

PART IV

Conceptual and Theoretical Issues

14. The System of Price Statistics

A. Introduction

14.1 This chapter is about value aggregates and their associated price indices in an integrated system of economic statistics. To understand why value aggregates are important, we foreshadow the next chapter, which addresses concepts for decomposing value aggregates into price and volume components. Chapter 15 begins with defining a value aggregate in equation (15.1) as the sum of the products of the prices and quantities of goods and services. Equations (15.2) and (15.3) characterize a price index as the factor giving the relative change in the value aggregate arising from changes in prices. Not surprisingly then, to define a price index, it is first necessary to define precisely the associated value aggregate.

14.2 Four of the principal price indices in the system of economic statistics—the PPI, the CPI, and the export and import price indices (XPI and MPI)—are well-known and closely watched indicators of macroeconomic performance. They are direct indicators of the purchasing power of money in various types of transactions and other flows involving goods and services. As such, they also are used as deflators in providing summary measures of the volume of goods and services produced and consumed. Consequently, these indices are important tools in the design and conduct of the monetary and fiscal policy of governments, and they are also useful in informing economic decisions throughout the private sector. They do not, or should not, comprise merely a collection of unrelated price indicators but provide instead an integrated and consistent view of price developments pertaining to production, consumption, and international transactions in goods and services. By implication, the meaningfulness of all of these indices derives in no small measure from the significance of the value aggregates to which each refers.

14.3 Section B of this chapter establishes the relationships among the four major price series, as

well as their relationships with a number of supporting or derivative price indices. It does this by associating them with certain aspects of the interlocking aggregates defined in the *1993 SNA*. Section C briefly considers purchasing power parities in the system of economic statistics.

14.4 The reader interested in a survey of the goods and services accounts of the *1993 SNA* and how it interrelates to the full range of price indices in the economy will find the entire chapter of interest. Users engaged principally in compiling the PPI should focus on Sections B.1.1, B.1.2, B.1.3.1, B.1.3.2, B.1.3.6, and B.2, since these deal directly with the PPI. This sequence of sections skips over explanations of how the *1993 SNA* builds up the consumption, capital formation, and external trade flows in the supply and use table (SUT) of the *1993 SNA* from the accounts of individual economic agents. Also skipped in this sequence are the total economy price indices for total supply, final uses, GDP, and the price index for labor services.

14.5 Section B.5 also may be of interest to compilers, because it focuses on how the PPI relates to other major price indices. Chapter 4 of this *Manual* on weights and their sources cross-references the current chapter, which defines the institutional unit and transactions scope of the PPI. It also lays out the conceptual framework for the weights of the PPI and its net production and stage-of-processing variants. These sources comprise the Output submatrix of the Supply matrix, and the Intermediate Consumption and Value-Added submatrices of the Uses matrix. Chapter 6 on price collection discusses the practical dimensions of defining the price to be collected, cross-referencing the current chapter regarding the basic price valuation basis for the PPI output aggregates.

B. Major Goods and Services Price Statistics and National Accounts

B.1 National accounts as a framework for the system of price statistics

14.6 The significance of a price index derives from its referent value aggregate.¹ This chapter considers a core system of value aggregates for transactions in goods and services that is clearly of broad economic interest: the system of national accounts. The major price and quantity indices should, in principle, cover those value aggregates in the national accounts system representing major flows of goods and services and levels of tangible and intangible stocks. If the coverage of the major indices is not complete relative to the national accounts aggregates, then it should be compatible with and clearly related to the components of these aggregates. This chapter shows how the national accounts positions headline price indices such as the PPI and CPI, and how we can logically link these indices.

14.7 The *1993 SNA*, paragraph 1.1, describes itself as follows:

1.1 The System of National Accounts (SNA) consists of a coherent, consistent and integrated set of macroeconomic accounts, balance sheets and tables based on a set of internationally agreed concepts, definitions, classifications and accounting rules. It provides a comprehensive framework within which economic data can be compiled and presented for purposes of economic analysis, decision taking and policy making.

14.8 The accounts cover the major activities taking place within an economy, such as production, consumption, financing, and the accumulation

¹As noted in Chapter 2, price indices may be used as deflators and general economic indicators. They also may be used in the calculation of escalators for adjusting contract, government pension, and transfer payments. A distinction may be drawn between a price index, which is defined in this chapter as the price component of relative change in a value aggregate, and an escalator, which is one of the uses of a price index. While an escalator may be chosen as equal to a selected price index, the optimal determination of escalators can lead to more complex functions of price indices than a simple identity relationship.

of capital goods. Some of the flows involved, such as income, saving, lending, and borrowing, do not relate to goods and services, so not all of them can be factored into price and quantity components. However, the *1993 SNA* also contains a comprehensive framework, the supply and use table, discussed in more detail below, within which the relationships among the main flows of goods and services in the economy are established and displayed. The coverage and contents of these flows are defined, classified, and measured in a conceptually consistent manner. The table clearly shows the linkages among major flows of goods and services associated with activities such as production, consumption, distribution, importing, and exporting. It provides an ideal framework for designing and organizing a system of internally consistent price statistics that relate to a set of economically interdependent flows of goods and services. Not only are the relationships among consumer, producer, import, and export prices established within such a table, but so are their linkages with price indices for major macroeconomic aggregates such as GDP.

14.9 This overview of price indices first takes a top-level view of the major national accounts aggregates. It then reviews the underlying construction of these aggregates. It first considers the types of economic agents that the national accounting system recognizes. It then considers the economic accounts kept on transactions that build up to the main aggregates. As these accounts are built from their foundations, precise relationships emerge between the well-known headline price indicators—the PPI, CPI, XPI, and MPI—and the closely watched national accounts aggregates.

B.1.1 Supply and use of goods and services in the aggregate

14.10 At the most aggregate level, the supply and use of goods and services in the national accounts is the simple textbook macroeconomic identity equating total supply with total uses. Total supply is the sum of output Y , imports M , and taxes less subsidies on products T . Total uses is the sum of intermediate consumption Z , the final consumption of households C and government G , capital formation I , and exports X .²

²This chapter uses the standard terminology of the *1993 SNA*, in which net accumulation of current output to enable
(continued)

$$(14.1) Y + M + T = Z + C + G + I + X.$$

14.11 Rearranging this identity by subtracting intermediate consumption and imports from both sides reveals the familiar alternative expressions for GDP from the production (*value-added*) and expenditure approaches:

$$\begin{aligned} (14.2) (Y - Z) + T \\ &= \text{value added} + T \\ &\equiv C + G + I + X - M \\ &= \text{GDP}. \end{aligned}$$

GDP is internationally recognized as the central national accounts aggregate for measuring national economic performance. It is essentially a measure of production, distinct from final demand. More precisely, it measures the value added of the productive activity carried out by all the units resident in an economy. Since imports are not included in GDP, a price index for GDP tracks internally generated inflation. Compiling indices for tracking the parts of relative change in GDP and its components that can be attributed to price and volume change is perhaps the primary objective for developing price statistics in modern statistical systems.

14.12 As explained in more detail later, the SUT in the *1993 SNA* is a comprehensive matrix covering the economy that exploits the identities, equations (14.1) and (14.2), at a disaggregated level. Each row of the matrix shows the total uses of a commodity, or group of commodities, while each column shows the total supplies from domestic industries and imports. The SUT provides an accounting framework that imposes the discipline of both conceptual and numerical consistency on data on flows of goods and services drawn from different sources. The flows have to be defined, classified, and valued in the same way, and any errors have to be reconciled. The SUT provides a good basis for compiling a set of interdependent price and quantity indices. In the following sections, the various elements or building blocks that make up the SUT are considered.

future production is called Capital formation rather than Investment.

B.1.2 Institutional units and establishments: economic agents and units of analysis in the national accounts

14.13 In building the accounting system and the major aggregates $Y, M, T, Z, C, G, I,$ and X of equations (14.1) and (14.2), the *1993 SNA* first organizes the economy of a country into the kinds of entities or agents that undertake economic activity. These agents are called *institutional units* and comprise five types of units that are resident in the economy, as well as a single nonresident category—the rest of the world. An institutional unit is *resident* in an economy if its primary center of economic interest is located there.³ The five types of resident institutional sectors are nonfinancial corporations, financial corporations, general government, households, and nonprofit institutions serving households (NPISHs). Generally speaking, the *1993 SNA* associates with institutional units the ability to hold title to productive assets, and thus they represent the smallest units on which complete balance sheets can be compiled.⁴

14.14 For analyzing production, the *1993 SNA* identifies a unit or agent smaller than an institutional unit, called an *establishment* or *local kind of activity unit* (LKAU). Within an institutional unit, the establishment is the smallest unit organized for production whose costs and output can be identified separately. Generally, establishments specialize in the production of only a few types of output at a single location.

14.15 In addition to production activity, institutional units may engage in final consumption of goods and services and in capital formation, represented by the accumulation of goods and services as productive assets. The *1993 SNA* classification of institutional units into sectors is shown in Box 14.1. Notice that the *1993 SNA* institutional sectors repre-

³For example, this is determined by physical domicile for households, according to whether the household has been living within the geographic boundaries of a country for a year or more.

⁴The *1993 SNA* classification or sectoring of institutional units does not strictly follow the legal status of institutional units, but rather their function. Hence, a government-owned nonfinancial enterprise producing output sold at prices substantially covering its costs and for which a balance sheet can be compiled would be classified as a nonfinancial corporation, along with nonfinancial legal corporations. For further details, see *1993 SNA*, Chapter IV.

Box 14.1. Institutional Sectors in the System of National Accounts 1993

- S.1 Total economy
 - S.11 Nonfinancial corporations**
Ultimate subdivisions public, national private, and foreign-controlled
 - S.12 Financial corporations**
Ultimate subdivisions public, national private, and foreign-controlled
 - S.121 Central bank
 - S.122 Other depository corporations
 - S.1221 Deposit money corporations
 - S.1222 Other depository corporations, except deposit money corporations
 - S.123 Other financial intermediaries, except insurance corporations and pension funds
 - S.124 Financial auxiliaries
 - S.125 Insurance corporations and pension funds
 - S.13 General government**
Alternate scheme n = 1, social security funds shown as a separate branch of government S.1314
Alternate scheme n = 2, social security funds included as components of central, state, and local branches, and S.1314 deleted
 - S.13n1 Central government
 - S.13n2 State government
 - S.13n3 Local government
 - S.1314 Social security funds
 - S.14 Households**
Classified according to the largest source of income received
 - S.141 Employers (*Mixed income*,¹ *owning an unincorporated enterprise with paid employees*)
 - S.142 Own-account workers (*Mixed income*, *owning an unincorporated enterprise without paid employees*)
 - S.143 Employees (*Compensation of employees*)²
 - S.144 Recipients of property and transfer income³
 - S.1441 Recipients of property income
 - S.1442 Recipients of pensions
 - S.1443 Recipients of other transfers
 - S.15 Nonprofit institutions serving households (NPISHs)**
- S.2 Rest of the world

¹To understand how subsectors S.141 and S.142 of households are formed, an explanation of the term *mixed income* is in order. This, in turn, requires the national accounts income concept of operating surplus. The operating surplus of an enterprise is the residual of the value of output less purchases of goods and services, inputs, wages and salaries, employers' social contributions (social security and pension payments), and taxes net of subsidies payable on production that are unrelated to products. The mixed income of household unincorporated enterprises is algebraically defined identically with the operating surplus of other enterprises. However, for unincorporated household enterprises, the compensation of the owners or proprietors of the enterprise may not be included in the recorded compensation of employees item, and thus the difference between output and operating cost will include compensation for the owners' labor. The distinct terminology merely recognizes that the owners' wages are often inextricably mixed with the operating surplus for these units.

²Compensation of employees comprises wages and salaries and the employer-provided benefits comprising employers' social contributions.

³Property income comprises interest, dividends, and rent.

sent the units typically covered in economic and household censuses and surveys. The *1993 SNA*, as indicated by its name, focuses on the activities of institutional units that are resident in a nation. A provision for the rest of the world (S.2 in Box 14.1)

is made to capture the transactions of resident institutional units with nonresidents. Transactions of nonresidents with other nonresidents are out of scope for the national or regional accounts of a given country or region.

B.1.3 Constructing the system of supply and use flows from accounting data on institutional units

14.16 Equations (14.1) and (14.2) identified the basic aggregates comprising the total supply and uses of goods and services in the economy, and derived GDP in terms of these aggregates. To separate the price and volume components of supply and use, it is necessary to build these basic aggregates from the institutional sector accounts of the economy's economic agents. One must detail the production and consumption activities of these agents, as well as the types of goods and services they produce and consume. The framework within which this information is organized is the SUT in the national accounts. As it is built, the SUT also effectively begins to accumulate data on the price (or quantity or volume) index weights considered in Chapter 4. The basic accounts of the 1993 SNA in which all of these aggregates are recorded at the level of institutional units are the *production, use of income, capital, and external goods and services* accounts. These accounts organize the information for the following top-level aggregates:

- Production account: Output Y , intermediate consumption Z , and value added $Y - Z$;
- Use of income account: Household consumption C and government consumption G ;
- Capital account: Capital formation K ; and
- External goods and services account: Exports X and imports M .

B.1.3.1 Recording transactions in goods and services

14.17 Before further elaborating on these four goods and services accounts, it is important to specify how each entry in the value aggregates comprising them is to be recorded. The items in the value aggregate equation (14.1) represent detailed goods and services flows classified into categories of transactions. There are two defining aspects of recording transactions: timing and valuation.

B.1.3.1.1 Timing of transactions covered

14.18 To associate each transaction with a date, the national accounts consider a transaction to have been consummated when the event takes place that creates the liability to pay. In the case of flows of goods and services, this occurs when the ownership

of the good is exchanged or when the service is delivered. When change of ownership occurs or the service delivered, a transaction is said to have *accrued*. In general, this time need not be the same as the moment at which the payment actually takes place.

B.1.3.1.2 Valuation

14.19 There are two valuation principles in the national accounts, one for suppliers and one for users. For suppliers, transactions in goods and services are to be valued at *basic prices*. The basic price is the price per unit of a good or service *receivable* by the producer.⁵ Because the producer does not receive taxes (if any) on products but does receive subsidies (if any) on products, taxes on products are excluded from the basic price, while subsidies on products are included.⁶ The producer also does not receive invoiced transportation and insurance charges provided by other suppliers, or any distribution margins added by other retail or wholesale service producers, and these also are excluded from the basic price. On the other hand, the user, as purchaser, pays all of these charges. Users' purchases are therefore valued at *purchasers' prices*, which add taxes net of subsidies on products and margins for included transportation, insurance, and distribution services to the basic price.

⁵The term *receivable* is used to indicate that the price refers to an *accrued* transaction for the seller, and the term *payable* is used to indicate a transaction that has *accrued* to the purchaser.

⁶The 1993 SNA distinguishes between *taxes on products* and *other taxes on production*. Taxes net of subsidies on products T include all taxes payable per unit or as a fraction of the value of goods or services transacted. Included in T are excise, sales, and the nonrefundable portion of value-added taxes, duties on imports, and taxes on exports. Subsidies on products include all subsidies receivable per unit or as a fraction of the value of goods or services produced, including in particular subsidies paid on imports and exports. *Other taxes on production* comprise, for example, taxes on real property and taxes on profits. *Other subsidies on production* include, for example, regular payments by the government to cover the difference between the costs and revenues of loss-making enterprises. Of total taxes and subsidies on production, only taxes and subsidies on *products* are considered in defining basic and purchasers' prices. By implication, there are no taxes payable on products included in either of the aggregates Y or M , while subsidies receivable on products are included in these aggregates.

Table 14.1. Production Account for an Establishment, Institutional Unit, or Institutional Sector

(1993 SNA items in bold refer to flows in goods and services)

Uses	Resources
P.2 Intermediate consumption (purchasers' prices)	P.1 Output (basic prices)
B.1 <i>Gross value added</i> (balances the account; that is, it is the difference between output [P.1] and intermediate consumption [P.2])	
	<p><i>Of which, memorandum items breaking down total output for classifying the market/nonmarket status of the producer unit:</i></p> <p>P.11 Market output P.12 Output for own final use P.13 Other nonmarket output</p>

14.20 Accordingly, output Y and imports M in equations (14.1) and (14.2) are valued at *basic prices*, to which are added taxes less subsidies on products T to arrive at total supply.⁷ The components of total uses are valued at purchasers' prices. This is clearly interpreted for the final consumption of households and government. For capital formation expenditures, the notion of purchasers' prices also includes the costs of setting up fixed capital equipment. For exports, purchasers' prices include export taxes net of subsidies, according to the "free on board" (f.o.b.) value at the national frontier. Now each of the four major goods and services accounts are discussed in turn.

⁷The reader may have noted that transportation, insurance, and distribution margins have somehow disappeared after having been introduced. Whether these services are included with the good or invoiced separately does not affect the total expenditure on goods and services by the purchaser. For the economy as a whole, these transactions cancel out, but when industry activity and product detail are considered, they will have redistributive effects among goods and services products. This point is revisited in the discussion of the supply and use table.

B.1.3.2 Production

14.21 An institutional unit engaged in production is said to be an *enterprise*. By implication, any of the five types of resident institutional units can be an enterprise. The *production account* for enterprises in the 1993 SNA appears, with minor reordering of elements, essentially as shown in Table 14.1. An identical presentation also applies to the establishments or LKAUs owned by enterprises, and, in fact, an establishment can be defined operationally as the smallest unit for which a production account can be constructed. There are cases in which an establishment or LKAU is synonymous with, or at least inseparable from, the institutional unit that owns it. This is true of single-establishment corporations and of household unincorporated enterprises, for example. In other cases, an enterprise may own multiple establishments. The production account also can be produced for various establishment and enterprise groupings, including institutional sectors, but also for establishment industry or activity groups. In the production account and throughout the 1993 SNA, the transaction codes beginning with "P." refer to entries for transactions in goods and services. The codes beginning with "B." refer to so-called "balancing items," which are defined residually as the difference between a re-

sources total and the sum of itemized uses of those resources.

14.22 For classifying an establishment or LKAU, output is broken down into market output and two types of nonmarket output. Market output (P.11) is sold at economically significant prices substantially covering the cost of production. Nonmarket output is provided without charge or at prices so low they bear no relationship to production cost. The two types of nonmarket output are output for own final use (P.12) and other nonmarket output (P.13). Output for own final use includes the production of, for example, machine tools and structures (fixed capital formation items) by an establishment for the sole use of the establishment itself or other establishments in the same enterprise; the imputed rental value of certain productive assets owned by households, such as (and currently limited to) owner-occupied dwellings; and the production of certain other unincorporated household enterprises, such as agricultural products produced by a farmer for consumption by his own family or his employees. Other nonmarket output comprises the output of general government and NPISHs distributed free or sold at prices that are not economically significant. For price index construction, only those transactions of establishment units that involve economically significant prices, and thus market output (P.11), are relevant. However, the prices collected for market output items also may be used to value the own final use portion of nonmarket output (P.12). Our scope of coverage for price indices thus extends to cover this component of nonmarket output as well.

14.23 A production unit's resources derive from the value of its output, and its uses of resources are the costs it incurs in carrying out production. The production account therefore uses both the basic price and purchasers' price methods of valuation, as appropriate to a production unit in its roles as a supplier and a user of products. For the *supply (resources)* of goods and services, products are valued at *basic prices*, the national currency value *receivable* by the producer for each unit of a product. They *include* subsidies and *exclude* the taxes on products and additional charges or margins on products to pay for included retail and wholesale trade services, and for included transportation and insurance. For *uses* of goods and services, products are valued at *purchasers' prices*, the national currency value *payable* by the user for each unit of a

product, *including* taxes on products, trade, and transport margins, and *excluding* subsidies on products.

14.24 *Product detail in the production account.* In addition to breaking down output into its market and nonmarket components, output and intermediate consumption also can be broken down by type of product. Classifying product types using, for example, the international standard CPC, version 1.0, the production account for each establishment appears as in Table 14.2.

14.25 *Industry detail in the production account.* The entries in Table 14.3 of total output by product and total market and nonmarket outputs for each establishment allow us to classify establishments by their principal activity or industry *and* market/nonmarket status. To reflect the information required for this classification, positions for the activity and market or nonmarket classification codes of the establishment are shown in the first line of Table 14.2.⁸ The activity classification involves principally, if not exclusively, sorting establishments according to the types of product (CPC code *cccc* or other product code, such as the CPA) for which the total output is greatest. The major categories of the ISIC, Revision 3, are shown in Box 14.2.

⁸As indicated in Table 14.3, The 1993 SNA recommends use of the ISIC for activities or industries, the CPC for domestic products, and the closely related HS for exported and imported products. Each country may adapt the international standard to its specific circumstances. If the adaptation amounts to adding further detail, the classification is said to be derived from the international standard. NACE is an industrial classification derived from the ISIC. If the adaptation reorganizes the way in which detailed categories are grouped compared with the international standard but provides for a cross-classification at some level of detail, it is said to be related. NAICS, which is being implemented by Canada, Mexico, and the United States, is an industrial classification related to the ISIC. The European Union's PRODCOM classification of industrial products is derived from its CPA, which, in turn, is related to the international standard CPC through a cross-classification defined at a high level of product detail.

Table 14.2. Production Account with Product Detail for an Establishment/LKAU
(1993 SNA items in bold refer to flows in goods and services)

Uses	Resources
<p>P.2 Intermediate consumption (purchasers' prices), of which</p> <p>CPC 0 Agriculture, forestry and fishery products CPC 1 Ores and mineral; electricity, gas, and water CPC 2 Food products, beverages and tobacco; textiles, apparel and leather products CPC 3 Other transportable goods, except metal products, machinery and equipment CPC 4 Metal products, machinery and equipment CPC 5 Intangible assets; land; constructions; construction services CPC 6 Distributive trade services; lodging; food and beverage serving services; transport services; and utilities distribution services CPC 7 Financial and related services; real estate services; and rental and leasing services CPC 8 Business and production services CPC 9 Community, social and personal services</p>	<p>P.1 Output (basic prices), of which</p> <p>CPC 0 Agriculture, forestry and fishery products CPC 1 Ores and mineral; electricity, gas, and water CPC 2 Food products, beverages and tobacco; textiles, apparel and leather products CPC 3 Other transportable goods, except metal products, machinery and equipment CPC 4 Metal products, machinery and equipment CPC 5 Intangible assets; land; constructions; construction services CPC 6 Distributive trade services; lodging; food and beverage serving services; transport services; and utilities distribution services CPC 7 Financial and related services; real estate services; and rental and leasing services CPC 8 Business and production services CPC 9 Community, social and personal services</p>
<p>B.1 <i>Gross value added</i></p>	<p><i>Memorandum items breaking down total output for classifying the market/nonmarket status of the producer:</i></p> <p>P.11 Market output P.12 Output for own final use P.13 Other nonmarket output</p>

Note: Establishment ID: eeeeeee. Activity/industry code (ISIC): aaaa. Institutional unit ID: uuuuuuuu.
 Institutional sector code: S.nnnnn. Market status: P.1n.

14.26 The associated products are grouped in the production accounts by activity and output transaction status, and each entry of the accounts is summed across all establishments within each industry and output transaction status category. Table 14.3 shows a model production account for an industry (identified by activity code aaaa). This account is an aggregate of the production accounts of establishments classified into that industry and according to whether they are principally market, own final use, or other nonmarket producers. In most cases, both the establishment and industry production accounts would show higher product detail than has been shown here, preferably at the four- or five-digit CPC level, or higher with country-specific extensions.

14.27 *Output aggregate for the PPI in the production account.* The PPI is an index of the prices of the outputs of establishments. The position of the PPI in the 1993 SNA is defined by the relationship of its output value aggregate to those defined in the national accounts. Box 14.2 considers the formation of the PPI value aggregate according to its industry coverage, arguing that the PPI's industry coverage should be complete. The coverage of the PPI across the type of output by market status is shown under the column of Table 14.3 labeled P.11 Output (basic prices), market. For most establishments, output for own final use, P.12, comprises only capital formation, such as acquisition of machine tools or construction. Household establishments also may pro-

Table 14.3. Industry/Activity Production Account with Detail for Products and Market/Nonmarket

(1993 SNA items in bold refer to flows in goods and services)

Uses		Resources	
P.2 Intermediate consumption (purchasers' prices), market, of which	P.2 Intermediate consumption (purchasers' prices), own final use, of which	P.11 Output (basic prices), market, of which	P.12 Output (basic prices), own final use, of which
PP1 output aggregate			
CPC 0 Agriculture, forestry, and fishery products	CPC 0 Agriculture, forestry, and fishery products	CPC 0 Agriculture, forestry, and fishery products	CPC 0 Agriculture, forestry, and fishery products
CPC 1 Ores and mineral; electricity, gas, and water	CPC 1 Ores and minerals; electricity, gas, and water	CPC 1 Ores and minerals; electricity, gas, and water	CPC 1 Ores and minerals; electricity, gas, and water
CPC 2 Food products, beverages, and tobacco; textiles, apparel, and leather products	CPC 2 Food products, beverages, and tobacco; textiles, apparel, and leather products	CPC 2 Food products, beverages, and tobacco; textiles, apparel, and leather products	CPC 2 Food products, beverages, and tobacco; textiles, apparel, and leather products
CPC 3 Other transportable goods, except metal products, machinery and equipment	CPC 3 Other transportable goods, except metal products, machinery, and equipment	CPC 3 Other transportable goods, except metal products, machinery, and equipment	CPC 3 Other transportable goods, except metal products, machinery, and equipment
CPC 4 Metal products, machinery and equipment	CPC 4 Metal products, machinery, and equipment	CPC 4 Metal products, machinery and equipment	CPC 4 Metal products, machinery and equipment
CPC 5 Intangible assets; land; constructions; construction services	CPC 5 Intangible assets; land; constructions; construction services	CPC 5 Intangible assets; land; constructions; construction services	CPC 5 Intangible assets; land; constructions; construction services
CPC 6 Distributive trade services; lodging; food and beverage serving services; and transport services; and utilities distribution services	CPC 6 Distributive trade services; lodging; food and beverage serving services; transport services; and utilities distribution services	CPC 6 Distributive trade services; lodging; food and beverage serving services; transport services; and utilities distribution services	CPC 6 Distributive trade services; lodging; food and beverage serving services; transport services; and utilities distribution services
CPC 7 Financial and related services; real estate services; and rental and leasing services	CPC 7 Financial and related services; real estate services; and rental and leasing services	CPC 7 Financial and related services; real estate services; and rental and leasing services	CPC 7 Financial and related services; real estate services; and rental and leasing services
CPC 8 Business and production services	CPC 8 Business and production services	CPC 8 Business and production services	CPC 8 Business and production services
CPC 9 Community, social, and personal services	CPC 9 Community, social, and personal services	CPC 9 Community, social, and personal services	CPC 9 Community, social, and personal services
B.1 Gross value added, market output establishments	B.1 Gross value added, output for own final consumption establishments	B.1 Gross value added, other nonmarket output establishments	B.1 Gross value added, other nonmarket output establishments

Note: Activity/industry code (ISIC): aaaa.

Box 14.2. Industry/Activity Coverage of the Producer Price Index Output Value Aggregate

The principal economic activities of the International Standard Industrial Classification of All Economic Activities (ISIC), Revision 3, are

- A Agriculture, hunting, and forestry
- B Fishing
- C Mining and quarrying
- D Manufacturing
- E Electricity, gas, and water supply
- F Construction
- G Wholesale and retail trade; repair of motor vehicles, motorcycles, and personal and household goods
- H Hotels and restaurants
- I Transport, storage, and communications
- J Financial intermediation
- K Real estate, renting, and business activities
- L Public administration and defense; compulsory social security
- M Education
- N Health and social work
- O Other community, social, and personal service activities
- P Private households with employed persons
- Q Extra-territorial organizations and bodies

These are characteristic of the activities identified in most national industrial classifications. In assembling data on the supply and use flows in the economy, a detailed industry production account such as that in Table 14.3 is effectively constructed for each type of activity in the economy. The major activity categories are shown in the ISIC list above. (More is said about the comprehensive presentation of supply and use for the total economy in Section B.1.3.) With the product output and expenditure, detail Table 14.3 shows more explicitly the typical goods and services coverage of the PPI within the output aggregate P.1 of the production account for each industry. In most countries, PPIs cover goods-producing industries, such as the “mining and manufacturing” activities C and D and sometimes also agriculture (A), fishing (B), and construction (F). Most PPIs also cover the two “industrial” service activities—electricity, gas, and water supply (E) and transport, storage, and communications (I). In principle, the PPI should cover the market output of all activities, and a number of countries are working on rounding out PPI coverage to other service-producing activities beyond transportation and utilities.

duce goods for households’ own consumption, such as food, and this activity is included within the 1993 SNA production boundary. Large portions of P.12, output for own final use, may be valued at market prices if close market substitutes are available but otherwise at the cost of production (1993 SNA, Paragraph 6.85). In principle, the weighting of items in the PPI could be extended to cover the market-valued portion of P.12. The scope of the PPI would not extend to P.13, other nonmarket output, since this is almost without exception valued at production cost because rarely are market equiva-

lents available, and thus no basis for constructing an explicit price index exists.

B.1.3.3 Consumption

14.28 Final consumption of goods and services in the 1993 SNA is shown in the *use of income account*, which appears essentially as in Table 14.4 for each institutional unit. Recall that the 1993 SNA designates goods and services items with the codes “P.n.” These goods and services flows can be decomposed into price and volume components and thus would draw our interest as price index compil-

Table 14.4. Use of Income Account for Institutional Units and Sectors

(1993 SNA items in bold refer to flows in goods and services)

Uses	Resources
P.3 Final consumption expenditure (purchasers' prices)¹	B.6 <i>Disposable income</i> ²
P.31 Individual consumption expenditure <i>P.311 Monetary consumption expenditure</i> <i>P.312 Imputed expenditure on owner-occupied housing services</i> <i>P.313 Financial Intermediation Services Implicitly Measured (FISIM)</i> <i>P.314 Other individual consumption expenditure</i>	
P.32 Collective consumption expenditure (general government sector S.13 only)	
D.8 Adjustment for the change in the net equity of households in pension funds ³	
B.8 <i>Saving</i> (balances the account; the difference between disposable income [B.6] and the sum of expenditures [P.3] and adjustment [D.8])	

Note: Institutional unit ID: uuuuuuu. Institutional sector code: S.nnnnn.

¹By definition, corporations have no final consumption in the 1993 SNA. Thus, item P.3 and its subdivisions appear with non-zero entries only for household, government, and NPISH units.²The 1993 SNA derives disposable income in a sequence of accounts producing the balancing items *Value added* B.1 (production account), *Operating surplus* B.2 and *Mixed income* B.3 (generation of income account), *Balance of primary incomes* B.5 (allocation of primary income account), and *Disposable income* B.6 (secondary distribution of income account). Collapsing all of these steps, *Disposable income* B.6 is *Value added* B.1 less (net) taxes on production and imports (payable) D.2 plus (net) subsidies D.3 (receivable), plus compensation of employees receivable, plus (net) property income (receivable) D.4, less (net) taxes on income and wealth (payable) D.5, less (net) social contributions (payable) D.61, plus (net) social benefits (receivable) D.62, less (net) other transfers (payable) D.7.³This adjustment reflects the treatment by the 1993 SNA of privately funded pensions as owned by the household beneficiaries of such plans. It maintains consistency between the income and accumulation accounts in the system. It is not relevant to price and volume measurement, and the reader is referred to the 1993 SNA, Chapter IX, Section A.4, for further details.

ers. Items of final consumption are designated by P.3 with extensions. P.3 comprises individual consumption expenditure (P.31) and collective consumption expenditure (P.32).⁹

⁹Final consumption expenditure (P.3) is made by institutional units classified in the general government (S.13), household (S.14), and NPISH (S.15) institutional sectors only. Corporations (S.11) and (S.12) do not have final consumption expenditure, and thus for these units operating surplus (B.2) is equal to saving (B.8) in the use of income account (Table 14.4).

14.29 Individual consumption, actual consumption and household consumption expenditures. The 1993 SNA distinguishes individual from collective goods and services, a distinction equivalent to that between private and public goods in economic theory. It is mainly relevant to services. Individual services are provided to individual households and benefit those particular households, whereas collective services are provided to the community: public order, administration, security, and defense. Many individual services, such as education, health, hous-

Box 14.3. The Treatment of Housing and Consumer Durables in the 1993 SNA and CPIs

Dwellings are fixed assets. Purchases of dwellings by households therefore constitute household gross fixed capital formation and are not part of household consumption. They cannot enter into a price index for household consumption. Fixed assets are used for purposes of production, not consumption. Dwellings therefore have to be treated as fixed assets that are used by their owners to produce housing services. The 1993 SNA actually sets up a production account in which this production is recorded. The services are consumed by the owners. The expenditures on the services are imputed, the services being valued by the estimated rentals payable on the market for equivalent accommodation. The rentals have to cover both the depreciation on the dwellings and the associated interest charges or capital costs.

The existence of these imputed expenditures on owner-occupied housing services has always been recognized in national accounts, and most countries also have included them in their CPIs, even though other imputed expenditures are not included.

Consumer durables, such as automobiles, cookers, freezers, etc., also are assets used by their owners over long periods of time. In principle, they could be treated in the same way as dwellings and be reclassified as fixed assets that produce flows of services consumed by their owners. For certain analytic purposes, it may be desirable to treat them this way. However, to do so in the 1993 SNA would not simply be a matter of estimating the market rentals that would be payable for hiring the assets. It also would be necessary to set up production accounts in which the durables are used as fixed assets. This has traditionally been regarded as too difficult and artificial. There also are objections to extending further the range of imputed flows included in the 1993 SNA and GDP. In practice, therefore, expenditures on durables are classified in the 1993 SNA as consumption expenditures and not as gross fixed capital formation, a practice carried over into CPIs.

ing, and transportation, may be financed and paid for by government or nonprofit institutions and provided free or at a nominal prices to individual households. A large part of government consumption expenditure is not on public goods but on goods or services supplied to individual households. These individual consumption expenditures by governments and NPISHs are described as *social transfers in kind* in the 1993 SNA.

14.30 Household consumption can have three distinct meanings. First, it can mean the total set of individual consumption goods and services *acquired* by households, including those received as social transfers in kind. Second, it can mean the subset that households actually *pay for* themselves. To distinguish between these two sets, the 1993 SNA describes the first as the *actual final consumption* of households and the second as *household final consumption expenditures*. A third possible interpretation of household consumption is the actual physical process of consuming the goods and services. It is this process from which utility is derived

and that determines households' standard of living. The process of consuming or using the goods or services can take place some time after the goods or services are acquired, since most consumer goods can be stored. The distinction between acquisition and use is most pronounced in the case of consumer durables that may be used over a long time. The treatment of durables is discussed further in Box 14.3.

14.31 The existence of social transfers in kind is not recognized in CPIs, although one should take account of them, especially when considering changes in the cost of living. Moreover, governments may start to charge for services that previously were provided free, a practice that has become increasingly common in many countries. The goods and services provided free as social transfers could, in principle, be regarded also as being part of household consumption expenditures but having a zero price. The shift from a zero to positive price is then a price increase that could be captured by a consumer price index.

14.32 *Monetary and imputed expenditures.* Not all household expenditures are monetary. A monetary expenditure is one in which the counterpart to the good or service acquired is the creation of some kind of financial liability. This may be immediately extinguished by a cash payment, but many monetary expenditures are made on credit. Household consumption expenditures also include certain imputed expenditures on goods or services that households produce for themselves. These are treated as expenditures because households incur the costs of producing them (in contrast to social transfers in kind, which are paid for by government or nonprofit institutions).

14.33 The imputed household expenditures recognized in the *1993 SNA* include all of those on goods that households produce for themselves (mainly agricultural goods in practice) but exclude all household services produced for own consumption *except* for housing services produced by owner occupiers. The imputed prices at which the included goods and services are valued are their estimated prices on the market. In the case of housing services, these are imputed market rentals. In practice, most countries follow the *1993 SNA* by including owner-occupied housing in the CPI. It is not customary, however, to include other imputed prices, such as the prices of vegetables, fruit, dairy, or meat products produced for own consumption.

14.34 *A hierarchy of household consumption aggregates.* The following hierarchy of household consumption aggregates that are relevant to CPIs may be distinguished in the *1993 SNA*. It is worth noting that all household consumption expenditures are individual expenditures, by definition.

- P.41 Actual individual consumption, *of which*
- D.63 Social transfers in kind (individual consumption expenditure P.31 of general government S.13 and NPISHs S.15).
 - P.31 Individual consumption expenditure, *of which*
 - P.311 Monetary consumption expenditure;
 - P.312 Imputed expenditure on owner-occupied housing services;
 - P.313 Financial Intermediation Services Implicitly Measured (FISIM);
 - P.314 Other individual consumption expenditure:

- Expenditures on nonhousing production for own consumption;
- Expenditures on goods and services received by employees as income in-kind.

14.35 The codes P.311, P.312, P.313, and P.314 do not exist in the *1993 SNA* but are introduced for convenience here. These four subcategories of household consumption expenditures are separately specified in Tables 14.4, 14.5, and 14.6. As already noted, D.63 and P.314 are usually excluded from the calculation of CPIs.

14.36 It is worth noting that the treatment of financial services in the *1993 SNA* would imply an augmented treatment of financial services consumption expenditures to include expenditures on bank services not separately distinguished from interest charge, as well as the explicit expenditures on service charges charged directly. This is indicated in the footnote to the CPC 7 item in Table 14.5.

14.37 *Product detail in the use of income account.* As with the production accounts of establishments owned by institutional units, the product detail of goods and services consumption can be expanded in the use of income account according to the type of product consumed.¹⁰ To maintain the integration of the system of price and volume statistics on consumption with those that have just been covered on production, products would be classified according to the same system as in the production

¹⁰Although the discussion in this chapter maintains a consistent product classification of expenditure across all goods and services accounts, alternative, functional classifications of expenditure have been developed for each institutional sector for specific purposes. The international standard versions of these classifications included in the *1993 SNA* comprise the Classification of Individual Consumption by Purpose (COICOP), the Classification of the Purposes of Non-profit Institutions Serving Households (COPNI), the Classification of the Functions of Government (COFOG), and the Classification of the Purposes of Producers (COPP). The first column of Tables 14.5 and 14.6 is often compiled from household expenditure survey data, which are collected using functional classifications such as COICOP rather than product classifications. To facilitate constructing the cross-economy framework of the *1993 SNA* considered in this chapter, there is a concordance between the CPC and the COICOP.

Table 14.5. Use of Income Account with Product Detail for Institutional Units and Sectors

(Left columns show detail of far right column; 1993 SNA items in bold refer to flows in goods and service, sector titles in italics indicate whether the column appears in the use of income account for that sector)

Uses			P.32 Collective consumption expenditure		P.3 Final consumption expenditure (total, purchasers' prices)		Resources
P.31 Individual consumption expenditure		P.32 Collective consumption expenditure		P.3 Final consumption expenditure (total, purchasers' prices)		B.6 Disposable income	
Monetary individual consumption expenditure (P.311)	Consumption of owner-occupied housing services (P.312) and FISIM (P.313)	Other individual consumption expenditure (P.314)		Entries for general government sector (S.13) only			
CPC 0 Agriculture, forestry, and fishery products	CPC 0 Agriculture, forestry, and fishery products	CPC 0 Agriculture, forestry, and fishery products	CPC 0 Agriculture, forestry, and fishery products	CPC 0 Agriculture, forestry, and fishery products	CPC 0 Agriculture, forestry, and fishery products	Agriculture, forestry, and fishery products	
CPC 1 Ores and minerals; electricity, gas, and water	CPC 1 Ores and minerals; electricity, gas, and water	CPC 1 Ores and minerals; electricity, gas, and water	CPC 1 Ores and minerals; electricity, gas, and water	CPC 1 Ores and minerals; electricity, gas, and water	CPC 1 Ores and minerals; electricity, gas, and water	Ores and minerals; electricity, gas, and water	
CPC 2 Food products, beverages, and tobacco; textiles, apparel, and leather products	CPC 2 Food products, beverages, and tobacco; textiles, apparel, and leather products	CPC 2 Food products, beverages, and tobacco; textiles, apparel, and leather products	CPC 2 Food products, beverages, and tobacco; textiles, apparel, and leather products	CPC 2 Food products, beverages, and tobacco; textiles, apparel, and leather products	CPC 2 Food products, beverages, and tobacco; textiles, apparel, and leather products	Food products, beverages, and tobacco; textiles, apparel, and leather products	
CPC 3 Other transportable goods, except metal products, machinery, and equipment	CPC 3 Other transportable goods, except metal products, machinery, and equipment	CPC 3 Other transportable goods, except metal products, machinery, and equipment	CPC 3 Other transportable goods, except metal products, machinery, and equipment	CPC 3 Other transportable goods, except metal products, machinery, and equipment	CPC 3 Other transportable goods, except metal products, machinery, and equipment	Other transportable goods, except metal products, machinery, and equipment	
CPC 4 Metal products, machinery, and equipment	CPC 4 Metal products, machinery, and equipment	CPC 4 Metal products, machinery, and equipment	CPC 4 Metal products, machinery, and equipment	CPC 4 Metal products, machinery, and equipment	CPC 4 Metal products, machinery, and equipment	Metal products, machinery, and equipment	
CPC 6 Distributive trade services; lodging; food and beverage serving services; transport services; and utilities distribution services	CPC 6 Distributive trade services; lodging; food and beverage serving services; transport services; and utilities distribution services	CPC 6 Distributive trade services; lodging; food and beverage serving services; transport services; and utilities distribution services	CPC 6 Distributive trade services; lodging; food and beverage serving services; transport services; and utilities distribution services	CPC 6 Distributive trade services; lodging; food and beverage serving services; transport services; and utilities distribution services	CPC 6 Distributive trade services; lodging; food and beverage serving services; transport services; and utilities distribution services	Distributive trade services; lodging; food and beverage serving services; transport services; and utilities distribution services	
CPC 7 Financial and related services; real estate services; and rental and leasing services ¹	CPC 7 Financial and related services; real estate services; and rental and leasing services ¹	CPC 7 Financial and related services; real estate services; and rental and leasing services ¹	CPC 7 Financial and related services; real estate services; and rental and leasing services ¹	CPC 7 Financial and related services; real estate services; and rental and leasing services ¹	CPC 7 Financial and related services; real estate services; and rental and leasing services ¹	Financial and related services; real estate services; and rental and leasing services	
CPC 8 Business and production services	CPC 8 Business and production services	CPC 8 Business and production services	CPC 8 Business and production services	CPC 8 Business and production services	CPC 8 Business and production services	Business and production services	
CPC 9 Community, social, and personal services	CPC 9 Community, social, and personal services	CPC 9 Community, social, and personal services	CPC 9 Community, social, and personal services	CPC 9 Community, social, and personal services	CPC 9 Community, social, and personal services	Community, social, and personal services	
D.8 Adjustment for the change in the net equity of households in pension funds							
B.8 Saving							

Note: Institutional unit ID: uuuuuuu. Institutional sector code: S.nmmn.

¹In addition to the real estate, rental, and leasing services of homeowners, the 1993 SNA treats financial services consumption expenditure as the sum of measured and imputed components. Measured expenditures comprise explicit service charges levied by financial institutions for deposit, loan, advisory services, and the like, while imputed expenditures reflect the income foregone because the household does not lend (keep deposits with a financial institution) or borrow at a reference rate. See Chapter 10. In principle, these imputed expenditures, as well as those for other imputed consumption, are of the same market-equivalent valued type as for owner-occupied housing services and could be covered in the CPI.

Table 14.6. Use of Income Account with Product Detail for the Total Economy

(Left columns show detail of far right column; 1993 SNA items in bold refer to flows in goods and services)

		B.6 Disposable income, total economy S.1, with uses comprising	
P.31 Individual consumption expenditure, total economy S.1 (purchasers' prices), comprising		P.32 Collective consumption expenditure, total economy S.1 (purchasers' prices), comprising	
P.31 Individual consumption expenditure, household sector S.14		P.32 Collective consumption expenditure, general government sector S.13	
Consumer price index reference aggregate #1		P.31 Individual consumption expenditure, general government S.13 and NPISH S.15 sectors	
CPI reference aggregate #2 ¹	Consumption of owner-occupied housing services (P.312) and FISIM (P.313)		
Monetary individual consumption expenditure (P.311)	Other individual consumption expenditure (P.314)		
CPC 0 Agriculture, forestry, and fishery products	CPC 0 Agriculture, forestry, and fishery products	CPC 0 Agriculture, forestry, and fishery products	CPC 0 Agriculture, forestry, and fishery products
CPC 1 Ores and minerals; electricity, gas, and water	CPC 1 Ores and minerals; electricity, gas, and water	CPC 1 Ores and minerals; electricity, gas, and water	CPC 1 Ores and minerals; electricity, gas, and water
CPC 2 Food products, beverages, and tobacco; textiles, apparel, and leather products	CPC 2 Food products, beverages, and tobacco; textiles, apparel, and leather products	CPC 2 Food products, beverages, and tobacco; textiles, apparel, and leather products	CPC 2 Food products, beverages, and tobacco; textiles, apparel, and leather products
CPC 3 Other transportable goods, except metal products, machinery, and equipment	CPC 3 Other transportable goods, except metal products, machinery, and equipment	CPC 3 Other transportable goods, except metal products, machinery, and equipment	CPC 3 Other transportable goods, except metal products, machinery, and equipment
CPC 4 Metal products, machinery, and equipment	CPC 4 Metal products, machinery, and equipment	CPC 4 Metal products, machinery, and equipment	CPC 4 Metal products, machinery, and equipment
CPC 6 Distributive trade services; lodging; food and beverage serving services; transport services; and utilities distribution services	CPC 6 Distributive trade services; lodging; food and beverage serving services; transport services; and utilities distribution services	CPC 6 Distributive trade services; lodging; food and beverage serving services; transport services; and utilities distribution services	CPC 6 Distributive trade services; lodging; food and beverage serving services; transport services; and utilities distribution services
CPC 7 Financial and related services; real estate services; and rental and leasing services	CPC 7 Financial and related services; real estate services; and rental and leasing services	CPC 7 Financial and related services; real estate services; and rental and leasing services	CPC 7 Financial and related services; real estate services; and rental and leasing services
CPC 8 Business and production services	CPC 8 Business and production services	CPC 8 Business and production services	CPC 8 Business and production services
CPC 9 Community, social, and personal services	CPC 9 Community, social, and personal services	CPC 9 Community, social, and personal services	CPC 9 Community, social, and personal services
D.8 Adjustment for the change in the net equity of households S.14 in pension funds		D.8 Adjustment for the change in the net equity of households S.14 in pension funds	
B.8 Saving, total economy S.1		B.8 Saving, total economy S.1	

Note: Institutional unit ID: uuuuuuu. Institutional sector code: S.mmmn.

¹See also Table 14.7, Capital Account.

Table 14.7. Capital Account

(Items in bold refer to flows of goods and services)

Uses	Resources
P.5 Gross capital formation, of which	B.10.1 <i>Changes in net worth due to saving and capital transfers, of which</i>
P.51 Gross fixed capital formation	B.8n <i>Saving, net</i>
P.511 Acquisitions less disposals of tangible fixed assets	B.8 <i>Saving (from use of income account)</i>
P.5111 Acquisitions of new tangible fixed assets <i>Of which, residential dwellings</i> <u>CPI reference aggregate #2</u>	K.1 <i>Consumption of fixed capital (-)</i>
P.5112 Acquisitions of existing tangible fixed assets <i>Of which, residential dwellings</i> <u>CPI reference aggregate #2</u>	
P.5113 Disposals of existing tangible fixed assets <i>Of which, residential dwellings</i> <u>CPI reference aggregate #2</u>	
P.512 Acquisitions less disposals of intangible fixed assets	
P.5121 Acquisitions of new intangible fixed assets	D.9 <i>Capital transfers receivable (+)</i>
P.5122 Acquisitions of existing intangible fixed assets	D.91 <i>Investment grants</i>
P.5123 Disposals of existing intangible fixed assets	D.9 <i>Capital transfers payable (-)</i>
P.513 Additions to the value of nonproduced nonfinancial assets	D.91 <i>Capital taxes payable</i>
P.5131 Major improvements to nonproduced nonfinancial assets	D.91 <i>Other capital transfers payable</i>
P.5132 Costs of ownership transfer on nonproduced nonfinancial assets	D.92 <i>Other capital transfers receivable</i>
P.52 Changes in inventories	
P.53 Acquisitions less disposals of valuables	
K.1 <i>Consumption of fixed capital (-)</i>	
K.2 <i>Acquisitions less disposals of nonproduced nonfinancial assets</i>	
K.21 <i>Acquisitions less disposals of land and other tangible nonproduced assets</i>	
K.22 <i>Acquisitions less disposals of intangible nonproduced assets</i>	
B.9 <i>Net lending (+)/net borrowing (-)</i>	
Note: Institutional unit ID: uuuuuuu. Institutional sector code: S.nnnnn.	

account. Table 14.5 shows the major categories of the CPC, version 1.0, within the components of final consumption expenditure.

14.38 *The expenditure aggregate of CPI in the use of income account.* The detailed use of income accounts for institutional sectors can be assembled into a consolidated framework by choosing columns from Table 14.5 for each sector and displaying them together as in Table 14.6. Table 14.6 shows an economywide presentation of final consumption and saving. It also shows that total economy individual consumption comprises the individual consumption entries (P.31) of the household, NPISH, and general government sector use of income accounts. Table 14.6 separately shows the final collective consumption of government (P.32) and consolidates the disposable income (B.6) of all three. The account in Table 14.6 has been arranged specifically to show the consumption coverage of the typical CPI, which comprises the first and second columns.

B.1.3.4 Capital formation

14.39 Capital formation comprises the accumulation of fixed tangible and intangible assets, such as equipment, structures, and software; changes in inventories and works in progress; and acquisitions less disposals of valuables, such as works of art. These items are accounted for in the *1993 SNA capital account*, which appears, with minor resorting, essentially as in Table 14.7 for each institutional unit.

14.40 B.9 *Net lending (+)/net borrowing (-)* is the balancing item of the capital account. It makes the uses on the left, comprising net acquisitions of stocks of various tangible and intangible items, add up to the resources on the right, comprising the sources of income financing them. From the section on institutional units and establishments, it would be easy to conclude that the smallest economic unit to which the capital account can apply is the institutional unit. It was asserted earlier that only institutional units maintain balance sheets and can monitor stock variables that are the focus of this account. However, the physical capital assets whose changes are tracked in the capital account should be compiled, if possible, at the establishment or LKAU level to allow production of data on capital formation by industry. Such data are particularly useful for productivity analysis, even though complete

capital accounts cannot be compiled at the establishment level. As with the other goods- and services-related accounts in the *1993 SNA*, the capital account's goods and services items, designated by the code P.5 with extensions, can be exploded by product type.¹¹ The account, therefore, can be rearranged to show this goods and services detail as in Table 14.8, which, as for Table 14.7, may pertain to an institutional unit, an institutional sector aggregate, or the total economy.

B.1.3.5 External trade

14.41 The external account of goods and services is shown in Table 14.9. It contains the transactions of nonresident institutional units sector—S.2 rest of the world—with the five types of resident units taken together. The external goods and services account is generally taken from the Balance of Payments, which uses adjusted merchandise trade information from the customs records for goods on P.61 and P.71, and assembles services data on P.62 and P.72 from various sources (IMF, 1993).¹² Note, however, that the *1993 SNA* differs from the IMF's *Balance of Payments Manual, Fifth Edition (BPM5)*, in compiling the external accounts from the nonresident's point of view rather than the resident's point of view (a *BPM5* resident's credit or debit is a *1993 SNA* nonresident's debit or credit). As with the other accounts, the external goods and services account can be exploded to show product detail, as in Table 14.10.

14.42 As noted, the *1993 SNA* treats external trade from the point of view of the nonresident buyer in the case of exports and the nonresident seller in the case of imports. Free on board prices for exports are the purchasers' price valuations relevant for nonresident users of goods and services

¹¹In addition to the CPC version 1.0 shown here, the *1993 SNA*, Annex V, contains a nonfinancial assets classification identifying the specific tangible, intangible, produced, and nonproduced fixed assets, as well as inventory and valuables items, recognized by the *1993 SNA*.

¹²Services are valued and recorded when performed. Regarding goods, the *BPM5*, Paragraph 114, states that "... goods for export are generally considered to change ownership when the exporter ceases to carry the goods on his books as real assets and makes a corresponding change in his financial items. Goods for import are considered to change ownership when the importer enters the goods as a real asset and makes a corresponding change in his financial items."

Table 14.8. Capital Account with Product Detail
(1993 SNA items in bold refer to flows in goods and services)

<p>P.51 Gross fixed capital formation</p> <p>P.511 Acquisitions less disposals of tangible fixed assets, of which³</p> <p>P.512 Acquisitions less disposals of intangible fixed assets, of which⁴</p> <p>P.513 Additions to the value of non-produced non-financial assets, of which⁵</p>		<p>P.52 Change in inventories¹</p>	<p>P.53 Acquisitions less disposals of valuables²</p>	<p>B.10.1 Change in net worth due to saving and capital transfers, with uses comprising</p> <p>P.5 Gross capital formation</p>
		<p>CPC 0 Agriculture, forestry, and fishery products</p> <p>CPC 1 Ores and minerals; electricity, gas, and water</p> <p>CPC 2 Food products, beverages, and tobacco; textiles, apparel, and leather products</p> <p>CPC 3 Other transportable goods, except metal products, machinery, and equipment</p> <p>CPC 4 Metal products, machinery, and equipment</p> <p>CPC 5 Intangible assets; land; constructions; construction services</p> <p><i>Of which</i> <i>Residential dwellings</i> <i>CPI reference aggregate #2</i></p>	<p>CPC 0 Agriculture, forestry, and fishery products</p> <p>CPC 1 Ores and minerals; electricity, gas, and water</p> <p>CPC 2 Food products, beverages, and tobacco; textiles, apparel, and leather products</p> <p>CPC 3 Other transportable goods, except metal products, machinery, and equipment</p> <p>CPC 4 Metal products, machinery, and equipment</p> <p>CPC 5 Intangible assets; land; constructions; construction services</p> <p><i>Of which</i> <i>Residential dwellings</i> <i>CPI reference aggregate #2</i></p>	
<p>P.55 Net borrowing/net lending</p>		<p>K.1 Consumption of fixed capital</p> <p>K.2 Acquisitions less disposals of nonproduced nonfinancial assets</p>		<p>B.9 Net borrowing/net lending</p>

Note: Institutional unit ID: uuuuuuu. Institutional sector code: S.mmmn.
¹/1993 SNA asset code AN.12 Inventories. Excludes intangible assets, land, and constructions.
²/1993 SNA asset code AN.13 Valuables. Excludes intangible assets, land, constructions, and construction services.
³/1993 SNA asset code AN.111 Tangible fixed assets. Excludes intangible assets, land, and construction services.
⁴/1993 SNA asset code AN.112 Intangible fixed assets. Excludes, land, constructions, and construction services.
⁵/1993 SNA asset code AN.2 Nonproduced assets. Excludes intangible assets, constructions, and construction services.

Table 14.9. External Account of Goods and Services

(All resident institutional units S.1.nnnn with nonresident institutional units S.2; 1993 SNA goods and services items shown in bold)

Uses	Resources
P.6 Exports of goods and services	P.7 Imports of goods and services
P.61 Exports of goods	P.71 Imports of goods
P.62 Exports of services	P.72 Imports of services
B.11 <i>External balance of goods and services</i>	

supplied by resident providers, and f.o.b. prices for imports are the basic price valuations for non-resident suppliers of imports to resident users.¹³ Regarding Table 14.10, the *1993 SNA*, Paragraph 15.68, states that imported goods should be valued at cost-insurance-freight (c.i.f.) at the level of detailed products. On the other hand, like the *BPM5*, the *1993 SNA* requires that, in total, imports of goods be valued f.o.b. at the border of the exporting country.¹⁴ This is managed by excluding insurance and transportation in a single adjustment to total imports c.i.f. (*1993 SNA*, Paragraphs 14.36–14.41). That part of freight services on imports provided by nonresidents is included in imports of transport services, and that part of insurance services provided

on imports by nonresidents is added to imports of insurance services. Transportation and insurance services provided by residents on imports are included in exports of transportation and insurance services.¹⁵

B.1.3.6 The supply and use table

14.43 The SUT arrays the industries side by side first for market producers, then for own-account producers, and then for other nonmarket producers under *Resources* and *Uses*. An SUT is shown in Table 14.11. It arrays various accounts relevant to monitoring developments in production and consumption within a country according to the *supply* of goods and services (with reference to the *1993 SNA* codes labeling the regions of Table 14.11)

- From resident establishments (arranged in industries) in the form of domestic output (P.1), given by Y in equations (14.1) and (14.2);
- From the rest of the world as imports (P.7), given by M in equations (14.1) and (14.2);

¹³Referring to Chapter 17, taking the nonresident's view implies that the export price index is an input price index and the import price index is an output price index. The opposite would be true from the point of view of the residents—the export price index would be an output price index, and the import price index would be an input price index. As shown in Chapter 17, the point of view taken by the *1993 SNA* has implications for the direction of bias in Laspeyres and Paasche export and import price indices relative to the underlying economic index numbers.

¹⁴Regarding the point in time and space at which the value of a goods transaction is to be assessed, Paragraph 222 of the *BPM5* states that

“The standard, or rule, is that goods shall cover, in principle, the value of goods and related distributive services at the same time the goods reach the customs frontier of the country from which the goods are to be exported. The value of the goods includes the value of any loading of the goods on board the carrier at that frontier. That is, exports and imports of goods are valued f.o.b. at the customs frontier of the exporting economy. ... The customs frontier need not coincide physically with the national boundary and could be located in the interior of the economy.”

¹⁵This rather roundabout approach is taken to imports by product because, as a practical matter, it may be difficult to obtain insurance and freight charges on imports from customs administrative data systems at the product level of detail. (See *1993 SNA*, Paragraphs 14.40–14.41.) Recent developments in computerized customs documentation have made the itemization of insurance and freight more straightforward, and the *1993 SNA* does allow also for the possibility of determining imports by product at their f.o.b. values, consistent with the aggregate valuation of imports. Were this the case, insurance and freight on imports could be shown as trade and transport margins analogously with such margins on domestically produced goods.

Table 14.10. External Account of Goods and Services with Product Detail

(All resident institutional units S.1 with nonresident institutional units S.2; 1993 SNA goods and services items shown in bold)

Uses	Resources
<p>P.6 Exports of goods and services Export Price Index uses aggregate P.61 Exports of goods <i>At f.o.b. values</i></p> <p>CPC 0 Agriculture, forestry, and fishery products CPC 1 Ores and minerals; electricity, gas, and water CPC 2 Food products, beverages, and tobacco; textiles, apparel, and leather products CPC 3 Other transportable goods, except metal products, machinery, and equipment CPC 4 Metal products, machinery, and equipment</p> <p>P.62 Exports of services</p> <p>CPC 5 Intangible assets; land; constructions; construction services³ CPC 6 Distributive trade services; lodging; food and beverage serving services; transport services; and utilities distribution services, <i>of which</i></p> <ul style="list-style-type: none"> Distributive trade services; lodging; food and beverage serving services; transport services; and utilities-distribution services; <i>except</i> transport services on imports and exports rendered by residents Transport services on imports and exports rendered by residents <p>CPC 7 Financial and related services; real estate services; and rental and leasing services, <i>of which</i></p> <ul style="list-style-type: none"> Financial and related services; real estate services; and rental and leasing services; <i>except</i> insurance services on imports rendered by residents Insurance services on imports rendered by residents <p>CPC 8 Business and production services CPC 9 Community, social, and personal services</p>	<p>P.7 Imports of goods and services Import Price Index supply aggregate P.71 Imports of goods <i>At f.o.b. values, of which</i> <i>At c.i.f. values:^{1,2}</i></p> <p>CPC 0 Agriculture, forestry, and fishery products CPC 1 Ores and minerals; electricity, gas, and water CPC 2 Food products, beverages, and tobacco; textiles, apparel, and leather products CPC 3 Other transportable goods, except metal products, machinery, and equipment CPC 4 Metal products, machinery, and equipment <i>Less: Adjustment to total imports of goods c.i.f. for insurance and freight provided by both residents and nonresidents for delivery to the first resident recipient.</i></p> <p>P.72 Imports of services</p> <p>CPC 5 Intangible assets; land; constructions; construction services⁴ CPC 6 Distributive trade services; lodging; food and beverage serving services; transport services; and utilities distribution services, <i>of which</i></p> <ul style="list-style-type: none"> Distributive trade services; lodging; food and beverage serving services; transport services; and utilities distribution services; <i>except</i> transport services on imports rendered by nonresidents Transport services on imports and exports rendered by nonresidents <p>CPC 7 Financial and related services; real estate services; and rental and leasing services, <i>of which</i></p> <ul style="list-style-type: none"> Financial and related services; real estate services; and rental and leasing services; <i>except</i> insurance services on imports rendered by nonresidents Insurance services on imports rendered by nonresidents <p>CPC 8 Business and production services CPC 9 Community, social, and personal services</p>
<p>B.11 External balance of goods and services</p>	

¹The 1993 SNA values imports f.o.b. However, it allows for the fact that while f.o.b. valuation by product would be consistent and preferred, compiling such data may be problematic at the product level of detail. Imports of goods c.i.f. by product may be all that is available because the insurance and freight data often are not separately compiled by product in customs systems. See 1993 SNA, Paragraph 15.68. Totals for these data may be obtained instead from resident and nonresident shippers in the process of compiling the Balance of Payments. Insurance and freight services provided by residents on imports are a services export.

²Regarding goods and services valuations in the import price and volume indices, see MPI in Tables 14.11 and 14.12, where it is explained that both f.o.b. and purchasers' price valuations are important in constructing the MPI as a deflator for imports f.o.b.. Imports at purchasers' prices would be imports c.i.f. plus import tariffs as well as domestic insurance and freight for delivery to the first domestic owner.

³Construction services only.

⁴Construction services only.

Table 14.11. The Supply and Use Table (SUT)

(Production account: double outlines and no fill; use of income account: single outlines and no fill; capital account: diagonal fill; external account of goods and services: vertical fill)

Supply		Use													
P.1 Output at basic prices of establishments producing for:		D.21-D.31 Taxes less subsidies products ²		Imports c.i.f. ³		P.2 Intermediate consumption at purchasers' prices of establishments producing for:		P.31 Individual consumption		P.32 Collective consumption		P.5 Gross capital formation		P.6 Exports f.o.b.	
P.11 Market	P.12 Own use	P.13 Other nonmarket	Transport and distribution margin adjustment ¹	P.7 Imports f.o.b.	c.i.f./ f.o.b. adjustment ⁴	P.11 Market	P.12 Own use	P.13 Other nonmarket	Product × 1	Product × 1	Product × 1	Product × 1	Product × 1	Product × 1	Product × 1
Product × Industry	Product × Industry	Product × Industry	Goods (+) Services (-)	Goods f.o.b. Services ⁶	Goods (+) ⁵ Services (-)	Product × Industry	Product × Industry	Product × Industry	Product × 1	Product × 1	Product × 1	Product × 1	Product × 1	Product × 1	Product × 1
1 × Industry	1 × Industry	1 × Industry	+	+	=	B.1 Value added 1 × Industry	B.1 Value added 1 × Industry	B.1 Value added 1 × Industry	+	+	+	+	+	+	+
P.11 Output at basic prices 1 × Industry	P.12 Output at basic prices 1 × Industry	P.13 Output at basic prices 1 × Industry				P.11 Output at basic prices 1 × Industry	P.12 Output at basic prices 1 × Industry	P.13 Output at basic prices 1 × Industry							

¹The sum of items in this column is zero. It appears in the SUT but does not appear in any 1993 SNA account. Included in this adjustment are transportation, insurance, and distribution charges on goods within the geographical boundaries of the national economy only.

²Taxes and subsidies on products are shown in the 1993 SNA allocation of primary income account for the general government institutional sector S.13, which derives B.5 Balance of primary incomes as the balancing item (1993 SNA, Annex V, Table A.V.5). B.5 is the sum of B.2 operating surplus, D.2 taxes on production and imports, less D.3 subsidies, plus D.4 property income (net). This account is the source of data for construction of this column in the SUT when exploded to show product detail for the items D.21 and D.31, taxes and subsidies on products.

³As noted elsewhere, the 1993 SNA values goods imports c.i.f. at the product level of detail but f.o.b. in total. Thus, the 1993 SNA presentation of goods imports in the supply matrix is the sum of P.7 imports f.o.b. and the c.i.f./f.o.b. adjustment on goods imports. To simplify the presentation of this diagram of the SUT and clarify the nature of the negative adjustment to services, assume that insurance and freight provided on imports can be compiled by product, and thus imports f.o.b. can be compiled by product, and thus imports f.o.b. can be compiled by product. Insurance and freight provided on imports by residents already are included in the insurance and transportation rows of the P.1 matrix.

⁴The sum of items in this column is zero. It appears in the SUT but does not appear in any 1993 SNA account.

⁵Insurance and freight on imports of goods by product provided by both residents and nonresidents.

⁶Including insurance and freight on imports provided by nonresidents. Insurance and freight provided on imports by residents are included in the insurance and transportation rows of the P.1 matrix.

- Adjusted for trade and transport margins¹⁶ and taxes less subsidies on products (D.21 through D.31), given by T in equations (14.1) and (14.2);

and the *uses* of goods and services

- For current inputs into production by resident producers (arranged in industries) in the form of intermediate consumption (P.2), given by Z in equations (14.1) and (14.2);
- For final domestic consumption, including individual consumption by resident households, resident NPISHs, and the government (P.31), and collective consumption by the government (P.32), given by, respectively, C and G in equations (14.1) and (14.2);
- Capital formation by resident enterprises (P.5) (comprising fixed capital formation (P.51), inventory change (P.52), and acquisitions less disposals of valuables (P.53)), given by I in equations (14.1) and (14.2); and
- For export (P.6) and use by the rest of the world, given by X in equations (14.1) and (14.2).

14.44 The SUT primarily is a matrix of flows of goods and services designed to highlight the relationship between the production and consumption of institutional units and institutional sectors. For example, households may undertake production in unincorporated enterprises whose activity appears in the production for own final use part of the SUT, but they also may consume goods and services, as represented in individual consumption. The current production transactions of the establishments of all institutional units are grouped together and summarized in one part of the SUT, and the remaining transactions are summarized and organized in an-

¹⁶Trade and transport margins do not appear in the standard sequence of accounts in the 1993 SNA because these accounts are not shown with product detail. Although these margins are nonzero for individual products, they sum to zero, because the amount added to the domestic supply of goods comes from the domestic supply of distribution, insurance, and transport services. Margins are thus shown in Table 14.11, separately for margins on domestic production and imports (c.i.f./f.o.b. adjustment), because the SUT displays product detail down the columns. In the aggregate, these adjustments for trade and transport margins on domestic production and the c.i.f./f.o.b. adjustment for imports cancel each other out.

other part. The SUT deals principally with flows of transactions in goods and services. Associated with these monetary flows are price and volume components. It is of central interest in monitoring the economy with national accounts statistics to be able to assess the price and volume components of flows of goods and services exchanged for money or credit in market transactions in the SUT. Movements in the price components are of interest in assessing changes in the purchasing power of incomes, as well as in influencing the rate of general price change through monetary policy. Finally, price movements in the various national accounts aggregates are used in private sector decision making and in the escalation of contracts. Movements in the price components of national accounts aggregates are, as discussed at the beginning of this section, measured with price indices.

B.2 Variants of the PPI and their relationship to other major price series

B.2.1 PPI variants

B.2.1.1 Price indices for intermediate consumption

14.45 In considering total economy and industry intermediate consumption price indices (ICPIs), the weights correspond to a column-wise reading of the intermediate consumption part of the SUT's use matrix. The intermediate consumption matrix derives from the production account in Table 14.3. It is shown in Tables 14.11 and 14.12 as the region labeled P.2. Because the various margins on basic prices inherent in prevailing purchasers' prices may vary from industry to industry, the ideal sources for purchasers' prices for ICPIs would be enterprise surveys. Such surveys are generally burdensome and expensive. Instead, as noted in the discussion on price indices for total supply, the price index of intermediate consumption by industry can be derived from detailed product components of the supply price index (SPI). This index will be acceptably accurate if the variation in the total tax, subsidy, transport, and distribution margin is not too great from industry to industry within product class. For the total economy, the price index of intermediate consumption is obtained as a weighted average of industries' intermediate input price indices. The weights are the share of each industry's intermediate consumption in the total intermediate consumption in the economy.

Table 14.12. Location and Coverage of the Major Price Indices in the Supply and Use Table
(The effective coverage of the major indices is shown by areas with gray shading)

Supply		Use	
<p>P.1 Output at basic prices of establishments producing for:</p> <p>P.11 Market use</p> <p>P.12 Own use</p> <p>P.13 Other nonmarket</p>	<p>D.21-D.31 Taxes, less subsidies on products</p> <p><i>Transport and distribution margin adjustment</i></p>	<p>P.2 Intermediate consumption at purchasers' prices of establishments producing for:</p> <p>P.11 Market use</p> <p>P.12 Own use</p> <p>P.13 Other nonmarket</p>	<p>P.31 Individual consumption</p> <p>P.32 Collective consumption</p> <p>P.5 Gross capital formation</p> <p>P.6 Exports f.o.b.</p>
<p>PPI</p>	<p>Goods (+)</p> <p>Services (-)</p> <p>+</p> <p>Product × 1</p> <p>+</p> <p>MPI</p> <p>+</p> <p>Goods (+)</p> <p>Serv. (-)</p> <p>=</p>	<p>Product × Industry</p> <p>+</p> <p>Product × Industry</p> <p>+</p> <p>Product × Industry</p> <p>+</p> <p>CPI¹</p> <p>+</p> <p>Product × Industry</p> <p>+</p> <p>Product × Industry</p> <p>+</p> <p>B.1 Value added 1 × Industry</p> <p>=</p> <p>PPI</p>	<p>XPI</p> <p>+</p> <p>PPI²</p>
<p>PPI</p>	<p>Product × Industry</p> <p>+</p> <p>Goods (+)</p> <p>Serv. (-)</p> <p>=</p>	<p>P.13 Output at basic prices 1 × Industry</p> <p>=</p> <p>PPI</p>	

¹Covering the individual consumption expenditure (P.31) of the household sector (S.13) only and excluding consumption of goods produced by households for own final use, with the exception of imputed rental of dwellings of owner-occupants.
²Covering the finished goods component of change in inventories (P.52).

B.2.1.2 Net output PPIs and value-added deflators

14.46 The PPI has been defined in terms of the total market or market-valued output aggregates of the *1993 SNA*, but PPIs sometimes are produced for net output as well as total output. The argument for net output PPIs is that, for a given aggregate of establishments, total output PPIs overweight or “double count” the output of goods used in intermediate consumption within the aggregate. Net output PPIs may be produced for various narrow or broad aggregations of establishments, from detailed industries to the entire population of establishments resident in the economy. The value aggregate of net output PPIs subtracts from total output the value of goods and services used within the aggregate *and* of the *same types* as produced for output by establishments in the aggregate. With one exception, net output is not value added, because it does *not* exclude the intermediate consumption of goods and services used by establishments of the aggregate that are *not* of the same types as produced for output. The exception is when the aggregate is all resident establishments.

14.47 By implication, the net output PPI for all establishments resident in the economy must be closely related to the value-added price index or deflator discussed in Chapter 17. The value aggregate for the all items net output PPI would be value added (Section B.1) as defined in the *1993 SNA* and shown in the production account (Tables 14.1, 14.2, and 14.3). In fact, if the PPI has complete product coverage, including all service products, then net output and value added are the same thing for the total economy.¹⁷ They may be the same even at the industry level under an alternative definition of “net output.” See this issue in a stage-of-processing context in Section B.2.1.3.

14.48 The principal issue in interpreting net output PPIs is the definition of the intermediate consumption prices netted from output to arrive at the net output aggregate. These prices should be defined with a view toward the valuation principle in-

¹⁷Note, however, the equivalence between net output and value-added price indices for the total economy presumes variations in taxes on products, and charges for included (not separately invoiced) transportation and distribution charges on outputs used as inputs are part of the prices of those inputs. The practice of compiling net output PPIs should, but sometimes does not, take this into account.

herent in the value aggregates to which they refer. Recall that output (P.1) is valued at *basic prices* while intermediate consumption is valued at *purchasers’ prices*. Ideally, the net output PPI would be a type of double-deflation price index, similar in principle to the value-added deflator described in Chapter 17. In such an index, the prices of the goods and services in intermediate consumption would be defined inclusive of taxes on products and charges for included transportation and distribution services, and exclusive of subsidies on products. The prices of goods and services in output would be defined as exclusive of taxes on products and separately invoiced charges for transportation and distribution, and inclusive of subsidies on products. Net output PPIs generally do not attempt the *purchasers’ price* valuation of the intermediate consumption of output-type goods and services within the industry aggregate in question. They compromise the concept of the net output index, should there be a change in any component of the purchasers’ prices of intermediate consumption goods and services other than the underlying basic prices of products. See Section B.2.1.3 regarding the scope of intermediate consumption in the net output PPI and its alignment with intermediate consumption in value added.

B.2.1.3 Stage-of-processing PPIs

14.49 *Product-based stage-of-processing indices.* The simplest method of forming a set of stage-of-processing PPIs is first to determine an ordering of products a priori, on the basis of judgment, from primary to finished goods. The second step is to produce PPIs for goods grouped by this intrinsic stage of processing classification. Such indices are referred to as product- or commodity-based stage-of-processing indices. They may employ the so-called “end-use” product classifications associated with the commodity flow methods often used in compiling the national accounts.

14.50 *Industry-based stage-of-processing indices.* Industry net output PPIs are associated with industry stage-of-processing PPIs. They are produced in an effort to measure the contribution of the basic prices of goods and services to the change in value added for the economy. They also provide an analytical tool to measure the transmission of inflation through stages of processing, from primary goods and services to those sold for final uses. Industry stage-of-processing PPIs involve a sorting of the product rows and industry columns of the use ma-

trix so the matrix is roughly triangular. In other words, any given *product row* in the stage-of-processing-sorted use matrix comprises all zero uses to the left of a particular industry sorted by industry stage of processing. It would have mostly positive uses for that industry and other industries to the right of (and thus at higher stages of processing relative to) that industry. Further, within any given industry column, products earlier in the stage-of-processing sort (above the product in question in the industry column) would tend to have positive uses. There would be zero use of products later in the stage-of-processing sort (below the product in question) in the industry column. Stages of processing are meaningful in this context for goods, but triangularizing the uses matrix tends to classify business services in the primary production category because all industries use them in varying degrees. In this definition of stage of processing, they are primary output because they are produced mainly with labor and capital primary inputs, rather than the outputs of other industries.

14.51 The PPIs constructed for such stage-of-processing-sorted use matrices are compiled as net output indices, exclusive of uses of output-type goods and services within the industry aggregate in question. Hence, net output PPIs generally are associated with industry stage-of-processing PPIs. For most aggregates, total economy industry net output is equivalent to value added. Unfortunately, when the coverage of services is incomplete, output and intermediate consumption prices cannot be fully characterized except for goods, the largest industry for which the net output aggregation is feasible. Here, only the price index for the net output of goods can be characterized, which differs from the value added of the goods industry because intermediate consumption of services is still not netted from the net output of goods.

14.52 There is a second interpretation of stage-of-processing PPIs. In this view, they are conceptually the same as value-added price indices or deflators for industries that have been sorted by stage of processing according to the above diagonalization process. By implication, a PPI for an industry at a late stage of processing would expressly exclude the price change of primary products from the price change of the tertiary or finished products of the late-stage industry. Again, universal product coverage, including services, is needed for output and intermediate consumption, and many countries are

lacking particularly in the coverage of the prices of service products. When there are no service price indices, value-added deflators cannot be computed even for goods-producing industries, because the services component of intermediate consumption is missing.

B.2.2 Relationship of the PPI to other major price indices

14.53 It is instructive at this point to associate the four major headline price indices compiled by most countries with the component aggregates and matrices of the SUT. The four main price indices and their associated national accounts aggregates and matrices in the SUT are

- (i) Output of resident producers (P.1): producer price index¹⁸
- (ii) Individual consumption expenditure on goods and services (P.31), except consumption from own production but including the imputed rent of owner-occupied dwellings, of the household sector (S.13) only: consumer price index;
- (iii) Exports (P.6): export price index; and
- (iv) Imports (P.7): import price index.

14.54 The location and coverage of these major price indicators as they directly apply to goods and services value aggregates in the national accounts is diagrammed in Table 14.12. Recall that Section A of this chapter characterized a price index as a function of price relatives and weights, noting that, other than the formula for the index itself, the requisite features of the relatives and weights would be determined by the value aggregate. These factors were

- What items to include in the index,
- How to determine the item prices,
- Which transactions that involve these items to include in the index, and

¹⁸This chapter has also described net output PPIs, whose associated value aggregate is value added (B.1) for the economy as a whole, as well as for individual industries, under the assumption that all products including services are covered in the PPI. As noted earlier, if product coverage (for example, of services) is incomplete, then the net output concept deviates from value added because the intermediate consumption of noncovered goods is not subtracted from output.

Table 14.13. Definition of Scope, Price Relatives, Coverage, and Weights for Major Price Indices

Index	Items to Include	Price Determination for Relatives	Transactions Coverage	Sources of Weights
PPI	All types of domestically produced or processed goods and services that are valued at market prices.	Basic prices, determined for goods as the date when available for sale (available for change of ownership) or service price when service rendered.	Output of resident enterprises, comprising sales plus change in finished goods inventories for goods, and sales for services.	The product by industry matrices of market output (P.11) and output for own final use (P.12) in the expanded industry production account and the SUT.
CPI	All types of goods and services purchased by households for individual consumption.	Purchasers' prices, determined for goods and services on the date when used, including taxes on products, excluding subsidies on products, and including transportation and distribution margins.	Consumption expenditures of the households sector (S.13) of institutional units, excluding consumption from own production, except for imputed expenditures for rental of owner-occupied dwellings.	The product column of the CPI consumption subaggregate of individual consumption (P.31) of the household sector (S.13) in the expanded use of income account and in the SUT.
XPI	All types of transportable goods and services purchased by nonresidents from residents. Goods exported without change of ownership for significant processing by nonresidents and subsequent reimport are included.	<i>From the point of view of the nonresident purchaser,</i> purchasers' prices at the national frontier of the exporting country (f.o.b.), including export taxes and excluding export subsidies, and including transport and distribution margins from the production location to the national frontier.	All transportable goods and services produced or processed by residents and purchased by nonresidents, except goods in transit or goods exported and minimally processed by nonresidents for reimport.	The product column of exports (P.6) in the expanded external account of goods and services and the SUT.
MPI	All types of transportable goods and services purchased by residents from nonresidents. Goods imported without change of ownership for significant processing by residents and subsequent reexport are included.	<i>From the point of view of the nonresident seller,</i> basic prices at the national frontier of the exporting country (f.o.b.), excluding import taxes and including import subsidies, and excluding transport and distribution margins from the production location to the national frontier.	All transportable goods and services produced or processed by nonresidents and purchased by residents, except goods in transit or goods imported and minimally processed by residents for reexport.	The product column of imports (P.7) in the expanded external account of goods and services and the SUT.

- From what source to draw the weights used in the selected index formula.

Based on our survey of the goods and services accounts of the 1993 SNA culminating in the SUT, these particulars for each of the four major indices can be summarized as in Table 14.13.

B.2.3 CPI versus PPI as a measure of inflation in market transactions

14.55 Central banks take an interest in the major price indices, particularly if they implement an “inflation-targeting” monetary policy. The CPI is the most widely available macroeconomic price statistic, and in many countries it may be the only available option for inflation measurement. When available, the PPI ordinarily is produced monthly, on a timetable similar to that of the CPI. It is useful, therefore, to compare the two indices as candidates for inflation measurement.

14.56 Both reference aggregates for the CPI (consumption plus capital formation) are important components of total final expenditure and GDP in virtually all countries. Indeed, reference aggregate 2 (consumption plus capital formation) has been promoted by some analysts as a better measure of change in the prices of actual transactions in goods and services than CPIs based on reference aggregate 1 (consumption), which gives substantial weight to the imputed rent of owner-occupied housing. On the other hand, the total value of transactions in goods and services also includes intermediate consumption and acquisitions or disposals of tangible and intangible capital assets, so as an inflation index for total goods and services transactions, the CPI’s coverage is rather limited under either definition 1 or 2. The CPI’s purchasers’ price valuation principle also includes taxes less subsidies on products, which may not be desired in an inflation indicator for underlying price change.

14.57 In contrast, the PPI covers, in principle, total output, which by definition implicitly includes intermediate consumption as well as value added.¹⁹ A second desirable feature of the PPI is that it pro-

¹⁹However, progress in extending the industry coverage of the PPI to cover all output producing activities, services in particular, has proceeded slowly owing to the technical difficulty of specifying service products and measuring the associated prices.

vides some information on the transmission of inflation through the economy by stage of processing. As noted earlier, product-based stage-of-processing PPIs may be used to provide information on transmission of inflation through the economy from primary products to finished products. If industry value-added indices are compiled, then industry-based stage-of-processing net output price indices can be used to inform on the transmission of inflation from primary activity to tertiary activity. As noted earlier, the latter indices require price indices for intermediate consumption, which most often are estimated using available information on basic prices, trade and transport margins, and taxes and subsidies on products, rather than from direct surveys, although the latter may be used and are preferable if the survey resources are available.²⁰

B.3 Other goods and services price indicators in national accounts

B.3.1 Price indices for total supply

14.58 Consistent with our earlier discussion of the PPI coverage, total market-valued output is defined as the sum of market output (P.11) and output for own final use (P.12). Total output (P.1) is the sum of market-valued output and other nonmarket output (P.13). Total supply at basic prices is the sum of output and imports (P.7). Markup adjustments at the product level for trade and transport margins on domestic production, insurance and freight on imports, and taxes (D.21) less subsidies (D.31) on products would be added to total supply at basic prices to produce total supply at purchasers’ prices.

14.59 In decomposing total supply into price and volume components, the total SPI at basic prices can be seen to be a weighted mean of the total out-

²⁰Although it is possible to produce something similar to industry-based stage-of-processing indices with information only on basic prices deriving from the output-based PPI in conjunction with a product by industry intermediate consumption matrix, such indices do not capture changes in trade and transportation margins or taxes less subsidies on production. To the extent that such changes are occurring, such indices measure the value-added deflators with an error. However, for inflation measurement, particularly with a view toward an inflation targeting monetary policy, it may be desirable to remove the contribution to change in such industry-based stage-of-processing indices that arises from changes in taxes net of subsidies on products.

put price index (YPI) and the MPI. The YPI comprises in turn the PPI and an implicit deflator index (IDI) for other nonmarket output. To obtain the deflator for total supply at purchasers' prices, the SPI would be multiplied by an index of the total markup for trade, insurance, and transport margins,²¹ and taxes net of subsidies on products.

14.60 Total supply price indices at product levels of detail are useful in compiling and reconciling discrepancies in supply and use tables expressed in volume terms. In addition, SPIs are employed in producing industry price indices for intermediate consumption (P.2), which are useful for compiling GDP volume measures from the production approach. Although principally used as a compilation aid and in deflation of value added at basic prices via the double-deflation approach (see Section B.4.2), SPIs could also serve as analytical indicators in their own right because of their coverage of all goods and services transactions in the economy relating to production and external trade. As such, they may be useful as indicators for economic policy analysis and evaluation requiring broad transaction coverage, in monetary policy formulation, for example.

B.3.2 Price indices for final uses

14.61 The price indices for final uses comprise deflators for individual consumption (P.31), collective consumption (P.32), gross fixed capital formation (P.51), change in inventories (P.52), acquisitions less disposals of valuables (P.53), and exports (P.6). Of the major price indices discussed above, the CPI is the principal source of detailed (product-level) information for P.31, and the PPI is a significant source of detailed information for P.51 and the principal source for the finished goods component of P.52. The SPI may be the principal source for the input inventories component of P.52 in the absence of a detailed intermediate inputs purchase price survey, and the XPI is the deflator for P.6. The SPI can serve as a source of detailed product information for P.32, P.51, and P.53. The deflator for total final uses is designated as the final uses price index, or the FPI. It would be computed as a weighted mean

²¹These margins matter only when developing supply price indices at purchasers' prices for individual products and product subaggregates. For all products they cancel out, leaving only taxes less subsidies on products contributing to the total markup on total supply at basic prices.

(formula to be determined) of the component indices just discussed.

B.3.3 GDP deflator

14.62 As noted above in the discussion of the SPI and the IPI, the GDP price deflator²² can be compiled in two ways, corresponding to the two goods and services methods of compiling GDP: the production approach and the expenditure approach. Recall that the production approach derives from the definition of value added, which is the difference between output (P.1) (at basic prices) and intermediate consumption (P.2) (at purchasers' prices). The 1993 SNA recommends the use of double deflation for value added, by which output at basic prices Y is deflated by the all items YPI to obtain output volume, and intermediate purchases are deflated by an intermediate purchases price index to obtain intermediate input volume. Real value added is then computed as the difference between output volume and intermediate input volume.²³ This operation is equivalent to deflating value added in current prices with a double-deflation-type price index having a positive weight on the YPI and a negative weight on the IPI.²⁴ The total value added at current basic prices divided by real value added obtained via double deflation yields the implicit deflator for value added at basic prices. Finally, the GDP deflator at purchasers' prices is the value-added price index (at basic prices for output and purchasers' prices for intermediate input) multiplied by the in-

²²The terminology "GDP price index" could be used here with no confusion of meaning, but we follow conventional usage as set out in Chapter 17. This does not imply that a price index that declines with increases in some prices is in fact not a price index—this *Manual* considers a price index to be that part of the relative change in a value aggregate that can be attributed to the associated change in prices, whether such a change increases or decreases the aggregate. See Chapter 15.

²³See 1993 SNA, Chapter XVI.

²⁴In the usual case just described, the value-added deflator is as a Paasche index (Chapter 15, equation [15.6]) of the output price index $YPI^{s,t}$ and the intermediate input price index $IPI^{s,t}$, where the weight on the $IPI^{s,t}$ is

$$w_i^t = \frac{-P.2^t}{P.1^t - P.2^t}.$$

As noted in Chapter 15, equation (15.11), the corresponding volume index has the Laspeyres or "constant price" form, which is equivalent to the double-deflation real value-added volume measure described in the text divided by base-period value added.

Table 14.14. Generation of Income Account for Establishment, Institutional Unit, or Institutional Sector

(1993 SNA goods and services items shown in bold)

Uses	Resources
D.1 Compensation of employees	B.1 <i>Value added</i> ¹
D.11 Wages and salaries	
D.12 Employers' social contributions	
D.121 Employers' actual social contributions	
D.122 Employers' imputed social contributions	
D.2 Taxes on production and imports	
D.29 Other taxes on production ²	
D.3 Subsidies	
D.39 Other subsidies on production (-) ³	
B.2 <i>Operating surplus</i> ⁴	

¹From the production account.²Taxes on production unrelated to products.³Subsidies on production unrelated to products.⁴Balancing item of the generation of income account.

dex of the markup on value added of output taxes less output subsidies on products.

14.63 Alternatively, the final expenditure deflator FPI may be combined with the MPI using a double-deflation-type approach. GDP volume is calculated from expenditure data by deflating imports (P.7) by the MPI and subtracting it from the volume of final uses, calculated by deflating final uses by the FPI. The implicit GDP deflator would be the ratio of GDP at current prices with GDP volume so calculated.

B.3.4 Labor services price indices

14.64 The 1993 SNA provides for the income components comprising value added in the *generation of income account*, shown in Table 14.14. The largest of the income components itemized in this account is compensation of employees (D.1), comprising wages and salaries (D.11) and employers' social contributions (D.12). D.1 represents a value aggregate for a flow of labor services and thus is susceptible to decomposition into price and volume components. Table 14.15 shows the same account exploded by type of labor service (occupation) for an establishment or industry. The price index of labor services or employment cost index (ECI) meas-

ures developments in total compensation by occupation within industry. The price of labor services in total compensation terms is of particular interest when compared with the GDP deflator, which indicates the relative purchasing power of labor compensation in terms of production for final consumption. This comparison is useful in assessing cost-push pressures on output prices and as an input into compiling measures of the productivity of labor. A second useful comparison is between the wages and salaries subindex of the ECI²⁵ with the CPI. The ratio of the ECI with the CPI indicates the purchasing power of wages in terms of consumption goods and services, and tracks the material welfare particularly of the employees subsector (S.143) of the household institutional subsector (S.14) (see Box 14.1).

²⁵In the ECI, the price of labor services comprises all of the components of compensation of employees, including employers' social contributions (benefits) as well as wages and salaries. The wages and salaries subindex of the ECI would be another example of a price index adjusted by a markup index. Analogously with the price index for total supply at purchasers' prices or for GDP by production in Table 14.12, the ECI would be adjusted in this case by a "markdown index" taking off employers' social contributions.

Table 14.15. Generation of Income Account for Establishment and Industry with Labor Services (Occupational)¹ Detail
 (1993 SNA goods and services items shown in bold)

Uses		Resources	
D.11 Wages and salaries	D.12 Employers' social contributions	D.1 Compensation of employees	B.1 Value added²
1: Legislators, senior officials, and managers 2: Professionals 3: Technicians and associate professionals 4: Clerks 5: Service workers and shop and market sales workers 6: Skilled agricultural and fishery workers 7: Craft and related trades workers 8: Plant and machine operators and assemblers 9: Elementary occupations 0: Armed forces	1: Legislators, senior officials, and managers 2: Professionals 3: Technicians and associate professionals 4: Clerks 5: Service workers and shop and market sales workers 6: Skilled agricultural and fishery workers 7: Craft and related trades workers 8: Plant and machine operators and assemblers 9: Elementary occupations 0: Armed forces	1: Legislators, senior officials, and managers 2: Professionals 3: Technicians and associate professionals 4: Clerks 5: Service workers and shop and market sales workers 6: Skilled agricultural and fishery workers 7: Craft and related trades workers 8: Plant and machine operators and assemblers 9: Elementary occupations 0: Armed forces D.2 Taxes on production and imports D.29 Other taxes on production D.3 Subsidies (-) D.39 Other subsidies on production B.2 <i>Operating surplus</i> ³	

Note: Establishment ID: eeeeeee. Activity/industry code (ISIC): aaaa. Institutional unit ID: uuuuuuu. Institutional sector code: S.mmmn. Market status: P.1n.

¹Shown are major groups of the International Standard Classification of Occupations 1988 (ISCO-88), ILO.

²From the production account.

³Balancing item of the generation of income account.

B.4 A framework for a system of price statistics

14.65 To summarize this section's overview of the main price indicators and the national accounts, Table 14.16 shows the price indices needed for the value aggregates in the national accounts and their relation to the four main price indicators. Indices that are functions of two other indices are shown with the general notation $f(I_1, I_2; w)$, where f is an index formula, I_1 and I_2 are price indices (for example, MPI and YPI), w is the weight of the second index, with the weight of the first argument in f understood to be $1 - w$. For example, if f is the Laspeyres formula, then the output price index YPI would be calculated by making the following substitutions: $P_L^{s,t} = YPI^{s,t}$, $r_1^{s,t} = PPI^{s,t}$, $w_1^s = 1 - w_X^s$, $r_2^{s,t} = XPI^{s,t} \times \Delta^{s,t}$, $w_2^s = w_X^s$. The variable f also could be chosen as a Paasche formula (with the same substitutions except for change in the time superscript on the weights $w_1^t = 1 - w_X^t$ and $w_2^t = w_D^t$), Fisher Ideal formula, or other index formula.

C. International Comparisons of Expenditure on Goods and Services

14.66 The main price statistics discussed thus far trace price developments of goods and services through time. Purchasing power parities compare price levels expressed in a numeraire currency, such as the U.S. dollar or the euro, of detailed goods and services among different countries or geographical areas for a given accounting period. They eliminate the effect of prices when comparing the levels of GDP between two countries or areas. The price relatives in bilateral PPPs comprise the ratios of the

local prices, converted to a numeraire currency, of identical goods and services between the two countries or areas. The weights are proportional to the shares of these items in expenditure on GDP, expressed in a numeraire currency, between the two countries or areas. PPPs thus follow the same scope and valuation concepts as GDP in Table 14.16, with the superscript t referring to an area or country rather than month, quarter, or year.

14.67 The sources of price relatives are the same as those for the final uses GDP deflator, and the weights are simply the total final uses, net of imports f.o.b., by product. To ensure the PPP between area A and area B is the reciprocal of the PPP between B and A , bilateral PPPs need to be computed using symmetric index numbers such as the Fisher or Törnqvist indices.²⁶

14.68 A matrix of bilateral PPPs provides a means of making not only direct bilateral comparisons, but also bilateral comparisons between any two areas as the product of a sequence of bilateral PPPs through any set of intervening areas, beginning with the first area and ending with the second. To ensure the consistency of such comparisons (for example, that a chain beginning with a given area and ending with the same area produces a PPP of unity), bilateral PPPs are adjusted to produce a transitive set of comparisons. The methods for imposing transitivity on a system of bilateral parities compare each area or country's goods and services prices and shares in GDP to a regional set of reference prices and reference shares.

²⁶Note that in the international comparisons case the superscripts s and t of the price and volume decompositions in Section A of this chapter refer to two countries rather than two time periods.

Table 14.16. A Framework for Price Statistics

1993 SNA Aggregate	1993 SNA Transaction Codes ¹	Valuation and Needed Detail	1993 SNA Source Account	Price Index ²	Derivation from Other Price Indices
<i>Supply</i>					
Market-valued output	P.11 + P.12	Basic prices, product by industry	Production account with industry and product detail, total economy (S.1)	Producer price index	
Other nonmarket output ³	P.13	Basic prices (cost of production), product by industry	Production account with industry and product detail, total economy (S.1)	<i>Implicit deflator index for other nonmarket output</i>	Derived from volume indicator
Total output	P.1 = P.11 + P.12 + P.13	Basic prices, by product	Production account with industry and product detail, total economy (S.1)	<i>Output price index</i>	$YPI = f(PPI, IDI; w_m), w_m = \frac{P.13}{P.1}$
Imports	P.7	Basic prices (goods f.o.b. frontier of exporting country, plus separately identified freight and insurance on imports provided by nonresidents, as well as other services provided by nonresidents), by product	External transactions in goods and services account with product detail, total economy (S.1)	Import Price Index, comprising an import purchasers' price index, multiplied by an f.o.b./purchasers' price markdown index	
Total supply, basic prices	P.1 + P.7	Basic prices, by product	Supply and use table, total economy (S.1)	<i>Supply price index</i>	$SPI = f(MPI, YPI; w_y), w_y = \frac{P.1}{P.1 + P.7}$
Domestic trade, insurance, and transport margin adjustment		Basic prices, for services provided for transportation and distribution within national frontiers, by product	Supply and use table, total economy (S.1)	<i>Supply markup index (SMI)</i>	$SMI = \frac{P.1' + P.7' + D.21' - D.31'}{P.1^s + P.7^s + D.21^s - D.31^s}$ <i>(in the aggregate). Product-level total output markup indices also would include trade and transport margins in the numerator of the above expression.</i>
Freight and insurance on imports adjustment		Basic prices (for services provided from exporter frontier to domestic frontier, regardless of residency of provider), by product	Supply and use table, total economy (S.1)		
Taxes less subsidies on products	D.21 - D.31	Payable, by product	Allocation of primary income account, general government sector (S.13)		
Total supply, purchasers' prices	P.11 + P.12 + P.7 + D.21 - D.31	Purchasers' prices			$SPI \times SMI$

<i>Uses</i>					
Intermediate consumption	P.2	Purchasers' prices, products by industries	Production account with product and industry detail, total economy (S.1)	Intermediate consumption price index	Usually incorporates product-level information from the total supply price index at purchasers' prices.
Individual consumption	P.31	Purchasers' prices, by product	Use of income account with product detail, total economy (S.1)	Household consumption price index (HPI)	Incorporates the CPI and may incorporate product-level information from the CPI and PPI regarding goods and services produced from own consumption and provided to individuals by NPISHs and general government.
Household sector S.14	CPI reference aggregate #1: employers' social contributions and consumption for own final use, but including imputed rent of homeowners CPI reference aggregate #2: employers' social contributions and consumption for own final use (and excluding by implication imputed rent of homeowners)	Purchasers' prices, by product	Reference aggregate #1: Use of income account with product detail, household sector (S.14), with special subclassification of P.31 CPI reference aggregate #2: Use of income account with product detail, household sector (S.14), with special subclassification of P.31	Consumer price index, consumption basis Consumer price index, transactions or inflation basis	
Collective consumption	P.32	Purchasers' prices, by product	Use of income account with product detail, general government sector (S.13)	Government price index (GPI)	May incorporate product indices from the CPI and PPI.
Gross fixed capital formation	P.51	Purchasers' prices, by product	Capital account with product detail, total economy (S.1)	Fixed capital formation price index (KPI)	May incorporate product indices from the PPI.
Household sector S.14	CPI reference aggregate #2: Gross capital formation in residential dwellings (P.51)	Purchasers' prices, by product	CPI reference aggregate #2: Capital account regarding acquisitions (P.5111) less disposals (P.5112) of residential dwellings	Consumer price index, transactions or inflation basis	
Change in inventories	P.52	Purchasers' prices, by product	Capital account with product detail, total economy (S.1)	Inventory price index (NPI)	Price index of inventory stocks
Acquisitions less disposals of valuables	P.53	Purchasers' prices, by product	Capital account with product detail, total economy (S.1)	Valuables price index (VPI)	Price index of valuables stocks

Table 14.16. (concluded)

1993 SNA Aggregate	1993 SNA Codes ¹	Transaction	Valuation and Needed Detail	1993 SNA Source Account	Price Index ²	Derivation from Other Price Indices
Exports	P.6		Purchasers' prices (f.o.b. domestic frontier), by product	External transactions in goods and services account with product detail, total economy (S.1)	Export price index (XPI)	
Total final uses	P.3 + P.5 + P.6		Purchasers' prices, by product	Supply and use table, total economy (S.1)	Final uses price index (FPI)	$FPI = f(HPI, GPI, KPI, NPI, VPI, XPI, \bar{w})$ <p>where</p> $\bar{w} = [w_G, w_K, w_N, w_F, w_X]^4 \text{ and}$ $w_G = \frac{P.32}{P.3 + P.4 + P.5 + P.6},$ $w_K = \frac{P.51}{P.3 + P.4 + P.5 + P.6},$ $w_G = \frac{P.32}{P.3 + P.4 + P.5 + P.6},$ $w_F = \frac{P.53}{P.3 + P.4 + P.5 + P.6},$ $w_X = \frac{P.6}{P.3 + P.4 + P.5 + P.6}.$
Value added (net output PPI)	V = P.1 - P.2 + D.21 - D.31		By industry, product and institutional sector, with industry and total value-added price indices adjusted by a markup factor for taxes net of subsidies on products. Net output PPI may exclude from intermediate consumption products, particularly services, on which there may be no price information.	Gross Domestic Product Supply and use table, total economy (S.1)	Value-added deflator	$\text{Value-added deflator} = f(SPI, IPI, w_I),$ <p>where</p> $w_M = \frac{-P.7}{GDP}$ $w_I = \frac{-P.2}{GDP}$

Gross domestic product	GDP = P.3 + P.5 + P.6 – P.7	By product and institutional sector.	Supply and use table, total economy (S.1)	GDP deflator	$GDP\ deflator = f(FPI, MPI; w_M)$ $= SMI^* \times f(SPI, IPI; w_I)$ <p>where</p> $SMI^* = \frac{P.1' - P.2' + D.21' - D.31'}{P.1^s - P.2^s + D.21^s - D.31^s}$ <p>(in the aggregate).</p> <p>Industry-level value-added markup indices <i>SMI*</i> would include the total trade and transport margins on output in the numerator.</p>
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Other Price Indices Related to Net Output

Compensation of employees	D.1	By occupation, industry, and institutional sector	Generation of income account, total economy (S.1)	Employment cost index
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¹P.11 = Market output, P.12 = Output for own final use, D.21 = Taxes on products, and D.31 = Subsidies on products.

²The four major price indices are shown in bold.

³This category comprises public services output provided free of charge or at economically insignificant prices by general government and NPISHs. This output is valued at cost because it has no market comparator. A price index cannot be directly constructed for this aggregate because there are no economically significant prices for other nonmarket output. The implicit deflator for other nonmarket output (P.13) is derived by dividing a directly compiled volume indicator into the value of other nonmarket output.

⁴Unlike the other aggregations of indices that involve the combination of two component indices, it is shown that the FPI is a simultaneous aggregation of six price indices for the components of final uses. Again, *f* can be any of the indices introduced in this chapter, and with the weight of the first item (here of individual consumption [P.31]) determined as one minus the rest of the weights, and the price relatives given by the list of index arguments.

⁵The negative weights of the second index arguments of both of these formulas for GDP is an indication that they represent a double-deflation-type price index. See 1993 SNA, Chapter XVI, Section E.