BOLETÍN
INFLACIÓN Y ANÁLISIS MACROECONÓMICO

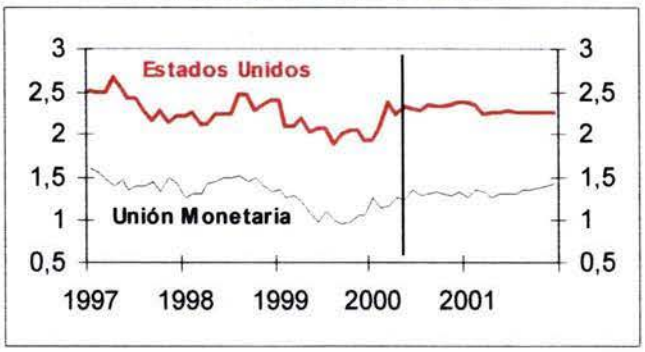
www.uc3m.es/boletin

Instituto Flores de Lemus de Estudios Avanzados en Economía N° 68 Mayo 2000

EDITORIAL

Mejores expectativas de inflación en la Unión Monetaria que en Estados Unidos.

INFLACIÓN TENDENCIAL EN LA UNIÓN MONETARIA Y ESTADOS UNIDOS



TEMA A DEBATE

ECONOMIC TIME,
Por Oscar Jordá,

La escala temporal de numerosos acontecimientos económicos es endógena al problema económico en cuestión (unidad de tiempo económico). Sin embargo, la recolección de datos se realiza tradicionalmente a intervalos de tiempo regulares, dictados por la tradición del calendario (unidad de tiempo observacional). *(Sigue en p.41)*

IS IT LONG MEMORY OR JUST CHANGING VARIANCE WE SEE IN FINANCIAL RETURNS?
Por Thomas Mikosch y Catalin Starica,

(Sigue en p.46)

Contenidos

I. EDITORIAL ..... p. 1

II. ANÁLISIS DE INFLACIÓN Y COYUNTURA ECONÓMICA
II.1 Unión Monetaria y Europea ..... p. 5
II.2 Estados Unidos ..... p. 13
II.3 España ..... p. 21

CUADROS Y GRÁFICOS ..... p. 30

TEMA A DEBATE:
"Economic time", por Oscar Jordá ..... p. 41
"Is it long memory or just changing variance we see in financial returns?", por Thomas Mikosch y Catalin Starica ..... p. 46

Contents

I. MAIN POINTS IN THIS BULLETIN p.1

II. ANALYSIS OF INFLATION
II.1 Monetary and European Unions ..... p. 5
II.2 United States ..... p. 13
II.3 Spain ..... p. 21

TABLES & PLOTS ..... p. 30

MONTHLY DEBATE:
"Economic time", by Oscar Jordá ..... p. 41
"Is it long memory or just changing variance we see in financial returns?", by Thomas Mikosch and Catalin Starica ..... p. 46

Universidad Carlos III de Madrid

INSTITUTO FLORES DE LEMUS

N° 68

Depósito Legal: M22 938 - 1995

BOLETÍN

INFLACIÓN Y ANÁLISIS MACROECONÓMICO

www.uc3m.es/boletin

Instituto Flores de Lemus de Estudios Avanzados en Economía

Entidades Colaboradoras
Supporting Entities

FUNDACIÓN UNIVERSIDAD CARLOS III

INSTITUTO DE LA EMPRESA FAMILIAR

BANCO BILBAO VIZCAYA

Banesto

La General
CAJA DE GRANADA

fundación retevision

Instituto Flores de Lemus de Estudios Avanzados en Economía Universidad Carlos III de Madrid
C/ Madrid, 126 – 28903 Getafe (MADRID – ESPAÑA)
T. +34 91.624.98.89 - F. +34 91.624.93.05
e-mail: laborat@est-econ.uc3m.es
www.uc3m.es/boletin

CONSEJO EDITORIAL:
Michele Boldrin, Juan José Dolado, Antoni Espasa y Juan Urrutia.

DIRECTOR: Antoni Espasa.

COORDINACIÓN GENERAL Y ANÁLISIS DE INFLACIÓN:
Eva Senra.

POLÍTICA ECONÓMICA Y ANÁLISIS INTERNACIONAL:
Fermín Ezquer.

PREDICCIONES MACROECONÓMICAS:
Nicolás Carrasco.

ANÁLISIS DE LA BOLSA DE MADRID:
Pablo Gaya.

ANÁLISIS DEL MERCADO LABORAL ESPAÑOL:
Sergi Jiménez-Martín y Franco Peracchi

PREDICCIONES DE INFLACIÓN: Rebeca Albacete.

COLABORADORES EN PREDICCIÓN: Antonio Garre, Israel J. Muñoz y Lorena Sáiz.

COMPOSICIÓN: Gema Marcelo.

BOLETÍN INFLACIÓN Y ANÁLISIS MACROECONÓMICO es una publicación universitaria independiente de periodicidad mensual del Instituto Flores de Lemus de Estudios Avanzados en Economía, Universidad Carlos III de Madrid.

Queda prohibida la reproducción total o parcial del presente documento o su distribución a terceros sin la autorización expresa del instituto Flores de Lemus.
Depósito Legal: M22 938 - 1995

PUBLICATION MANAGEMENT COMMETTEE:
Michele Boldrin, Juan José Dolado, Antoni Espasa y Juan Urrutia.

DIRECTOR: Antoni Espasa.

COORDINATION AND INFLATION ANALYSIS:
Eva Senra.

ECONOMIC POLICY AND INTERNATIONAL ANALYSIS:
Fermín Ezquer.

MACROECONOMIC PREDICTIONS:
Nicolás Carrasco.

MADRID STOCK EXCHANGE MARKET:
Pablo Gaya.

ANALYSIS OF SPANISH LABOR MARKET:
Sergi Jiménez-Martín and Franco Peracchi.

INFLATION FORECASTS: Rebeca Albacete.

FORECAST COLLABORATORS: Antonio Garre, Israel J. Muñoz and Lorena Sáiz.

COMPOSITION: Gema Marcelo.

EU & US INFLATION AND MACROECONOMIC ANALYSIS BULLETIN is an independent academic publication, monthly published by the Instituto Flores de Lemus de Estudios Avanzados en Economía, Universidad Carlos III de Madrid.

All rights reserved. Reproduction in part or whole is strictly prohibited without prior written permission of the Instituto Flores de Lemus.

I. EDITORIAL

La inflación en la zona euro en el mes de abril de 2000 fue del 0,09% inferior a nuestra predicción del 0,14%. La tasa anual se ha situado en el 1,93%.

La innovación a la baja en la inflación global se compone de una innovación al alza en los precios de la inflación subyacente (bienes y servicios no energéticos) y a la baja en la inflación residual (alimentos no elaborados y energía).

Por países se han registrado innovaciones a la baja en seis de los once países que componen la Unión Monetaria, entre ellos Francia e Italia, y en los cuatro países restantes que forman la Unión Europea. La innovación a la baja registrada por la mayoría de los países de la UM procede de los precios energéticos. En cuanto a la inflación en el resto de bienes y servicios, se ha comportado según lo previsto en Francia e Italia, pero ha registrado una innovación al alza en Alemania.

I. MAIN POINTS IN THIS BULLETIN

Inflation in Euro zone *in April 2000 was 0.09% below our forecast of 0.14%. The annual rate settled at 1.93%.*

The downward innovation in global inflation is made up of an upward innovation in core inflation (non-energy goods and services) and a downward innovation in residual inflation (non-processed food and energy).

By countries, there have been downward innovations in six of the eleven countries that form the Monetary Union and in the rest four countries that aggregate the European Union. The downward innovation registered by most of the countries in MU comes from energy prices. With respect to the inflation in the rest of goods and services, it behaved as expected in France and Italy, but there has been an upward innovation in Germany.

Unión Monetaria (UM-11) ***Monetary Union (MU-11)***	TASAS DE CRECIMIENTO ANUAL MEDIO *AVERAGE ANNUAL RATE OF GROWTH*				
	1997	**1998**	**1999**	**2000**	**2001**
Inflación Residual / *Residual Inflation* - 17.72%	2.08	-0.35	1.16	**5.66**	**1.85**
Inflación Subyacente / *Core Inflation* - 82.28%	1.47	1.41	1.11	**1.28**	**1.34**
Inflación en el IPCA / *HICP Inflation* - 100%	1.57	1.09	1.12	**1.94**	**1.43**

La predicción de inflación para el mes de mayo es del 0,18%, con una tasa anual del 2,01%. Las perspectivas para 2000 son de que la tasa del IPCA vaya disminuyendo hasta el 1,62% en diciembre, con una inflación tendencial del 1,33% y una inflación residual hasta el 3,70% en dicha fecha.

El diagnóstico emitido en anteriores boletines sigue estando vigente, así: (1) la estabilidad inflacionista en la Unión Monetaria por debajo del 2% se presenta como muy probable para el 2000 y 2001; (2) se prevé también bastante homogeneidad inflacionista intersectorial, (3) pero por otra parte, la dispersión entre países tiende a mantenerse alta todavía en la media de 2001: Alemania y Francia no se espera que superen el 1%, España se situará en el 2,45%, Luxemburgo y Portugal superarán este valor e Irlanda por encima del 4%.

El BCE decidió mantener los tipos de interés en su pasada reunión del día 25 lo que contribuyo a una ligera recuperación del euro que sobrepasó la barrera de los 0,90 dólares. Este hecho apoya la tesis defendida desde este Boletín sobre la necesidad de limitar la actuación monetaria en tipos de interés a cuestiones

Inflation forecast for May is 0.18%, with an annual rate of 2.01%. Expectations for 2000 are that the HICP rate diminishes to 1.62% in December, with a core inflation of 1.33% and a residual inflation of 3.70% on that date.

The diagnosis reported in previous bulletins is still valid, so: (1) inflation stability in the Monetary Union below 2% appears quite likely for 2000 and 2001; (2) it is also forecasted intersectorial homogeneity and (3) but on the other hand, dispersion between countries tends to remain high still in 2001 average rates: it is expected that Germany and France don't grow beyond 1%, Spain would settle at 2.45%, Luxembourg and Portugal will register higher values and Ireland would be over 4%.

The ECB decided to maintain existing interest rates in its most recent meeting on May 25th. This contributed to a slight recovery of the euro, which passed the barrier of $0.90 This fact supports the thesis defended in this Bulletin about the need to limit monetary performance in interest rates to questions pertaining

relativas a inflación y no a sostenimiento de la divisa. En todo caso, parecería que la cuestión de la vuelta del euro a niveles próximos a los de principios de 1999 radica sobretodo en la habilidad para generar confianza en las posibilidades de la zona euro. Los datos económicos por si solos son suficientemente alentadores, pero falta que los inversores internacionales confíen en su continuidad. En tanto que al diferencial de inflaciones existente entre los distintos países de la zona euro, las mayores tasa de inflación en los países con menor nivel de precios podrían ser consecuencia del propio proceso de unificación europea al tender estos a homogeneizarse en toda al área y por lo tanto irá reduciéndose gradualmente a medida que se alcance un nivel de precios homogéneo.

to inflation and not to the maintenance of the currency. At any rate, it would seem that the question of the euro's returning to levels close to those of the beginning of 1999 is key, above all, in the ability to generate confidence in the possibilities of the euro zone. Economic figures alone are encouraging enough, but it still remains to be seen whether or not international investors believe that it will continue. As far as the inflationary gap between the different countries of the area, greater inflation rates in the countries with lower price levels could be a consequence of the process of European Unification itself, by tending to homogenize themselves throughout the area, and will therefore gradually diminishing as they reach homogeneous price levels.

La inflación en Estados Unidos en el mes de abril ha registrado una tasa anual del 3,01%, dos décimas de punto porcentual por debajo de lo esperado. La tasa mensual fue 0,06% en lugar del 0,25% previsto.

Annual US inflation *in April was 3.01%, two decimal percent points below it was expected. Monthly rate was 0.06% instead of the 0.25% forecasted.*

Se han producido innovaciones a la baja tanto en la inflación tendencial como en la residual. Se ha producido un comportamiento mejor de lo previsto en todos los bienes y servicios, pero las innovaciones han sido de pequeña magnitud salvo en los precios de la energía, que descendieron un 1,23 en lugar del previsto aumento del 0,25%.

There have been downward innovations in core and residual inflation. The observed rates were better than expected in all the goods and services, but innovations were of small magnitude with the exception of energy prices that descended by 1.23 instead of the forecasted increase of 0.25%.

Estados Unidos ***United States***	TASA DE CRECIMIENTO ANUAL MEDIO *AVERAGE ANNUAL RATE OF GROWTH*				
	1997	**1998**	**1999**	**2000**	**2001**
Inflación Residual / *Residual Inflation – 26.6%*	2.17	-1.02	2.59	**5.03**	**2.06**
Inflación Subyacente/*Core Inflation– 73.4%*	2.39	2.29	2.08	**2.28**	**2.28**
Inflación en el IPC / *CPI Inflation - 100%*	2.34	1.55	2.19	**2.88**	**2.24**

El diferencial de inflación tendencial entre bienes y servicios es ligeramente superior a dos puntos porcentuales y tiende a mantenerse estable en este valor durante 2000 y 2001. Este diferencial de inflación puede constituir un riesgo para la inflación global.

At the present moment the inflation differential between these two sectors is over two percents points and it is expected to remain along 2000 and 2001. This fact remains as a risk for global inflation stability.

La inflación residual (que agrega los índices de los precios al consumo de energía y alimentación) ha registrado en abril de 2000 una tasa anual del 5,76% que se espera que decrezca al 3,41% el próximo diciembre con una predicción del 2,06% en la tasa anual media del 2001.

Residual inflation (energy and food consumer price indexes) has registered in April 2000 an annual rate of 5.76% and it expected to decrease to 3.41% next December with a forecast of 2.06% in the annual average rate of growth in 2001.

Se prevé un descenso del 0,13% en el IPC global, con una tasa anual del 2,87%. Los crecimientos medios para 2000 y 2001 se situarían en el 2,88 y 2,24%.

It is expected a descent of 0.13% in global CPI with an annual rate of 2.87%. The average annual rates of growth for 2000 and 2001 would settle at 2.88 and 2.24%.

La Reserva Federal decidió finalmente incrementar 50 puntos básicos el tipo de interés de los Fed Funds hasta el 6,5%. Esta decisión estuvo basada en la preocupación de la Fed que la demanda continúe excediendo la oferta potencial, a pesar de su aumento por las mejoras en productividad. La situación en el mercado de trabajo y el deterioro en el comportamiento de los costes laborales pesaron en la decisión de la Fed. Tras esta medida, se abre el interrogante sobre las próximas intervenciones de la Reserva Federal.

The Federal Reserve finally decided to increase the base Fed Funds interest rate by 50 points, bringing it up to 6.5%. This decision was based on the Fed concern that demand will continue out-distancing potential supply, despite the increase in productivity improvements. The situation in the labor market and a worsening in the performance of labor costs weighed heavily on the Fed's decision. After this measure, the question arises as to what the Federal Reserve will do next.

Los datos aparecidos durante el mes de mayo apuntan a la continuidad del ciclo alcista y contribuyen al temor de un brote inflacionista pero resulta difícil determinar el momento y amplitud de las próximas restricciones.

The May figures point to a continuing upward cycle, and they are fanning the fears of an inflationary spurt but it is difficult to determine the exact moment and extent of coming monetary restrictions.

Desde el punto de vista de la demanda, el consumo y la inversión inmobiliaria en el primer trimestre han sido revisados a la baja mientras que la formación bruta de capital seguía una corrección al alza. Esto calmaría el temor de un repunte inflacionista al sugerir posibles aumentos en la productividad. Por lo que se refiere a la oferta, ha habido un continuo acercamiento a niveles no deseables de utilización de la capacidad instalada y un aumento en los retrasos de tiempos de entrega y en los pedidos no satisfechos. En conjunto, el balance final es de riesgo inflacionista, lo que significa que de continuar la actual tendencia y sobretodo, si se verifica un aumento en la tensión en el mercado de trabajo y en los costes laborales, la Fed podría subir tipos tan pronto como a finales de junio.

As of demand, consumption and real estate investment in the first quarter have been revised downwards while gross capital formation has followed the opposite change. This may calm the fears of an inflationary outbreak, insofar as they suggest the persistence of improvements in productivity. To take a look to supply, there has been an uninterrupted approach to undesirable levels of capacity utilization together with greater delays in production delivery times and an increase in orders backlog. All in all, it seems clear that the final balance is one of inflationary risk. This means that if the present growth trend continues, and above all, if it is proven that labor market tensions are on the rise, the Federal Reserve will raise rates again, possibly as soon as the end of June.

El índice de precios al consumo en España en abril creció el 0,41% frente a una predicción de 0,31%, alcanzando una tasa de crecimiento anual del 2,96%.

The Consumer Price Index in Spain *grew by 0.41% in April rather than the 0.31% predicted, reaching an annual growth rate of 2.96%.*

Este dato se ha caracterizado por: (a) una innovación al alza importante de los precios de las manufacturas no energéticas y en la inflación tendencial en servicios que se ha traducido en la continuación del proceso de crecimiento de la inflación tendencial; (b) continuación del proceso de reducción de la inflación residual que se prevé se truncará el mes próximo como consecuencia del aumento en los precios del gasóleo, gasolinas y gas natural.

These figures are characterised by: (a) a significant upward innovation in non-energy manufacturing prices and in service prices within core inflation which means in effect the continuation of the growth process in core inflation; (b) the continuation of the downward trend in residual inflation which, it is foreseen, will come to a halt next month as a result of the increase in prices of gasoil, gasoline and natural gas.

La predicción de inflación para abril de 2000 es de un aumento del 0,21%, lo que situará su crecimiento anual en el 3,19%. La inflación tendencial será del 0,18% y la inflación residual registrará un 0,31%. Las tasas de inflación media en el IPC global son superiores a las publicadas en el último Boletín y se sitúan en el 3,00% en 2000 y 2,65% en 2001.

Inflation predicted for April 2000 is for an increase of 0.21%, which will place its annual growth at 3.19%. Core inflation will be 0.18% and residual inflation will register a rate of 0.31%. Mean inflation rates within the overall CPI are higher than those published in the last Bulletin and are to settle at 3.00% in 2000 and 2.65% in 2001.

España ***Spain***	TASA DE CRECIMIENTO ANUAL MEDIO *AVERAGE ANNUAL RATE OF GROWTH*				
	1997	**1998**	**1999**	**2000**	**2001**
Inflación Residual / *Residual Inflation – 22.34%*	1.07	0.59	3.03	**5.10**	**2.63**
Inflación tendencial / *Core Inflation – 77.66%*	2.23	2.20	2.10	**2.40**	**2.66**
Inflación en el IPC / *CPI Inflation - 100%*	1.97	1.84	2.31	**3.00**	**2.65**

La información disponible, referida a los primeros meses del actual ejercicio, indica que la economía española está aumentando su ritmo de crecimiento y que su evolución está resultando mas positiva que la esperada hace cuatro meses. La aceleración del crecimiento parte de una notable mejora del contexto internacional, que está favoreciendo nuestras exportaciones. Por otro lado, la demanda interna, tal y como se esperaba, se está desacelerando pero lo hace en menor medida que la prevista. A la luz de la nueva información se revisa al alza la previsión de crecimiento del PIB para el bienio 2000-2001; ahora para el presente ejercicio se fija en el 3,9% y para el próximo en el 3,4%, tres y una décima mas, respectivamente, que en la estimación anterior.

6 de junio de 2000

The available information, referring to the first months of current financial year, indicates that the Spanish economy is accelerating its rhythm of growth and its evolution is turning out to be more positive than expected four months ago. The acceleration of the GDP comes from a noticeable improvement of the international context that it is favouring exports. On the other hand, domestic demand is slowing down, as was expected, but somewhat less was than expected. With the new information, GDP growth forecasted for the period 2000-2001 has to be adjusted upwards; now for the current year it is fixed at 3.9% and for next year at 3.5%, three and one tenths of a decimal point more, respectively, than in the former estimate.

June 6, 2000

II. ANÁLISIS DE INFLACIÓN Y COYUNTURA ECONÓMICA

II. ANALYSIS OF INFLATION AND INTERNATIONAL ANALYSIS

II.1 Unión Monetaria y Europea

II.1 Monetary and European Unions

La inflación en la zona euro fue del 0,09%, inferior a la predicción.

La inflación en la zona euro en el mes de abril de 2000 fue del 0,09% inferior a nuestra predicción del 0,14%. La tasa anual se ha situado en el 1,93%.

Inflation in Euro zone in April 2000 was 0.09% below our forecast of 0.14%. The annual rate settled at 1.93%.

Se ha producido una innovación al alza en la inflación tendencial y a la baja en la residual.

La innovación a la baja en la inflación global se compone de una innovación al alza en los precios de la inflación subyacente (bienes y servicios no energéticos) y a la baja en la inflación residual (alimentos no elaborados y energía). Dentro de la inflación subyacente los precios de los bienes no energéticos se han comportado muy próximos a su predicción, mientras que los precios de los servicios son los responsables de la innovación al alza. En los componentes de la inflación residual, los precios de los alimentos no elaborados han registrado un crecimiento mayor del previsto, pero la innovación a la baja en los precios de la energía ha sido importante, y ha estado causada por los precios de los carburantes que descendieron más del doble del descenso previsto.

The downward innovation in global inflation is made up of an upward innovation in core inflation (non-energy goods and services) and a downward innovation in residual inflation (non-processed food and energy). Within core inflation, the prices of non-energy goods behaved very close to the prediction, while prices of services are responsible of the upward innovation. In residual inflation, prices of non processed food grew more than expected, but the downward innovation in energy prices has been important and has been caused by prices of gasolines that descended more than double of the expected descent.

El cuadro 1 recoge los errores de predicción de los distintos agregados básicos para la zona euro.

Table 1 summarises the observed and forecasted values for the different basic aggregations for Euro Zone.

Cuadro 1 — *Table 1*

VALORES OBSERVADOS Y PREDICCIONES EN LOS DATOS DE PRECIOS AL CONSUMO EN LA UE

OBSERVED AND FORECAST VALUES ON CONSUMER PRICE FIGURES IN UE

Indices de Precios al Consumo (IPCA) ***Consumer Price Index (HICP)***	**Crecimiento observado** ***Current growth IV 2000***	**Predicción** ***Forecast***	**Intervalos de confianza (*)** *Confidence intervals (*)*
(1) AE (12.645%)	0.10	0.09	± 0.20
(2) MAN (32.663%)	0.10	0.06	± 0.14
BENE [1+2] (45.313%)	0.10	0.07	± 0.12
(3) SERV (37.512%)	0.19	-0.05	± 0.17
IPSEBENE [1+2+3] (82.819%)	**0.14**	**0.01**	± 0.10
(4) ANE (8.209%)	1.06	0.48	± 0.62
(5) ENE (8.964%)	-1.06	0.03	± 1.20
R [4+5] (17.173%)	**-0.09**	**0.23**	± 0.67
IPC [1+2+3+4+5] (100%)	**0.09**	**0.15**	± 0.14

(*) Al 80% de significación / *At 80% confidence level*
Fuente / Source: INE & INSTITUTO FLORES DE LEMUS
Fecha: 17 de mayo de 2000 / Date: May, 17th2000.

La mayor parte de los países han registrado innovaciones a la baja con origen en la evolución de los precios de la energía.

Por países se han registrado innovaciones a la baja en seis de los once países que componen la Unión Monetaria, entre ellos Francia e Italia, y en los cuatro países restantes que forman la Unión Europea. El cuadro 2 recoge un resumen de las discrepancias entre los valores observados y las predicciones. La información relativa a todos los países se encuentra en el cuadro A2 en el apéndice.

By countries, there have been downward innovations in six of the eleven countries that form the Monetary Union and in the rest four countries that aggregate the European Union. Table 2 summarises the discrepancies between observed and forecasted values. The information corresponding to all the countries can be found in table A2 in appendix.

Cuadro 2 — *Table 2*

VALORES OBSERVADOS Y PREDICCIONES EN LOS DATOS DE PRECIOS AL CONSUMO EN LOS PAÍSES DE LA UE (*)

OBSERVED VALUES AND FORECASTS ON CONSUMER PRICE FIGURES IN EU COUNTRIES(*)

País ***Country***	**Ponderación Weight** UM *MU*	UE15 *EU15*	**Crecimiento observado** ***Current growth IV 2000***	**Predicción** ***Forecast***	**Intervalos de confianza (%)(**)** ***Confidence Intervals (%)(**)***
IPCA España *Spain HICP*	*9.08%*		0.37	0.32	± 0.15
IPCA Alemania *Germany HICP*	*34.65%*		-0.10	-0.21	± 0.29
IPCA Francia *France HICP*	*20.91%*		0.00	0.18	± 0.20
IPCA Italia *Italy HICP*	*18.31%*		0.00	0.17	± 0.23
IPCA UM *MU HICP*	*100.00%*	*78.35%*	0.09	0.14	± 0.12
IPCA E-15 *EU-15 HICP*		*100.00%*	0.15	0.23	± 0.11

(*) Puede encontrarse una información más detallada en el cuadro A2 del Apéndice.
(**) Al 80% de significación.

(*) A more detailed information can be found in table A2 in Appendix.
(**) At 80% confidence level.

Fuente / *Source:* EUROSTAT & INSTITUTO FLORES DE LEMUS
Fecha de elaboración: 17 de mayo de 2000/ *Date: May, 17th 2000.*

En Alemania la inflación de los bienes y servicios no energéticos han registrado una innovación al alza.

La innovación a la baja registrada por la mayoría de los países de la UM procede de los precios energéticos. En cuanto a la inflación en el resto de bienes y servicios, se ha comportado según lo previsto en Francia e Italia, pero ha registrado una innovación al alza en Alemania.

The downward innovation registered by most of the countries in MU comes from energy prices. With respect to the inflation in the rest of goods and services, it behaved as expected in France and Italy, but there has been an upward innovation in Germany.

El cuadro 3 recoge los crecimientos anuales observados en el Índice de Precios Armonizado de la energía y en el índice correspondiente al resto de bienes y servicios (HICP-E).

Table 3 shows annual rates observed in Harmonised Consumer Price Index in energy and in the corresponding to the rest of goods and services (HICP-E).

Cuadro 3 *Table 3*

PREVISIONES DE CRECIMIENTOS ANUALES MEDIOS EN EL IPCA
MEAN ANNUAL GROWTH FORECASTS IN HICP

	IPCA excl. Energía / *HICP excl. Energy*				IPCA Energía / *HICP energy*			
	Observ.		Predicc. / *Forecasts*		Observ.		Predicc. / *Forecasts*	
	IV 00	Media *Average* 1999	Media *Average* 2000	Media *Average* 2001	IV 00	Media *Average* 1999	Media *Average* 2000	Media *Average* 2001
Alemania *Germany*	0.68	0.24	0.66	0.82	9.28	4.16	9.48	2.19
España *Spain*	2.06	2.14	2.26	2.54	13.88	3.40	11.15	1.95
Francia *France*	0.39	0.59	0.44	0.58	10.36	0.40	9.71	2.71
Italia *Italy*	1.80	1.71	1.84	1.79	9.84	1.09	7.23	1.43
U.Monetaria *Monetary U.*	1.11	1.01	1.16	1.37	11.83	2.23	9.99	2.01

Fuente / *Source:* EUROSTAT & INSTITUTO FLORES DE LEMUS
Fecha: 6 de junio de 2000 / Date: June 6th 2000

El diferencial entre países en los precios de los bienes y servicios no energéticos es elevado y se prevé siga siéndolo.

En el cuadro 3 se muestra: (1) Los precios de la energía siguen registrando tasas elevadas, superiores al 9% y las predicciones también son elevadas en el año 2000, aunque se moderarán en el 2001 y (2) el diferencial en los precios del resto de bienes y servicios entre países es elevado y se prevé siga siéndolo en 2000 y 2001.

Table 3 shows: (1) prices of energy are still registering rates over 9% and forecasts are also high for year 2000, though will moderate in 2001 and; (2) price differentials between countries in the rest of goods and services is high and it is forecasted that it remain so in 2000 and 2001.

La predicción de inflación para el mes de mayo es del 0,18%, con una tasa anual del 2,01%. Las perspectivas para 2000 son de que la tasa del IPCA vaya disminuyendo hasta el 1,62% en diciembre, con una inflación tendencial del 1,33% y una inflación residual hasta el 3,70% en dicha fecha.

Inflation forecast for May is 0.18%, with an annual rate of 2.01%. Expectations for 2000 are that the HICP rate diminishes to 1.62% in December, with a core inflation of 1.33% and a residual inflation of 3.70% on that date.

El cuadro 4 recoge un resumen de las predicciones para los distintos componentes en la Unión Monetaria. Las tasas mensuales y anuales se pueden encontrar al final del documento en los cuadros A4A y A4B.

Table 4 shows a summary of the forecasts for the different components in Monetary Union. Monthly and annual rates can be found at the end of the document in tables A4A and A4B.

Cuadro 4					Table 4
TASAS DE CRECIMIENTO ANUAL MEDIO EN LA UNIÓN MONETARIA (UM-11) *AVERAGE ANNUAL RATE OF GROWTH IN MONETARY UNION (MU-11)*					
	1997	**1998**	**1999**	**2000**	**2001**
Inflación Residual / 17.17% ***Residual Inflation***	2.08	-0.35	1.16	**5.66**	**1.85**
Alimentos No Elaborados / 8.21% *Non Processed Food*	1.34	1.97	0.00	1.02	1.65
Energía / 8.96% *Energy*	2.82	-2.65	2.23	9.99	2.01
Inflación tendencial / 82.82% ***Core Inflation***	1.45	1.41	1.11	**1.28**	**1.34**
Alimentos Elaborados /12.65% *Processed Food*	1.44	1.39	0.92	1.27	1.99
Manufacturas No Energéticas/32.66% *Non Energy Commodities*	0.56	0.86	0.64	0.57	0.58
Servicios No Energéticos / 37.51% *Non Energy Services*	2.34	1.95	1.57	1.72	1.75
Inflación en el IPCA / 100% ***HICP Inflation***	1.57	1.09	1.12	**1.94**	**1.43**

Fuente / *Source:* EUROSTAT & INSTITUTO FLORES DE LEMUS
Fecha: 6 de junio de 2000 / Date: June 6th 2000.

Durante el año 2001 se espera que la inflación tendencial se sitúe entre el 1,3-1,4% y que la inflación residual llegue a bajar al 1,84% en diciembre de 2001. Con ello, la tasa media anual del IPCA se situará en el 1,43% en dicho año.

Along 2001, it is expected that core inflation remains between 1.3-1.4% and residual inflation may descend to 1.84% in December 2001. With that the HICP average annual rate would 1.43% on that year.

El cuadro 5 recoge un resumen de las tasas de crecimiento medio para los principales países, las predicciones de inflación mensual y anual para todos los países se puede encontrar al final del documento en los cuadros A5A y A5B. La principal revisión es la producida en Alemania al alza en el año 2000.

Table 5 summarises average annual rates for the main countries, monthly and annual forecasts may be found in tables A5A and A5B. The main revision is for Germany in the upward sense.

Cuadro 5				Table 5
CRECIMIENTOS ANUALES MEDIOS *ANNUAL AVERAGE RATES OF GROWTH*				
	98	***99***	***Predicciones / Forecasts*** ***00***	***01***
IPCA España / *Spain HICP* – 9.08%	1.77	2.23	2.94	2.45
IPCA Alemania / *Germany HICP* – 34.65%	0.60	0.64	1.74	1.03
IPCA Francia / *France HICP* – 20.91%	0.67	0.56	1.40	0.87
IPCA Italia / *Italy HICP* – 18.31%	1.97	1.65	2.30	1.72
IPCA UM / *MU HICP* – 100%	1.11	1.12	1.97	1.45

Fuente/*Source*: Eurostat & I. Flores de Lemus
Fecha/*Date*: 23 de mayo de 2000/ *May 23rd 2000*

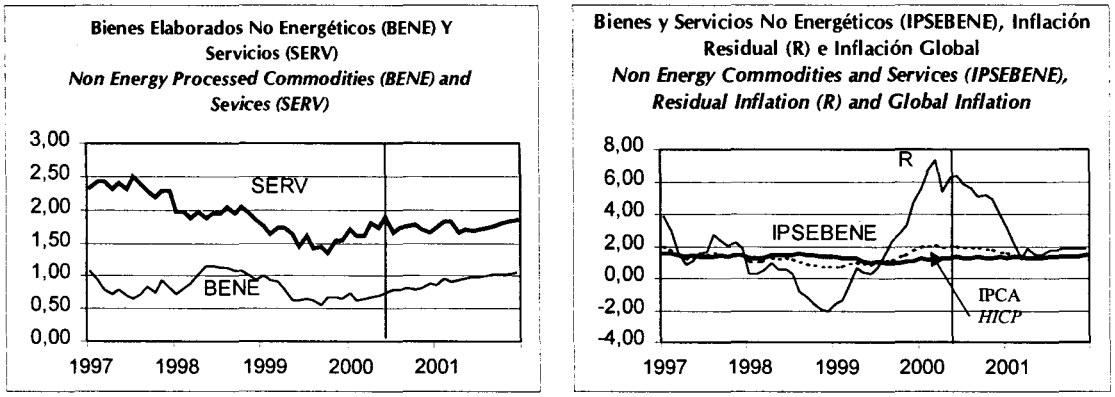
Se prevé estabilidad inflacionista en la Unión Monetaria.

La estabilidad inflacionista en la Unión Monetaria por debajo del 2% se presenta como muy probable para el 2000 y 2001 y se prevé también bastante homogeneidad inflacionista intersectorial. El gráfico 1 representa las tasas anuales en distintos agregados del HICP.

Inflation stability in the Monetary Union below 2% appears quite likely for 2000 and 2001 and it is also forecasted intersectorial homogeneity. Graph 1 shows annual rates in different HICP aggregations.

Gráfico 1 — *Graph 1*

TASAS ANUALES DEL IPCA EN LA UM
HICP ANNUAL GROWTH RATES IN MU



Fuente / *Source*: Eurostat & I. FLORES DE LEMUS
Fecha elaboración: 6 de junio de 2000 / *Date: June 6, 2000.*

La dispersión entre las tasas de inflación de los distintos países es elevada con tendencia a mantenerse.

Por otra parte, la dispersión entre países tiende a mantenerse alta todavía en la media de 2001: Alemania y Francia no se espera que superen el 1%, España se situará en el 2,45%, Luxemburgo y Portugal superarán este valor e Irlanda por encima del 4%.

On the other hand, dispersion between countries tends to remain high still in 2001 average rates: its expected that Germany and France don't grow beyond 1%, Spain would settle at 2.45%, Luxembourg and Portugal will register higher values and Ireland would be over 4%.

La decisión del BCE de mantener los tipos inalterados este mes ha propiciado mejoras en la cotización del euro.

El BCE decidió mantener los tipos de interés en su pasada reunión del día 25 lo que contribuyo a una ligera recuperación del euro que sobrepasó la barrera de los 0,90 dólares. Este hecho apoya la tesis defendida desde este Boletín sobre la necesidad de limitar la actuación monetaria en tipos de interés a cuestiones relativas a inflación y no a sostenimiento de la divisa. Dada la actual estabilidad en precios y las reducidas predicciones de inflación para los próximos años comentadas en este Boletín, existe margen para mantener una cierta neutralidad monetaria en los próximos meses lo que redundaría en una mejora en las expectativas de crecimiento de la zona euro y en la

The ECB decided to maintain existing interest rates in its most recent meeting on May 25th. This contributed to a slight recovery of the euro, which passed the barrier of $0.90 This fact supports the thesis defended in this Bulletin about the need to limit monetary performance in interest rates to questions pertaining to inflation and not to the maintenance of the currency. Given the present price stability and the diminished predictions of inflation for the coming years commented in this Bulletin, a buffer exists for maintaining a certain monetary neutrality during coming months. This would bring about an improvement in expectations for growth in the euro zone as well as in

confianza de los inversores internacionales. De este modo, se invertiría el actual flujo de capitales desde la UE hacia los USA incidiendo positivamente en la fortaleza del euro.

international investors' confidence. In this way, the current flow of capital from the EU towards the U.S. would be turned around, and could be a positive force for strengthening the euro.

Los datos sobre la evolución económica de la Zona euro no justifican la actual debilidad del euro por lo que más bien se trata de una cuestión de confianza en la continuidad del ciclo.

En todo caso, parecería que la cuestión de la vuelta del euro a niveles próximos a los de principios de 1999 radica sobretodo en la habilidad para generar confianza en las posibilidades de la zona euro. Los datos económicos por si solos son suficientemente alentadores, pero falta que los inversores internacionales confíen en su continuidad.

At any rate, it would seem that the question of the euro's returning to levels close to those of the beginning of 1999 is key, above all, in the ability to generate confidence in the possibilities of the euro zone. Economic figures alone are encouraging enough, but it still remains to be seen whether or not international investors believe that it will continue.

En este sentido, los últimos datos publicados por Eurostat, confirman el avance de la zona. La producción industrial excluida la construcción, creció un 1,2% y 0,6% en febrero y marzo lo que ha supuesto una tasa de crecimiento interanual del 5,5% y 5%respectivamente tras haber sufrido una ligera ralentización en enero. Destaca sobretodo el importante avance de la producción de bienes duraderos y de equipo. Respecto al sector manufacturero, se experimento un crecimiento ligeramente superior al del total de la industria, 6,4% interanual en febrero, aunque el dato referente a los tres meses hasta éste, se mantuvo en el 1,1%, igual que en el período precedente.

In this sense, the latest figures published by Eurostat confirm the advance of the zone. Industrial production, without building activity , grew by 1.2% in February and 0.6% in March. This has meant a year over year growth rate of 5.5% and 5% respectively, after having suffered a slight slowdown in January. Above all the significant advance in production of durable goods and equipment is worth mentioning. With regards to the manufacturing sector, it underwent slightly higher growth than the industry as a whole, 6.4% year over year in February, although the figure for the three months prior to February remained stable at 1.1%, as it had in the preceding period.

Atendiendo a los resultados de las encuestas de confianza, esta tendencia debería mantenerse en los próximos meses.

To take a look at the results of the confidence surveys, this trend should remain steady in the months ahead.

La producción industrial y las manufacturas han crecido en los dos primeros meses del año al igual que las ventas al por menor y el superávit corriente.

Desde el lado de la demanda, las ventas al por menor crecieron un 0,4% en febrero lo que supone una tasa interanual del 2,7% en el conjunto de la zona euro. Por lo que se refiere a la demanda externa, el superávit por cuenta corriente aumentó ligeramente hasta los 2,4 mil millones de euros en febrero gracias a un descenso en los déficits de las cuentas de rentas y transferencias corrientes, que compensó con creces la disminución del superávit en la balanza de bienes y el déficit en la de servicios.

With regards to demand, retail sales grew 0.4% in February. This means a year over year rate of 2.7% in the entire euro zone. With reference to foreign demand, the current account surplus increased slightly, reaching 2.4 billion euros in February, thanks to a respite in the deficits of the current income and current transfer accounts. This situation more than compensated for the drop in the balance of goods surplus and the deficit in that of services.

Con este entorno ciertamente expansivo contrasta la situación de las principales economías de la zona: Alemania y Francia. La

With this decidedly expansive environment, the contrasting situation of the main euro zone economies, France and Germany, stands

Contrasta la situación de Alemania y Francia que han experimentado una cierta desaceleración en el primer trimestre.

economía francesa por su parte ha mostrado un menor vigor en el primer trimestre de este año al crecer un 0,7% lo que ha supuesto una tasa interanual del 2% frente al 2,9% del trimestre anterior. Este descenso en el ritmo de crecimiento se ha debido a un menor impulso de la formación bruta de capital empresarial que creció un 1,2% frente al 1,5% del trimestre anterior. Esta caída se vio compensada con el aumento desde el 1% al 2,1% en la inversión inmobiliaria lo que finalmente permitió una contribución de la inversión total al crecimiento del PIB de 0,3 puntos. El consumo sin embargo creció un 0,8% en el primer trimestre frente al 0,6% del anterior y contribuyó con 0,4 puntos al crecimiento del PIB. Este menor ritmo de la inversión, y del crecimiento económico, podría ser consecuencia de las continuas subidas en tipos de interés que han tenido lugar en la zona desde el verano de 1999. De continuar esta tendencia se reabriría el debate respecto a la oportunidad de las recientes subidas y el problema de los choques asimétricos. Economías como la francesa con niveles de inflación interanual cercanos al 1% no precisan de restricciones monetarias sino por el contrario de una política más relajada que permita afianzar su crecimiento. Lo mismo ocurriría en Alemania donde tanto la producción industrial como las ventas al por menor han registrado tasas de crecimiento negativas en marzo del –2,5% y –2,0% respectivamente.

Las economías con más peso en la zona experimentan bajas tasas de inflación por lo que mayores tipos de interés simplemente deprimirían el ciclo expansivo.

Los recientes repuntes en tipos de interés del BCE han sido justificados en torno al argumento de la existencia de tensiones inflacionistas en algunos países de la zona euro y del riesgo de que un euro débil alimente este fenómeno vía mayores precios de la importación. Teniendo en cuenta que la actual debilidad del euro se debe más bien a la preferencia de los inversores extranjeros por el mercado norteamericano, más pujante y con mayor expectativa de beneficio, y considerando además que los países con mayor inflación del área son aquellos cuyo nivel de precios es en líneas generales menor que en el resto de la Unión, se puede concluir que una política de restricción monetaria no es quizás la alternativa óptima para solucionar los problemas.

out. The French economy has shown itself to be less vigorous in the first quarter of this year, growing by 0.7%. This has meant a year over year rate of 2%, compared to 2.9% in the previous quarter. This decline in the growth rate is due to a smaller push from gross business capital formation, which grew 1.2%, as compared to 1.5% in the previous quarter. This drop was made up for with the increase from 1% to 2.1% in new home investment, which finally allowed for a contribution of the total investment to the growth of the GDP by 0.3 points. However, consumer spending grew 0.8% in the first quarter, as compared to the 0.6% a quarter before. It contributed 0.4 points to GDP growth. This slower rate of investment, as well as of economic growth, could be consequences of the continuous raising of interest rates which have taken place in the euro zone since the summer of 1999. If this trend should continue, the debate would be renewed about the appropriateness of recent increases and the problem of asymmetric shocks. Economies like the French, with year over year inflation levels close to 1%, do not need monetary restrictions. Quite the contrary. What they need is a more relaxed policy that would allow it to establish growth. The same thing was happening in Germany, where industrial production as well as retail sales registered negative growth rates in February and March, -2.5% and -2.0% respectively.

Recent interest rate hikes by the ECB have been justified by using the argument that inflationary tensions exist in some countries of the euro zone, and of the risk that a weak euro feeds this phenomena through greater import prices. Bearing in mind that the present weakness of the euro is primarily due to foreign investors' preference for the U.S. market, which is more bullish and has greater expectations for profits, and considering, too, that the countries with greatest inflation are those whose price level is, generally speaking, lower than that of the rest of the Union, it can be concluded that a policy of monetary restriction is perhaps not the best alternative for solving the problems.

Si consideramos que la mayor inflación en los países con menores niveles de precios es consecuencia directa de la convergencia, la conclusión final pone en duda la necesidad de mayores tipos.

Este argumento viene fundamentado por dos tesis. Por una parte, al subir los tipos se reducen las expectativas de crecimiento en la zona y por lo tanto el euro se debilita y por otra, las mayores tasa de inflación en los países con menor nivel de precios podrían ser consecuencia del propio proceso de unificación europea al tender estos a homogeneizarse en toda al área dada la mayor libertad comercial y el creciente grado de integración de los mercados. De acuerdo con esta hipótesis sería de esperar que los países con menores niveles de precios vayan experimentando diferenciales positivos de inflación respecto al resto de la zona cada vez menores a medida que se vaya alcanzando un nivel homogéneo en los precios.

This argument is founded on two premises. On the one hand, raising rates reduces the expectations for growth in the zone, thus weakening the euro. On the other hand, greater inflation rates in the countries with lower price levels could be a consequence of the process of European Unification itself, by tending to homogenize themselves throughout the area, given the greater freedom of trade and the growing degree of market integration. Thus, with this hypothesis it would be logical that the countries with lower price levels should experience positive inflation differentials as compared to the rest of the zone, gradually diminishing as they reach homogeneous price levels.

II.2 Estados Unidos

La inflación anual en Estados Unidos en abril ha sido del 3,01%, dos décimas de punto porcentual por debajo de lo previsto.

La inflación en Estados Unidos en el mes de abril ha registrado una tasa anual del 3,01%, dos décimas de punto porcentual por debajo de lo esperado. La tasa mensual fue 0,06% en lugar del 0,25% previsto.

Se han registrado innovaciones a la baja tanto en la inflación tendencial como en la residual.

Se han producido innovaciones a la baja tanto en la inflación tendencial como en la residual. Se ha producido un comportamiento mejor de lo previsto en todos los bienes y servicios, pero las innovaciones han sido de pequeña magnitud salvo en los precios de la energía, que descendieron un 1,23 en lugar del previsto aumento del 0,25%.

Los cuadros 6 y 7 permiten evaluar las discrepancias entre los valores observados y las predicciones de los distintos componentes.

II.2 United States

Annual US inflation in April was 3.01%, two decimal percent points below it was expected. Monthly rate was 0.06% instead of the 0.25% forecasted.

There have been downward innovations in core and residual inflation. The observed rates were better than expected in all the goods and services, but innovations were of small magnitude with the exception of energy prices that descended by 1.23 instead of the forecasted increase of 0.25%.

Tables 6 and 7 allow evaluating the differences between observed values and forecasts for the different components.

Cuadro 6 — *Table 6*

DESGLOSE IPC EEUU
USA CPI DISAGGREGATION

IPC ***CPI*** (1+2+3+4) (100%)	1) IPC Energía *Energy CPI* (**E** – 10%)	INFLACIÓN RESIDUAL *RESIDUAL INFLATION* (1+2) (**RI** – 26,6 %)	**IPC** ***CPI*** (1+2+3+4) (100%)
	2) IPC Alimentos *Food CPI* (**F** – 16,6%)		
	3) IPC Servicios no energéticos *Non energy Services CPI* (**S** – 46,4%)	INFLACIÓN TENDENCIAL *CORE INFLATION* (3+4) (**CI** – 73,4 %)	
	4) IPC Bienes no energéticos no alimenticios *Non energy Commodities except food CPI* (**C** – 27%)		

Fuente / *Source:* BLS & INSTITUTO FLORES DE LEMUS

Cuadro 7 *Table 7*

VALORES OBSERVADOS Y PREDICCIONES EN LOS DATOS DE PRECIOS AL CONSUMO EN EEUU (*)
OBSERVED VALUES AND FORECASTS ON CONSUMER PRICE FIGURES IN US (*)

Indices de Precios al Consumo (IPC) *Consumer Index Price (CPI)*	**Crecimiento observado** *Observed growth IV 2000*	**Predicción** *Forecast*	**Intervalos de confianza(*)** *Confidence Intervals (*)*
Inflación Residual *Residual Inflation* **(RI – 26,6 %)**	**-0.33**	**0.21**	± 0.86
IPC Energía *Enery CPI* (E – 10%)	-1.23	0.25	± 2.00
IPC Alimentos *Food CPI* (F – 16,6%)	0.06	0.19	± 0.36
Inflación Tendencial *Core Inflation* **(CI – 73,4 %)**	**0.19**	**0.27**	± 0.14
IPC Servicios no energéticos *Non energy Services CPI* (S – 46,4%)	0.10	0.16	± 0.16
IPC Bienes no energéticos no alimenticios *Non energy Commodities except food CPI* (C – 27%)	0.41	0.52	± 0.26
IPC **CPI (100%)**	**0.06**	**0.25**	± 0.25

(*) Al 80% de significación. *(*) At 80% confidence level.*

Fuente / *Source:* BLS & INSTITUTO FLORES DE LEMUS
Fecha: 16 de mayo de 2000/ *Date: May, 16th 2000.*

Los bienes duraderos y otros bienes como el vestido y el calzado continúan registrando tasas de crecimiento anuales negativas.

Los precios de los bienes no energéticos ni alimenticios continúan beneficiándose de las tasas anuales negativas registradas en los bienes duraderos (-0,4%), y en algunos otros bienes como el vestido y el calzado (-1,4%). La tasa anual en el total del sector de bienes ha sido del 0,69% y se prevé se mantenga el resto del año por debajo del 1% con una tasa media anual del 0,64%. Durante el año 2001 también se espera un buen comportamiento con un crecimiento anual medio del 0,82%.

Prices on non-energy goods excluding food keep on benefiting of the negative annual rates in durable goods (-0.4%), and in some other commodities like apparel (-1.4%). The annual rate in the global of the sector has been 0.69% and it is expected to remain the rest of the year below 1% with and average annual rate of 0.64%. In year 2001, the forecast of the average annual rate of growth is 0.82%.

Se prevén tasas entre el 2,9 y 3,1% en 2000 y 2001 en el sector de servicios.

La innovación en el sector de servicios también ha sido a la baja (0,10 en lugar de 0,16%), pero la tasa anual de este índice se ha situado en el mes de abril en el 2,92%, y se prevé que se mantenga en tasas entre el 3 y 3,1% a lo largo del año 2000 para reducirse mínimamente a valores entre el 2,9-3% en el 2001.

The innovation in the services sector has also been downwards (0.10 instead of 0.16%), but the annual rate has settled in April at 2.92%, and it is forecasted that it remains in rates between 3 and 3.1% the rest of the year 2000 to slightly reduce to values between 2.9-3% in 2001.

El diferencial de inflación tendencial entre bienes y servicios es superior a dos puntos, con tendencia a mantenerse en 2000 y 2001.

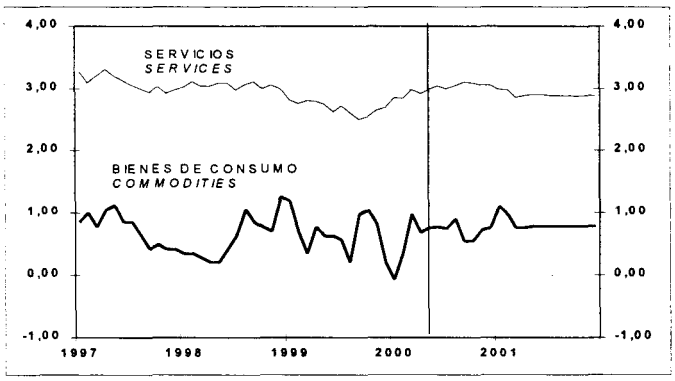
El gráfico 2 muestra las tasas anuales observadas y las predicciones de inflación tendencial en bienes y servicios. El diferencial de inflación en estos momentos es superior a dos puntos porcentuales y se espera se mantenga a lo largo de 2000 y 2001.

Graph 2 shows the annual rates observed and forecasted in core inflation in goods and services. At the present moment the inflation differential between these two sectors is over two percents points and it is expected to remain along 2000 and 2001.

Gráfico 2 *Graph 2*

INFLACIÓN TENDENCIAL EN BIENES Y SERVICIOS EN EEUU

CORE INFLATION OF COMMODITIES AND SERVICES IN US

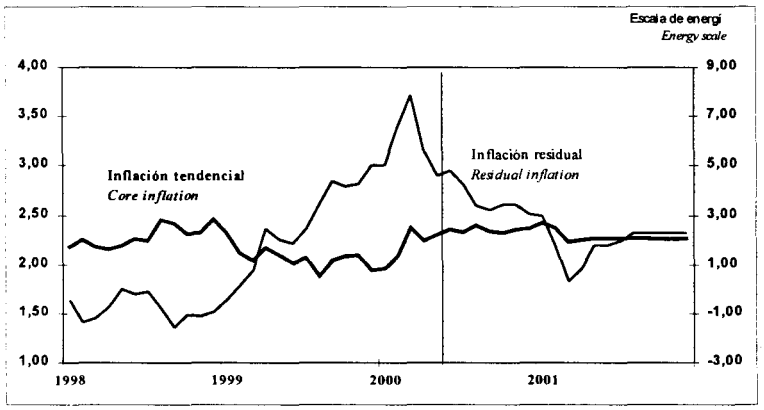


Fuente / *Source:* BLS & INSTITUTO FLORES DE LEMUS
Fecha de elaboración: 6 de junio de 2000 / *Date: June 6, 2000.*

Gráfico 3 *Graph 3*

INFLACIÓN TENDENCIAL Y RESIDUAL EN EEUU

CORE AND RESIDUAL INFLATION IN US



Fuente / *Source:* BLS & INSTITUTO FLORES DE LEMUS
Fecha de elaboración: 6 de junio de 2000 / *Date: June 6, 2000.*

A pesar de la caída del precio del barril del petróleo, la tasa anual de los precios de los componentes energéticos continúa elevada (12,25%).

La caída del precio del barril de petróleo ha sido el principal responsable de la innovación a la baja registrada en los precios del fuel y las gasolinas de automoción que han descendido un 2,3 y un 4,9% respectivamente. Aún así, las tasas anuales de estos índices se sitúan todavía en valores elevados del 27,4 y 41% respectivamente. Se prevé un nuevo descenso de los precios de la energía en mayo del 1,79%, lo que situaría la tasa anual en el 12.25%. La predicción de la tasa de crecimiento anual medio para el año 2000 es del 11,95%, mientras que para el año 2001 se situaría en el 0,81%.

The descent of the prices in petroleum barrel is the main responsible for the downward innovation registered in fuel and motor-oil prices that descended by 2.3 and 4.9% respectively with respect to the previous month. Even though, the annual rates in these indexes still show elevated values of 27.4 and 41% respectively. It is expected a new descent in the global of the energy component in May of 1.79%, what would settle the annual rate at 12.25%. The forecast for the average annual rate of growth in 2000 is 11.95%, while in 2001 it would settle at 0.81%.

En cuanto a los precios de la alimentación, la innovación ha sido también a la baja (0,06 en lugar de 0,19%) y ha sido debida al buen comportamiento generalizado de todos sus componentes. Las predicciones en este índice se han visto ligeramente revisadas a la baja a crecimientos medios anuales del 1,97 y 2,60% en 2000 y 2001.

With respect to food prices, the innovation has also been downward (0.06 instead of 0.19%) and it was due to the generalised good behaviour of all its components. Forecasts for this index have been slightly downward revised to average annual rates of 1.97 and 2.60% in 2000 and 2001.

Se predice que la inflación residual descenderá a lo largo de 2000 hasta el 3,41%.

Con el dato de abril la inflación residual ha iniciado una fase descendente que la situaría en el mes de diciembre de 2000 en el 3,41%. En el año 2001 este componente tendrá un carácter oscilante y alcanzará un valor medio del 2,06%.

With April figure, residual inflation has begun a descendent phase that would settle the rate on December 2000 at 3.41%. In year 2001 this component will have an oscilant behaviour and will reach an average value of 2.06%.

El cuadro 8 recoge las predicciones de inflación media anual para 2000 y 2001 para los distintos componentes de la economía americana. (Las predicciones mensuales y anuales se encuentran en los cuadros A5A y A5B en el apéndice).

Table 8 shows the average annual rates of growth for 2000 and 2001 for the different components of the US economy (monthly and annual rates can be found in tables A5A and A5B in the appendix).

Cuadro 8 — *Table 8*

TASAS DE CRECIMIENTO ANUAL MEDIO EN EEUU (*)
US AVERAGE RATES OF GROWTH (*)

	1997	1998	1999	Predicciones / *Forecasts* 2000	2001
Inflación Residual ***Trend Inflation (RI – 26,5 %)***	**2.17**	**-1.02**	**2.59**	**5.03**	**2.06**
Energía *Energy (E – 11%)*	1.26	-7.75	3.64	11.95	0.81
Alimentación *Food (F – 15,5 %)*	2.60	2.17	2.13	1.97	2.60
Inflación Tendencial ***Core Inflation (CI – 73,5 %)***	**2.39**	**2.29**	**2.08**	**2.28**	**2.28**
Bienes no energéticos (exc. alim.) *Non energy Commodities (exc. food) (C – 28%)*	0.74	0.59	0.68	0.64	0.82
Servicios no energéticos *Non energy Services (S – 45,5 %)*	3.09	3.05	2.69	3.00	2.90
Inflación en el IPC ***CPI Inflation (100%)***	**2.34**	**1.55**	**2.19**	**2.88**	**2.24**

(*) Las tasas mensuales y anuales se encuentran en los cuadros A4A y A4B del Apéndice.

(*) Monthly and annual growth rates can be found in tables A4A and A4B in Appendix.

Fuente / *Source:* BLS & INSTITUTO FLORES DE LEMUS
Fecha: 6 de junio de 2000 / *Date: June 6, 2000.*

Para mayo de 2000 se predice un descenso de la inflación global del 0,13%.

Con todo ello se prevé un descenso del 0,13% en el IPC global, con una tasa anual del 2,87%. Los crecimientos medios para 2000 y 2001 se situarían en el 2,88 y 2,24%.

With all the above exposed, it is expected a descent of 0.13% in global CPI with an annual rate of 2.87%. The average annual rates of growth for 2000 and 2001 would settle at 2.88 and 2.24%.

La Reserva Federal decidió finalmente incrementar 50 puntos básicos el tipo de interés de los Fed Funds hasta el 6,5% al considerar que la balanza del riesgo inflacionista se inclinaba más a favor de tal posibilidad. Esta ha sido la mayor subida en el precio del dinero de los cinco últimos años alcanzando niveles no conocidos desde hacía una década.

The Federal Reserve finally decided to increase the base Fed Funds interest rate by 50 points, bringing it up to 6.5%. This decision came after seeing that the balance of inflationary risk was tipping, in favor of such a possibility. This increase in the price of money is the largest in the last five years, resulting in rates unknown for a decade.

La Fed subió tipos para evitar que el exceso de demanda sobre la oferta potencial genere presiones sobre los recursos.

De acuerdo con su nota de prensa, a la Reserva Federal le preocupa que la demanda continúe excediendo la oferta potencial, a pesar de su aumento por las mejoras en productividad, generando continuas presiones sobre los recursos.

According to its press release, the Federal Reserve is concerned that demand will continue out-distancing potential supply, despite the increase in productivity improvements. This, of course, will in turn generate continuous pressure on resources.

Tal como se explicó en la anterior edición del Boletín la posibilidad de un repunte del 0,5% venía apoyada por los datos de crecimiento del primer trimestre y por la evolución al alza de los costes laborales unitarios dado el comportamiento a la baja de la tasa de crecimiento de la productividad. Se apuntaba sin embargo la posibilidad de que la Reserva Federal interpretase la caída de la construcción en marzo y las sucesivas correcciones de la bolsa en abril como indicadores de ralentización del crecimiento económico.

As was explained in a previous edition of the Bulletin, the possibility of a hike of 0.5% came backed up by the figures of first quarterly growth and by the upward trend of unitary labor costs. The rise in labor costs is due to a downward performance of the productivity growth rate. Nevertheless, it was suggested that the Federal Reserve might interpret March's downturn in building and the series of stock market corrections in April as indicators of a general economic slowdown.

Esta segunda posibilidad se vio reforzada justo antes de la reunión del Comité de Mercado Abierto (FOMC) al conocerse el discreto avance en la construcción en abril del 2,8%, lejos del ritmo de crecimiento experimentado en los primeros meses del año y reflejando el peso de las subidas en tipos sobre los costes financieros de las hipotecas. A ello se unieron los datos de inflación de abril que apuntaron a una cierta moderación en los precios lo que reducía el riesgo de que el salto experimentado en marzo fuese el origen de una tendencia alcista. En efecto los precios al consumo crecieron en abril un 3,01% frente al 3,7% del mes anterior y la tasa anual de la inflación subyacente se situó en el 2,23% frente al 2,38 de marzo.

This possibility was reinforced just before the FOMC meeting, when it was announced that the building sector had advanced slightly in April, 2.8%, far off the mark of the growth experienced in the first month of the year as a reflection of the weight of interest rate increases over mortgage financial costs. Added to that were the inflation figures for April, which showed slight moderation in prices. This reduced the risk that the jump felt in March might be the origin of an upward price trend. Indeed, consumer prices grew 3.01% in April, as opposed to 3.7% a month earlier, and the yearly core inflation rate stood at 2.23%, as compared to 2.38% for March.

A pesar de que estos datos pudieron inclinar la balanza hacia un aumento del 0,25%, la situación en el mercado de trabajo y el

In spite of the fact that these figures could tip the scale towards an increase of 0.25%, the situation in the labor market and a worsening

En la decisión de la Fed pesó más la evidencia de continuidad en el crecimiento y aumento de costes laborales que la consideración de factores que apuntaban a una cierta estabilidad de precios.

deterioro en el comportamiento de los costes laborales pesaron más en la decisión de la Fed optando por un aumento del 0,5%.

Tras esta medida, se abre el interrogante sobre las próximas intervenciones de la Reserva Federal. Parece claro que la situación actual es de claro riesgo inflacionista por lo que los tipos seguirán subiendo salvo que la economía desacelere de una forma clara a muy corto plazo. Sin embargo la dificultad radica en determinar el momento y amplitud de las próximas restricciones.

Eliminando el efecto de una menor inversión en inventarios en el primer trimestre, la economía creció un 6.9%, ritmo similar al cuarto trimestre de 1999.

Los datos aparecidos durante el mes de mayo apuntan a la continuidad del ciclo alcista y contribuyen al temor de un brote inflacionista. Por un lado, el segundo avance sobre el crecimiento de la economía en el primer trimestre mantiene el dato comentado en la anterior edición de este Boletín en el 5,4% anualizado. Aunque este dato supone un descenso en el ritmo de crecimiento frente al 7,3% del cuarto trimestre de 1999, ello es atribuible al descenso en la inversión en inventario, muy fuerte a finales del año pasado en previsión de las distorsiones del efecto 2000. De hecho, eliminando el impacto de los inventarios, el crecimiento en las llamadas ventas finales se mantuvo en el primer trimestre de 2000 en el 6,9%, nivel registrado en el trimestre precedente. Desde el punto de vista de los componentes de la demanda interna, el crecimiento del primer trimestre tuvo su reflejo en un aumento del 7,5% en el consumo, 5,2% en inversión residencial y 25,2% en formación bruta de capital. En la primera estimación publicada, se daban mayores crecimientos para el consumo y la inversión inmobiliaria y menores para la inversión empresarial. Las revisiones a la baja en las dos primeras partidas y al alza en la última atemperan el temor a un brote inflacionista en tanto en cuanto suponen una menor presión en la demanda de las economías domésticas y apoyan la continuidad de las mejoras en productividad dado que la formación bruta de capital ha sido un factor capital en los avances registrados.

El avance en el primer trimestre ha sido importante en la formación bruta de capital lo que apoya la posibilidad de continuar el ciclo expansivo con moderación de precios.

Desde el punto de vista de la oferta, la producción industrial creció un 0,9% en abril tras registrar un aumento del 0,7% en marzo,

in the performance of labor costs weighed more heavily on the Fed's decision, and they opted for an increase of 0.5%.

After this measure, the question arises as to what the Federal Reserve will do next. It seems clear that the present situation is one of inflationary risk. This means that interest rates will continue climbing, unless the economy should slow down sharply in the very near future. However, it is difficult to determine the exact moment and extent of coming restrictions.

The May figures point to a continuing upward cycle, and they are fanning the fears of an inflationary spurt. On the one hand, the second advance in the economy's growth in the first quarter maintains the figure commented on in the previous edition of this Bulletin, of 5.4% year over year. Although this number spells out a decline in the growth rate when compared to the 7.3% from the fourth quarter of 1999, it is attributable to the decline in inventory investment, which was very strong towards the end of last year in anticipation of possible YK2 complications. In fact, after eliminating the impact of the inventories, growth in the so-called final sales remained stable in the first quarter of 2000, at 6.9%. This was the same level recorded the quarter before. To turn to domestic demand components, first quarter growth was reflected in an increase of 7.5% in consumer spending, 5.2% in new home investment, and 25.2% in gross capital formation. In the first published estimation, greater growth was attributed to consumer spending and real estate investment, while less was foreseen for business investment. A downward revision of the first two variables and an increase of the third have calmed the fears of an inflationary outbreak, insofar as they suggest the persistence of improvements in productivity, given that the gross capital formation has been a main factor in the advances registered.

To take a look at supply, industrial production grew by 0.9% in April, after increasing 0.7% in March. This figure was revised upward

dato revisado al alza tras un preliminar del 0,3%. El avance de la producción en estos dos meses ha elevado la tasa de utilización de la capacidad productiva hasta el 82,1% tras un 81,7% en marzo y 80,4% hace un año, lo que ha supuesto entrar en el intervalo del 82%-84% considerado como límite compatible con la estabilidad en el crecimiento de los precios del productor. Este continuo acercamiento a niveles no deseables de utilización de la capacidad productiva coincide con mayores retrasos en los tiempos de entrega de la producción y un aumento en los pedidos no satisfechos. Los índices correspondientes a estos dos indicadores de la habilidad del sector productivo para satisfacer la demanda se situaron en abril en 55,6 y 51,0 puntos respectivamente, por encima del nivel 50 considerado como límite a partir del cual se supone existen cuellos de botella y por lo tanto presiones al alza en los precios del productor.

after an initial estimate of 0.3%. The advance in production during these two months brought the installed capacity utilization rate up to 82.1%, following 81.7% in March and 80.4% a year ago. This has meant the entry into the safety zone of 82%-84% considered the limit consistent with stability in the growth of producer prices. This uninterrupted approach to undesirable levels of production capacity utilization also comes at a time of greater delays in production delivery times and an increase in orders backlog. April indexes on these two factors of the production sector's ability to satisfy demand stood at 55.6 and 51.0 points, respectively. This is above the level of 50 regarded as the limit after which one must conclude that bottlenecks exist, and thus increasing pressures on producer prices to rise.

Los datos relativos a utilización de la capacidad instalada, retrasos en producción y acumulación de pedidos apuntan a la generación de cuellos de botella.

Otro elemento a favor de la generación de tensiones inflacionistas a corto plazo vendría de la mano de la evolución reciente del mercado de trabajo y los costes laborales. En tanto que al empleo, se registró un mejora en abril de 340.000 contrataciones tras las 458.000 de marzo, llevando la tasa de paro al 3,9%, la menor tasa registrada en los últimos 30 años, muy por debajo del nivel del 5% que se considera compatible con un crecimiento estable de los salarios. De hecho, tal como se explicó en la anterior edición del boletín, el índice del coste del empleo creció un 4,3% interanual en el primer trimestre de 2000 frente al 3,4% del período precedente empujado por alzas tanto en salarios como en los beneficios sociales a cargo del empleador. Esto, unido con un descenso en el ritmo de crecimiento de la productividad daría lugar a un deterioro en los costes laborales unitarios ante el avance de la retribución por hora, que creció un 4,2% interanual en el primer trimestre.

Another component showing the generation of inflationary tensions in the short run could result from recent trends in the labor market and labor costs. As for unemployment, in April there was improvement in payrolls of 340,000, following 458,000 in March. This brought unemployment down to 3.9%, the lowest rate in thirty years. This figure is also much below the 5% considered compatible with stable wage growth. In fact, as was explained in the previous edition of the Bulletin, the index of labor costs grew 4.3%year over year during the first quarter of 2000, as compared to the 3.4% registered during the preceding period, which was pushed upward both by wages and by social benefits charged to the employer. This, together with a decline in the productivity growth rhythm, would make way for a decline in unitary labor costs, due to the advance in hourly wages, which went up 4.2%, year over year, during the first quarter.

La tasa de paro a caído a su menor nivel de los últimos 30 años hasta el 3.9% y la retribución al factor trabajo aumenta.

Los factores hasta ahora analizados, suponen riesgos importantes para la inflación y de continuar su evolución se justificarían nuevos repuntes en el tipo de interés empezando en la próxima reunión de la Fed del 27-28 de junio.

The factors thus far analyzed seem to indicate significant risks for inflation. Moreover, if the present trend continues, this would justify raising interest rates again, beginning with the next meeting of the Fed on June 27th-28th.

Sin embargo, los datos de abril sobre precios al consumo y precios del productor y las predicciones de inflación para los próximos meses analizadas en este Boletín, apuntan más bien a una cierta neutralidad de la Reserva Federal lo que implicaría retrasar hasta agosto u octubre las nuevas medidas restrictivas.

However, the April figures on both consumer and producer prices, along with the predictions for inflation for the coming months analyzed in this Bulletin, point more towards neutrality on the part of the Federal Reserve, which would mean delaying the new restrictive measures until August or October.

Entre los elementos que atenúan el riesgo de inflación tenemos la fortaleza del dólar y la actual evolución de precios.

Por último, destacar que existen algunos factores que reducen en cierta medida el riesgo de inflación y que considerados por si solos llevarían a un descenso en tipos aunque dada la importancia de los elementos anteriormente estudiados y el deseo de la Fed de propiciar un aterrizaje suave simplemente alejan en el tiempo la aplicación de las medidas restrictivas o atemperan la amplitud de las mismas. En esta línea destaca la actual fortaleza del dólar pues resta vigor a la demanda agregada vía generación de déficit comercial que, de hecho, alcanzó en marzo un nuevo record de 30,2 mil millones de dólares.

Finally, it should be pointed out that there are some factors which reduce the risk of inflation to a certain extent and which, when considered separately, could lead to a lowering of interest rates. Actually, given the importance of the factors examined earlier, and the wishes of the Fed to provide a smooth landing, they just put off the application of the restrictive measures or soften their effects. Along these lines the present strength of the dollar stands out, since it saps strength from aggregated demand, via generation of the trade deficit, which, in fact, hit a new record of $30.2 billion in March.

Con todo ello, parece claro que el balance final es de riesgo inflacionista por lo que, de continuar la actual tendencia de crecimiento y, sobre todo, si se comprueba un nuevo aumento de la tensión en el mercado de trabajo y se mantiene la aceleración en el ritmo de crecimiento de los costes laborales la Reserva federal volvería a subir tipos tan pronto como a finales de junio.

All in all, it seems clear that the final balance is one of inflationary risk. This means that if the present growth trend continues, and above all, if it is proven that labor market tensions are on the rise, the Federal Reserve will raise rates again, possibly as soon as the end of June.

II.3 España

El IPC en España en abril aumentó un 0,41% frente a una predicción de 0,31%.

El índice de precios al consumo en abril creció el 0,41% frente a una predicción de 0,31%, alcanzando una tasa de crecimiento anual del 2,96%.

La inflación tendencial, calculada a partir del índice IPSEBENE-XT, registró en abril una tasa anual del 2,26% frente a una predicción del 2,20%. Con ello, la inflación tendencial continúa el proceso de crecimiento que comenzó a finales de año. Con respecto a abril de 1999 la inflación residual ha sido del 5,42%, continuando el proceso de reducción de este componente, que se inició a principios de año pero, se prevé que se truncará el mes próximo.

Las innovaciones al alza registradas en la inflación tendencial se encuentran tanto en el componente correspondiente al mercado de bienes como en el de servicios, sin embargo, la sorpresa al alza registrada en la inflación tendencial en bienes ha sido más elevada y deriva, como en meses pasados, de los precios de las manufacturas no energéticas. En cuanto a la inflación residual, se han registrado sorpresas al alza en los precios de los paquetes turísticos y de los alimentos no elaborados, a la baja en los precios de los aceites y las grasas, y una innovación prácticamente nula en los precios energéticos.

Las sorpresas al alza en la inflación tendencial proceden de MAN y en la residual de ANE y Paquetes Turísticos.

Para analizar este dato más rigurosamente es necesario recurrir a los cuadros 8 y 9. El cuadro 8 recoge la desagregación utilizada en este BOLETÍN para estudiar el comportamiento de la inflación (una versión más detallada se puede encontrar en el cuadro A1 al final del documento) y el cuadro 9 resume los errores de predicción cometidos en los distintos componentes.

II.3 Spain

The Consumer Price Index grew by 0.41% in April rather than the 0.31% predicted, reaching an annual growth rate of 2.96%.

Core inflation, calculated from the IPSEBENE-XT index, showed an annual rate of 2.26% in April, rather than the 2.20% predicted. This means that core inflation continues along the path of growth that began at the end of last year. With respect to April 2000, residual inflation was 5.42%, continuing thus the downward tendency for this component which started at the beginning of this year but which foreseeably will come to a halt next month.

The upward innovations in core inflation are to be found both in the goods market component as well as in services, the surprise, however, came in core inflation in goods, higher than expected and derived from, as in previous months, non-energy manufacturing prices. As far as residual inflation is concerned, there were surprises on the upward side in prices of tourist packages and fresh foods, on the downward side in the prices of oils and fats, and a practically null innovation in energy prices.

In order to analyse this data in greater detail it is necessary to look at tables 8 and 9. Table 8 includes the disaggregation used in this Bulletin to study inflation behaviour (a more detailed version may be found in Table A1 at the end of the document) and table 9 sums up the prediction errors made in different components.

Cuadro 8 — *Table 8*

DESGLOSE IPC ESPAÑA (*) — *SPANISH CPI DISAGGREGATION (*)*

1) IPC Alimentos Elaborados (excluídos Aceites y Tabaco) *Processed Foods CPI (excluding Fats and Tobacco)*	AE-X (14,82%)	Inflación Tendencial *Trend Inflation* (1 + 2 + 3)	IPC *CPI* (100%)
2) IPC Manufacturas No Energéticas *Non Energy Commodities CPI*	MAN (32,88%)		
3) IPC Servicios No Energéticos (excepto Turismo) *Non Energy Services CPI (excluding Tourism)*	SERV-T (29,95%)	IPSEBENE-XT (77,66%)	
4) IPC Grasas, Tabaco y Turismo *Fats, Tobacco and Tourism*	XT (3,34%)	Inflación Residual *Residual Inflation* (4 + 5 + 6)	
5) IPC Alimentos No Elaborados *Non Processed Foods CPI*	ANE (11,88%)		
6) IPC Energía *Energy CPI*	ENE (7,12%)	R (22,34%)	

(*) Puede encontrarse una información más detallada en el cuadro A1 del Apéndice.

(*) *A more detailed information can be found in table A1 in Appendix*

Fuente / *Source:* INSTITUTO FLORES DE LEMUS

Cuadro 9 — *Table 9*

VALORES OBSERVADOS Y PREDICCIONES EN LOS DATOS DE PRECIOS AL CONSUMO EN ESPAÑA (*)

OBSERVED VALUES AND FORECASTS ON CONSUMER PRICE FIGURES IN SPAIN (*)

Indices de Precios al Consumo (IPC) ***Consumer Price Index (CPI)***	**Crecimiento observado** ***Current growth*** ***IV 2000***	**Predicción** ***Forecast***	**Intervalos de confianza(*)** ***Confidence Intervals (*)***
(1) AE-X (14.82%)	0.08	0.10	± 0.18%
(2) MAN (32.88%)	0.33	0.24	± 0.16%
BENE-X [1 + 2] (47.41%)	0.25	0.20	± 0.14%
(3) SERV-T (29.95%)	0.35	0.32	± 0.17%
IPSEBENE-X-T [1 + 2 + 3] (77.66%)	**0.29**	**0.25**	± 0.13%
(4) X + T (3.34%)	1.15	0.85	
(5) ANE (11.88%)	0.85	0.37	± 1.09%
(6) ENE (7.12%)	0.60	0.59	
R [4 + 5 + 6] (22.34%)	**0.83**	**0.54**	
IPC [1+2+3+4+5+6] (100%)	**0.41**	**0.31**	± 0.15%

(*) Al 80% de significación.

(*) *At 80% confidence level.*

Fuente / *Source:* INE & INSTITUTO FLORES DE LEMUS
Fecha: 12 de mayo de 2000 / *Date: May, 12nd 2000.*

La inflación tendencial en bienes (medida por el índice BENE-X) ha sido del 0,25% frente a una predicción del 0,20%. La sorpresa al alza se produce a partir de la comentada innovación al alza en el componente de manufacturas, que aumentaron el pasado mes de abril un 0,33% en lugar del 0,24% previsto. En la evolución del IPC de Manufacturas No Energéticas de abril, todos los componentes han registrado innovaciones

Core inflation in goods (measured by the BENE-X index) was 0.25% as opposed to the predicted 0.20%. The surprise on the upward side comes from an upward innovation in the manufacturing component whose prices went up by 0.33% in April instead of the 0.24% foreseen. In the April evolution of Non-Energy Manufactured Goods within the CPI, all components showed upward innovations, particularly surprising being prices of

Importante innovación al alza en los precios de las manufacturas, derivada de los bienes duraderos y del calzado.

al alza, destacando las sorpresas al alza en los precios del calzado que crecieron un 0,56% frente a una predicción de 0,38% y en los precios de otros bienes duraderos y artículos del hogar, que aumentaron un 0.34%, en lugar del 0.22% previsto. Con ello los precios de los bienes duraderos volvieron a registrar en abril una tasa anual del 1,8%. Los mercados de bienes de consumo duraderos tienen grandes posibilidades de estar abiertos a la competencia internacional, por lo que dicha tasa anual es excesivamente alta dentro del contexto europeo actual. La innovación al alza registrada en abril, revisa al alza las predicciones de los precios de las manufacturas para el 2000 y 2001 situándolas en 1,99% y 2,19% respectivamente.

footwear that went up by 0.56% instead of the predicted 0.38% and in prices of other consumer durables and household articles that went up 0.34% rather than the 0.22% foreseen. With this, consumer durables showed once again in April an annual rate of 1.8%. The Consumer Durables markets have great possibilities of opening up to international competition, for which reason the figure is excessively high within the current European context. April's upward innovation means upward adjustments have to e made to the predictions for manufacturing prices for 2000 and 2001, placing them at 1.99% and 2.19% respectively.

El crecimiento mensual de la inflación tendencial en alimentación observado en abril prácticamente coincide con lo previsto.

Los precios de los alimentos elaborados excluidos aceites y tabaco (AE-X) registraron un crecimiento mensual de 0,08%, prácticamente igual al previsto, 0,10% con lo que la tasa de inflación anual en estos bienes se mantiene en el 0,97%, que es el valor que viene registrando desde diciembre. Sus expectativas de crecimiento medio se han modificado a la baja para 2000 al 1,21% y para 2001 al 1,6%.

Processed food prices, excluding those of oils and tobacco (the AE-X index) showed a monthly growth rate of 0.8%, practically the same as the 0.10% foreseen, with which the annual inflation rate for these goods remains at 0.97%, the figure that it has been showing since last December. Their mean growth expectation has, therefore, been adjusted downwards to 1.21% for 2000 and 1.6% for 20001.

Aumento de las expectativas de crecimiento medio en BENE-X.

La revisión al alza de MAN aumenta las perspectivas de inflación tendencial en bienes (medidas por el índice BENE-X). Las expectativas de crecimiento medio para 2000 y 2001 se sitúan en el 1,75 y2,01% respectivamente.

The upward adjustment of the MAN index increases prospects for core inflation in goods (measured by the BENE-X index). Mean growth expectations for 2000 and 2001 are now placed at 1.75% and 2.01% respectively.

El cuadro 10 recoge un resumen de las predicciones medias anuales de los distintos componentes de la inflación tendencial y residual (una información más detallada se puede encontrar en los cuadros A6A y A6B al final del documento).

Table 10 contains a summary of the mean annual predictions for the different core and residual inflation components (more detailed information may be found in Figures/Tables A6A and A6B at the end of the document).

Cuadro 10 — *Table 10*

TASAS DE CRECIMIENTO ANUAL MEDIO EN ESPAÑA
SPANISH AVERAGE RATES OF GROWTH

		1997	1998	1999	Predicciones / *Forecasts* 2000	2001
Inflación Residual	***Residual Inflation***	**1.07**	**0.59**	**3.03**	**5.10**	**2.63**
Aceites	*Fats*	-26.85	-11.11	14.95	-4.56	-6.05
Tabaco	*Tobacco*	16.28	7.90	4.33	1.26	2.54
Paquetes Turísticos	*Tourism*	14.77	15.39	7.21	6.55	8.90
Alim. No Elaborados	*Non Processed Foods*	0.87	2.14	1.17	3.08	3.38
Energía	*Energy*	2.41	-3.82	3.23	11.15	1.95
Inflación Tendencial	***Core Inflation***	**2.23**	**2.20**	**2.10**	**2.40**	**2.66**
BENE-X	*BENE-X*	1.53	1.44	1.27	1.75	2.01
SERV-T	*SERV-T*	3.27	3.30	3.31	3.31	3.56
Inflación en el IPC	***CPI Inflation***	**1.97**	**1.84**	**2.31**	**3.00**	**2.65**

(*) Puede encontrarse una información más detallada en los cuadros A6A y A6B del Apéndice.

(*) A more detailed information can be found in tables A6A and A6B in Appendix.

Fuente / *Source:* INE & Instituto Flores de Lemus
Fecha de elaboración: 30 de mayo de 2000 / *Date: May, 30th 2000.*

Se han registrado innovaciones al alza en los precios de los hoteles, del transporte, de la vivienda y de la enseñanza.

En cuanto al sector de servicios excluido los paquetes turísticos (SERV-T) la inflación mensual, 0,35%, se comportó ligeramente por encima de lo previsto, 0,32%, debido a innovaciones al alza en los precios de los hoteles, transporte, vivienda y enseñanza. Con ello, la inflación tendencial en servicios (SERV-T) anual ha repuntado al 3,23%, valor una décima superior al que viene registrando desde el pasado mes de agosto, y se prevé que continúe aumentando. Por tanto, las expectativas de crecimiento medio se revisan al alza al 3,31% en 2000 y al 3,56% en 2001.

With regards to the services sector (the SERV-T index), which excludes Tourist Packages, monthly inflation, 0.35%, came out slightly above the rate that was foreseen, 0.32%, owing to upward innovations in prices of hotels, transport, housing and education. With this, core inflation in services (the SERV-T index) showed an upturn to reach 3.2%, a figure that is one tenth of a decimal point higher than the rate this index has been registering since last August and it is expected to continue rising. Mean growth expectations, therefore, have to be adjusted upwards to 3.31% in 2000 and 3.56% in 2001.

La tasa anual del IPSEBENE-XT continúa el proceso de crecimiento.

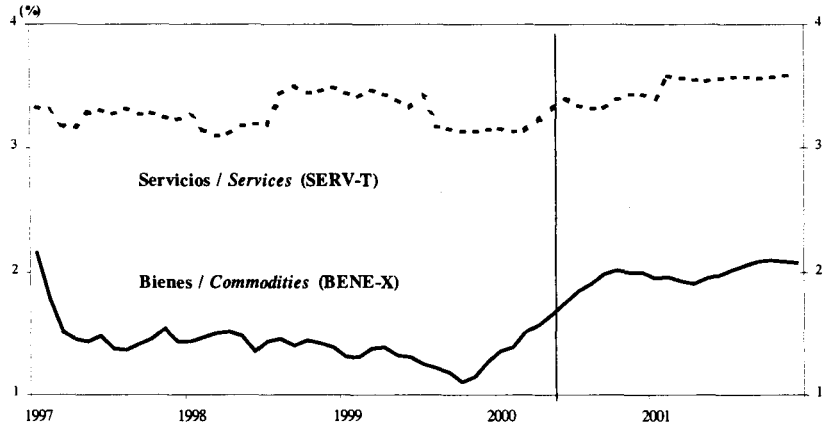
Con las mencionadas innovaciones al alza en las manufacturas (MAN) y en los servicios (SERV-T), la inflación tendencial, calculada a partir del índice IPSEBENE-XT registró una tasa anual del 2,26% frente a una predicción del 2,20%, revisando al alza las expectativas de crecimiento medio para 2000 y 2001 al 2,40% y al 2,66% respectivamente. Con ello, la inflación tendencial continúa con el proceso de crecimiento que comenzó a finales de año.

With the above-mentioned upward innovations in manufacturing prices, (the MAN index) and in services (the SERV-T index), core inflation, that calculated on the basis of the IPSEBENE-XT index, showed an annual rate of 2.26% as opposed to a predicted figure of 2.20%, meaning upward adjustments have to be made to the mean growth expectations for 2000 and 2001, to 2.40% and 2.66% respectively. With this, core inflation continues the growth process that started at the end of last year.

Gráfico 4 *Graph 4*

TASAS ANUALES DE CRECIMIENTO DE LA INFLACIÓN TENDENCIAL EN BIENES (BENE-X) Y EN SERVICIOS (SERV-T)

AVERAGE RATES OF GROWTH OF CPI INFLATION IN GOODS (BENE-X) AND IN SERVICES (SERV-T)



Fuente / *Source:* INE & INSTITUTO FLORES DE LEMUS
Fecha de elaboración: 30 de mayo de 2000 / *Date: May 30, 2000*

Dentro de la inflación residual, los alimentos no elaborados y los paquetes turísticos se han comportado peor de lo previsto.

En cuanto a los precios sobre los que se calcula la inflación residual, se tiene que los precios energéticos se comportaron prácticamente según lo esperado, (0,60% observado frente al 0,59% previsto), los precios de los aceites y grasas bastante mejor de lo esperado (-1,53% observado frente al 0,06% previsto) y en el grupo de alimentos no elaborados (ANE) se registraron innovaciones al alza en carnes y huevos, que resultan ser los sectores de alimentos no elaborados más inflacionistas, y también en moluscos y legumbres. Los precios de los paquetes turísticos tuvieron también un comportamiento peor del previsto, como consecuencia de la estacionalidad de este componente.

As regards those prices upon which residual inflation is calculated, it can be seen that energy prices behaved practically as expected (a rate of 0.60% was observed as opposed to the 0.59% predicted), prices of oils and fats behaved somewhat better than was expected (a rate of –1.53% was observed as opposed to the 0.69% predicted), and in the Fresh Foods group (the ANE index) there were upward innovations in meat and eggs, which are turning out to be the most inflationary Fresh Foods sectors, and also in prices of Shellfish and Pulses. Tourist Package prices also behaved worse than was expected, as a consequence of their seasonal nature.

Con todo ello la inflación residual registró un crecimiento mensual de 0,83% frente a una predicción de 0,54%, alcanzando una tasa anual del 5,42%.

With all of this, residual inflation showed monthly growth of 0.83% as opposed to a prediction of 0.54%, reaching an annual rate of 5.42%

Como consecuencia de las últimas y frecuentes subidas de los precios de las gasolinas así como del gasóleo automoción y del gas natural, las expectativas de crecimiento medio de los precios al consumo energéticos se revisan al alza al 11,15% y al 1,95% en 2000 y 2001, respectivamente. Las tasas de variación anual de los precios de los

As a consequence of the recent and frequent jumps in gasoline prices, as well as those of gasoil for private cars and natural gas, mean growth expectations for consumer energy prices have to be adjusted upwards to 11.15% and to 1.95% in 2000 and 2001 respectively. Annual variation rates for prices of oils and fats are expected to drop by 4.56%

aceites y grasas se espera que desciendan un 4,56% en 2000 y un 6,05% en 2001. En cuanto a las expectativas de crecimiento medio de los precios de los alimentos no elaborados han sido revisadas al alza y se sitúan en el 3,08% en 2000 y 3,38% en 2001. Por último, los precios de los Paquetes Turísticos, alcanzarán valores medios del 6,55 y 8,90% en 2000 y 2001 respectivamente. Por tanto, el crecimiento medio estimado en la inflación residual se sitúa en el 5,10% en 2000 y en el 2,63% en 2001.

El continuo crecimiento de los precios de las gasolinas pone en peligro el proceso de desaceleración de la inflación residual.

in 2000 and by 6.05% in 2001. As regards mean growth expectations for Fresh Food prices, they have had to be adjusted upwards and are now placed at 3.08% in 2000 and 3.38% in 2001. Lastly, prices of Tourist Packages will reach mean figures of 6.55% and 8.90% in 2000 and 2001 respectively. The estimated mean growth rate for residual inflation is 5.10% in 2000 and 2.63% in 20001.

Con todo ello, la predicción de inflación para mayo de 2000 es de un aumento del 0,21%, lo que situará su crecimiento anual en el 3,19%, la tasa de inflación anual no rebasó el 3% ni en 1998, ni en 1999, y tampoco lo hizo en los primeros cuatro meses del presente año. La inflación tendencial será del 0,18% y la inflación residual registrará un 0,31%. Las tasas de inflación media en el IPC global superan a las publicadas en el último Boletín y se sitúan en el 3,00% en 2000 y 2,65% en 2001.

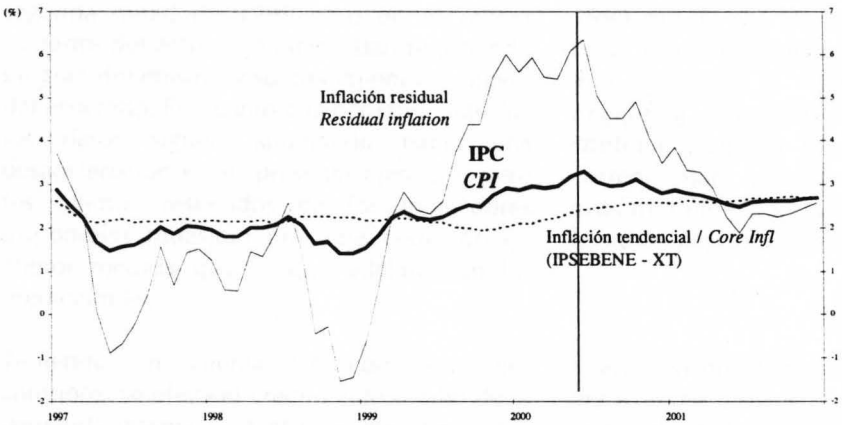
La predicción de inflación para marzo de 2000 es de un 0,21%; la inflación tendencial será del 0,18% y la residual del 0,31%.

With all of this, inflation predicted for May 2000 is for an increase of 0.21%, which will place its annual growth at 3.19%, the annual inflation rate did not go beyond 3% in 1998 or 1999, nor did it in the first four months of this year. Core inflation will be 0.18% and residual inflation will register a rate of 0.31%. Mean inflation rates in the overall CPI are greater than those published in the last Bulletin and are placed at 3.00% in 2000 and 2.65% in 2001.

Gráfico 5 — *Graph 5*

TASAS ANUALES DE CRECIMIENTO DE LA INFLACIÓN GLOBAL, TENDENCIAL Y RESIDUAL

AVERAGE RATES OF GROWTH OF TOTAL INFLATION, CORE AND RESIDUAL INFLATION



Fuente / Source : INE & INSTITUTO FLORES DE LEMUS
Fecha de elaboración: 30 de mayo de 2000/ *Date: May 30, 2000*

En el IPC de abril destaca, por tanto, la continuación del proceso de crecimiento de la inflación tendencial, como consecuencia de las innovaciones al alza tanto en el mercado de bienes como en el de servicios, así como

April's CPI has as an outstanding feature, therefore, the continuation of the growth process of core inflation, as a consequence of the upward innovations both in goods markets and services markets, as well as the

los continuos crecimientos de los precios de las gasolinas, como consecuencia del aumento del precio internacional del petróleo y la debilidad del euro frente al dólar, que ponen en peligro el proceso de reducción de la inflación residual.

continuing growth in gasoline prices, as a consequence of the increase in international petroleum prices and the weakness of the Euro against the Dollar, which jeopardise the process of reduction of residual inflation.

La evolución de la actividad económica es más positiva que la esperada hace tan sólo unos meses, lo que nos lleva a revisar al alza nuestras previsiones de crecimiento realizadas a finales del pasado febrero.

La mayoría de los indicadores disponibles para los primeros meses del actual ejercicio muestran que la economía española está registrando una gran fortaleza y aumentando su ritmo de crecimiento en el primer semestre de 2000. A este respecto es relevante el elevado crecimiento del empleo estimado por la EPA para el primer trimestre del actual ejercicio, incluso si se corrige del efecto de renovación censal que esta encuesta ha registrado en este trimestre. La evolución de la actividad económica es más positiva que la esperada hace tan sólo unos meses, lo que nos lleva a revisar al alza nuestras previsiones de crecimiento realizadas a finales del pasado febrero. Las nuevas estimaciones se muestran en el cuadro 11.

Most of the available indicators for the early months of the current financial year show that the Spanish economy is giving evidence of great strength and increasing its growth rate in the first semester of the year 2000. In this respect, the high growth of employment estimated by the EPA (in its Spanish initials) over the first quarter of the present year is noteworthy, even after correcting the effect of the updating of the census that this survey has carried out in this period. The evolution of economic activity is more positive than was to be expected just a few months ago, which means adjusting the growth forecasts made at the end of February. The new estimates are shown in table 11.

La previsible intensificación del crecimiento parte de una importante mejora del contexto internacional, con el consiguiente aumento del comercio mundial, que está impulsando al alza nuestras exportaciones. La recuperación de las exportaciones ya se inició en la segunda mitad de 1999 pero en el primer trimestre del actual ejercicio están registrando un gran dinamismo y su crecimiento es mayor del esperado. En cuanto a la demanda interna, los datos siguen apuntando hacia una desaceleración en el presente ejercicio, pero los últimos resultados de los indicadores disponibles muestran que está cediendo en menor medida que lo que adelantaban las predicciones.

The predictable intensification of growth comes from an major improvement in the international context, with the resulting world-wide trade increase, that is pushing Spanish exports upwards. The recovery of exports already started in the second half of 1999 but in the first quarter of the current fiscal year they are showing great dynamism and growth is higher than expected. Regarding the domestic demand, data continue pointing to a deceleration in the current year, but the latest results of the available indicators show that is decelerating less than previous predictions advanced.

Teniendo en cuenta las consideraciones anteriores se eleva el crecimiento medio de la demanda interna para el presente ejercicio y se fija en el 4,3%, dos décimas más que en la previsión anterior. A esta mejora contribuirán tanto el gasto en consumo final de los hogares como la Formación Bruta de Capital Fijo. Las exportaciones mejoran de manera significativa su anterior previsión de crecimiento medio anual (10,3%) y ahora se eleva hasta el 10,8%. A su vez, en correspondencia con el vigor de la demanda interna, la tasa anual de

Bearing in mind the previous considerations, the average growth of domestic demand has been adjusted upwards for the year 2000 and is fixed at 4.3%, two tenths of a decimal point more than in the previous forecast. The final consumption expenditure of households as Gross Fixed Capital Formation will contribute to this improvement. Exports will improve in a significant manner on the previous former forecast of yearly average growth of 10.3% and are now up to 10.8%. At the same time, in line with the strength of domestic demand,

crecimiento de las importaciones aumenta ligeramente, en una décima, y se sitúa en el 11,7%. Estos cambios en el sector exterior hacen que la demanda externa sea menos contractiva y su aportación al crecimiento del PIB será de –0,4 puntos porcentuales, frente a –0,5 de la previsión del pasado febrero. Como consecuencia de esta revisión de las previsiones de las diferentes macromagnitudes, el crecimiento del PIB se fija en el 3,9% para el conjunto de 2000, tres décimas más que en la anterior estimación.

the yearly growth of rate of imports is up slightly, by a tenth of a decimal point, and is sitting at 11.7%. These changes in the external sector mean that the external demand will be less contracted and its contribution to the GDP growth will be of –0.4 points, against the -0.5 of the previous forecast. As a consequence of this review of the forecasts of the different economic variables, GDP growth is settled at 3.9% for year 2000, three tenths of a decimal point more than in last February's forecast.

El crecimiento del empleo estimado por la EPA para el primer trimestre del actual ejercicio ha sido muy elevado, el 5,3% en tasa interanual. Esta tasa está sesgada al alza dado que el INE ha llevado a cabo en ese trimestre una renovación censal de la muestra, lo que supone un afloramiento, según sus propias estimaciones, de 77.500 ocupados. Si se corrige esa tasa de este sesgo ya es comparable con la del mismo trimestre de 1999 y se reduce al 4,7%. Este ritmo de crecimiento es muy elevado y supone que el empleo sigue una intensa evolución alcista. Esta fortaleza del empleo nos hace revisar su anterior previsión de crecimiento medio para el 2000 y elevarla hasta el 3,6%, frente al 2,8% de la anterior estimación.

The growth of employment estimated by the EPA for the first quarter of the current fiscal year has been very high, 5.3% in the year-on-year rate. This rate is biased upwards since the INE has updated the census in the sample, which means an outcrop of 77,500 employees, according to its own estimates. If the growth of employment in this period is corrected, it is comparable with the one from the same quarter in 1999 and the year-on-year variation rate (5.3%) is reduced to 4.7%. In any case, this growth rate is very high and means that employment is continuing along an intense upward evolutionary path. This strength of employment means adjusting the previous forecast of average growth for 2000 and raising it to 3.6%, against the 2.8% estimated before.

La economía española es probable que modere algo su crecimiento en el segundo semestre del actual ejercicio y también se espera que esa pauta de suave desaceleración continúe en el 2001.

La economía española es probable que modere algo su crecimiento en el segundo semestre del actual ejercicio y también se espera que esa pauta de suave desaceleración continúe en el 2001. La ralentización de la demanda interna continuará con más intensidad que en el actual ejercicio y se espera que tanto las exportaciones como las importaciones moderen ligeramente su tasa de avance anual. El crecimiento previsto del PIB para el próximo ejercicio se fija en el 3,5%, una décima mayor que en las previsiones del pasado febrero.

The Spanish economy is likely to moderate its growth rate in the second semester of the current financial year and it is also expected that this tendency towards a slight deceleration will continue in 2001. The slowing down of domestic demand will continue next year with more intensity than in the current financial year and it is expected that exports and imports will moderate their annual rates slightly. Forecasted growth for GDP in the next fiscal year is fixed at 3.5%, a tenth of a decimal point more than in last February's forecast.

Cuadro 11 *Table 11*

CUADRO MACROECONÓMICO E INDICADORES (*)
MACROECONOMIC TABLE AND INDICATORS

	Tasas anuales / *Annual Rates*		
		Predicciones / *Forecasts*	
	1999	**2000**	**2001**
Gasto en consumo final hogares / *Private Final Consumption Expenditure*	4.4	4.0	3.6
Gasto en consumo final AA.PP. / *Public Final Consumption Expenditure*	1.8	2.1	1.9
Formación Bruta de Capital Fijo / *Gross Fixed Capital Formation*	8.3	7.6	5.9
Equipo / *Equipment*	8.4	7.9	6.1
Construcción / *Building*	8.3	7.4	5.8
Variación de Existencias / *Inventary change* (1)	0.1	0.0	0.0
Demanda Interna / *Domestic Demand*	4.9	4.3	3.9
Exportación de Bienes y Servicios / *Exports of Goods and Services*	8.5	10.8	9.9
Importación de Bienes y Servicios / *Imports of Goods and Services*	12.6	11.7	10.8
Saldo Exterior / *Net Exports* (1)	-1.2	-0.4	-0.5
PIB / *GDP*	**3.7**	**3.9**	**3.5**
PIB, precios corrientes / *GDP, current prices*	7.0	6.9	6.2
Precios y Costes / *Prices and Costs*			
IPC, media anual / *CPI, annual average*	2.31	3.00	2.65
IPC, dic./dic. / *CPI, dec./dec.*	2.92	2.80	2.68
Remuneración (coste laboral) por asalariado / *Average earning per worker*	2.3	3.0	2.8
Coste laboral unitario / *Unit labour cost*	1.7	2.7	2.1
Mercado de Trabajo / *Labour Market*			
Población Activa (% variación) / *Labor Force (% variation)*	1.0	1.4	1.4
Empleo / *Employment:*			
Datos corregidos del cambio metodológico de la EPA			
Data adjusted from changes in the employment survey			
Variación media en % / *annual average variation in %*	3.2 (3)	3.6	2.8
Variación media en miles / *annual average variation in thousands*	425.6 (3)	498.0	401.0
Tasa de paro (% población activa) / *Unemployment rate*	15.9	14.0	12.8
Otros equilibrios básicos / *Basic balances*			
Sector exterior / *Foreing sector*			
Saldo de balanza por Cta. Cte. (m.m. Pts) / *Current Account (billions Pts.)*	-1650.5	-2263.2	-2021.3
Capacidad (+) o necesidad (-) de financiación (%PIB) / *Net lending or borrowing (% GDP)* (2)	-1.8	-2.1	-1.8
AA.PP. (Total) / *Public Administration*			
Capacidad (+) o necesidad (-) de financiación (%PIB) / *Net lending or borrowing (% GDP)* (2)	-1.3	-1.0	-1.0
Otros Indicadores Económicos / *Other Economic Indicators*			
Índice de Producción Industrial / *Industrial Production Index*	2.7	5.4	4.7

(1) Contribución al crecimiento del PIB, en puntos porcentuales / *Contribution to GDP growth in percentage points*
(2) En términos de contabilidad nacional / *In national account terms*
(3) Sin la mencionada corrección el crecimiento del empleo será sobre 606.000 personas, es decir, un 5,3% / *Without this adjustment the employment growth would be around 606.000 persons, i.e., 5.3%.*

Fuente: *Source:*

INE & I. FLORES DE LEMUS

Fecha: 30 de mayo de 2000. *Date: May 30, 2000.*

(*) Sección patrocinada por la Cátedra Fundación Universidad Carlos III de Predicción y Análisis Macroeconómico.

CUADROS Y GRÁFICOS / *TABLES & PLOTS*

CUADROS / *TABLES :*

A1: Desglose de la inflación en España.
A1: Spanish CPI desaggregation

A2: Errores de predicción de Europa.
A2: Europe forecast errors.

A3A: Crecimientos anuales 1998, 1999 y 2000 del IPC armonizado (ICPA) para la UM.
A3A: Harmonized Consumer Price Index (HICP) Annual Growth Rates for 1998, 1999 and 2000 for MU.

A3B: Crecimientos mensuales 1998, 1999 y 2000 del IPC armonizado (IPCA) para la UM.
A3B: Harmonized Consumer Price Index (HICP) Monthly Growth Rates for 1998, 1999 and 2000 for MU.

A4A: Crecimientos anuales 1999-2000-2001 del IPC armonizado (IPCA) por componentes básicos en la UM.
A4A: Harmonized Consumer Price Index (HICP) Annual Growth Rates by basic components for 1999-2000-2001 for MU.

A4B: Crecimientos mensuales 1999-2000-2001 del IPC armonizado (IPCA) por componentes básicos en la UM.
A4B: Harmonized Consumer Price Index (HICP) Monthly Growth Rates by basic components for 1999-2000-2001 for MU.

A5A: Crecimientos anuales 1998, 1999 y 2000 del IPC para Estados Unidos.
A5A: US CPI Annual Growth Rates for 1998, 1999 and 2000.

A5B: Crecimientos mensuales 1998, 1999 y 2000 del IPC para Estados Unidos.
A5B: US CPI Monthly Growth Rates for 1998, 1999 and 2000.

A6A: Crecimientos anuales 1998, 1999 y 2000 del IPC para España.
A6A: Spanish CPI Annual Growth Rates for 1998, 1999 and 2000.

A6B: Crecimientos mensuales 1998, 1999 y 2000 del IPC para España.
A6B: Spanish CPI Monthly Growth Rates for 1998, 1999 and 2000.

GRÁFICOS (*) / *PLOTS (*):*

A1A: Evolución de la inflación entre 1998 y 1999. Predicciones anuales desde febrero de 1998.
A1A: Annual forecasts since February 1998.

A1B: Evolución de la inflación entre 1996 y 1999. Errores de predicción mensual desde enero de 1996.
A1B: Monthly forecast errors since January 1996.

(*) Los gráficos que en números anteriores aparecían bajo los epígrafes A3, A4, A5 y A6 pueden consultarse en la página web del Boletín, www.uc3m.es/boletin, con la nueva numeración correspondiente A2, A3, A4 y A5.
(*) The graphs published in previous issues as A3, A4, A5 & A6 can be found in the web page of Bulletin, www.uc3m.es/boletin, now as A2, A3, A4 and A5.

Cuadro A1 | **Table A1**

AGREGADOS SOBRE LOS COMPONENTES BÁSICOS *BASIC COMPONENTS AGGREGATION*	COMPONENTES BÁSICOS *BASIC COMPONENTS*	AGREGADOS SOBRE LOS COMPONENTES BÁSICOS *BASIC COMPONENTS AGGREGATIONS*
IPSEBENE (IPC de servicios y bienes elaborados no energéticos; 80,99%) (1)+(2)+(3)+(4)+(5) *(Non Energy Manufactured Goods and Services CPI)* **BENE** (IPC de bienes elaborados no energéticos; 50,35%) (1)+(2)+(4) *(Non Energy Manufactured Goods)* **AE** (IPC de alimentos elaborados; 17,47%) (1)+(4) *(Processed Food CPI)*	(1) **AE-X** (IPC de alimentos elaborados excluyendo aceites, grasas y tabaco; 14,82%) *(Processed Food CPI, exluding fats, oils and tobacco)* (2) **MAN** (IPC de manufacturas; son los precios de los bienes que no son alimenticios ni energéticos; 32,88%) *(Non Energy Manufactured Goods CPI, excluding Food)* (3) **SERV-T** (IPC de servicios; excluyendo los paquetes turísticos, 29,95%) *(Services CPI, excluding Tourist Packages)* (4) **X** (IPC de aceites, grasas y tabaco; 2,65%) *(Fats, oils and tobacco CPI)* (5) **T** (IPC de los paquetes turísticos; 0,69%) *(Tourist Packages CPI)* (6) **ANE** (IPC de alimentos no elaborados; 11,88%) *(Non Processed Food)* (7) **ENE** (IPC de bienes energéticos; 7,12%) *(Energy CPI)*	**BENE-X** (IPC de bienes elaborados no energéticos excluyendo aceites, grasas y tabaco; 47,71%) (1)+(2) *(Non energy Manufactured Goods exluding fats, oils and tobacco)* **IPSEBENE-X-T** (IPC de servicios y bienes elaborados no energéticos excluyendo aceites, grasas, tabaco y paquetes turísticos; 77,66%) (1)+(2)+(3) *(Non energy manufactured goods and services, excluding fats, oils, tobaco and tourist packages)* **R** (IPC de aceites, grasas, tabaco, paquetes turísticos, alimentos no elaborados y energía; 22,34%) (4)+(5)+(6)+(7) *(Fats, oils, tobacco, tourist packages, non processed food and energy CPI)* **IPC** (IPC General) (1)+(2)+(3)+(4)+(5)+(6)+(7) *(General CPI)*
INFLACIÓN SUBYACENTE (Se calcula sobre el IPSEBENE) ***CORE INFLATION*** *(calculated on IPSEBENE)*		**INFLACIÓN RESIDUAL** (Se calcula sobre R) ***RESIDUAL INFLATION*** *(Calculated on R)* **INFLACIÓN TENDENCIAL** (Se calcula sobre el IPSEBENE-X-T) ***TREND INFLATION*** *(Calculated on IPSEBENE-XT)* **INFLACIÓN** (Se calcula sobre el IPC) ***INFLATION*** *(Calculated on CPI)*

IPC = 0,1482 AE-X + 0,3288 MAN + 0,2995 SERV-T + 0,0265 X + 0,0069 T + 0,1188 ANE + 0,0712 ENE

Fuente: *Source:*

INE & Instituto Flores de Lemus, Universidad Carlos III de Madrid

Cuadro A2 *Table A2*

VALORES OBSERVADOS Y PREDICCIONES DE LA TASA MENSUAL DEL IPC ARMONIZADO
(IPCA) PARA LOS PAÍSES DE LA UE
OBSERVED AND FORECASTED VALUES ON HARMONIZED ICP (HICP)
MONTHLY GROWTH FOR EU COUNTRIES

País *Country*	Ponderación *Weight* UM *MU*	UE15 *EU15*	Crecimiento observado *Current growth*	Predicción *Forecast*	Intervalos de confianza (%) (*) *Confidence Intervals (%)(*)*
IPCA España *Spain HICP*	9.08%		0.37	0.32	± 0.15
IPCA Alemania *Germany HICP*	34.65%		-0.10	-0.21	± 0.29
IPCA Austria *Austria HICP*	2.91%		-0.19	-0.09	± 0.37
IPCA Bélgica *Belgium HICP*	3.99%		0.19	0.58	± 0.32
IPCA Finlandia *Finland HICP*	1.51%		0.19	0.35	± 0.37
IPCA Francia *France HICP*	20.91%		0.00	0.18	± 0.20
IPCA Holanda *Netherlands HICP*	5.65%		0.37	0.35	± 0.33
IPCA Irlanda *Ireland HICP*	0.98%		0.64	0.68	± 0.30
IPCA Italia *Italy HICP*	18.31%		0.00	0.17	± 0.23
IPCA Luxemburgo *Luxembourg HICP*	0.20%		0.66	0.22	± 0.32
IPCA Portugal *Portugal HICP*	1.81%		1.12	0.59	± 0.66
UM IPCA *HICP MU*	100.00%	78.35%	0.09	0.14	± 0.12
IPCA Dinamarca *Denmark HICP*		1.35%	0.19	0.28	± 0.27
IPCA Grecia *Greece HICP*		2.19%	0.61	1.18	± 0.78
IPCA Reino Unido *UK HICP*		16.33%	0.38	0.71	0.33
IPCA Suecia *Sweden HICP*		1.78%	-0.19	0.25	0.50
IPCA UE-15 *EU-15 HICP*		100.00%	0.15	0.23	0.11

(*) Al 80% de significación. *(*) At 80% confidence level.*

Fuente: *Source:*

EUROSTAT & INSTITUTO FLORES DE LEMUS

Fecha de elaboración: 17 de mayo de 2000. *Date: May, 17th 2000*

uadro A3A

Indicador retrasado*

CRECIMIENTOS **ANUALES** DEL IPC ARMONIZADO (ICPA) PARA LOS PAÍSES DE LA UE[1]
Crecimientos de un mes sobre el mismo mes del año anterior (T112)
HARMONIZED CPI (HICP) ***ANNUAL*** *GROWTH FOR EU COUNTRIES*[1]
Annual growth (T112)

Lagged indicator*

Table A3A

	Pond./ *Weight* UM *MU*	UE15 *EU15*	Tasa *Rate*	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Tasas Medias / *Average Rates*(2) 99/98	00/99	01/00
IPCA España	9.08%		1999	1.45	1.85	2.14	2.33	2.13	2.13	2.12	2.30	2.50	2.40	2.69	2.78	2.23		
Spain HICP			2000	2.87	2.96	3.04	3.03	**3.20**	**3.21**	**2.96**	**2.82**	**2.84**	**2.97**	**2.74**	**2.69**		**2.94**	
			2001	**2.65**	**2.53**	**2.46**	**2.40**	**2.31**	**2.36**	**2.43**	**2.44**	**2.43**	**2.45**	**2.48**	**2.51**			**2.45**
IPCA Alemania	34.65%		1999	0.20	0.10	0.49	0.79	0.39	0.39	0.58	0.68	0.78	0.88	0.98	1.37	0.64		
Germany HICP			2000	1.86	2.06	2.05	1.56	**1.80**	**1.97**	**1.68**	**1.61**	**1.62**	**1.64**	**1.68**	**1.39**		**1.74**	
			2001	**1.14**	**1.11**	**0.86**	**1.04**	**1.01**	**0.84**	**0.97**	**0.99**	**1.06**	**1.12**	**1.14**	**1.15**			**1.03**
IPCA Austria	2.91%		1999	0.29	0.20	0.20	0.10	0.39	0.20	0.29	0.49	0.59	0.79	0.98	1.66	0.51		
Austria HICP			2000	1.37	1.96	1.95	1.76	**1.77**	**1.74**	**1.71**	**1.69**	**1.67**	**1.62**	**1.58**	**1.41**		**1.69**	
			2001	**1.49**	**1.37**	**1.37**	**1.41**	**1.38**	**1.40**	**1.41**	**1.40**	**1.40**	**1.40**	**1.40**	**1.40**			**1.40**
IPCA Bélgica	3.99%		1999	0.98	0.98	1.28	1.07	0.78	0.68	0.68	0.88	1.27	1.37	1.56	2.05	1.13		
Belgium HICP			2000	1.85	2.14	2.52	2.32	**2.25**	**2.48**	**2.59**	**2.69**	**2.62**	**2.54**	**2.51**	**2.36**		**2.41**	
			2001	**2.34**	**2.17**	**1.89**	**2.00**	**2.09**	**2.01**	**1.92**	**1.93**	**1.89**	**1.89**	**1.85**	**1.78**			**1.98**
IPCA Finlandia	1.51%		1999	0.49	0.88	0.88	1.27	1.36	1.17	1.37	1.27	1.36	1.55	1.85	2.24	1.31		
Finland HICP			2000	2.34	2.72	3.20	2.50	**2.39**	**2.48**	**2.79**	**2.81**	**2.55**	**2.57**	**2.66**	**2.54**		**2.63**	
			2001	**2.71**	**2.23**	**1.83**	**1.78**	**1.75**	**1.77**	**1.85**	**1.86**	**1.79**	**1.79**	**1.82**	**1.78**			**1.91**
IPCA Francia	20.91%		1999	0.30	0.29	0.39	0.49	0.39	0.29	0.39	0.49	0.59	0.78	0.98	1.37	0.56		
France HICP			2000	1.67	1.47	1.66	1.36	**1.46**	**1.55**	**1.69**	**1.46**	**1.29**	**1.25**	**1.16**	**0.77**		**1.40**	
			2001	**0.96**	**0.85**	**0.63**	**0.73**	**0.70**	**0.70**	**0.84**	**0.90**	**0.96**	**0.99**	**1.07**	**1.09**			**0.87**
IPCA Holanda	5.65%		1999	2.06	2.04	2.02	1.92	2.12	2.13	1.84	2.52	2.02	1.82	2.01	1.92	2.03		
Netherlands HICP			2000	1.63	1.53	1.61	1.69	**1.72**	**1.73**	**1.89**	**1.66**	**1.85**	**1.96**	**1.89**	**1.94**		**1.76**	
			2001	**1.97**	**1.99**	**1.94**	**1.91**	**1.88**	**1.88**	**1.88**	**1.87**	**1.87**	**1.87**	**1.86**	**1.86**			**1.90**
IPCA Irlanda	0.98%		1999	2.07	2.25	2.05	2.04	2.32	2.12	1.93	2.41	2.59	2.79	2.98	3.93	2.46		
Ireland HICP			2000	4.44	4.60	4.97	5.04	**5.01**	**5.03**	**5.06**	**4.47**	**4.44**	**4.42**	**4.40**	**3.81**		**4.64**	
			2001	**3.79**	**4.15**	**4.10**	**4.09**	**4.08**	**4.09**	**4.08**	**4.08**	**4.08**	**4.08**	**4.08**	**4.08**			**4.07**
IPCA Italia	18.31%		1999	1.45	1.35	1.35	1.35	1.54	1.44	1.73	1.63	1.92	1.92	2.01	2.11	1.65		
Italy HICP			2000	2.20	2.39	2.57	2.38	**2.24**	**2.44**	**2.25**	**2.40**	**2.25**	**2.24**	**2.17**	**2.09**		**2.30**	
			2001	**2.06**	**1.89**	**1.65**	**1.76**	**1.75**	**1.71**	**1.74**	**1.68**	**1.67**	**1.60**	**1.59**	**1.59**			**1.72**
IPCA Luxemburgo	0.20%		1999	-1.37	0.59	0.59	1.27	1.27	1.17	-0.29	1.37	1.56	1.85	1.85	2.34	1.02		
Luxembourg HICP			2000	3.47	2.63	3.02	3.19	**3.23**	**3.49**	**5.06**	**3.54**	**3.56**	**3.50**	**3.57**	**3.45**		**3.47**	
			2001	**4.05**	**3.38**	**3.17**	**2.79**	**2.69**	**2.73**	**2.69**	**2.68**	**2.67**	**2.62**	**2.65**	**2.58**			**2.89**
IPCA Portugal	1.81%		1999	2.53	2.73	2.82	2.70	2.11	2.11	1.91	1.82	1.92	1.81	1.90	1.70	2.17		
Portugal HICP			2000	1.90	1.61	1.42	1.88	**2.36**	**2.41**	**2.57**	**2.74**	**2.81**	**2.77**	**2.65**	**2.70**		**2.32**	
			2001	**2.71**	**2.92**	**3.02**	**2.71**	**2.62**	**2.62**	**2.55**	**2.55**	**2.54**	**2.54**	**2.53**	**2.53**			**2.65**
UM IPCA	100%	78.35%	1999	0.78	0.78	0.98	1.07	0.97	0.87	1.07	1.17	1.17	1.36	1.46	1.75	1.12		
HICP MU			2000	1.95	2.04	2.13	1.93	**2.02**	**2.14**	**2.01**	**1.97**	**1.98**	**1.93**	**1.94**	**1.67**		**1.97**	
			2001	**1.68**	**1.56**	**1.37**	**1.43**	**1.38**	**1.32**	**1.41**	**1.41**	**1.45**	**1.46**	**1.48**	**1.49**			**1.45**
IPCA Dinamarca		1.35%	1999	1.17	1.23	1.65	1.74	1.64	1.93	2.03	2.42	2.41	2.61	2.70	3.09	2.05		
Denmark HICP			2000	2.80	2.79	2.96	2.86	**2.88**	**2.91**	**2.91**	**2.65**	**2.69**	**2.72**	**2.69**	**2.53**		**2.78**	
			2001	**2.62**	**2.52**	**2.22**	**2.26**	**2.26**	**2.22**	**2.23**	**2.23**	**2.22**	**2.22**	**2.22**	**2.22**			**2.29**
IPCA Grecia		2.19%	1999	3.27	3.10	3.02	2.61	1.97	1.52	1.56	1.37	1.34	1.70	1.97	2.32	2.14		
Greece HICP			2000	2.35	2.64	2.76	2.11	**2.01**	**2.03**	**2.25**	**2.26**	**2.05**	**2.02**	**2.00**	**1.91**		**2.20**	
			2001	**2.04**	**2.09**	**1.83**	**1.76**	**1.80**	**1.82**	**2.02**	**2.03**	**1.84**	**1.81**	**1.79**	**1.71**			**1.88**
IPCA Reino Unido		16.33%	1999	1.57	1.46	1.66	1.55	1.35	1.35	1.26	1.26	1.15	1.15	1.25	1.15	1.35		
UK HICP			2000	0.77	0.96	0.67	0.57	**0.34**	**0.36**	**0.47**	**0.43**	**0.45**	**0.52**	**0.43**	**0.48**		**0.54**	
			2001	**0.84**	**0.74**	**0.87**	**0.83**	**1.18**	**1.23**	**1.25**	**1.27**	**1.27**	**1.28**	**1.28**	**1.28**			**1.11**
IPCA Suecia		1.78%	1999	0.00	0.20	0.49	0.29	0.29	0.39	0.19	0.78	1.07	0.97	0.78	1.17	0.55		
Sweden HICP			2000	0.98	1.36	1.36	0.97	**0.90**	**0.95**	**1.18**	**1.12**	**0.88**	**0.88**	**1.08**	**0.93**		**1.05**	
			2001	**1.20**	**0.99**	**0.85**	**1.07**	**1.05**	**1.09**	**1.15**	**1.19**	**1.10**	**1.09**	**1.14**	**1.14**			**1.09**
IPCA UE-15		100%	1999	0.96	0.94	1.14	1.18	1.06	0.97	1.11	1.20	1.18	1.35	1.44	1.67	1.18		
EU-15 HICP			2000	1.76	1.87	1.90	1.71	**1.71**	**1.72**	**1.65**	**1.60**	**1.59**	**1.56**	**1.55**	**1.37**		**1.66**	
			2001	**1.44**	**1.30**	**1.17**	**1.23**	**1.28**	**1.29**	**1.38**	**1.42**	**1.46**	**1.49**	**1.52**	**1.52**			**1.38**

* La tasa T1.12 normalmente refleja los cambios fundamentales en el crecimiento de los precios con seis meses de retraso respecto a los crecimientos mensuales, por lo que es necesario analizar sus predicciones para evaluar el momento inflacionista presente.

(1) Las cifras en negrilla son predicciones

(2) Tasa de crecimiento del nivel medio de un año con respecto al año anterior.

* *T1.12 growth rate lags fundamental changes in prices: 6 months with respect to monthly growth rates. It is necessary to evaluate forecast in order to analyze current situation.*

(1) Figures in bold type are forecasted values.

(2) Annual average rate of growth.

Fuente:

Fecha de elaboración: 6 de junio de 2000

Source:

EUROSTAT & INSTITUTO FLORES DE LEMUS

Date: June 6th 2000

CRECIMIENTOS **MENSUALES** DEL IPC ARMONIZADO (IPCA) PARA LOS PAÍSES DE LA UE[1]

HARMONIZED CPI (HICP) ***MONTHLY*** *GROWTH FOR EU COUNTRIES[1]*

	Pond. *Weight* UM/*MU*	UE15/*EU15*	Tasa *Rate*	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Tasas Anuales / *Annual Rates*(2) D99/ D98	D00/ D99	D01/ D00
España IPCA	9.08%		1999	0.29	0.10	0.38	0.38	0.00	0.00	0.47	0.47	0.19	-0.09	0.19	0.37	2.78		
Spain HICP			2000	0.37	0.19	0.46	0.37	**0.17**	**0.01**	**0.23**	**0.34**	**0.21**	**0.03**	-0.04	**0.33**		**2.69**	
			2001	**0.33**	**0.07**	**0.39**	**0.32**	**0.07**	**0.07**	**0.30**	**0.35**	**0.20**	**0.05**	**-0.01**	**0.36**			**2.51**
Alemania IPCA	34.65%		1999	-0.10	0.20	0.20	0.39	0.00	0.10	0.49	0.00	-0.29	-0.10	0.10	0.39	1.37		
Germany HICP			2000	0.39	0.39	0.19	-0.10	**0.24**	**0.26**	**0.20**	**-0.07**	**-0.28**	**-0.07**	**0.14**	**0.10**		**1.39**	
			2001	**0.14**	**0.35**	**-0.05**	**0.08**	**0.21**	**0.09**	**0.34**	**-0.06**	**-0.21**	**-0.01**	**0.15**	**0.12**			**1.15**
IPCA Austria	2.91%		1999	-0.10	0.20	0.10	0.00	0.10	-0.39	0.10	0.20	-0.10	0.39	0.29	0.87	1.66		
Austria HICP			2000	-0.38	0.77	0.10	-0.19	**0.11**	**-0.42**	**0.07**	**0.17**	**-0.11**	**0.33**	**0.25**	**0.71**		**1.41**	
			2001	**-0.31**	**0.65**	**0.10**	**-0.15**	**0.08**	**-0.40**	**0.08**	**0.17**	**-0.11**	**0.33**	**0.25**	**0.71**			**1.40**
IPCA Bélgica	3.99%		1999	0.39	0.19	0.10	0.39	0.19	-0.19	0.19	-0.19	0.29	0.10	0.19	0.38	2.05		
Belgium HICP			2000	0.19	0.48	0.48	0.19	**0.13**	**0.03**	**0.30**	**-0.09**	**0.22**	**0.02**	**0.17**	**0.24**		**2.36**	
			2001	**0.17**	**0.31**	**0.20**	**0.30**	**0.21**	**-0.05**	**0.22**	**-0.08**	**0.18**	**0.01**	**0.13**	**0.17**			**1.78**
IPCA Finlandia	1.51%		1999	-0.19	0.39	0.19	0.87	0.29	0.00	-0.29	0.10	0.48	0.10	0.00	0.29	2.24		
Finland HICP			2000	-0.10	0.76	0.66	0.19	**0.17**	**0.09**	**0.01**	**0.12**	**0.22**	**0.12**	**0.09**	**0.17**		**2.54**	
			2001	**0.07**	**0.30**	**0.27**	**0.14**	**0.14**	**0.12**	**0.09**	**0.12**	**0.15**	**0.12**	**0.12**	**0.14**			**1.78**
IPCA Francia	20.91%		1999	-0.39	0.39	0.29	0.29	0.00	0.00	-0.29	0.20	0.20	0.10	0.10	0.49	1.37		
France HICP			2000	-0.10	0.19	0.48	0.00	**0.09**	**0.09**	**-0.15**	**-0.03**	**0.03**	**0.06**	**0.00**	**0.10**		**0.77**	
			2001	**0.10**	**0.09**	**0.27**	**0.10**	**0.06**	**0.09**	**-0.02**	**0.03**	**0.09**	**0.09**	**0.08**	**0.12**			**1.09**
IPCA Holanda	5.65%		1999	0.00	0.67	1.05	0.28	0.00	-0.47	-0.57	0.67	0.47	0.09	0.19	-0.47	1.92		
Netherlands HICP			2000	-0.28	0.57	1.13	0.37	**0.02**	**-0.45**	**-0.42**	**0.45**	**0.66**	**0.20**	**0.12**	**-0.42**		**1.94**	
			2001	**-0.25**	**0.58**	**1.07**	**0.35**	**-0.01**	**-0.46**	**-0.42**	**0.44**	**0.66**	**0.19**	**0.11**	**-0.42**			**1.86**
IPCA Irlanda	0.98%		1999	-0.77	0.68	0.29	0.57	0.67	0.28	-0.47	0.66	0.47	0.09	0.19	1.21	3.93		
Ireland HICP			2000	-0.28	0.83	0.64	0.64	**0.64**	**0.30**	**-0.44**	**0.09**	**0.45**	**0.07**	**0.17**	**0.64**		**3.81**	
			2001	**-0.29**	**1.18**	**0.59**	**0.63**	**0.63**	**0.31**	-0.44	**0.09**	**0.45**	**0.07**	0.17	0.64			**4.08**
IPCA Italia	18.31%		1999	0.10	0.19	0.19	0.19	0.29	0.00	0.28	0.00	0.28	0.19	0.19	0.19	2.11		
Italy HICP			2000	0.19	0.37	0.37	0.00	**0.16**	**0.19**	**0.10**	**0.15**	**0.13**	**0.18**	**0.13**	**0.11**		**2.09**	
			2001	**0.16**	**0.21**	**0.14**	**0.11**	**0.14**	**0.16**	**0.12**	**0.09**	**0.12**	**0.11**	**0.12**	**0.11**			**1.59**
IPCA Luxemburgo	0.20%		1999	-1.66	1.88	0.10	0.49	0.29	-0.10	-1.26	1.66	0.19	0.29	0.10	0.38	2.34		
Luxembourg HICP			2000	-0.57	1.05	0.47	0.66	**0.32**	**0.15**	**0.24**	**0.20**	**0.21**	**0.23**	**0.17**	**0.26**		**3.45**	
			2001	**0.00**	**0.41**	**0.27**	**0.29**	**0.22**	**0.20**	**0.20**	**0.19**	**0.19**	**0.19**	**0.19**	**0.19**			**2.58**
IPCA Portugal	1.81%		1999	-0.38	0.00	0.38	0.66	0.09	0.19	0.00	-0.19	-0.09	0.19	0.66	0.19	1.70		
Portugal HICP			2000	-0.19	-0.28	0.19	1.12	**0.57**	**0.24**	**0.15**	**-0.02**	**-0.03**	**0.16**	**0.54**	**0.24**		**2.70**	
			2001	**-0.17**	**-0.08**	**0.28**	**0.82**	**0.48**	**0.23**	0.09	**-0.03**	**-0.04**	**0.15**	**0.54**	**0.23**			**2.53**
UM IPCA	100%	78.35%	1999	-0.10	0.29	0.29	0.29	0.10	0.00	0.19	0.10	0.00	0.10	0.10	0.38	1.75		
HICP MU			2000	0.10	0.38	0.38	0.09	**0.19**	**0.12**	**0.07**	**0.06**	**0.01**	**0.05**	**0.10**	**0.13**		**1.67**	
			2001	**0.10**	**0.26**	**0.19**	**0.15**	**0.14**	**0.06**	**0.15**	**0.07**	**0.04**	**0.07**	**0.12**	**0.14**			**1.49**
IPCA Dinamarca		1.35%	1999	0.19	0.48	0.58	0.29	0.38	0.28	-0.28	0.28	0.38	0.09	0.19	0.19	3.09		
Denmark HICP			2000	-0.09	0.47	0.75	0.19	**0.40**	**0.31**	**-0.28**	**0.04**	**0.42**	**0.12**	**0.16**	**0.04**		**2.53**	
			2001	**-0.01**	**0.37**	**0.45**	**0.23**	**0.41**	**0.27**	**-0.28**	**0.04**	**0.41**	**0.12**	**0.16**	**0.04**			**2.22**
IPCA Grecia		2.19%	1999	-1.34	-0.72	2.46	1.24	-0.26	-0.18	-2.12	-0.09	1.98	0.35	0.18	0.88	2.32		
Greece HICP			2000	-1.31	-0.44	2.57	0.61	**-0.36**	**-0.16**	**-1.90**	**-0.08**	**1.78**	**0.32**	**0.16**	**0.79**		**1.91**	
			2001	**-1.17**	**-0.40**	**2.31**	**0.54**	**-0.32**	**-0.14**	**-1.71**	**-0.07**	**1.60**	**0.28**	**0.14**	**0.71**			**1.71**
IPCA Reino Unido		16.33%	1999	-0.58	0.19	0.48	0.48	0.29	-0.10	-0.67	0.38	0.38	-0.10	0.19	0.19	1.15		
UK HICP			2000	-0.95	0.38	0.19	0.38	**0.05**	**-0.07**	**-0.56**	**0.35**	**0.40**	**-0.03**	**0.11**	**0.24**		**0.48**	
			2001	**-0.60**	**0.28**	**0.32**	**0.34**	**0.39**	**-0.02**	**-0.54**	**0.36**	**0.41**	**-0.03**	**0.11**	**0.24**			**1.28**
IPCA Suecia		1.78%	1999	-0.39	0.10	0.58	0.19	0.29	-0.10	-0.48	0.00	0.87	0.19	-0.38	0.29	1.17		
Sweden HICP			2000	-0.58	0.48	0.58	-0.19	**0.23**	**-0.05**	**-0.25**	**-0.06**	**0.64**	**0.18**	**-0.19**	**0.15**		**0.93**	
			2001	**-0.31**	**0.27**	**0.44**	**0.03**	**0.21**	**-0.02**	**-0.19**	**-0.03**	**0.55**	**0.17**	**-0.13**	**0.15**			**1.14**
IPCA UE-15		100%	1999	-0.21	0.25	0.38	0.34	0.13	-0.02	-0.02	0.14	0.13	0.07	0.11	0.36	1.67		
EU-15 HICP			2000	-0.12	0.37	0.41	0.15	**0.13**	**0.00**	**-0.10**	**0.09**	**0.12**	**0.05**	**0.10**	**0.18**		**1.37**	
			2001	**-0.05**	**0.23**	**0.28**	**0.22**	**0.18**	**0.01**	**-0.01**	**0.13**	**0.15**	**0.08**	**0.12**	**0.18**			**1.52**

(1) Las cifras en negrilla son predicciones.

(2) Tasa de crecimiento de diciembre de un año con respecto a diciembre del año anterior.

(1) Figures in bold type are forecasted values.

(2) December over December rate of growth.

Fuente: EUROSTAT & INSTITUTO FLORES DE LEMUS *Source:*

Fecha de elaboración 6 de junio de 2000 *Date: June 6th 2000*

Cuadro A4A

Table A4A

Indicador retrasado*

Lagged indicator*

CRECIMIENTOS **ANUALES** DEL ÍNDICE DE PRECIOS AL CONSUMO ARMONIZADO EN LA UNIÓN MONETARIA 1999-2000-2001 (a)

*HARMONIZED CONSUMER PRICE INDEX **ANNUAL** GROWTH RATES IN MONETARY UNION 1999-2000-2001 (a)*

	Año *Year*	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Tasas Medias / *Average rates* (b) 99/98	00/99	01/00
(1) AE (12.645%)	1999	1.27	1.27	1.17	1.07	0.68	0.68	0.78	0.68	0.68	0.87	0.87	1.07	0.92		
	2000	0.97	0.97	0.87	0.96	**1.08**	**1.21**	**1.28**	**1.41**	**1.56**	**1.57**	**1.64**	**1.72**		**1.27**	
	2001	**1.63**	**1.69**	**1.85**	**1.93**	**1.99**	**2.03**	**2.05**	**2.10**	**2.13**	**2.12**	**2.14**	**2.15**			**1.99**
(2) MAN (32.663%)	1999	0.90	0.79	0.79	0.69	0.59	0.59	0.59	0.59	0.49	0.59	0.59	0.49	0.64		
	2000	0.69	0.49	0.59	0.59	**0.57**	**0.58**	**0.63**	**0.56**	**0.52**	**0.50**	**0.50**	**0.58**		**0.57**	
	2001	**0.55**	**0.67**	**0.54**	**0.54**	**0.56**	**0.56**	**0.57**	**0.58**	**0.58**	**0.60**	**0.61**	**0.61**			**0.58**
BENE [(1)+(2)] (45.308%)	1999	1.01	0.93	0.90	0.80	0.62	0.62	0.65	0.62	0.55	0.67	0.67	0.66	0.72		
	2000	0.75	0.61	0.66	0.68	**0.70**	**0.75**	**0.80**	**0.79**	**0.81**	**0.79**	**0.81**	**0.89**		**0.75**	
	2001	**0.86**	**0.96**	**0.91**	**0.93**	**0.97**	**0.97**	**0.99**	**1.01**	**1.02**	**1.03**	**1.04**	**1.05**			**0.98**
(3) SERV (37.512%)	1999	1.75	1.64	1.74	1.74	1.63	1.44	1.62	1.43	1.43	1.34	1.53	1.53	1.57		
	2000	1.72	1.61	1.61	1.80	**1.73**	**1.90**	**1.66**	**1.72**	**1.75**	**1.77**	**1.70**	**1.66**		**1.72**	
	2001	**1.73**	**1.82**	**1.82**	**1.66**	**1.70**	**1.68**	**1.70**	**1.74**	**1.76**	**1.80**	**1.82**	**1.84**			**1.75**
IPSEBENE [(1)+(2)+(3)] (82.82%)	1999	1.35	1.26	1.28	1.22	1.08	1.00	1.10	1.00	0.96	0.99	1.07	1.06	1.11		
	2000	1.26	1.10	1.16	1.26	**1.25**	**1.35**	**1.30**	**1.32**	**1.33**	**1.32**	**1.30**	**1.33**		**1.28**	
	2001	**1.26**	**1.36**	**1.33**	**1.27**	**1.31**	**1.30**	**1.32**	**1.35**	**1.36**	**1.39**	**1.40**	**1.42**			**1.34**
(4) ANE (8.209%)	1999	1.06	1.46	1.75	1.16	0.38	-0.67	-1.44	-1.55	-1.17	-0.39	-0.29	-0.29	0.00		
	2000	-0.57	0.00	-0.48	0.19	**0.62**	**1.10**	**1.96**	**2.14**	**2.16**	**2.02**	**1.79**	**1.39**		**1.02**	
	2001	**1.74**	**1.36**	**1.74**	**1.44**	**1.55**	**1.61**	**1.64**	**1.69**	**1.72**	**1.76**	**1.77**	**1.76**			**1.65**
(5) ENE (8.964%)	1999	-4.41	-4.33	-2.87	0.10	0.40	1.20	2.90	4.82	6.15	6.25	7.19	10.00	2.23		
	2000	11.99	13.57	15.29	10.46	**11.83**	**11.52**	**9.34**	**8.45**	**7.43**	**7.69**	**7.47**	**5.80**		**9.99**	
	2001	**4.30**	**3.05**	**0.81**	**2.18**	**1.36**	**1.26**	**1.93**	**1.73**	**1.94**	**1.87**	**1.93**	**1.90**			**2.01**
R [(4)+(5)] (17.173%)	1999	-1.75	-1.47	-0.59	0.68	0.29	0.29	0.88	1.58	2.57	2.98	3.58	4.97	1.16		
	2000	5.75	6.75	7.51	5.43	**6.38**	**6.46**	**5.77**	**5.54**	**4.94**	**5.06**	**4.78**	**3.70**		**5.66**	
	2001	**3.13**	**2.35**	**1.24**	**1.84**	**1.45**	**1.42**	**1.80**	**1.72**	**1.84**	**1.82**	**1.86**	**1.84**			**1.85**
IPCA (100%)	1999	0.78	0.78	0.98	1.07	0.97	0.87	1.07	1.17	1.17	1.36	1.46	1.75	1.12		
	2000	1.95	2.04	2.13	1.93	**2.01**	**2.08**	**1.95**	**1.91**	**1.92**	**1.87**	**1.88**	**1.62**		**1.94**	
	2001	**1.62**	**1.51**	**1.31**	**1.37**	**1.33**	**1.32**	**1.41**	**1.41**	**1.45**	**1.46**	**1.48**	**1.49**			**1.43**

* La tasa T1,12 normalmente refleja los cambios fundamentales en el crecimiento de los precios con seis meses de retraso respecto a los crecimientos mensuales, por lo que es necesario analizar sus predicciones para evaluar el momento inflacionista presente.

** T1,12 growth rate lags fundamental changes in prices 6 months wiht respect to monthly growth rates. It is necessary to evaluate forecasts to anallyze current situation*

** En cada concepto se recoge entre paréntesis su ponderación en el IPCA global

*** Weights on Global HICP are shown in brackets*

(a) Las cifras en negrilla son predicciones

(a) Figures in bold type are forecasts

(b) Tasa de crecimiento del nivel medio de un año con respecto al año anterior

(b) Annual average rate of growth

Fuente:

Source:

EUROSTAT & INSTITUTO FLORES DE LEMUS

Fecha: 6 de junio de 2000

Date: June 6th 2000

Cuadro A4B *Table A4B*

CRECIMIENTOS **MENSUALES** DEL ÍNDICE DE PRECIOS AL CONSUMO ARMONIZADO EN LA UNIÓN MONETARIA 1999-2000-2001 (a)

*HARMONIZED CONSUMER PRICE INDEX **MONTHLY** GROWTH RATES IN MONETARY UNION 1999-2000-2001 (a)*

	Año *Year*	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Tasas Anuales / *Annual Rates* (b) D99/D98	D00/D99	D01/D00
(1) AE (12.645%)	1999	0.39	0.10	0.10	0.00	0.00	0.00	0.10	0.00	0.00	0.19	0.10	0.10	1.07		
	2000	0.29	0.10	0.00	0.10	**0.11**	**0.13**	**0.16**	**0.13**	**0.15**	**0.20**	**0.17**	**0.17**		**1.72**	
	2001	**0.20**	**0.16**	**0.15**	**0.18**	**0.17**	**0.17**	**0.18**	**0.18**	**0.18**	**0.19**	**0.18**	**0.18**			**2.15**
(2) MAN (32.663%)	1999	-0.49	0.30	0.39	0.10	0.00	-0.10	-0.39	0.20	0.29	0.20	0.10	-0.10	0.49		
	2000	-0.29	0.10	0.49	0.10	**-0.02**	**-0.09**	**-0.34**	**0.13**	**0.25**	**0.17**	**0.11**	**-0.02**		**0.58**	
	2001	**-0.32**	**0.21**	**0.37**	**0.09**	**0.01**	**-0.09**	**-0.33**	**0.14**	**0.25**	**0.18**	**0.12**	**-0.02**			**0.61**
BENE [(1)+(2)] (45.308%)	1999	-0.24	0.24	0.31	0.07	0.00	-0.07	-0.25	0.14	0.21	0.19	0.10	-0.04	0.66		
	2000	-0.14	0.10	0.35	0.10	**0.02**	**-0.03**	**-0.20**	**0.13**	**0.22**	**0.18**	**0.12**	**0.03**		**0.89**	
	2001	**-0.18**	**0.20**	**0.31**	**0.11**	**0.06**	**-0.02**	**-0.18**	**0.15**	**0.23**	**0.19**	**0.14**	**0.04**			**1.05**
(3) SERV (37.512%)	1999	0.00	0.48	0.09	0.00	0.19	0.09	0.85	0.00	-0.28	-0.19	0.09	0.19	1.53		
	2000	0.19	0.37	0.09	0.19	**0.12**	**0.26**	**0.62**	**0.05**	**-0.25**	**-0.17**	**0.02**	**0.15**		**1.66**	
	2001	**0.25**	**0.47**	**0.09**	**0.03**	**0.16**	**0.24**	**0.63**	**0.09**	**-0.23**	**-0.13**	**0.04**	**0.18**			**1.84**
IPSEBENE [(1)+(2)+(3)] (82.82%)	1999	-0.11	0.34	0.21	0.04	0.08	0.00	0.23	0.08	-0.01	0.03	0.10	0.06	1.06		
	2000	0.09	0.22	0.23	0.14	**0.07**	**0.11**	**0.18**	**0.10**	**0.00**	**0.02**	**0.08**	**0.09**		**1.33**	
	2001	**0.02**	**0.32**	**0.21**	**0.08**	**0.11**	**0.10**	**0.20**	**0.12**	**0.02**	**0.04**	**0.09**	**0.10**			**1.42**
(4) ANE (8.209%)	1999	1.06	-0.10	0.19	0.38	0.00	-0.76	-1.34	-1.07	0.00	0.20	0.49	0.68	-0.29		
	2000	0.78	0.48	-0.29	1.06	**0.43**	**-0.29**	**-0.51**	**-0.90**	**0.02**	**0.06**	**0.26**	**0.29**		**1.39**	
	2001	**1.13**	**0.11**	**0.08**	**0.76**	**0.54**	**-0.23**	**-0.48**	**-0.84**	**0.05**	**0.09**	**0.27**	**0.28**			**1.76**
(5) ENE (8.964%)	1999	-0.41	-0.31	0.82	3.26	-0.30	0.30	1.58	1.36	0.96	0.09	0.38	1.89	10.00		
	2000	1.39	1.10	2.35	-1.06	**0.94**	**0.02**	**-0.41**	**0.54**	**0.01**	**0.34**	**0.18**	**0.30**		**5.80**	
	2001	**-0.04**	**-0.11**	**0.13**	**0.28**	**0.12**	**-0.08**	**0.26**	**0.34**	**0.20**	**0.27**	**0.23**	**0.28**			**1.90**
R [(4)+(5)] (17.173%)	1999	0.30	-0.20	0.50	1.88	-0.19	-0.19	0.19	0.10	0.58	0.10	0.48	1.34	4.97		
	2000	1.04	0.75	1.21	-0.09	**0.71**	**-0.12**	**-0.45**	**-0.12**	**0.01**	**0.21**	**0.22**	**0.30**		**3.70**	
	2001	**0.49**	**-0.01**	**0.11**	**0.50**	**0.32**	**-0.15**	**-0.08**	**-0.20**	**0.13**	**0.19**	**0.25**	**0.28**			**1.84**
IPCA (100%)	1999	-0.10	0.29	0.29	0.29	0.10	0.00	0.19	0.10	0.00	0.10	0.10	0.38	1.75		
	2000	0.10	0.38	0.38	0.09	**0.18**	**0.07**	**0.07**	**0.06**	**0.01**	**0.05**	**0.10**	**0.13**		**1.62**	
	2001	**0.10**	**0.26**	**0.19**	**0.15**	**0.14**	**0.06**	**0.15**	**0.07**	**0.04**	**0.07**	**0.12**	**0.14**			**1.49**

** En cada concepto se recoge entre paréntesis su ponderación en el IPCA global

** *Weights on Global HICP are shown in brackets*

(a) Las cifras en negrilla son predicciones

(a) Figures in bold type are forecasts

(b) Tasa de crecimiento de diciembre de un año con respecto a diciembre del año anterior

(b)December over December rate of growth

Fuente: *Source:*

EUROSTAT & INSTITUTO FLORES DE LEMUS

Fecha: 6 de junio de 2000 *Date: June 6th 2000*

Cuadro A5A

Table A5A

TASAS DE CRECIMIENTO **ANUALES** DEL IPC USA (1)

*US **ANNUAL** RATES OF GROWTH ON CPI AND ITS COMPONENTS(1)*

	Tasa *Rate*	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Media Avrg 98/ 97 (2)	Media Avrg 99/ 98 (3)	Media Avrg 00/ 99 (4)	Media Avrg 01 00 (5)
Bienes no energéticos excepto alimentos	1998	0.35	0.35	0.28	0.21	0.21	0.42	0.64	1.06	0.85	0.77	0.70	1.27	0.59			
Non energy Commodities less food	1999	1.20	0.70	0.35	0.76	0.63	0.63	0.56	0.21	0.98	1.04	0.83	0.21		0.68		
(C-27%)	2000	-0.07	0.35	0.97	0.69	**0.76**	**0.77**	**0.75**	**0.90**	**0.54**	**0.54**	**0.73**	**0.76**			**0.64**	
	2001	**1.10**	**0.97**	**0.76**	**0.76**	**0.79**	**0.79**	**0.79**	**0.79**	**0.79**	**0.79**	**0.79**	**0.79**				**0.82**
Servicios no energéticos	1998	3.02	3.11	3.05	3.04	3.10	3.09	2.97	3.07	3.12	3.00	3.05	3.00	3.05			
Non energy Services	1999	2.82	2.75	2.80	2.79	2.74	2.63	2.72	2.61	2.50	2.55	2.65	2.70		2.69		
(S-46,4%)	2000	2.85	2.84	2.98	2.92	**2.98**	**3.04**	**3.00**	**3.04**	**3.11**	**3.09**	**3.06**	**3.05**			**3.00**	
	2001	**2.98**	**2.97**	**2.85**	**2.89**	**2.90**	**2.90**	**2.89**	**2.88**	**2.89**	**2.88**	**2.89**	**2.89**				**2.90**
Inflación Tendencial	1998	2.21	2.26	2.13	2.13	2.24	2.25	2.24	2.48	2.47	2.28	2.34	2.40	2.29			
Core inflation	1999	2.39	2.09	2.09	2.20	2.02	2.08	2.08	1.90	2.01	2.06	2.06	1.95		2.08		
(CI-73,4%)	2000	1.94	2.11	2.38	2.23	**2.32**	**2.31**	**2.29**	**2.36**	**2.32**	**2.33**	**2.35**	**2.38**			**2.28**	
	2001	**2.39**	**2.35**	**2.23**	**2.25**	**2.27**	**2.27**	**2.27**	**2.26**	**2.27**	**2.26**	**2.26**	**2.27**				**2.28**
Alimentación	1998	2.17	1.85	1.98	2.04	2.36	2.23	2.23	2.16	2.03	2.40	2.27	2.27	2.17			
Food	1999	2.31	2.45	2.25	2.25	2.12	2.19	2.06	1.99	2.17	1.91	1.91	1.91		2.13		
(F-16,6%)	2000	1.53	1.84	1.96	1.96	**1.82**	**1.91**	**2.04**	**2.09**	**2.08**	**2.04**	**2.11**	**2.30**			**1.97**	
	2001	**2.56**	**2.42**	**2.47**	**2.61**	**2.64**	**2.64**	**2.64**	**2.64**	**2.64**	**2.64**	**2.64**	**2.64**				**2.60**
Energía	1998	-6.53	-8.75	-8.63	-7.36	-5.55	-5.88	-5.57	-7.73	-9.83	-9.15	-9.21	-8.76	-7.75			
Energy	1999	-7.37	-5.72	-3.15	3.04	1.73	1.04	3.33	7.23	10.22	10.17	10.65	13.45		3.64		
(E-10%)	2000	14.68	19.94	24.19	14.95	**12.25**	**13.29**	**11.12**	**8.63**	**7.00**	**7.11**	**7.15**	**6.15**			**11.95**	
	2001	**5.97**	**2.48**	**-2.48**	**-1.43**	**0.76**	**0.51**	**0.87**	**0.70**	**0.69**	**0.71**	**0.70**	**0.65**				**0.81**
Inflación Residual	1998	-0.64	-1.41	-1.28	-1.00	-0.28	-0.28	-0.28	-1.38	-1.94	-1.33	-1.26	-1.19	-1.02			
Residual inflation	1999	-0.91	-0.15	0.42	2.57	2.33	1.54	2.39	3.59	4.89	4.39	4.68	5.40		2.59		
(RI-26,6%)	2000	5.70	7.22	8.40	5.76	**4.80**	**5.46**	**4.78**	**4.30**	**3.51**	**3.69**	**3.62**	**3.41**			**5.03**	
	2001	**3.54**	**2.44**	**0.96**	**1.38**	**2.08**	**1.99**	**2.10**	**2.05**	**2.05**	**2.06**	**2.06**	**2.05**				**2.06**
IPC USA	1998	1.57	1.44	1.37	1.44	1.69	1.68	1.68	1.62	1.49	1.49	1.55	1.61	1.55			
US CPI	1999	1.67	1.61	1.73	2.28	2.09	1.96	2.14	2.26	2.63	2.56	2.62	2.68		2.19		
100%	2000	2.68	3.16	3.70	3.01	**2.87**	**3.01**	**2.85**	**2.80**	**2.60**	**2.64**	**2.64**	**2.62**			**2.88**	
	2001	**2.72**	**2.42**	**1.92**	**2.05**	**2.22**	**2.21**	**2.23**	**2.21**	**2.22**	**2.21**	**2.22**	**2.22**				**2.24**

(1) Las cifras en negrita son predicciones.
(2)Tasa de crecimiento del nivel medio de 1998 sobre el nivel medio de1997.
(3) Tasa de crecimiento del nivel medio de 1999 sobre el nivel medio de 1998.
(4) Tasa de crecimiento del nivel medio de 2000 sobre el nivel medio de 1999.
(5) Tasa de crecimiento del nivel medio de 2001 sobre el nivel medio del 2000.

(1) Figures in bold type are forecasted values.
(2) Mean level of 1998 over 1997 growth rate.
(3) Mean level of 1999 over 1998 growth rate.
(4) Mean level of 2000 over 1999 growth rate.
(5) Mean level of 2001 over 2000 growth rate.

Fuente:

Source:

BLS & INSTITUTO FLORES DE LEMUS

Fecha de elaboración: 6 de junio de 2000.

Date: June 6th 2000

Cuadro A5B | ***Table A5B***

*TASAS DE CRECIMIENTO **MENSUALES** DEL IPC USA (1)*
*US **MONTHLY** RATES OF GROWTH ON CPI AND ITS COMPONENTS (1)*

	Tasa *Rate*	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	98 (XII)/ 97(XII) (2)	99 (XII)/ 98(XII) (3)	00(XII)/ 99(XII) (4)	01(XII)/ 00(XII) (5)
Bienes no energéticos excepto alimentos	1998	-0.07	0.49	0.49	0.28	-0.14	-0.56	-0.28	0.21	0.35	0.42	0.00	0.07	1.27			
Non energy Commodities less food	1999	-0.14	0.00	0.14	0.69	-0.28	-0.55	-0.35	-0.14	1.12	0.48	-0.21	-0.55		0.21		
(C-27%)	2000	-0.42	0.42	0.76	0.41	**-0.20**	**-0.55**	**-0.37**	**0.01**	**0.76**	**0.48**	**-0.02**	**-0.52**			**0.76**	
	2001	**-0.08**	**0.28**	**0.56**	**0.41**	**-0.18**	**-0.55**	**-0.37**	**0.01**	**0.76**	**0.48**	**-0.02**	**-0.52**				**0.79**
Servicios no energéticos	1998	0.54	0.48	0.32	0.16	0.05	0.26	0.32	0.31	0.16	0.26	0.05	0.05	3.00			
Non energy Services	1999	0.36	0.41	0.36	0.15	0.00	0.15	0.41	0.20	0.05	0.31	0.15	0.10		2.70		
(S-46,4%)	2000	0.51	0.40	0.50	0.10	**0.05**	**0.22**	**0.37**	**0.24**	**0.12**	**0.29**	**0.12**	**0.10**			**3.05**	
	2001	**0.44**	**0.39**	**0.39**	**0.13**	**0.06**	**0.22**	**0.36**	**0.24**	**0.12**	**0.28**	**0.12**	**0.11**				**2.89**
Inflación Tendencial	1998	0.29	0.53	0.29	0.23	0.06	-0.06	0.17	0.29	0.23	0.29	0.06	0.00	2.40			
Core inflation	1999	0.29	0.23	0.28	0.34	-0.11	0.00	0.17	0.11	0.34	0.34	0.06	-0.11		1.95		
(CI-73,4%)	2000	0.28	0.39	0.56	0.19	**-0.02**	**-0.01**	**0.15**	**0.18**	**0.31**	**0.35**	**0.08**	**-0.08**			**2.38**	
	2001	**0.29**	**0.36**	**0.44**	**0.22**	**-0.01**	**-0.01**	**0.14**	**0.17**	**0.31**	**0.34**	**0.08**	**-0.08**				**2.27**
Alimentación	1998	0.76	-0.31	0.19	0.06	0.31	-0.12	0.25	0.31	0.06	0.56	0.06	0.12	2.27			
Food	1999	0.80	-0.18	0.00	0.06	0.18	-0.06	0.12	0.24	0.24	0.30	0.06	0.12		1.91		
(F-16,6%)	2000	0.42	0.12	0.12	0.06	**0.05**	**0.02**	**0.25**	**0.29**	**0.23**	**0.26**	**0.14**	**0.31**			**2.30**	
	2001	**0.67**	**-0.01**	**0.16**	**0.20**	**0.08**	**0.02**	**0.25**	**0.29**	**0.23**	**0.26**	**0.14**	**0.31**				**2.64**
Energía	1998	-2.31	-2.55	-1.55	0.30	1.86	1.83	-0.47	-1.33	-1.06	-1.36	-0.79	-1.59	-8.76			
Energy	1999	-0.81	-0.82	1.13	6.71	0.57	1.14	1.78	2.39	1.71	-1.41	-0.36	0.90		13.45		
(E-10%)	2000	0.27	3.73	4.71	-1.23	**-1.79**	**2.07**	**-0.17**	**0.10**	**0.18**	**-1.32**	**-0.32**	**-0.04**			**6.15**	
	2001	**0.10**	**0.32**	**-0.36**	**-0.17**	**0.39**	**1.82**	**0.19**	**-0.08**	**0.17**	**-1.29**	**-0.33**	**-0.09**				**0.65**
Inflación Residual	1998	-0.19	-1.03	-0.20	0.01	0.65	0.78	-0.06	-0.47	-0.27	0.09	-0.21	-0.28	-1.19			
Residual inflation	1999	0.09	-0.27	0.38	2.16	0.41	0.00	0.77	0.70	0.98	-0.38	0.07	0.40		5.40		
(RI-26,6%)	2000	0.38	1.16	1.48	-0.33	**-0.50**	**0.63**	**0.12**	**0.23**	**0.22**	**-0.21**	**0.00**	**0.20**			**3.41**	
	2001	**0.50**	**0.09**	**0.01**	**0.09**	**0.17**	**0.55**	**0.23**	**0.18**	**0.22**	**-0.20**	**0.00**	**0.19**				**2.05**
IPC USA	1998	0.19	0.19	0.19	0.18	0.18	0.12	0.12	0.12	0.12	0.24	0.00	-0.06	1.61			
US CPI	1999	0.24	0.12	0.30	0.73	0.00	0.00	0.30	0.24	0.48	0.18	0.06	0.00		2.68		
100%	2000	0.24	0.59	0.82	0.06	**-0.13**	**0.14**	**0.14**	**0.19**	**0.29**	**0.22**	**0.06**	**-0.02**			**2.62**	
	2001	**0.34**	**0.30**	**0.34**	**0.19**	**0.03**	**0.12**	**0.16**	**0.18**	**0.29**	**0.22**	**0.06**	**-0.02**				**2.22**

(1) Las cifras en negrita son predicciones.
(2) Tasa de crecimiento de diciembre de 1998 sobre diciembre de1997.
(3) Tasa de crecimiento de diciembre de 1999 sobre diciembre de 1998.
(4) Tasa de crecimiento de diciembre de 2000 sobre diciembre de 1999.
(5) Tasa de crecimiento de diciembre de 2001 sobre diciembre del 2000.

(1) Figures in bold type are forecasted values.
(2) December 1998 over December 1997 growth rate.
(3) December 1999 over December 1998 growth rate.
(4) December 2000 over December 1999 growth rate.
(4) December 2001 over December 2000 growth rate.

Fuente: | *Source:*

BLS & INSTITUTO FLORES DE LEMUS

Fecha de elaboración: 6 de junio de 2000. | *Date: June, 6th 2000*

Cuadro A6/A

Table A6/A

CRECIMIENTOS **ANUALES** DEL ÍNDICE DE PRECIOS AL CONSUMO EN **ESPAÑA** 1998-1999-2000-2001 (a)

*CONSUMER PRICE INDEX, **ANNUAL** GROWTH RATES IN **SPAIN** 1998-1999-2000-2001 (a)*

Concepto (**) *Concept*	Tasa *Rate*	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Med Ave 98/97(b)	Med Ave 99/98(c)	Med Ave 00/99(d)	Med Ave 01/00(e)
	1998	1.74	1.78	1.87	1.83	1.68	1.22	1.18	1.12	1.09	1.04	1.03	0.85	1.37			
(1) AE-X	1999	0.84	0.83	0.89	0.88	0.87	0.91	0.83	0.74	0.65	0.65	0.74	1.05		0.82		
(14,82%)	2000	1.00	0.99	0.89	0.97	**1.02**	**1.11**	**1.25**	**1.34**	**1.51**	**1.53**	**1.49**	**1.41**			**1.21**	
	2001	**1.29**	**1.31**	**1.43**	**1.49**	**1.56**	**1.61**	**1.68**	**1.72**	**1.80**	**1.80**	**1.78**	**1.73**				**1.60**
	1998	1.30	1.33	1.34	1.37	1.40	1.42	1.55	1.61	1.55	1.63	1.60	1.63	1.48			
(2) MAN	1999	1.52	1.52	1.59	1.62	1.52	1.49	1.44	1.43	1.42	1.30	1.33	1.35		1.46		
(32,88%)	2000	1.51	1.57	1.79	1.84	**1.95**	**2.03**	**2.11**	**2.15**	**2.20**	**2.23**	**2.22**	**2.26**			**1.99**	
	2001	**2.25**	**2.25**	**2.14**	**2.09**	**2.13**	**2.14**	**2.16**	**2.19**	**2.22**	**2.22**	**2.22**	**2.23**				**2.19**
	1998	1.44	1.47	1.50	1.51	1.48	1.36	1.44	1.46	1.41	1.45	1.43	1.39	1.44			
BENE - X	1999	1.31	1.31	1.37	1.39	1.32	1.31	1.25	1.22	1.19	1.10	1.15	1.26		1.27		
'[(1)+(2)] = (47,41%)	2000	1.35	1.39	1.52	1.57	**1.67**	**1.75**	**1.84**	**1.90**	**1.99**	**2.02**	**2.00**	**2.00**			**1.75**	
	2001	**1.95**	**1.96**	**1.93**	**1.91**	**1.95**	**1.98**	**2.02**	**2.05**	**2.09**	**2.09**	**2.09**	**2.08**				**2.01**
	1998	3.25	3.15	3.11	3.12	3.19	3.20	3.19	3.44	3.51	3.45	3.46	3.48	3.30			
(3) SERV-T	1999	3.45	3.42	3.47	3.44	3.40	3.33	3.42	3.18	3.17	3.14	3.14	3.15		3.31		
(29.95%)	2000	3.16	3.14	3.15	3.23	**3.33**	**3.40**	**3.35**	**3.33**	**3.32**	**3.39**	**3.44**	**3.44**			**3.31**	
	2001	**3.41**	**3.59**	**3.56**	**3.55**	**3.54**	**3.57**	**3.58**	**3.58**	**3.56**	**3.58**	**3.59**	**3.60**				**3.56**
	1998	2.17	2.15	2.15	2.16	2.18	2.11	2.15	2.26	2.26	2.26	2.25	2.24	2.20			
IPSEBENE-XT	1999	2.18	2.17	2.23	2.23	2.17	2.14	2.14	2.03	2.00	1.94	1.97	2.04		2.10		
[(1)+(2)+(3)]=(77,66%)	2000	2.10	2.12	2.19	2.26	**2.36**	**2.44**	**2.47**	**2.50**	**2.55**	**2.59**	**2.60**	**2.60**			**2.40**	
	2001	**2.56**	**2.64**	**2.61**	**2.60**	**2.62**	**2.65**	**2.67**	**2.69**	**2.71**	**2.72**	**2.72**	**2.72**				**2.66**
	1998	1.56	3.87	1.94	5.13	6.20	7.55	8.07	7.60	2.52	2.35	0.38	1.00	3.99			
(4) XT	1999	3.09	5.11	8.02	7.69	7.59	8.96	8.17	8.03	8.38	8.43	8.62	8.13		7.53		
(3,34%)	2000	5.16	3.82	1.42	1.91	**2.59**	**0.24**	**-1.71**	**-2.34**	**-0.71**	**0.80**	**0.51**	**-0.01**			**0.91**	
	2001	**0.86**	**0.30**	**1.81**	**1.41**	**1.32**	**1.94**	**2.43**	**2.52**	**2.51**	**2.57**	**2.50**	**2.59**				**1.90**
	1998	2.58	1.00	1.79	2.19	2.00	2.95	4.10	3.82	1.78	2.23	0.51	0.87	2.14			
(5) ANE	1999	0.80	2.49	3.23	2.97	1.82	0.15	-1.00	-1.11	-0.17	0.78	2.17	2.02		1.17		
(11,88%)	2000	2.20	1.69	0.97	1.78	**1.85**	**3.17**	**4.04**	**5.33**	**5.11**	**4.38**	**3.43**	**3.09**			**3.08**	
	2001	**3.31**	**3.58**	**4.44**	**4.09**	**3.70**	**3.26**	**3.09**	**2.94**	**2.92**	**2.95**	**3.12**	**3.23**				**3.38**
	1998	-1.05	-2.07	-2.25	-1.83	-2.48	-3.01	-3.03	-5.93	-5.75	-5.70	-5.90	-6.62	-3.82			
(6) ENE	1999	-5.25	-4.94	-2.93	-0.47	0.09	1.60	4.89	8.93	9.38	7.79	9.01	11.53		3.23		
(7,12%)	2000	11.75	14.74	15.94	13.88	**15.46**	**15.64**	**11.23**	**7.89**	**6.97**	**8.33**	**7.37**	**6.29**			**11.15**	
	2001	**6.56**	**4.76**	**2.39**	**1.98**	**0.69**	**-0.14**	**1.10**	**1.30**	**1.10**	**1.20**	**1.40**	**1.51**				**1.95**
	1998	1.25	0.55	0.53	1.45	1.35	1.89	2.58	1.42	-0.45	-0.28	-1.55	-1.45	0.59			
R	1999	-0.64	0.68	2.24	2.81	2.40	2.31	2.60	3.72	4.36	4.37	5.47	6.00		3.03		
[(4)+(5)+(6)]=(22,34%)	2000	5.58	5.94	5.46	5.42	**6.08**	**6.34**	**5.04**	**4.52**	**4.50**	**4.89**	**4.09**	**3.48**			**5.10**	
	2001	**3.85**	**3.32**	**3.27**	**2.89**	**2.26**	**1.88**	**2.31**	**2.33**	**2.26**	**2.31**	**2.45**	**2.56**				**2.63**
	1998	1.96	1.79	1.79	2.00	1.99	2.06	2.25	2.07	1.64	1.69	1.39	1.40	1.84			
IPC	1999	1.54	1.84	2.23	2.36	2.22	2.18	2.25	2.41	2.53	2.48	2.74	2.92		2.31		
(100%)	2000	2.87	2.96	2.92	2.96	**3.19**	**3.30**	**3.05**	**2.96**	**2.99**	**3.11**	**2.93**	**2.80**			**3.00**	
	2001	**2.85**	**2.80**	**2.76**	**2.66**	**2.53**	**2.47**	**2.59**	**2.61**	**2.60**	**2.62**	**2.66**	**2.68**				**2.65**

* La tasa T1,12 normalmente refleja los cambios fundamentales en el crecimiento de los precios con seis meses de retraso respecto a los crecimientos mensuales, por lo que es necesario analizar sus predicciones para evaluar el momento inflacionista presente.

** En cada concepto se recoge entre paréntesis su ponderación en el IPC general.

(a) Las cifras en negrilla son predicciones

(b) Tasa de crecimiento del nivel medio de 1998 sobre el nivel medio de 1997.

(c) Tasa de crecimiento del nivel medio de 1999 sobre el nivel medio de 1998.

(d) Tasa de crecimiento del nivel medio del 2000 sobre el nivel medio de 1999.

(e) Tasa de crecimiento del nivel medio del 2001 sobre el nivel medio del 2000.

Fuente:

Fecha: 30 de mayo de 2000.

INE & INSTITUTO FLORES DE LEMUS

** T1,12 growth rate lags fundamental changes in prices 6 months with respect to monthly growth rates. It is necessary to evaluate forecast in order to analyze current situation*

*** Weights on General CPI are shown in brackets.*

(a) Figures in bold type are forecasted values

(b) 1998 over 1997 mean growth

(c) 1999 over 1998 mean growth

(d) 2000 over 1999 mean growth

(e) 2001 over 2000 mean growth

Source:

Date: May, 30th 2000.

Cuadro A6B | Table A6B

CRECIMIENTOS **MENSUALES** DEL ÍNDICE DE PRECIOS AL CONSUMO EN **ESPAÑA** 1998-1999-2000-2001 (a)

*CONSUMER PRICE INDEX, **MONTHLY** GROWTH RATES IN **SPAIN** 1998-1999-2000-2001 (a)*

Concepto (*) (*Concept*)	Tasa *Rate*	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	D98/ D97(b)	D99/ D98(c)	D00/ D99(d)	D01/ D00 (e)
	1998	0.36	0.23	0.07	0.02	-0.02	-0.01	0.03	0.10	0.08	0.08	0.02	-0.10	0.85			
(1) AE-X	1999	0.35	0.22	0.13	0.00	-0.03	0.03	-0.05	0.01	-0.01	0.07	0.11	0.21		1.05		
(14,82%)	2000	0.30	0.20	0.04	0.08	**0.02**	**0.12**	**0.08**	**0.11**	**0.16**	**0.09**	**0.07**	**0.13**			**1.41**	
	2001	**0.19**	**0.22**	**0.16**	**0.14**	**0.08**	**0.18**	**0.15**	**0.15**	**0.23**	**0.09**	**0.05**	**0.09**				**1.73**
	1998	0.13	0.08	0.05	0.25	0.14	0.08	0.10	0.07	0.10	0.32	0.20	0.10	1.63			
(2) MAN	1999	0.02	0.08	0.12	0.29	0.04	0.05	0.04	0.06	0.09	0.20	0.23	0.12		1.35		
(32,88%)	2000	0.17	0.15	0.33	0.33	**0.15**	**0.13**	**0.11**	**0.10**	**0.14**	**0.24**	**0.22**	**0.15**			**2.26**	
	2001	**0.16**	**0.16**	**0.22**	**0.28**	**0.19**	**0.14**	**0.13**	**0.13**	**0.16**	**0.24**	**0.22**	**0.17**				**2.23**
	1998	0.20	0.13	0.05	0.18	0.09	0.05	0.08	0.08	0.10	0.24	0.15	0.04	1.39			
BENE - X	1999	0.12	0.12	0.12	0.20	0.02	0.04	0.01	0.05	0.06	0.16	0.20	0.14		1.26		
[(1)+(2)] = (47,41%)	2000	0.21	0.17	0.24	0.25	**0.11**	**0.13**	**0.10**	**0.11**	**0.15**	**0.19**	**0.18**	**0.15**			**2.00**	
	2001	**0.17**	**0.17**	**0.20**	**0.24**	**0.16**	**0.15**	**0.14**	**0.14**	**0.18**	**0.20**	**0.17**	**0.14**				**2.08**
	1998	0.75	0.36	0.25	0.30	0.23	0.19	0.14	0.39	0.32	0.21	0.16	0.13	3.50			
(3) SERV-T	1999	0.70	0.33	0.30	0.28	0.19	0.12	0.23	0.15	0.31	0.19	0.16	0.15		3.15		
(29.95%)	2000	0.71	0.31	0.31	0.35	**0.28**	**0.20**	**0.18**	**0.13**	**0.30**	**0.25**	**0.20**	**0.15**			**3.44**	
	2001	**0.68**	**0.49**	**0.29**	**0.33**	**0.27**	**0.23**	**0.19**	**0.13**	**0.29**	**0.27**	**0.21**	**0.16**				**3.60**
	1998	0.42	0.22	0.13	0.23	0.15	0.11	0.10	0.20	0.19	0.23	0.15	0.08	2.25			
IPSEBENE-XT	1999	0.36	0.21	0.20	0.23	0.09	0.08	0.10	0.09	0.16	0.17	0.18	0.14		2.04		
[(1)+(2)+(3)]=(77,66%)	2000	0.42	0.23	0.27	0.29	**0.18**	**0.16**	**0.14**	**0.12**	**0.21**	**0.22**	**0.19**	**0.15**			**2.60**	
	2001	**0.38**	**0.31**	**0.24**	**0.28**	**0.21**	**0.18**	**0.16**	**0.13**	**0.23**	**0.23**	**0.19**	**0.15**				**2.72**
	1998	-0.17	-0.35	0.00	0.97	0.65	1.02	3.92	1.62	-2.73	-2.76	-2.60	1.63	1.00			
(4) XT	1999	1.91	1.60	2.78	0.66	0.55	2.30	3.17	1.49	-2.41	-2.72	-2.44	1.18		8.13		
(3,34%)	2000	-0.89	0.31	0.40	1.15	**1.22**	**-0.04**	**1.16**	**0.84**	**-0.78**	**-1.24**	**-2.71**	**0.65**			**-0.01**	
	2001	**-0.02**	**-0.25**	**1.90**	**0.75**	**1.14**	**0.57**	**1.66**	**0.93**	**-0.79**	**-1.18**	**-2.78**	**0.74**				**2.59**
	1998	0.32	-2.77	-0.12	0.31	0.21	-0.19	1.03	0.76	0.49	-0.54	-0.61	2.06	0.87			
(5) ANE	1999	0.25	-1.14	0.60	0.05	-0.91	-1.82	-0.13	0.65	1.44	0.41	0.75	1.91		2.02		
(11,88%)	2000	0.43	-1.63	-0.11	0.85	**-0.84**	**-0.55**	**0.71**	**1.90**	**1.23**	**-0.28**	**-0.17**	**1.58**			**3.09**	
	2001	**0.64**	**-1.38**	**0.72**	**0.52**	**-1.21**	**-0.97**	**0.54**	**1.75**	**1.21**	**-0.26**	**0.00**	**1.69**				**3.23**
	1998	-1.71	-1.05	-0.64	-0.11	-0.47	-0.61	0.06	-0.73	-0.05	0.20	-0.44	-1.26	-6.62			
(6) ENE	1999	-0.26	-0.73	1.46	2.41	0.10	0.88	3.30	3.10	0.35	-1.25	0.69	1.02		11.53		
(7,12%)	2000	-0.05	1.92	2.52	0.60	**1.48**	**1.04**	**-0.64**	**0.00**	**-0.50**	**0.00**	**-0.20**	**0.00**			**6.29**	
	2001	**0.20**	**0.20**	**0.20**	**0.20**	**0.20**	**0.20**	**0.60**	**0.20**	**-0.70**	**0.10**	**0.00**	**0.10**				**1.51**
	1998	-0.40	-1.79	-0.26	0.30	0.08	-0.09	1.30	0.48	-0.32	-0.76	-0.95	0.98	-1.45			
R	1999	0.42	-0.49	1.28	0.87	-0.32	-0.18	1.59	1.58	0.29	-0.75	0.09	1.49		6.00		
[(4)+(5)+(6)]=(22,34%)	2000	0.02	-0.15	0.82	0.83	**0.31**	**0.07**	**0.35**	**1.07**	**0.27**	**-0.38**	**-0.67**	**0.89**			**3.48**	
	2001	**0.37**	**-0.66**	**0.77**	**0.46**	**-0.31**	**-0.30**	**0.78**	**1.09**	**0.21**	**-0.32**	**-0.54**	**1.00**				**2.56**
	1998	0.24	-0.23	0.05	0.25	0.13	0.06	0.37	0.27	0.07	0.01	-0.09	0.28	1.40			
IPC	1999	0.37	0.06	0.44	0.37	0.00	0.02	0.43	0.43	0.19	-0.04	0.16	0.45		2.92		
(100%)	2000	0.33	0.14	0.40	0.41	**0.21**	**0.14**	**0.19**	**0.33**	**0.23**	**0.08**	**-0.01**	**0.32**			**2.80**	
	2001	**0.38**	**0.08**	**0.36**	**0.32**	**0.09**	**0.07**	**0.30**	**0.35**	**0.22**	**0.10**	**0.02**	**0.35**				**2.68**

** En cada concepto se recoge entre paréntesis su ponderación en el IPC general.
(a) Las cifras en negrilla son predicciones
(b) Tasa de crecimiento de diciembre 1998 sobre diciembre de 1997.
(c) Tasa de crecimiento de diciembre de 1999 sobre diciembre de 1998.
(d) Tasa de crecimiento de diciembre del 2000 sobre diciembre de 1999.
(e) Tasa de crecimiento de diciembre del 2001 sobre diciembre de 2000.

*** Weights on General CPI are shown in brackets.*
(a) Figures in bold type are forecasted values
(b) December 1998 over December 1997.
(c) December 1999 over December 1998.
(d) December 2000 over December 1999.
(e) December 2001 over December 2000.

Fuente: *Source:*

Fecha: 30 de mayo de 2000. *Date: May, 30th 2000.*

INE & INSTITUTO FLORES DE LEMUS

ECONOMIC TIME

Oscar Jordá
University of California, Davis

RESUMEN

La escala temporal de numerosos acontecimientos económicos es endógena al problema económico en cuestión (unidad de tiempo económico). Sin embargo, la recolección de datos se realiza tradicionalmente a intervalos de tiempo regulares, dictados por la tradición del calendario (unidad de tiempo observacional). Este artículo investiga algunos de los aspectos empíricos que surgen cuando las unidades de tiempo económico y observacional difieren entre sí. A diferencia de los estudios sobre agregación temporal, los intervalos de tiempo que separan sucesivos acontecimientos económicos no son constantes. Por el contrario, es más correcto considerar a estos intervalos de tiempo como variables aleatorias. Un ejemplo basado en datos financieros de alta frecuencia analizados a intervalos de media hora resalta los aspectos fundamentales del análisis empírico cuando las unidades de tiempo económico son aleatorias.

ABSTRACT

The timing and frequency of many economic events (the economic time scale) is endogenous to the economic problem that generates these events and may vary from one event to the next. By contrast, data collection is done at regular, fixed intervals of calendar time (the observational time scale). This essay discusses some of the empirical issues that arise when the economic time scale differs from the observational time scale. Unlike traditional time aggregation however, the intervals of time separating economic events are not a fixed constant (say one month). Rather, they are probably best described as random variables. An example based on high frequency financial data analyzed at half-hourly intervals illustrates the major points that arise when economic time evolves stochastically.

Introduction

Economics is a tricky science. We have to investigate the underpinnings of economic behavior without the luxury of controlled experimentation, building upon axioms based on the fickle nature of the human psyche, and relying on data collected at the convenience and stricture of calendars rather than in "economic time."

Despite these challenges, we have certainly come a long way. We have learned to rely on "natural experiments" - something like studying the resilience of a roofing structure by investigating the aftermath of a hurricane - to compensate for the unavailability of controlled experimentation. The rational expectations revolution and recent developments on bounded rationality and experimental economics continue to perfect our ability to construct sensible models. However, incorporating the timing with which economic events take place into economic models and reconciling the time scale of economic behavior with that of available data, remains a difficult barrier to our comprehension of economics.

To understand what I mean, go back in time to April 13, 1970. After the explosion of an oxygen tank brought the Apollo XIII Mission to the brink of catastrophe, astronauts James Lowell, John Swigert and Fred Haise had to execute manual, controlled, engine burns to keep their spacecraft in an optimal trajectory to return to earth. The

timing and the length of these burns were critical if they were to reenter the atmosphere safely. Store managers face a similar problem everyday in trying to manage their inventory levels. Given expected sales, stock-out costs and the financial costs of excess inventory, one can compute the optimal level of inventories (the optimal trajectory to return to earth) and adjust any deviations from this level (the manual burns). However, unlike the famous astronauts of our story, store managers often do not get to know their inventory position until the end of the day. Had the heroes of Apollo XIII not been able to continuously monitor their exact coordinates, we would have likely celebrated their odyssey in the form of a memorial at Arlington cemetery rather than with a Hollywood blockbuster.

This essay reviews recent developments in the analysis of dynamic econometric models when the economic data generating process evolves in a different time-scale than that of available sampled data. These two parallel time-scales will rarely coincide and in fact can differ quite dramatically from one another in practice. We will denominate as *operational time* the time scale native to the economic process under investigation while *observational time* will refer to the time scale of the sampled data. An example will clarify the meaning of this nomenclature.

The literature on time aggregation typically assumes that the true economic decision interval is finer than the data sampling interval in addition to assuming that economic decision-making is done at fixed intervals. An example of this type of aggregation occurs when the economic process evolves at a monthly frequency but only quarterly data is available to the investigator. Numerous papers exist on this topic and I shall not dedicate any effort to review the main results, which are well established.

The view that the economic process evolves at fixed intervals of time is rather restrictive however. A more interesting and realistic scenario is to consider situations in which operational time evolves at stochastic intervals of time while data collection is done at fixed, calendar-time intervals. This type of aggregation is common in finance, for example, where available data on financial assets is reported weekly, or daily at best, while transactions in these markets take place anywhere from seconds to hours and days apart. This is also an example of the type of problem faced by our store manager and space enthusiast. More importantly, the timing of economic events is likely to be endogenous to the economic process under observation. The implication of this observation is that the information contained in the manner the data is aggregated is very likely to be helpful in the choice of econometric model.

The remainder of this essay will elaborate on ways to model and estimate problems that involve this type of disconnection between the timing of economic behavior and the available data and the implications that this disconnection has on structural economic analysis.

Transformations of the Time Scale

Suppose that the economic process under consideration follows a generic stochastic process that evolves in *operational time* τ, namely, $x = \{x_\tau\}_{\tau=1}^{\infty}$. By contrast, the available data will be the realizations of a different process, $z = \{z_t\}_{t=1}^{\infty}$, whose elements are functions of those of *x*. *z* is said to evolve in *observational time t*. The transformation of the operational time scale τ, into the observational time scale *t*, is given by

$$\tau = \varphi(t) = \varphi(k(t)) = \sum_{j=1}^{t} k_j \quad \text{for } k = \{k_t\}_{t=1}^{\infty}$$

k is termed the frequency of aggregation which can be thought of as a sequence of numbers or more generally, a stochastic process itself. The easiest way to understand the notation is by noting that the number of operational time observations aggregated per sampling interval is given by $\varphi(t) - \varphi(t-1) = k_t$. Therefore, if the internal time scale to the process is monthly but the data is only recorded quarterly, then $k = 3$, as in the old fashion thinking on time aggregation. If one considers asset prices in the stock market for example, then *k* is more naturally thought of as a stochastic process.

Given the frequency of aggregation, *k*, and knowledge of whether the data was averaged over the interval of aggregation or only the last observation in the interval recorded, it is possible to generate the mechanism that transports us from the operational time process *x* to the observational time process *z*. At this point, understanding the properties of the process *z* given the process *x* becomes mathematically complex although the main points can be stated succinctly.[1]

The most important point is this: Even when one assumes that the operational time process *x* is a simple linear dynamic process (such as an ARIMA process) drawn from a distribution with a constant conditional variance, the observational time process *z* will have, in general, time-varying parameters and a conditional variance that depend on the frequency of aggregation *k*. Furthermore, the resulting process, *z*, will have additional persistence that was not present originally.

Structural Bias

Why should one care about these claims and the discrepancies between time scales? There are at least three good reasons: (1) Any empirical test of an economic model will require that the frequency of aggregation be appropriately modeled and incorporated into the econometric specification to avoid structural bias (after all we would not want to see our astronauts burning up upon reentry into the atmosphere); (2) forecasting performance can be improved by conveniently exploiting information on the aggregation frequency; and (3) understanding

[1] The reader is referred to Jordá and Marcellino (2000) for a further discussion and proofs.

that the stylized statistical properties of many economic variables may be artifacts of a transformation of the time scale may lead to better economic models.

Time matters. To understand reason (1), suppose that we try to model William Baumol's and James Tobin's holdings of cash. According to the Baumol-Tobin model of cash management, holding money is convenient but costly. People hold cash to avoid having to go to the bank each time they want to make a purchase but the cost of this convenience is the forgone interest in their accounts. To test this theory, we thus record the total cash holdings of our famed economists every month. That, along with the interest rate paid on their checking accounts, allows us to estimate their willingness to hold cash.

This estimate will likely be flawed. Here is why. William lives in New York, more specifically in the Bronx, which is the only place where he can afford to live in given his meager professor salary. Fully aware of the risks of withdrawing money in public from a cash machine, he goes there only once a month (while less law-abiding segments of society are scouting the local gun show for new gear) and withdraws $300.00. By contrast, James lives in New Haven, but as a Nobel Prize winner, he is able to afford a cottage in a peaceful community in Connecticut. Therefore, he hardly ever carries more than $30.00 since he can always go to the cash machine by the university library, thus withdrawing cash an average of 10 times over the month. From the econometrician's point of view, both economists behave similarly since the only data available indicates that their total cash withdrawals amounted to $300.00 over the month although it is clear that the behavior of both economists is radically different.

In the notation used in this paper, the number of times each economist went to the cash machine is what we termed k, the frequency of aggregation. Armed with this information, our fellow econometrician would have had no problem describing the behavior implied by the Baumol-Tobin model, given the available data. We will reserve the next section of the paper to discuss an example that extrapolates the methods sketched here in an investigation of the foreign exchange market. This roughly corresponds to reason (2) raised above.

Modeling Strategies

In the previous section I argued that knowledge of the frequency of aggregation might be very useful in empirical analysis. When we are trying to estimate a model of economic behavior, this frequency of aggregation gives us an idea of the intensity of economic decision-making that pervaded throughout each interval of the sampled data. This section illustrates methods that can be used to improve the analysis of economic phenomena and the forecasting performance of econometric models when the aggregation frequency is observed. Situations in which the aggregation frequency is unobserved are perhaps more frequent but require of rather complex methods. The reader is referred to Jordá and Marcellino (2000) for a discussion. Here, I present a simple example designed to investigate the behavior of the bid-ask spread in the U.S. Dollar/Deutsche Mark foreign exchange rate (USD/DM, FX) market.

The FX market is a 24 hours, global market although the activity pattern throughout the day is dominated by three major trading centers: East Asia, with Tokyo as the major trading center; Europe, with London as the major trading center; and America, with New York as the major trading center. Figure 1 displays the activity level in a regular business week as the number of quotes received per half hour interval. The seasonal pattern presented is calculated nonparametrically with a set of 48 time-of-day dummies. Figure 2 illustrates the weekly seasonal pattern in activity levels by depicting a sample week of raw data.

The original data corresponds to the HFDF-93 dataset available from Olsen & Associates.[2] The sub-sample I consider here contains 3,500 observations of half-hour intervals (approximately 300,000 ticks) constructed by counting the number of quotes in half-hour intervals throughout the day. For each individual half-hour observation I then record the corresponding bid-ask spread. The average intensity is approximately 120 quotes/half-hour during regular business days, although during busy periods this intensity can reach upwards of 250 quotes/half-hour. The activity level drops significantly over the weekend although not completely.

Figure 2
Seasonal Intraday Pattern
Diurnal Dummies

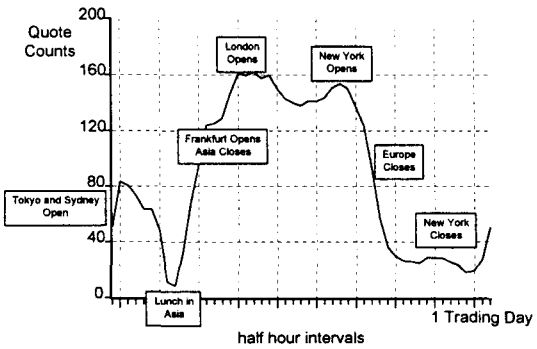
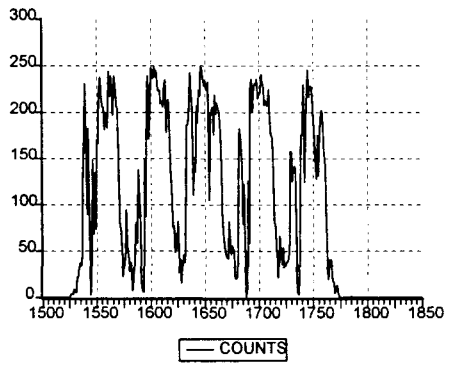


Figure
A Typical Week of Trading
Exchange Rate Quotes by 30 Minute Interval-Counts



The explanations for the width of the bid-ask spread vary widely (see O'Hara, 1995), ranging from "market failure" and "market power" explanations to more transactions, cost-related "dealer risk-aversion" and "gravitational pull" theories. The simple approach I take here is to investigate the dynamics of the bid-ask spread as a function of information flows measured by the level of activity in the market.

Let k_t denote the number of quotes per half hour interval (a count variable which we have denominated here as the aggregation frequency) and let z_t denote the bid-ask spread that corresponds to the half-hour interval t. Thus, this is an example in which the variable z_t is the result of aggregating the original tick-by-tick data but for which

[2] These data span one year beginning October 1, 1992 and ending September 30, 1993, approximately 1.5 million observations. The data have a 2 second granularity and are pre-filtered for possible coding errors and outliers at the source (approximately 0.36% of the data is therefore lost).

we observe the frequency of aggregation (k_t). The problem thus consists of jointly modeling these two random variables. However, since I am only interested in knowing the effect of information flow on the bid-ask spread, I will concentrate on the conditional distribution of z_t given k_t.

A researcher interested in modeling z_t but ignorant that the data has been aggregated into half-hour intervals, may proceed by using an off-the-shelf ARIMA model. To illustrate the pitfalls of his approach and based on our knowledge that the dynamics of the bid-ask spread probably depend on the information flow, I specify the following model,

$$z_t = seasonals(1 + F_0(k_t)) + \Phi(L, k_t) z_{t-1} + \varepsilon_t$$

$$\Phi(L, k_t) = \phi_1(1 + F_1(k_t)) + \phi_2(1 + F_2(k_t))L + \phi_3(1 + F_3(k_t))L^2 \tag{1}$$

where the *seasonals* variables are a collection of time-of-day effect, day-of-week effect, and holiday effect dummies, L is the lag operator and $F_i(k_t)$ for i = 0, 1, 2, 3 is a non-parametric estimate based on a sixth order polynomial. Note that as a particular case, if all the $F_i(k_t)$ are zero, one recovers a conventional linear AR(3) model.

Figure 3 depicts the estimated autoregressive parameters as a function of the transaction intensity, k_t. In the limit, notice that as the transaction intensity approaches 0 (i.e. nobody trading during that particular half-hour interval), then ϕ_1 goes to 1 while ϕ_2 and ϕ_3 go to 0 since z_t attains the same value as z_{t-1}. However, as the transaction intensity picks up, the estimated parameters exhibit a fair amount of non-monotonic variation, ranging from high persistence to negative correlation and back into high levels of persistence. Figure 4 reports the fluctuations in the average, seasonally adjusted, residual spread as a function of the transaction intensity. After accounting for the intra-day trading patterns, the spread exhibits two well defined peaks: One at low levels of activity, which is consistent with the view that when the market is inactive, the best position is to maintain a sizeable bid-ask spread to hedge against unforeseen and sudden large transactions. The second peak takes place when the intensity reaches 140 quotes per half-hour (recall that the average trading intensity in a regular business day is around 120 quotes per half hour). However, as the trading intensity increases, the filtration and price learning processes in the market evolve much faster and therefore, it becomes easier to price the FX rate. Consequently the bid-ask drops.

Figure 3

Nonparametric Estimates of the Autoregressive Parameters of the Spread Model as a Function of the Intensity

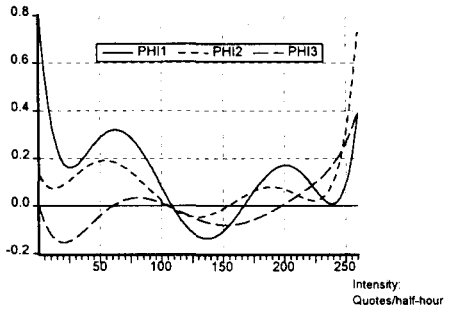
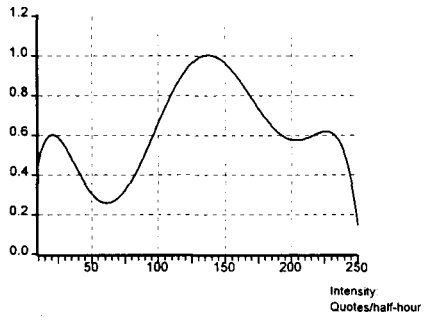


Figure 4

Nonparametric Estimate of the Mean Spread as a Function of the Intensity of Quote Arrivals



A Word on Forecasting

The results in the preceding section demonstrate the advantages of incorporating knowledge on the transaction intensity into a model of the bid-ask spread or in the wording of this paper, the model of the aggregated data z_t depends on the frequency of aggregation k. However, given knowledge of the dynamic behavior of the spread, an agent in this market may be interested in forecasting the width of the spread in the coming half-hour for the purposes of minimizing the costs of his next transaction. Therefore, one needs to construct a forecast of the trading intensity k that is expected in the next half-hour interval. Figures 3 and 4 illustrate that depending on the expected transaction intensity, the best forecast of the bid-ask spread will be different.

The transaction intensity k is a count variable so it is natural to think of it as a Poisson distributed random variable.[3] Hence, the conditional distribution of k_t given all past information (that is, lags of k_t as well as lags of z_t) can be written as,

$$P(k_t = j \mid \overset{(}{z}_{t-1}, \overset{(}{k}_{t-1}, \theta) = \frac{e^{-\lambda_t}\lambda_t^j}{j!} \tag{2}$$

where $\overset{(}{z}_{t-1}$ and $\overset{(}{k}_{t-1}$ denote all past values of z and k as of time t-1. λ_t is the conditional expected transaction intensity at time t. Since the Poisson distribution is a one parameter density, the variance coincides with the conditional mean, λ_t . A natural way to parameterize λ_t is to use a formulation similar to that of an ARCH[4]

[3] Recall that the Poisson distribution is often used in problems such as those describing the arrival of customers to a line per interval of time. Here we are investigating the arrival of quotes per half-hour interval of time.

[4] ARCH stands for autoregressive conditional heteroskedasticity. The ARCH model was first introduced by Engle (1982).

model. In particular, to account for the fact that λ_t must remain non-negative, I use the following E-GARCH[5] type specification,

$$\log(\lambda_t) = seasonals + \Theta(L)\log(\lambda_{t-1}) + \Psi(L)k_{t-1} + \Pi(L)z_{t-1} \tag{3}$$

The variables in *seasonals* are the same dummies described in equation (1) while $\Theta(L)$, $\Psi(L)$, and $\Pi(L)$ are conventional, finite order, autoregressive, lag polynomials. The model described by equations (2) and (3) is called the autoregressive intensity model (ACI) introduced in Jordá and Marcellino (2000) and can be easily estimated by maximum likelihood.

To get a sense of the properties of this formulation, I estimated the ACI model on the transaction intensity data that I used to estimate the bid-ask model in equation (1). Table 1 below summarizes the salient results and compares them to a benchmark Poisson regression based on the *seasonals* variables alone. The likelihoods are directly comparable since the Poisson model is a nested particular case of the ACI model.

Table 1 - The ACI model versus a benchmark Poisson Model

	Poisson	**ACI**
Log-Likelihood	-28562.37	-18145.52
Parameters	55	80
Akaike Information C.	19.729	12.565
Schwarz Information C.	19.842	12.730
Ljung-Box Q_5	1608	99
Ljung-Box Q_{10}	1903	128
Ljung-Box Q_{50}	2398	372
LR test ACI vs. Poisson	0.000 (p-value)	

These are rather striking results by any measure. The ACI model does a very good job at explaining the enormous amount of persistence indicated by the Ljung-Box statistic. The ACI has 15 additional parameters relative to the Poisson model, which could explain the dramatic improvement in the likelihood. However, as the Akaike and Scwarz information criteria[6] show, the ACI model is overwhelmingly preferred to the Poisson. Overall, the ACI model appears to be a good way to forecast movements in transaction intensity.

Final Thoughts

Recently a student asked me why was I not teaching overlapping generations models of monetary economies in my monetary theory course. My response was that overlapping generations models are very useful in thinking about long-run issues, such as social security, taxation, government debt and the like, but that they are less well

[5] E-GARCH stands for exponential generalized autoregressive conditional heteroskedasticity. The E-GARCH model was first introduced by Nelson (1991).
[6] The Akaike and the Schwarz information criteria are measures that balance the quality of the fit against overparameterized models.

suited to explain money. Money usually arises in these economies as a medium for a generational transfer. That is simply the wrong time scale (then again, my need to have cash for my afternoon coffee may skew my view toward a transactions-cost based view of the world). My argument in this paper is that different economic decisions have different time scales, and that the timing of economic events is not gratuitous but rather endogenous to the economic problem. By contrast, available data is limited to the calendar traditions of data recording.

The implications of the divergence between "economic time" and "observational" time are twofold. On one hand, we should devote more effort to constructing models in which each economic decision has the right time scale. It can not be that my consumption decisions, my financial decisions and my retirement decisions coincide in timing, not only with each other, but also with the hiring decisions, investment decisions and production decisions of the firm that is employing me, along with the public sector's decisions on taxes and the deficit. On the other hand, we need to become more adept at understanding the subtleties that data availability impose on empirical analysis. This essay concentrated on the second implication to argue that: (1) Empirical analysis of economic hypotheses requires that we carefully model the transformation of the operational time scale into the observational time scale; (2) from a purely econometric perspective, forecasting can benefit from explicit modeling of the aggregation scheme; and (3) the data will inherit properties that originated from the economic process as well as properties that relate to the manner it was recorded. An economic model should only try to match the first set of properties.

References

Engle, Robert F. (1982) "Autoregressive Conditional Heteroscedasticity with Estimates of the Variance of United Kingdom Inflation," *Econometrica,* 50/4, 987-1006.

Jordá, Oscar and Marcellino, Massimiliano (2000) "Stochastic Processes Subject to Time-Scale Transformations: An Application to High Frequency, FX Data," U.C. Davis, Working Paper 00-02.

Nelson, Daniel B. (1991) "Conditional Heteroskedasticity in Asset Returns: A New Approach," *Econometrica,* 59/2, 347-370.

IS IT LONG MEMORY OR JUST CHANGING VARIANCE WE SEE IN FINANCIAL RETURNS?

Thomas Mikosch
University of Groningen and EURANDOM Eindhoven

Catalin Starica
Chalmers University of Technology, Gothenburg

1 Some preliminaries on ARCH and GARCH processes

Among the models for log-returns

$$X_t = \log(P_t / P_{t-1}), \quad t = 1, 2, \ldots,$$

of stock indices, foreign exchange rates, share prices, etc., P_t , $t = 10, 1, \ldots$, the ARCH (*autoregressive conditionally heteroscedastic*) processes have gained particular popularity. Besides the *stochastic volatility models* (see for example Ghysels et al. [19] for a recent survey paper) they have become the standard models in the financial econometrics literature. In particular, they appear in many recent textbooks and monographs on time series analysis (see for example Brockwell and Davis [10] or Embrechts et al. [17]) or econometrics (see Campbell et al. [11]). Thus many students of statistics and virtually all students of econometrics have heard of them. The GARCH modules of various software packages have certainly contributed to the increasing popularity of this kind of econometric time series models as well.

The success story of the ARCH family started in 1982 when Engle introduced the ARCH(p) processes (ARCH of order p)

(1.1) $$X_t = \sigma_t Z_t,$$

where σ_t (the so-called *stochastic volatility*) obeys the recurrence equation

(1.2) $$\sigma_t^2 = \alpha_0 + \alpha_1 X_{t-1}^2 + \ldots + \alpha_p X_{t-p}^2,$$

with α_i's non-negative parameters, while (Z_t) is a white noise process with variance 1, usually supposed to be iid.. (In what follows we always assume (Z_t) to be iid). This implies that, conditionally upon $X_{t-1}, \ldots, X_{t-p}$ (the p past observations of the time series), X_t has variance σ_t^2.

The basic idea behind the construction (1.1) is quite intuitive: for a "forecast" of the distribution of X_t we only have to know two ingredients: σ_t and the distribution of Z_t. For example, if Z_t is normal $N(0, 1)$, then, given the past observations of the time series, $X_t \sim N(0, \sigma_t^2)$. Hence, conditionally upon $X_{t-1}, \ldots, X_{t-p}$, the present value X_t may assume values in $[-1.96\sigma_t, 1.96\sigma_t]$ with 95% probability. Similarly, there is a 5% chance for the log-return X_t to fall below the threshold $-1.64\sigma_t$. The 5% -quantile of the log-return distribution is considered as a measure of risk for the underlying asset. In the financial area, this quantile is known under the name of *Value at Risk* or *VaR*; see RiskMetrics [31].

These simple calculations show why models of type (1.1) have become so popular; in the presence of non-Gaussian distributions for log-returns (this is a fact no specialist would doubt!) mixture models such as (1.1) allow one to get updated (i.e. conditional) probability "forecasts" without too much sophistication.

Empirical work has shown that the simple ARCH(p) process given by (1.1) and (1.2) has a reasonable fit to real-life data *only if the number of the parameters* σ_i *is rather large*. Since the rationale for the definition (1.2) is to take a time-changing weighted average of the past squared observations as an approximation to the conditional variance σ_t^2 (an "updated estimate of the variance", if you like), it is quite natural to define σ_t^2 not only as a weighted average of past X_j^2's but also of past. σ_j^2's. This new idea resulted in Bollerslev's [2] and Taylor's [35] generalised ARCH process of order (p, q) (GARCH(p; q)): the process (X_t) is again given by (1.1), but now the squared stochastic volatility satisfies

$$\sigma_t^2 = \alpha_0 + \sum_{j=1}^{p} \alpha_j X_{t-j}^2 + \sum_{k=1}^{q} \beta_k \sigma_{t-k}^2 := \alpha_0 + \alpha(L) X_t^2 + \beta(L)\sigma_t^2, \tag{1.3}$$

where the σ_j's and are non-negative parameters, L is the back-shift operator and $\alpha(L)$, $\beta(L)$ are the corresponding polynomials in L with coeficients α_j, β_k. Clearly, σ_t^2 could have been defined in many other reasonable ways, and therefore it is perhaps not totally surprising that a wave of different ARCH-type models has flooded the econometrics journals. Each of these models was introduced in order to improve upon (1.2) or (1.3) in some sense. Some of them have gained popularity such as Nelson's [30] EGARCH (exponential GARCH) model while most of them remained only of academic interest. From a mathematical point of view, not all of them are directly comparable with the GARCH processes. However, we do not have here the space to discuss

these modifications in detail; see for example Bollerslev et al. [3] or Shephard [32] for review papers. In what follows, we mostly stick to the GARCH model and we do so for two reasons. The first is that, although apparently simple, its analytic study exemplifies the difficulties encountered when working with this class of models. Secondly, it is one of the models heavily used in practice.

Notice that we call (X_t) an ARCH or GARCH process and not the squared process (X_t^2). (Since both conventions have been used in the literature we want to make clear our preference.)

The connection with ARMA processes. It is straightforward that equation (1.3) can be rewritten as an ARMA equation with noise $v_t := X_t^2 - \sigma_t^2$:

$$(1.4) \qquad (1-\varphi(L))X_t^2 = \alpha_0 + (1-\beta(L))v_t, \qquad \varphi(L) := \alpha(L) + \beta(L).$$

If (X_t) is strictly stationary and $EX^2 < \infty$, (v_t) constitutes a strictly stationary martingale difference sequence. In the light of (1.4), the idea of viewing the GARCH process as an ARMA process for the squares X_t^2 was certainly a father of thought.

Representation (1.4) could give one the illusion that the theory for GARCH processes might be as easy as for ARMA processes. (Naturally, the notion of "simplicity" is a relative one; a thorough study of linear processes as provided by Brockwell and Davis [9] shows that simplicity can also have a high dimension of complexity.) However, (1.1) makes (X_t) a non-linear process. For this deviation from a linear (ARMA) process one has to pay a price. After 15 years of ARCH modelling we know it is a high one: we know very little about the theoretical (probabilistic) properties of ARCH and GARCH processes. The "pure theorist" and the "practical econometrician" will certainly deny this statement. However, just to give some examples of the difficulties one has to face: with a few exceptions (the ARCH(1) and GARCH(1,1) models) we can in general not decide whether a GARCH(p; q) process has a strictly stationary version, provided we know the distribution of the Z_t's and the parameters, we do not know much about the tails of the marginal distributions of (X_t), and very little about the finite-dimensional distributions, i.e. the dependence structure. We know almost nothing about the theoretical properties of multivariate extensions of ARCH-type models.

Surprisingly, the statistical estimation of the parameters α_j and β_k is not too difficult. (This fact is an essential argument in favour of GARCH processes.) Given the Z_t's are iid standard normal, the likelihood function of the vector $(X_1, \ldots, X_n)$ can be written down, and conditional maximum likelihood theory yields consistent and asymptotically normal estimates of the parameters. This theory remains valid even if one deviates from the Gaussianity of the Z_t's. The estimation theory for GARCH processes is provided for example in Gourieroux [23].

The stationarity issue. The GARCH(p, q) equations (1.1), (1.3) with iid innovations Z_t such that $EZ=0$ and $EZ^2=1$ have a strictly stationary finite first moment solution (σ_t^2) (and hence (X_t) is strictly stationary as well and has finite variance) if

$$\alpha_0 > 0 \text{ and } \sum_{j=1}^{p} \alpha_j + \sum_{k=1}^{q} \beta_k < 1. \tag{1.5}$$

See Nelson [29] for the GARCH(1,1) case and Bougerol and Picard [7] for the general case.

Though we do not know the most general conditions for strict stationarity of a GARCH(p, q) process we gain some information about this problem by considering the ARCH(1) (see Goldie [22] and Section 8.4 in Embrechts et al. [17]) and GARCH(1,1) (see Nelson [30], Mikosch and Starica [26]) cases. Given that Z is standard normal, a strictly stationary solution (X_t) exists in the ARCH(1) case if $\alpha_0 > 0$ and $\alpha_1 \in (0, 2e^{\gamma})$, where γ is Euler's constant (e^{γ} = 3.5621 ...). For a GARCH(1,1) process the conditions $\alpha_0 > 0$ and $E \ln(\alpha_1 Z^2 + \beta_1) < 0$ are necessary and sufficient for the existence of a strictly stationary version of (X_t). Hence $\alpha_1 + \beta_1 \geq 1$ is possible for certain choices of α_1 and β_1. The general GARCH(p, q) case is very complicated and it will not be discussed here (see Mikosch and Starica [26]).

Before discussing some features of the real data, let us define the notion of *long-range dependence*. For any *stationary* sequence (Y_t) define the *autocorrelation function* (ACF) as

$$\rho_Y(h) = \frac{\gamma_Y(h)}{\gamma_Y(0)}, \qquad \gamma_Y(h) = \operatorname{cov}(Y_0, Y_h), \qquad h \in \mathrm{Z}.$$

We say that (Y_t) exhibits *long-range dependence* (LRD) if

$$\sum_{h=0}^{\infty} |\rho_Y(h)| = \infty, \tag{1.6}$$

and *short-range dependence* otherwise.

2 A closer look at real-life data

2.1 The LRD effect

Long log-return series (X_t) of foreign exchange rates, stock indices and share prices have the following properties in common:

- The sample ACF $\hat{p}x$ of the data is tiny for all lags, save possibly the first ones; the sample mean is not significantly different from zero. This indicates that (X_t) is a white noise process.

- The sample ACFs $\hat{\rho}|x|$ and $\hat{p}x^2$ of the absolute values and their squares
  - are all positive,
  - decay fast for the first few lags,
  - remain "almost constant" for larger lags.

This is what we call the LRD *effect*.

The first mentioned empirical property of the sample ACF for the data fits nicely with the fact that the X_t's from a GARCH(p, q) process are uncorrelated (provided their second moment exists). Recalling that the GARCH(p, q) process actually has exponentially decaying autocorrelations, we may doubt that a GARCH process can capture the particular behaviour of the sample ACFs of the real-life $|X_t|'s$ and $X_t^2's$ described as the LRD *effect*.

In order to illustrate the mentioned "stylized sample ACF facts" we consider the daily log-returns of the Standard & Poor's 500 composite stock index from January 2, 1953, to December 31, 1990. The sample ACF of the log-returns and their absolute values (called *absolute log-returns* in what follows) are displayed in Figure 2.2. The same data set will be used in the sequel to substantiate most of our statements.

Since the GARCH(p, q) process cannot describe the observed sample ACF behaviour in an adequate way, we may ask for alternative explanations of this phenomenon. In the literature various answers have been given which we now want to mention.

2.2 The IGARCH effect

The estimation of GARCH processes on log-return data produces with regularity the following results:

- For longer samples, the estimated parameters $\alpha_1,...,\alpha_p$ and $\beta_1,...,\beta_q$ of the model (1.1), sum up to values *close* to one.

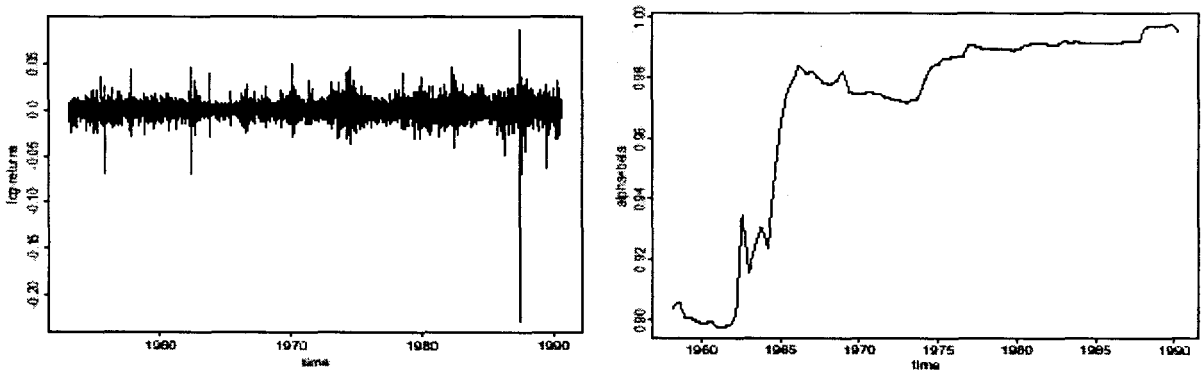


Figure 2.1 Left: *Plot of 9558 S&P500 log-returns. The year marks indicate the beginning of the calendar year.* Right: *The estimated values of* $\alpha_1 + \beta_1$ *for an increasing sample of S&P500 log-returns. An initial GARCH(1,1) model was estimated on the first 1500 observations. Then* α_1 *and* β_1 *were re-estimated on increasing samples of size 1500+k * 100, k >0. The labels on the x-axis indicate the date of the latest observation used for the estimation procedure. The graph shows how the IGARCH effect builds up when the sample size increases.*

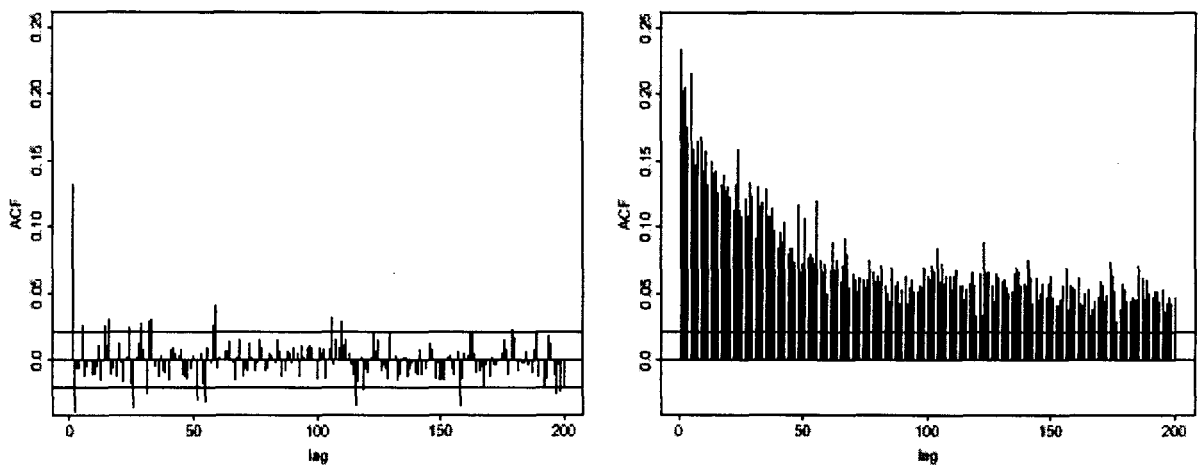


Figure 2.2 Left: *Sample ACF for the S&P500 log-returns. Here and in what follows, the horizontal lines in graphs displaying sample ACFs are set as the 95% confidence bands (*$\pm$ *1.96 /* $\sqrt{n}$ *) corresponding to the ACF of iid Gaussian white noise.* Right: *Sample ACF for the S&P500 absolute log-returns.*

- When shorter subsamples are used for estimation, the sum of the coe_cients, although not small, *stays away* from 1.

We will refer to these two regularities as the IGARCH effect. Figure 2.1 illustrates the IGARCH(1; 1) *effect* with the S&P500 data.

The first mentioned stylized fact motivated the introduction of the integrated GARCH(*p, q*) (IGARCH(*p, q*)) process by Engle and Bollerslev [18] as a possible generating process for log-returns

(2.1) $$\alpha_0 > 0 \quad \text{and} \quad \sum_{j=1}^{p} \alpha_j + \sum_{K=1}^{q} \beta_k = 1.$$

Under the assumptions given above, in particular $EZ^2 = 1$, the IGARCH model has a strictly stationary solution, but the X_t's do not have a finite second moment. To see this take expectations in the defining equation (2.1) and note that $E\sigma^2 = EX^2$:

$$E\sigma^2 = \alpha_0 + \sum_{j=1}^{p} \alpha_j EX^2 + \sum_{j=1}^{q} \beta_k E\sigma^2 = \alpha_0 + E\sigma^2.$$

Since $\alpha_0 > 0$ is necessary for strict stationarity, $E\sigma^2 = \infty$ follows. For an IGARCH(1,1) process, if the distribution of Z satisfies some mild assumptions (such as the existence of a density with infinite support), it follows from a classical result of Kesten [24] (see also Goldie [22] for an alternative proof) that

$$P(X > x) \;\; \text{~constant } x^{-2}, \quad x \to \infty.$$

We refer to Mikosch and Starica [26] for details and further references.

At this point it is important to notice that

the IGARCH model and the LRD notion are incompatible.

Indeed, our definition of LRD in terms of the ACF is not applicable since the ACF is not well defined. Thus, if the IGARCH model was correct, in particular the variance infinite, the sample ACFs of (X_t), ($|X_t|$) and (X_t^2) would estimate nothing meaningful. A plausible explanation of the empirically observed LRD *effect* would then be:

If the IGARCH model is the generating process of the log-returns, the LRD effect has nothing to do with LRD; it is simply an artifact since the sample ACFs do not measure anything.

This point of view has been further explored in Mikosch and Starica [26]. There we discuss the behaviour of the sample ACF for the less extreme case of an "almost integrated" GARCH(1,1) model when $\alpha_1 + \beta_1$ is less than, but close to 1. In this case, the ACFs for the log-returns and absolute log-returns are well defined and the corresponding sample ACFs have, possibly, a meaning. The outcome of this research is very much in line with the previous discussion and can be summarised as follows.

- X has power law behaviour in the tails:

  there exists $\kappa > 2$ but *close* to 2 such that P($X > x$) ~ constant x^{-k} as $x \to \infty$.

- If the ACF is well defined, the rate of convergence of the sample autocorrelations (of the X_t 's, $|X_t|$'s, X_t^2's) to their deterministic counterparts is extremely slow; it is the slower the smaller the value of κ.

- If the ACF is not defined (depending on κ, this can happen for certain powers of the absolute log-returns), the sample autocorrelations converge in distribution to a *non-degenerate limit*.

Thus, if one assumes an "almost integrated" GARCH model as log-return generating process, the sample ACF is again not very meaningful.

Although a possible explanation for the LRD effect, taking the IGARCH e_ect at face value contradicts other empirical findings. As we have already mentioned, assuming an estimated GARCH model (i.e. an integrated or "almost integrated" GARCH) as generating process for log-returns presupposes a tail index κ of (or close to) 2. However the existing statistical evidence shows quite convincingly that the tails of real log-returns are not so heavy; see for example Müller et al. [28] and Embrechts et al. [17].

We can offer two alternative explanations for the deviation of κ from 2.

- The statistical estimates of κ are poor.

- The IGARCH *effect* is spurious and occurs because the GARCH process is not a suitable model for the data.

The first fact has been discussed in detail (see Embrechts et al. [17] and the references therein; see also Starica [34]) and cannot be neglected. However, despite the large variation of estimators for our experience shows:

The sum of estimated GARCH coefficients is close to 1 always when one uses a sufficiently long log-return series, but it usually stays away from 1 when estimating on smaller subsamples.

(See for example Figure 2.1.) This observation seems to indicate that a GARCH process is not a suitable model and that the IGARCH effect is just an artifact. Since changes of the structure in long log-return series are much more likely than in short ones, the following hypothesis (which goes back to Diebold [15] and Lamoureux and Lastrapes [25]) sounds plausible:

The IGARCH effect is due to non-stationarity in log-return series.

It is perhaps the time to soothe the worried reader who has not forgotten that our aim was to explain the LRD *effect* in the absolute log-returns. It seems that instead of doing that we ended up discussing possible connections between the IGARCH *effect* and non-stationarity. However, she should rest reassured, the detour was deliberate and brought us close to the question we believe to be central to the understanding of the issue at hand:

Is it possible that both, the LRD and the IGARCH effects, are caused by the same simple reason: ***non-stationarity of the data?***

A possible answer is given in the next section.

2.3 Checking the goodness of fit of GARCH processes

In order to verify in which period of time a GARCH(*p, q*) model gives a good _t to real-life data we constructed a goodness of _t test statistic in the spectral domain:

(2.2) $$S_n := \sqrt{n} \sup_{\lambda \in [0,\pi]} \left| \sum_{h=1}^{n-1} \frac{\hat{\gamma}x(h)}{[\mathrm{var}(X_0 X_h)]^{1/2}} \frac{sin(\lambda h)}{h} \right|.$$

Under the null hypothesis that (X_t) comes from a GARCH(*p, q*) model with given parameters α_j and β_k, var(X_0X_h) can be calculated. Mikosch and Starica [27] proved under the null hypothesis and assuming a finite 4th moment for X, that S_n converges in distribution to the supremum of a Brownian bridge on [0, π]. Thus the limit theory for S_n is very much the same as for the classical Kolmogorov-Smirnov goodness of fit test statistic; cf. Shorack and Wellner [33]. In Figure 2.3 we show how one can apply S_n in order to detect changes in the GARCH structure of the S&P500 log-return series. The graphs show that the unconditional variance of the log-returns varies strongly through time. A frequently re-estimated GARCH(1,1) model seems to capture the change in variance.

A glance at Figures 2.3 and 2.4 shows quite convincingly:

One particular GARCH process is a good model for the log-return time series only for a relatively short period of time, and therefore the underlying GARCH models have to be updated quite frequently.

Since the classical tools of time series analysis such as the *sample* ACF and the *periodogram* together with the results of *parametric* model *estimation* can be interpreted in a meaningful way *only if the underlying data can be thought of as coming from a strictly stationary process*, we may question everything we have done so far: the sample ACFs of Figure 2.2, in particular the LRD *effect*, and the parameter estimates for the α_j's and β_k's, in particular the IGARCH *effect*. However, is there a simple explanation for what we see in the data?

In Mikosch and Starica [27] we considered a time series

$$Y_1^{(1)},\ldots,Y_{[np]}^{(1)},Y_{[np]+1}^{2},\ldots,Y_n^{(2)},$$

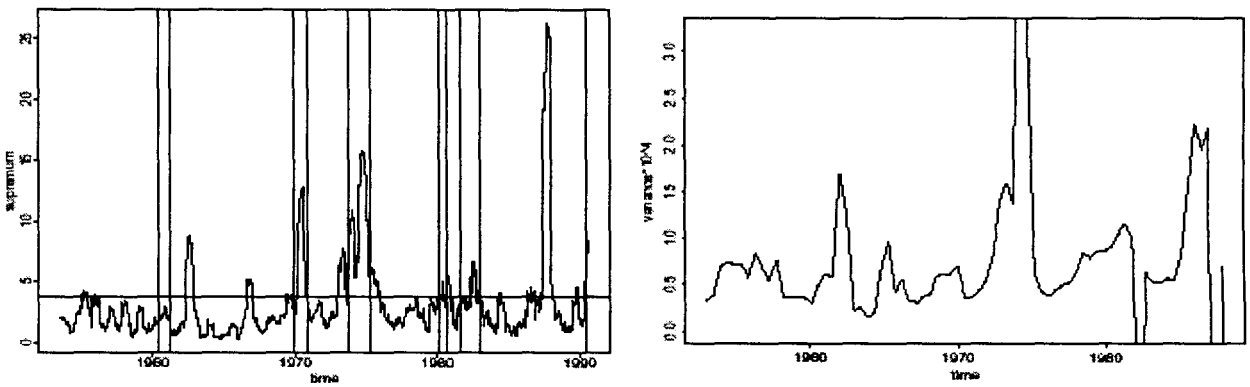


Figure 2.3 Left: *The goodness of fit test statistic S_{125} (see (2:2)) calculated on a weekly basis from previous 125 observations (approximately 6 months) of the S&P500. Based on estimation of the parameters from the first 1500 observations, we check the null hypothesis $\sigma_{t+1}^2 = 8.58 \times 10^{-6} + 0.072X_t + 0.759\sigma_t^2$ and $EX^4 = 3.72$. The horizontal line is set at 3:6, the 99% quantile of the limit distribution of S_n. Values above the confidence bound correspond to 6 months periods when the hypothesised model is inappropriate. Essentially, high values of the statistic S_n signal higher unconditional variance than that of the supposed model. The dotted vertical lines mark the beginning and end of economic recessions as determined by the National Bureau of Economic Research. They nicely show the coincidence between the recession periods and the intervals of higher unconditional variance detected by our tool.* Right: *The implied GARCH(1,1) unconditional variance of the S&P500 data. A GARCH(1,1) model is estimated every 6 months using the previous 2 years of data. The graph displays the variances $\sigma_X^2 = \alpha_0/(1-\alpha_1-\beta_1)$. The similarities between the two graphs seem to show that a frequently re-estimated GARCH(1,1) model captures to a certain extent the changing unconditional variance of the log-returns.*

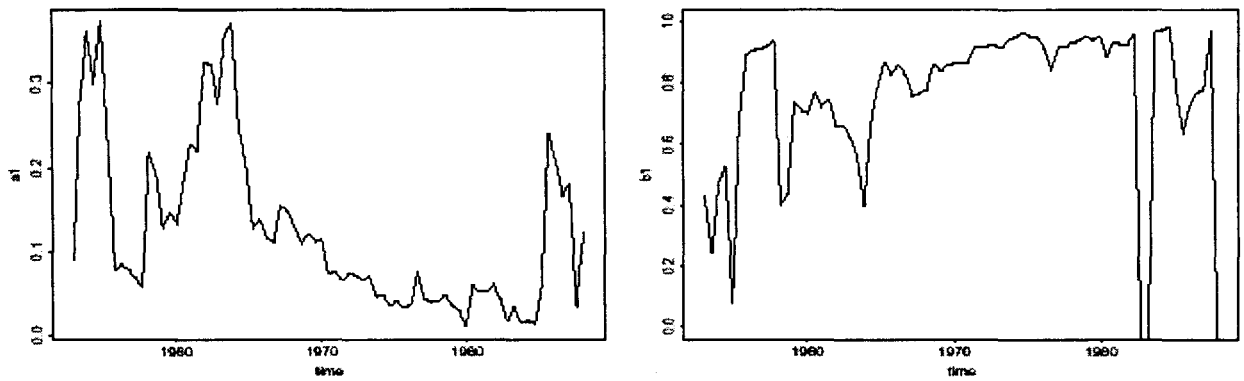


Figure 2.4 *A GARCH(1,1) model is fitted to every block of 6 months data. The fit is based on the previous 2 years of data. Estimated* α_1 (left) *and* β_1 (right).

where $p \in (0,1)$ is a fixed number. The two pieces of this time series come from distinct stationary ergodic models. (We focus here on two time series, the case of a finite number of such pieces can be treated completely analogously.) Simple calculation shows that as $n \to \infty$, the sample ACF at lag *h* converges:

(2.3) $$\hat{\gamma}_Y(h) \xrightarrow{P} p\gamma_{Y^{(1)}}(h) + (1-p)\gamma_{Y^{(2)}}(h) + p(1-p)(EY^{(1)} - EY^{(2)})^2 .$$

Now assume that the two subsamples are also uncorrelated. Let $\lambda_j = 2\pi j / n$, $j = 1,2, \ldots$, denote the Fourier frequencies. Then the periodogram $I_Y(\lambda_j)$ (the natural estimator of the spectral density f_Y of a *stationary* process (Y_t); see Brockwell and Davis [9]) at the Fourier frequencies satisfies as $n \to \infty$ and $\lambda_j \to 0$

$$EI_Y(\lambda_j)$$

(2.4) $$\sim p2\pi d_{Y^{(1)}}(\lambda_j) + (1-p)2\pi f_{Y^{(2)}}(\lambda_j) + \frac{2}{n\lambda_j^2}(EY^{(1)} - EY^{(2)})^2(1-\cos(2\pi jp)).$$

Let us apply our findings to a sample that consists of two subsamples from different GARCH(*p, q*) processes, $X_t^{(1)}, t = 1,\ldots,[np]$ and $X_t^{(2)}, t = [np]+1,\ldots,n$. Since all these variables have mean zero, we conclude from (2.3) and (2.4) that

$$\hat{\gamma}_X \xrightarrow{P} p\gamma_{X^{(1)}}(h) + (1-p)\gamma_{X^{(2)}}(h) = 0,$$

$$EI_Y(\lambda_j) \sim p2\pi f_{X^{(1)}}(\lambda_j) + (1-p)2\pi f_{X^{(2)}}(\lambda_j) = p\,\mathrm{var}(X^{(1)}) + (1-p)\,\mathrm{var}(X^{(2)}).$$

Thus we expect that the sample ACF estimates zero at all lags and the periodogram estimates a constant; see Figure 2.6. This is in agreement with the empirical findings for log-return series; see Figure 2.2.

Similar calculations for the absolute values and squares of the time series predict a totally different behavior. For example, assume that $E|X^{(1)}| \neq E|X^{(2)}|$ (the case of the squared time series is analogous). Then (2.3) implies that

$$\hat{\gamma}_{|X|} \xrightarrow{P} p\gamma_{|X^{(1)}|}(h) + (1-p)\gamma_{|X^{(2)}|}(h) + p(1-p)(E|X^{(1)}| - E|X^{(2)}|)^2.$$

Since the ACF of the absolute values of a GARCH process decays to zero exponentially the terms

$$p\gamma_{|X^{(1)}|}(h) + (1-p)\gamma_{|X^{(2)}|}(h)$$

decay to zero at an exponential rate, and so we may expect that we see a fast decay of the sample ACF at the first few lags. This is indeed in agreement with the sample ACF of the absolute values of various log-return series. The typical shape of the sample ACF at large lags of such a time series is however characterised by the constant term

$$p(1-p)(E|X^{(1)}| - E|X^{(2)}|)^2,$$

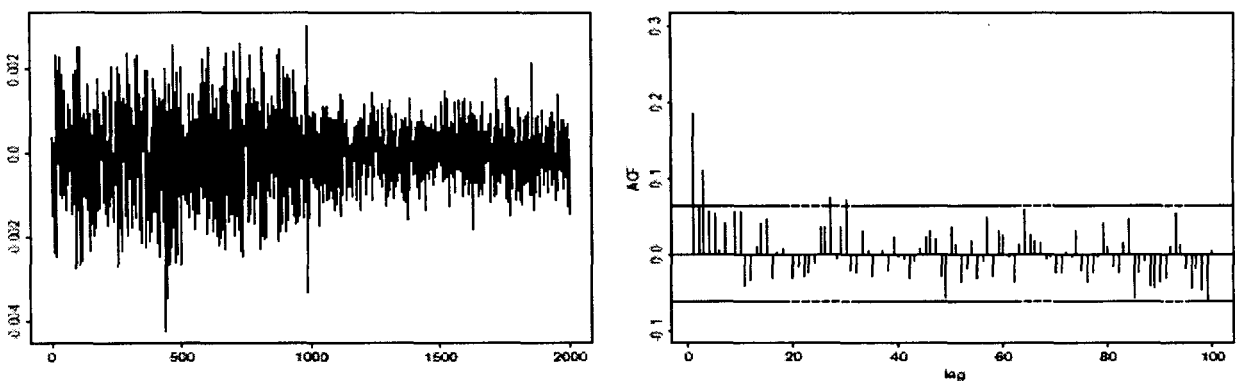


Figure 2.5 Left: *Two independent realizations of length 1000 of two GARCH(1,1) processes with parameters* $\alpha_0 = 0.13 \times 10^{-6}$, $\alpha_1 = 0.11$, $\beta_1 = 0.52$, *respectively* $\alpha_0 = 0.17 \times 10^{-6}$, $\alpha_1 = 0.20$, $\beta_1 = 0.65$, *are juxtaposed.* Right: *Sample ACF for* $|X_t|$, $t = 1, \ldots, 1000$. *The other sample ACF for* $|X_t|$, $t = 1000, \ldots, 2000$, *looks similar. The sample ACF quickly decreases to 0.*

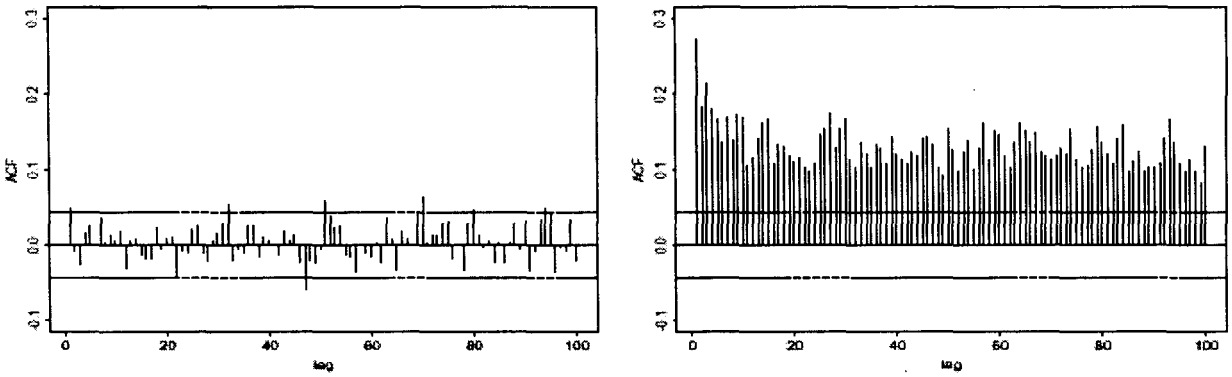


Figure 2.6 Left: *Sample ACF for X_t , t = 1, ..., 2000. The sample ACF is tiny.* Right: *Sample ACF for $|X_t|$, t = 1, ..., 2000, with the LRD effect..*

which forces the sample ACF to stay positive and almost constant for a large number of lags and which produces the LRD effect in the absolute log-returns; see Figure 2.6.

Now consider the expected periodogram at small Fourier frequencies. From (2.4),

$$EI_{|X|}(\lambda_j) \sim p2\pi f_{|X^{(1)}|}(\lambda_j) + (1-p)2\pi f_{|X^{(2)}|}(\lambda_j) + \frac{2}{n\lambda_j^2}(E|X^{(1)}| - E|X^{(2)}|)^2(1-\cos(2\pi jp).$$

Assume that p = r_1/r_2 for two relatively prime integers. Notice that the term with the cosine is either zero for some frequencies or bounded away from zero for the remaining Fourier frequencies. Since the ACF of the absolute values of a GARCH process decays exponentially, the corresponding spectral density is a continuous function on $[0,\pi]$. Hence

$$p2\pi f_{|X^{(1)}|}(\lambda_j) + (1-p)2\pi f_{|X^{(2)}|}(\lambda_j) \to p2\pi f_{|X^{(1)}|}(0) + (1-p)2\pi f_{|X^{(2)}|}(0) = \text{constant}.$$

On the other hand, for $n\lambda_j^2 \to 0$ the second term

$$\frac{2}{n\lambda_j^2}(E|X^{(1)}| - E|X^{(2)}|)^2(1-\cos(2\pi j r_1 / r_2))$$

will give very large values for "almost all" such Fourier frequencies, and this will create the impression of a spectral density which has a singularity at zero.

The above discussion shows:

Non-stationarity of a time series could be responsible for the spurious LRD effect in the behavior of the sample ACF and the periodogram of absolute log-returns.

Finally, we also claim that the IGARCH effect might be due to non-stationarity as well. In Mikosch and Starica [27] we investigated the behavior of the Whittle estimate of α_1 and $\varphi_1 = \alpha_1 + \beta_1$ applied to the squares of a sample consisting of two subsamples generated by two different GARCH(1; 1) processes. There we calculate the theoretical limit φ_1 of the Whittle estimate when the sample size increases to infinity (the proportion of observations from the first model in the sample remains always the same). The results of our investigation are summarized in Figure 2.7. For simplicity we assume here that the sample consists of two equal length pieces from different GARCH(1,1) models. The first GARCH(1,1) process is the one used for the goodness of fit test in Section 2.3. This model was obtained by estimating a GARCH(1,1) process on three years of daily S& P500 log-returns, beginning January 1953. The estimated parameters were

(2.5) $$\alpha_0 = 8.58 \times 10^{-6},\ \alpha_1 = 0.072,\ \beta_1 = 0.759,$$

and an estimated 4th moment for the residuals of 3.72. The second subsample is suppose to be a realization of a GARCH(1,1) model with the same α_0 and same 4th moment for the residuals. The parameters α_1 and β_1 vary around the values 0.072 and 0.759 respectively (and are displayed on the *y*-, respectively *x*-axis).

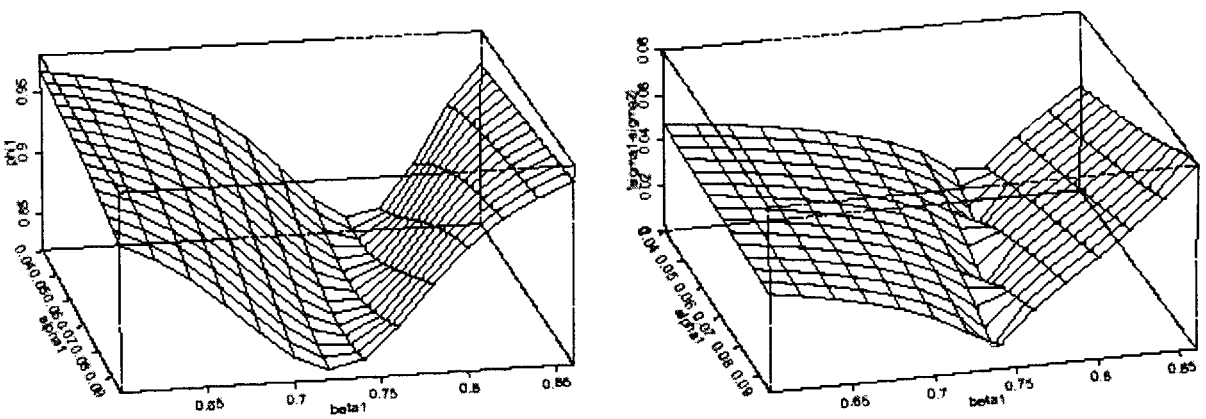


Figure 2.7 Left: *Theoretical φ_1 (on the z-axes), the limit (as the sample size goes to infinity) of the Whittle estimate corresponding to a sample containing two equal subsamples, the first described by (2.5), the second having the same α_0 and same 4th moment for the residuals as the first and varying α_1 (on the y-axis) and β_1 (on the x-axis).* Right: *The absolute difference between the standard deviations of the two models generating the subsamples.*

The graphs in Figure 2.7 establish a close connection between the size of the absolute difference in the variances of the two subsamples in the sample and φ_1's proximity to1: the larger the absolute difference in variance, the closer the value of φ_1 is to 1. This might explain the IGARCH *effect* since the longer the time series the larger the chance that strong non-stationarity will affect it and hence the closer to one the estimated value of '1 (see Figure 2.1 for an example of how the IGARCH *effect* builds up in longer time series).

It is not very realistic to assume that a real-life time series consists of disjoint pieces from distinct parametric models. It is more natural to think of a sample that, besides sharp switches from a certain regime to another, also contains periods described by models where the parameters change continuously. To understand this kind of behavior in log-returns more detailed research is needed. However, our simplistic model has already shown that LRD-type behavior of the sample ACF of absolute log-returns could be due to non-stationarity in the sample, and more sophisticated models will certainly support this hypo-1thesis.

Before we conclude we want to emphasize that the task of uncovering the phenomena behind the empirical findings of slowly decaying sample ACFs and high persistence of the volatility is rendered more difficult by the fine distinction (many times just a matter of belief) between non-stationarity and LRD stationarity. To illustrate this consider the time series in Figure 2.8. Here the observations X_t are 0 or 1 and the lengths of ON periods (spells of 1s) and OFF periods (spells of 0s) are iid Pareto distributed with tail index 1. It is easy to see that the behavior of the theoretical ACF is: corr(X_t ;X_{t+h}) $\approx ch^{-1}$, hence the time series exhibits long memory. When the time series in the left graph of Figure 2.8 is analyzed, the assumption of stationarity (and long memory) is plausible,

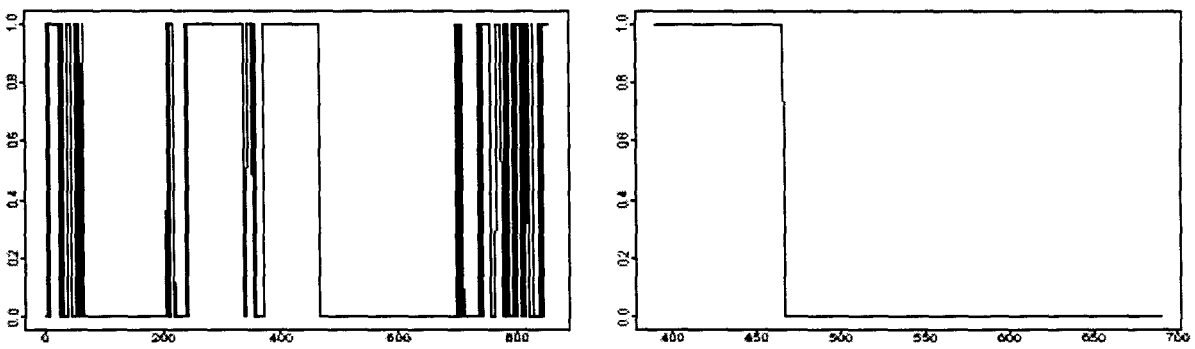


Figure 2.8 Left: X_t , t = 1, ..., 856. *The long memory stationary assumption is plausible.* Right: X_t , t = 390, ..., 690. *The hypothesis of structural change is plausible if only a part of the original time series is available.*

while, when only in possession of the observations displayed in the second graph, i.e. observation 390 up to 690, the hypothesis of a structural change is more plausible.

This fine distinction between long memory stationarity and non-stationarity is the source for various competing explanations for the empirical findings under discussion. We postulate non-stationarity of the unconditional variance as a possible source of both the slow decay of the sample ACF and the high persistence of the volatility in long log-return time series as measured by ARCH type models. Hence we claim that both these findings in long time series could be spurious. Other studies (Baillie et al. [1]) have argued that the slow decay of the sample ACF correctly reflects the presence of a stationary long memory time series while the apparent integrated GARCH behavior is an artifact of a long memory process investigated through the estimation of a GARCH(1,1) model. While the "correct" explanation behind the empirical facts is still elusive, it is worth mentioning that, while Baillie et al. [1] base their explanation on simulations, we are able to prove our results analytically (see [27]).

3 Some concluding remarks

So far we have argued that:

- Standard GARCH models cannot explain LRD.
- GARCH models give a reasonable _t to log-returns only for short time horizons. The models have to be updated frequently.
- LRD and IGARCH effects in log-returns series might be both due to non-stationarity.

This point of view is not shared by many authors who wrote papers on long memory in absolute log-return series. To the contrary, the empiricially observed sample ACF and periodogram behavior of such time series made absolute log-returns one of the warhorses of the LRD community.

We are aware that other models, for example stochastic volatility models (see for example Breidt et al. [8]) or the ARCH(1) version of Giraitis et al. [21], can model the LRD-type behavior in the absolute log-returns and their squares.

However, common sense may allow one to ask at least two questions.

- Which economic reasons exist for LRD in absolute log-returns?
- What would we gain if we knew that there is LRD in absolute log-returns?

We have tried hard to find in the literature any convincing rational/economic argument in favor of long-range dependent stationary log-returns, but we did not find any, and so the above questions remain, to the best of our knowledge, unanswered. Since one cannot decide about the stationarity of a stochastic process on the basis of a finite segment (sample) the question as to whether there is LRD in the absolute log-returns or not will certainly keep a part of the academic community busy also in the future.

References

[1] BAILLIE, R.T., BOLLERSLEV, T. AND MIKKELSEN, H.O. (1996) Fractionally integrated generalized autoregressive conditional heteroskedasticity. J. Econom. 74, 3-30.

[2] BOLLERSLEV, T. (1986) Generalized autoregressive conditional heteroskedasticity. J. Econometrics 31, 307-327.

[3] BOLLERSLEV, T., CHOU, R.Y. AND KRONER, K.F. (1992) ARCH models in _nance: A review of the theory and evidence. J. Econometrics, 52, 5-59.

[4] BOLLERSLEV, T. AND ENGLE, T. (1993) Common persistence in conditional variances. Econometrica 61 (1993), 167-186.

[5] BOLLERSLEV, T. AND MIKKELSEN, H.O. (1996) Modeling and pricing long memory in stock market volality. J. Econom. 73. 151-184.

[6] BOUGEROL, P. AND PICARD, N. (1992a) Strict stationarity of generalized autoregressive processes. Ann. Probab. 20, 1714-1730.

[7] BOUGEROL, P. AND PICARD, N. (1992b) Stationarity of GARCH processes and of some nonnegative time series. J. Econometrics 52, 115-127.

[8] BREIDT, J.F., CRATO, N. AND LIMA, P. DE (1998) On the detection and estimation of long memory in stochastic volatility. J. Econom. 83, 325-348.

[9] BROCKWELL, P.J. AND DAVIS, R.A. (1991) Time Series: Theory and Methods, 2nd edition. Springer, New York.

[10] BROCKWELL, P.J. AND DAVIS, R.A. (1996) Introduction to Time Series and Forecasting. Springer, New York.

[11] CAMPBELL, J.Y., LO, A.W. AND MACKINLEY, A.C. (1997) The Econometrics of Financial Markets. Princeton University Press, Princeton.

[12] DING, Z. AND GRANGER, C.W.J. (1996) Modeling volatility persistence of speculative returns: A new approach. J. Econom. 73, 185-215.

[13] DAVIS, R.A. AND MIKOSCH, T. (1998) The sample autocorrelations of heavy{tailed processes with applications to ARCH. Ann. Statist. 26, 2049-2080.

[14] DAVIS, R.A., MIKOSCH, T. AND BASRAK, B. (1998) Sample ACF of multivariate stochastic recurrence equations with applications to GARCH. Technical Report, University of Groningen.
Available at www.math.rug.nl/~mikosch

[15] DIEBOLD, F.X. (1986) Modeling the persistence of conditional variance: a comment. Econometric Reviews 5, 51-56.

[16] DOUKHAN, P. (1994) Mixing. Properties and Examples. Lecture Notes in Statistics 85. Springer Verlag, New York.

[17] EMBRECHTS, P., KL. UPPELBERG, C. AND MIKOSCH, T. (1997) Modelling Extremal Events for Insurance and Finance. Springer, Berlin.

[18] ENGLE, R.F. AND BOLLERSLEV, T. (1986) Modelling the persistence of conditional variances. Econom. Rev. 27, 1-50.

[19] GHYSELS, E., HARVEY, A. AND RENAULT, E. (1997) Stochastic volatility. In:Madala, G.S. and Rao, C.R. (Eds.) Statistical Methods of Finance. Handbook of Statistics, vol. 14, pp. 119-191.

[20] GIRAITIS, L., KOKOSZKA, P. AND LEIPUS, R. (1998) Stationary ARCH models: dependence structure and Central Limit Theorem. Econom. Theory, toappear.

[21] GIRAITIS, L., ROBINSON, P. AND SURGAILIS, D. (1998) A model for long memory conditional heteroskedasticity. Preprint.

[22] GOLDIE, C.M. (1991) Implicit renewal theory and tails of solutions of random equations. Ann. Appl. Probab. 1, 126-166.

[23] GOURIEROUX, C. (1997) ARCH Models and Financial Applications. Springer Series in Statistics. Springer-Verlag, New York.

[24] KESTEN, H. (1973) Random di_erence equations and renewal theory for products of random matrices. Acta Math. 131, 207-248.

[25] LAMOUREUX, C.G. AND LASTRAPES, W.D. (1990) Persistence in variance, structural change and the GARCH model. J. of Business and Economic Statist. 8, 225-234.

[26] MIKOSCH, T. AND STARICA, C. (1998) Limit theory for the sample autocorrelations and extremes of a GARCH(1,1) process. Technical Report. University ofGroningen.
Available at www.math.rug.nl/ ˜ mikosch

[27] MIKOSCH, T. AND STARICA, C. (1999) Change of structure in _nancial time series, long{range dependence and the GARCH model. Technical Report. University of Groningen.
Available at www.math.chalmers.se/ ˜ starica

[28] M. ULLER, U.A., DACOROGNA, M.M. AND PICTET, O.V. (1998) Heavy tails in high-frequency financial data. In: Adler, R.J., Feldman, R.E. and Taqqu, M.S. (Eds.) A Practical Guide to Heavy Tails, Birkhauser, Boston, pp. 55-78.

[29] NELSON, D.B. (1990) Stationarity and persistence in the GARCH(1; 1) model. Econometric Theory 6, 318-334.

[30] NELSON, D.B. (1991) Conditional heteroskedasticity in asset returns. A new approach. Econometrica 59, 347-370.

[31] RiskMetrics (1995) Technical document. JP Morgan, New York.

[32] SHEPHARD, N. (1996) Statistical aspects of ARCH and stochastic volatility. In: Cox, D.R., Hinkley, D.V. and Barndorff-Nielsen, O.E. (Eds.) Likelihood, Time Series with Econometric and other Applications. Chapman and Hall, London.

[33] SHORACK, G.R. AND WELLNER, J.A. (1986) Empirical Processes with Applications to Statistics. Wiley, New York.

[34] STARICA, C. (1998) On the tail empirical process for stochastic difference equations. Technical Report. Available at www.math.chalmers.se/ ~ starica

[35] TAYLOR, S. (1986) Modelling Financial Time Series. Wiley, NewYork.

TEMAS A DEBATE APARECIDOS EN BOLETINES ANTERIORES / *MONTHLY DEBATES IN PREVIOUS BULLETINS*

- García Martos, D. "La bonanza de la actividad de la construcción: perspectivas", (nº 67, pgs. 63-69)
- Albi, E. "Reformas organizativas y presupuestarias", (nº 66, pgs. 50-55)
- Valckx, N. "The information value of stocks and bonds for inflation news", (nº 66, pgs. 56-66)
- Bauwens, L. and P. Giot, "Markets with autoregressive conditional duration models", (nº 65, pgs. 49-56)
- San Segundo, M. J., "Déficits españoles en capital humano: el caso de la enseñanza secundaria", (nº 65, pgs. 57-76)
- Hendry, D., "Implications of selection inmodelling, forecasting and policy", (nº 64, pgs. 68-85)
- Currais, L. C., "Salud, capital humano y crecimiento económico. Breve panorama y evidencia empírica", (nº 64, pgs. 86-92)
- Cañizares, E. y A. Juara, "Proceso de integración de la Unión Europea. Privatizaciones. Etc", (nº 63, pgs. 42-48)
- Barea, J., "Presupuesto año 2000", (nº 62, pgs. 43-48)
- Mas, M., "La capitalización de la economía española", (nº 62, pgs. 49-69)
- Ruiz-Castillo, J., E. Ley y M. Izquierdo, "Recomendaciones ante el problema de los sesgos existentes en la medición del IPC español", (nº 61, pgs. 50-61)
- Dolado, J. J., "La rigidez de los mercados de trabajo y el futuro de la Europa social: algunas reflexiones", (nº 61, pgs. 62-67)
- García, M. e I. Ramos, "I Congress of European Monetary and Economic Union and Euro (Carlos III University)", (nº 60, pgs. 64-77)
- Cancelo, J.R. y A. Espasa, "The housing prices statistics: descriptive analysis and implications for short-term economic reports", (nº 60, pgs. 78-92)
- Paap, R. y H. D. van Dijk, "Posterior evidence on the permanent income hypothesis" (nº 58, pgs. 48-52)
- Jimeno, J. F., "El empleo y el paro en la Unión Europea" (nº 58, pgs. 53-66)
- Sebastián, M., "Brasil: la salida de la crisis" (nº 57, pgs. 49-59)

TRABAJOS RESEÑADOS EN BOLETINES ANTERIORES / *REVIEW WORKS IN PREVIOUS BULLETINS*

- Modrego, A., A. García-Romero, E. Sanz y C. García Zorita, "La investigación española en economía" (Boletin nº 65)
- Aparicio, F. M. y J. Estrada, "Information-theoretic analysis of serial dependence and cointegration" (Boletín nº 62)
- Aparicio, F. M., y A. Escribano, "On the empirical distributions of stock returns: European markets, 1990-95" (Boletín nº 62)
- Kaiser, R. y A. Maravall, "Trend, seasonality and Economic Cycles. The Hodrick-Prescott paradigm revisited" (Boletín nº 60).
- Rodríguez, R., "Actividad económica y valoración de activos financieros" (Boletín nº 57).
- Sanjuan Meso, C., "Comparaciones de productividad en la agricultura europea" (Boletín nº 52).
- Font, B., "Modelización de Series Temporales Financieras. Una Recopilación" (Boletín nº 51).
- Miles, D., "Especificación e inferencia en modelos econométricos para curvas de Engel" (Boletín nº 50).
- Poncela Blanco, P., "Algunos problemas en la identificación y predicción de factores comunes en series temporales multivariantes" (Boletín nº 49).
- Dolado, J.J., y María-Dolores, R., "Un análisis de los efectos cíclicos de la política monetaria en España (1977-1996)" (Boletín nº 48).
- María-Dolores, R., "Asimetrías en los efectos de la política monetaria en España (1977-1996)" (Boletín nº 46).
- Senra, E., "Modelos para series temporales con rupturas tendenciales y estructuras cíclicas asimétricas y bruscas" (Universidad Carlos III de Madrid) (Boletín nº 45).
- Álvarez, Mª.J., "Las cuentas de las privatizaciones: el caso de Seat" (Universidad Carlos III de Madrid) (Boletín nº 44).
- Balbás, A., " Measuring the degree of fulfillment of the law of one price. Applications to financial market integration" (Universidad Carlos III de Madrid) (Boletín nº 43)
- Martínez, J.M., Espasa, A., "La demanda de importaciones españolas. Un enfoque VECM desagregado". Universidad Carlos III de Madrid) (Boletín nº 42).
- Boldrin, M., Jiménez-Mártin, S., Peracchi, F., "Resumen de social security and retirement in Spain, NBER, WP 6136. Universidad Carlos III de Madrid) (Boletín nº 41).
- Lorenzo, F. "Modelización de la inflación con fines de predicción y diagnóstico". (Universidad Carlos III de Madrid) (Boletín nº 40).
- Risueño, M. "Estimación y modelización de la tasa de depreciación del capital. Un análisis desagregado. (Universidad Carlos III de Madrid) (Boletín nº 39).
- Ruiz, E., Lorenzo, F., "Estimación de la volatilidad de la inflación en presencia de observaciones atípicas y heteroscedasticidad condicional. (Universidad Carlos III de Madrid) (Boletín nº 38).
- García, T., Ocaña, C., "El efecto del control bancario en el comportamiento inversor de las empresas españolas". (Universidad Carlos III de Madrid) (Boletín nº 37).
- García, C.E., Macías, M., "Evolución y tendencias en la industria editorial española". (Universidad Carlos III de Madrid, Septiembre 1997) (Boletín nº 36).
- Kaiser, R. "Detección de cambios repentinos en los componentes inobservados de una serie temporal". (Universidad Carlos III de Madrid, Julio 1997) (Boletín nº 34).
- Martínez, J.M., Espasa, A. "Modelización de los cambios estructurales y de la evolución dinámica dependiente de la fase cíclica en el PIB español", (Universidad Carlos III de Madrid, Junio 1997) (Boletín nº 33).
- Espasa, A., Revuelta, J.M. y Cancelo, J. R., "Modelización automática de series diarias de actividad económica", (Universidad Carlos III de Madrid, DT 96-07 (03)) (Boletín nº 32).
- Camino, D. "The role of information and trading volume on intradail y and weekly reurn patterns in spanish stoch market" (Universidad Carlos III de Madrid, WP 96-10. Bussines Economic Series 01) (Boletín nº 31).

PyD PREDICCIÓN Y DIAGNÓSTICO

números publicados en 1998 y 1999

- La actividad industrial prosigue la recuperación impulsada por el dinamismo de las exportaciones (nº 46, Febrero 2000)
- La recuperación del sector exterior: situación actual y perspectivas (nº 45, Enero 2000)
- El comportamiento de la economía española en 1999 y perspectivas para el período 2000-2001 (nº 44, Diciembre 1999)
- El comportamiento de los costes laborales en el actual contexto económico (nº 43, Noviembre 1999)
- Primeros síntomas de ralentización del consumo privado (nº 42, Octubre 1999).
- La economía española intensifica su crecimiento apoyada en la demanda interna (nº 41, Septiembre 1999).
- Los resultados de la EPA en la primera mitad de 1999. Una estimación del crecimiento real del empleo y previsiones (nº 40, Agosto 1999).
- La fortaleza de la construcción: situación y perspectivas (nº 39, Junio 1999).
- La demanda externa en el contexto económico actual (nº 38, Mayo 1999).
- Prosigue la desaceleración de la actividad industrial (nº 37, Abril 1999).
- La desaceleración en la generación de puestos de trabajo: situación actual y perspectivas (nº 36, Marzo 1999).
- La fortaleza de la economía española. Situación y perspectivas (nº 35, Febrero 1999).
- La pujanza actual del sector de la construcción. Perspectivas (nº 34, Enero 1999).
- La desaceleración de la demanda externa neta: situación actual y perspectivas (nº 33, Diciembre 1998).
- La moderación de la actividad industrial (nº 32, Noviembre 1998).
- La aceleración del sector de la construcción en la actual coyuntura (nº 31, Octubre 1998).
- La moderación del sector exterior: situación actual y perspectivas (nº 30, Septiembre 1998).
- El mercado laboral ante los nuevos retos de la crisis financiera actual (nº29, Agosto 1998).
- Actividad económica: perspectivas de moderación de los crecimientos (nº 28, Junio 1998).

Informes elaborados por: Nicolás Carrasco, Antoni Espasa e Israel J. Muñoz
Director de PyD: Antoni Espasa

PREDICCIÓN Y DIAGNÓSTICO **es una publicación patrocinada por la Fundación Universidad Carlos III**

Para más información contactar con:

Gema Marcelo, Laboratorio de Predicción y Análisis Macroeconómico
Instituto Flores de Lemus de Estudios Avanzados en Economía, Universidad Carlos III
C/ Madrid, 126 E-28903 Getafe (Madrid) T. +34 91 624 98 89 F. +34 91 624 93 05
E-mail: laborat@est-econ.uc3m.es
www.uc3m.es/boletin

BOLETÍN INFLACIÓN Y
ANÁLISIS MACROECONÓMICO

Universidad Carlos III de Madrid

INSTITUTO FLORES DE LEMUS

HOJA DE SUBSCRIPCION Y PATROCINIO PARA EL AÑO 2000

Nombre y Apellidos:.....
Dirección: ..... C.P.: .....
Teléfono: .....Telefax..... Correo electrónico: .....
NIF/CIF:..... Fecha: .....

Boletín Inflación y Análisis Macroeconómico *(edición mensual)* ..... **325** ❑
Distribución a los 14 días de la publicación del IPC europeo armonizado 54.000 ptas

Servicio de actualización de las predicciones *(2 actualizaciones)* ❶ ..... **725** ❑
a las 12 horas de publicarse el IPC español 120.000 ptas
a las 24 horas de publicarse el IPC de los principales países europeos

Subscripción conjunta ..... **900** ❑
Subscripción al Boletín Predicción y Análisis Macroeconómico 150.000 ptas
+ Servicio de actualización de las predicciones y diagnósticos.

Subscripción y patrocinio ..... **3000** ❑
Subscripción al Boletín Predicción y Análisis Macroeconómico 500.000 ptas
+ Servicio de actualización de las predicciones y diagnósticos
+ Inclusión de anagrama en la lista de patrocinadores en el boletín y en internet.

METODOS DE PAGO
(Incluye IVA y gastos de envío)

Transferencia bancaria .....❑
A: Fundación Universidad Carlos III C.C.C.: 2096-0630-18-2839372704

Tarjeta de Crédito ..... **VISA** ❑.....**AMERICAN EXPRESS** ❑ ..... **MASTERCARD** ❑
Número..... Fecha de caducidad .....
Firma .....

Gracias, deseo que me envíen *GRATIS*

Una copia del Boletín Análisis y Predicción Macroeconómico .....❑
Una actualización de las predicciones y diagnósticos del Boletín en curso ❶.....❑

❶*Por favor, envíenme las actualizaciones de las predicciones y diagnósticos por Telefax* .....❑
Por favor, envíenme las actualizaciones de las predicciones y diagnósticos por Correo electrónico...❑

Universidad Carlos III de Madrid
Instituto Flores de Lemus de Estudios Avanzados en Economía
C/ Madrid, 126 E-28903 Getafe (Madrid) Tel +34 91 624 98 89 Fax +34 91 624 93 05 E-mail: laborat@est-econ.uc3m.es
www.uc3m.es/boletin

BOLETÍN

INFLACIÓN Y ANÁLISIS MACROECONÓMICO

www.uc3m.es/boletin

Instituto Flores de Lemus de Estudios Avanzados en Economía Nº 68. 6 de Junio 2000

La inflación anual en la Unión Monetaria en el mes de abril ha sido del 1,93%.

- Se han registrado innovaciones a la baja en los IPCA de seis de los once países que componen la UM (entre ellos Francia e Italia) y en los cuatro países restantes que forman la UE.
- La innovación a la baja registrada por la mayoría de los países de la UM procede de los precios energéticos. Alemania, sin embargo, ha registrado una innovación al alza derivada de los precios no energéticos.
- Por componentes, se produjo una innovación al alza en la inflación subyacente (0,14% observado frente a una predicción del 0,01%) procedente principalmente del sector servicios.
- Por otra parte, el componente residual del IPCA ha registrado una innovación a la baja derivada de los precios de la energía.
- Nuevamente, se han producido revisiones en los datos de los componentes correspondientes a los agregados europeos.

TASAS MEDIAS ANUALES DE CRECIMIENTO				
			Forecasts	
	1998	1999	2000	2001
IPCA Alemania	0.60	0.64	1.74	1.03
IPCA Francia	0.67	0.56	1.40	0.87
IPCA Italia Italy HICP	1.97	1.65	2.30	1.72
Inflación Subyacente	1.41	1.11	1.28	1.34
Bienes elaborados no energéticos	1.01	0.72	0.75	0.98
Servicios no energéticos	1.95	1.57	1.72	1.75
IPCA UM	1.09	1.12	1.94	1.43

- Para el mes de mayo se predice una tasa mensual en el IPCA del 0,18%, con una tasa anual del 2%.
- La tasa anual media se predice en el 1,94% para 2000 y en el 1,43% para 2001.
- El componente subyacente del IPCA registrará un crecimiento anual medio de 1,28% en 2000 y 1,34% en 2001. Sin embargo, el componente residual alcanzará un crecimiento medio de 5,66% en 2000 y descenderá al 1,85% en 2001.

- La estabilidad inflacionista en la UM por debajo del 2% se presenta bastante probable para 2000 y 2001.
- La dispersión entre países de la UM tiende a mantenerse alta todavía en la media de 2001: Alemania y Francia no se espera que superen el 1%, España, se situará en el 2,45%, Luxemburgo y Portugal superarán este valor e Irlanda se situará por encima del 4%.
- Por sectores, se prevé homogeneidad inflacionista.

Una información más detallada se puede encontrar en el Editorial del Boletín nº 68

Instituto Flores de Lemus
de Estudios Avanzados en Economía
C/ Madrid, 126 E-28903 Getafe (Madrid)

Universidad Carlos III de Madrid

www.Uc3m.es/boletin
E-mail: laborat@est-econ.uc3m.es
T. +34 91 624 98 89 F. +34 91 624 93 05

BOLETÍN

INFLACIÓN Y ANÁLISIS MACROECONÓMICO

www.uc3m.es/boletin

Instituto Flores de Lemus de Estudios Avanzados en Economía Nº 68. 6 de Junio de 2000

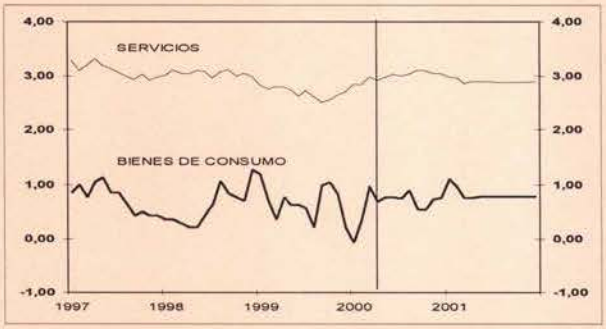
La inflación en Estados Unidos en el mes de abril ha registrado una tasa anual del 3,01%; dos décimas de punto porcentual por debajo de lo esperado.

- La innovación más importante se debe a la caída de los precios del gasóleo, pero también se han registrado innovaciones a la baja en los componentes de la inflación subyacente.

- La tasa anual de la inflación subyacente en abril de 2000 se ha situado en el 2,23%. Se espera una tasa anual media de 2,28% para 2000 y 2001.
- La inflación residual (que agrega los índices de los precios al consumo de energía y alimentación) ha registrado en abril de 2000 una tasa anual del 5,76% que se espera que decrezca al 3,41% el próximo diciembre con una predicción del 2,06 para la tasa anual media del 2001.
- La predicción de la tasa anual del IPC para mayo de 2000 es del 2,87%. Esta tasa disminuirá hasta el verano de 2001 cuando alcanzará un valor alrededor del 2,22%.
- El diferencial entre la inflación tendencial en bienes y en servicios es ligeramente superior a dos puntos porcentuales y tiende a mantenerse en este valor durante 2000 y 2001.

- El diferencial de inflación mencionado anteriormente puede constituir un riesgo para la inflación global.

Inflación tendencial en bienes y servicios en EEUU



Tasas anuales de la inflación Tendencial en EEUU

TASAS DE CRECIMIENTO ANUAL MEDIO EN EEUU				
	1998	**1999**	**2000**	**2001**
Inflación Residual (RI-26,5%)	-1.02	2.59	**5.03**	**2.06**
IPC Energía (**E**-11%)	-7.75	3.64	**11.95**	**0.81**
IPC Alimentos (**F**-15,5%)	2.17	2.13	**1.97**	**2.60**
Inflación Subyacente (CI – 73,5%)	2.29	2.08	**2.28**	**2.28**
IPC Servicios no energéticos (**S** – 45%)	3.05	2.69	**3.00**	**2.90**
IPC Bienes no energéticos no alimenticios (**C**-28,5%)	0.59	0.68	**0.64**	**0.82**
IPC (100%)	1.55	2.19	**2.88**	**2.24**

En negrita son predicciones

Una información más detallada se puede encontrar en el Editorial del Boletín nº 68

Instituto Flores de Lemus
de Estudios Avanzados en Economía
C/ Madrid, 126 E-28903 Getafe (Madrid)

Universidad Carlos III de Madrid

www.Uc3m.es/boletin
E-mail: laborat@est-econ.uc3m.es
T. +34 91 624 98 89 F. +34 91 624 93 05