The quarterly national accounts switch to the 2005 base.

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On 13 May 2011, when the first results for Q1 2011 were published, the national accounts changed base: they switched to the '2005 base'. The key innovation in this base change is a change of classification of products and activities in order to accompany developments in the economic fabric. The national accounts classification is now consistent with the new Classification of Economic Activities in the European Community, thereby facilitating international comparisons. The general methodology for drawing up the quarterly accounts has not changed: the principles are identical to those of the '2000 base', and little in the way of new indicators has been introduced.

Aside from all the modifications linked to the change of classification, the description of business cycle since the Second World War has remained globally unchanged. This is particularly the case of the three recessions and the ensuing rebound phases. The revisions of GDP and of the main aggregates of demand (consumption, investment, foreign trade, etc.) are fairly minor given the variability of the series. The same can be said of the main accounts and ratios of the economic agents.

The business cycle is still characterised by the predominant share of corporate demand, a share which is much larger than its weight in the economy would suggest. While they only represent an average of 10% of activity, corporate investment and, above all, inventory changes account for around two-thirds of cyclical fluctuations in activity. The scale of the contribution of inventory changes is equivalent to that measured in the United States. The weights of the various components in cyclical fluctuations of GDP in its 'income' approach (compensation, gross operating profit...) are close to the respective weights in level.

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The national accounts change base...

The national accounts changed base on 13 May 2011, when the first results for Q1 2011 were published. After the '95 base' and the '2000 base', they switched to the '2005 base'. A change of base involves reworking all the concepts, classifications and methods that form the basis of the national accounts, so that these accounts can continue to reflect economic reality as best possible. It is also an opportunity to change the reference year: the quarterly national accounts are now calculated and published in volumes at the previous year's prices, chain-linked to the year 2005.

... without any major conceptual modification

This new change of base does not involve any major conceptual modification: as with the 95 and 2000 bases, the reference accounting system is still the European System of Accounts of 1995 (ESA 95), which is the European version of the French system national of accounts of 1993 (SNA 93) and which is covered by a European regulation and thus applies to all European Union member states. However, the switch to the 2005 base brings with it a change of classification of products and activities. Additionally, numerous methodological improvements affecting the measurement of annual economic aggregates have been introduced. For example, the long-run evaluation of rents has been revised. All the methodological modifications made to the annual accounts are described in a report in the Économie française (*see Broin et al*).

As the quarterly national accounts are by definition consistent with the annual accounts, they integrate all these modifications. But the switch to the 2005 base was also an opportunity to make changes that were specific to the infra-annual evaluation. This report gives a summary of all these changes in the general methodology for drawing up the quarterly national accounts. It then presents the results obtained compared to the previous base, supplying revision indicators to judge their quality. Lastly, it offers a working framework to characterise the French economic cycle, giving a few international comparison points.

A new classification

Like all the European countries, France is adopting a new classification...

The main innovation in the switch to the 2005 base is a change of classification of products and activities. This is part of a regulatory framework: in 2011 the countries of the European Union have to adopt the new European Classification of Economic Activities (NACE), version 2008. On this occasion most countries are revising the evaluations featuring in their accounts. In each country, the national accounts are logically the last big statistical operation to incorporate this change of classification, after all the statistical indicators that they involve.

With the 2000 base, the national accounts were published according to the French composite economic classification (NES). At a more detailed level, the NES was associated with the French classification of activities (NAF), derived from the European classification NACE.[1] But at the level of intermediate aggregations, NES and NAF did not coincide. In the publication of the accounts, this did not facilitate the comparison of French aggregates with the same aggregates of other countries.

... which is compatible with the European classification

This drawback has disappeared with the change of base. In the 2005 base, the new aggregate classification of 2008 (NA 2008) replaces the NES. The published classification is compatible with the NAF and NACE classifications in their se-

(1)) The classifications of economic activities (NAF and NACE) are conventionally mentioned. But the national accounts actually use product classifications which correspond to them at a more detailed level: classification of French products (CPF) and European classification of products by activity (CPA).

cond, revised version (NAF rev. 2 and NACE rev. 2), including at the levels of intermediate aggregations. International comparisons are thus easier to make.

A publication level detailing the economic fabric in 17 items

More specifically, the new classification includes several levels of aggregation denoted 'Axx' where xx represents the number of items in the level:

- A10: most aggregated international level;
- A17: publication level of the French quarterly accounts, intermediate between levels A10 and A38;
- A21: 'sections', standard international level in the NAF/NACE rev. 2 tree structure;
- A38: international level, intermediate between sections and divisions;
- A66: European level, intermediate between levels A38 and divisions (A 88);
- A88: 'divisions', publication level of the French annual accounts and standard international level of the NAF/NACE rev. 2 tree structure.

The 2000 base accounts were published in 16 items. The most natural international level for dissemination of the French quarterly accounts in the new classification was therefore the intermediate grouping of 21 sections known as 'A21'. However, this level turned out to be unsuitable for the quarterly accounts as it was too detailed in the services field and not detailed enough in the manufacturing industry field.

An alternative aggregation in 17 groupings ('A17'), inserted between international levels A10 and A38, was therefore built. It details the manufacturing industry in five items instead of just one and, conversely, groups together certain service activities for which the statistical data were less abundant and more fragile (*see Box 1*).

Box 1 - The quarterly accounts classification

With the 2005 base the quarterly accounts are published at aggregation level 'A17' of the aggregated classification of 2008 (NA 2008, associated with NAF rev. 2), broken down into 17 sectors/products. The working level of the quarterly accounts is A38 for the resource-use balances and A17 for the labour, working time and generation of income accounts. But depending on the domain and economic and statistical relevance, the accounts are sometimes drawn up at a finer level.

Table A describes aggregation level 'A17', the official headings and the abbreviated headings that correspond to them. These latter are necessary to be able to present certain composite tables legibly in the INSEE publications. However, these headings are often simplistic and cannot replace the official headings of the classification.

As regards the French composite economic classification (NES) and the breakdown of the 2000 base into 16 items, level A17 reinforces the importance granted to services. The classification now distinguishes an accommodation and catering item (IZ) and an information and communication item (JZ). Non-tradable services are mainly grouped together in the 'general government, teaching...' item (OQ). Item RU, which groups together services mainly destined for households, also includes certain non-tradablet services, even though it is globally considered as market in nature.

The outline and the breakdown of the manufacturing industry are different from the 2000 base. This sector now incorporates the refinery and agrifood industries; conversely, publishing product is now considered as a service. The intermediate goods sector is no longer isolated, as the new approach now prefers a logic of industrial sectors (wood, metals, etc.). The outline of the 'energy, water, waste' item (DE) differs from the 'energy' item in the former base: it excludes refinery, now incorporated into the manufacturing industry, and includes waste treatment, formerly classified in services and intermediate goods. The outlines of the 'agriculture' (AZ), 'construction' (FZ), 'trade' (GZ), 'transport' (HZ), 'financial and insurance activities' (KZ) and 'real-estate activities' (LZ) items are similar to those used in the 2000 base.

As with the previous base, a grouping into five main aggregated sectors is also used, for both products and sectors: it distinguishes agriculture, industry (including energy), construction, (mainly) tradable services and (mainly) non-market services. The manufacturing industry includes all the industry items excluding energy. With regard to sectors, the 'non-agricultural market' aggregate excludes the agricultural sector and non-tradable services. Its outline is similar to the (EB-EP) field in the 2000 base, often used as a reference for short-term analysis. ■

Table A

NA 2008 classification, aggregation 'A17', official and abbreviated headings, aggregations

Code (A17)	Sections (A21)	Code (A38)	Official heading	Abbreviated heading (products)	Aggregates		
AZ	A	AZ	Agriculture, forestry and fishing	Agricultural goods	Agriculture		
DE	B,D,E	BZ, DZ, EZ	Mining, Energy and water supply, sewerage, waste management	Energy, Water and Waste	Energy	Industrial Goodss	Goods
C1	C	CA	Manufacture of food products, beverages and tobacco productss	Food products	Manufactured goods		
C2		CD	Manufacture of coke and refined petroleum products	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	Households' services	Tradable services		

Source: INSEE

The '2005 base' quarterly accounts: no change to the general methodology

The main principles for drawing up the quarterly accounts are unchanged

For drawing up the quarterly accounts since 1980, all existing tools were transcribed in the new classification, adjusted to the re-estimated annual accounts, with infra-annual indicators switching to the new classification. The general principles are identical to those of the previous base (*see Appendix 1*).

- As with the 2000 base, the quarterly accounts are calculated using an econometric technique called 'calibrating-fitting', which interpolates and extrapolates the annual data using monthly or quarterly indicators. The principles for building the input-output table (IOT) are unchanged: activity is evaluated via output in industry (since the supply and use tables are balanced on inventory changes) and via demand (consumption, investment, foreign trade...) in services (since the resource-use balances are balanced on output);
- The principles for building the integrated economic accounts are also unchanged: value-added by economic sector is shared between the different institutional sectors (enterprises, general government, households...); the sequence of accounts by institutional sector is then calculated (generation of income account, revenue account, capital account);
- The main indicators remain the same, but new indicators have been introduced (*see Appendix 2*). For example, consumption expenditure on technological goods is now tracked by a monthly indicator supplied by a panellist (GfK);
- As with the 2000 base, the published accounts are corrected for seasonal variations and calendar effects (TDA-SA).

This methodology requires a substantial time lag. It is implemented with the 2005 base starting from Q1 1980. All the accounts estimated since that date and up to the last known quarter were published on 13 May 2011 (except for the data on working time).

Retropolated series prior to 1980 available from end June 2011

Data from the quarterly accounts retropolated using a different methodology from 1949 to 1979

Additionally, as with the 2000 base, the change of base has led to a 'retropolation' of the quarterly accounts prior to 1980, that is, an adaptation of the historical series to the new levels and the new classification. The annual accounts are already available for the period 1949-2010. The corresponding long series of the quarterly accounts from 1949 to 1979 will be disseminated in their full version when the detailed results of Q1 2011 are published, on 29 June 2011.

The methodology related to this exercise is simpler than that for estimating the quarterly accounts in current production, in that:

- the working level is directly that of the publication;
- it is not necessary to extrapolate as-yet unknown data;
- the indicators used are the accounts of previous bases, switched to the new classification.

However, all the general principles for building the quarterly accounts are respected (consistency with annual data, TDA-SA data), in such a way that the series are homogenous before and after 1980.

The change of base does not modify the description of economic cycles

Revisions to the previous base are small in scale...

A graphic comparison of the fluctuations in GDP growth and the various elements of demand shows that the revisions are quite minor. Leaving aside all the methodological modifications and those relating to the change in classification, the description of economic cycles since the postwar years is globally unchanged (*see Graphs 1 to 4*). This is especially the case of recession phases (from Q4 1974 to Q2 1975, Q2 1992 to Q1 1993, Q2 2008 to Q1 2009) and of the ensuing rebounds. Although the revisions are slightly larger over the last three years, this has less to do with the base change than the usual process of revision of the annual accounts which occurs once a year (for this year, integration of the definitive 2008, semi-definitive 2009, and provisional 2010 accounts).

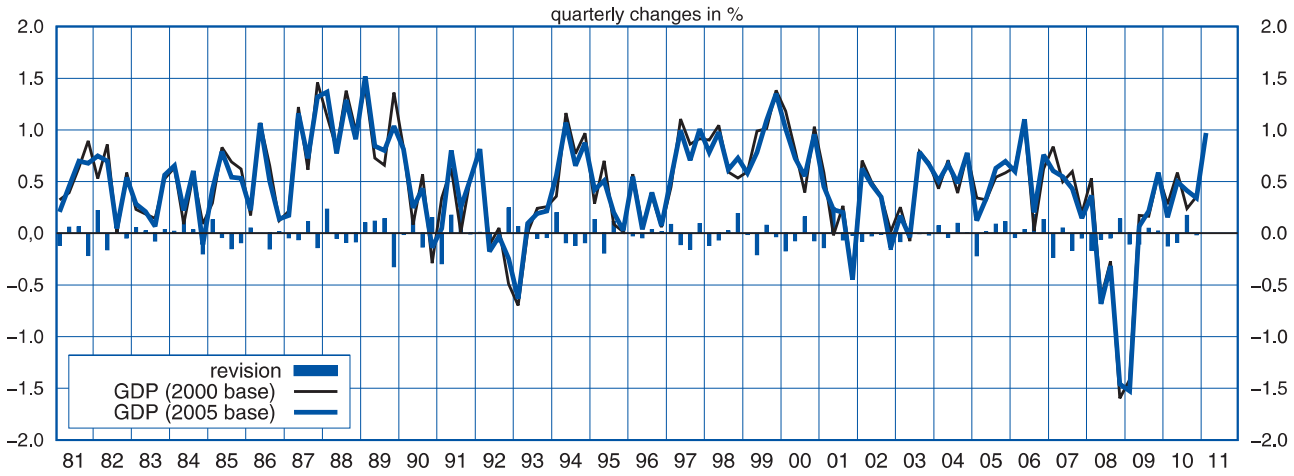
While this closeness between the estimates of the two bases is desirable when no major conceptual change takes place, it is not a foregone conclusion. Indeed, a base change is a highly complex statistical operation with aggregate-level results that are difficult to control, since it is conducted at a very fine level of detail. This is why as well as a graphic analysis of the series, it is useful to elaborate a quantified analysis to summarise the scale of the revisions of the major macroeconomic aggregates. This approach is a way of assessing the overall quality of the statistical operation conducted.

... as illustrated by the calculation of a revision indicator

To judge the closeness between the different bases, a 'revision indicator' is calculated, defined by the standard deviation of revisions of the quarterly trends of a given aggregate. For example, between the 2000 base and the 2005 base, the standard deviation of revisions of quarterly GDP growth in volume is 0.12 point over the period 1980-2010 (*see Table 1, second-last column*). In absolute value, 57% of quarters have a growth revision of less than 0.1 point; 33% have a revision of between 0.1 and 0.2 point; and lastly, for 10% of quarters (12 quarters), the absolute revision is higher than 0.2 point.

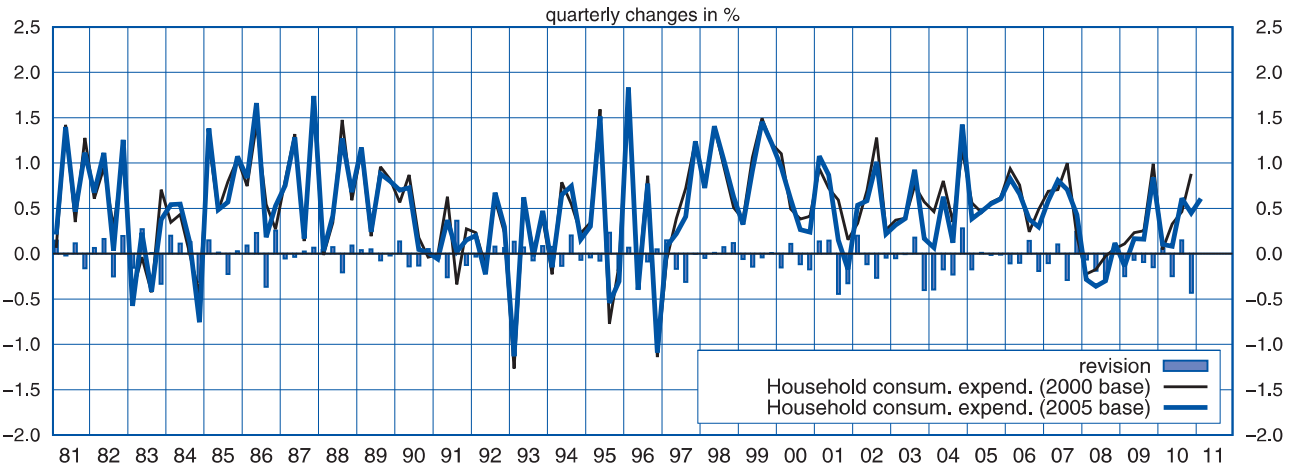
The quarterly national accounts switch to the 2005 base.

1 - Quarterly GDP growth, to the 2000 base from the 2005 base (chain-linked volumes)



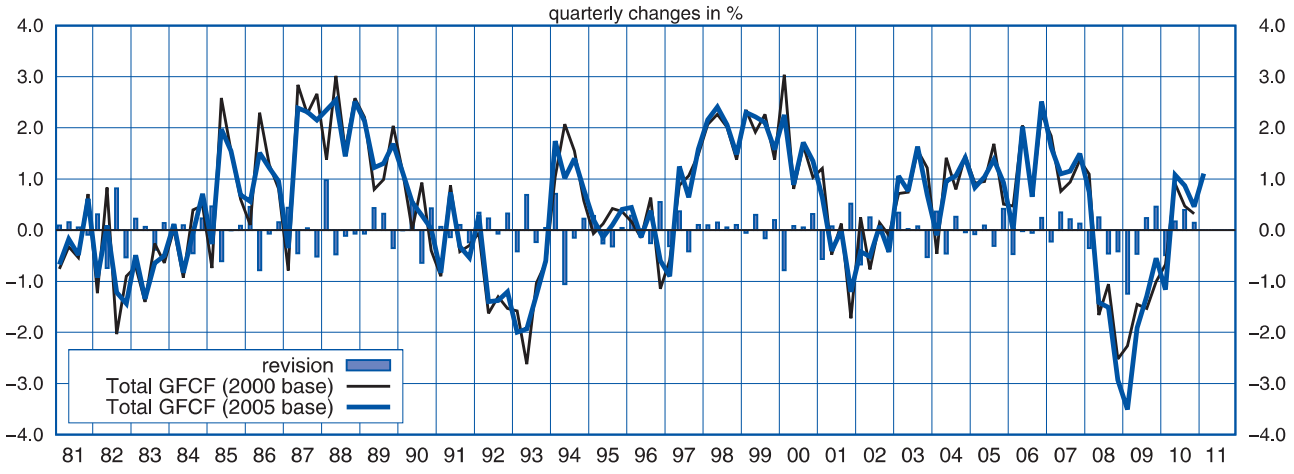
Sources: INSEE, quarterly national accounts

2 - Quarterly household consumption expenditure growth, to the 2000 base from the 2005 base (chain-linked volumes)



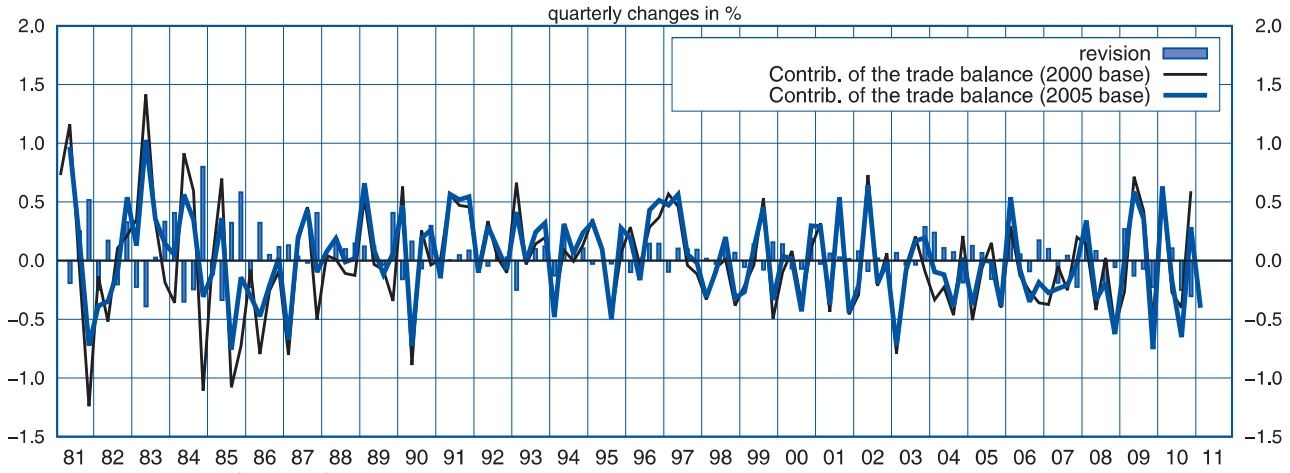
Sources: INSEE, quarterly national accounts

3 - Quarterly GFCF growth (all institutional sectors), to the 2000 base from the 2005 base (chain-linked volumes)



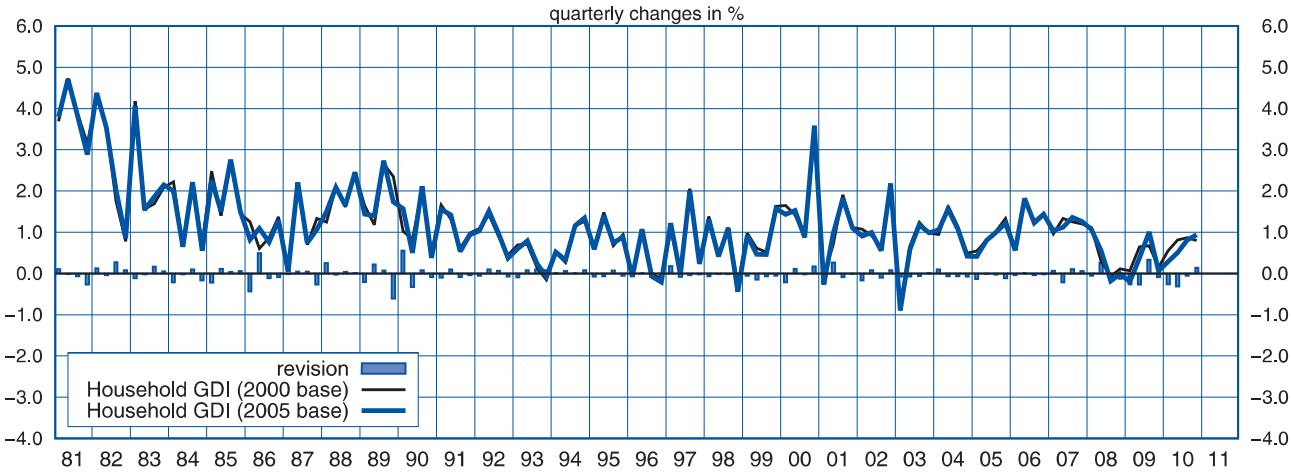
Sources: INSEE, quarterly national accounts

4 - Contribution of the trade balance to the growth, to the 2000 base from the 2005 base (chain-linked volumes)



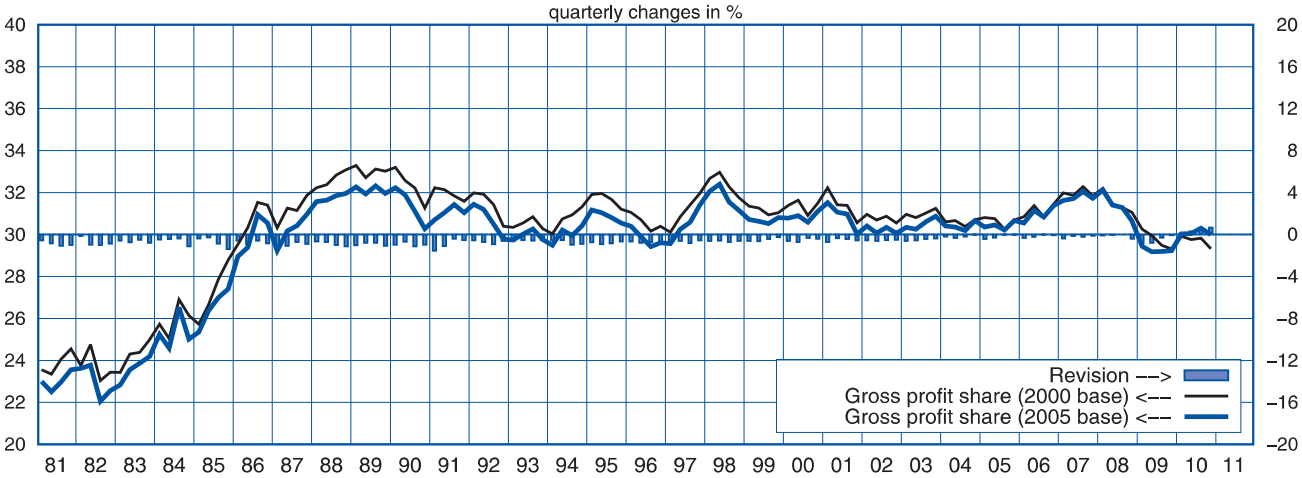
Sources: INSEE, quarterly national accounts

5 - Gross disposable income of households, to the 2000 base from the 2005 base (values)



Sources: INSEE, quarterly national accounts

6 - The margin rate of non-financial enterprise, to the 2000 base from the 2005 base



Sources: INSEE, quarterly national accounts

The standard deviation of revisions also gains from being plotted against the intrinsic variability of the aggregates under consideration. For example, over the period 1980-2010, the revisions of quarterly GDP growth caused by the base change are, on average, four times smaller than the quarterly variations in growth: the 'relative indicator' is 25% (*see Table 1, last column*).

Revisions are smaller than in previous base changes...

In the light of these indicators, the revision induced by the switch to the 2005 base seems relatively minor: the two previous base changes (to the 95 base and to the 2000 base) revised the accounts more substantially.(2) The switch to the 2005 base brought about revisions of an equivalent scale to that usually observed when the quarterly accounts incorporate the new annual accounts of the last three years *(see Box 2)*.

Prior to 1980, the GDP growth revision indicator is higher (0.34 point), but this is the result of a higher growth rate and higher variability. Over the period 1949-1979 (for which estimations are retropolated using a simplified methodology, see below), the relative revision indicator is comparable to that over the period 1980-2010 (29%, *see Table 2, first line*).

... for GDP and the main demand items

For the (consumption, investment, foreign trade, etc.), similar results can be found to those obtained on GDP when the relative revision indicators are preferred, as they plot the scale of the revisions against the intrinsic variability of the aggregates under consideration (*see Table 2, last column*).

For consumption expenditure, the revisions are relatively higher since 1980: this can be explained by the introduction of new business cycle indicators which were not available in the previous bases *(see Appendix 2)*. The biggest revisions relate to corporate investment, but the resultant profile is now somewhat better from the standpoint of economic analysis as it is less irregular in the 1980s. This can be explained by modifications to TDA-SA models in certain series at a disaggregated level *(see Graph 3)*. Lastly, the revisions of the contribution of inventory changes to growth are also relatively large over the two periods 1949-1979 and 1980-2010. This is explained among other things by the method for building the quarterly national accounts: without any available information, inventory

(2) The switch to the 2000 base (in 2005) brought with it a few conceptual modifications without any change in classification; the switch to the 1995 base (in 1999) included conceptual changes, a change of classification, and methodological modifications with the first implementation of corrections for calendar effects.

Table 1

GDP growth revision indicators (volumes at constant prices) from one base to the next

	Years (1)		Periods	Standard deviation of revision in % (2)	Standard deviation of GDP growth in %
	former base	new base			
Base changes					
80 base -> 1995 base (3)	PR 98Q4	PR 99Q2	1978Q1 - 1998Q4	0.44	64
95 base -> 2000 base	RD 04Q4	RD 05Q1	1978Q1 - 2004Q4	0.15	31
2000 base ->2005 base	RD 10Q4	PR 11Q1	1980Q1 - 2010Q4	0.12	25
Annual campaigns (4)					
Average previous campaigns				0.09	20
Campaign 2007	RD 06Q4	PR 07Q1	1978Q1-2006Q4	0.13	29
Campaign2008	RD 07Q4	PR 08Q1	1978Q1-2007Q4	0.10	22
Campaign2009	RD 08Q4	PR 09Q1	1978Q1-2008Q4	0.09	18
Campaign 2010	RD 09Q4	PR 10Q1	1978Q1-2009Q4	0.05	10

(1) Each publication corresponds to a 'year'; PR for first results; RD for detailed results; the quarter corresponds to the last quarter published.
(2) To be able to compare with the previous bases, the growths in volumes are at constant prices (differing slightly from the calculations on volumes at chain-linked prices in the following tables).
3) As the 80 base was not corrected for calendar effects, these are revisions between the accounts in non-CJO data.
(4) Each year the annual campaigns of year 'N' lead to integration of the revised annual accounts of years 'N-3', 'N-2' and 'N-1'.
Sources: INSEE, quarterly national accounts

Box 2 - Revisions of the quarterly national accounts

As well as base changes, the quarterly national accounts are revised at each publication.

From one publication of the quarterly national accounts to the next

There are two phases for any given quarter:

- The first, called 'first results', is published less than 45 days after the end of the quarter. It gives a first estimate of quarterly GDP growth as well as operations on goods and services (foreign trade, production, consumption, gross fixed capital formation, inventory changes).
- The second, the 'detailed results', is published less than 90 days after the end of the quarter. It updates the first estimate of quarterly GDP growth and operations on goods and services. It also provides a first estimate of the household and corporate accounts.

The estimation method is the same for the 'first results' and the 'detailed results'. Only the number of indicators extrapolated and the number of series published differ between the two estimates. In particular, between the two publications, the last month of turnover indices and the last two months of sickness insurance data (dates of care) are available. The missing indicators are usually extrapolated using statistical processes (of the 'Arima' type).

With each publication, the quarterly accounts can be revised thanks to:

- the replacement of extrapolations by indicators that were initially unavailable;
- revisions of unadjusted indicators in the last quarter or previous quarters;
- revisions of corrections for seasonal variations;
- once a year, in May, revisions of the annual accounts and the re-estimation of the TSA-SA models and the ensuing calibration;
- every five years approximately, base changes.

Integration of the annual accounts

As a general rule, while the quarterly profile of series can be modified from their origin, the annual aggregations of their raw data are not, because they are adjusted to the annual accounts until the last provisional account published. Once a year, the definitive (year N-3), semi-definitive (year N-2) and provisional (year N-1) accounts are published in May of year N, and they revise the annual estimates of the macroeconomic aggregates. The quarterly accounts incorporate these data from the new annual accounts campaign when the 'first results' of Q1 of year N are published.

The revisions of the annual accounts over year N-1 come from three sources, mainly:

1) re-estimation of the TDA-SA models;

2) re-estimation of calibration relations, owing to the integration of the definitive and semi-definitive accounts of the campaign underway (i.e. the definitive 2008 and semi-definitive 2009 accounts at the moment). This modifies the dynamic of the macroeconomic aggregates at the period end;

3) adjustment to certain annual data, known for the first time or more precisely determined: most notably the general government, financial enterprises and agriculture accounts, and certain final consumption of households items.

Base changes

Additionally, the national accounts regularly change base year. After the '95 base' and the '2000 base', the national accounts switched to the '2005 base' on 13 May 2011. This results in an extensive revision of the macroeconomic aggregates previously published, both in recent years and over the published period as a whole (retropolation exercise). Any base change results in the rebuilding of all the quarterly accounts.

Substantial changes are thus added to the more usual revisions of the definitive and semi-definitive accounts.

Data on past revisions

Between 1999 and 2010, the absolute mean deviation is 0.05 point between the first estimate of quarterly GDP growth (published in the 'first results') and the second (published in the 'detailed results').

The absolute mean revision of quarterly GDP growth between the initial estimate and the one published one year later is 0.16 point (calculation made over the period 1991-2010). The absolute mean revision is 0.21 point after two years and 0.25 point after three years. ■

changes balance the goods resource-use balance *(see Appendix 1)*, to the extent that the revisions to inventory tend to accumulate the revisions of all the other supply and demand items.

With regard to the main aggregates of the accounts of economic agents, the cyclical history barely changes in the new quarterly accounts. This is the case of household disposable income (*see Graph 5*) and of the margin rate of non-financial enterprises (*see Graph 6*). For this latter item, the levels are slightly different from the previous base due to the revisions of the annual accounts, but the quarter-to-quarter fluctuations are close from one base to the other. Generally speaking, the main aggregates of the household account and that of non-financial enterprises also seem to be little-revised (*see Table 3*). As with inventory changes in the demand approach, the revision of the gross operating surplus of financial enterprises is, however, relatively a little larger than that of the other operations, because it is not directly observed but estimated by balance.

Characterising the economic cycle: the weight of corporate demand

The switch to the 2005 base has led to revisions that are moderate in scale: it therefore does not modify the reading of business cycles in the past - fortunately. But what can be learned from this reading?

Consumption carries the most weight in GDP...

In level, the weights of the various components of domestic demand are relatively stable over the long term: household consumption expenditure represents

Table 2
Indicators of GDP growth revision (chain-linked volumes)and of its main components in the demand approach

in%

	1949QT1 - 1979Q4		1980Q1 - 2010Q4	
	Standard deviation-revision	Revision standard deviation / standard deviation aggregate growtht	Standard deviation-revision	Revision standard deviation / standard deviation aggregate growth
GDP	0.34	29	0.12	25
Household consum. expend	0.22	25	0.17	31
GFCF of enterprises	0.16	5	0.73	46
GFCF of gen. govt.	0.17	6	0.59	30
GFCFG of households	0.09	3	0.16	13
Exports	0.67	18	0.38	19
Imports	0.91	25	0.48	25
Contribution of final domestic demand (excluding inventory))	0.13	15	0.3	28
Contribution of inventory change	0.33	45	0.20	45
Contribution of the trade balance	0.13	27	0.15	36

How to read it: over the period 1949-1979, the standard deviation of the GDP growth revision in chain-linked volumes is 0.34%, that is, 29% of the standard deviation of GDP growth.
Sources: INSEE, quarterly national accounts

Table 3
Indicators of GDP in value revision and main components in the 'income' approach

in%

	1949Q1 - 1979Q4		1980Q1 - 2010Q4	
	Standard deviation-revision	Revision standard deviation / standard deviation aggregate growtht	Standard deviation-revision	Revision standard deviation / standard deviation aggregate growth
GDP in value	0.29	17	0.21	23
Total value-added	0.32	20	0.23	25
Value-added on non-financial enterprises (SNF)	0.86	31	0.40	34
Gross operating surplus of SNF	3.22	37	1.42	47
Gross disposable income of households	0.36	25	0.16	15

How to read it: over the period 1949-1979, the standard deviation of the GDP growth revision in chain-linked volumes is 0.29%, that is, 17% of the standard deviation of GDP growth.
Sources: INSEE, quarterly national accounts

around 55% of GDP, general government consumption expenditure a little over 20% and investment 20%, half of which comes from non-financial enterprises *(see Table 4)*. This stability means that in the long term, GDP grows at roughly the same rate as consumption and investment. However, the weight of foreign trade has increased considerably over time. Exports and imports have grown by 4.5% per year on average since 1974, against 2.0% per year for GDP.

... but it is corporate demand that weighs heaviest in its quarterly fluctuations

However, the relative weight of the different elements of demand is modified when we no longer focus on long-term growth but on the economic cycle, that is, the way GDP fluctuates around its trend (*see Appendix 3*). Indeed, while corporate demand (investment and inventory changes) accounts for around 10% of GDP, the fluctuations in this demand account for two-thirds of the variability of growth (including around 40% for stocking-up behaviour alone). Conversely, while household consumption expenditure represents an average of 56% of GDP over the period 1950-1973, then 58% since the first oil shock, it contributes only half as much to the variability of growth (23% of the variance in GDP growth rate for the first period, 32% for the second). General government demand is very little-correlated to the economic cycle. Last, the contribution of exports to the cycle is also very significant, but is more than offset by that of imports in accounting terms, to the extent that the trade balance has appeared to be extremely countercyclical since the first oil shock. All these orders of magnitude are very similar to those of the 2000 base.

Inventory changes and the trade balance often contribute to growth in opposite ways

The different components of demand do not contribute uniformly to the economic cycle. In particular, the contributions to growth of inventory changes and of the trade balance are often opposing. From Q1 1985 to Q4 2010, the correlation factor between these two components is -0.7. In annual data, the factor is lower (-0.3). This partly results from the strong anti-correlation for goods with a long production process: aircraft, trains and ships, classified as 'transport equipment'. For these products, inventory changes are more a reflection of the difference that exists between the measurement of output (measured as the work progresses) and that of foreign trade (recorded on delivery of the finished product) than a case of short-term stocking-up behaviour. Leaving aside these goods, the quarterly factor is -0.5. For example, at the moment of the first results for Q1 2011, the contribution of inventory change to GDP growth came to +0.7 point, against -0.4 point for foreign trade. But excluding aeronautics, these contributions res-

Table 4
Breakdown of GDP in the 'demand' approach, and contributions to its average level,to its average trend, to its fluctuations

in %

			Quarterly variation in mean		GDP variance quarterly	
	1950-1973	1974-2010	1950-1973	1974-2010	1950-1973	1974-2010
GDP			1,31	0,50	1,49	0,31
	Average level (total = 100)		GDP variance (total = 100)		GDP variance (total = 100)	
Inventory changes	2	0	1	-1	36	43
Final domestic demand (excluding inventory) including :	97	100	100	100	55	65
Household consum. expend.	*58*	*55*	*56*	*58*	*23*	*32*
Consum. expend. of gen. govt.	*16*	*23*	*14*	*26*	*3*	*0*
GFCF of ENF	*12*	*10*	*14*	*10*	*21*	*22*
GFCF of households	*6*	*6*	*10*	*1*	*3*	*8*
GFCF of gen. govt.	3	3	4	2	*4*	*2*
Trade balance	1	0	-1	0	9	-9
including exports	*14*	*23*	*22*	*49*	*35*	*52*
including imports (-)	*13*	*23*	*23*	*49*	*27*	*61*

Sources: INSEE, quarterly national accounts

pectively come to +0.3 and -0.1 point. This puts into proportion, somewhat, the role of inventory change in the strong GDP growth observed in Q1 2011.

The sources of variability in growth are similar in France and the USA

In level, the weight of the different components of domestic demand are similar to the United States, both in France and in the Eurozone *(see Table 5)*. As a contribution to the variability in growth, the figures differ a little more, but the stylised facts remain the same: the amounts of investment and inventory changes are substantially lower than those of consumption, yet their weights are much more important when the cyclical fluctuations in activity are analysed.

However, differences between countries or between sub-periods within the same country should be analysed carefully: although they may reflect differences in how the economies work, they may also be of statistical origin and reveal differences in methodology for drawing up the accounts. For example, in France inventory changes are not estimated directly but most frequently obtained as balances between supplie and uses for goods. Any measurement errors affecting each of the components of the balance are thus inventory variations, which sometimes makes then difficult to interpret from one quarter to the next. The similarity in terms of the weight of inventory change in cyclical fluctuations of activity between France (contribution of 42%) and the United States (36%) is thus even more remarkable. Indeed, unlike in France, in the American quarterly accounts the evaluation of inventory changes is based on direct statistical information via a quarterly survey on corporate inventory.

The weight of industry and services in fluctuations in activity has gradually balanced out

A breakdown of GDP in the 'output' approach, that is, via the value-added of the main sectors, calls for several observations *(see Table 6)*. In level, the weight of market services has increased (from 36% on average before 1974 to 45% after) to the detriment of industry, which has seen its place in the economy diminish (23% to 18%). The contribution of industry to the cyclical fluctuations of GDP dropped between the two sub-periods (from 66% to 35%), but remains well above the figure that its weight in level would suggest. The share linked to market services increased (42% after the first oil shock, against 22% before); their weight in the cycle is now comparable to the share they have in the economy. However, the contribution of non-market services to cyclical fluctuations of GDP is very low (3%), whereas since 1974 it has represented 18% of GDP in level.

Last, a breakdown of GDP in value according to the revenue of the various production factors shows that their contribution is comparable in level and in the economic cycle since 1974 *(see Table 7)*. For example, remuneration of which, the average weight is 53%, contributes 51% to GDP variance in value. This was not the case prior to the first oil shock, with a lower share of wages in cyclical fluctuations than in level. The increase in bonuses, which by nature are more volatile

Table 5
Breakdown of GDP in the 'output' approach, and contributions to its average level,to its average trend, to its fluctuations, international comparisons

in%

				Quarterly variation in mean			GDP variance quarterly		
	United States	Euro zone	France	United States	Euro zone	France	United States	Euro zone	France
	1969-2009	**1978-2008**	**1974-2010**	**1969-2009**	**1978-2008**	**1974-2010**	**1969-2009**	**1978-2008**	**1974-2010**
GDP				0.74	0.57	0.50	0.70	0.38	0.31
	Average level (total = 100)			GDP variance (total = 100)			GDP variance (total = 100)		
Inventory change	0	0	0	-1	-14	-1	36	21	43
Final domestic demand (excluding inventory)	102	99	100	106	113	100	73	80	65
Trade balance	-2	1	0	-5	1	0	-9	-1	-9

Sources: INSEE, quarterly national accounts, 2005 base

than basic wages, may be an economic factor explaining this growth. But a statistical factor may also have come into play: up to 1997, the only infra-annual indicator available, the basic wage measured in the Acemo surveys, did not include either bonuses or overtime, unlike the indicator currently used, supplied by the Acoss on the basis of remuneration declared to the Urssaf *(see Appendix 2)*. ■

Table 6
Breakdown of GDP in the 'output' approach, and contributions to its average level,to its average trend, to its fluctuations

in %

			Quarterly variationd in mean		GDP variance quarterly	
	1950-1973	**1974-2010**	**1950-1973**	**1974-2010**	**1950-1973**	**1974-2010**
GDP			1,31	0,50	1,49	0,31
	Average level (total = 100)		GDP variance (total = 100)		GDP variance (total = 100)	
Taxes net of subsidies	12	11	14	11	0	11
Value-added, including:	88	89	86	89	100	89
agriculture	*10*	*3*	*6*	*3*	*8*	*4*
industry	*23*	*18*	*28*	*14*	*66*	*35*
construction	*6*	*6*	*7*	*0*	*3*	*5*
market services	*36*	*45*	*38*	*58*	*22*	*42*
non-market services	*12*	*18*	*8*	*15*	*2*	*3*

Sources: INSEE, quarterly national accounts, 2005 base

Table 7
Breakdown of GDP in the 'income' approach (in current data)

in %

			Quarterly variationd in mean		GDP variance quarterly	
	1950-1973	**1974-2010**	**1950-1973**	**1974-2010**	**1950-1973**	**1974-2010**
PIB en valeur			2,8	1,6	3,6	1,4
	Average level (total = 100)		GDP variance (total = 100)		GDP variance (total = 100)	
Remuneration paid	47	53	49	55	28	51
Gross operating surplus	39	34	38	32	55	37
Taxes	16	16	16	16	17	14
Subsidies	-2	-2	-2	-3	0	-2

Sources: INSEE, quarterly national accounts, 2005 base

The quarterly national accounts switch to the 2005 base.

Appendix 1 - Principles and methods of the quarterly accounts

General principles

The quarterly national accounts aim to provide macroeconomic information at an infra-annual frequency; the information is intended to be complete, relatively detailed and consistent with previous annual accounts.

The quarterly accounts share the same conceptual framework as the annual accounts, that of the national accounts in its European version (ESA 1995).

1- The calibrating-fitting method

The first principle is that the annualised quarterly data should be consistent with those of the annual accounts. To achieve this, the quarterly accounts are calculated using an econometric technique known as calibrating-fitting, which interpolates and extrapolates the annual data using monthly or quarterly indicators.

In more concrete terms, a calibration is an econometric relationship between an aggregate of the annual accounts and a quantitative indicator aggregated over the year. To determine the quarterly accounts, the relationship is applied at a monthly or quarterly frequency.

A simple calibration may be presented as follows:

$$C_a = \alpha + \beta . I_a + u_a$$

where C_a is a variable of the annual accounts, I_a an indicator aggregated in annual frequencies, and u_a the 'adjustment' of the econometric equation. This equation may be of different types: white noise, stationary autoregressive, or random walk; in this latter case the equation is estimated in difference.

Applying the estimated relationship between indicator and annual account at a quarterly frequency does not guarantee equality between the annual data and the sum of the four quarterly values thus calculated: to achieve this, it is necessary to take the residual into account of the adjustment, which contains the information required to guarantee this equality.

This information then has to be conserved by 'fitting' the quarterly accounts to the annual accounts in the past. To do so, the annual residual must be smoothed over each of the quarters. A simple division of the annual adjustments by four might result in sudden changes of levels in certain quarters if the residual turns out to be significant in relation to the annual account.

The 'quarterisation' method used, which spreads the annual adjustment across each quarter, thus aims to avoid this sort of leap: it minimises variations from one quarter to the next so that the contribution of the adjustment to the volatility of the quarterly account is as small as possible.

For each past year, the sum of the quarterly accounts over the year is then equal to the annual account. For the year underway, the annual account does not yet exist and the annual adjustment is therefore extrapolated: the extrapolation of the adjustment uses the structure of the adjustment defined by the model (white noise, stationary autoregressive, or random walk).

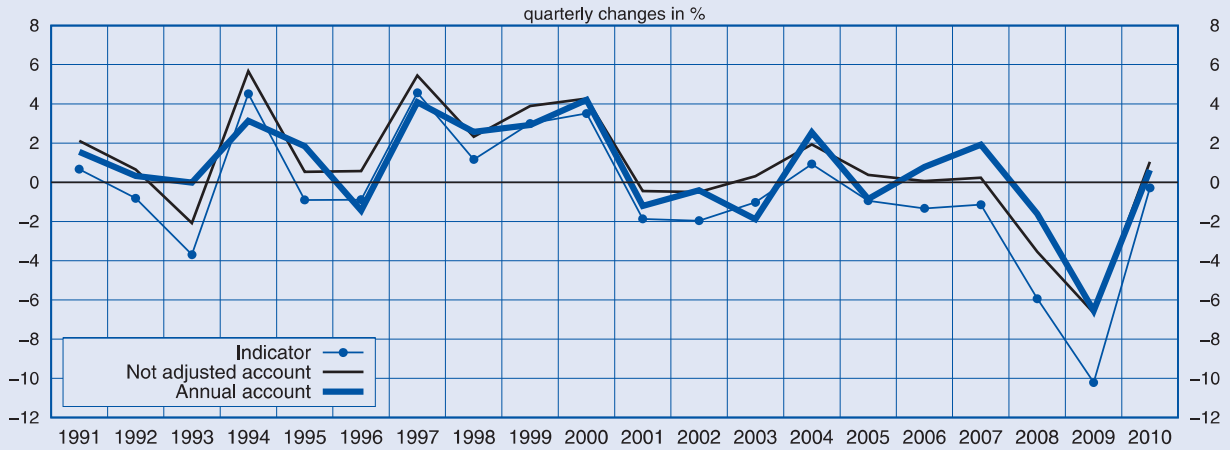
Graph A illustrates the deviations in annual trends between an annualised indicator (here, the industrial output index of the 'wood-paper' sector), the corresponding variable using the calibration relationship before adjusting, and the (adjusted) annual account.

2- Corrections for calendar effects and seasonal variations

The quarterly accounts data (in value, volume and price) are corrected for seasonal variations and calendar effects so that the changes from one quarter to the next only reflect cyclical movements.

The aim of the correction for calendar effects (CJO) is to build series 'with identical business days', for which the analysis of trends is not disrupted by differences in the number of business days. The correction for calendar effects is not neutral over the year, as for

a - Calibration-adjustment effect , illustration with the wood-paper sector



Sources: INSEE, quarterly national accounts

example the number of bank holidays differs from one year to the next, making an impact on annual evolutions. The method used for the quarterly accounts consists in a regression of the unadjusted monthly variable on variables that respectively represent the number of business Mondays (i.e. not bank holidays), business Saturdays and Sundays, holiday or otherwise, of each month. Leap years are also processed using an indicator. So as not to integrate any seasonal-specific effect, these variables are deseasonalised and only the deviation from the mean of these numbers of days is conserved.

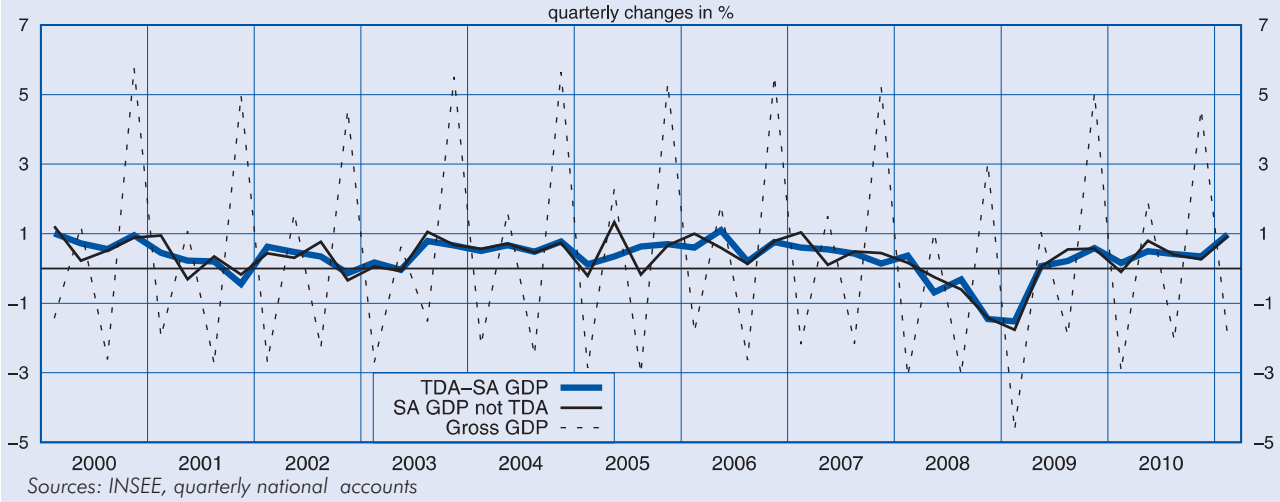
Most series of accounts present a very marked seasonal aspect: output, for example, is less dynamic in July and August because many firms stop or reduce their activity for the summer holidays. It is thus very difficult to understand underlying trends independently of seasonal effects. The seasonal adjustment (SA) eliminates these seasonal effects. The deseasonalisation method used is the one implemented in the X12-Arima software, which is based on iterative filtering via mobile averages.

Graph B illustrates the deviations for GDP between unadjusted quarterly trends, SA, and TDA-SA.

The global method used to switch from an indicator to the TDA-SA quarterly account may be plotted by the diagram.

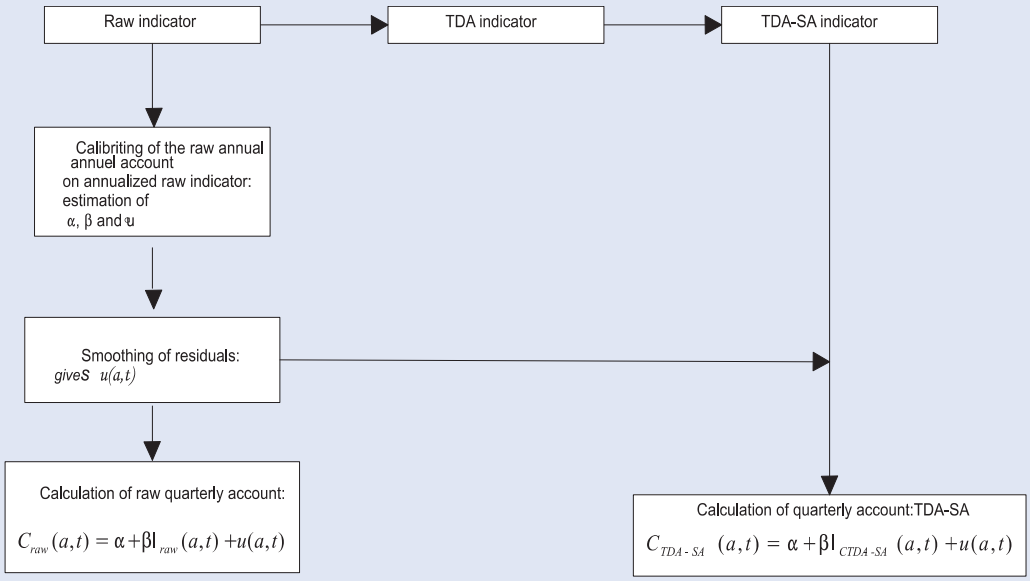
For certain series whose weight is generally low, no cyclical data is available. The annual accounts are thus extended by extrapolation of the year underway, most often based on ad hoc assessments (such as the Accounts Commissions of certain sectors), and the quarterly accounts result from a 'quarterly smoothing' of the annual series. This smoothing consists in estimating a quarterly series which minimises the variability of the series from one quarter to the next. ■

b - TDA and SA effects , illustration with GDP growth



Sources: INSEE, quarterly national accounts

Schema : Sketch of operations from gross indicator to quarterly national account



Appendix 2 - Main indicators used

1) For the construction of the input-output table (IOT) and GDP

Household consumption

Household consumption expenditure is based on multiple sources, known in value or in volume. For goods, the source is mainly the surveys on merchants conducted by the Banque de France. Statistics from public bodies (e.g. national sickness insurance fund) or professional organisations (e.g. GfK) are also used. For services, as well as statistics from public operators (electronic communications regulation authority - Arcep, civil aviation directorate - DGAC...), turnover indices (from VAT returns) are very often used. For prices, the consumer price index (CPI) covers virtually the entire scope.

Globally, the value or volume indicators cover 63% of household consumption expenditure in the 2005 base. Among the other extrapolated and smoothed accounts (37%), most are items which by nature do not fluctuate much: most notably, services rent represent 18% of total expenditure. Compared with the 2000 base, 5% of extra expenditure is covered in the 2005 base by a new value and volume indicator. In particular, indicators are used for the first time to track 'technological' goods, music and film publishing (GfK), consumption of minor building maintenance, and consumption of automobile equipment (VAT indicators). New price indicators have also been introduced (CPI), allowing even more complete and more detailed coverage than with the 2000 base.

Bearing in mind the reliability of the available indicators, household consumption of goods is also published monthly. The switch to the 2005 base was an opportunity to considerably extend the scope covered, from only manufactured goods in the 2000 base (around a quarter of household consumption expenditure) to all goods (half that expenditure): expenditure on food and energy is now published monthly.

Foreign trade

The value indicators come from two main sources: customs statistics and balance of payments. Import and export price indices in industry cover an increasingly wide scope of goods. Unit value indices of foreign trade are exclusively used for agricultural products. Lastly, with regard to volumes, physical foreign trade of electricity data from the Energy Observatory are used. Globally, value (or volume) indicators cover 99% of scope. However, there is practically no service price indicators. Compared to the 2000 base, the flows of services in value are tracked in a more detailed way.

Output

As regards goods, the main sources are the industrial production indices (indicators in volume for industry, excluding water, gas and electricity). Agriculture and transport statistics cover the outputs of the eponymous sectors. The turnover indices (from VAT returns) are used more marginally. In this field, 96% of output is estimated on the basis of indicators (only crop production and forestry are extrapolated and smoothed). For the other sectors (services excluding transport, energy-water-waste), output is obtained indirectly from uses. For accounts in value, the producer price indices in industry cover a wider scope than in the 2000 base.

Gross fixed capital formation

Concerning construction, GFCF is mainly based on building starts, broken down by building type and client. For civil engineering, it is the turnover in value indicator of the national civil engineering federation (FNTP). Vehicle registrations are used for automobile expenditure. Turnover indices (from VAT returns) are also used in industry, wholesale and services. Overall, the indicators cover more than 90% of investment expenditure by non-financial enterprises and general government and 80% of household expenditure, but no cyclical information is available for non-profit institutions serving households (NPISH). Numerous indicators are known for all the institutional sectors, without any distinction according to type of agent (notably for civil engineering or turnover indices).

Intermediate consumption and inventory change

Mostly unobserved, intermediate consumption is usually obtained from the output of the corresponding sector with assumptions on the trend stability of the technical coefficients in volume. Similarly, as there is no directly available information, inventory changes are obtained through the balance between supplies and uses excluding stocks (intermediate consumption, final consumption, GFCF, exports) for virtually all goods.

2) For the sectoral accounts (integrated economic account)

Employment, wages, working time

The main sources for the total wage bill are the quarterly statistics on paid employment (Dares-Insee), and the quarterly data on wages supplied by the Acoss (central agency for social security bodies) in the 'general recovery regime' of the Urssaf. Data from the DGFip (general directorate of public finances) allow the tracking of wages paid in the public sector. For working time, the sources used include the Acemo survey (activity and working conditions of the labour force) by the Dares (Labour, Employment and Health Ministry), and statistics on sickness, maternity and occupational accident days (national sickness insurance fund) and on overtime (Acoss).

Taxes, contributions and social benefits

For taxes, two types of indicator are used: the monthly recovery of State revenue and the notices of issue of roles of local taxes (DGFip); the Acoss data for the taxes assigned to the social security (CSG in particular). This latter source is used for the contributions to the general social security scheme. For benefits, the statistical data comes from the national sickness insurance, old-age insurance and family allowance funds, as well as from Pôle-Emploi (unemployment benefit). The statistical data from the other social welfare bodies (self-employed social scheme, agricultural mutual fund) and those from the DGFip are also used.

For wages and taxes, the proportion of accounts covered by an indicator represents more than 90% of the total of each of these operations. For social benefits and contributions, the proportion of accounts covered by an indicator represents around 85% of each of these operations.

Other operations in the integrated economic account

Among the other operations used to determine the main balances of economic agents, some come from the input-output table (consumption or investment expenditure of the different agents, for example). Indicators exist for other operations (for example the balance of payments for the rest of the world account). However, there is a lack of indicators for the other items (property income, current transfers, capital transfers). The household and non-financial enterprise counts are the subject of a detailed publication. However, the information about the other institutional sectors (general government, financial enterprises, NPISH) is considered more fragile. Certain operations or balances in these institutional sectors cannot be published until the annual accounts of these agents are known (in May of year N+1).■

Appendix 3 - Contributions to cyclical fluctuations in activity

The breakdown of GDP 'by demand' or 'GDP card' represents the balance between total supplies of goods and services and that of uses in the economy. Activity flows in the course of a given period are explained primarily by the different types of domestic demand (consumption, investment...) of the agents of the economy (enterprises, households, general government). Foreign demand is that of the rest of the world, an institutional sector whose final demand is the result of exports net of imports. Lastly, inventory change allows the balance between supplies and uses of goods and services:

(1) GDP= Domestic demand excluding stock+Foreign balance+Inventory changes

= dintfhs + balance + ΔS

Where ΔS represents the inventory change from one period to the next, dintfhs final domestic demand excluding stocks and balance the balance of foreign trade. This equality defines an accounting balance in level between the different macroeconomic variables under consideration. However, while the balance is respected in value and volume at constant prices, it no longer is with the concept of volumes at the chain-linked prices of the previous year when the national accounts are published, as this concept does not have the property of additivity.

Also, the GDP growth rate being defined as:
$ev(PIB) = \Delta(PIB) / PIB_{t-1}$

Its trend is broken down into a sum of contributions of its components in level:

(2) ev(PIB) = ctr(dintfhs) + ctr(solde) + ctr(ΔS)

Where ctr(X) represents the contribution of an aggregate X to GDP growth. In constant value and volumes, we get:

$ctr(X) = (\Delta X)/PIB_{t-1}$

In the chain-linked volumes concept (for which there is no additivity property), the definition of contributions is a little more complex, but it has the advantage of assuring the additivity of contributions *(see F. Arnaud [2007]* for a detailed presentation of contributions in chain-linked volumes).

Whether in value or in volume, the ratio between the average contribution of an aggregate to GDP and the average GDP growth is an indicator of the weight of this aggregate in average GDP growth. Denoting as 'E' the 'average' operator, it is formalised as follows:

E(ctr(X))/E(ev(PIB))

For a given aggregate, this weight is close to the mean weight in level if the aggregate increases like GDP over a given period (case of the different aggregates of domestic demand).

Last, we can also break down the fluctuations in growth (or its variance) according to the different elements that make it up *(see Gregoir-Laroque [1992])*. To do so, we need to start from equality. (2) Using 'var' and 'cov' as terms for the variance and covariance operators, we can write:

(3) Var(ev(PIB)) = cov(ev(PIB),ctr(dintfhs)+ctr(balance)+ctr((ΔS))
=cov(ev(PIB),ctr(dintfhs))+cov(ev(PIB),ctr(balance))+cov(ev(PIB)
,ctr(ΔS))

Each of these terms then measures the contribution of one of the items in final demand to variance in GDP growth, that is, to cyclical fluctuations in activity.

Inventory changes have a very low weight in relation to GDP in level; it plays a relatively small role in average GDP growth; however, it plays a far more important role in quarterly macroeconomic fluctuations (*see Table 4 and 5*).

This breakdown of the fluctuations in GDP in the demand approach may also apply in an analysis of GDP fluctuations in the output approach (breakdown by sector, *see Table 6*) or GDP fluctuations in the income approach (*see Table 7*).

Bibliography

Insee.fr

Associated with the Informations Rapides, long series in Excel format and complementary tables in PDF format are put online each time the accounts are published. All this data is accessible via the 'National accounts' or 'Economic cycle' theme. Dissemination of the long series has been restructured and its volume extended. These series are classified in three categories:

- products (GDP and GDP card, breakdown by major demand operation, resource-use balances for major groupings)

- sectors (breakdown by sector of value-added, employment, wages...)

- agents accounts (households, general government, enterprises...).

The following are available in each of these categories:

- composite files (already disseminated with the 2000 base), extracting from the accounts the main information required for economic analysis (contributions to GDP, breakdown of household income, breakdown of the unit cost of enterprises...)

- a file summarising all public data.

All these series are also published via the macroeconomic database on insee.fr.

Methodology notes are also available, in particular the document entitled 'Insee méthode n° 108' on the methodology for the quarterly accounts with the 1995 base. It is still relevant for the majority of the principles, methods and sources presented. It will soon be updated to the new base.

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