etc. should be treated as remuneration in kind, as explained more fully in **chapter 7**.

4. The boundary between intermediate consumption and gross fixed capital formation

6.187 Intermediate consumption measures the value of goods and services that are transformed or entirely used up in the course of production during the accounting period. It does not cover the costs of using fixed assets owned by the enterprise nor expenditures on the acquisition of fixed assets. The boundary between these kinds of expenditures and intermediate consumption is explained in more detail below.

Small tools

6.188 Expenditures on durable producer goods that are small, inexpensive and used to perform relatively simple operations may be treated as intermediate consumption when such expenditures are made regularly and are very small compared with expenditures on machinery and equipment. Examples of such goods are hand tools such as saws, spades, knives, axes, hammers, screwdrivers, spanners and so on. However, in countries where such tools account for a significant part of the stock of producers' durable goods, they may be treated as fixed assets.

Maintenance and repairs

6.189 The distinction between maintenance and repairs and gross fixed capital formation is not clear-cut. The ordinary, regular maintenance and repair of a fixed asset used in production constitutes intermediate consumption. Ordinary maintenance and repair, including the replacement of defective parts, are typical ancillary activities but such services may also be provided by a separate establishment within the same enterprise or purchased from other enterprises.

6.190 The practical problem is to distinguish ordinary maintenance and repairs from major renovations, reconstructions or

enlargements that go considerably beyond what is required simply to keep the fixed assets in good working order. Major renovations, reconstructions, or enlargements of existing fixed assets may enhance their efficiency or capacity or prolong their expected working lives. They must be treated as gross fixed capital formation as they add to the stock of fixed assets in existence.

6.191 Ordinary maintenance and repairs are distinguished by two features:

- (a) They are activities that owners or users of fixed assets are obliged to undertake periodically in order to be able to utilize such assets over their expected service lives. They are current costs that cannot be avoided if the fixed assets are to continue to be used. The owner or user cannot afford to neglect maintenance and repairs as the expected service life may be drastically shortened otherwise;
- (b) Maintenance and repairs do not change the fixed asset or its performance, but simply maintain it in good working order or restore it to its previous condition in the event of a breakdown. Defective parts are replaced by new parts of the same kind without changing the basic nature of the fixed asset.

6.192 On the other hand, major renovations or enlargements to fixed assets are distinguished by the following features:

- (a) The decision to renovate, reconstruct or enlarge a fixed asset is a deliberate investment decision that may be undertaken at any time and is not dictated by the condition of the asset. Major renovations of ships, buildings or other structures are frequently undertaken well before the end of their normal service lives;
- (b) Major renovations or enlargements increase the performance or capacity of existing fixed assets or significantly extend their previously expected service lives. Enlarging or extending

an existing building or structure obviously constitutes a major change in this sense, but a complete refitting or restructuring of the interior of a building, or ship, also qualifies.

Research and development

6.193 *To follow in the light of the final recommendation on R&D*

Mineral exploration and evaluation

6.194 Expenditures on mineral exploration and evaluation are not treated as intermediate consumption. Whether successful or not, they are needed to acquire new reserves and so are all classified as gross fixed capital formation.

Military equipment

6.195 All military equipment is treated as capital formation; either fixed capital or inventories as appropriate as discussed in [chapter 10](#).

5. Services provided by government to producers

6.196 Government may provide services to producers. To the extent that a charge is made for these services, the charges form part of the intermediate consumption of the producer. However, when the charge does not represent an economically significant price, the value of the service to the producer is greater than the cost. However, no estimation of this benefit is made and the costs of the services not covered by the charges made are included in collective consumption of government.

6. Social transfers

6.197 Expenditures by government or NPISHs on goods or services produced by market producers that are provided directly to households, individually or collectively, without any further processing constitute final consumption expenditures by government or NPISHs and not intermediate consumption. The goods and services in question are one form of social transfers and enter into the actual consumption of households.

6.198 By convention, non-financial and financial corporations do not make social transfers in kind, nor engage in final consumption.

7. Services of business associations

6.199 Non-profit institutions in the form of business associations that exist to protect the interests of their members and are financed by them are market producers. The subscriptions paid by the businesses constitute payments for services rendered. These services are consumed as intermediate inputs by the members of the association and are valued by the amounts paid in subscriptions, contributions or dues.

8. Outsourcing

6.200 It is increasingly common for producers to change the way in which a production activity is completed. Different stages in the process or different support activities such as office cleaning or assembly of electronic components may be contracted out to another producer, in the same country or abroad. This changes the pattern of intermediate inputs even though the underlying technology may be the same. The impact of this on input-output tables is discussed [in chapter 16](#).

9. Leasing equipment

6.201 The decision to rent buildings, machinery or equipment under an operating lease, rather than purchase them, can have a major impact on the ratio of intermediate consumption to value added and the distribution of value added between producers. Rentals paid on buildings or on machinery or equipment under an operating lease constitute purchases of services that are recorded as intermediate consumption. However, if an enterprise owns its buildings, machinery and equipment, most of the costs associated with their use are not recorded under intermediate consumption. The capital consumption on the fixed assets forms part of gross value added while interest costs, both actual and implicit, have to be met out of the net operating surplus. Only the costs of the materials needed for maintenance and repairs appear under intermediate consumption. Decisions to rent

rather than purchase may be influenced by factors quite unrelated to the technology of production, such as taxation, the availability of finance, or the consequences for the balance sheet.

6.202 A comprehensive discussion on the characteristics of different forms of leasing is included in **chapter 17**.

H. Consumption of fixed capital

1. The coverage of consumption of fixed capital

6.203 *Consumption of fixed capital is the decline, during the course of the accounting period, in the current value of the stock of fixed assets owned and used by a producer as a result of physical deterioration, normal obsolescence or normal accidental damage.*

Capital consumption is calculated for all fixed assets owned by producers, but not for valuables (precious metals, precious stones, etc.) that are acquired precisely because their value, in real terms, is not expected to decline over time. Fixed assets must have been produced as outputs from processes of production as defined in the System. Consumption of fixed capital does not, therefore, cover the depletion or degradation of natural assets such as land, mineral or other deposits, or coal, oil, or natural gas or contracts, leases and licences.

6.204 Although some structures such as roads or railway tracks may appear to have infinite lives if properly maintained, it must be remembered that the value of assets may decline not merely because they deteriorate physically but because of a decrease in the demand for their services as a result of technical progress and the appearance of new substitutes for them. In practice, many structures, including roads and railway tracks, are scrapped or demolished because they have become obsolete. Even though the estimated service lives may be very long for some structures, such as roads, bridges, dams, etc., they cannot be assumed to be infinite. Thus, capital consumption needs to be calculated for all types of structures, including those owned and maintained by government units, as well as machinery and equipment.

6.205 Losses of fixed assets due to normal accidental damage are also included under consumption of fixed capital; that is, damage caused to assets used in production resulting from their exposure to the risk of fires, storms, accidents due to human errors, etc. When these kinds of accidents occur with predictable regularity they are taken into account in calculating the average service lives of the goods in question. At the level of the economy as a whole, the actual normal accidental damage within a given accounting period may be expected to be equal, or close, to the average. However, for an individual unit, or group of units, any difference between the average and the actual normal accidental damage within a given period is recorded in the other changes in volume of assets account.

6.206 On the other hand, losses due to war or to major natural disasters that occur very infrequently, such as major earthquakes, volcanic eruptions, tidal waves, exceptionally severe hurricanes, are not included under consumption of fixed capital. There is no reason for such losses to be charged in the production account as costs of production. The values of the assets lost in these ways are recorded in the other changes in the volume of assets account. Similarly, although consumption of fixed capital includes reductions in the value of fixed assets resulting from normal, expected rates of obsolescence, it should not include losses due to unexpected technological developments that may significantly shorten the service lives of a group of existing fixed assets. Such losses are treated in the same way as losses due to above average rates of normal accidental damage. In practice, however, it may be difficult to measure such losses.

2. Consumption of fixed capital and rentals on fixed assets

6.207 *The rental is the amount payable by the user of a fixed asset to its owner, under an operating lease or similar contract, for the right to use that asset in production for a specified period of time.* The rental needs to be large enough to cover not only the reduction in the value of the asset over that period (the consumption of fixed capital) but also the interest costs on the value of the asset at the start of the period and any other costs incurred by the owner. The interest costs may consist either of actual interest paid on borrowed funds or the loss of interest incurred as a result of investing own funds in the purchase of the fixed asset instead of a financial asset. Whether owned or rented, the full cost of using the fixed asset in production is measured by the actual or imputed rental on the asset and not by consumption of fixed capital alone. When the asset is actually rented under an operating lease or similar contract, the rental is recorded under intermediate consumption as the purchase of a service produced by the lessor. When the user and the owner are one and the same unit, consumption of fixed capital represents only part of the cost of using the asset. The remaining part of the cost, referred to above as the interest cost, is also known as the return to fixed capital. The sum of the consumption of fixed capital and the return to capital is known as the capital services rendered by the asset. Capital services are discussed in more detail in [chapter 19](#).

6.208 The value of a fixed asset to its owner at any point of time is determined by the present value of the future capital services (that is, the sum of the values of the stream of future rentals less operating costs discounted to the present period) that can be expected over its remaining service life. Consumption of fixed capital is measured by the decrease, between the beginning and the end of the current accounting period, in the present value of the remaining sequence of capital services. The extent of the decrease will be influenced not only by the amount by which the efficiency of the asset may have declined during the current period but also by the shortening of its service life and the rate at

which its economic efficiency declines over its remaining service life. If the flow of future income that determines the present values used to derive consumption of fixed capital is expressed in terms of income flows that include an element of inflation, then the discount factor should be nominal. If the flows are expressed in terms of current period prices or rentals, then a real discount rate should be used. Either procedure results in a present value expressed in current period prices.

6.209 Consumption of fixed capital is a forward-looking measure that is determined by future, and not past, events. The future rentals on which its value depend result from the benefits that institutional units expect to derive in the future from using the asset in production over the remainder of its service life. Unlike depreciation as usually calculated in business accounts, consumption of fixed capital is not, at least in principle, a method of allocating the costs of past expenditures on fixed assets over subsequent accounting periods. The value of a fixed asset at a given moment in time depends only on the remaining benefits to be derived from its use and consumption of fixed capital must be based on values calculated in this way.

3. The calculation of consumption of fixed capital

6.210 Fixed assets may have been purchased in the past at times when both relative prices and the general price level were very different from prices in the current period. In order to be consistent with the other entries in the same production account, consumption of fixed capital must be valued with reference to the same overall set of current prices as that used to value output and intermediate consumption. Consumption of fixed capital should reflect underlying resource costs and relative demands at the time the production takes place. It should therefore be calculated using the actual or estimated prices and rentals of fixed assets prevailing at that time and not at the times the goods were originally acquired. The “historic costs” of fixed assets, i.e., the prices originally paid for them, may become quite irrelevant for the calculation of consumption

of fixed capital if prices change sufficiently over time.

- 6.211 For these reasons, depreciation as recorded in business accounts may not provide the right kind of information for the calculation of consumption of fixed capital. If data on depreciation are used, they must, at the very least, be adjusted from historic costs to current prices. However, depreciation allowances for tax purposes have often been grossly manipulated in quite arbitrary ways to try to influence rates of investment and are best ignored altogether in many cases. It is recommended that independent estimates of consumption of fixed capital should be compiled in conjunction with estimates of the capital stock. These can be built up 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. As a result of market forces, the purchaser's price of a new fixed asset should provide a good initial estimate of the present value of the future rentals that can be derived from it. Subsequent changes in its value can then be deduced analytically from information or assumptions about the rate at which its efficiency in production declines over time. This method of building up estimates of the capital stock and changes in the capital stock over time is known as the perpetual inventory method, or PIM. Estimates of consumption of fixed capital are obtained as a by-product of the PIM.

4. The perpetual inventory method

- 6.212 A brief explanation of how consumption of fixed capital may be calculated as a by-product of the perpetual inventory method of calculating the capital stock is given in this section. An overview of the link between the calculation of consumption of fixed capital, the return to capital and the stock of assets is given in chapter 19. Much more guidance on the way to calculate capital stock estimates appears in the [OECD manual *Measuring capital stock*](#).

Calculation of the gross capital stock

- 6.213 The perpetual inventory method requires an estimate to be made of the stock of fixed

assets in existence and in the hands of producers. The first step is to estimate how many of the fixed assets installed as a result of gross fixed capital formation undertaken in previous years have survived to the current period. Average service lives, or survival functions, based on observations or technical studies may be applied to past investments for this purpose. Fixed assets purchased at different prices in the past have then to be revalued at the prices of the current period by utilizing appropriate price indices for fixed assets. The construction of suitable price indices covering long periods of time raises difficult conceptual and practical problems, but these technical problems of price measurement are not peculiar to the PIM method and will not be pursued further in the present context. The stock of fixed assets surviving from past investment and revalued at the purchasers' prices of the current period is described as the gross capital stock. The gross capital stock can also be measured at the prices of a given base year if it is desired to have annual time series for the gross capital stock at constant prices.

Relative efficiencies and rentals

- 6.214 The inputs into production obtained from the use of a given fixed asset tend to diminish over time. The rate at which the efficiency declines may vary from one type of asset to another. Various profiles are possible, for example:
- (a) Constant efficiency until the asset disintegrates: for example, an electric light bulb;
 - (b) A linear decline in efficiency: the service life ends when efficiency declines to zero;
 - (c) A constant geometric, or exponential, decline in efficiency.

In each of these cases, it is sufficient to know one parameter, either the length of the service life or the rate of decline, in order to have full information about the pattern of relative efficiency over time.

6.215 The amounts of rentals that users are prepared to pay will be proportional to the relative efficiencies of similar assets. If one is twice as efficient as another for the user's purposes, the user will be prepared to pay a rental that is also twice as great. Thus, the efficiency profiles of fixed assets determine the profiles of the rentals they command over their service lives (assuming that prices remain, or are held, constant). Once the profiles of the rentals over the service lives of the fixed asset have been determined, it becomes possible to calculate the consumption of fixed capital, period by period.

Rates of consumption of fixed capital

6.216 Consumption of fixed capital is derived as the reduction in the present value of the remaining rentals, as explained earlier. This reduction, and the rate at which it takes place over time, must be clearly distinguished from the decline in the efficiency of the capital assets themselves. Although the efficiency, and hence the rental, of an asset with the efficiency

characteristics of a light bulb may remain constant from period to period until it disintegrates, the value of the asset declines over time. It also follows that the consumption of fixed capital is not constant. It can easily be shown in this case that the decline in the present value of the remaining rentals from period to period is considerably lower earlier in the life of the asset than when the asset is approaching the end of its life. Consumption of fixed capital tends to increase as the asset gets older even though the efficiency and rental remain constant to the end.

Values of consumption of fixed capital

6.217 Consumption of fixed capital should not be estimated in isolation from the derivation of a set of capital stock data. Such data are needed for the balance sheet and, as shown in [chapter 19](#), trying to identify consumption of fixed capital in isolation from the level of the stock of the asset and its patterns of price and efficiency decline is likely to be error prone.