CHAPTER 3
THE INPUT-OUTPUT TABLE AND GDP MEASUREMENTS

3 - THE INPUT-OUTPUT TABLE AND GDP MEASUREMENTS

3.1. A method using the three familiar techniques to assess the volume of GDP

GDP (gross domestic product) can be estimated in one of three ways:

- by adding up all goods and services produced within the country and the value added created by this production (the output approach);
- by adding up final uses of goods and services (the demand approach);
- by adding up incomes (the income approach).

With the demand approach, GDP is estimated by drawing up an input-output table (IOT).

The IOT combines data from individual goods and services accounts. It gives volumes, values and prices in their raw form, then seasonally-adjusted, and finally in SA-WDA form (adjusted for seasonal variation and working day variation). The IOT published on insee.fr is based on SA-WDA data.

The input-output table combines supply-use balance data for each source of output, published at level A17[16] in the quarterly accounts (*Appendix 10*). The supply-use balance offers a general overview of the circuits of exchange for a given output, corresponding to the following accounting equation:

Product output + imports + commercial margins + transport margins + taxes on this product - subsidies on this product = Intermediate uses + final consumption + gross fixed capital formation + changes in inventories + acquisitions less disposals of valuables + exports

In the majority of cases, a given branch produces only its own products and the branch output is strictly equal to this product output. However, certain branches also product a secondary product: for example, the agricultural branch produces wine, which is classed as an 'agrifood' product. This wine output is counted with the output of the agricultural branch, but thus disappears from the account for product-specific (wine) output. This conversion between product output and the corresponding branch output is thus obtained via a process of 'transfers':

Branch output = product output - transfers

The output account reproduces, branch by branch, the conversion from output to value added. It is also published at classification level A17:

Value added = branch output – intermediate consumption of this branch

[16] The classification system used in the national accounts is the French Classification of Activities (often abbreviated as NAF) derived from the NACE (European classification system), which includes six levels of aggregations; publication level A17 is an intermediate French level, inserted between levels A10 and A38.

3.1.1. Assessing GDP in volume using the input-output table

In order to compile the quarterly accounts, sources of output are separated into two broad categories determined by the manner in which the supply-use balance is compiled: outputs falling into the 'services' category, whose balance is calculated with reference to output (the 'demand' approach); and outputs falling into the 'goods' category, whose balance is calculated primarily on the basis of changes in inventories (the 'output' approach).

Considering the example of a simplified supply-use balance, which excludes margins, taxes and subsidies:

$$P + I = IU + C + GFCF + \Delta S + X$$

where P and I are resources (production/outputs and imports), while IU, C, $GFCF$, ΔS and X are uses: intermediate uses, consumption expenditure, gross fixed capital formation, changes in inventories and exports.

For goods, changes in inventories are calculated on the basis of the balance, using the formula:

$$\Delta S = P + I - IU - C - GFCF - X$$

while for services, the output is the result of the supply-use balance (ignoring changes in inventories, which are generally insignificant in service products):

$$P = IU + C + GFCF + X - I$$

The complexity of these operations arises from the difficulty of measuring intermediate consumption, which is directly dependent upon output. No sub-annual indicator is available to measure intermediate consumption at the quarterly level. The estimation of intermediate consumption thus relies on the technical coefficients and the output figures. The technical coefficients correspond to the relationship between the intermediate consumption of a given branch and a product within the output of this branch. These coefficients are generally relatively stable from one year to the next. Some of them will tend to rise, reflecting an increase in the outsourcing of certain production activities. To obtain quarterly figures these annual coefficients undergo smoothing, with reference to past developments. If, for example, previous annual figures show that the technical coefficient grows regularly, this growth will be reflected in the figure retained for the current period. Nonetheless, these increases are often very small, compared to the variations in output.

However, for service activities, output cannot be accurately measured until all intermediate uses have been calculated, and these latter figures are directly dependent on the output of each branch. The method used is thus both sequential and iterative:

- for some services, an output indicator is used at first to calibrate the output figures. This first measure of the volume of production, known as the 'initialisation output', helps to calculate the intermediate consumption of each branch in volume;
- for other service activities, an output *indicator* is calculated in the form of a *partial* balance: it is the result of the supply-use balance, based on those intermediate uses figures which have already been calculated, i.e. those coming from branches of goods and services for which an output indicator is available. This indicator is used to calibrate the output data, and the resulting estimate is used to calculate the corresponding intermediate consumption figures.

Finally, when all intermediate uses have been measured, the remaining balance represents the output of services. A second iteration is then conducted: intermediate consumption is calculated again using this balance-derived output data. Subsequently, output is calculated once again with reference to the supply-use balance.

The final step is to estimate GDP, when all output and intermediate consumption figures have been calculated.

To understand the structure of GDP, it can be broken down into terms obtained directly using indicators.

If GDP is assessed as the sum of all value added by goods and services, ignoring taxes and production subsidies, it can be expressed as:

$$PIB \approx P_B - IC_B + P_S - IC_S$$

where P_B and P_S represent the respective outputs of the goods and services branches and IC_B and IC_S represent the intermediate consumption of branches B and S.

However, if the intermediate consumption for the goods branch is broken down into goods and services produced, it can be expressed as follows:

$$IC_B = IC_B(B) + IC_B(S)$$

By adding up the intermediate consumption of the goods and services branches in goods produced, at the result is:

$$IU_B = IC_B(B) + IC_S(B)$$

The same goes for services. The GDP equation given above can thus be rewritten:

$$PIB \approx P_B - IU_B + P_S - IU_S$$

where IU_B and IU_S represent the intermediate consumption of all branches in goods and services.

Using the balance of services, P_S can be broken down into its component uses (intermediate and final, net without imports). Which ultimately results in:

$$PIB \approx P_B - IU_B + C_S + FBCF_S + X_S - I_S$$

Breaking down the equation in this fashion allows to isolate those operations which contribute directly to GDP growth, as reflected in the quarterly accounts.

- For goods, only the output indicator gives an accurate estimate of output. Intermediate uses of goods are estimated based on the output of individual branches in terms of goods and services. Moreover, the final uses do not have a direct influence on changes in inventories. Final uses of goods, while they may not affect the estimation of the corresponding output figures, do nonetheless have an indirect impact on the measurement of GDP. These figures allow to measure both commercial margins and the taxes levied on goods (VAT). Commercial margins are then used when calculating the output of the commercial sector, and they also make a substantial contribution to GDP.
- With services, on the other hand, uses are incorporated directly into output calculations, and thus into GDP.

This distinction is important when it comes to understanding how GDP is estimated in the quarterly accounts, and is a result of the various indicators used in these calculations. The approach used to compile the French quarterly accounts is a hybrid method, combining elements of the demand- and output-based approaches (this is the INSEE's official 'approach to the calculation of GDP'). For each quarter, the three approaches to GDP calculation (demand, output and income) are tracked in their entirety, but the final, balanced figures are achieved by prioritising the demand approach in some areas and the output approach in others. This breakdown may not be entirely coherent for the quarterly figures of previous years. As it is, the quarterly accounts are fitted on the annual accounts, for which the GDP calculation process is different, having been largely based on the revenue approach since the transition was made to the 2000 reference base.

This first section offers a schematic overview, describing the general mechanism with a certain degree of simplification. The construction of the input-output table is slightly more complicated:

- the following sub-sections focus on some special cases, and explain certain methodological aspects specific to the input-output table;
- the second part of this chapter gives further details, sector by sector, of the different indicators used upstream in the process of compiling the input-output table.

3.1.2. The special case of public administration

General government essentially produces non-tradable services whose value is not directly assessed. In order to measure the contribution of the 'public administration' branch to GDP (Code OZ in classification scheme A38, a component of branch 'OQ' at A17 level), it is necessary to estimate the value of this output.

To begin, the value added is estimated based on the sum of costs incurred in the production of non-tradable services. These costs include wages, effective and imputed employers' contributions, taxes less subsidies on production, and consumption of fixed capital. This latter figure is obtained as a quarterly statistic by smoothing the annual series.

The price indicator used to deflate value added and obtain a simple value is the 'general government wage index' (without category-specific measures).

Next, unlike in the procedure applied in other branches, intermediate consumption is measured at a quarterly frequency, independently of output. The output of the 'public administration' branch is then calculated as the sum of value added and intermediate consumption in this branch.

The supply-use balance of 'public administration' product is then obtained by calculating the balance of the collective consumption of general government, as other final uses (individualised consumption of general government and households) are much less significant and can be estimated by smoothing. When compiling GDP statistics using the 'demand' approach, these individualised and collective consumptions form the basis of the calculations. But the contribution of 'public administration' to GDP is broadly derived from the output of the corresponding branch of activity, estimated as the sum of costs and thus more closely linked to the 'income' approach. Given the specificities of the calculation process, this item may be considered to be separate from the two major balancing categories.

3.1.3. Assessing the value of the input-output table

So far this chapter has focused largely on the calculation of GDP and the construction of the input-output table using constant volumes.

But each estimate of an operation in terms of volume corresponds to a price and/or value estimate. The following section explains the types of indicators – for volume and price – used for each sector. A value estimate is also systematically produced for the input-output table, giving a coherent estimate of GDP in Euros at current market value. This is particularly useful when assessing the value added by different branches of activity, integral to the construction of the integrated economic table.

Until 2011, intermediate consumption was not calculated in value form for each individual branch and source of output. Only the margins (total intermediate consumption for each branch and output, i.e. intermediate uses) were measured.

- For intermediate uses, the price indicator is selected according to the type of output, based on an operation or an aggregation of several operations affecting this same output (production volume, margins, consumption, investment, etc.). For each output, the indicator representing the value of intermediate uses is obtained as the product of the price indicator and the volume of intermediate uses.
- For each branch of activity, the intermediate consumption indicator is obtained by calculating the total volume of intermediate consumption for each output, with values based on the prices retained for the intermediate uses of this output.

After calibration and fitting, the overall intermediate consumption for each branch will still not correspond to the total sum of intermediate uses: a balance is achieved by giving priority to the intermediate uses estimates (so as not to cast too much doubt on the coherency of the supply-use balances) and balancing out the deviation between the intermediate consumption figures for the four main branches (services to businesses, transport, trade and construction). When the total value of intermediate uses has been calculated, a supply-use balance is calculated for each output, using the same principles which apply for the volume calculations.

As of 2012 a new methodology is under consideration, an approach which would allow to calculate the consumption in value for every possible combination of inputs in an intermediate input-output table. This would allow to analyse those combinations which were only implicit in the previous method. It would also allow to perform fitting for certain branches where external information is available; calculating an explicit value table would allow to move beyond the simplistic assumption that prices are constant for a given output.

3.2. Indicators required for the input-output table

This section focuses on the various indicators used in the construction of the input-output table, starting with the classification systems for statistical publications and the 17-group aggregation. The working classification used to draw up the IOT is, however, more detailed; this classification is presented hereunder. This classification is the lowest common denominator which unites the various working classifications applied in the different operations that feed into it, operations which may be even more detailed. The choice of the suitable level of detail for the working classifications in each operation will be based on the specificities of these operations, particularly the indicators in use. These indicators are presented successively and by operation, in the standard order established for ESA operations.

3.2.1. Classification systems for statistical publications

3.2.1.1. Classification of activities and products

In the '2005 base' system (in application since May 2011), the quarterly accounts have been published at a level of aggregation defined as 'A17' in the 2008 aggregated classification (NA2008, associated with the second revision of the French classification of activities, or NAF), grouped into 17 branches of activity/products.

While the 2000 base was still in use, the national accounts were published in accordance with the Composite Economic Classification (NES). At its most detailed level, the NES was linked to the French classification of activities (NAF), derived from the Statistical Classification of Economic Activities in the European Community (commonly referred to by its French acronym NACE).[17] But in terms of their intermediate aggregate levels, the NES and the NAF were not compatible. Given the levels of detail in which accounts were published, this situation made it difficult to compare French aggregates with aggregate figures from other countries. This obstacle was removed thanks to the change of base.

The classification used in the public accounts is thus compatible with the NAF and NACE systems in their second revised incarnation (NAF rev. 2 and NACE rev. 2), and this includes the intermediate aggregate levels. It has therefore become easier to make international comparisons.

More specifically, the new classification system incorporates several levels of aggregation expressed in the format 'Axx', where xx represents the number of items contained in that level:

- A10: the most aggregated international level;
- A17: the level of detail at which the French quarterly accounts are published, an intermediate level between A10 and A38;
- A21: 'sections', the standard international level for the NAF/NACE rev. 2 structure;
- A38: an intermediate international level between sections and divisions;
- A66: the intermediate European level between A38 and divisions (A88);
- A88: 'divisions', the level of publication for the French annual accounts and a standard international level for NAF/NACE rev. 2.

[17] The activity classifications (NAF and NACE) are the most frequently cited systems. However, the national accounts actually use the corresponding product classifications at their most detailed levels: the French product classification (CPF) and the European classification of products by activity (CPA).

In the 2000 base, the accounts were published with 16 items. The most natural international level for the French quarterly accounts under the new classification system would thus appear to be the 21-item format known as A21. However this level soon proved to be unsuitable for the quarterly accounts, as it is too detailed for the service sector and not detailed enough when it comes to manufacturing and industry.

An alternative aggregation level with 17 items (A17) was thus constructed, positioned between international levels A10 and A38. This 17-item system devotes 5 items to manufacturing, compared to just one in A21, while grouping together certain service activities for which short-term statistical information is less abundant and less reliable.

Table 1 below gives details of this 'A17' system, including the official item codes and their corresponding abbreviations. These abbreviations are of crucial importance, allowing to present legible, coherent composite tables in the various INSEE publications. However these abbreviations are often reductive, and in no way replace the full official classification codes.

Table 1: Classification of definitions used in the input-output table (IOT)

Code (A17)	Sections (A21)	Code (A38)	Exact title	Short title	Agregates			
AZ	A	AZ	Agriculture, forestry and fishing	Agricultural goods	Agriculture / *Agricultural goods*			
DE	B, D, E	BZ, DZ, EZ	Mining, Energy and water supply, sewerage, waste management	Energy, Water and Waste	Energy, Water and Waste	Manufacture / *Industrial products*	Non agricultural, tradable activities	Goods
C1	C	CA	Manufacture of food products, beverages and tobacco products	Food products	Manufacturing / *Manufactured goods*			
C2		CD	Coke and refined petroleum	Coke and refined petroleum				
C3		CI-CK	Manufacture of machinery and equipment	Machinery and equipment goods				
C4		CL	Manufacture of transport equipment	Transport equipment				
C5		CB-CC, CE-CH, CM	Manufacture of other industrial goods	Other industrial goods				
FZ	F	FZ	Construction	Construction	Construction			Services
GZ	G	GZ	Wholesale and retail trade; repair of motor vehicles and motorcycles	Trade	Tradable services			
HZ	H	HZ	Transportation and storage	Transportation				
IZ	I	IZ	Accommodation and food service activities	Accommodation and food services				
JZ	J	JA - JC	Information and communication	Information and communication				
KZ	K	KZ	Financial and insurance activities	Financial services				
LZ	L	LZ	Real estate activities	Real estate services				
MN	M, N	MA-MC, NZ	Professional, scientific and technical activities; administrative and support service activities	Business services				
OQ	O, P, Q	OZ, PZ, QA,QB	Public administration and defence; compulsory social security; education; human health and social work activities	Non Tradable services	Non Tradable services			
RU	R, S, T	RZ,SZ, TZ	Arts, entertainment and recreation, repair of household goods and other services	Household services	Tradable services		Non agricultural, tradable activities	

Source: Insee, french classification of activities and products and national accounts.

Compared to the composite economic classification (NES) and the 16-item breakdown used under the 2000 base, A17 affords a greater importance to service activities (for a conversion table allowing comparison of these two aggregate classifications, cf. *Appendix 11*). The classification now includes an 'accommodation and food service activities' item (IZ) and an item dedicated to 'information and communication' (JZ). Non-tradable services are mostly covered by the category 'public administration and defence, education etc.' (OQ). Section RU, primarily devoted to household services, also includes some non-tradable services, although broadly speaking it remains a trade item. The contours and breakdown of the manufacturing industry have been modified from their base 2000 form. Refining activities and the 'agrifood' industry are now included; conversely, publishing is now considered as a service activity. The intermediate goods branch is no longer isolated, as the overall approach aims to group activities into industrial branches (wood, metals, etc.).

The 'energy, water and waste' (DE) item is not fully equivalent to the old 'energy' item: it excludes refining activities, which are now included in the manufacturing section, but includes waste management, which was previously grouped with services and intermediate goods. The 'agriculture' (AZ), 'construction' (FZ), 'trade' (GZ), 'transportation' (HZ), 'financial and insurance activities' (KZ) and 'real estate activities' (LZ) items are broadly similar to those used in the NES under the 2000 base.

As with the previous base system, these items are also grouped together into five broadly aggregated branches, for outputs and for individual branches: these are agriculture, industry (including energy), construction, (primarily) tradable services and (primarily) non-tradable services. The manufacturing branch covers all industrial items with the exception of energy. At this branch level, the 'non-agricultural, tradable services' aggregate excludes the agricultural branch and all non-tradable services. This aggregate is thus close to the EB-EP field of the 2000 base, often used as a point of reference for short-term analysis.

3.2.1.2. Classification of operations

The operations covered in the input-output table are summarised in *Table 2* hereafter. The level of detail here is inferior to that found in the annual accounts: in the quarterly accounts, for example, the output (P1) item makes no distinction between tradable production (P11), production for own final use (P12) and other non-tradable output (P13).

Factors specific to the mechanics of the quarterly accounts also allow to create codes which combine the nature of the operation and the type of institutional sector involved: for example consumption expenditure (P3) of households is directly coded 'P3M'. This also applies to different types of GFCF.

Table 2: Classification of operations in the supply-use balance

Resources		
P1		Output
D2N		Taxes on products excluding subsidies
D2		Taxes on production and imports
	D211	Value added type taxes (VAT)
	D212	Taxes and duties on imports excluding VAT
	D214	Taxes on products, except VAT and import taxes
-D319		Subsidies on products
P9		Margins
P91		Transport margins
P92		Trade margins
P7		Imports of goods and services
P73		CIF-FOB correction
Uses		
P2		Intermediate uses
P3		Final consumption expenditure
	P31G	General government final consumption expenditure, individual
	P32G	General government final consumption expenditure, collective
	P3M	Household final consumption expenditure
	P3P	NPISH final consumption expenditure
P51		Gross fixed capital formation
	P51B	GFCF of financial corporations (including uninc. entrep.)
	P51G	GFCF of general government
	P51M	GFCF of households (excluding uninc. entrep.)
	P51P	GFCF of NPISHs
	P51S	GFCF of non financial coprorations (including uninc. entrep.)
P54		Changes in inventories + acquisition less disposals of valuables
P52		Changes in inventories
P53		Acquisition less disposals of valuables
P6		Exports of goods and services

Note: Operations' codes are international codes defined in the ESA except when in italics.
Source: European System of national and regional Accounts (ESA) 1995 and quarterly national accounts.

3.2.2. The working classification used in the input-output table

To construct quarterly accounts for each product, the 'working' classification used in drawing up the accounts is more precise than the system used in the publications described above. A greater level of detail is required for economic reasons (the importance of distinguishing between different products which are subject to highly-specific short-term dynamics, responding to very different demand profiles) and statistical reasons (the need to align the classification as closely as possible with the indicators). This also allows to increase the precision of the published aggregates: the more precise the supply-usebalance, the greater the coherency between these supplies and uses. Last but not least, a more detailed classification allows to publish the provisional annual accounts (for which the goods and services results are compiled using the purpose-built output mechanism from the quarterly accounts) at the international standard level A38.

The working classification used in the input-output table is based on this international classification level A38, adding a further ten items to end up with a classification system containing 48 items, known as F48.[18] The definitions used in aggregate classification A88 allow to analyse certain items in greater detail:

- for agriculture, forestry and fishing (code ' AZ ' in level A38), a distinction is made between agriculture on the one hand, and forestry-fishing on the other;

[18] The letter 'F' refers to the composite economic classification system of the 2000 base, which included different aggregation levels with codes beginning with 'E' (16 products/branches), 'F' (40 products/branches) and 'G', the level used in the annual accounts, increased from 118 products/branches in the 2000 base to 138 products/branches in the 2005 base.

- in the agrifood (or food and drinks) industry (CA) a distinction is made between food excluding beverages on the one hand, and beverages and tobacco on the other;
- in the 'manufacture of transport equipment' item (CL) the automobile industry and other transport manufacturing industries (planes, boats, trains, etc.) are dealt with separately;
- within construction (FZ), civil engineering (or public works) is treated separately from other activities, particularly construction of buildings;
- as in the 2000 base, tradable goods (GZ) are divided into 3 categories (motor vehicles, wholesale and retail);
- transportation services (HZ) treat postal services separately from other types of services;
- in the 'accommodation and food services' item (IZ) the two components are handled separately.

Some items are sub-divided on account of the underlying concepts on which they are based, following the method used in the annual accounts:

- the financial and insurance services item is broken down into FISIM (Financial Intermediation Services Indirectly Measured), other financial services and insurance activities;
- real estate activities are broken down into rents and other activities.

Table 3 offers a composite breakdown of the working classification used in the input-output table, at level F48 in the quarterly accounts, and presents both their corresponding aggregate families at levels A17 and A38 and their more detailed definitions at level A88. The final column in the table specifies whether the supply-use balance for this product is calculated on inventories (generally applies to 'goods', labelled 'G') or on the output ('S', as this approach is generally applied to services).

Table 3: The working classification used in the input-output table

Code A17	Code A38	Division (A88) or working classification "G"	Description (code A38 or working classification F48)	Working classification (F48)	Type of Resources-Uses balance Goods (G) or Services (S)
AZ	**AZ**	01-03	Agriculture, forestry and fishing		
		01	*Agriculture*	AZ1	*G*
		02-03	*Forestry and fishing*	AZB	*G*
DE	**BZ**	05-09	Mining and quarrying	BZ0	*G*
	DZ	35	Electricity, gas, steam and air conditioning supply	DZ0	*S*
	EZ	36-39	Water, sewerage, waste and remediation	EZ0	*S*
C1	**CA**	10-12	Food products, beverages and tobacco products		
		10	*Food products*	CA1	*G*
		11-12	*Beverages-tobacco products*	CA2	*G*
C2	**CD**	19	Coke and refined petroleum products	CD0	*G*
C3	**CI**	26	Computer, electronic and optical products	CI0	*G*
	CJ	27	Electrical equipment	CJ0	*G*
	CK	28	Machinery and equipment n.e.c.	CK0	*G*
C4	**CL**	29-30	Transport equipment		
		29	*Motor vehicles*	CL1	*G*
		30	*Other transport equipment*	CL2	*G*
C5	**CB**	13-15	Textiles, wearing apparel, leather and related products	CB0	*G*
	CC	16-18	Wood, paper, printing	CC0	*G*
	CE	20	Chemicals	CE0	*G*
	CF	21	Pharmaceutical products	CF0	*G*
	CG	22-23	Rubber and plastic products, other non-metallic mineral products	CG0	*G*
	CH	24-25	Basic metals and fabricated metal products (except machinery and equipment)	CH0	*G*
	CM	31-33	Other manufacturing; repair and installation of machinery and equipment	CM0	*G*
FZ	**FZ**	41-43	Construction		
		41; 43	*Construction of buildings*	FZA	*S*
		42	*Civil engineering*	FZ2	*S*
GZ	**GZ**	45-47	Trade; repair of motor vehicles and motorcycles		
		45	*Wholesale and retail trade and repair of motor vehicles and motorcycles*	GZ1	*S*
		46	*Wholesale trade*	GZ2	*S*
		47	*Retail trade*	GZ3	*S*
HZ	**HZ**	49-53	Transportation and storage		
		49-52	*Transportation*	HZA	*G*
		53	*Postal and courier activities*	HZ5	*S*
IZ	**IZ**	55-56	Accommodation and food service activities		
		55	*Accommodation*	IZ1	*S*
		56	*Food and beverage service activities*	IZ2	*S*
JZ	**JA**	58-60	Publishing, audiovisual and broadcasting activities	JA0	*S*
	JB	61	Telecommunications	JB0	*S*
	JC	62-63	IT and other information services	JC0	*S*
KZ	**KZ**	64-66	Financial and insurance activities		
		GK64H	*Financial activities exluding FISIM*	KZH	*S*
		GK64S	*FISIM*	KZS	*S*
		65-66	*Insurance activities*	KZA	*S*
LZ	**LZ**	68	Real estate activities		
		GL68A	*Activities except renting*	LZ1	*S*
			Renting	LZ2	*S*
MN	**MA**	69-71	Legal, accounting, management, architecture, engineering, technical testing and analysis activities	MA0	*S*
	MB	72	Scientific research and development	MB0	*S*
	MC	73-75	Other professional, scientific and technical activities	MC0	*S*
	NZ	77-82	Administrative and support service activities	NZ0	*S*
OQ	**OZ**	84	Public administration	OZ0	*"Admin."*
	PZ	85	Education	PZ0	*S*
	QA	86	Human health activities	QA0	*S*
	QB	87-88	Residential care and social work activities without accommodation	QB0	*S*
RU	**RZ**	90-93	Arts, entertainment and recreation	RZ0	*S*
	SZ	94-96	Other service activities	SZ0	*S*
	TZ	97-98	Activities of households as employers	TZ0	*S*
	UZ	99	Activities of extraterritorial organisations and bodies	-	

Source: Insee, french working and products classification and quarterly national accounts.

3.2.3. Output (P1)

3.2.3.1. The primary output indicators

The primary indicators used to measure the output of the manufacturing industry (for a definition of these terms, cf. *Table 1* above) are the industrial production index (IPI – used for most branches) and the turnover indices (also known as the VAT indices, used in other branches). These indices are published by the INSEE.

In conceptual terms, the IPI is an ideal indicator for measuring industrial output. It allows to track the volume of output at a very detailed level. Nonetheless, a lack of better data sometimes means that the indicator is calculated using indirect information (quantities delivered, deflated invoicing, hours worked, etc.). Moreover the IPI is only truly representative of the output of firms with over twenty employees. Furthermore, the IPI seeks to measure the evolution in volume of the value added by industry, which in practice requires the use of a weighting system to aggregate the component data series reflecting the valued added by individual branches, and not actual output. Fortunately, at the level on which the quarterly accounts operate, this does not introduce any significant bias.

As for the turnover indices, they do not correspond precisely to the standard accountancy definition of output. They only cover sales, and not changes in inventories. Furthermore, these indices are published for sectors of activity, not branches.[19]

For all of these reasons, and as far as is possible and practical, the IPI is given precedence as the most pertinent output indicator when drawing up the quarterly accounts; turnover indices are used by default to estimate the output value of branches for which the IPI offers poor coverage or when, due to management issues, the IPI data for a given branch is compromised.

The growth in manufacturing output recorded in the quarterly accounts may be quite different from that represented by the IPI. These differences can be attributed to four main causes:

- the seasonal adjustment and working day adjustment processes applied to the IPI data are independent of those applied to the indicators used in the quarterly accounts: the SA-WDA models used, as well as the levels of aggregation at which these adjustments are performed, may differ;
- the indicators are calibrated and fitted to obtain volume figures for the quarterly accounts; output will not necessarily follow the same curve as the indicator;
- the industrial production index for the manufacturing branch is obtained by aggregating the indices for the component sub-branches, weighted to reflect the value added of each branch, whereas for quarterly manufacturing output the implicit weightings are the relative weight of each branch in terms of output;
- for certain manufacturing branches, the indicator used to assess output is not the IPI, but one or more turnover indices.

Price indicators – for the domestic market, primarily the agricultural producer price indices ('IPPAP') and the producer price indices in industry (PPI), both published by the INSEE – allow to convert these volume figures into value indicators (or value figures into volume indicators, in cases where the turnover indices are used instead of the IPI). Consumer price indices (CPI) are sometimes used for certain services.

Furthermore, in order to take into account the importance – which is often significant – of the proportion of output which is destined for export, the price indicator ultimately used to measure production generally corresponds to a weighted average of the indicators listed above and the export deflator for the output in question (details of the indicators used to deflate export statistics are given in sub-section 2.10 of this chapter).

Table 4 hereafter covers all of the fundamental levels of output calculation, including value, volume and price indicators for the different branches, whether for directly estimated items (a single measurement, with direct

[19] Within an individual company, sales are recorded in different categories for the different activities involved. Considered collectively, the companies engaged in a given activity constitute the 'branch of activity'. A sector of activity, meanwhile, groups together only those companies that share the same primary activity.

impact) or for ‘initial estimate of outputs’ (the measurement represents the first step in an iterative process which calculates output based on the supply-use balance). Those branches which require neither direct nor initial estimates are not included in this table.

3.2.3.2. Agricultural output

The ‘agricultural industries’ branch (item AZ in the A17 classification) covers agriculture (AZ1 in classification F48), and a joint item combining forestry and fishing (AZB).

Given the diversity of the information sources used, agricultural production (AZ1), which covers arable and livestock farming, is estimated with the help of very detailed calibration calculations.

- For livestock farming, output in volume is estimated using: the raw domestic production indicators for cattle, poultry and eggs, published by the Statistics and Forecasts department of the Ministry for Agriculture via the ‘Agreste’ website; and also the raw milk production indicator provided by FranceAgriMer (the government-backed organisation responsible for agricultural produce and fisheries, working on behalf of the Ministry for Agriculture, Food and Fisheries). The agricultural producer price indices (IPPAP), published by the INSEE, assign a value to these volumes.
- For arable farming, output by volume and by price is calculated by smoothing the annual figures, extrapolated from the annual forecasts. These forecasts are updated throughout the year by the INSEE’s agricultural division, when producing the account forecasts for the agricultural sector. Smoothing is justified here partly by the way in which agricultural products are defined in the national accounts, requiring all output to be recorded throughout the period of production and not just at the point of harvest.

The two components of the joint forestry-fishing item (AZB) may exhibit very different short-term dynamics, and the output accounts go into more detail at the F48 level by making the distinction between the two branches.

- There is no sub-annual indicator for the forestry branch, and the output in volume is thus obtained by smoothing the annual output. As with agricultural production, this smoothing is coherent for the portion of activity corresponding to timber production. Output in value is then obtained by smoothing the annual prices.
- The volume output of fishing is measured on the basis of the quantities sold at market. The price indicator is the average price of these sales. These two statistics are published by Ofimer (the national inter-professional office for fishing and aquaculture).

3.2.3.3. Manufacturing output and mining

Mining

Within item DE in the A17 classification, the mining branch (BZ0 in classification F48) is the only branch for which output figures are used directly in the calculation of GDP via the ‘construction approach’. The two other branches are analysed subsequently, in the sub-section ‘initial estimate of outputs’. The mining branch is relatively marginal compared to the other two branches, and also in terms of the value of imports for the corresponding products. The volume indicator is provided by the IPI, the PPI serves as the price indicator.

The food industry (agrifood)

At level F48, this item makes a distinction between food excluding beverages (CA1) and beverages and tobacco (CA2). Figures for the food item (CA1) are slightly more detailed than the input-output table demands: a decision was made to treat meat and milk separately, as the short-term outlook of this branch can be fairly specific. This item corresponds to the old ‘meat and milk’ branch found in the composite economic classification (NES), which makes the retropolation process for these indicators considerably easier.

For each item, the industrial production index (IPI) helps to measure output by volume. The value is then assessed using the producer price index in industry (PPI) applicable for this branch. Itshould also be noted that the ‘transformation and preservation of fruits and vegetables’ indicator, a highly-detailed tool, is not used when calculating the final indicator: the data produced by this detailed indicator are in fact highly volatile, and would make it a good deal more complicated to perform seasonal adjustment at the next level up.

Manufacture of coke and refined petroleum products, machinery and equipment

For coke and refined petroleum products (CD0), as well as for the three equipment and machinery branches (CI0, CJ0, CK0), the level of calibration and calculation for the quarterly accounts is F48, identical to A38. For each item, the industrial production index (IPI) is used to give an estimate of output in volume form. This figure is converted into a value using the producer price index in industry (PPI) applicable for this branch.

The transport equipment industry

The greater precision offered by level F48 allows to make a clear distinction between the automobile industry (CL1) and other transport equipment manufacturing (CL2). For the former, a further distinction is made between vehicle manufacturers and equipment suppliers. The output of these branches is calculated using the corresponding IPIs for volumes, and PPIs for prices.

Other manufacturing branches

Branch C5 of the A17 classification brings together a heterogeneous mixture of sub-branches. For the majority of these branches, the level at which statistics are produced corresponds directly to the level of detail found in the input-output table and classification A38 (CB0, CC0, CE0, CF0, CH0). Generally speaking, the output of these branches is calculated using the corresponding IPIs for volumes, and PPIs for prices.

There are, nonetheless, two exceptions. Firstly, the unique internal dynamics of the branch 'rubber, plastics, other mineral products' (CG0) has prompted statisticians to divide this branch in two: rubber and plastics in one section, glass and other mineral products in the other. This distinction makes retropolation of the indicators much easier. For each component, the IPI and PPI are the respective volume and price indicators.

Furthermore, the new branch 'other manufacturing- repairs and installation' (CM0) is broken down into four sub-items. The first three sub-items use the IPI and PPI indicators. One of these, the sub-item 'repairs and installation' is a new addition to the classification: previously such services were counted along with the type of product involved. The fourth sub-item is not covered by the IPI: the sub-item in question is 'jewellery, precious stones, musical instruments, sporting goods, games and toys', found at levels GC32A and GC32C of the working classification used in the annual accounts. In this section, VAT indices are used to calibrate the values; the value is then deflated using price data (PPI) in order to obtain the indicator used to calculate the volume figures.

3.2.3.4. Transportation output

In order to estimate transportation output, calibration is performed at a more detailed level than that demanded by the input-output table (HZA). Quarterly output is thus calibrated for rail transport (GH49A), passenger road transport (GH49B), road freight (GH49C) and air transport (GH51Z). Nonetheless, these branches do not allow to cover the whole transportation sector. Total transportation output is therefore calculated by calibrating the sum of recorded outputs.[20]

- The value output of rail transport (GH49A) is assessed on the basis of SNCF's turnover. The price indicator used is the consumer price index (PCI) for rail transport product, an indicator which is only partial as it does not cover freight activities.
- The VAT index for passenger road transport (GH49B), also used as a consumption indicator, here serves as a value indicator. The corresponding PCI allows to deflate this value.
- For road freight transport (GH49C), the Observation and Statistics Department (SoeS) at the Ministry for Transport issues a quarterly indicator of the output volume of road transportation of goods, corresponding to the number of tonnes transported for each kilometer to the profit of third parties. A quarterly price indicator is also issued, the market price index for road freight transport (extended national zone).

[20] The feasibility of making further distinctions for the branches 'storage and auxiliary services' (GH52Z) and 'transportation by boat' (GH50Z), based on the VAT indicators, is currently under study.

- The output volume indicator for air transport (GH51Z) is calculated as the weighted average of the number of passengers and the number of tonnes of goods passing through Parisian and regional airports. These figures are provided by the SoeS, and based on statistics passed on by the General Directorate for Civil Aviation (DGAC). In the absence of a suitable price indicator, the output value of air transport is not estimated.

3.2.3.5. 'Initial estimate'of output

For those branches whose indicators have not been detailed above, output is estimated indirectly: it is calculated using the supply-use balance of the corresponding output (the 'services' approach, based on demand).

Nonetheless, an initial estimate of output is obtained by calibrating the annual accounts based on an indicator for certain branches: electricity, gas and steam (DZ0), water, sanitation and waste management (EZ0), and the sub-sections for retail, accommodation and food services, financial services, information and communication and services to businesses. This initial output measurement, known as the 'initial estimate', serves to evaluate the intermediate consumption of each branch in terms of volume, figures which are then used in the iterative process which ultimately gives the supply-use balance (cf. first part of Chapter 3).

- To produce an initial estimate of the output of the electricity, gas and steam branch (DZ0), precise calibration calculations are required. For this purpose electricity production (item GD35A in the working classification used by the annual accounts) and gas and steam (GD35B) are handled separately. The output for these items is measured using the IPI, for volumes, and the corresponding PPI (producer price indices) for prices.

- With water, sanitation and waste management (EZ0), a distinction is also made between 'natural water' (GE36Z), covered by the IPI, and all other items (waste water, waste, anti-pollution treatments etc.) for which VAT indices are used to compensate the lack of an appropriate IPI. With natural water an PPI indicator is used to deflate the results, while for the other items the quarterly prices are obtained by smoothing the annual figures.

- When assessing the output of trade and repair of motor vehicles (GZ1), wholesale (GZ2) and retail (GZ3), the value indicators used for calibration are the VAT indices for the corresponding sectors. In these three branches no short-term price information is available and output values are deflated by prices, which are obtained by smoothing the annual figures.

- As for the output value of postal services (HZ5), along with accommodation (IZ1) and food services (IZ2), the initial estimates are calculated using the applicable VAT index for these sectors. Prices are obtained by smoothing for the postal sector (HZ5), while for the other two items the available value figures are deflated using the associated consumer price index.

- Output in the telecommunications branch (JB0) is estimated using the same indicators used to calculate consumption. These are essentially turnover figures for the major telephone operators, provided by the Regulatory Authority for Electronic Communications and the Post (ARCEP). The output figures are deflated using the consumer price index.

- The indicator used to calibrate the figures for financial activities excluding FISIM (KZH) and insurance activities (KZA) is the quarterly indicator for paid employment (full-time equivalent) for the aggregated branch KZ. For FISIM activities (KZS), on the contrary, the process is based on smoothing of the annual accounts.

- For each of the four sub-components of the 'business services' item, output value is obtained by calibrating data using the VAT index for the corresponding sector. For the 'legal and accountancy services, etc.' branch (MA0), a cost index provided by SYNTEC (the federation of professional organisations for the engineering, consultancy and information technology industries) is used, which allows to calculate output in volume. For the other branches, prices are obtained by smoothing the annual figures.

Broadly speaking, the expansion in recent years of the scope of price indices should soon allow to envisage the replacement of annual price smoothing by genuine indicators. This transition will nonetheless require sufficiently long time series for each indicator.

3.2.3.6. From branch output to product output

These various calibration methods allow to estimate the output of individual branches. To convert these figures into product outputs, we need to factor in production transfers (cf. part 1). In practice these transfers only affect a small number of branches. For the most important of these (wine production, residual sales), the account volumes are estimated via calibration and fitting, with the changes in output for the corresponding branch serving as the indicator. For other types of transfer, less substantial in the 2005 base, the quarterly estimates are obtained by smoothing the figures published in the annual accounts.

In the national accounts output is assessed at the base price, i.e. the price which the buyer pays the producer, less taxes but including any product subsidies. In order to obtain a basic price value, consistent with different components of demand, it is necessary to add the various taxes applicable to products after subsidies (VAT, customs duties and other taxes such as the petroleum import tax, or TIPP), as well as the retail and transportation margins. Section hereafter 2.4 describes the methods used to estimate these margins, while section 2.5 describes the process used to assess taxes and subsidies.

Table 4: Output indicators

A17		F48		Item of calibrating		Indicator		
Code	Short title	Code	Short title	Code	Title (if different from "F48")	**Volume**	**Value**	**Price**
AZ	Agricultural goods	AZ1	Agriculture	HA01U1	Cattle	Agreste (gross indigenous production)		Price index of agricultural production (PIAP)
				HA01U2	Calves	Agreste		PIAP
				HA01U3	Sheep Goats	Agreste		PIAP
				HA01U4	Equines	Agreste		PIAP
				HA01U5	Pigs	Agreste		PIAP
				HA01U6	Raw milk	Onilait		PIAP
				HA01U7	Poultry	Agreste		PIAP
				HA01U8	Eggs	Agreste		PIAP
				HAZ1RESTE	Perennial and non-perennial crops	Smoothing		Smoothing
		AZB	Forestry, fishing	GA02Z	Forestry and logging	Smoothing		Smoothing
				GA03Z	Fishing and aquaculture	Ofimer		Ofimer
DE	Energy, water, waste	BZ0	Mining and quarrying	BZ0		Industrial production index (IPI)		Indices of production prices and import prices (IPPI)
		DZ0	Electricity, gas, steam and air conditioning supply	GD35A	Electricity	IPI		IPPI
				GD35B	Gas, steam and air conditioning supply	IPI		IPPI
		EZ0	Water, sewerage, waste and remediation	GE36Z	Water collection, treatment and supply	IPI		IPPI
				GE37Z38Z39Z = GE37Z + GE38Z + GE39Z	Sewerage + waste + remediation activities and other waste management services		Turnover indexes (TI)	Smoothing
C1	Food products	CA1	Food	GC10AE = GC10A + GC10E	Meat and meat products + Dairy products	IPI		IPPI
				GC10RESTE= GC10B à GC10D, GC10F à GC10K	Manufacture of other food products, except beverages	IPI		IPPI
		CA2	Beverages - tobacco	CA2		IPI		IPPI
C2	Coke and refined petroleum products	CD0	Coke and refined petroleum products	CD0		IPI		IPPI
C3	Machinery and equipment goods	CI0	Computer, electronic and optical products	CI0		IPI		IPPI
		CJ0	Electrical equipments	CJ0		IPI		IPPI
		CK0	Machinery and eqipment n.e.c.	CK0		IPI		IPPI

C4	Transport equipment	CL1	Motor vehicles	GC29A	Motor vehicles - bodies (coachwork) for motor vehicles & trailers and semi-trailers	IPI		IPPI
				GC29B	Parts and accessories for motor vehicles	IPI		IPPI
C5	Other industrial goods	CL2	Other transport equipment	CL2		IPI		IPPI
		CB0	Textiles, clothing, leather, footwear	CB0		IPI		IPPI
		CC0	Wood, paper, printing	CC0		IPI		IPPI
		CE0	Chemical products	CE0		IPI		IPPI
		CF0	Pharmaceutical products	CF0		IPI		IPPI
		CG0	Rubber and plastic products, other non-metallic mineral products	GC22AB	Rubber and plastic products	IPI		IPPI
				GC23AB	Glass and glass products+ other non-metalic products except glass	IPI		IPPI
		CH0	Manufacture of basic metals, manufacture of fabricated metal products, except machinery and equipment	CH0		IPI		IPPI
		CM0	Other manufacturing; repair and installation of machinery and equipment	GC31Z	Furniture	IPI		IPPI
				GC32B	Medical and dental instruments and supplies	IPI		IPPI
				GC33Z	Repair and installation of machinery and equipment	IPI		IPPI
				GC32AC = GC32A + GC32C	Jewellery, bijouterie & related articles & musical instruments+ sports goods, games & toys and other manufactoring		TI	IPPI
GZ	Trade	GZ1	Trade and repair of motor vehicles and motorcycles	GZ1			TI	Smoothing
		GZ2	Wholesale trade	GZ2			TI	Smoothing
		GZ3	Retail trade	GZ3			TI	Smoothing
HZ	Transportation	HZA	Transportation	GH49A	Rail transport		Turnover (SNCF)	Consumer prices index (CPI)
				GH49B	Other passenger land transport		TI	PCI
				GH49C	Freight transport by road and via pipeline	Road freight transport (SOeS)		Road freight transport (SOeS)
				GH51Z	Air transport	Airports		
		HZ5	Postal and courier activities	HZ5			TI	Smoothing
IZ	Accommodation and food service activities	IZ1	Accommodation	IZ1			TI	PCI
		IZ2	Food and beverage service activities	IZ2			TI	PCI

JZ	Information - communication	JB0	Telecommunication	JB0		Arcep	PCI
KZ	Financial services	KZH	Financial services excluding FISIM	KZH	Full-time equivalent (FTE) jobs		Smoothing
		KZS	FISIM	KZS	Smoothing	Smoothing	
		KZA	Insurance services	KZA	Full-time equivalent (FTE) jobs		Smoothing
MN	Business services	MA0	Legal and accounting activities, management consultancy activities, architectural activities…	MA0		TI	Syntec (price index)
		MB0	Scientific research and development	MB0		TI	Smoothing
		MC0	Other professional, scientific and technical activities	MC0		TI	Smoothing
		NZ0	Administrative and support service activities	NZ0		TI	Smoothing

Source: quarterly national accounts.

3.2.4. Trade and transport margins

Lacking pertinent indicators to measure these operations, hypotheses must be constructed, based on those constructed for the compilation of the annual accounts, also subject to imperfect information.

3.2.4.1. Trade margins

Trade margins represent the difference between the basic price paid for a product by a distributor (supermarkets or car dealerships, for example) and the retail price of these goods, without further transformation. These trade margins exist for the majority of 'goods' categories.

For volume, they are assessed, by use, by rate smoothing (or calibration and fitting, for intermediate consumption) of the corresponding taxable sum. In other words, taking the example of trade margins on the final consumption of a given product 'P', these margins are calculated by projecting the trend change to the ratio of these margins to the final consumption of 'P'. The final consumption price of this product is used as a price indicator for the trade margins, and allows to derive a value indicator once the volumes have been determined. Calibration and fitting are then performed on this value indicator to obtain final value figures. This method is similar to that used to calculate margins on other operations (GFCF, exports, intermediate consumption, net acquisitions of valuables).

For the economy as a whole, total trade margins are held to have a zero sum: trade margins on retail output cancel out the total trade margins on other types of output, all balanced against trade output.

3.2.4.2. Transport margins

Transport margins represent that portion of a product's basic price which can be attributed to transportation costs, when the price of transportation is given separately from the price of the goods. When compiling the quarterly accounts, the approach implemented differs from that used to determine trade margins: the transport margins of transportation output serve to complete the supply-use balance for transport.

For all goods subject to transport margins, the resource margins are calibrated and fitted using the transport margins of the transportation service as both value and volume indicator.

Here again, for the economy as a whole, transport margins are a zero sum. The spontaneous deviation resulting from the preceding calibration and fitting operations is assigned to the food product transport margins (CA1), as this is the largest item in terms of quantity.

3.2.5. Taxes on products (D2)

Taxes on products are taxes 'payable on each unit of goods of services produced or exchanged'. The amounts payable are calculated either per unit of goods or services sold, or in the form of a fixed percentage applied to their unit price or value.

3.2.5.1. Value Added Tax (D211)

VAT received

Since the changeover to the 95 base, taxes are recorded at the moment they become payable, i.e. 'at the moment of birth, transformation or disappearance/cancellation of an economic value, debt or obligation' (ESA 95). Thus the sums involved are recorded at the moment that the economic activity generating a tax obligation takes place.

As such, value added tax (VAT) is recorded at the moment it is incurred, i.e. when a purchase subject to VAT is made. In practice, the average time lag between the completion of a purchase and the payment of the tax is between one and two months, depending on the organisation collecting the tax.

VAT is a tax on goods and services collected step by step by firms. This revenue is used by the national government, by the publically-administered social security bodies and by the European Union. The revenue received by the Customs Office and the General Directorate for Public Finances (DGFiP) represents the sub-annual sources of information regarding VAT.

These indicators are offset by two months for revenue collected by Customs and one month for other sources, to ensure that the volumes recorded are indeed based on taxes incurred and not on takings. These data are seasonally-adjusted separately. The effect of working day variation is difficult to calculate, particularly since the revenue collection series will also be affected by public holidays, reflected in a delayed administrative processing of taxes received. VAT revenue is thus not adjusted for working day variation in the quarterly accounts.

These indicators allow to track the monthly variations in the total sum of VAT paid on products. The indicator obtained by aggregating the three sources of revenue is not perfect, since the one- to two-month time lag only allows for an approximate estimate of the monies owed. Furthermore, in the annual accounts some VAT revenue is counted in with other taxes on production (D292) in the form of VAT on subsidies and as part of other taxes on products (D214) and land. These adjustments are not made for the quarterly indicator. On the other hand, the part of VAT allocated to social security since 2006 (part of the tax revenue dedicated to cutting the contributions of the lowest-paid workers) is not included in the indicators provided by the DGFiP and Customs. As annual data are available, these figures are smoothed and combined with the available sub-annual indicators to achieve a homogeneous vision of the period as a whole.

VAT deviation

Taxes on products are applied between the basic price and the final retail price, with the most notable of these taxes being VAT. In the resources column, this is the VAT paid to the government. This is not the same as the theoretical VAT figures obtained by applying average VAT rates to each product, depending on the type of operation. The difference between the real and theoretical VAT totals is known as the 'VAT gap', with one major cause being fraud (i.e. additional VAT revenue which should have been collected if there was no tax fraud).

In order to estimate the VAT which will actually be collected for each source of economic output, it is necessary to compare the relationship between theoretical VAT and the VAT received by the state, for which no detailed product-by-product indicator is available. The theoretical VAT is estimated for each use of each product (e.g. theoretical VAT on final consumption of new car output). In value terms, indicators are constructed using the value of the corresponding demand and the legal rate of tax applicable to such output. For example, the VAT on a given form of consumption C is represented by the following indicator:

$$Indic(VAT_{Val}) = Rate * C / (1+Rate)$$

As consumption is measured at retail price, i.e. VAT and all other sales taxes included, these consumption figures are at first deflated by 1 + the rate to obtain the 'net of tax' value. Subsequently, by multiplying the result by the

applicable rate, the theoretical VAT rate is obtained. The next step is to perform calibration and fitting on the annual data, in order to obtain quarterly figures for theoretical VAT by use and by output.

In volume terms, VAT is calculated by rate smoothing performed on the corresponding tax base (or sometimes calibration and fitting): as with trade margins, VAT volumes are assumed to follow the same curve as the tax bases on which the tax is levied.

Following the methodology used in the annual accounts (Braibant M. and Pilarski C. [6]), the gap between real and theoretical VAT is distributed evenly across production, trade and transport margins, for each product. The uses of these products, whose values are estimated with VAT included, are not affected: the purpose of this process is simply to re-establish the balance between VAT, output and margins. The total value of VAT as a resource is fitted to the VAT actually received by the public administration.

3.2.5.2. Taxes and duties on imports, excluding VAT (D212)

Taxes and duties on imports excluding VAT 'include all compulsory charges levied by governments or by the institutions of the European Union on goods imported, with the exception of VAT, in order to ensure the efficient application of these taxes throughout the economic territory, and on all services provided by resident units to non-resident units.' (ESA 95).

In the absence of specific short-term data, the quarterly volume and value of these taxes are based on the apparent rates of taxation for each product, measured annually as the ratio of taxes on imports of the product considered to the quantities of these imports for the same product (rate smoothing). These apparent tax rates are extrapolated on the basis of their average past evolution, then smoothed to obtain the monthly rates.

3.2.5.3. Other taxes on products (D214)

Indicators of tax revenue

In France, the tax revenue indicators which are available come from two principal sources: the General Directorate for Public Finances (DGFiP) and the General Directorate for Customs and Indirect Taxes (DGDDI).

- Beverages and tobacco (CA2): tax information for beverages and tobacco products is provided by the DGDDI.
- Coke and refined petroleum (CD0): the main tax applicable here is the domestic tax on petroleum products (TIPP), the indicator is provided by the DGFiP.
- Insurance activities (KZA): the indicator provided by the DGFiP reflects the sums raised by the special tax on insurance contracts.
- Real estate rental services (LZ2): taxes on real estate rental services previously consisted largely of the tax on leases and the contribution levied on rental revenues. The value of these taxes has decreased significantly since the 'droit au bail' lease system was abolished in 2000.
- Advice and consultancy services (MA0): the DGFiP gives details of the total taxes charged on the transfer of assets with considerations.
- Arts, entertainment and recreation (RZ0): details regarding the taxes levied on the games run by the Française des jeux, the PMU and the takings of casinos are provided by the DGFiP.

Taxes on products in the national accounts

As is often the case with tax collection data, these indicators either offer only partial coverage or else are subject to considerable volatility: the ups and downs of these data series are more a product of the way fiscal revenue is managed and recorded than a product of any real variations in legislation or in the tax base. These indicators thus sometimes only poorly reflect the short-term fluctuations which are interested to measure. They are thus not always used directly as indicators when estimating the total value of taxes payable on products. They do, however, allow to assess an annual value target for the current year, or to pick up on exceptional variations. A price indicator is then used to transform the values into volume figures.

In drawing up the accounts, an alternative method is used for certain products. The changes in the volumes of tax derived from a given product reflect, by definition, the evolution of the corresponding tax base. Changes in rates thus correspond to variations in the tax price, including cases where the tax is calculated on the basis of quantity produced and not value (TIPP, for example). With the exception of cases where the legal taxation base is redefined (comparable to a change in price), the volume of a tax is proportional to the output volume of the product being taxed.[21] For certain products, the corresponding tax is thus measured using the quarterly output volume account, or the consumption/use targeted by this tax, with smoothing of the apparent annual rate. Different price indicators are then used to calculate the volume of these items. The value indicator thus obtained is then calibrated and fitted to give the total value of direct taxes on products.

For the majority of products the amount of tax applied is low, often extremely low. Volume is thus obtained by smoothing the annual data. Value is estimated by multiplying this volume by the price derived from smoothing of the annual data.

Main items

For the principal accounting items, the compilation of the national accounts depends on the nature of the tax and its base (see also *Table 5*).

- Gas and electricity (DZ0): this primarily concerns the tax on electricity and the tax payable to the Public Fund for Electricity Production; the volume of tax payable on energy products is calculated using the output volumes, with smoothing of the apparent rate in volume. Similarly, the total tax value is calculated using the output value and by smoothing the apparent rate for the output value.
- Drinks and tobacco (CA2): this primarily concerns duties payable on alcohol and tobacco; total value is calculated by smoothing, with the annual indicator simply allowing to adjust the annual target. The volume indicator is calculated by dividing the value data by the prices of household consumption expenditure.
- Manufacture of coke and refined petroleum products (CD0): here the value indicator used is the fiscal revenue indicator, i.e. the domestic tax on petroleum products (TIPP). This indicator is calibrated and fitted to obtain the value of this direct tax. To obtain an indicator of volume, the value of the tax is deflated using a data series which reflects the major changes in the corresponding tax rate. These changes will indeed not have an influence on the variations of the volume of this tax. The impact of these changes on the value of the tax is calibrated independently. This calibration was most notably used when the floating TIPP was introduced in Q4 2000, and when it was abolished in Q3 2002. The volume of tax on this product is finally measured by smoothing the annual ratio of volume to value, deflated by the reconstructed rate fluctuation series.
- Publishing, television and broadcasting (JA0): the corresponding price and volume indicators are the consumption and price figures respectively.

[21] This is true at the fundamental levels. However this proportionality is lost at the more aggregated levels, as not all components have the same weight in the measurement of aggregated output and corresponding taxes, causing a certain degree of structural distortion.

- Insurance activities (KZA): the indicator provided by the DGFiP regarding the special tax on insurance policies is not sufficiently well correlated with the annual account to be useful; the volume and price figures are thus obtained by smoothing the annual series.
- Rents (LZ2): the volume indicator used is the consumption (in volume) of real estate rentals. The figures are calibrated and fitted to calculate the total taxes levied on such products (in volume). The price indicator is the corresponding consumer price for this product.
- Advice and consultancy services (MA0): this primarily concerns the sales duty corresponding to 'notary fees' levied on property sales or re-sales. The value indicator is erratic, and the fluctuations of this data series result from the vicissitudes of administrative management. SA-WDA data are not used directly, but do allow to establish an annual target as the known quarterly values are gradually integrated. The annual account is thus smoothed, while the target for the current year is estimated directly in volume by deflating the indicator using a composite property price index (the same index used to track property investment, which broadly corresponds to this tax), a weighted average of the market prices of new and old properties. This price indicator is then reused to calculate the account value. It should thus be noted that, for this product, the raw value series is obtained directly from the fiscal indicator.
- Arts, entertainment and recreation (RZ0): this account corresponds to the taxes levied on lottery games and gambling activities. The value indicator is used to estimate the value series. Consumer prices are used as the price indicator for these service activities.

3.2.5.4. Subsidies on products (D319)

Other subsidies on products (D319) include: those subsidies paid to resident businesses on their output which is used or consumed within the economic territory; subsidies paid to publically-owned companies to cover losses made on production activities by deliberately charging, as part of an economic or social policy put in place by the national or European authorities, prices which are below their average production costs; direct export subsidies paid directly to producers resident on the territory when their goods leave the economic territory, or when services are provided to non-resident clients. However, this item excludes the reimbursement of product taxes which have already been paid, and exemptions from taxes which would have been payable if the products had been sold or used within the economic territory.

In France, this primarily affects subsidies to transport services (generally paid by local government, for railway services or urban public transport), agricultural products, electricity supply (since 2002, to compensate for the public service charges) and vehicle scrappage incentives.

In the majority of cases, where no suitable indicator is available, these subsidies are estimated by smoothing the volumes and values. There are a few rare cases for which sub-annual data is available and generally used: one such case is the scrappage incentive programmes, designed to subsidise the purchase of new cars.

Table 5: Indicators and accounts for taxes on products

A17		F48		Available indicators	Account		
Code	Short title	Code	Short title	Value	Volume	Value	Price
AZ	Agricultural goods	AZ1	Agriculture		Smoothing		Smoothing
		AZB	Forestry, fishing		Smoothing		Smoothing
DE	Energy, water, waste	BZ0	Mining and quarrying		Smoothing		Smoothing
		DZ0	Electricity, gas, steam and air conditioning supply		Ratio smoothing (output)	Ratio smoothing (output)	
		EZ0	Water, sewerage, waste and remediation		Smoothing		Smoothing
C1	Food products	CA1	Food		Smoothing		Smoothing
		CA2	Beverages - tobacco	Customs		Smoothing	Consumption
C2	Coke and refined petroleum products	CD0	Coke and refined petroleum products	Customs	Ratio smoothing, indicator except "floating TIPP"	Indicator	
C3	Equipment goods	CI0	Computer, electronic and optical products		Smoothing		Smoothing
		CJ0	Electrical equipments		Smoothing		Smoothing
		CK0	Machinery and equipment n.e.c.		Smoothing		Smoothing
C4	Transport equipment	CL1	Motor vehicles		Smoothing		Smoothing
		CL2	Other transport equipment		Smoothing		Smoothing
C5	Other industrial goods	CB0	Textiles, clothing, leather, footwear		Smoothing		Smoothing
		CC0	Wood, paper, printing		Smoothing		Smoothing
		CE0	Chemical products		Smoothing		Smoothing
		CF0	Pharmaceutical products	Acoss-Urssaf	Smoothing		Smoothing
		CG0	Rubber and plastic products, other non-metallic mineral products		Smoothing		Smoothing
		CH0	Manufacture of basic metals, manufacture of fabricated metal products, except machinery and equipment		Smoothing		Smoothing
		CM0	Other manufacturing; repair and installation of machinery and equipment		Smoothing		Smoothing
FZ	Construction	FZA	Construction of buildings		Smoothing		Smoothing
		FZ2	Civil engineering		Smoothing		Smoothing
HZ	Transportation	HZA	Transportation	Acoss-Urssaf (VTM)	Smoothing		Smoothing
IZ	Accommodation - food service	IZ1	Accommodation		Smoothing		Smoothing
JZ	Information-communication	JA0	Publishing, audiovisual and broadcasting activities		Consumption		Consumption
		JB0	Telecommunication		Smoothing		Smoothing
KZ	Financial services	*KZH*	*Financial services excluding FISIM*		*Smoothing*		*Output*
		KZA	Insurance services	DGFiP (SMR)	Smoothing		Smoothing
LZ	Real estate activities	LZ2	Rents	DGFiP	Consumption		Consumption
MN	Business services	MA0	Legal and accounting activities, management consultancy activities, architectural activities…	DGFiP (mainly property transfer fees)	Smoothing		Price index - housing market
		MC0	Other professional, scientific and technical activities		Smoothing		Smoothing
RU	Household services	RZ0	Arts, entertainment and recreation	DGFiP (SMR)		Indicator	Consumption
		SZ0	Other service activities		Smoothing		Smoothing

Source: quarterly national accounts.

3.2.6. Household consumption expenditure (P3)

The consumption expenditure measured within the framework of the national accounts reflects the spending of resident households, whether this expenditure takes place in France or in another country. However the majority of consumption indicators measure only or predominantly consumption within France, whether or not the households doing the spending are resident in France.

In the first step of the process, consumption expenditure in France is measured product by product. The consumption expenditure of resident households is then measured as a total, not broken down into separate products, by the addition of a new 'territorial correction' term. This term allows to include the consumption expenditure of resident households which is made outside of the economic territory, considered as imports expenditure, and to discount consumption expenditure by non-residents within the economic territory, considered as exports. The resulting balance represents the opposite of the tourism balance, which is similarly added to the foreign trade balance without being broken down into individual products. This expenditure is assessed using the balance of payment indicators published by the Banque de France (cf. section 2.10 of this chapter concerning foreign trade).

3.2.6.1. The classification system for household consumption expenditure (P3M)

Quarterly consumption is assessed using a specific classification (*table 6*). This working classification is compiled at a much finer level of detail than that required for the input-output table (F48). It goes into detail in certain areas in order to ensure that the field of products corresponds as closely as possible to the associated indicators. Indeed, these indicators often correspond to commercial sectors, which can sometimes involve groupings which are very different from those found in the quarterly accounts classification system: this is particularly true of the turnover indices published by the Banque de France.

The classification used thus contains just under 100 items, inserted into the F48 classification. However, a single indicator may cover several items. An initial calibration is performed on the aggregate figures, followed by a rate smoothing operation which spreads the results across the sub-items. A good example is the division of food consumption between agricultural products and products originating in the 'agrifood' industry.

3.2.6.2. The indicators

Of all the indicators used in this context, not one is derived from the results of the household surveys: the results yielded by these surveys are of insufficient quality, or are published too late. The indicators are generally derived either from surveys of retailers conducted by the Banque de France, market study analysts such as GfK and professional organisations, or else from administrative statistics (this applies primarily to services). The price indicators used are generally the consumer price indices (CPI) at the appropriate level.

Consumption of 'goods', which represents around half of household consumption, is tracked in the short term with the help of a good number of early indicators, which allow to publish a monthly estimate of consumption of goods towards the end of the following month. These monthly consumption figures are fully consistent with quarterly consumption, as published in the quarterly accounts.[22]

Among the principal indicators, those provided by the Banque de France's monthly survey of retailers provide turnover indices based on total sales of goods (furniture, electronic goods, household appliances, etc.). This survey covers all retail formats, from hypermarkets to small shops.

[22] Only modifications to the indicators made between the date of publication of the monthly account and that of the quarterly account can produce such discrepancies, which are generally insignificant.

Food products

Food consumption includes agricultural products (AZ) and agrifood products (C1).

For agricultural products, the level of detail retained is that used in the input-output table.

- Core agricultural products (AZ1, primarily fruits and vegetables): a value indicator is available at a more aggregated level thanks to the Banque de France's surveys of general retailers ('BdF Food'). This indicator is calibrated using the annual aggregate, then consumption in value terms is estimated by a process of rate smoothing.
- Forestry and fishing products (AZB): consumption by volume is calculated by smoothing the annual figures.

As for agrifood products (CA1, CA2 in class. F48), a more detailed classification was required, given the number of statistical indicators available.

- Meats and meat-based products: in this case the value indicator provided by the Banque de France only covers the 'butchery' sector.
- Bakery, pastry and pastas: the statistics provided by FranceAgriMer for this sector serve as a quantity indicator (tonnes of flour consumed by professionals) allowing to estimate the consumption volume.
- Tobacco: this item is estimated based on the sales figures posted by the Altadis group (formerly Seita).
- General foodstuffs: in addition to agricultural products, the retail turnover index published by the Banque de France is also used to measure dairy products, beverages and 'other agrifood products'. This general foodstuffs indicator is calibrated using the corresponding annual aggregate, providing the material for rate smoothing operations which allow to produce estimates for each individual item.

Energy products

Energy products are found in two categories: 'energy, water and waste' (DE) and 'refined petroleum products' (C2). They have a significant short-term impact due to their variability, due largely to the influence of weather conditions on heating expenditure.

The indicators are given in quantities, based on data provided by the energy suppliers (EDF, GDF, petroleum distributors) or the Energy Observatory at the Observation and Statistics Department (SoeS).

- Electricity: the sub-annual series used here is the measure of electricity distributed at low voltage, provided by the energy watchdog. This is a quantity indicator used to calibrate volumes. The low voltage indicator is the closest available measure of household consumption.
- Natural gas: Gaz de France publishes details of the total sales to residential clients (in GWh), based on meter readings and estimates. However, the deregulation of the gas market in recent years led to discussions in 2012 regarding the creation of an alternative indicator: this may turn out to be based on the information published by the energy watchdog and/or the company responsible for managing the gas network (GRT Gaz). This latter indicator is available at short notice, but only covers a more limited geographical zone.
- Water, sanitation and waste (EZ0): due to a lack of sub-annual data, volume figures are obtained by smoothing the annual accounts.

As for refined petroleum products (C2), they are broken down into 7 constituent sub-items in order to distinguish clearly between different types of fuel, liquefied petroleum gas, heating oil and other products.

- Fuels: calibration-fitting is performed for each individual sales indicator: super unleaded, diesel, LPG and leaded petrol (which has all but disappeared over the past decade). The basic indicators are provided by the Professional Council for Petroleum (CPDP). The data does not concern quantities consumed at the

pump, but rather quantities delivered via the petrol distribution network. Given the frequency of deliveries, this approximation should not be too wide of the mark.

- Heating oils: the quantities of heating oil sold for domestic use, expressed in terms of quantities delivered and also tracked by the CPDP, allow to estimate the volume of consumption of heating oils.
- Liquefied petroleum gas: this indicator is based on the quantity of butane-propane sales (more precisely, this is a weighted measure of packaged butane, packaged propane and propane sold in bulk). This indicator is also based on CPDP statistics.
- Other products (coke, coal, lubricants): in the absence of a suitable indicator, the value of this item is obtained by smoothing the annual data.

Engineered goods

The 'engineered goods' item broadly corresponds to the 'manufactured goods' category found in the old classification system. It also covers products classed as machinery and equipment goods (C3), transport equipment (C4) and other industrial goods (C5). In addition to this product-by-product breakdown, more functional aggregations are also used, particularly when calculating monthly consumption of goods:

- 'durables': transport equipment (particularly cars), household goods (furniture, appliances) and 'other durables' (watches and jewellery, satellite navigation systems, glasses, medical equipment, etc.);
- 'textiles and leather': clothing, textiles, leathers, luggage, other leather goods;
- 'other manufactured goods' which are not durable (stationery, medicines, cosmetics, etc.).

In addition to the important role played by the Banque de France's monthly reports, the information published by market analysts GfK is also used to assess the sales of specific products or clearly-defined groups of products (computers, satellite navigation systems, etc.). For car sales, information is provided by the qualified professional body: the Committee of French Car Manufacturers (the CCFA). For pharmaceutical products, the indicator is derived from the statistics provided by the National Health Insurance Fund for Salaried Workers (CNAMTS).

- Machinery and equipment goods

For computer, electronic and optical products (CI0), a sizeable sample provided by the GfK data ensures a suitably broad coverage: computers, communication equipment, satellite navigation systems, optical and photographic equipment, etc. Four distinct calibration operations are thus performed based on the value indicators taken from this same source. Furthermore, the monthly survey conducted by the Banque de France (public consumption of electrical goods) allows to track the sales of electrical goods to the general public (televisions, cameras, CD-DVD players, games consoles, etc.). Similarly, the Banque de France's watches and jewellery survey provides a useful indicator for the 'horology and measuring instruments' item. Calibration is performed on the sum total of this post and 'fine jewellery and other jewellery related items', then the trends observed are applied to each item via rate smoothing. All in all the aggregate item given at level F48 is based on the sum of six sub-items for which value indicators are available.

For electrical equipment (CJ0), two sub-items are identified: 'household appliances', for which the relevant monthly survey conducted by the Banque de France is used, and 'other electrical equipment' (i.e. cables, wires, lights, etc.), for which the monthly Banque de France's survey of hardware and DIY stores is used. The figures are calibrated for all items in this sector, then smoothed.

The items 'other machinery and equipment' (CK0), and 'basic metals and fabricated metal products' (CH0) also include tools and materials for DIY and gardening, and as such the same survey of hardware and DIY stores is used.

- Motor vehicle manufacturing (CL1)

Based on the vehicle registration database, the CCFA (Committee of French Car Manufacturers) provides figures on the number of new vehicles registered by households. An indicator is constructed, covering these new vehicles purchased by households for private use and also incorporating an estimate of the fiscal power of these vehicles, in order to include the quality factor. The resulting indicator is used to calibrate the consumption volumes.

By definition, in terms of the national accounts, sales of vehicles from private individual to private individual do not have an effect on total household consumption. On the other hand, transactions between private individuals and agents from another institutional sector are counted as consumption. The figures for second-hand vehicle consumption thus only cover sales of demonstration vehicles, sales from institutional sectors other than households and the resale margins of dealerships. Although the second-hand vehicle registration indicator does not allow to distinguish between different types of vendors, and therefore does not allow to clarify this field, it is nonetheless used as an indicator when drawing up this account.

The 'automobile equipment' item primarily concerns spare parts, purchased directly or as part of a vehicle repair operation. This is why the index used to calculate this item is the VAT indicator for car repair turnover, the same indicator used to calculate the corresponding service item.

To complete the vehicle-related consumption field, an additional item covers caravans, trailers, bodywork and engines. It is estimated by smoothing the volume figures.

- Other transport equipment (CL2)

For this item the new motorcycle registration figures are available, provided by the International Union of Automobiles and Motorcycles (CSIAM). These figures serve as an indicator for the calibration of statistics on motorcycles, bicycles, mobility scooters, prams and pushchairs. However, no sub-annual data is available regarding boats and private aircraft, so the annual figures are smoothed.

- Textiles-Clothing -Leather (CB0)

For textiles and clothing, the monthly survey conducted by the Banque de France on textile and leather retailers is used. This indicator is used to calibrate two value accounts: one for textiles, the other for clothing. For leather goods and shoes, the value indicator retained is the relevant Banque de France's survey. In 2012, the possibility of using the indicator provided by the Institut Français de la Mode (IFM) was raised, as this indicator has the advantage of covering each of these two items separately.

The sales which are a common feature of this sector can introduce considerable volatility into the raw textile consumption data. They are treated as seasonal phenomena, and adjusted accordingly. However, the start and end dates of these sales can vary from one year to the next, further increasing the variability of the SA data series.

- Wood, paper, printing (CC0)

For wood and wooden items (excluding furniture), as the majority of these products are purchased in hardware and DIY stores, the value indicator from the Banque de France's hardware-DIY survey is used once again. However, for paper or carboard items the quarterly figures are the result of smoothing. The paper goods account is smoothed from 2011 onwards, due to a change in the indicator used by the Banque de France: the 'books-stationery' item is replaced by a new 'newspapers and stationery' indicator. As there is no historical data for this indicator, the corresponding account will be smoothed for a few years until seasonal adjustment is feasible. This will have no effect on data for either book sales or the printed press, both covered by other indicators.

- Chemicals (CE0)

For basic chemical products (fertilisers, etc.), the value indicator from the Banque de France's hardware-DIY survey is used. However for all soaps, perfumes and cleaning products the quarterly account total is the result of smoothing. Up until 2008 a volume indicator for perfumes (issued by the federation of beauty product manufacturers) allowed to track sub-annual sales, but this indicator is no longer published. The new Banque de France's survey covering this sector could provide a new value indicator in the medium term.

- Pharmaceutical products (CF0)

The statistics published by the CNAMTS (National Health Insurance Fund for Salaried Workers) provide details of all medicinal prescriptions reimbursed by the state, with corresponding dates; a distinction is made between the portion of pharmacy costs reimbursed by the state and the portion paid by households. These latter data serve as an indicator of household consumption and expenditure. One significant drawback is that they do not cover non-reimbursed medicines and self-medication, both of which have been rising steadily in recent years. Annual figures are available for this sub-item, and are smoothed to give quarterly values. Moreover, the quarterly data published by pharmaceutical firms (LEEM) allow to adjust the smoothing of the figures during the course of the

year. One particularity of this item is that the price indicator used is not the CPI, but the indicator provided by the CNAM.

- Rubber and plastic products (CG0)

The National Syndicate for Rubber and Polymers (SNDP) publishes figures for monthly household consumption in number of tyres for passenger vehicles and all-terrain vehicles. This indicator is used when calculating the volume of rubber products consumed. For plastic and glass products, the annual account figures are smoothed.

- Other manufacturing, repairs and installations (CM0)

This F48 item is sub-divided into five working categories. For furniture, a Banque de France study of this sector is used to calculate the total value. A similar report on jewellery and watchmaking is used for the watches and jewellery sector. Calibration is first performed on each item ('fine jewellery and other jewellery related items'and 'horology and measuring instruments'), then rate smoothing distributes the development observed in both items. The reimbursement statistics published by the CNAMTS provide indicators regarding the value of household expenditure on medical, surgical and dental equipment on one side, and on glasses on the other side. Finally, for other products included in this item (sporting goods, games and toys, repairs and installations,etc.), figures are obtained by smoothing the annual volumes. Recent surveys conducted by the Banque de France on the games and toys and sporting goods sectors may provide future value indicators for these items.

Construction

Household consumption on construction includes 'minor repairs'. The indicator used here is the same used for 'major renovations', classed as an investment (GFCF). This is the housing repair-improvement indicator, published by the Ministry for Ecology, Sustainable Development, Transport and Housing (MEDDTL). No distinction is made here between major and minor repair works; this value indicator is deflated by the Maintenance and Improvement Price Index (IPEA), and the resulting figures serve as a volume indicator.

Tradable services

Although they represent a considerable percentage of household consumption expenditure, there are fewer indicators available to track tradable services than there are for goods. The most commonly-used indicator is the index of VAT on turnover, which has two limits:

- limited availability: since the result for the third month is not known when the 'initial results' are published after 45 days, it needs to be extrapolated;
- the indicator does not allow to clearly identify the different groups of consumers affected by short-term fluctuations.

- Trade and repair of motor vehicles (GZ1)

It is important to reiterate that in the national accounts, for the sake of assessing values at basic prices, the commercial activity associated with the sale of goods is counted in with the trade margins on goods, as well as with trade output. There is, therefore, no specific consumption data for commercial services. Commercial consumption primarily refers to the consumption of automobile repair services. Turnover indices for the automobile repair sector are constructed on the basis of VAT declarations, which also serve as indicators for the consumption of repair services in value terms. This is the same indicator used to assess consumption of the spare parts required used for repairs.

- Transport (HZA)

The level of detail in which household consumption of travel services is examined goes further than the requirements of the input-output table. A distinction is made based on the type of transport involved (rail, road, water, air, other).

For rail travel, the ticket revenue of the SNCF serves as the value indicator.

For other terrestrial transportation methods, including urban public transport (subways, buses and taxis) and road transport (coaches, school buses, removals, etc.) the value indicator retained is the turnover index (VAT index) for the corresponding sector. The same goes for water-borne transportation (sea and river boats).

For air transport, the statistical department of the Ministry for Transport uses statistical feedback from the General Directorate of Civil Aviation (DGAC) to calculate the number of passengers taking three distinct types of flight: domestic flights leaving from Paris airports, international flights departing from Paris airports and all types of flight departing from regional airports. The air transport consumption indicator is based on these three estimates.

'Auxiliary transport services' mostly refers to expenditure on toll roads and parking. For this item, the quantity indicator used to calculate volumes is provided by the motorway management agencies, and based on distances travelled.

- Postal services (HZ5)

Up until 2002 a value indicator was published based on the monthly postal revenue of La Poste. These figures are now obtained by smoothing the annual data.

- Accommodation (IZ1) and food services (IZ2)

The turnover indices for these sectors, constructed on the basis of VAT declarations, serve as indicators for value consumption. These indicators cover both household expenditure and intermediate consumption by businesses. This can prove to be a disadvantage when it comes to distinguishing the fluctuations specific to each sector, but it is nonetheless this indicator which is used when compiling the annual accounts. In 2012, the possibility of using the indicator of nights spent in hotels for personal and tourism purposes was raised, an indicator used since 2006 in studies of the hotel industry conducted by the INSEE and the General Directorate for Competitiveness, Industry and Services.

Furthermore, these indicators are adjusted for seasonal and working day variation. But, even after these adjustments, the data series remain volatile. In order to retain only that information which is relevant to the underlying trends, the monthly indicator used in calibration is smoothed using a moving average of order 3. Each time a new indicator is integrated for a given month, predictions are thus extended to cover an extra month.

- Publishing, audio-visual and broadcasting activities (JA0)

Here again, the multiplicity of statistical sources available implies to work at a level of detail superior to that required for the input-output table.

For books, the indicator used is the monthly sales index published by the magazine *Livre-Hebdo*. To measure consumption of newspapers and the printed press in general, figures for total sales less exports – provided monthly by the *nouvelles messageries de la presse parisienne* (NMPP) are used as a value indicator.

For video games and other software products, the lack of a suitable indicator obliges to smooth the annual data.

As concerns the distribution (DVD and Blu-ray) and projection of films (i.e. cinemas attendance), information is provided by the National Centre for Cinematography (CNC), in partnership with GfK for the former, and based on cinema takings for the latter. As for the publication of recorded music (essentially CDs, but now also including downloads), the indicator used is provided by the National Syndicate for Phonographic Publishing (SNEP), based on GfK data.

Finally, with regard to broadcast programmes, household consumption is calculated with reference to the television licence payment. There is no sub-annual indicator, so the annual volumes are smoothed.

- Telecommunications (JB0)

The data provided by the Regulatory Authority for Electronic Communications and the Post (ARCEP) provide an estimate of total consumption (businesses and individuals) in terms of value of telecommunications services, making a clear distinction between fixed line services, mobile services and internet services. These data are then used to calibrate household consumption, in value, of each of these three services. An estimate of household consumption of telecommunication services can be derived from these figures, in value but also in volume thanks to comparison with the CPI.

These ARCEP data, however, only become available when the detailed results are published, 90 days after the end of each quarter: for initial estimates, quarterly household consumption is thus extrapolated.

In terms of broadcasting statistics for radio and television programmes, the service involved is the broadcasting of programmes by cable, by radio transmission and by satellite. In the absence of a detailed indicator, the annual account data are smoothed.

- IT and other information services (JC0)

For this relatively small item, which includes the installation and configuration of home computers as well as the hosting of personal websites, no indicator is available so the annual volume and value data are smoothed.

- FISIM (KZS), financial services excluding FISIM (KZH), insurance services (KZA)

Financial Intermediation Services Indirectly Measured (FISIM) can be defined as the margins taken by financial institutions on their banking intermediation service operations. Two types of margin can be distinguished: margins made on loans granted by financial institutions, and margins made on the deposits or investments which these institutions manage. To make a profit, a financial intermediary needs to issue loans at an interest rate which is higher than his own refinancing rate, and remunerate clients' deposits at a rate which is inferior to the rate at which he can invest this money without significant risk.

The margin made on each operation is thus largely dependent on the refinancing costs which apply to financial institutions. In practice, the national accounts do not measure these margins directly, as they fluctuate in line with variations in interest rates and are different for each different type of operation. FISIM services are measured indirectly in relation to a single refinancing rate: the average market rate for inter-bank lending.

FISIM services involving deposits are calculated as the difference between, on the one hand, the remuneration implied by the conditions on the money markets (outstanding bank deposits x the inter-bank lending rate) and, on the other hand, the amount of savings interest actually paid by financial institutions on these same deposits. These margins correspond to the output of financial intermediation services, consumed by households depositing sums with banks.

FISIM services on bank loans are calculated as the difference between, on the one hand, the interests actually received by financial institutions on loans made to clients and, on the other hand, the refinancing rate which implicitly applies to these same financial institutions (outstanding loans x the inter-bank lending rate). As with deposits, these margins are held to represent the FISIM output of financial institutions, consumed by lenders.

With reference to households in particular, final consumption is primarily composed of the margin made by financial institutions on the bank deposits that they control. The remaining final FISIM consumption of households is derived primarily from the banks' profit margin on consumer credits. FISIM on mortgages, however, is classed as intermediate consumption (part of the housing services production process) and not final consumption.

In order to evaluate quarterly FISIM consumption, the annual account figures are smoothed (in volume and in value). In the future, however, the quarterly indicators published by the Banque de France could be integrated into the calculations.

The non-FISIM financial services item (KZH) refers primarily to banking fees paid by households. As with insurance activities (KZA), the lack of a sub-annual indicator obliges to smooth the volume data from the annual accounts. The price indicator used here is the CPI.

- Real estate activities

Effective consumption excluding rent (LZ1) covers those services provided by estate agents on behalf of others. The annual figures are smoothed to yield volumes and values.

For rents (LZ2), effective household consumption of accommodation, i.e. including the individualised consumption of general government, is obtained by smoothing the annual consumption volumes. This item distinguished between real and imputed rents (in the national accounts, the owner of a residential property is held to be the consumer of an accommodation service, paying an imputed rent to him/herself). Smoothing for this item, which accounts for a significant proportion of household consumption, is justified on the basis that the fluctuations in the annual accounts are very weak, and these annual figures are based on multi-annual sources (the Housing studies).

The individualised consumption of general government corresponds primarily to housing subsidies paid to tenants. This information is available on a quarterly basis via the statistics published by the National Fund for Family Allocations (CNAF). Consumption expenditure is thus calculated as the balance between effective smoothed consumption and the individualised consumption of general government.

- Business services

Several items in the F48 classification are devoted to such services, but in none of them does household consumption occupy a significant position, as these services are aimed primarily at businesses.

These services include legal, accountancy and management services and more (MA0), ranging from legal representation to vehicle roadworthiness tests. The indicator used here is the turnover index (or VAT index) for the corresponding section, used to estimate values.

For other specialist services (MC0), a distinction is made between veterinary services (for which a VAT index is used) and all other services (photographic prints and retouching, etc.), for which the annual volumes are smoothed.

For administrative and support services (NZ0), VAT indicators are available for the rental value accounts (vehicles, tools, etc.) and travel agencies and booking services. For other items (security, recruitment for personal services, etc.) the annual account data are smoothed.

- Household services

For these products, primarily assigned to household consumption, three F48-level items are identified.

For arts, entertainment and recreation (RZ0), a distinction is made between tradable activities, for which VAT indices are used to calculate the value data, and non-tradable activities, whose value is derived by smoothing the annual volume figures. A further distinction is made for gambling and games of chance: their quarterly profile is based on the VAT index, but the prices are smoothed as the CPI does not stretch to this form of expenditure.

The category of 'other service activities' (SZ0) includes repairs of domestic appliances as well as personal services (hairdressing, laundry, funeral services, etc.). The value of the quarterly accounts is determined with reference to the VAT index.

Finally, with regard to the 'activities of households as employers' (TZ0), this item essentially corresponds to the wages of professionals paid to provide services in the home (cleaners, gardeners, concierges, babysitters, etc.). Although for the time being the annual account is smoothed to determine the volumes, the 'cost of paid employment for domestic services' indicator published by ACOSS may be used in the medium-term.

Non-tradable services

- Public administration (OZ0)

This includes the partial payment by households for general government services (central or local) and the guidance services provided by social services and economic support agencies. The annual accounts figures are smoothed to obtain values and volumes.

- Education (PZ0)

A distinction is made between the tradable and non-tradable components. While short-term information tends to be thin on the ground for both components, the CPI is nonetheless applied to the price of private teaching (driving lessons, further education for adults, private school fees).

- Human health (QA0)

Non-hospital treatments and private hospital fees are treated separately. The indicators are derived from the monthly healthcare reimbursement statistics provided by the CNAMTS, tracking treatment dates and the dates on which the corresponding costs were reimbursed. As with expenditure on medicines, household consumption expenditure is identified as that portion of the cost which is not reimbursed by the CNAMTS. For non-hospital treatments the price indicator is also provided by the CNAMTS, whereas for private hospitals the lack of suitable indicators means the prices need to be deducted by smoothing. For the non-tradable component, i.e. that portion of household expenditure in public hospitals which is not reimbursed, the annual account data are smoothed (for values and volumes), again due to the absence of a suitable indicator.

- Residential care and social work services without accommodation (QB0)

This item also includes a distinction between tradable and non-tradable services. The annual account figures are smoothed, with the exception of the tradable component (household expenditure on retirement homes, hospices, etc.), for which a CPI is available.

3.2.6.3. Prices

The consumer price indices (CPI) provide detailed price indicators for almost every aspect of consumption.

Unlike the traditional seasonal adjustment method used for the quarterly accounts, for prices the seasonal coefficients are only calculated once annually, and are not re-estimated each quarter. As prices are not affected by the number of working days in a month, no working day adjustment is required.

The CPI is a good indicator, in that the prices given in the annual accounts are calculated using the same source. Calibration therefore has only a very minor effect on the evolution of this indicator. However, at the aggregated level, the quarterly changes to the CPI and the consumption prices given in the quarterly accounts may diverge slightly. One potential source of such differences is accommodation consumption, where the national accounts include imputed rents. The housing item is thus markedly less weighted in the CPI than it is when calculating the consumption deflator. If the rental price trend diverges from the general trend of the index, this difference will be accentuated by the consumption deflator. A further source of divergence is FISIM consumption, a concept specific to the national accounts and not used by the CPI.

Table 6: Household consumption expenditure indices

A17		F48		Calibrating grade		Indicator		
Code		Code	Description	Code	Description (if grade different from grade"F48")	**Volume**	**Value**	**Price**
AZ	Agricultural goods	AZ1	Agriculture	AZ1			Banque de France on food products (BDF Food)	Consumer price indices (CPI)
		AZB	Forestry and fishing	AZB		Smoothing		CPI
DE	Energy, water end waste	BZ0	Extraction	BZ0			Smoothing	CPI
		DZ0	Electricity, gas, steam and air conditioning supply	GD35A	Electricity	Energy Observatory		CPI
				GD35B	Gas, steam and air conditioning supply	GDF, Energy Observatory		CPI
		EZ0	Water, sewerage, waste and remediation	EZ0		Smoothing		CPI
C1	Manufacture of food products, beverages and tobacco products	CA1	Food products	GC10A	Meat & meat products		BDF Butchery	CPI
				GC10E	Dairy products		BDF Food	CPI
				GC10G	Bakery-pastry & pastas	FranceAgriMer		CPI
				GC10div = GC10B+GC10C+ GC10D+GC10F+ GC10H+GC10K	Other food products		BDF Food	CPI
		CA2	Beverages and tobacco products	GC11Z	Beverages		BDF Food	CPI
				GC12Z	Tobacco		Sales Altadis/Seita	CPI
C2	Coke and refined petroleum	CD0	Coke and refined petroleum	HC19Z1Z2AI	Coking - coal - lubricant	Smoothing		CPI
				HC19Z2BCD	Oil	Professionnal Coucil for Petroleum (CPDP)		CPI
				HC19Z2E	Liquefied petroleum gas			
				HC19Z2F	Gasoline, leaded premium gasoline			
				HC19Z2G	Unleaded fuel			
				HC19Z2H	Diesel			
C3	Equipment goods	CI0	Computer, electronic and optical products	GC26AB = GC26A +	Electronic components and cards + computers and peripherals		GFK	CPI
				GC26C	Communication equipment		GFK	CPI
				GC26D	Public electronic products		BDF (public consumption of electronical goods)	CPI
				HC26E0A	GPS		GFK	CPI
				HC26E0BC	Horology - Measuring instruments		BDF (watches and jewellery)	CPI
				GC26G	Optical equipment & phot. - magnetic media & opt.		GFK	CPI
		CJ0	Electrical equipment	GC27A	Appliances		BDF (household appliance)	CPI
				GC27B	Other electrical equipment		BDF (hardware and DIY stores)	CPI
		CK0	Machinery and equipment n.e.c.	CK0			BDF (hardware and DIY stores)	CPI

C4	Transport equipment	CL1	Motor vehicles	HC29A1A	New cars	Vehicles registred * fiscal importance (CCFA-SOeS)		CPI
				HC29A1B	Demonstration cars - Professional sales other than households origin - Professional sales from households origin (margin)	Vehicles registred (CCFA-SOeS)		CPI
				HC29div	Remanufactured engine - Camping-cars - Sheet metal and trailers	Smoothing		CPI
				GC29B	Automotive equipment		VAT	CPI
		CL2	Other transport equipment	GC30AC = GC30A + GC30C	Ships and boats + Aircraft	Smoothing	Smoothing	
				GC30E	Transport equipment n.e.c.	Vehicles registred - International Union of Automobiles and Motorcycles (CSIAM)		CPI
C5	Other industrial goods	CB0	Textiles, wearing apparel, leather and shoes	GC13Z	Textiles		Institut français de la Mode (IFM)	CPI
				GC14Z	Wearing apparel			
				GC15Z	Leather and shoes		IFM	CPI
		CC0	Wood, paper, printing	GC16Z	Wood, wood products cork (except furniture) - basketry & plaiting		BDF (hardware and DIY stores)	CPI
				GC17B	Paper or cardboard articles		Smoothing	CPI
		CE0	Chemicals	GC20AC = GC20A + GC20C	Basic chemicals, fertilisers and nitrogen compounds, plastics and synthetic rubber in primary forms and other chemical products & man-made fibres		BDF (hardware and DIY stores)	CPI
				HC20B1	Cleaning products	Smoothing		CPI
				HC20B2	Perfume	Smoothing		CPI
		CF0	Pharmaceutical products	GC21Z	reimbursed medicines		Cnam	National health insurance fund (Cnam)
					self-medication		Smoothing	
		CG0	Rubber and plastic products, other mineral products	GC22A	Rubber products	National syndicate for rubber and Polymers (SNDP)		CPI
				GCG0div = GC22B +GC23A + GC23B	Plastic products + glass ans glassware + other non mineral products except glass	Smoothing		CPI
		CH0	Basic metals and fabricated metal products except machinery and equipment	CH0			BDF (hardware and DIY stores)	CPI
		CM0	Other manufacturing; repair and installation of machinery and equipment	GC31Z	Furniture		BDF (furnitures)	CPI
				GC32A	Jewelry, jewelry store & similar & musical instrument		BDF (watches and jewellery)	CPI
				HC32B1	Medical and surgical and dental equipment		Cnam	CPI
				HC32B2	Corrective glasses - Sunglasses		Cnam	CPI
				GC32div = GC32C + GC33Z	Sports equipment, games & toys and other manufacturing - Repair and installation of machinery and equipment	Smoothing		CPI
FZ	Construction	FZA	Building	FZA		Repair-improvement indicator deflated by the IPEA		CPI

GZ	Trade	GZ1	Wholesale and retail trade and repair of motor vehicles and motorcycles	GZ1			VAT	CPI
HZ	Transportation	HZA	Transportation	GH49A	Rail transport		Ticket revenue of the SNCF	CPI
				GH49BC = GH49B +	Others terrestrial travelers transporting & freight road transport & by driving		VAT	CPI
				GH50Z	Waterway transport		VAT	CPI
				GH51Z	Air transport	SOeS-DGAC		CPI
				GH52Z	Storage and auxiliary services of transports	Motorway agencies		CPI
		HZ5	Postal and courier activities	HZ5		Smoothing		CPI
IZ	Accommodation - food services	IZ1	Accommodation	IZ1			VAT	CPI
		IZ2	Food services	IZ2			VAT	CPI
JZ	Information-communication	JA0	Edition, audiovisual and diffusion	HJ58Z1A	Book publishing		Livre hebdo	CPI
				HJ58Z1BCDE	Telematic services and telephone booth - Publishing of newspapers - Publishing of journals and periodicals - Other publishing activities		NMPP	CPI
				HJ58Z1FZ2	Electronic games edition - others softwares edition	Smoothing		CPI
				HJ59Z2A	Film distribution		CNC-GFK	CPI
				HJ59Z2B	Movies projection		CNC	CPI
				HJ59Z3	Sound recording edition (including online)		Snep-GFK	CPI
				GJ60Z	Programing and diffusion	Smoothing		CPI
		JB0	Telecommunications	HJ61Z0A	Telecommunications		Arcep	CPI
				HJ61Z0B	Radio and television broadcasting	Smoothing		CPI
		JC0	Computer activities and information services	JC0		Smoothing	Smoothing	
KZ	Financial services	KZH	Financial activities exluding FISIM	KZH		Smoothing		CPI
		KZS	FISIM	KZS		Smoothing	Smoothing	
		KZA	Insurance activities	KZA		Smoothing		CPI
LZ	Real estate activities	LZ1	Except rents services	LZ1		Smoothing	Smoothing	
		LZ2	Rents	GL68I	Imputed rents	Smoothing		CPI
				GL68R	Real rents	Smoothing		CPI
MN	Business services	MA0	Legal, accounting, management, architecture activities…	MA0			VAT	CPI
		MC0	Other professional, scientific and technical activities	GM74Z	Other professional, scientific and technical activities	Smoothing		CPI
				GM75Z	Veterinaries		VAT	CPI
		NZ0	Administrative and support service activities	GN77Z	Rental and leasing activities		VAT	CPI
				GN79Z	Travel agency, tour operator and other reservation service and related activities		VAT	CPI
				GNZ0div = GN78Z + GN80Z + GN81Z+ GN82Z	Employment activities Security and investigation activities Services to buildings and landscape activities Office administrative, office support and other business support activities	Smoothing		CPI

OQ	Non tradable services	OZ0	Public administration	OZ0		Smoothing		Smoothing
		PZ0	Education	GP85M	Education (tradable)	Smoothing		CPI
				GP85N	Education (non tradable)	Smoothing		Smoothing
		QA0	Human health	HQ86M0A	Private hospitals		Cnam	Smoothing
				HQ86M0BG	Non-hospital treatments		Cnam	Cnam
				GQ86N	Human health activities (non tradable)	Smoothing	Smoothing	
		QB0	Residential care and social work activities without accommodation	GQ8788M= GQ87M+GQ88M	Residential care activities (tradable) Social work activities without accommodation (tradable)	Smoothing		CPI
				GQ8788N = GQ87N+GQ88N	Residential care activities (non tradable) Social work activities without accommodation (non tradable)	Smoothing		Smoothing
RU	Household services	RZ0	Arts, entertainment and recreation	GRZ0M= GR90M + GR91M+ GR93M	Creative, arts and entertainment activities (tradable) Libraries, archives, museums and other cultural activities (tradable) Sports activities and amusement and recreation activities (tradable)		VAT	CPI
				GRZ0N	Creative, arts and entertainment activities (non tradable) Libraries, archives, museums and other cultural activities (non tradable) Sports activities and amusement and recreation activities (non tradable)	Smoothing	Smoothing	
				GR92Z	Gambling and betting activities		VAT	Smoothing
		SZ0	Other service activities	SZ0			VAT	CPI
		TZ0	Activities of households as employers	TZ0		Smoothing		CPI

Source: quarterly national accounts.

3.2.7. Individualised consumption expenditure of general government (GG) and non-profit institutions serving households (NPISH)

3.2.7.1. Individual consumption expenditure of general government (P31G)

'Individualised' or individual consumption expenditure by government bodies refers to all expenditure for which the effective user is identifiable and which ultimately benefits households: essentially health and education spending, along with housing subsidies and similar expenditure. This expenditure is supplemented by social transfers in kind (reimbursement of healthcare costs, housing allocation, education).

For the vast majority of these products, individual expenditure is low and volumes are therefore calculated by smoothing the annual data, while values are obtained by calibrating these volumes and multiplying by the corresponding consumer price index.

Short-term tracking of the major items is made possible by the various indicators available (*Table 7*).

- Rents (LZ2)

Individual market expenditure on housing is calibrated using the various housing benefit figures: personal housing support (APL), social housing benefit (ALS) and the family housing allowance (ALF).These indicators are provided by the CNAF (National Fund for Family Allocations).

- Tradable human health services

For this type of expenditure, the relevant indicators are the medical reimbursement statistics provided by the CNAMTS.

These figures cover the cost of reimbursing expenditures on medicines (CF0), non-hospital treatments and private hospital costs (QA0): treatment dates are available for the first two, and reimbursement dates for the latter. While the date of treatment is the best reflection of the date of expenditure, it does present one major drawback: the publication of these figures is delayed by several months, to the extent that the final two months often have to be extrapolated when publishing the 'initial estimates' (published within 45 days after the end of the quarter in question). For medicines and non-hospital treatments, a price indicator is provided directly by the CNAMTS. For private hospitals, the annual data is smoothed. For medical-surgical and dental equipment, and glasses (CM0), reimbursement dates are published and the price index used is the CPI.

- Non-tradable human health services

Individual consumption of non-tradable health services is estimated using an indicator of the value of non-tradable output from public hospitals, estimated in the economic summary table (EST) using data provided by the General Directorate for Public Finances (DGFiP). More precisely, this indicator represents the total sum of intermediate consumption, wages, social contributions and taxes on production, minus production subsidies. In accounting terms this total corresponds to the output of government services, from which the fixed capital consumption - for which no indicator is available is subtracted, and the gross operating profit on tradable services, which represents a negligible part of the whole. The indicator is also seasonally adjusted, but it remains highly volatile. So as to retain only the information on the underlying trends, the indicator used in the calibration calculations is smoothed using a centred moving average of five. The price indicator is derived from smoothing the annual figures.

- Education (PZ0)

As with health expenditure, the value of individual consumption of non-tradable education services is obtained by calibration using an indicator reconstructed using DGFiP data on input costs. On the other hand, the annual estimate of the volume account is based on an 'output' method which is largely dependent on the fluctuations in the number of students per subject; the annual changes are not particularly volatile, and a sub-annual analysis would therefore be superfluous. The quarterly volumes are thus calculated by smoothing the annual data.

- Residential care and social work services without accommodation (QB0)

As with non-tradable health and education expenditure, the value of individual consumption of residential care is calculated via calibration using a reconstructed indicator based on cost data for production factors, using indicators provided by the DGFiP. Price figures are obtained by smoothing the annual accounts.

- Public administration (OZ0)

Finally, individual consumption of general government, which includes the management costs of social security institutions, is calculated by smoothing the annual value and volume data series.

3.2.7.2. Individual consumption expenditure of NPISH (P3P)

No short-term information is available to help measure the individual consumption expenditure of non-profit institutions serving households (NPISH). Furthermore, the sums involved are often relatively small compared to the expenditure of households and government bodies. NPISH expenditure is calculated by smoothing the corresponding annual series.

3.2.8. Collective consumption expenditure of general government (P4G)

As defined in ESA 95, "collective consumption covers those services (defined as 'collective') provided simultaneously to all members of the community or to a specific group (for example, all households living within a specific region)." The collective consumption expenditure of general government (P4G) primarily covers the costs of general administration (police, justice, armed forces, central administration, etc.) and public research.

Collective expenditure on 'research and development' (MB0) and 'other activities and services' (SZ0) by local government bodies and associations is calculated by smoothing the annual value and volume data.

The collective consumption of 'public administration' (OZ0) corresponds to the balance of the supply-use account for this producton'(cf. Section 1.2 of Chapter 3).

Table 7: Individual consumption expenditure indicators for general government

A17		F48		Item of Calibrating		Indicator		
Code	Short title	Code	Short title	Code	Title (if different from "F48")	Volume	Value	Price
C1	Food products	CA1	Food	GC10G	Bakery and farinaceous products	Smoothing		Consumer price indices (CPI)
				GC10div	Other food products	Smoothing		CPI
C3	Equipment goods	CI0	Computer, electronic and optical products	GC26F	Irradiation, electromedical and electrotherapeutic equipment	Smoothing	Smoothing	
C4	Transport equipment	CL2	Other transport equipment	GC30E	Transport equipment n.e.c.	Smoothing		CPI
C5	Other industrial goods	CB0	Textiles, clothing, leather, footwear	GC14Z	Wearing apparel	Smoothing		CPI
		CE0	Chemical products	CE0		Smoothing		CPI
		CF0	Pharmaceutical products	GC21Z	Pharmaceutical products		National health insurance fund (Cnam)	National health insurance fund (Cnam)
		CM0	Other manufacturing; repair and installation of machinery and equipment	HC32B1	Medical, surgical and dental equipment		Cnam	CPI
				HC32B2	Eyeglasses - sunglasses		Cnam	CPI
HZ	Transportation	HZA	Transportation	GH49A	Rail transport	Smoothing		CPI
				GH49BC = GH49B + GH49C	Other passenger land transport and freight transport by road and via pipeline	Smoothing		CPI
				GH51Z	Air transport	Smoothing		CPI
IZ	Accommodation - food service	IZ1	Accommodation	IZ1		Smoothing		CPI
JZ	Information-communication	JA0	Publishing, audiovisual and broadcasting activities	GJ60Z	Programming and broadcasting activities	Smoothing		CPI
LZ	Real estate activities	LZ2	Rents	GL68R	Actual rentals		National Fund for Family Allocations (Cnaf)	CPI
MN	Business services	NZ0	Administrative and support service activities	GN77Z	Rental and leasing activities	Smoothing		CPI
OQ	Non tradable services	OZ0	Public administration	OZ0		Smoothing	Smoothing	
		PZ0	Education	GP85M	Education (tradable)	Smoothing		CPI
				GP85N	Education (non tradable)	Smoothing	General Directorate for Public Finances (DGFiP)	
		QA0	Human health	HQ86M0A	Private hospitals		Cnam	Smoothing
				HQ86M0BG	Non-hospital treatments		Cnam	Cnam
				GQ86N	Human health (non tradable)		DGFiP	Smoothing
		QB0	Residential care and social work activities without accommodation	GQ8788M= GQ87M+GQ88M	Residential care activities (tradable) Social work activities without accommodation (market)	Smoothing		CPI
				GQ8788N = GQ87N+GQ88N	Residential care activities (non tradable) Social work activities without accommodation (non tradable)		DGFiP	Smoothing
RU	Household services	RZ0	Arts, entertainment and recreation	GRZ0N	Creative, arts and entertainment activities (non tradable) Libraries, archives, museums and other cultural activities (non tradable) Sports activities and amusement and recreation activities (non tradable)	Smoothing	Smoothing	
		SZ0	Other service activities	SZ0		Smoothing		CPI
		TZ0	Activities of households as employers	TZ0		Smoothing		CPI

Source: quarterly national accounts.

3.2.9. Gross fixed capital formation (P51) and changes in inventories (P52)

3.2.9.1. Gross fixed capital formation (P51)

Gross fixed capital formation (GFCF) corresponds to the economic definition of investment. It is "equal to the total acquisitions (minus sales) of fixed assets by resident producers during the reference period, supplemented by certain capital gains on non-produced assets resulting from the production activities of productive or institutional units" (ESA 95). In the national accounts, fixed capital corresponds to "tangible or intangible assets derived from the production process and used repeatedly or continuously in other production processes for a minimum period of at least one year" (ESA 95).

GFCF (P51) includes:

- acquisitions minus sales of fixed tangible assets:
  - housing, non-residential buildings and civil engineering constructions
  - machinery and equipment
  - farming assets (plants and animals)
- acquisitions minus sales of fixed intangible assets:
  - mining and oil drilling rights
  - software
  - original artistic, literary or entertainment works
  - other fixed intangible assets
- major improvements to non-produced tangible assets
- costs linked to the transfer of ownership of non-produced assets such as land or patented assets.

In the quarterly accounts GFCF is measured by output, for each institutional sector.

In the mechanics and dissemination of the quarterly accounts, GFCF operations are thus directly assigned codes representing their respective institutional sectors: 'S' for non-financial corporations (NFCs), 'M' for households (excluding self-employment), 'G' for general government, 'P' for NPISH, 'B' for financial corporations. These are not ESA codes, but labels specific to the French quarterly accounts.

Information on the distribution of GFCF by branch of activity is only available annually. Thus investment by NFCs (P51S) in the motor vehicle sector is estimated quarterly, while total investment by corporations in the 'motor vehicle' branch (CL1) is not subject to quarterly estimations.

The indicators used for different sources of output are described below, and summarised in *Table 8*.

Agricultural products and energy, water and waste

Total GFCF in agriculture (AZ1) and the forestry and fishing sectors (AZB) is very low when considered in the context of total GFCF. No sub-annual indicator is available to measure the GFCF of non-financial corporations and general government, the only two institutional sectors that invest in such products. Quarterly volume figures are thus derived by smoothing the corresponding annual series. The total value is obtained by smoothing the annual prices and transposing the results onto the quarterly volume accounts..

Total GFCF in energy, water and waste management is also marginal as a proportion of total GFCF. This investment corresponds to pollution control expenditure. It mostly applies to businesses, with only a tiny percentage attributable to households. The quarterly volume figures are obtained by smoothing the corresponding annual data series. Total value is obtained by smoothing the annual prices and transposing the results onto the quarterly volume accounts.

Manufactured goods

- Capital goods

For computers, electronics and optical products (CI0), electrical equipment (CJ0) and machinery and equipment, only GFCF by NFCs is calibrated. The GFCF of other institutional sectors is obtained by smoothing. The total value of NFCs investments is estimated using a turnover index (the VAT index) based on wholesale transactions involving the corresponding products. For example, the electrical equipment item (CJ0) represents an estimate of the turnover of the wholesale sector for electrical appliances (Code 4669A in the NAF). This method is thus based on the assumption that the short-term behaviour of businesses investing in mechanical goods purchased via wholesalers is similar to the behaviour of businesses purchasing investment products directly.

To deduce GFCF in volume, a price indicator for the domestic market is used as a deflator: this is the net quarterly price index (for output and imports), minus exports. This price indicator is used for all relevant institutional sectors.

- Motor vehicles (CL1)

GFCF in the motor vehicle product (CL1) originates primarily from NFCs: household acquisition of motor vehicles (excluding self-employed entrepreneurs) is classified as consumption. 'Motor vehicles' in this context covers a broad spectrum, from small cars to heavy goods vehicles (articulated trucks, buses and coaches).

The indicator used to estimate GFCF in the automobile sector by NFCs is based on the number of new vehicles registered, figures provided by the CCFA (French Committee of Motor Vehicle Manufacturers). Five categories of vehicle registration are taken into account: demonstration models, company cars (including hire cars), light commercial vehicles, heavy commercial vehicles, buses and coaches. These categories are aggregated to obtain a calibration based on two key indicators: one for light vehicles, the other for heavy vehicles.

If a company purchases a vehicle but then resells it to a private buyer within a year, the purchase is counted as GFCF, but only at a value corresponding to the difference between the purchase price and resale price of the vehicle. Demonstration models and cars for rental use, the latter of which are estimated to account for 40% of company cars, are thus subject to this specific calculation method, as they are generally purchased new and resold within a year. The annual resale price (estimated at 85% of the new price for demonstration models and 75% for rental cars) is thus deducted from the original sale price. Only 25% of the total value of hire car purchases, and 15% of demonstration models, is thus counted as GFCF. The 'light vehicles' indicator is an aggregation of total registrations of new company cars (including hire cars), demonstration models and light commercial vehicles (weighing under 5 tonnes).

A heavy vehicle indicator is also produced, covering heavy commercial vehicles, buses and coaches. This indicator does not take account of structural changes within the categories. To do so itwould require more detailed information, such as the precise tonnage of each vehicle registered.

For institutional sectors other than NFCs, quarterly GFCF is calculated by smoothing the annual volumes. Finally, the price indicator used for all sectors is the price given in the quarterly accounts for the production of the motor vehicle branch.

- Other transport equipment (CL2)

Investment in naval, aeronautical and railway construction is generally either by non-financial corporations (NFCs) or general government organisations.

For general government, the value of GFCF is obtained by a process of smoothing. GFCF in volume is calculated by calibration, with the indicator used being the value of GFCF deflated by the branch's production prices. For financial corporations, where GFCF represents only a very small sum every year, the volumes and values are smoothed.

For NFCs, the value of GFCF is calculated using a composite indicator based on aircraft statistics. First the number of Airbuses delivered is calculated, weighting the quantities using the list prices. In order to take other

manufacturers into account, the value of imported aeronautical products is then added to this 'Airbus' indicator (with the exception of imports from Germany, which are considered to be largely redundant as they represent Airbus deliveries). To calculate volumes, the price indicator used is the branch's production price index.

This indicator fails to take other types of transport equipment into account (trains, boats) and the calibration prospects are generally mediocre, resulting in a substantial residual (the remainder which cannot be explained and smoothed). Generally speaking, the GFCF profile is relatively smooth.

- Metals and metallurgy (CH0)

Investment by NFCs is calculated using the industrial production indices (IPI) for individual branches within the metal manufacturing industry (excluding machinery and equipment), applied here as a volume indicator. Quarterly GFCF by financial corporations and government bodies, generally insignificant, is calculated by smoothing the annual volumes. For all institutional sectors, the value of GFCF is then assessed by multiplying the volumes by the branch's production price indicator.

- Other manufactured products, repairs and installation (CM0)

As with industrial equipment, for other manufactured products, repairs and installation (CM0) only the GFCF of NFCs is calibrated. The total value of NFCs investment is estimated using the turnover index (VAT index) for wholesale purchases of goods falling into the 'other manufactured products' category. The value of GFCF in the installation and repairs sector is thus not directly covered by the indicator. GFCF in other sectors is calculated by smoothing. To obtain the corresponding volume figures, production prices provide a suitable deflator for all relevant institutional sectors.

Construction

Investment in building and civil engineering works represents more than half of total GFCF, and around 80% of GFCF by households and general government. Recording construction operations in the national accounts presents a particular set of challenges, as the production of a new building or motorway may be spread over an extended period of time. Production thus corresponds to what is actually completed within a given period: a building whose construction is spread across several periods will be progressively valued and recorded as the project progresses. This production is broken down to show GFCF and changes in inventories: projects that are completed and sold are recorded as GFCF, while completed but unsold projects are recorded as changes in inventories.

- Building (FZA)

Assessing GFCF in the building sector is a fairly complex task, due to the wide array of activities involved and the multiplicity of indicators used. GFCF for the building sector thus covers not only new builds, but also major renovation work and the commercial side of property development. When calculating quarterly account figures for GFCF, a more detailed level than that required for the input-output table is used.

Property development (GF41A) is dealt with separately. This item covers the margins made by developers on the sale of new properties to households or businesses. For both households and businesses, the volume figures are obtained by smoothing. To calculate the corresponding values a composite price indicator is produced, 10% based on the price indicator for new individual dwellings and 90 % on the price indicator for new collective housing. This price information is provided by the Observation and Statistics Department (SOeS) at the Ministry for Ecology, Sustainable Development, Transport and Housing.

Standard and specialised construction work are two activities resulting in the production of new buildings (residential or otherwise), as well as maintaining existing buildings.

For new builds, the SOeS issues monthly statistics on new building starts on individual dwellings (individual houses), collective residences (apartment buildings) and the various types of non-residential building (offices, shops, schools, hospitals, etc.). However these statistics tell nothing more than the number of building starts. Weighting criteria (known as time grids) are thus applied to building starts to assess what is actually built during each time period. The application of these deadline grids gives 'building equivalent' figures. Weighting is then applied to these equivalents in order to distinguish between building equivalents linked with GFCF by companies, and those corresponding to general government and households.

GFCF on major restoration work is measured using the quarterly 'maintenance value' scales, distinguishing clearly between housing and non-residential buildings. These scales are published by the Ministry for Ecology, Sustainable Development, Transport and Housing (MEDDTL), and provide an overview of the development of 'maintenance and renovation' work. The Ministry for Housing also publishes the IPEA price index (a price index for home maintenance and improvement work), used to deflate the two scales and obtain the corresponding volume indicators. These indicators are then weighted, on the basis of their relative contribution to building-related GFCF in their respective institutional sectors in the base year.

For businesses, the overall construction-related GFCF indicator is the weighted sum of 'building equivalent' figures for different types of building and different forms of maintenance work, covering both private housing and non-residential buildings. The weighting is based on the 'building equivalent' turnover statistics for different types of construction work in the base year, along with the relevant maintenance/renovation indicators. These turnover figures are derived from the report published by the Public Accounts Commission for Housing, and the annual survey conducted on construction companies. For businesses, the indicator is around 70% based on 'building equivalents' and 30% on renovation statistics. As there is no more specific information available to allow to distinguish clearly between GFCF by non-financial corporations and financial corporations, the same indicator is used for both, with the figures for each branch then undergoing different calibration processes.

The indicator for general government is simpler, in that housing expenditure represents only a very small part of the whole. As such the indicator used is the total sum of 'building equivalents' for non-residential construction (offices, schools, hospitals, etc.) and the specific maintenance indicator for non-residential buildings.

For households, the indicator is based on the assumption that GFCF by households on non-residential buildings is negligible. The indicator is thus calculated as the sum of the building equivalents for housing and the corresponding maintenance indicator. This indicator is 60% based on the 'building equivalents', and 40% on maintenance and renovation figures. To make a clear distinction between what has already been sold and what has not, the volumes of changes in inventories should be subtracted from this aggregated indicator, which serves to calculate GFCF. But bringing these changes into the equation has a negative impact on calibration ratios, and they are therefore avoided. Furthermore, changes in inventories levels are estimated, as described in Section 2.9.2 of this chapter.

The GFCF of NPISH, generally fairly low, is smoothed.

For each institutional sector, calibration is first performed based on volumes. The price indicator used for general government, NFCs and financial corporations is BT01, the monthly construction index published by the SOeS. This indicator covers the whole building sector. For households, the price indicator used here is a weighted indicator based on both the cost of construction index (ICC) published by the INSEE, allowing to observe the prices of new homes, and the price index for home maintenance and improvement work (IPEA).

- Civil engineering (FZ2)

To keep track of GFCF in civil engineering (FZ2), the total value of all public engineering work, calculated and published by the National Federation for Public Works (FNTP), is used as the value indicator. The major drawback of this indicator is that it makes no distinction between private and public commissions. The same indicator is therefore used to calibrate civil engineering GFCF by NFCs and by general government. The SOeS price index TP01 is used as the price indicator.

Tradable services

- Information and communication technologies

This covers two items in the input-output tables: publishing, audio-visual and broadcasting (JA0) on the one hand, and IT and information services on the other (JC0). In this context the first item (JA0) is largely concerned with software purchases by businesses, while the second (JC0) covers expenditure on computer programming, consultants and the maintenance of IT systems and applications. In both cases, the VAT index for the corresponding sector of activity is used to deduce the values of each sector (financial firms, NFCs, general government). In order to calculate the volumes, smoothing on the prices is performed. Only the 'household publishing expenditure' (JA0) is smoothed in value, as the amounts involved are insignificant.

- Real estate activities

Financial and non-financial corporations, as well as households, invest money in real estate activities other than rent (LZ1). These activities primarily involve agency fees linked to the purchase of old or new buildings. For NFCs and households, volumes are obtained by smoothing the annual target. A sub-annual indicator is in fact available, but the quarter-to-quarter fluctuations are too great. This indicator is therefore not used directly, but rather allows to identify and refine an annual target for the year in progress, a target which is then subjected to smoothing. In terms of prices, the composite indicator used is based 50% on the price index for existing housing (published by the INSEE) and 50% on the price of new housing (individual or collective). As for the expenditure of financial corporations in this field, generally negligible, the annual accounts are smoothed to give quarterly volume and price data.

- Business services

Expenditure on services to businesses is covered by just one item in the input-output table (level 'F48'): expenditure on legal services, accountancy, architecture, etc. (MA0). The diverse array of activities covered by this definition of consultancy and advisory services requires to perform calibration in greater detail than that used in the input-output table.

Firstly, GFCF in 'legal and accounting services' (level GM69Z in the working classification used by the annual accounts) primarily covers those services provided by notaries. But these services are well-regulated, and the revenue generated corresponds largely to the sums generated by the recording of transfers of ownership, which generate the majority of tax revenue from this sector. The available figures for taxes on products in this sector are thus used directly to assess GFCF in value and in volume (but the tax indicators are not used directly to compile the accounts, on account of the quarterly fluctuations that they generate, cf. paragraph 2.5.3. of this chapter). The value of these taxes is broken down to show the GFCF of NFCs and the GFCF by households, with keys denoting the corresponding distribution in the base year. The small portion of GFCF which does not correspond to notarial services is smoothed to give quarterly figures. Finally, GFCF by general government and NPISH in this sector, both negligible, is calculated by smoothing the annual volume and price figures.

The second sub-item is 'architecture, engineering, testing and technical analyses' (GM71Z in the working classification used by the annual accounts). For these products, the counterpart to production is the intermediate use of GFCF, which allows to use the turnover index (VAT index) as our indicator, although this is usually an output indicator. Calibration is thus needed to adjust, as far as possible, the divergences between intermediate uses and GFCF and the discrepancies resulting from the fact that the indicator covers total output for the sector, and not by product. The same indicator for all institutional sectors (except NPISH) is used. Volumes are calculated by deflating the quarterly value accounts using the smoothed annual prices. For NPISH, meanwhile, the quarterly volume and price accounts are both obtained by smoothing.

- Household services

Investment in (primarily) household services is included in the 'arts, entertainment and recreation subdivision' (RZ0); only non-financial corporations and general government invest in this sector, which also includes 'other services' (SZ0). This item also includes the repair of computers and domestic and personal goods. NFCs, general government and financial corporation are all concerned. Due to a lack of sub-annual information, the quarterly figures for each item are calculated by smoothing the annual data.

Table 8: GFCF indicators

A17		F48		Item of calibrating		*Institutional sector*	Indicator		
Code	Short title	Code	Short title	Code	Title (if different from "F48")		**Volume**	**Value**	**Price**
AZ	Agricultural goods	AZ1	Agriculture	AZ1		*NFC, GG*	Smoothing		Smoothing
		AZB	Forestry, fishing	AZB		*NFC*	Smoothing		Smoothing
						NFC, GG	Smoothing		Smoothing
DE	Energy, water, waste	EZ0	Water, sewerage, waste and remediation	EZ0		*NFC, Households*	Smoothing		Smoothing
C3	Machinery and equipment goods	CI0	Computer and electronic products…	CI0		*NFC*		VAT	Domestic market
						FC, GG, NPISH	Smoothing		
		CJ0	Electrical equipment	CJ0		*NFC*		VAT	Domestic market
						FC, GG	Smoothing		
		CK0	Machinery and equipment n.e.c.	CK0		*NFC*		VAT	Domestic market
						FC, GG, NPISH	Smoothing		
C4	Transport equipment	CL1	Motor vehicles	CL1		*NFC*	New vehicles registered (small cars, heavy vehicles) CCFA		Output
						FC, GG, NPISH	Smoothing		
		CL2	Other transport equipment	CL2		*NFC*		Import aeronautic (except. Germany)-(Customs)+ Airbuses delivered * list prices	Output
						GG, FC		Smoothing	
C5	Other industrial goods	CH0	Manufacture of basic iron and steel	CH0		*NFC*	IPI		Output
						FC, GG	Smoothing		
		CM0	Other manufacturing, repair and installation	CM0		*NFC*		VAT	Output
						FC, GG, NPISH	Smoothing		
FZ	Construction	FZ1	Construction of buildings	GF41A	Development of building projects	*NFC, Households*	Smoothing		Composite indicator : price index for existing housing and new housing
				GF4BAT = GF41B+ GF43Z	Construction of residential (dwellings) and non-residential (NRP) buildings; specialised construction activities	*NFC, FC*	New buildings starts (housing and non residential) + maintenance and renovation (deflated by IPEA)		Index BT01
						GG	New buildings starts + maintenance and renovation (non residential buildings)		
						NPISH	Smoothing		Smoothing
						Households	New buildings starts + maintenance and renovation deflated by IPEA (housing)		Composite price indicator (ICC, IPEA)
		FZ2	Civil engineering	GF42Z	Civil engineering	*NFC, GG*		Total value of all public engineering work (FNTP)	TP01
JZ	Information-communication	JA0	Publishing, audiovisual, broadcasting activities	JA0		*NFC, FC, GG*		VAT	Smoothing
						Households	Smoothing		Smoothing
		JC0	IT and information services	GJ62Z	Computer programming, consultancy and related activities	*NFC, FC, GG*		VAT	Smoothing
LZ	Real estate activities	LZ1	Activities except renting	LZ1		*NFC, Households*	Smoothing		Composite indicator : price index for existing housing and new housing
						FC	Smoothing		Smoothing
MN	Business services	MA0	Legal and accounting activities, management consultancy activities, architectural activities…	GM69Z	Legal and accounting activities	*NFC, Households*	Tax revenue	Tax revenue	
						GG, NPISH	Smoothing		Smoothing
				GM71Z	Architectural and engineering activities; technical testing and analysis	*NFC, FC, GG, Households*		VAT	Smoothing
						NPISH	Smoothing		Smoothing
RU	Household services	RZ0	Arts, entertainment and recreation	RZ0		*NFC, GG*	Smoothing		Smoothing
		SZ0	Other service activities	SZ0		*NFC, FC, GG*	Smoothing		Smoothing

Source: quarterly national accounts.

3.2.9.2. Changes in inventories (P52) and acquisitions less disposals of valuables (P53)

Changes in inventories (P52) are assessed as the value of input in inventories minus the value of outputs and any losses. Inventories include all raw materials and supplies, covering all goods which businesses hold in stock with the intention of using them as intermediaries in their production processes. Inventory also covers all production currently in progress, i.e. all uncompleted output. This incomplete production forms part of a producer's inventory, and can take a huge number of forms: plants and livestock in the growth phase, unfinished buildings (with the exception of those constructed within the framework of advance sales contracts or for personal use, which are treated as fixed capital formation), other incomplete assets (for example, cargo ships or oil rigs); partially completed research conducted by legal advisors etc.

For the majority of goods and services, there is no direct measurement of changes in inventories.

For physical goods, changes in inventories are derived from the supply-use balance for each product, considered at the level of detail applied in the input-output table, for both volume and value figures (cf. section 1.1 of Chapter 3). It should be noted that, for products with a particularly long production process (e.g. aeronautical construction), production is assessed based on the current status of work in progress, while international deals are only recorded when the finished products are delivered. The result is a discrepancy between production statistics on the one hand and world trade figures on the other. The apparent changes in inventories for such products, as reflected in the supply-use balance, are more likely to be a result of this discrepancy than an actual variation in the levels of inventories. Generally speaking the changes in inventories for such products are levelled out by the corresponding balance of trade; this is particularly true of the category 'other transport equipment'.

For services, changes in inventories are less significant, and thus the corresponding annual accounts are smoothed to get quarterly figures.

One notable exception is the level of inventories for buildings (FZA). Sub-annual data are only available for housing stock, i.e. excluding non-residential buildings, yet these figures serve as the indicator for all construction. The resulting tool is a quarterly indicator of available housing stock, provided by the new home sales survey compiled by the SOeS. For these figures, the information provided allows to make a distinction between completed housing inventory and incomplete projects (estimated as the remaining balance once completed construction projects are subtracted from the total annual project figures). This is a useful distinction to make because, although completed construction projects are fully accounted for in the national accounts, projects in progress are recorded only at their percentage of completion. To isolate only the completed projects covered by the annual accounts, calibration on incomplete building inventory is performed. Thereafter, the volume indicator for changes in inventories is based on completed changes in inventories measured at the average price of a new home in the base year, also incorporating the completed portion of unfinished projects, derived from the initial calibration. Nonetheless, given the high degree of variability in the resulting figures, this process is used merely to refine an annual target which is then smoothed to give quarterly volumes. The overall quarterly volume figures for changes in inventories of buildings are thus obtained by smoothing, with an annual target estimated for the current year and, if necessary, adjusted using this indicator.

Acquisitions less disposals of valuables (P53) are often linked with changes in inventories. A specific code (P54) has been created to group together these two related operations.

'Valuables' are the non-financial goods which are not generally used for production or consumption purposes and which, in normal circumstances, do not (physically) deteriorate over time and which are primarily acquired and kept to serve as stores of value. This includes precious stones and metals, antiques and other works of art (e.g. paintings, sculptures, etc.) which are not counted in with final household consumption expenditure.

No sub-annual information is available for these sums which barely change from one year to another. Thus the quarterly accounts are calculated by smoothing the annual accounts.

3.2.10. Exports (P6) and imports (P7)

Foreign trade, which corresponds to the country's exports (P6) and imports (P7), is one field where the sources used to calculate value accounts are the same for both the quarterly accounts and the annual accounts; total trade of goods is calculated using the import and export statistics provided by the General Directorate for Customs and Indirect Taxes (DGDDI), while services are assessed using the current transactions column of the balance of payments (*Table 9*). Additional sources are used to estimate the annual volume and value of foreign trade for some services.

3.2.10.1. Foreign trade of goods

Overview

The General Directorate for Customs and Indirect Taxes issues information on the CIF values (costs, insurance and freight fees paid as far as the border) of imports and the FOB (free on board) values of exports. These data are subject to potential revisions for up to 36 months after their initial publication. These revisions are often a result of late declarations by businesses. This means that the values of the most recent trade flows are often underestimated in the customs surveys. In an effort to limit the scale of these revisions, a forecasting method has been developed: the final, definitive values of these trade flows is partly anticipated, based on the average rates of revision observed in recent exercises. More specifically, the modifications which are likely to be made to a given data series are estimated using an econometric model which evaluates the average revisions made in the past. After 16 months, the potential for meaningful revisions is considered to be negligible and the customs figures are no longer adjusted.

The customs data are also adjusted for the rate of non-response attributed to Intrastat's 'threshold effect'. Since this new data collection system was put in place in 1993, companies no longer have to declare their interactions with the European Union beneath a certain threshold value. In order to compensate for those non-responses, an adjustment is performed using a general coefficient calculated by the customs office. The coefficient is different for different sources of output, and takes into account the weight of intra-EU trade as a percentage of total world trade for the product in question. The coefficient was not updated between 1993 and 2000. Since 2001, the coefficient has been revised annually.

After these corrections, the resulting trade data are adjusted for working day variations and seasonal effects. The final value figures are obtained by calibrating and fitting these indicators. To transform the values into volumes, the value account series is deflated by the import-export prices published by the INSEE since 2005. As these series are too recent to allow for effective calibration, the monthly volume series are derived by directly deflating the values, without calibration, and fitting the results on the annual accounts. This process is specific to the foreign trade accounts, made necessary by the fact that the same initial price is used in both the quarterly and the annual accounts, as since 2005 the annual accounts have also used these price indices as exogenous factors, before arbitration. Before 2005 unit value indices (UVI) were used as price indicators, calculated by dividing values by the quantities recorded by the customs officials. The main drawback was that these figures thus integrated variations linked to increases in the quality of the products.

Changes to the value of foreign trade of goods, as derived from the quarterly accounts, may paint a different picture to that given by the customs authorities. For individual items, such discrepancies are generally a result of the specific processing methods described above (anticipation of revisions, adjustment for the threshold effect, different models of seasonal and working-day adjustment, calibration and fitting). But these differences may also be partly due to specific processes unique to certain products (for example coordinated manufacturing for 'other transport equipment', cf. above).

Exceptions for certain goods

- Agricultural products

Unlike other goods, there is no export-import price indicator for the products of agriculture (AZ1), forestry and fishing (AZB). Unit value indices (UVI) are thus still used beyond 2005 for these products.

- Extraction (BZ0)

The level of detail required by the input-output table involves three sub-items: coal and lignite (level 'GB05Z' in the annual accounts), petroleum products (GB06Z) including imported crude oil and gas, and other mining products (GB07Z to GB09Z). For imports of petroleum products, the customs department issues a volume indicator (quantity) which is then calibrated and fitted. As for exports, they are generally related to the re-exportation of imported gas.

- Electricity, gas, steam and air conditioning (DZ0)

This item concerns only electricity transactions, as there are no relevant trade flows concerning the distribution of gas. The volume accounts are calibrated using indicators provided by the energy observatory. They add up the gigawatt-hours of electricity traded with other countries.

- Water, sanitation, waste management and pollution treatments (EZ0)

For exports and imports in this division, a price indicator is derived by smoothing the annual data.

- Capital goods

Given the importance of the 'computer, electronic and optical products' item (CI0), particularly in terms of imports, various sub-items are identified in the annual accounts. Specific data are thus provided for circuit boards and components (GC26A), computers and external devices (GC26B), communication equipment (GC26C) and consumer electrical goods (GC26D). This level of detail is derived from the classification used in the old base system; it also allows to track the specific individual price changes for each item, strongly influenced by quality.

- Transport equipment

The customs data published on transport equipment (CL2), arms and ammunition (included in item CH0) and 'computer, electronic and optical products' (CI0) do not include military equipment. These data remain confidential, but are provided directly to the INSEE by the General Directorate for Customs. Military equipment is thus added to the raw figures for the aforementioned items.

For transport equipment (CL2), an adjustment is performed to exclude coordinated manufacturing by Airbus, where France collaborates with other European nations to produce aircraft. Coordinated manufacturing corresponds to the transportation of planes from one site to another for minor specific manufacturing operations. Until 2010 these flows of incomplete items were excluded from the customs statistics. For the purpose of harmonising EU data, since 2010 they have been included in these customs statistics. In order to stick to the principles of the ESA, however, the national accounts continue to use figures which do not include coordinated manufacturing, and the necessary adjustment is made using the monthly statistics published by the customs authorities.

- Chemicals (CE0)

The 'Chemicals' item (CE0) is also broken down into different sub-sections: on the one hand there are basic chemical products, nitrates and fertilisers, basic plastics and synthetic rubbers (level 'GC20A' in the annual accounts); on the other hand, all other chemical products are grouped together, including soaps, perfumes and cleaning products (items 'GC20B' and 'GC20C' in the classification used by the annual accounts). This distinction is carried over from the classification used in the previous base system.

- Other manufactured goods, installation and repairs (CM0)

The input-output table figures is generally divided into two sub-categories, primarily based on the data sources: furniture and other goods (items GC31Z and GC32Z in the annual accounts) are covered by customs statistics; foreign trade in repair services (GC33Z) is calculated based on the balance of payments.

3.2.10.2. Foreign trade in services

Overview

The Banque de France measures the balance of payments (BoP), publishing three successive monthly value indicators which become progressively more precise:

- the monthly publications used to issue the first quarterly accounts results (within 45 days of the end of the month in question);
- quarterly publications, issued approximately 80 days after the end of the quarter in question; these figures are integrated into the detailed results, published within 90 days;
- definitive annual publications, released in June of the following year; these final figures are fitted with the annual accounts and may lead to retrospective revision of the sub-annual data.

These indicators are adjusted for seasonal and working-day variation. However, the resulting data series remain highly volatile. In order to retain only that information which reflects the underlying trends, the calibration indicator is smoothed: this may be achieved using a centred moving monthly average of order thirteen, or else via Baxter-King filtering (smoothing which accords greater weight to the target quarter). In order to smooth these indicators, each time an indicator is integrated for a given month a forecast is made for the six following months. This moving average is applied both to the raw indicator and to the SA-WDA figures. The quarterly values derived from this operation are then deflated by the quarterly prices (calculated by smoothing the annual price data) and calibrated and fitted to give the corresponding volumes.

The level of detail in which exchanges of services are covered in the quarterly accounts is intended to satisfy the requirements of the input-output table (F48), as well as corresponding to the level of detail used for the monthly BoP data. This BoP information is provided via the economic and financial classification (NEF), and a conversion table is required in order to transpose the data into the activity and production classification format used in the national accounts. Accounts for which no suitable indicator is available are extrapolated and smoothed to obtain quarterly figures. Seasonal adjustment is sometimes performed at a more precise level than calibration. This is particularly true of indicators compiled from multiple sources and/or services which cover several of the codes used in the economic and financial classification (NEF).

Exceptions for specific services

- Publishing, audio-visual and broadcasting activities (JA0)

These activities are covered both by the customs figures (for the balance of books imported and exported, for example) and the balance of payments with regard to services traded.

- Financial services

Financial activities excluding FISIM (KZH) are partly covered by the balance of payments, and are thus divided into two sub-items: one covers the flow of exchanges between financial corporations (covered by the balance of payments) and is calculated by a process of calibration, the other focuses on collective investment schemes (not covered) and is calculated by smoothing. In both cases, the volume data is obtained by smoothing.

Figures for Financial Intermediation Services, Indirectly Measured (FISIM, KZS) are derived entirely from smoothing of the annual data, in value and in volume.

- Human healthcare

For human health activities (QA0), the annual account is compiled from a specific source: the CNAM accounts for international exchanges of social security expenditure. In the absence of a sub-annual indicator for this item, the quarterly accounts in value and in volume are obtained by smoothing the annual account figures.

- Arts, entertainment and recreation (RZ0)

This item covers foreign trade in artworks, for which information is contained in the customs indicators. In order to ensure that the quarterly output account, which plays a key role in the supply-use balance for each product, is not affected by the significant fluctuations in import and export flows, the customs indicator for value of trade is smoothed using a centred moving monthly average of order thirteen.

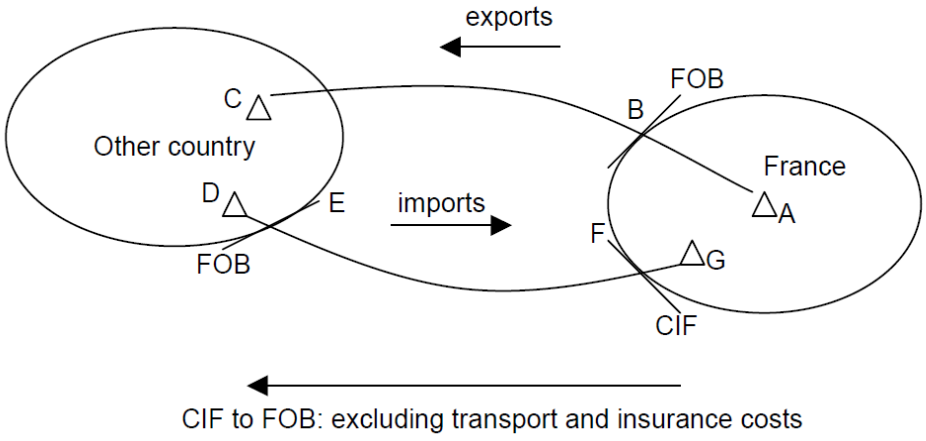
3.2.10.3. CIF / FOB correction and the balance of tourism

- CIF/FOB correction

In the customs statistics, the value of traded goods is measured as they cross the border. Imports are measured in CIF (cost, insurance and freight paid as far as the border - F in *Diagram 2* -), while exports are measured FOB (free on board: transport costs paid from the site of production in France up to the French border - section B).

However, the cost of insurance and freight associated with the import of goods is also counted in with service imports, specifically transport and insurance services. In order to avoid counting these costs twice, CIF imports of goods are adjusted accordingly. The conversion from CIF/FOB to FOB/FOB is made possible by an overall adjustment of import values: the aim here is to eliminate all fees connected with the transportation of goods from the borders of the exporting nation up to the French border (transit from E to F). This adjustment cannot be performed individually for each freight operation. As CIF/FOB is estimated jointly for all goods, trade figures for individual products remain in CIF/FOB format.

Diagram 2: CIF / FOB



Source: quarterly national accounts.

In practice, sub-annual data on the total sums engaged in freight and insurance services are not used. To calculate the corresponding CIF/FOB value adjustment for freight transfers, the assumption is that the cost of transporting goods is proportional to the total quantity of imported goods transported (goods, works and products transported), and can thus be determined with the help of a suitable coefficient. This coefficient is the CIF/FOB rate, derived from the multi-annual surveys led by the General Directorate for Customs, and used in the calculation of the annual accounts. This coefficient was increased from 3.0% to 3.2% in 2009, and has been stable in recent years. A calibration ratio is then applied in order to estimate the corresponding values. The price used is the import price for transportation and freight services, obtained by smoothing the annual accounts to find

the quarterly volumes. The process for the insurance account is slightly different, as the sums involved are much smaller: rate smoothing is performed on the insurance section of the CIF/FOB correction for volumes of imported goods. A value indicator is obtained by multiplying these volumes by the reference import price for insurance services, which allows to calculate value figures by calibrating and fitting using this indicator.

- The balance of tourism

Tourist services do not represent an individually identifiable activity or product; however the consumption by foreigners in France absorbs a portion of national output, and consumption by French nationals overseas represents a use of their gross disposable income.

This expenditure must thus be taken into account in the GDP calculations, and particularly in Frances's balance of trade. Consumption of tourist services concerns various products ('cafes, hotels and restaurants', most notably, but not exclusively) which are identified in the input-output table classification; however, within these items, it is not possible to isolate that expenditure which is specifically related to tourism. The best solution is therefore to perform an all-encompassing general adjustment, a 'territorial adjustment', the principles of which are as follows.

A 'territorial adjustment' line is added to the input-output table. For this pseudo-product, exports represent expenditure by foreign nationals in France. As this expenditure is included in territorial consumption, it is deducted from household consumption expenditure to obtain total consumption expenditure by residents. Tourism-related consumption expenditure within France is thus well accounted for in the GDP figures, but it is classed as 'export of tourist services'. Conversely, expenditures by French nationals overseas are subtracted from their disposable income, similarly as their final consumption expenditure. In order to fit these 'imports' into the 'territorial adjustment' line of the resources table, a virtual consumption of the same quantity is added to household consumption.

The expenditure and revenue which make up the balance of payments for travel are used as import-export indicators for foreign trade. As with other items in the balance of payments, which are partly extrapolated to generate the 'first results', these figures are often revised when the quarterly services survey is integrated to produce the 'detailed results'.

Table 9: Foreign trade indicators

A17		F48		Item of Calibrating		Indicator		
Code	Short title	Code	Short title	Code	Title (if different from "F48")	**Volume**	**Value**	**Price**
AZ	Agricultural goods	AZ1	Agriculture	AZ1			Customs	Indices on unit values (IUV)
		AZB	Forestry, fishing	AZB			Customs	IUV
DE	Energy, water, waste	BZ0	Mining and quarrying	GB05Z	Coal and lignite		Customs	Indices of production prices and import prices (IPPI)
				GB06Z	Crude petroleum and natural gas	Customs	Customs	
				GB0709 = GB07Z à GB09Z	Metal ores + other mining and quarrying		Customs	IPPI
		DZ0	Electricity, gas, steam and air conditioning			Energy Observatory	Customs	
		EZ0	Water, sewerage, waste and remediation	EZ0			Customs	Smoothing
C1	Food products	CA1	Foods	CA1			Customs	IPPI
		CA2	Beverages - tobacco	CA2			Customs	IPPI
C2	Coke and refined petroleum products	CD0	Coke and refined petroleum products	CD0			Customs	IPPI
C3	Machinery and equipment goods	CI0	Computer, electronic and optical products	GC26A	Electronic components and boards		Customs	IPPI
				GC26B	Computers and peripheral equipment		Customs	IPPI
				GC26C	Communication equipment		Customs	IPPI
				GC26D	Consumer electronics		Customs	IPPI
				GC26EFG = GC26E + GC26F + GC26G	Instruments and appliances for measuring, testing and navigation; watches and clocks + irradiation, electromedical and electrotherapeutic equipment + optical instruments and photographic equipment + magnetic and optical media		Customs	IPPI
		CJ0	Electrical equipments	CJ0			Customs	IPPI
		CK0	Machinery and equipment n.e.c.	CK0			Customs	IPPI
C4	Transport equipment	CL1	Motor vehicles	CL1			Customs	IPPI
		CL2	Other transport equipment	CL2			Customs	Smoothing
C5	Other industrial goods	CB0	Textiles, clothing, leather, footwear	CB0			Customs	IPPI
		CC0	Wood, paper, printing	CC0			Customs	IPPI
		CE0	Chemical products	GC20A	Basic chemicals, fertilisers and nitrogen compounds, plastics and synthetic rubber in primary forms		Customs	IPPI
				GC20BC	Soap and detergents, cleaning and polishing preparations, perfumes and other chemicals products & man-made fibres		Customs	IPPI
		CF0	Pharmaceutical products	CF0			Customs	IPPI
		CG0	Rubber and plastic products, other non-metallic mineral products	CG0			Customs	IPPI
		CH0	Basic metals, fabricated metal products	CH0			Customs	IPPI
		CM0	Other manufacturing, repair - installation	GC31Z32Z	Furniture + jewellery, bijouterie & related articles & musical instruments + medical and dental instruments and supplies + sports goods, games & toys and other manufactoring		Customs	IPPI
				GC33Z	Repair and installation of machinery and equipment		Balance of Payments (BoP)	Smoothing
GZ	Trade	GZ2	Wholesale trade	GZ2			BoP	Smoothing

HZ	Transportation	HZA	Transportation	HZA			BoP	Smoothing
		HZ5	Postal and courier activities	HZ5			BoP	Smoothing
JZ	Information - communication	JA0	Publishing, audiovisual and broadcasting activities	JA0			Customs + BoP	Smoothing
		JB0	Telecommunications	JB0			BoP	Smoothing
		JC0	Computer and service activities	JC0			BoP	Smoothing
KZ	Financial services	KZH	Financial services excluding FISIM	GK64HA	Financial companies	Smoothing	BoP	
				GK64HB	UCITS	Smoothing	Smoothing	
		KZS	FISIM	KZS		Smoothing	Smoothing	
		KZA	Insurance services	KZA			BoP	Smoothing
MN	Business services	MA0	Legal, accounting, architectural activities…	MA0			BoP	Smoothing
		MB0	Scientific research and development	MB0			BoP	Smoothing
		MC0	Other professional scientific activities	MC0			BoP	Smoothing
		NZ0	Administrative and support service activities	NZ0			BoP	Smoothing
OQ	Non tradable services	QA0	Human health	QA0		Smoothing	Smoothing	
RU	Household services	RZ0	Arts, entertainment and recreation	RZ0			Customs	Smoothing
		SZ0	Other service activities	SZ0			BoP	Smoothing

Source: quarterly national accounts.

Appendix 10: Classification of operations in the input-output table

	Supply						
Products	Production	Imports	Trade margins	Transport margins	Taxes on products	Subsidies on products	Total of products supplies
Goods	P1_DG	P7_DB+ P7_PCIFOB	TDM_DG	TSM_DG	D21_DG	D31_DG	RESS_DG+ RESS_PCIFOB
Services	P1_DS	P7_DS	TDM_DS	TSM_DS	D21_DS	D31_DS	RESS_DS
Territorial correction		P7_PCHTR					RESS_PCHTR
Total	P1_D	P7_D	0	0	D21_D	D31_D	RESS_D

	Intermediate consumption			**Final uses**					**Total**
				Consumption expenditure			Gross fixed capital formation	Inventories and valuables	Exports	
Branch / Products	Industry +agriculture	Services	Total	Households'	GG	NPISH	(I) = S for the NFCs B for the FCs M for the households G for the GG P for the NPISH			
Goods	P2DB_DG	P2DS_DG	P2_DG	P3M_DG	P3G_DG		P51(I)_DG	P54_DG	P6_DG	USE_DG= RES_DG+ RES_PCAFAB
Services	P2DB_DS	P2DS_DS	P2_DS	P3M_DS	P3G_DS	P3P_DS	P51(I)_DS	P54_DS	P6_DS	USE_DS= RES_DS
Territorial correction				P3M_PCHTR					P6_PCHTR	EMP_PCHTR= RES_PCHTR
Total	P2E_DG	P2E_DS	P2_D= P2E_D	P3M_D	P3G_D	P3P_D	P51(M)_D	P54_D	P6_D	EMP_D= RES_D
Value added	B1_DG	B1_DS	B1_D							
Branch production	P1E_DG	P1E_DS	P1E_D							
Transfers	TR_DG	TR_DS	0							

Source: quarterly national accounts.

Appendix 11: Switch from the 16-item composite classification to the 'A17' aggregated classification of 2008

NES 16 (horizontal rows) / A17 (columns)		AZ	C1	C2	C3	C4	C5	DE	FZ	GZ	HZ	IZ	JZ	KZ	LZ	MN	OQ	RU	
		Agricultural goods	Food products	Coke and reined petroeum products	Equipment goods	Transport equipments	Other industrial goods	Energy, water, waste	Construction	Trade	Transportation	Accommodation-food services	Information-communication	Financial services	Real estate activities	Business services	Non tradable services	Household services	All sectors
EA	Agriculture	241	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	246
EB	Agricultural and Food industries	0	368	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	372
EC	Consumer goods industry	0	0	0	14	12	287	0	0	0	0	0	45	0	0	0	0	1	359
ED	Motor vehicles	0	0	0	11	265	0	0	0	0	0	0	0	0	0	0	0	0	276
EE	Equipment goods	0	0	0	203	153	154	0	9	0	0	0	1	0	0	0	0	2	521
EF	Intermediate products	0	0	0	84	10	710	38	2	0	0	0	0	0	0	0	0	0	844
EG	Energy	0	0	153	0	0	13	232	0	0	0	0	0	0	0	0	0	0	399
EH	Construction	0	0	0	0	0	0	1	721	0	0	0	0	0	0	1	0	0	722
EJ	Trade	0	0	0	0	0	0	0	0	949	0	0	0	0	0	0	0	5	955
EK	Transports	0	0	0	0	0	0	0	0	0	435	0	0	0	0	24	0	0	459
EL	Financial services	0	0	0	0	0	0	0	0	0	0	0	0	521	0	0	0	0	521
EM	Real estate activities	0	0	0	0	0	0	0	50	0	0	0	0	3	796	7	0	0	856
EN	Business services	0	0	0	0	0	1	48	0	1	38	0	363	0	0	1 081	1	11	1 543
EP	Individuals services	0	0	0	0	0	0	0	0	0	0	238	79	0	0	2	2	197	518
EQ	Éduc. human health, social action	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	866	0	873
ER	Administration	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	506	31	536
	All sectors	**241**	**373**	**153**	**312**	**439**	**1 171**	**319**	**781**	**949**	**473**	**238**	**487**	**524**	**796**	**1 121**	**1 374**	**247**	**10 000**

Source: national accounts.

The table above represents the conversion matrix, for output figures, which allows to convert statistics from the 16-item composite economic classification (NES) (used in the 1995 and 2000 bases) to the system used in the

more recent reference formats: the 17-item aggregated classification (NA). The lines indicate how the output of the old NES items is distributed between the slightly different items found in this new aggregated classification. Conversely, the columns indicate the contents of the A17 and NA2008 items in terms of output with reference to the 16-item NES system. To make this table easier to read, total output is set at a fixed value of 10,000; individual amounts for each item are expressed as a proportion of this overall total.

Applying this conversion matrix to the product-by-product output figures of the 2000 base account does not allow to calculate the corresponding A17 figures for a given year. This is partly due to methodological changes which have resulted in changes to the product definitions used in the new base, and partly due to the fact that NA2008 is constructed with a much greater level of detail.

Key: on the 4th line, for the figure 276 assigned to motor vehicle production (ED) in NES 16: 265 falls under item C4 ‘transport equipment’ in NA 2008; 11 go to item C3 ‘machinery and equipment’. In the 4th column, the figure of 312 assigned to machinery and equipment output in the new classification (item C3) is an aggregation of four distinct items from NES 16: EC for consumption of goods (14); ED for motor vehicle production (11); EE for equipment (203) and EF for intermediate products (84).