Quarterly National Accounting of Spain. Base 2000

First quarter 2005

Main methodological novelties

The estimates for the Quarterly National Accounting of Spain, base 2000 (QNAS-2000), presented in this press release are homogeneous -both numerically and methodologically- with the annual data disseminated last 19 May in the framework of base 2000 of the Spanish National Accounts.

Therefore, the estimate of this quarterly series incorporates all the modifications, both conceptual and statistical, that differentiate this accounting base from the previous one, i.e.:

– *Conceptual changes*. The QNAS-2000, incorporates two conceptual changes which -over the course of 2005- should be introduced in the respective accounts of European Union Member States:

– Introduction of a new method to compile estimates in volume terms by means of which fixed base estimates at constant prices used to date are replaced by chained estimates at prices of the previous year. This methodological change is based on Commission Decision number 98/715/EC

–Allocation of the Financial Intermediation Services Indirectly Measured (FISIM) for user sectors/activity branches, in application of the terms envisaged in Council Regulations numbers 448/98 and 1889/2002

– *Statistical changes*. The QNAS-2000 incorporates new statistical sources for the base and new methods and procedures for the compilation of estimates. A more detailed description of these changes appears in the INE press release from 19 May 2005.

The most important advantage of the methodology used to deflate national accounts prices at prices of the previous year is the fact that it facilitates obtaining more updated, specific and, therefore, more reliable aggregated growth estimates.

Therefore, the volume growth of an aggregate, in all periods, will be est imated by measuring said aggregate at prices of the previous natural year (mobile base). This estimate will constitute the link of a chain which -after repeating the same procedure for all years- will determine a temporal series in the form of chained index numbers.

It is substantially more complicated to apply this methodology to quarterly accounts than to yearly accounts. In principle, estimating the links follows the same procedure as the annual case, but chaining-linking all data -without losing the coherence between the annual and quarterly data- is more complicated. There are three different techniques that can be used to perform this operation. The QNA-2000 has selected the process known as *annual overlap*, which takes average values for the four quarters of the previous year as references for the quarterly estimates in volume.

Although this methodology presents a more specific estimate of aggregate growth, it entails the disadvantage of losing the additivity between aggregates

and the components. Therefore, the aggregates of demand or supply will not coincide with GDP. Likewise, geographical additivity is also lost. Thus, the sum of European Union Member States GDP will not equal the EU GDP published by Eurostat Non-additivity appears solely due to the strict technical application of the chain-linking methodology. Consequently, discrepancies between aggregates and components should not be interpreted as indications of quality in the results.

The Financial Intermediation Services Indirectly Measured (FISIM) have been allocated to user sectors and branches in the QNAS-2000, following the same model applied for the annual accounts.

Thus, the use of these services will no longer be recorded entirely as intermediate consumption of a fictional sector/branch (according to the agreement initially established in the EAS-95), but also as consumption expense (final or intermediate) and exports / imports, which affect the economy's GDP level.

In general terms, and with the new methodology, companies will record intermediate consumption for these services, whilst Households, Non-profit making institutions serving households and public administrations will spend on final FISIM consumption, which will have a corresponding effect on the GDP level.

The FISIM estimate in volume terms is established using a deflator that evolves according to the variation, between the previous and the current year, the interest rates and the prices of internal demand.

Two of the most important methodological modifications are included hereunder: chained indices and the treatment of FISIM.

Introduction of the chained volume measures in the Quarterly National Accounting of Spain.

The applied methodology is presented in the document *Chained indices in Quarterly National Accounting* . Focusing on the annual case, a general layout of the main principles of this type of volume measurement appears.

1 Introduction

Modern market economies are characterised by the performance, over a specific period of time, of a high number of transactions that involve the production and sale of goods and services (mainly products). The value in current terms of each of said transactions is obtained by multiplying the amount produced or exchanged of the product in question by its corresponding unitary price. Thus, for a specific time interval (e.g., a year or quarter) the total value of the transactions that take place in a given economy results from adding up the individual values of all the transactions performed over said period.

The comparison of said values in time, generally, results from combining variations in the exchanged amounts and modifications regarding the prices at which the transactions have been performed. Consequently, from a statistic and economic point of view, it is interesting to view to which extent said nominal variations are due to one or another factor, breaking down the nominal variation as regards volume and price.

This double statistic and analytical need has given way to two types of measurements that isolate the effect of variations in amount from variations in prices: estimates at constant prices and chained volume measures. The latter provide a more accurate estimate of the economic phenomenon linked to the production and exchange of amounts of products. Thus the INE, following recommendations issued by Eurostat and other international statistics institutions, has applied this measurement system when compiling National Accounts, both yearly and quarterly.

In the first place, the different assessment systems are set out: at current prices (section 2), at constant prices of a base year (section 3), at prices of the previous year alongside the corresponding chained volume measure (section 4). Hereunder is a chained indices methodology applied to the data published for the 2000-2004 accounting series at constant prices of 1995. Finally, the European Union legal framework that sustains the introduction of this new assessment system is also analysed.

2 Valuation at current prices

As aforementioned, valuation at current prices is obtained aggregating current exchanges values for all products of the economy. The following table presents an example including hypothetical data on two products (A and B) for three years (0, 1 and 2).

Table 1: Exchange value at current prices

	Año								
	0			1			2		
Producto	Precio	Cantidad	P_0Q_0	Precio	Cantidad	P_1Q_1	Precio	Cantidad	P_2Q_2
A	3	5	15	2	9	18	1	9	9
B	4	7	28	5	7	35	6	11	66
Total			43			53			75

3 Valuation at constant prices for a base year

Interannual variations in the previous table result both from modifications in the amounts exchanged of A and B, and variations in their respective prices. In order to isolate the former from the latter, the valuation at constant prices assess exchanges in terms of the valid prices for a certain period, called the "base period." The following results are obtained by taking year 0 as the base year, for example,:

Table 2: Exchange values at constant prices for year 0

	Año								
	0			1			2		
Producto	Precio	Cantidad	P_0Q_0	Precio	Cantidad	P_0Q_1	Precio	Cantidad	P_0Q_2
A	3	5	15	2	9	27	1	9	27
B	4	7	28	5	7	28	6	11	44
Total			43			55			71

Adopting a set year for the valuation implies that, to the extent that the exchange structure for said year is modified over time,[1] the corresponding assessment loses relevance and significance, from both economic and statistic viewpoints. Consequently, in order to update quantification structures, base year changes are performed periodically.

4 Valuation at prices of previous year and chained volume measure

If the loss of relevance of the base can be solved by modifying the base year periodically, the ideal solution is to update said base at the same frequency as the

[1] Given the changes in relative prices; modifications in the exchange patterns brought about by changes in technology or preferences; modifications in products exchanged, etc.

estimate. This operation obtains valuations at prices of the previous year, called "links," which appear in the following table:

Table 3: Exchange values at prices of the previous year

	Año										
	0			1				2			
Producto	Precio	Cantidad	P_0Q_0	Precio	Cantidad	P_1Q_1	P_0Q_1	Precio	Cantidad	P_2Q_2	P_1Q_2
A	3	5	15	2	9	18	27	1	9	9	18
B	4	7	28	5	7	35	28	6	11	66	55
Total			43			53	55			75	73
Eslabón			100				127.9				137.7

As valuations have always been performed considering consecutive pairs of years, creating a homogeneous series that represents the whole sequence of years requires the chain-linking of all yearly links. Said chain-linking is obtained by multiplying each yearly link as an index by the chain accumulated up until the previous year. The chain obtained using this method is obviously an index number. Therefore, its conversion to monetary terms is performed by multiplying it by the value at current prices for a specific year, called "reference year." The following table considers year 0 as the reference period:

Table 4: Chained index: basic and monetary expressions

	Año										
	0			1				2			
Producto	Precio	Cantidad	P_0Q_0	Precio	Cantidad	P_1Q_1	P_0Q_1	Precio	Cantidad	P_2Q_2	P_1Q_2
A	3	5	15	2	9	18	27	1	9	9	18
B	4	7	28	5	7	35	28	6	11	66	55
Total			43			53	55			75	73
Eslabón			100				127,9				137,7
Índice encadenado			100				127,9				176,2
Valoración monetaria			43				55				75,8

donde: (55/43) x 100 = 127,9
(73/53) x 100 = 137,7
127,9 x 137,7 = 176,2

43 x 127,9 = 55

43 x 176,2 = 75,8

Conversely to what occurs with the valuation at constant prices in which the reference year and the base coincide, it must be noted that they are not equivalent in the system for valuation at prices of the previous year. Thus, the reference year defines the scale for the chained index (setting it at 100), whilst the temporal base is mobile, with as many bases as consecutive pairs of years. Therefore, as a whole, the chained valuation lacks a set base (mobile base).

Applying the methodology generates a loss of additivity in the chained volume measures (except in data corresponding to the years considered as the *mobile base* and the immediately subsequent year). Losing additivity implies that, for example, the addition of the components of the Gross Domestic Product (GDP) does not coincide with the latter (except in the data corresponding to the years considered as the *mobile base* and the immediately subsequent year). In general, a variable assessed considering chained volume measures does not add up to the elements that compose it which have been equally assessed via chained volume measures. Losing additivity is a direct consequence of the mathematical properties of the valuation system. Therefore, discrepancies do not reflect any deterioration whatsoever regarding quality in the measuring process.

The following table considers four products (A, B, C and D) and two ways of aggregating them: $Z = X + Y$, where $X = A + B$ and $Y = C + D$ and $V = A + B + C + D$. All years except for the reference year (0) and the following year (1) show a discrepancy between both forms of composing totals Z and V.

Table 5: Chained index: loss of addition possibilities

	Año										
	0			1				2			
Producto	Precio	Cantidad	P_0Q_0	Precio	Cantidad	P_1Q_1	P_0Q_1	Precio	Cantidad	P_2Q_2	P_1Q_2
A	3	5	15	2	9	18	27	1	9	9	18
B	4	7	28	5	7	35	28	6	11	66	55
X=A+B			43			53	55			75	73
Eslabón			100				127.9				137.7
Índice encadenado			100				127.9				176.2
Valoración monetaria (X)			43				55				75.8
C	5	11	55	6	14	84	70	9	16	144	96
D	6	14	84	7	11	77	66	5	14	70	98
Y=C+D			139			161	136			214	194
Eslabón			100				97.8				120.5
Índice encadenado			100				97.8				117.9
Valoración monetaria (Y)			139				136				163.9
Z=X+Y			182				191				239.6
V=A+B+C+D			182			214	191				267
Eslabón			100				104.95				124.77
Índice encadenado			100				104.95				130.94
Valoración monetaria (V)			182				191				238.3
Z=X+Y			182				191				239.6
Valoración monetaria (V)			182				191				238.3
diferencia			0				0				1.3

In order to facilitate analysis and estimates, the reference is modified each time a new datum is published, always ensuring that the last year is additive. Modifying the reference changes the levels of the whole series, but preserves growth, as appears in the following table, referring exclusively to products A and B and their aggregate (X) that are included in table 5:

Table 6: Chained index with reference modification

Year	Year		
	0	1	2
Reference			

0	Chained index	100.0	127.9	176.2
	Monetary valuation	43.0	55.0	75.8
	Δ	-	27.9	37.7
1	Chained index	78.2	100.0	137.7
	Monetary valuation	43.0	55.0	75.7
	Δ	-	27.9	37.7
2	Chained index	56.8	72.6	100.0
	Monetary valuation	42.6	54.5	75.8
	Δ	-	27.9	37.7

5 Legal framework

Chained volume measurements in Spanish National Accounts are envisaged in European Commission Decision number 98/715, establishing their compulsory nature in the transmission of data from National Statistics Institutes to the Statistical Office of the European Union, EUROSTAT.

Throughout 2005, the following EU countries will include chained volume measures in their National Accounts: Germany, Austria, Cyprus, Denmark, Slovakia, Spain, Finland, France, Greece, Holland, Italy, Lithuania, Luxembourg, Malta, Poland, Portugal, Czech Republic, United Kingdom and Sweden. These measures are also applied in Australia, Canada, United States, Japan and New Zealand, among others.

There is no equivalent legal framework for Quarterly National Accounts. Nevertheless, to maintain consistency, Eurostat and other international statistical institutions such as the International Monetary Fund (IMF) and the Organisation for Economic Cooperation and Development (OECD), among others, have recommended their implementation. The methodology applied for the quarterly accounts requires a series of technical considerations that are detailed in a specific document.

Financial Intermediation Services Indirectly Measured (FISIM)

Spanish National Accounts Base 2000 (NAS-2000) introduce an important methodological modification in the compilation of annual and quarterly accounts, that refers to how Financial Intermediation Services Indirectly Measured (FISIM) are processed.

Definition of FISIM

Broadly, FISIM could be defined as the indirect income obtained by financial institutions from transactions involving deposits and loans performed with their clients.

FISIM are determined on the basis of a model. Thus, when the financial institutions user performs a deposit (or takes out a loan), he/she receives (or pays) an amount in interests that explicitly does not include any amounts linked to the payment of financial intermediation services provided by the institution. Considering that a specific market reference interest rate can be established for each financial instrument (deposits and loans), the difference between the interest rate effectively paid (or received) and the reference rate would be the financial intermediation service which, given the nature of its estimate, is said to be measured indirectly.

	Deposit	**Loans**
Amount	X	Y
Nominal interest rate	a	b
Nominal interest (effectively paid or received)	aX	bY
Reference interest rate	a′	b′
FISIM	$(a' - a)\ X$	$(b - b')\ Y$
Adjusted FISIM interest recorded as property income in institutional sectors accounts (D.41)	Nominal interest + FISIM	Nominal interest − FISIM

Introduction of the FISIM in the QNA and QNAS

In the Spanish National Accounts Base 1995 and in accordance with Regulation SEC-95, FISIM were produced by financial institutions and were not allocated to the user sectors/activity branches of said services, but were consumed as intermediates in their totality by a fictional sector/activity branch.

Said fictional sector/activity branch was characterised by having zero output and equal negative value added, but a contrasting sign to that of the aforementioned intermediate consumption. Consequently, the global added value of all sectors/branches of activity was reduced in the amount of said negative added value; i.e., the FISIM production did not affect the economy's Gross Domestic Product (GDP) level.

Regulations 448/98 and 1889/2002 establish that, as from 2005, the use of FISIM should be allocated to user sectors/activity branches, instead of to a fictional sector/branch of activity. Consequently, the use of FISIM will no longer be recorded, by agreement, entirely as intermediate consumption, but also as final consumption and exports/imports of said services, which will affect the economy's GDP level.

Thus, in general and considering the new methodology, companies will have an intermediate consumption in these services, whilst households, public administrations (P.A.) and non-profit institutions at the service of the households (NPISH) will perform final consumption expenses of FISIM that will have a corresponding effect on the economy's GDP level.

Effects on GDP and its components

In the NAS-2000, the global increase that this methodological change has implemented in the GDP for the base year amounts to 7,472 million euros, which equals an approximate 1.2 per cent increase in its level. The following chart shows the distribution of said effect on different transactions:

2000	Millions of euros
Total FISIM	18,958
Intermediate demand	11,486
Final demand	**7,472**
– Household final consumption expense	7,413
– Final consumption expense of the NPISH	160
–Final consumption expense of the P.A.	347
– Net exports	-448

The table hereunder includes the value of the FISIM destined to the final demand in the 2000-2004 period.

Year	Final FISIM demand
2000	7,472
2001	7,717
2002	6,352
2003	5,506
2004	5,395

Effects on institutional sectors accounting balances

The methodological change affects the institutional sector accounting balances as follows. Including the so-called adjusted FISIM interests in the sector accounts instead of the nominal interests that were recorded in previous accounting series results in the immediate modification of the disposable income in the Households, Public Administrations and Non-profit institutions at the service of household sectors. The disposable income for the Non financial companies and Financial sectors remains invariable.

The increase of disposable income will compensate greater income in the sectors' final consumption, and will show no modification both in terms of savings and the lending/borrowing capacity of the corresponding sectors.

Implementation of the methodological change in the heart of the EU

As aforementioned, this change is implemented as a consequence of the application of Regulations 448/98 and 1889/2002 modifying Regulation SEC-95. In the other EU Member States, the effects on their respective GDPs are between 1 and 1.5 per cent. Thus, there are no major differences between them except for Luxembourg given the weight financial activities have in the economy.

On the other hand, said modification will not be considered in the calculation of the EU's own resources, since it is thus established in the corresponding legal documents (European Union Decision on Own Resources and Regulation on Gross National Income).

For further information on this methodological change, the INE website includes Council Regulation 448/98 *which completes and amends Regulation 2223/96 in terms of the allocation of financial intermediation services indirectly measured (FISIM) in the European System of National and Regional Accounts (ESA-95)* and its Implementation Regulation, number 1889/2002.

Annex. unitExample of an estimate of financial intermediation services indirectly measured and their incidence on national accounts comparing the new methodology and the former one.

1. Take a household that deposits 1,000 euros in a financial institution, which will yield 3 per cent profit. Likewise, the household takes out a personal loan for 8,000 euros, with a 7 per cent interest rate.

Reference rates are as follows: 5 per cent for deposits and 3 per cent for personal loans.

Nominal interest yielded from the deposit = 1,000 x 3 / 100 = 30 euros
Nominal interest paid for the loan = 8,000 x 7 / 100 = 56 euros

FISIM calculation (yearly data):

Deposit: FISIM = 1,000 x (5 – 3) / 100 = 1,000 x 0.02 = 20 euros
Loan: FISIM = 8,000 x (7 – 3) / 100 = 8,000 x 0.04 = 32 euros
TOTAL FISIM = 20 + 32 = 52 euros

• *Former methodology*: FISIM are not shared

Macroeconomic chart

Transaction	Euros
Financial Institutions Production	52
Intermediate consumption fictional branch	52
Gross Domestic Product	**0**

Sector accounts

Jobs		Transactions	Resources	
F.I.	Household		Household	F.I.
		Production		52
52		**Gross Added Value**		
30	56	Income from property	30	56
		Adjustment by FISIM		*-52*
26	**-26**	**Disposable Income**		
26	**-26**	**Financing need/capacity**		

• *New methodology*: FISIM generated by deposit and loan transactions performed by the household establish a final consumption expense that increases the GDP by 52 euros.

Macroeconomic chart

Operation	Euros
Financial Institutions Production	52
Gross Domestic Product	**52**
Household final consumption expense	52

Interest adjusted to FISIM to be noted as income from property in household accounts will be calculated as follows:

Adjusted interest yielded from the deposit = Nominal interest + FISIM = 30 + 20 = 50
Adjusted interest paid for the loan = Nominal interest-FISIM = 56 – 32 = 24

Sector accounts

Jobs		Transactions	Resources	
F.I.	Household		Household	F.I.
		Production		52
52		**Gross Added Value**		
50	24	Income from property	50	24
26	**26**	**Disposable Income**		
	52	Final consumption expense		
26	**-26**	**Financing need/capacity**		

2. Take, alongside this household, a company that also deposits 10,000 euros in a financial institution, at 4 per cent interest and takes out a 50,000 euro loan at 6 per cent interest.

Nominal interest yielded from the deposit = 10,000 x 4 / 100 = 400 euros
Nominal interest paid for the loan = 50,000 x 6 / 100 = 3,000 euros

Calculation of the FISIM from the company (yearly data):

Deposit: FISIM = 10,000 x (5 – 4) / 100 = 10,000 x 0.01 = 100 euros
Loan: FISIM = 50,000 x (6 – 3) / 100 = 50,000 x 0.03 = 1,500 euros
TOTAL FISIM (company) = 100 + 1,500 = 1,600 euros
TOTAL FISIM (company + household) = 1,600 + 52 = 1,652 euros

• *Former methodology*: FISIM are not shared

Macroeconomic chart

Operation	Euros
Financial Institutions Production	1,652
Intermediate consumption fictional branch	1,652
Gross Domestic Product	**0**

Sector accounts

Jobs			Transactions	Resources		
F.I.	Household	Comp.		Comp.	Household	F.I.
			Production			1,652
1,652			**Gross Added Value**			
430	56	3,000	Income from property	400	30	3,056
			Adjustment by FISIM			*1,652*
2,626	**-26**	**-2,600**	**Disposable Income**			
2,626	**-26**	**-2,600**	**Financing need/capacity**			

• *New methodology*: FISIM generated by the deposit and loan transactions performed by the company increase its intermediate consumption by 1,600 euros. These transactions do not modify the GDP.

Macroeconomic chart

Operation	Euros
Financial Institutions Production	1,652
Company Intermediate Consumption	1,600
Gross Domestic Product	**52**
Household final consumption expense	52

Interest adjusted to FISIM to be noted as income from property in company accounts will be calculated as follows:

Adjusted interested yielded from the deposit = Nominal interest + FISIM = 400 + 100 = 500
Adjusted interested paid for the loan = Nominal interest-FISIM = 3,000–1,500 = 1,500

Sector accounts

Jobs			Transactions	Resources		
F.I.	Household	Comp.		Comp.	Household	F.I.
			Production			1,652
		1,600	Intermediate Consumption			
1,652		**-1,600**	**Gross Added Value**			
550	24	1,500	Income from property	500	50	1,524
2,626	**26**	**-2,600**	**Disposable Income**			
	52		Final consumption expense			
2,626	**-26**	**-2,600**	**Financing need/capacity**			

3. If a public administration were also to deposit 5,000 euros in a financial institution at 3 per cent interest and were to take out a loan for 20,000 euros at 6 per cent.

Nominal interest yielded from the deposit = 2,000 x 3 / 100 = 60 euros
Nominal interest paid for the loan = 20,000 x 6 / 100 = 1,200 euros

Calculation of FISIM from public administration (yearly data)

Deposit: FISIM = 2,000 x (5 – 3) / 100 = 2,000 x 0.02 = 40 euros
Loan: FISIM = 20,000 x (6 – 3) / 100 = 20,000 x 0.03 = 600 euros
TOTAL FISIM (public admin.) = 40 + 600 = 640 euros
TOTAL FISIM (company + household + public admin.) = 1,652 + 640 = 2,292 euros

• *Former methodology*: FISIM are not shared

Macroeconomic chart

Operation	Euros
Financial Institutions Production	2,292
Intermediate consumption fictional branch	2,292
Gross Domestic Product	**0**

Sector accounts

Jobs				Transactions	Resources			
F.I.	House hold	Comp.	P.A.		P.A.	Comp.	House hold	F.I.
				Production				2,292
2,292				**Gross Added Value**				
490	56	3,000	1,200	Income from property	60	400	30	4,256
				Adjustments considering FISIM				*2,292*
3,766	**-26**	**-2,600**	**-1,140**	**Disposable Income**				
3,766	**-26**	**-2,600**	**-1,140**	**Financing C/N**				

• *New methodology*: FISIM generated by deposit and loan transactions performed by the public administration (P.A.) increase its intermediate consumption by 640. Since the P.A.'s non-market production is valued by costs incurred, the value of the same will increase in the same amount as the public administration, 640 euros. Logically, considering the demand, the increase of the public administration's intermediate consumption will increase its final consumption expense and, therefore, will increase the GDP by 640 euros.

Macroeconomic chart

Operation	Euros
Financial Institutions Production	2,292
P.A. Production	640
Company Intermediate Consumption	1,600
P.A. Intermediate Consumption	640
Gross Domestic Product	**692**
Household final consumption expense	52
Final consumption expense of the A.P.	640

Interest adjusted to FISIM to be noted as income from property in public administration accounts will be calculated as follows:

Adjusted interest yielded from the deposit = Nominal interest + FISIM = 60 + 40 = 100
Adjusted interest paid for the loan = Nominal interest – FISIM = 1,200 – 600 = 600

Sector accounts

Jobs				Transactions	Resources			
F.I.	Household	Comp.	P.A.		P.A.	Comp.	Household	F.I.
				Production	640			2,292
		1,600	640	Intermediate consumption				
2,292		**-1,600**	**0**	**Gross Added Value**				
650	24	1,500	600	Income from property	100	500	50	2,124
3,766	**26**	**-2,600**	**-500**	**Disposable Income**				
	52		640	Final consumption expense				
3,766	**-26**	**-2,600**	**-1,140**	**Financing C/N**				