Chapter 10

The input-output table and integrated economic accounts

National accounts constitute one of the rare cases in which statisticians provide tables that are (almost) completely consistent, and it is this that gives national accounts their potency. This chapter explores how these consistent tables come to be, focusing on supply-and-use tables, aggregate supply and final uses tables, the intermediate use table, and the input-output table. It concludes by considering calculations of GDP and also examines integrated economic accounts.

According to Edmond Malinvaud, one of the most distinguished contemporary French economists, the national accounts are "the presentation, in a rigorous accounting framework, of all the quantitative information relating to the nation's economic activity" (Malinvaud, 1973). Here, the importance of the words "rigorous accounting framework" must be stressed. In fact, any macroeconomist carries in his head a simplified model of the economy in which everything made by someone is used by someone else, anything exported by someone is imported by someone else, anything saved by someone is invested by someone else, and so on.

However, basic statistics are not presented in a "rigorous accounting framework". They never precisely tie in together. For example, for a given product, the figures for total output are not going to correspond to the figures for total use. The reason for this is simply that output statistics are compiled differently from those of use: the statistical questionnaires are not addressed to the same people; the classifications are different; statisticians apply different methods; and so on. Some people have even ironically formulated a "theorem" that states if two statisticians are given the same set of data, the aggregate results they provide will necessarily be different!

For these reasons, macroeconomists appreciate that national accounts constitute one of the rare cases in which statisticians provide tables that are (almost) completely consistent.

"Almost" because there nevertheless remain certain inconsistencies known as "statistical discrepancies" that will be discussed later in this chapter. Some of these we already saw in Chapter 8 as the difference between the "B9s" in the non-financial accounts and the "B9s" in the financial accounts.

The totals are equal to the sum of the parts, the resources are equal to the uses, and so on. The simple model carried by macroeconomists in their heads is therefore given concrete shape, and it is this that gives national accounts their potency.

Even so, it has to be remembered that there are no miracles in statistics. To obtain consistent tables, national accountants have been obliged to cut here, to re-evaluate there – often arbitrarily – even though they use the best possible methods. The high level of consistency among tables in the national

accounts (to within a few million of the national currency) should not be allowed to mask what is still only limited accuracy (see Chapter 11). Some statisticians take the view, however, that it is the attempt to achieve consistency in the statistics that is one of the driving-forces for better quality. This consistency is obtained by using several global tables that we consider in this chapter.

1. The supply-and-use tables (SUTs)

In the national accounts, the first set of global tables is known as the "supply-and-use tables" (SUTs). A table of this kind applies to each product of the classification, for instance software. The equilibrium for this product can be stated as follows:

Equation 1:

Output + Imports = Supply = Uses = Intermediate consumption + Final consumption + GFCF + Changes in inventories + Exports.

First, let us interpret this equation in terms of *numbers*. The equation then signifies that the *number* of software programmes produced plus the *number* of software programmes imported is *necessarily* equal to the sum of the *numbers* of software programmes purchased by the user firms. The software is either for: (1) intermediate consumption (the small "disposable" programmes); (2) investment (the large professional programmes); (3) consumption by households (games software, in particular); (4) stocked as inventories by the software-producing firms in the form of work in progress; or (5) it is exported.

This is an absolute equality: the resources (another name for "supply") are *necessarily* equal to the uses, by definition. This explains why national accountants also refer to this equation as an ***accounting identity***. They make constant use of it, mainly to derive one item based on results for the others. For example, suppose there were no statistics concerning changes in inventories of software programmes. No matter: if statistics are available for the other items, the "change in inventories" item can be obtained by making intelligent use of the accounting identity and deriving it as the balance of the other items:

Change in inventories = Supply – Intermediate consumption – Final consumption – GFCF – Exports

In this way, we kill two birds with one stone: we obtain an estimate of the changes in inventories, and at the same time we verify the accounting identity. This example was not chosen at random because in certain countries, like France, this is the way changes in inventories are obtained. Incidentally, this illustrates a paradox of the national accounts, namely that those compiling them are not necessarily anxious to have statistics on every single

item in the supply-and-use tables. For one thing, it is certain that in this case the statistics will not spontaneously "tie up". It will be necessary to choose which of the figures to trim, and this is no easy exercise.

Therefore, it should not be thought that the accounting identity method is perfect. If changes in inventories are calculated as the balance between resources and other uses, all the errors of evaluation in any of these items will find their way into the change in inventories, with possibly pernicious results. It is therefore better in this case to have direct statistics in order to make corrections "by hand" of the supply-use balance. As can be seen, while in theory the equilibrium between resources and uses is indisputable, its verification in practice forms part of the "art" of the national accountant. The following box explains the statistical sources of the SUTs.

Box 10.1. **Sources for the supply-and-use tables**

Chapters 1, 3 and 4 have already described the sources for each of the items in the supply and use tables in the case of France. We shall therefore give here only a brief reminder of what these are, still in the case of France. Market output is derived principally from sales statistics. Figures for merchandise imports and exports are taken from customs figures. Imports and exports of services mainly come from the Balance of Payments statistics of the Banque de France. Non-market output and consumption by general government come from the public accounts.

The allocation of uses on the "domestic market" (defined as output + imports – exports) depends on the nature of the product. When the product is an investment, the use will be GFCF. When it is not an investment good, it is either household consumption or intermediate consumption. The nature of the product generally makes it possible to decide whether the sales constitute solely or mainly household consumption, or, by contrast, intermediate consumption. However, in cases where the nature of the product is not a sufficient criterion, bold assumptions have to be made to allocate the sales between final consumption and intermediate consumption. It is the intermediate consumption that is the most difficult to identify. This is because systematic surveys of firms – making it possible to know the nature of their purchases – are no longer done in France. Many of the cells in the intermediate consumption matrix are therefore estimated on the basis of information regarding the past. This is why INSEE, the French statistical office, is reluctant to publish intermediate use tables at detailed level. The changes in inventories are sometimes calculated as the difference between other items.

Box 10.1. **Sources for the supply-and-use tables** *(cont.)*

The estimates are compiled, product by product, at the 332 level of the product classification, meaning that there are 332 SUTs. These are then aggregated and compared with the global estimates derived from statistical processing of the company accounts transmitted by firms to the tax authorities. The art of the national accountant then lies in matching the global estimates and the detailed estimates to obtain the high degree of consistency shown by tables in the national accounts. This operation is known as "arbitration" (see Chapter 11).

Interpreting the accounting identity in terms of the *number* of software programmes was clearly simplistic. In practice, SUTs are drawn up in monetary terms, i.e. the amount of software programmes bought or sold *in millions of national currency* – in other words, the quantities multiplied by the prices. When these prices are those of the current period, one speaks of a supply-and-use table at current prices; when they are valued at the prices of a different period (often the previous year), one speaks of a supply-and-use table at constant prices. We saw in Chapter 2 the importance of constant-price data in the national accounts, since they are fundamental to the calculation of GDP growth in volume.

In both cases, whether at current prices or constant prices, the accounting identity still holds.

The accounting identity holds only in volume based on constant prices. It does not hold using chain-linked volumes, which lead to non-additivity (see Chapter 2).

However, the introduction of prices complicates the equilibrium somewhat, because the different transactions are not carried out at the same prices. The following is a more complete version of the full supply-use equilibrium, this time expressed in monetary aggregates:

Equation 2:

Output + Imports + non-deductible VAT + Other taxes on products – Subsidies on products + Trade margins + Transport margins = Supply = Uses = Intermediate consumption + Final consumption + GFCF + Changes in inventories + Exports.

Analysis of the complete equation

Compare this second equation with the first. It is in the resources that the differences are to be found. The additions include non-deductible VAT (see the section "Going further: the treatment of VAT in the national accounts"), other taxes (minus subsidies) on products, trade and transport margins. Why these additions? The answer is because of the conventions used to evaluate the price of each transaction. The most important of these conventions are as follows:

- On the resources side: a unit of output is evaluated at the "**basic price**", defined as the amount the producer can obtain from the production of this unit. This definition therefore excludes taxes on products invoiced by the producers but then passed on to the government. Imports are valued "cif", in other words, at the price paid for them at the frontier, including cost, insurance and freight (i.e. transport) from the country of origin to the importing country's frontier.
- On the uses side: all domestic uses are valued at their **market price**, also known as the **purchase price**, including non-deductible Value-Added Tax (VAT) and other taxes as well as transport and trade margins. Exports are valued "fob" (free on board), meaning the price paid by the customer to have the merchandise loaded on a ship (or a plane or a truck) at the frontier of the exporting country.

It can therefore be seen that the difference between prices applied to resources and prices applied to uses includes the taxes payable on the products. VAT is one of the most important taxes, but there are also certain country specific taxes on petroleum products, alcohol or cigarettes. In addition to taxes, prices on the resources side include the corresponding subsidies (treated as negative taxes) and the trade and transport margins. For a better understanding, here are some examples:

- *Taxes on products*. An oil company produces motor fuel. Its basic price per litre is the proceeds received as refiner, say 20 cents. The purchase price to the consumer will be its market price, which is the refiner's receipts, *plus* VAT and the specific petroleum-products tax payable to the government on this litre. These taxes amount to 80 cents, meaning that the pump price is 100 cents. The supply-use equilibrium is therefore (per litre): 20(*basic price*) + 80(*taxes on products*) = 100(*price to the consumer*). The taxes are not counted in the basic price, since the producer merely collects them for passing on to government.
- *Trade margins*. First, note that by convention national accounts do not consider retail and wholesale services to be consumed directly. Instead, the national accounts register the consumption of retail and wholesale services as the trade margins included in the cost of the products bought.

Take the example of computers. Producers are unlikely to sell these directly to households (with some exceptions related to Internet sales). Instead, they sell through a supermarket or another type of retailer. Suppose that the producer sells a computer to the supermarket for 1 000 euros. The supermarket will add its mark-up, say 500 (to cover inventory charges, publicity, etc. and its profit margin). It also has to add VAT of 225 (assuming a VAT rate of 15%). The supply-use equilibrium of the "computer" product will therefore be: 1 000(*basic price of the producer*) + 500(*trade margin*) + 225(*VAT*) = 1 725(*price to the consumer*).

- An alternative presentation would have been to establish the equilibrium for computers excluding trade margins, as follows: 1 000(*basic price*) + 150(*VAT*) = 1 150(*price to the consumer excluding trade margins*), and *in parallel* an equilibrium for the "distribution" product: 500(*basic price for the commercial service*) + 75(VAT) = 575(*price to the consumer for the commercial service*). This presentation, which is highly artificial, has not been adopted by the national accountants, so that in the end the accounts show no specific consumption of commercial services. And yet there has indeed been output of retail and wholesale services, equal to the sum of the trade margins. To resolve this contradiction, national accountants add a negative column in the input-output table, which reflects a conventional cancelling out of the output of distribution. We shall come back to this point later in this chapter.

The complete equation in constant prices

The above examples are at current prices. However, Equation 2 can be applied in exactly the same way using prices from a different period, for example the previous year. It can then be used to calculate changes in volume.

The following is a (simplified) balance for year A, at current prices, for a given product, in quantities, prices and monetary aggregates. It can be verified that the monetary aggregates are equal to the unit prices multiplied by the quantities.

	Output	Imports	Trade margins	VAT	Total Resources	Final consumption	GFCF	Exports	Total Uses
Quantity	35 900	18 800			48 700	42 150	854	5 696	48 700
Unit price	15 000	15 000				18 940	16 000	16 000	
Value in millions	538.5	192.0	48.7	123.9	903.1	798.3	13.7	91.1	903.1

The following is the balance, also at current prices, for the following year, A + 1.

	Output	Imports	Trade margins	VAT	Total Resources	Final consumption	GFCF	Exports	Total Uses
Quantity	42 000	14 100			56 100	43 580	950	11 570	56 100
Unit price	15 500	15 500				19 538	16 500	16 500	
Value in millions	651.0	218.6	56.1	132.4	1058.1	851.5	15.7	190.9	1 058.1

The following is the resource-use balance for year A + 1, at year A's prices (in constant prices), obtained by replacing the prices of year A + 1 by the prices of year A.

	Output	Imports	Trade margins	VAT	Total Resources	Final consumption	GFCF	Exports	Total Uses
Quantity	42 000	14 100			56 100	43 580	950	11 570	56 100
Unit price	15 000	15 000				18 940	16 000	16 000	
Value in millions	630.0	211.5	56.1	128.1	1 025.7	825.4	15.2	185.1	1 025.7

The last row of this table therefore shows the "volumes", at the previous year's prices. All that is then needed to obtain the growth in volume is to divide these volumes for year A + 1 by the corresponding values at current prices for year A. For example, the growth in household consumption *in volume* between year A and year A + 1 is 825.4/798.3 = 1.0344, i.e an increase of 3.4%.

Special mention should be made of the significance of in-volume figures for VAT and trade margins. These two items (VAT and trade margins) are elements of prices, so how is it possible to speak of volume in their case? This is another example of a national accounting convention one simply has to get used to. The volume of VAT is defined as the monetary amount obtained by applying the growth rate in volume of the use item on which VAT is received to the VAT at current prices of the previous year. In our example, therefore, the VAT in volume for year A + 1, i.e. 128.1, is obtained by applying the growth rate of 3.4% to 123.9, which is the value of VAT in year A. Why 3.4%? Because this is the increase in volume of household consumption, the item on which the VAT is paid. Similarly, the trade margins in volume for year A + 1 are obtained by multiplying the growth rate in volume of each of the items of demand concerned by the trade margin to the corresponding value of the trade margin in year A.

Although already quite complicated, the above example has deliberately been kept simple in comparison with actual practice. Our main purpose is to illustrate the supply-use balance as an essential building block in national accounts calculations, at both current and constant prices.

2. The aggregate supply and final uses tables

There are as many supply and use tables as there are product categories in the national accounts. In the case of France, for example, 332 detailed SUTs are calculated each year at both current prices and previous year's prices. These detailed tables are then summed up to obtain more aggregated tables.

At aggregate level, the supply-and-use tables are broken down into three parts: the resources table; the intermediate uses table; and the final uses table (final uses being all uses other than intermediate). It has to be recognised, however, that not all countries use this presentation in their national accounts. The following elements are therefore not strictly capable of being generalised to all the OECD countries. They nevertheless make it possible to highlight certain practical presentation problems.

The resources table constitutes the left-hand part of the supply and use table.

In the US, the resource table is called the "make" table.

Below is a version for France based on the highly aggregated so-called E level classification, consisting of 17 product groups. Tables at less aggregated levels would be too large for a single page. This Table 10.1 is to be read as if each SUT had been placed one above the other. For example, the first row shows resources for agricultural products (item AZ in the classification), the third shows food products (item C1, Food products, beverages and tobacco). For each item, one finds the resource headings set out in Equation 2 of the current chapter: output, imports, margins, taxes, subsidies.

The section "Going further" explains the rows for the cif-fob adjustment (PCAFAB) and the territorial adjustment (PCHTR).

Table 10.2 below shows final uses and is the counterpart of the previous table (Table 10.1). For each product category, it shows each type of final use.

Table 10.1. **France: Supply table**

Billion euros, 2011[a]

		Output of products	Imports	Cif-fob Adjustment	Trade margins	Transport margins	Total taxes on products	Of which, VAT	Subsidies on products	**Total resources**
AZ	Agriculture, forestry, and fisheries	76	12	0	23	2	2	2	-1	**113**
DE	Mining and quarrying; energy; water supply; waste management and remediation activities	159	61	0	1	3	14	7	-4	**236**
C1	Manufacture of food, beverages and tobacco	165	35	0	74	7	29	13	0	**310**
C2	Manufacture of coke and refined petroleum products	51	28	0	10	2	35	10	0	**126**
C3	Manufacture of electrical, electronic and computer equipment - Manufacture of machinery	91	105	0	45	4	7	7	0	**252**
C4	Manufacture of transport equipment	126	70	0	26	1	13	13	0	**236**
C5	Total institutional sectors - Manufacture of other industrial products	364	199	0	140	16	28	26	0	**746**
FZ	Construction	271	0	0	0	0	23	21	0	**293**
GZ	Trade, Repair of motor vehicles and motorcycles	369	3	0	-325	0	2	2	0	**50**
HZ	Transportation and storage	181	27	-16	0	-36	4	3	-9	**151**
IZ	Accommodation and food service activities	89	0	0	0	0	4	4	0	**93**
JZ	Information and communication	184	9	0	5	1	12	10	0	**209**
KZ	Financial and insurance activities	190	6	0	0	0	14	3	0	**209**
LZ	Real estate	293	0	0	0	0	3	3	0	**296**
MN	Scientific and technical activities; administrative and support service activities	446	26	0	0	0	25	13	0	**496**
OQ	Public administration, education, health and social work	508	0	0	0	0	1	1	0	**509**
RU	Other service activities	94	2	0	0	0	7	3	0	**103**
PCHTR	Products consumed outside national territory	0	32	0	0	0	0	0	0	**32**
PCAFAB	CIF/FOB adjustment	0	-16	16	0	0	0	0	0	**0**
	Total	**3 656**	**598**	**0**	**0**	**0**	**223**	**141**	**-15**	**4 461**

a) The sums of the columns and the rows may not correspond to the totals shown because of rounding.

Source: Insee (2014), Comptes de la nation, TES et TEE, *www.insee.fr/fr/themes/theme.asp?theme=16&sous_theme=5.5*

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Table 10.2. **France, Final uses table**

Billion euros, 2011[a]

		Final consumption expenditure Households	Final consumption expenditure general government	Final consumption expenditure NPISH	Total final consumption expenditure	Total GFCF	Valuables	Changes in inventories	Total GCF	Exportations	Total final uses
AZ	Agriculture, forestry, and fisheries	32	0	0	32	1	0	2	3	16	51
DE	Mining and quarrying; energy; water supply; waste management and remediation activities	46	0	0	46	0	0	1	1	12	59
C1	Manufacture of food, beverages and tobacco	167	0	0	168	0	0	1	1	41	210
C2	Manufacture of coke and refined petroleum products	51	0	0	51	0	0	0	0	15	67
C3	Manufacture of electrical, electronic and computer equipment – Manufacture of machinery	34	0	0	35	35	0	1	36	82	153
C4	Manufacture of transport equipment	67	0	0	67	31	0	4	35	83	185
C5	Total institutional sectors – Manufacture of other industrial products	147	30	0	177	34	1	5	39	172	388
FZ	Construction	13	0	0	13	210	0	0	210	0	224
GZ	Trade, Repair of motor vehicles and motorcycles	15	0	0	15	0	0	0	0	12	27
HZ	Transportation and storage	35	3	0	38	0	0	0	0	20	58
IZ	Accommodation and food service activities	79	1	0	79	0	0	0	0	0	79
JZ	Information and communication	50	1	0	50	39	0	0	39	7	96
KZ	Financial and insurance activities	56	0	0	56	0	0	0	0	10	66
LZ	Real estate	206	15	0	221	7	0	0	7	0	228
MN	Scientific and technical activities; administrative and support service activities	24	11	0	35	40	0	0	40	25	100
OQ	Public administration, education, health and social work	57	409	24	490	0	0	0	0	1	490
RU	Other service activities	43	20	18	80	3	0	0	3	2	85
PCHTR	Products consumed outside national territory	-7	0	0	-7	0	0	0	0	39	32
PCAFAB	CIF/FOB adjustment	0	0	0	0	0	0	0	0	0	0
TOTAL	**Total**	**1 114**	**490**	**41**	**1 645**	**400**	**1**	**15**	**415**	**538**	**2 599**

a) The sums of the columns and the rows may not correspond to the totals shown because of rounding.

Source: Insee (2014), Comptes de la nation, TES et TEE, *www.insee.fr/fr/themes/theme.asp?theme=16&sous_theme=5.5*

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3. Intermediate use table (IUT)

In addition to these two tables – the product supply table and the product final uses table – national accounts break out "intermediate consumption" for a given product into a variable number of intermediate consumption figures by **industry**. An industry is defined as the aggregation of firms, or parts of firms, making a given product.

For a better understanding, let us take a fictitious and simplified supply-use balance for the electricity category. In this case, we have *Output* (250)+ Imports (15) = Intermediate consumption (142) + Final consumption (97) + Exports (26). National accountants distribute the amount of 142 for intermediate consumption among detailed industries, recording, for example, 12 for the consumption of electricity by the automobile industry, 9 for the textile industry, 26 for the aluminium industry, and so on.

In this way, a matrix known as the intermediate use table (IUT) is compiled, showing consumption *by products* in the rows, and intermediate consumption *by industry* in the columns. Table 10.3 below is an illustration in the case of France using the E-level classification (17 products/17 industries) for 2011.

Table 10.3 is to be read as follows: First, along the rows, we find intermediate consumption of a given product by different industries. For example, the row C2 Coke and refined petroleum products shows that the French AZ industry (Agriculture, forestry and fisheries), shown in the first column, had intermediate consumption of coke and refined petroleum products amounting to 4 billion euros; the C1 industry (Manufacture of food, beverages and tobacco products) consumed 1 billion euros (the third column); and the HZ industry (Transportation and storage) consumed 15 billion, and so on. Total intermediate consumption of coke and refined petroleum products amounted to 60 billion euros, the total of all the figures in this row.

Looking at the columns on Table 10.3, one can see the intermediate consumption of all product types for any given industry. In the case of "C2 Manufacture of coke and refined petroleum", it can be seen that in 2011 its intermediate consumption of Mining and quarrying; energy, water supply, waste management and remediation products amounted to 37 billion, its consumption of transportation and storage services to 1 billion, its consumption of Other industrial products to 2 billion, etc. Its total intermediate consumption amounted to 49 billion euros.

Be sure to note the difference between reading the rows, which show figures for a single product category, and the columns, which show a single industry. It is essential not to confuse the two, even if the items in the classification have the same name. In our example, the Agriculture product category and the Agriculture industry are both labelled AZ, and yet one

Table 10.3. **France: Intermediate uses table**

Billion euros, 2011[a]

	Industries	AZ	DE	C1	C2	C3	C4	C5	FZ	GZ	HZ	IZ	JZ	KZ	LZ	MN	OQ	RU	TOTAL
AZ	Agriculture, forestry, and fisheries	17	0	40	0	0	0	3	0	0	0	1	0	0	0	0	0	0	**62**
DE	Mining and quarrying; energy; water supply; waste management and remediation activities	2	66	5	37	1	1	26	4	5	2	2	4	1	2	4	11	2	**176**
C1	Manufacture of food, beverages and tobacco	9	0	39	0	0	0	5	1	3	1	26	1	0	0	4	8	2	**99**
C2	Manufacture of coke and refined petroleum products	4	1	1	4	0	0	8	4	11	15	1	2	0	0	4	2	1	**60**
C3	Manufacture of electrical, electronic and computer equipment – Manufacture of machinery	2	3	1	1	20	19	14	14	5	2	0	6	0	0	7	3	2	**99**
C4	Manufacture of transport equipment	0	0	0	0	1	35	1	0	4	2	0	0	0	0	2	5	0	**51**
C5	Manufacture of other industrial products	13	13	11	2	25	31	135	56	12	4	1	12	2	1	13	21	5	**358**
FZ	Construction	0	4	0	1	1	1	2	39	1	1	0	2	1	4	4	7	1	**70**
GZ	Distributive trades – Repair of motor vehicles and motorcycles	0	0	1	0	1	1	2	1	11	2	0	1	0	0	1	1	0	**23**
HZ	Transportation and storage	0	1	2	1	1	1	5	2	22	35	1	4	2	1	8	8	2	**92**
IZ	Accommodation and food service activities	0	0	0	0	0	0	1	0	3	1	1	1	1	0	2	3	1	**14**
JZ	Information and communication	0	2	2	0	2	1	5	3	14	3	1	32	13	2	22	8	3	**113**
KZ	Financial and insurance activities	2	2	3	0	1	1	5	5	14	7	2	5	53	18	15	6	2	**143**
LZ	Real estate	0	0	1	0	1	1	3	1	16	3	2	4	8	10	14	4	1	**68**
MN	Scientific and technical activities; administrative and support service activities	3	11	15	2	12	15	38	28	44	17	5	20	21	11	111	35	8	**396**
OQ	Public administration, education, health and social work	0	0	0	0	0	1	1	1	1	2	0	1	1	0	2	7	0	**19**
RU	Other service activities	0	0	1	0	0	1	1	1	2	1	0	1	1	1	3	1	4	**17**
PCHTR	Products consumed outside national territory	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
PCAFAB	CIF/FOB adjustment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
TOTAL	**Total**	**52**	**105**	**122**	**49**	**67**	**109**	**254**	**159**	**169**	**96**	**44**	**97**	**104**	**52**	**216**	**131**	**36**	**1 862**

a) The sums of the columns and the rows may not correspond to the totals shown because of rounding.

Source: Insee (2014), Comptes de la nation, TES et TEE, *www.insee.fr/fr/themes/theme.asp?theme=16&sous_theme=5.5.*

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consists of agriculture products and the other of the firms producing these agriculture products. The similarities and differences between product and industry classifications are explained in the appendix "Going further".

4. The input-output table

We can now synthesize the three tables we have just looked at, plus two more. The resulting vast **input-output (IO) table** encompasses what might be called **goods and services accounts**. (This is in contrast to the "institutional sector accounts" that are part of the "integrated economic accounts" presented in Section 7 of this chapter). The organisation of the IO table is shown below. In the middle, we have the intermediate use table; on the left is the product supply table, and on the right is the product final uses table.

Table 10.4. **Input output table**

Product supply table	Intermediate use table	Final uses table
	Production account by industry	
	Generation of income account by industry	

Underneath the intermediate use table there are two accounts that we have not yet looked at in this chapter: the production account by industry; and the allocation of income account by industry (see Table 10.5). These two accounts give for each industry its output, its intermediate consumption and, finally, its value-added, as well as the breakdown of the value-added between compensation of employees and gross operating surplus (or mixed income). All these concepts were examined in Chapters 6, 7 and 9, which focused on the accounts of households, firms and general government. In fact, these tables constitute a breakdown by industry of these accounts.

The input-output (IO) presentation, made up of these five tables, gives both a global and a detailed view of all the economic relationships involving products and industries. To get an idea of the wealth of data in the national accounts, note that the IO table of France is calculated at 139 products and 139 industries. On its own, the French input-output table therefore contains 19 321 cells (139 x 139) for each of 20 years.

However, INSEE does not publish all the detailed tables. Resources and final uses are available at the G level (88 products), but the input-output table is available only at the F level (38 products). Unfortunately, even at the most aggregated level, IO would not fit in a page of this book, so we cannot illustrate it here. However, Exercise 1 at the end of this chapter proposes the compilation of an IO table using copy-and-paste. The reader is advised to re-read the preceding paragraphs with a complete IO table of this kind in front of

him or her. This will show the high internal consistency of the goods and services accounts much more clearly than any verbal description.

Table 10.5. **France: Production and generation of income account by industry**

		AZ	DE	C1	C2	C3	C4	C5	FZ	GZ	HZ	IZ	JZ	KZ	LZ	MN	OQ	RU	TOTAL
Production account by industry																			
P2	Intermediate consumption	52	105	122	49	67	109	254	159	169	96	44	97	104	52	216	131	36	**1 862**
B1	Value added	34	44	32	2	23	17	109	111	200	85	44	85	86	237	221	403	61	**1 794**
P1	Output by industry	86	149	154	51	91	126	364	270	369	180	88	182	190	289	437	534	96	**3 656**
Generation of income account by industry																			
		AZ	DE	C1	C2	C3	C4	C5	FZ	GZ	HZ	IZ	JZ	KZ	LZ	MN	OQ	RU	**TOTAL**
B1	Value added	34	44	32	2	23	17	109	111	200	85	44	85	86	237	221	403	61	**1 794**
D1	Compensation of employees	8	20	21	1	19	15	77	68	126	58	30	54	51	14	154	307	44	**1 064**
B2 or B3	Gross operating surplus or mixed income	34	23	9	1	3	1	27	40	68	22	13	29	29	201	61	90	17	**666**
D29	Other taxes on production	1	3	2	0	1	1	6	4	8	5	2	3	6	23	8	11	2	**87**
D39	Operating subsidies	-9	-1	0	0	0	0	0	0	-1	-1	0	-1	0	0	-2	-4	-1	**-23**

a) The sums of the columns and the rows may not correspond to the totals shown because of rounding
Source: Insee (2014), Comptes de la nation, TES et TEE, *www.insee.fr/fr/themes/theme.asp?theme=16&sous_theme=5.5.*
StatLink http://dx.doi.org/10.1787/888933144184

5. The use of the input-output table for economic analysis

What impact will the construction of a new high-speed rail link have on various branches of the national or regional economy? For the construction of the high-speed track, the civil engineering firm will need steel for the rails, electric pylons and also pre-stressed concrete for the bridges and other major construction works. The result will be to increase demand for the products of the steel and concrete industries. But this is not all. The firm will also need to buy new excavators and cranes and the production of these will in turn also require more steel. The steel industry will therefore see demand for its products rise substantially and, since it consumes coal and electricity, demand for the products of these other industries will also increase, and so on.

This is one type of question for which the input-output table can be useful, once one accepts the fairly bold assumptions of a linear production function and, in particular, the fundamental assumption that the "technical coefficients" remain fixed (Malinvaud, 1973). The "technical coefficients" for

industry are the ratios obtained by dividing the value of each of the various products consumed by an industry by the output of that industry.

"Accounting coefficient" would be a better term than "technical coefficient", since what we have are monetary amounts and not quantities. However, the term "technical coefficient" is generally used.

These technical coefficients can be denoted by a_{ji}, where j is the intermediate-consumption product and i is the industry (a_{ji} is therefore "the technical coefficient" of industry i for product j).

It is assumed, in this simplified universe, that the classifications by product and by industry are identical, in other words that the i and the j belong to the same universe, with i and j running from 1 to n. The a_{ji} are equal to X_{ji}/x_i, where X_{ji} is the intermediate consumption of product j by industry I, and x_i is the output of industry i. They are called "technical coefficients" because they are meant to represent a given production technique: for example, making one tonne of steel requires 5 tonnes of coal, 3 tonnes of iron, 10 megawatts of electricity, etc. The ratio between the value of the five tonnes of coal and the value of the resulting tonne of steel constitutes a coefficient that is representative of this production technique and is assumed to be fixed in volume. For the limitations of these assumptions, see Going further: "Relationship with economic theory".

Using these notations, and adding a variable y_j to represent final (not intermediate) demand for product j, a simplified supply-use balance can be written as follows:

$$x_j = X_{j1} + X_{j2} + \ldots + X_{jn} + y_j \quad (3)$$

The above indicates that the output of product j is equal to the sum of the intermediate consumption of product j by the various industries 1 to n, plus the final demand for this same product j.

As $a_{ji} = X_{ji} \div x_i$, equation 3 can be written:

$$x_j = a_{j1}\, x_1 + a_{j2}\, x_2 + \ldots + a_{jn}\, x_n + y_j \quad (4)$$

Using a matrix notation, and denoting by [A] the square matrix of the coefficients $[a_{ji}]$, by [x] the output column vector $[x_j]$ and by [y] the final demand vector $[y_j]$, we have:

$$[x] = [A] \times [x] + [y] \quad (5)$$

Reorganising and denoting the diagonal unit matrix by I, and expressing [x] as a function of the remainder, we find:

$$[x] = [I - A]^{-1} \times [y] \quad (6)$$

In other words, output is equal to the inverse of matrix [I – A] multiplied by the final demand vector. If one makes the bold assumption that the technical coefficients are fixed, this equation also holds for a variation Δy in demand. We then have:

$$[\Delta x] = [I - A]^{-1} \times [\Delta y] \quad (7)$$

and Δx is therefore the value of change in output necessitated by the variation Δy in demand.

The answer to our initial question regarding the impact of a high-speed train link is therefore obtained by a calculation of this kind. One sets a value Δy_j on the variation in final demand necessitated by this project and applies equation 7. Exercise 4 at the end of this chapter is based on a similar simulation.

6. From the sum of the values added to GDP

Table 10.5, presented earlier, represents the production account by industry and gives the gross value added of each of these industries. We explained in Chapter 1 that GDP is the aggregate of output (free of double counting) obtained from the *sum of the gross values added*. We call this value *GDP output approach*. The total column in the "gross value added" row of the production account in Table 10.5 gives a value of 1794. Is this the value of GDP for France?

The answer is no, because the national accountants have chosen to arrange matters so that GDP corresponds *also* to the sum of final uses; in other words, the *GDP output approach* must equal the *GDP expenditure approach*. However, we have seen that both the value added and output approaches to calculating GDP use basic prices, while the final uses approach uses purchase prices, including taxes on products, net of subsidies on products.

This explains why the exact definition of GDP is not the sum of the values added, but the sum of the values added *plus* the taxes on products (D21), *minus* the subsidies on products (D31).

The US is an exception regarding this rule. Value added in the NIPA accounts (see Chapter 12) is valued at market price, not at basic price.

This price adjustment makes it possible to bring the GDP output approach and final uses approach into equality.

Table 10.6 below shows the reconciliation between the output approach for calculating GDP and the expenditure approach, in this case using the case of Korea for 2012. For information, the table shows both estimates under SNA 1993 and SNA 2008 (Korea has published its SNA 2008 estimates a few weeks

before the publication of the present manual). Let's use the SNA 1993 column for further comments, but would we have used the SNA 2008 ones, the conclusions would not change, even if the data are different. The first part of the table clearly shows the addition to value added at basic prices of taxes on products minus subsidies on products (D21 – D31). It is this adjustment that makes it possible to obtain the value of GDP at market prices (as it is often called), and this also equals the figure obtained using the expenditure approach.

Table 10.6. **Korea: Gross Domestic Product: the three approaches**
2012, Billions of won, current prices, SNA 1993 and SNA 2008

		SNA 1993	SNA 2008
	Gross domestic product (output approach)	**1272459.5**	**1377456.6**
B1	Gross value added at basic prices, excluding FISIM	1145970.9	1251455.2
D21_D31	+ Taxes less subsidies on products	126488.6	126001.5
	Gross domestic product (expenditure approach)	**1272459.5**	**1377456.6**
P3	Final consumption expenditure	882232.5	911938.1
P5	+ Gross capital formation	350616.8	427028.6
P6	+ Exports of goods and services	718967.0	776062.5
P7	– Imports of goods and services	679786.1	737572.5
	+ Statistical discrepancy	429.3	-0.1
	Gross domestic product (income approach)	**1272459.5**	**1377456.6**
D1	Compensation of employees	583377.0	599308.5
B2_B3	+ Gross operating surplus and gross mixed income	548480.5	636915.0
D2_D3	+ Taxes less subsidies on production and imports	140602.0	141233.3
D29_D39	of which: Other taxes less subsidies on products	14113.4	15231.9
D21_D31	of which: Taxes less subsidies on products	126488.6	126001.4
	+ Statistical discrepancy	0	0

Source: OECD (2013), "Aggregate National Accounts: Gross domestic product", OECD National Accounts Statistics (database), *http://dx.doi.org/10.1787/data-00001-en*.and OECD calculations from Bank of Korea source.

StatLink http://dx.doi.org/10.1787/888933144199

Table 10.6 also illustrates the equality of these two approaches with the "income approach", which is also based on the input-output table. The three GDPs are indeed equal, whether in SNA 1993 or SNA 2008. The generation of income account by industry shown earlier (Table 10.5) gives, for each industry, the breakdown of value added between the two factors of production – labour ("Compensation of employees", coded as D1) and capital ("Gross operating surplus and mixed income", coded as B2/B3) – plus D29_D39 "Other taxes on production" (D29) net of "Other subsidies on production" (D39).

This breakdown is also found in Table 10.6. Indeed, the gross value added at basic prices used to calculate the output-approach GDP (1 272 459.5) is equal to the sum of: "D1 Compensation of employees" or 583 377.0; plus "B2/B3 Gross

operating surplus and mixed income", or 548 480.5; plus "D29-D39 Other taxes on production", net of subsidies, or 14 113.4. These "other" taxes and subsidies (D29 and D39) should not be confused with taxes and subsidies on products (D21 or D31). D29 and D39 are specific taxes and subsidies, generally for small amounts, not applied to products but to the production process. An example is taxes on the wage bill. The income-approach GDP can also be obtained as the sum of the compensation of factors of production plus all taxes on production, and it can be expressed using the codes as: D1 + B2/B3 + D2 – D3. We already saw this three-pronged approach to GDP in Chapter 1. Exercise 2 illustrates these calculations.

Table 10.6 also contains a typical "statistical discrepancy". Korea's GDP using the expenditure approach is equal to the GDPs obtained by the output and income approaches only if an additional 429.3 (in SNA 1993; in SNA 2008, it is, by chance, very small for 2012), called the "statistical discrepancy", is added to the various elements of demand. The reason is that Korea's national accounts are derived from two distinct statistical sources. The figures for both the output and income accounts come from the database consisting of the company accounts sent to the tax authorities, whereas the elements of demand (consumption, GFCF) come from surveys.

As a consequence, Korea's GDP obtained using the expenditure approach differs slightly from that obtained using the other approaches. Because the Korean national accountants found no satisfactory method of spreading this difference between the other items, they decided to show it separately in its own right. This practice of maintaining certain "statistical discrepancy" items between the different approaches to GDP has been adopted by several other OECD countries (the United States, in particular). Other countries, by contrast, eliminate these differences by various methods and do not show discrepancies that arise from the different ways of measuring GDP. This difference of methodology between countries does not imply that the statistical sources for the first group of countries are less reliable than for the second group. It is more a practical question and a presentational choice.

These statistical discrepancies are contrary to the "rigorous accounting framework" espoused by Edmond Malinvaud, but it is reasonable to leave a certain amount of latitude in the national accounts tables. As Alan Greenspan, former Chairman of the US Federal Reserve, used to say: showing statistical discrepancies has the advantage of reminding users that national accounts are far from being 100% reliable. Greenspan even added that the analysis of these discrepancies could itself be a source of information. In fact, some observers have shown a correlation between the value of the statistical discrepancies and the business cycle.

The three approaches to GDP reflect valuation of GDP at market prices as opposed to valuation "at factor cost". In the factor-cost approach, now abandoned, value added was calculated at the prices remunerating each of the factors of production, labour and capital. No taxes were taken into account. Some regret the abandonment of GDP at factor cost as an aggregate indicator of output. Indeed, from the point of view of the producer, taxes on products have no great influence on production decisions. But this has not prevented most economists and national accountant from using GDP at market prices as the main indicator of output, because it is highly practical to have GDP equal to the sum of final uses. However, some consider that this practice has led to some double counting in GDP (see in Going further: "Limitations of the national accounts").

If instead of using the sum of the *gross* values added, one had used the values added *net* of the consumption of fixed capital, one would then have had NDP, standing for Net Domestic Product. This aggregate is unfortunately little used despite being conceptually more correct than GDP, for both the production and income approaches. However, NDP is less robust statistically because of the difficulty of calculating the consumption of fixed capital.

7. The integrated economic account (IEA)

We have just looked at the input-output table, the internally consistent table for the presentation of the goods and services accounts. The second major internally consistent table is known as the integrated economic account (IEA). This provides a synthesis of the entire institutional sector accounts (see box "Institutional units and institutional sectors"). The IEA table is much too large to be shown on a page of this book. In fact, it spreads over two pages, with the uses on the left and resources on the right, columns for the institutional sectors and rows for the transactions. It can be summarised by saying that it constitutes the juxtaposition of the accounts of households, corporations and general government presented in Chapters 6, 7 and 9. In addition to these sectors, the IEA table shows the account of the whole national economy and the account of the rest of the world (we shall be returning later to these two accounts). The advantage of the IEA account is that it provides an immediate and consistent vision of all the transactions concerning a given operation. One of the important rules of national accounts as depicted in the IEA is **accrual accounting** (see appendix "Going further").

Let us take, among the 60 or so rows in the integrated economic account (IEA) for Denmark, the row for "interest" (D41). In the IEA, this is a single row, with the left side showing the amounts as uses, and the right side showing the amounts as resources. But for space reasons, in Table 10.7 we show the resources below the uses (even though in the actual table they are side by side).

Box 10.2. **Institutional units and institutional sectors**

The basic economic unit in the national accounts is known as the **institutional unit.** It is defined as "an elementary economic decision-making centre characterised by uniformity of behaviour and decision-making autonomy in the exercise of its principal function". A household is an institutional unit in the sense that it is within the household that decisions are made regarding the modalities of its principal function, i.e., consumption. For a "legal person" (i.e. a corporate body and not a "physical person") to be an institutional unit it must, among other things, have a complete set of accounts. If the unit in question does not have complete accounts, it is considered as forming part of the larger unit that contains it. For example, the French statistical office (INSEE) is not an institutional unit, because it is a directorate of the Finance Ministry, which is itself part of general government. General government has complete accounts but INSEE does not.

The **institutional sectors** are groupings of institutional units. They are six in number: households (S14); non-financial corporations (S11); financial corporations (S12); general government (S13); non-profit institutions serving households (S15); and the rest of the world (S2). The rest of the world is not really an institutional sector since it comprises only that part of the accounts of non-resident units that relates to transactions with resident units. The notion of residence was explained in Chapter 4. The definition of most of the institutional sectors was set out in Chapters 5, 6, 7 and 9, except for financial corporations.

The **financial corporations** are the institutional units specialising in financial intermediation (banks) and in insurance. The financial corporation sector (S12) comprises the central bank, the commercial banks, specialised financial corporations, mutual funds (also called UCITS in Europe – undertakings for collective investment in transferable securities), financial auxiliaries, which comprise certain portfolio management companies, insurance companies and pension funds.

Here is how to read the table: The first sub-table shows the "uses", i.e. the interest *paid* by the institutional sectors. The first group in the column is entitled "National economy" and labelled S1. This is the institutional sector, consisting of the sum of the four *resident* institutional sectors, as opposed to the "Rest of the world", consisting of *non-residents*. The four resident sectors are the non-financial corporations, the financial corporations, general government, households and non-profit institutions serving households. The figure of 305.5 billion DKK for interest is therefore the total amount of interest paid by each of the domestic sectors, i.e.: 47.1 + 141.1 + 37.5 + 79.8, these figures all appearing in the same row.

The equality between S1 and the sum of the resident sectors is a consequence of the national accounts not being "consolidated" (see appendix "Going further").

Following this, the next column indicates the interest paid to Denmark by the rest of the world, amounting to 62.1 billion DKK. In all, 367.6 billion of interest is paid by the various sectors.

Table 10.7. **Extract from the integrated economic account for Denmark, row "D41 interest"**

Billions of Danish kroner, 2011

		Uses						
		S1: National economy	S11: Non-financial corporations	S12: Financial corporations	S13: General government	S14_S15: Households and NPISH	S2: Rest of the world	Total
D. 41	Interest	305.5	47.1	141.1	37.5	79.8	62.1	367.6
		Resources						
	Total	S2: Rest of the world	S14_S15: Households and NPISH	S13: General government	S12: Financial corporations	S11: Non-financial corporations	S1: National economy	
	367.6	56.9	19.9	23.7	245.1	21.9	310.7	Interest

Source: OECD (2014), "Detailed National Accounts: Non-financial accounts by sectors, annual", OECD National Accounts Statistics (database), doi: *http://dx.doi.org/10.1787/data-00034-en*.

StatLink *http://dx.doi.org/10.1787/888933144200*

The second sub-table ("resources") shows the interest *received*, broken down by institutional sectors. Obviously the total interest received, 367.6 billion, is equal to the total interest paid, in conformity with the principle of consistency of the national accounts. Going along the row, one finds the sums received by each institutional sector.

This table is interesting because it makes it possible to visualise how the interest flows are broken down among agents. It nevertheless has two limitations. The first is that it is not consolidated (see appendix "Going further"), so it is important not to misinterpret the figures. The large sum of interest paid by the financial corporations does not signify that this interest is paid to other institutional sectors – far from it. Most of the interest paid by financial corporations is to other financial corporations, as a result of the complexity of modern financial systems.

The second limitation, linked to the first, is that these tables fail to show what national accountants call the "who-to-whom" element. For example, the table does not show "to whom" the financial corporations pay the 245.1 billion. Most probably, as has just been said, it is paid largely to other financial corporations, but also to households and non-financial corporations. However, these amounts are not known. Only a "who-to-whom" matrix could answer this question. The statistical offices have this type of information for certain transactions but do not generally publish them.

8. The transition from GDP to national income

It would be redundant to comment on all the rows in the integrated economic account (IEA) since the accounts for the main institutional sectors have already been described, one by one, in Chapters 6, 7 and 9. Here we shall only comment on the accounts of the S1 "National economy" sector, which is interesting in that it includes major aggregates such as Gross National Income, Gross Disposable Income, national saving and the nation's net lending/net borrowing.

Gross national income

Since GDP equals the sum of the values added plus taxes on products net of subsidies, it has an important place in the production account of sector S1, an extract of which is shown for Korea in Table 10.8 (in SNA 1993, but the conclusions would be the same in SNA 2008). The second important aggregate in this account is Gross National Income (GNI), or Net National Income (NNI), if the consumption of fixed capital is subtracted. This aggregate (GNI) used to be called Gross National Product, but too many people confused it with Gross Domestic Product, and it was therefore given a new – and more suitable – name.

Gross Domestic Product is the economic wealth produced during a certain period by economic agents within the economic territory. Gross National Income is the sum of the primary incomes of the economic agents resident in the territory during a certain period. In the case of Korea, the difference between the two appears clearly in the first part of Table 10.8 below. In order to derive GNI from GDP, the following steps are necessary:

1. start with GDP (1 272 459.5 in 2012);
2. add the primary incomes received from the rest of the world (+25 156.6). These primary incomes consist of wages and salaries, property income (interest, dividends) and taxes and subsidies;
3. deduct the primary incomes paid to the rest of the world (-18 069.7);
4. to finally obtain the GNI (1 279 546.4).

Table 10.8. **Korea: The transition from GDP to GNI and other major aggregates**

Billions of won, current prices, 2012, SNA 1993

B1_G	Gross domestic product	1 272 459.5
D1_D4	+ Primary incomes receivable from the rest of the world	25 156.6
D1_D4	- Primary incomes payable to the rest of the world	18 069.7
B5_G	Gross national income at market prices	1 279 546.4
K1	- Consumption of fixed capital	164 262.5
B5_N	Net national income at market prices	1 115 283.9
D5_D7	+ Current transfers receivable from the rest of the world	17 891.8
D5_D7	- Current transfers payable to the rest of the world	21 009.1
B6_N	Net national disposable income	1 112 166.6
P3	- Final consumption expenditures	882 232.5
B8_N	Saving, net	229 934.2
D9	+ Net capital transfers from the rest of the world	802.5
P5	- Gross capital formation	350 616.8
K2	- Acquisitions less disposals of non-financial non-produced assets	122.9
K1	+ Consumption of fixed capital	164 262.5
B9	Net lending/net borrowing	44 259.6

Source: OECD (2013), "Aggregate National Accounts: Disposable income and net lending/borrowing", OECD National Accounts Statistics (database), *http://dx.doi.org/10.1787/data-00002-en*.

StatLink *http://dx.doi.org/10.1787/888933144216*

The above makes it easier to interpret GNI. It is the totality of the primary incomes received by economic agents resident in the territory, regardless of whether these incomes are obtained in the territory or not. In addition to the income derived from production within the territory (already included in GDP), there are the incomes derived from production outside the territory (not included in GDP). This explains the addition of the compensation of employees received from the rest of the world, in all likelihood the wages and salaries of workers resident in Korea but working in neighbouring countries. Conversely, it is necessary to deduct the wages and salaries of workers who are non-resident in Korea but who have come to work there. The same operation is carried out for trans-border flows involving the two other forms of primary income, namely property income and taxes and subsidies on production. And the final result is GNI, which (unlike GDP) is an *income-based* concept and not a *production-based* concept, since it includes income derived from production abroad (and hence not recorded in its totality) and excludes the value of output repaid to foreign factors of production. Hence, the word "Income" instead of "Product" is used in its name. This being said, in the case of Korea the difference between the GDP and GNI is very small. We saw in Chapter 1 that it is greater for a country such as Luxembourg because of the importance of trans-border workers in relation to the country's economy.

GNI is an important aggregate for European Union (EU) countries because it is one of the main indicators used to allocate the budget and the operating costs of the EU institutions among member countries.

Given GNI, it is possible to calculate Net National Income (NNI) by subtracting the consumption of fixed capital.

The rest of Table 10.8 outlines the transition from NNI to **National saving**. Similar additions and deductions for transactions with the rest of the world are made in order to obtain Net Disposable National Income, from which is deducted total final consumption expenditure in order to obtain National saving, which itself equals the sum of the savings of the different institutional sectors. Finally, one arrives at the **Nation's net lending/net borrowing**, essentially by deducting capital formation. It can be seen from Table 10.8 that in 2012 Korea had net lending of 44 259.6 billion won. In other words, Korea had no need of foreign financing for its investment. On the contrary, Korea globally provided more financing to foreign countries than foreigners did to Korea.

References

Ahmad, N. and A. Wyckoff (2003), "Carbon Dioxide Emissions Embodied in International Trade of Goods", *OECD Science, Technology and Industry Working Papers*, No. 2003/15, OECD Publishing, doi: *http://dx.doi.org/10.1787/421482436815*.

Insee (2014), Comptes de la nation, TES et TEE, *www.insee.fr/fr/themes/theme.asp?theme=16&sous_theme=5.5*.

Malinvaud, E. (1973), " Initiation à la Comptabilité Nationale ", INSEE.

OECD (2013a), "Aggregate National Accounts: Gross domestic product", OECD National Accounts Statistics (database), *http://dx.doi.org/10.1787/data-00001-en*.

OECD (2013b), "Aggregate National Accounts: Disposable income and net lending/borrowing", OECD National Accounts Statistics (database), *http://dx.doi.org/10.1787/data-00002-en*.

Key points

- The balances depicted in the supply-and-use tables (SUTs) for products constitute the basic accounting identity for the goods and services accounts. They compare resources (output, imports) with uses (intermediate consumption and final uses). They are calculated at current prices and in volume.
- Output is valued at basic prices. Uses are valued at market prices.
- Trade and transport margins as well as taxes (net of subsidies) are all included in the calculation of resources for products in the supply-and-use table.
- The input-output (IO) table consists of the juxtaposition of the supply-and-use balances (resources table and final uses table) and the matrix of intermediate consumption. This matrix shows in its columns the various intermediate consumptions for a given industry.
- The input-output table also includes the production accounts and the generation of income accounts for industries.
- The input-output table is available at current prices and in volume.
- When value added is calculated at basic prices (which is generally the case), the Gross Domestic Product is the sum of the values added of the industries plus taxes on products net of subsidies.
- Gross National Income (GNI) is the new name for Gross National Product, which must not be confused with Gross Domestic Product. GNI equals the sum of the primary incomes of economic agents resident in the territory, regardless of whether these incomes were obtained within the territory or not. GNI does not include the primary incomes generated in the territory by non-resident agents.
- The Integrated Economic Account is a reorganised grouping of the accounts of the institutional sectors. It shows the amounts of uses and resources of each institutional sector for all transactions. It is calculated only at current prices.

Going further

The treatment of VAT in the national accounts

In many countries, the VAT (Value-Added Tax) is one of the main taxes on products. It is collected in stages by firms for the benefit of government. The principle is as follows. All market producers (including distributors) are obligated to invoice a certain additional VAT percentage on the prices of the goods and services they sell. VAT is identified separately on the invoices of the seller firms so that the buyer firms know how much VAT they have paid. Firms pay to the government only the difference between the VAT they have collected on their sales and the VAT they have paid on their purchases. Hence the description "value-added": the tax relates to the difference between output (sales) and intermediate consumption and investment, a notion that therefore comes close to that of value added in the national accounts. VAT is not invoiced at all on exports. It is applied to imports, however.

Due to this construction, VAT is an economically more rational tax than the old taxes based on sales, which could show an increase, for example, simply if a new intermediary joined the chain from producer to consumer. This cannot happen with VAT. The success of this tax, which is now applied in more than 100 countries, lies also in the fact that it is less open to fraud than traditional taxes. This is because buyer firms have an interest in seeing that the seller firms record VAT correctly, since they are able to claim reimbursement.

The term "deductible VAT" is applied to the VAT payable on firms' intermediate consumption or gross fixed capital formation, since these amounts are deductible from the VAT owed by the firm to government as a result of its sales. Conversely, the term "non-deductible VAT" applies to the VAT that the buyer cannot deduct from his own VAT debt to the state. By definition, therefore, the VAT paid by households is totally non-deductible, since households are final consumers of the goods. On the other hand, also by definition, virtually all the VAT paid by firms on their purchases is deductible. There remain, however, special cases in which firms cannot entirely deduct the VAT on their purchases and are accordingly liable for a small portion of non-deductible VAT.

In the national accounts system, only the non-deductible VAT is recorded. It would have been too complicated, and in the end would have been of little use for the purposes of analysis, to trace the flows of deductible VAT. This decision has three consequences. First, in the national accounts, the VAT paid on household consumption appears in the accounts in its entirety because it is totally non-deductible. By contrast, however, firms' intermediate consumption and investment are subject, in the national accounts, only to a very small amount of VAT, since most of the VAT on these flows is deductible. Lastly, VAT is recorded not as having been received by government from individual firms but as a global receipt from "the total economy".

The brief example given below shows both the actual mechanism for the recovery of VAT and its recording in the national accounts (considering a VAT rate of 20%).

- Actual VAT mechanism: firm A makes a sale of 120 to firm B, including 20 of VAT, which firm A pays back to the government. Firm B makes a sale of 270 to the final consumer, including 45 of VAT. It therefore pays the government (45 – 20) = 25. In total, the government receives 45 in the form of non-deductible VAT.
- Corresponding treatment in the national accounts: firm A is recorded as making a sale of 100 to firm B (and not 120, as in reality). The 20 of VAT is not recorded because it is deductible. Firm B makes a sale to the final consumer of 270, including 45 of VAT. This amount of 45 is recorded in its totality, being non-deductible. Moreover, it is recorded as being received by the government not from firm B, but from the total economy.

As can be seen, the treatment in the national accounts does not correspond to the monetary flows. However, the result is the same from the point of view of the government's receipts of VAT. Better still, this presentation is more suited to macroeconomic analysis, because it means that virtually the total amount of VAT in the national accounts is shown as affecting household consumption. The system therefore marks a return to economic reality that might be otherwise masked. The payers of the VAT received by government are the final consumers, or households, and not the firms, which merely collect the tax.

Note that in Europe a small portion of the VAT is paid into the European budget. In practice, this portion is received by the government and then transferred to the European budget. Under the current system the national accounts (ESA 1995) it is treated as being paid directly to the European institutions. Under the new system (ESA 2010), it will be treated as received by government and transferred to the EU institutions.

Industries, products and specific operations in the input-output table

This section explains certain additional notions that are indispensable for a full understanding of the tables making up the input-output table, using the example of France.

The classification of industries is almost the mirror image of the classification of products. In fact, an industry is defined as the totality of firms, or parts of firms, that produce a given product. For a full understanding of the relationship between the two, the best thing is to go to the INSEE website: *www.insee.fr/fr/methodes/default.asp?page=nomenclatures/naf2008/naf2008.htm*.

INSEE presents its classifications as being simultaneously products and industries. From the above website, let us consider a classification at level G, titled "C21 Pharmaceutical industry." This is itself contained within level F under "C Manufacturing industry" and in turn contains another subhead within the level H titled "C21.1 manufacturing of basic pharmaceutical products". The terminology used in this last case, including the word "manufacture", seems to suggest that it is an industry. But it is important not to go wrong on this point, since it can also be interpreted as the output of this industry, in this case medicines. It therefore represents simultaneously the activity (industry) and its result (the medicines produced). The principle that has to be kept in mind is that the output of industry X is (virtually) equal, by definition, to the output of product X. The word "virtually" is necessary because the national accounts are somewhat more complicated, and this equality does not hold for certain industries. It would take too long to go into the details here.

There is, however, one case where an industry exists but there is no corresponding product. This is "trade" (retail and wholesale trade). In the national accounts there is indeed output of trade services (measured by the trade margin) but there is no "trade" product, since, as explained in the main text, the trade margin is included in the purchase price of the product being sold. For this reason, the product supply table for France (Table 10.1) contains a row "GZ Trade, Repair of motor vehicles and motorcycles" with 369 in the output column, but this amount is cancelled out slightly further down by the purely conventional introduction of a negative margin of -325. The two amounts are not exactly equal, since the GZ item in fact contains other sub-headings than pure trade, but the idea is there: there is an output of trade, but no trade product. Although there is not the same dichotomy in the case of transport (for which there is both an industry and a product), a similar conventional cancelling out is applied relating to transport margins on final uses. This explains the figure of -36 appearing in the "transport margins"

column for the "HZ Transportation and storage" product in Table 10.1.

Two other rows in the French input-output table deserve additional explanation. These are the last two rows of Tables 10.1 and 10.2: "Products consumed outside national territory" and "cif-fob adjustment". The first concerns products consumed outside the territory, in practice tourism expenditure (see Chapter 5). Spending by French tourists abroad is conventionally recorded as an import of services (worth 32) in the product supply table (Table 10.1). Spending by foreign tourists in France is recorded as exports (worth 39) in the final uses table (Table 10.2). The difference between the two (-7) is recorded in the final uses table, in the same row and in the column "household final consumption expenditure". This sum will be added to the other consumption expenditure* in order to obtain, at the bottom of this column, the total household final consumption expenditure of households residing in France. This is because the other product rows in Table 10.2 include purchases by foreign tourists and these therefore have to be deducted to obtain consumption by residents. Conversely, the other product rows do not contain consumption by French tourists abroad and this has to be added in order to obtain their total consumption. This dual operation is carried out in the input-output table with the help of this row.

The cif-fob adjustment also pertains to relations with the rest of the world. As we saw in the main text, imports of goods are calculated cif, i.e. including cost, insurance and freight to the frontier. However, this price includes transport services from the exporting country's frontier to the French frontier. To give a more precise image of the imports of services, it was decided to show the total of imports at fob (free on board) prices, which exclude these transport costs, and to show the imported transport charges in total in the "transport" row. This explains the subtraction of 16 billion euros in the cell at the intersection of the "imports of goods" column and the "cif-fob adjustment" row in Table 10.1. If the transport service is carried out by a resident transporter, the output of this service will be included in the output of the "HZ Transportation and storage" industry. If it is carried out by a non-resident transporter, it will be included in imports of transport services. In either case, these amounts have to be deducted from the transport product row, since there is no use corresponding to these resources. This explains the entry for the same amount of -16 billion in the cell at the intersection of the "cif-fob adjustment" column and the transport row in Table 10.1. As for the cell at the intersection of the "cif-fob adjustment" column and the "cif-fob adjustment"

* This value is in fact negative in the case of France and so it would be more correct to say that it is subtracted. It is negative because spending by foreign tourists in France is greater than spending by French tourists abroad. This situation is also described by saying that the tourism balance is positive

row in Table 10.1, this is purely conventional and serves only to ensure that the row totals and the column totals for this specific operation cancel out. This cif-fob adjustment is quite complicated but has no overall impact. Its sole purpose is to give a clearer picture of the total aggregate imports of goods and services.

Limitations of the national accounts: Is there double counting in GDP?

GDP is equal to the sum of the components of final demand, each expressed at their purchase price, including taxes on products such as VAT. At the same time, GDP contains an estimate of the value of the output (and consumption) of non-market services, partly financed by these taxes. In so doing, are we not counting these taxes twice over?

The following simplified example will make it easier to understand the problem. Let us take an elementary economy in which there are only two products, manufactured goods and education. In this economy, the manufactured goods are subject to VAT at 20% and the proceeds are used by the authorities to purchase the services of teachers who provide free education services to households. It is assumed that there is no intermediate consumption in the economy.

A simplified economy financing education by VAT on manufactured goods

	Output = Value added	VAT	Final consumption
Manufactured goods	100	20	120
Education	20		20
GDP	140		140

The national accountants calculate GDP using the production approach: sum of values added + VAT, resulting in (120 + 20) = 140. This result matches that of the expenditure approach, since the addition of all the components of final demand, reduced in this case to consumption, does in fact give 140. But is there not something strange about including a VAT of 20 in the value of final consumption of manufactured goods and also counting this 20 in the consumption of education, although the latter is in fact free? Moreover, is it correct to speak of GDP at market prices when the consumption of education services is valued at a price that is not the one observed on the market, since education is free?

In order to understand the implications of the problem, let us suppose that the authorities decide to abolish VAT and to have the teachers paid directly by households. In addition, it will be assumed that nothing else

happens either to volume or to prices. Following this change, we then obtain a GDP of 120 at current prices, representing a drop of 20.

Abolition of VAT, replaced by direct purchase of educational services

	Output = Value added	VAT	Final consumption
Manufactured goods	100		100
Education	20		20
GDP	120		120

This decline is somewhat strange. Seen from the producers' viewpoint, the value of their output has not changed; seen from the consumers' viewpoint, the value of their overall consumption has not changed. There has indeed been a decline in the prices of manufactured goods, thanks to the abolition of VAT, but this decline was offset by the rise in prices of educational services, which were previously free and now have to be paid for. The overall decline in GDP of 20 is therefore difficult to interpret.

The conclusion is that unfortunately the present definition of "GDP at market prices" is impacted by such institutional changes. There is not a double counting but a weakness of the GDP definition. Should this be cause for concern? Not fundamentally, since the changes in volume will be unaffected. GDP in volume at the previous year's prices will still equal 140 following the institutional change. The consumption in volume of manufactured goods will also equal 140, since the prices applied are those of the previous period. In total, volume growth will be zero, which is intellectually satisfactory. As regards spatial comparison with another country, if (as is desirable) purchasing power parity (PPP) is applied, the problem will also be solved, since PPPs are calculated after tax and so will automatically correct for any "double counting".

It remains true that direct comparisons of GDP at current prices should not be made in the absence of PPP adjustment, although this is something one sees very often. Also, it is not clear how to interpret the movement of the GDP price index when going to no VAT (the implicit deflator of GDP will decrease, while it should remain constant). Nevertheless, there is no other definition of GDP that makes it possible to verify that GDP = output = income = expenditure. One question could be: is this equation purely theoretical due to the wedge introduced by taxes?

Relationship with economic theory: Wassily Léontieff and the use of input-output tables

The first input-output tables were developed by an American economist of Russian descent, Wassily Léontieff. In the 1930s, he published an input-

output table for the United States for the years 1919 and 1926 and used it to describe the structure of the American economy. However, it was in his native country, which had by then become the Soviet Union, that the most extensive use of the table was made. Gosplan, the Soviet Planning Ministry, drew up a five-year plan which set targets for the availability of consumer and capital goods and used input-output tables to evaluate the output needed to reach these targets. Each industry was accordingly given production targets that it was obligated to meet. Other countries like India, Egypt, China, Vietnam and Cuba adopted similar methods.

France and the Netherlands also had their five-year plans, but the purpose of these was not to impose targets on industries but rather to provide benchmarks and incentives. France and the Netherlands are market economies in which industries are not told what to produce. The five-year plans have now totally disappeared. At the same time, use of input-output tables to estimate the output needed to meet a given demand has become rarer but has not completely disappeared.

The assumption of fixed technical coefficients is a limitation of the method, except in the short term. Indeed, relative price movements between intermediate goods are not taken into account while they can generate technical changes that call this assumption into question. Moreover, long-period analysis of technical coefficients shows that they change substantially over time. Indeed, one of the major trends in recent decades has been industrial firms' increasing externalisation of entire portions of their production systems ("outsourcing"). For example, firms have drastically reduced their internal IT services to buy the IT services of specialised outside firms, regarded as giving better value for the money. This same phenomenon has occurred in the case of financial auditing, cleaning services and security, among others. Lastly, more and more industrial firms have been calling on the services of temporary agency staff (seen as being more flexible) even for their core productive activities. In all these cases, this outsourcing increases the intermediate consumption of industrial firms without correspondingly increasing their output. The result is a slow but inexorable increase in technical coefficients.

Although the use of input-output tables for economic analysis has been tending to diminish, there are certain examples to the contrary. The OECD has published an interesting study using this technique in an economic/environmental framework (Ahmad and al., 2003). The international Kyoto protocol on the environment sets targets for reductions in emissions of CO_2 (the principal "greenhouse gas") for the industrial countries. Most of the signatories have made progress towards these targets. However, this may not correspond to a genuine reduction in the emissions of CO_2 attributable to a country.

The problem is that the Kyoto protocol focuses on emissions within a country's borders, whereas globalisation means relocation of industries from the rich countries to the poor countries, reducing the emissions of the former but increasing the emissions of the latter, especially as they tend to use inefficient production techniques. In total, CO_2 emissions are higher than before. The OECD study dealt with emissions of CO_2 that are attributable not to the production of the rich countries, but to their consumption. For this purpose, it used input-output tables to determine which industries are involved in meeting certain types of consumption, including industries located in other countries. The study concluded that the emissions of CO_2 attributable to the consumption of the rich countries were 5% greater than the emissions due to their domestic production.

Accrual accounting

The so-called accrual basis is applied throughout the national accounts, and it is based on the same method used in company accounts. The principle is as follows: a transaction must be recorded in accordance with the amount and the timing of the creation of the claim (for the creditor) or of the obligation (for the debtor). For example, sales from firm A to firm B will be recorded at the time of change of ownership, in other words, when the sales contract is signed, without waiting for the payment of the money corresponding to the sale. In the period between the time of sale and the time when the money is transferred, the accounts will show a credit by the seller in favour of the buyer. This is the general principle applied in theory to all the series in the national accounts.

There is a dual justification for adopting this principle. First, if one considers that one aim of the national accounts is to show the wealth of economic agents at the end of the period, it is nothing less than indispensable. An agent's wealth at the end of the period must include as positive items all the unconditional claims on other agents (for example, if the sales contracts have been signed and the product delivered, the seller has an unconditional claim on the buyer) and, as negative items, the obligations contracted vis-à-vis other agents (for instance, even if he has not yet paid the government the taxes for the period, he still owes them). Second, its application permits better analytical correspondence among the variations of the macroeconomic series. For example, if the government raises the VAT rate in December of a given year, the repercussions on VAT receipts will be felt in the first quarter of the following year, given the time lag between the payment of VAT by agents and the receipt of these monies by government. However, it would be analytically incorrect to record the rise in VAT only in the following year, whereas some consumption at the new rate has already taken place in the current year. In accountants' jargon, it is said that the VAT receipts have to be "adjusted" in

order to attach them to the period when the flow was generated (at the time when, for example, a household purchases a product).

In practice, things are not so simple. On the one hand, the national accountants use company accounts, for which this rule is primordial. One might therefore think that the rule is respected. However, this is not totally the case, since in many countries one of the largest macroeconomic agents, i.e. government, does not systematically apply this rule. Quite rightly, the national accountants consider that for certain transactions (e.g. taxes) government statistics are better than those derived from aggregating the company accounts. The national accounts, which are bound to be internally consistent, therefore replace the accrual-basis tax data supplied by firms with the government statistics, which are better in terms of coverage but worse with respect to the accrual basis. This is finally done by shifting the timing of the VAT receipts of the government in order to bring them more into line with the timing of the generation of the tax.

Another practical difficulty needs to be pointed out, namely the difficulty experienced by the national accountants in applying this principle without taking into account "provisions". A firm always has to deal with bad payers. While it will therefore record all its claims on its purchasers, it will also, by precaution, set aside a "provision" to cover non-payment and this will be recorded in its income statement. But the national accounts do not allow for the recording of these provisions, which, by definition constitute a view taken by one agent of other agents, entailing a lack of symmetry. The national accounts, for the purpose of internal consistency, record only what is symmetrical. This is a contradiction that needs to be resolved.

What does "consolidation" mean?

There are two ways of aggregating institutional accounts. The first is simply to add them together, as do most national accounts systems. The second is to add them together but to eliminate the transactions between individual institutional units involved in the aggregation. This method is known as "consolidation". When consolidation has been carried out, there remain only the transactions between the aggregate grouping created and the units located outside this grouping. For example, in the extract from the integrated economic account concerning interest discussed in the main text (see Table 10.7), if the total for the national economy (S1) had been calculated by consolidation, the figure would have been much smaller than DKK 305.5 billion, because most of the interest is paid by resident units to other resident units, and so takes place within S1.

It is fairly easy to find a consolidated figure for S1. This is because if one eliminates transactions between resident sectors all that is left, in principle,

are the transactions with non-resident sectors, and there is only one such sector, i.e. the rest of the world (S2). The "consolidated S1" figures therefore correspond to the counterpart of the figure for S2, and so the consolidated interest paid by "S1 National Economy" is necessarily equal to the interest received by "S2 Rest of the World", i.e. DKK 56.9 billion. Note that two sectors are already consolidated. These are the rest of the world and households. The rest of the world by definition because the national accounts for a country take no interest in transactions that are internal to other countries or to transactions between other countries; households by statistical necessity because their accounts are obtained by difference since virtually no direct information is available regarding households. Because they are obtained by difference, household accounts are consolidated out of necessity. However, as it is very difficult to consolidate aggregate business accounts, they are most often not consolidated in the national accounts.

Note also that the items obtained as balancing items in the accounts (value added, operating surplus, saving, net lending/net borrowing) are generally invariant, whether there is consolidation or not. This is because they result from the difference between resources and uses. If the resources consist of transactions internal to the sector, the uses must necessarily include them also.

Exercises for Chapter 10

Exercise 1. Reconstitution of an input-output table using "copy and paste"

The aim of this exercise is to compile a life-size input-output table at level E of the French classification (17 products/industries). Go to the INSEE website (insee.fr), find the annual national accounts, and then look for "Synthesis tables" and then "input-output table" ("tableau des entrées et sorties"). This will give you the product supply table ("tableau des ressources en produits"), the final use table ("tableau des emplois finals par produits"), the intermediate use table ("tableau des entrées intermédiaires") and, underneath, the production accounts ("comptes de production") and the generation of income accounts ("comptes d'exploitation") by industry ("branche"). Print out these tables separately. Using copy and paste, reassemble them so as to obtain the picture of the input-output table given in Section 4 of this chapter. Be careful to ensure that both the rows and the columns correspond. Read again Sections 1 to 4 of this chapter with this new set of tables in front of you. For those courageous enough, the INSEE site makes it possible to perform the same manipulation at level F (38 products). The result is a very large table. Imagine how big it would be at level G (88 products)!

Exercise 2. Reconstitution of the accounts of institutional sectors

Take the case of an economy with three institutional sectors: households (including NPISHs), corporations (financial *and* non-financial) and general government.

Various sources have been used and processed according to the definitions in the national accounts, with the following result:

	Corporations	General government	Households
Expenditure			
Interest	162	35	20
Employers' social contributions	129	53	11
Dividends	60		
Other taxes minus subsidies on production	54	2	2
Operating surplus	?	?	65
Gross wages and salaries	431	87	51

	Corporations	General government	Households
Withdrawals from income of quasi-corporations	24		
Current taxes on income, wealth, etc.	34		178
Other property income	25		
Income from land and sub-soil assets	31	7	27
Final consumption expenditure		368	1 031
Social security reimbursements		57	
Benefits		162	
Other current transfers	57	159	73
Social benefits other than social transfers in kind	43	289	
Adjustment for the change pension entitlements	11		
Resources			
Value added (at basic prices)	780	158	561
Social contributions	54	268	
Dividends	28	5	13
Taxes minus subsidies on products		133	
Other current transfers	59	109	72
Income from land and sub-soil assets	44		21
Other property income	16		23
Interest	139	14	56
Withdrawals from income of quasi-corporations		13	44

In addition, the balance of payments supplies the following data:

Debit (resources of the rest of the world)	
Gross wages and salaries	2
Interest	21
Dividends	14
Other current transfers	59
Withdrawals from income of quasi-corporations (located within the economy)	3
Credit (uses of the rest of the world)	
Gross wages and salaries	6
Other property income	14
Interest	13
Withdrawals from income of quasi-corporations (located in other countries)	36
Other current transfers	10

This exercise consists of completing the accounts for the three institutional sectors shown on the following pages.

Here are certain indications that will be useful for the exercise:

1. the data shown in the first table above are not complete, and additional figures will have to be reconstituted;

2. the wages and salaries shown in the balance of payments table are by their nature paid to, or received, by the rest of the world, and the remainder are paid to households;
3. social benefits are by definition received by households;
4. social contributions received by corporations and general government are paid by households;
5. the adjustment for the change in pension entitlements applies to households, by definition;
6. households' adjusted disposable income is equal to disposable income plus social transfers in kind (Social Security reimbursements, other benefits in kind).

Households

Generation of income account	
Uses	Resources
Compensation of employees	Value added
gross wages and salaries	
employers' social contributions	
Other taxes on production, less subsidies	
Operating surplus	
Mixed income	
Allocation of primary income account	
Uses	Resources
	Gross operating surplus and mixed income
	Compensation of employees
	gross wages and salaries
	employers' social contributions
Property income	Property income
interest	interest
income from land and subsoil assets	dividends
	withdrawals from income of quasi-corporations
Balance of primary incomes	income from land and subsoil assets
	other property income
Secondary distribution of income account	
Uses	Resources
Current taxes on income, wealth, etc.	Balance of primary incomes
Social contributions	Social benefits other than social transfers in kind
Other current transfers	Other current transfers
Disposable income	

Households *(cont.)*

Use of income account	
Uses	Resources
	Disposable income
Final consumption expenditure	Adjustment for the change in pension entitlements
Saving	
Use of adjusted income account	
Uses	Resources
	Adjusted disposable income
Actual consumption	Adjustment for the change in pension entitlements
Saving	

Corporations

Generation of income account	
Uses	Resources
Compensation of employees	Value added
gross wages and salaries	
employers' social contributions	
Other taxes on production, less subsidies	
Operating surplus	
Allocation of primary income account	
Uses	Resources
Property income	Operating surplus
interest	
dividends	Property income
withdrawals from income of quasi-corporations	interest
other property income	dividends
	income from land and sub-soil assets
	other property income
Balance of primary incomes	
Secondary distribution of income account	
Uses	Resources
Current taxes on income, wealth, etc.	Balance of primary incomes
Social benefits other than social transfers in kind	Social contributions
Other current transfers	Other current transfers
Disposable income	
Use of income account	
Uses	Resources
Adjustment for the change in pension entitlements	Disposable income
Saving	

General government

Generation of income account	
Uses	Resources
Compensation of employees	Value added
gross wages and salaries	
employers' social contributions	
Other taxes on production, less subsidies	
Operating surplus	

Allocation of primary income account	
Uses	Resources
Property income	Operating surplus
interest	
income from land and sub-soil assets	Taxes minus subsidies on production and imports
other property income	taxes minus subsidies on products
	other taxes minus subsidies on production
	Property income
	interest
	dividends
	withdrawals from income of quasi-corporations
Balance of primary incomes	other property income

Secondary distribution of income account	
Uses	Resources
	Balance of primary incomes
	Current taxes on income, wealth, etc.
Social benefits other than social transfers in kind	Social contributions
Other current transfers	Other current transfers
Disposable income	

Use of income account	
Uses	Resources
Final consumption expenditure	Disposable income
Saving	

Use of adjusted income account	
Uses	Resources
Actual consumption	Adjusted disposable income
Saving	

Exercise 3. Creating an integrated economic account

Use the accounts of the three institutional sectors in the previous exercise to complete the integrated economic account in the following three pages:

Integrated economic account (extract) (1/3)

Total	Rest of the world	Total economy	Corporations	General government	Households	Production account	Corporations	General government	Households	Total economy	Rest of the world	Total
						Imports					499	499
540	540					Exports						
						Output	1 708	410	1 264	3 382		3382
1 883		1 883	928	252	703	Intermediate consumption						
						Taxes minus subsidies on products				133		133
1 632		1 632	780	158	561	Value-added/GDP						
-41	-41					Trade balance (goods and services)						
						Generation of income account)						
						Value added						
						Compensation of employees						
						Gross wages and salaries						
						Employer's social contribution						
						Taxes *minus* subsidies						
						On products						
						Other taxes						
						Operating surplus						
						Mixed income						

Integrated economic account (extract) (2/3)

Total	Rest of the world	Total economy	Corporations	General government	Households	Allocation of primary income account	Corporations	General government	Households	Total economy	Rest of the world	Total
						Operating surplus/ mixed income						
						Compensation of employees						
						Gross wages and salaries						

Integrated economic account (extract) (2/3) *(cont.)*

Total	Rest of the world	Total economy	Corporations	General government	Households	Allocation of primary income account	Corporations	General government	Households	Total economy	Rest of the world	Total
						Employer's social contribution						
						Taxes *minus* subsidies						
						On products						
						Other taxes on production						
						Property income						
						interest						
						dividends						
						income from quasi-corporations						
						income from land and sub-soil assets						
						other property income						
						Balance of primary incomes/National Income						

Integrated economic account (extract) (3/3)

Total	Rest of the world	Total economy	Corporations	General government	Households	Secondary distribution of income account	Corporations	General government	Households	Total economy	Rest of the world	Total
						Balance of primary incomes						
						Current taxes on income, wealth, etc.						
						Social contributions						
						Other social benefits						
						Other current transfers						
						Disposable income						
						Use of income account						
						Disposable income						
						Final expenditure						
						Change in pension entitlements						
						Saving						
						Current-account balance						

Exercise 4. Use of the input-output table in a so-called Léontieff model

Take the following input-output table, consisting of: [M] the intermediate consumption matrix; [Y] the vector of final demand for intermediate goods, capital goods and consumer goods; and, lastly [X], the vector of output from the industries producing these same goods (in order, intermediate goods, capital goods and consumer goods).

		[M]		[Y]
Intermediate products	5	20	20	5
Capital goods	5	10	12	33
Consumer products	10	6	15	89
[X]	50	60	120	
	Intermediate products	Capital goods	Consumer goods	

Given the above figures, and with the help of the equations in Section 5 of this chapter, do the following:

1. calculate the matrix [A] of technical coefficients;
2. use Equation 7 to calculate the impact on [X] of an increase of 20 in final demand for consumer goods (say, as a result of a tax cut by the government).

The solutions to these exercises are available at:
http://dx.doi.org/10.1787/9789264214637-28-en