BANK OF GREECE

Economic Bulletin

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Economic Bulletin

Number 24, January 2005

Contents

Greek banking profitability: recent developments*

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In an article co-authored with Barry Eichengreen for the Bank of Greece – Brookings conference on the Greek economy back in December 2000, we argued that the Greek banking system was being driven by three main forces: catch-up, competition and privatisation. We focused on the impact of these forces on various characteristics of the banking sector, including, in particular, its profitability (Eichengreen and Gibson, 2001).[1]

Since writing the article, a number of papers have been published on the Greek banking sector. These focus on issues of efficiency and the related question of whether Greek banks enjoy economies of scale (Christopoulos and Tsionas, 2001, Christopoulos et al., 2002, Tsionas et al,. 2003, Kamberoglou et al., 2004), the existence of excess capacity (Kapopoulos, 2001) and the impact of mergers and acquisitions (Athanasoglou and Brissimis, 2004). Mamatzakis and Remoundos (2003) and Athanasoglou et al. (2004) focus explicitly on the issue of profitability using data from 1989-2000 and 1985-2001, respectively, and a similar framework to that found in Eichengreen and Gibson (2001). The results of the Mamatzakis-Remoundos paper suggest that profitability is strongly influenced by both bank and market characteristics, although they find little support for the Structure, Conduct and Performance hypothesis.[2] Athanasoglou

1 The paper "Greek Banking at the Dawn of the New Millenium" was first presented at the conference "Greece's Economic Performance and Prospects" organised by the Bank of Greece and the Brookings Institution in December 2000 and subsequently published in the edited volume from the conference.

2 The Structure, Conduct, Performance hypothesis states that profitability is positively related to the degree of concentration in the banking sector and banks with market power will use that power to extract higher profits.

et al. focus (2004) explicitly on the impact of the macroeconomic environment on bank profitability and conclude that bank profits move procyclically with a tendency to rise more quickly during expansions than they contract during recessions.

The purpose of the present paper is to provide an update of developments in the sector using data up to 2003 rather than 1998 as in the original paper. We argue that the period since 1998 has largely been one of consolidation with the result that the downward trend in the degree of concentration in the banking sector which had begun in 1985 has been reversed somewhat. This might suggest a decline in the degree of competition. However, two factors have been countering the rise in concentration. First, the sector has moved further away from being dominated by one leader; instead a number of banks are now of sufficient size to compete with each other for market share. Second, another wave of new entrants has occurred since 1998. At the same time, the profitability of Greek banks has exhibited rather erratic behaviour. To a great extent, this reflects the huge surge in profitability provided during the years of the stock market boom (1998-2000); more recently, profitability has returned to more 'normal' levels and indications of a long-term downward trend in profitability are evident from the beginning of liberalisation (towards the end of the 1980s) onwards.

The remainder of the article is organised as follows: In the next section, we provide some descriptive statistics for the banking sector, focusing, as in the original article (Eichengreen and Gibson, 2001), on the impact of size and ownership on various aspects of bank behaviour and characteristics. Section 2 re-estimates the profitability equations using data from 1993 to 2003 instead of to 1998 and re-examines the various hypotheses put forward in the original article.[3] The results suggest that the period of rapid structural change is perhaps coming to an end with the banking sector settling down to more normal behaviour of profits. There is also evidence that banks with stronger market power earn higher profits. Finally, the impact of size on profitability is much weaker than in the earlier period; to the extent that size is significant, the results indicate that growing bigger did not help banks in the period examined to increase profitability, something which is suggestive of the fact that economies of scale may have been limited for the larger Greek banks.

1. Banking sector structure and characteristics

Table 1 provides a first impression of the extent of structural change in the sector over the period from 1993 to 2003. Of the banks in independent existence in 1993, the majority had disappeared by 2003, having been acquired by other banks in the system. Both in 2000 and again in 2003, there were a lot of new entrants, with the result that there are around 10 banks with market shares of less than 1.5%. Table 1 also gives the reader a picture of the banks in our sample and it should be clear from a cursory glance at the table that the majority of banks in the banking system are included.

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[3] Our dataset runs from 1980 to 2003 and is collected from banks' published accounts. From 1980 to 1993 we have only the major aggregates. From 1993 we have full sets of accounts which we use in the econometric analysis that follows.

Table 1

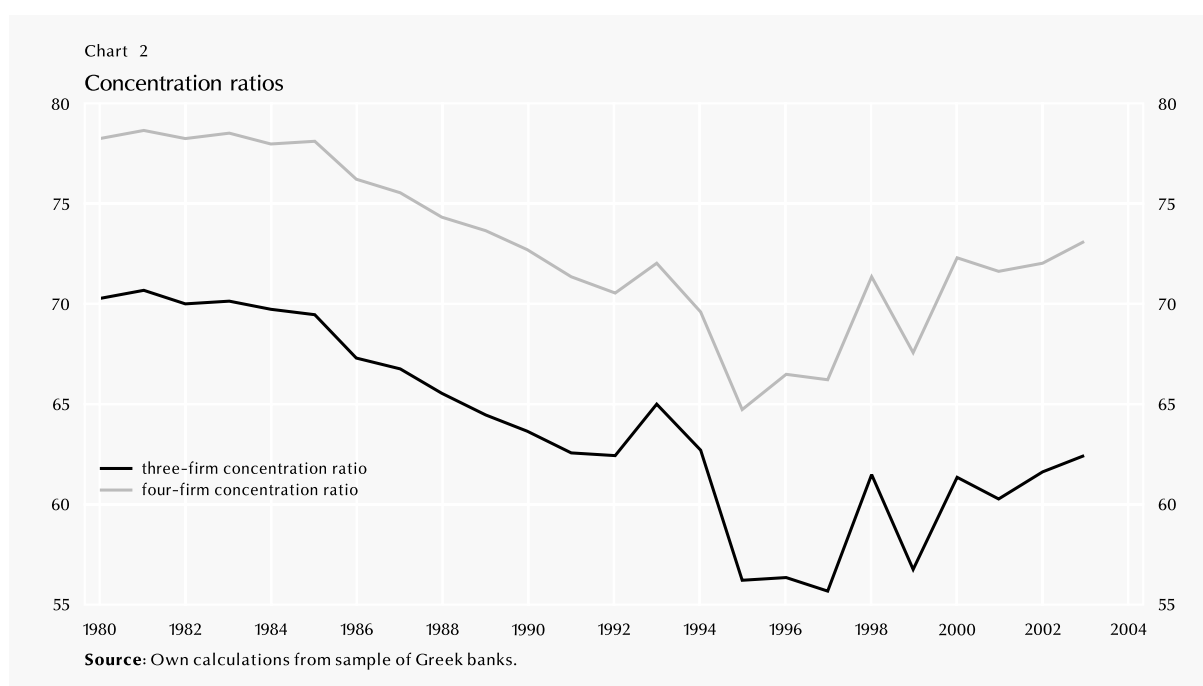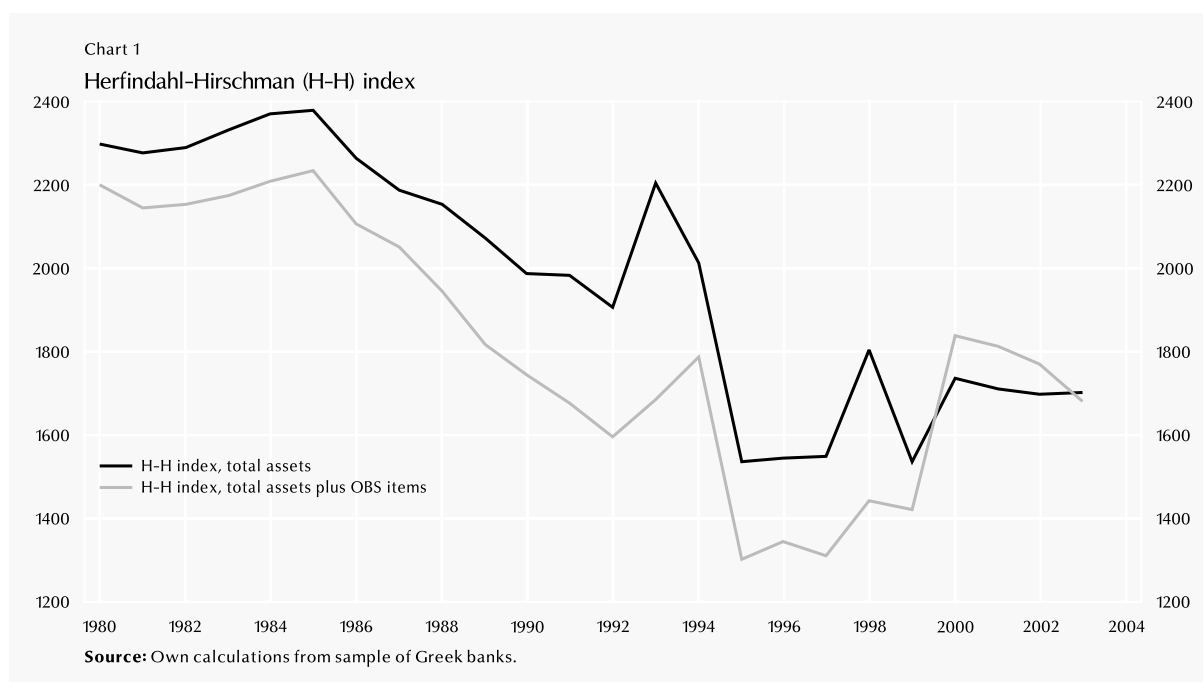**Market shares of individual banks at selected dates (based on total assets)**

(Shares in percentage points)

	1980		1993		1998		2000		2003	
	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%
National Bank of Greece	1	41.6	1	42.3	1	36.0	1	30.3	1	29.3
Agricultural Bank of Greece	2	16.6	2	12.2	2	13.1	4	10.9	4	10.6
Commercial Bank of Greece (Emporiki Bank)	3	12.0	3	10.5	4	9.8	3	10.9	5	9.9
National Mortgage Bank	4	8.1	4	7.0	–	–	–	–	–	–
Ionian Bank	5	5.3	7	4.6	5	5.6	–	–	–	–
ETBA	6	4.7	6	5.6	10	1.8	7	2.1	–	–
Alpha Bank	7	4.6	5	6.2	3	12.5	2	19.8	2	17.6
General Bank	8	2.0	9	1.4	11	1.6	8	1.5	7	2.0
ETEBA	9	1.6	13	0.6	14	1.0	11	0.9	–	–
Ergobank	10	1.0	8	3.1	6	5.2	–	–	–	–
Investment Bank	11	0.6	–	–	–	–	–	–	–	–
Bank of Crete	12	0.6	10	1.3	13	1.2	–	–	–	–
Bank of Athens	13	0.3	20	0.3	–	–	–	–	–	–
Bank of Piraeus (including Piraeus Prime)	14	0.3	17	0.4	8	2.0	6	7.9	6	8.3
Bank of Macedonia-Thrace	15	0.3	11	1.0	9	1.9	–	–	–	–
National Housing Bank of Greece	16	0.2	19	0.3	–	–	–	–	–	–
Bank of Attica	17	0.2	21	0.3	17	0.6	12	0.9	9	1.2
Bank of Central Greece	18	0.03	15	0.4	18	0.5	–	–	–	–
Eurobank	–	–	12	0.6	7	3.8	5	10.8	3	15.6
Xiosbank	–	–	14	0.5	12	1.5	–	–	–	–
Interbank	–	–	16	0.4	–	–	–	–	–	–
Credit Lyonnais Gréce	–	–	18	0.4	NA	NA	–	–	–	–
Egnatia Bank	–	–	22	0.2	15	0.8	9	1.2	8	1.5
Dorian Bank	–	–	23	0.2	20	0.3	14	0.6	–	–
European and Popular Bank	–	–	24	0.1	16	0.6	13	0.8	10	1.2
Aspis Bank	–	–	25	0.1	19	0.3	15	0.4	11	1.1
Novabank	–	–	–	–	–	–	10	0.9	NA	NA
Investment Bank of Greece	–	–	–	–	–	–	16	0.1	NA	NA
Unitbank	–	–	–	–	–	–	17	0.02	NA	NA
Probank	–	–	–	–	–	–	18	0.02	12	0.5
Omega Bank	–	–	–	–	–	–	–	–	13	0.5
First Business Bank	–	–	–	–	–	–	–	–	14	0.4
Panellinia Bank	–	–	–	–	–	–	–	–	15	0.1

Note: NA: data not available.
   – : bank not in existence as independent entity.
Source: Own calculations using sample collected (see text).

Chart 1

Herfindahl-Hirschman (H-H) index

Chart 1
Herfindahl-Hirschman (H-H) index

— H-H index, total assets
— H-H index, total assets plus OBS items

Source: Own calculations from sample of Greek banks.

Chart 2
Concentration ratios

Chart 2
Concentration ratios

— three-firm concentration ratio
— four-firm concentration ratio

Source: Own calculations from sample of Greek banks.

Charts 1-3 provide a graphical representation of the structure of the banking sector. The Herfindahl-Hirschman index (based either on total assets or total assets plus off-balance sheet —OBS— activity) suggests that the downward trend in concentration halted in the mid-to-late 1990s; subsequently, concentration levels have been rising, without, however, reaching anything

Chart 3

Market shares

(On the basis of total assets)

Source: Own calculations from sample of Greek banks.
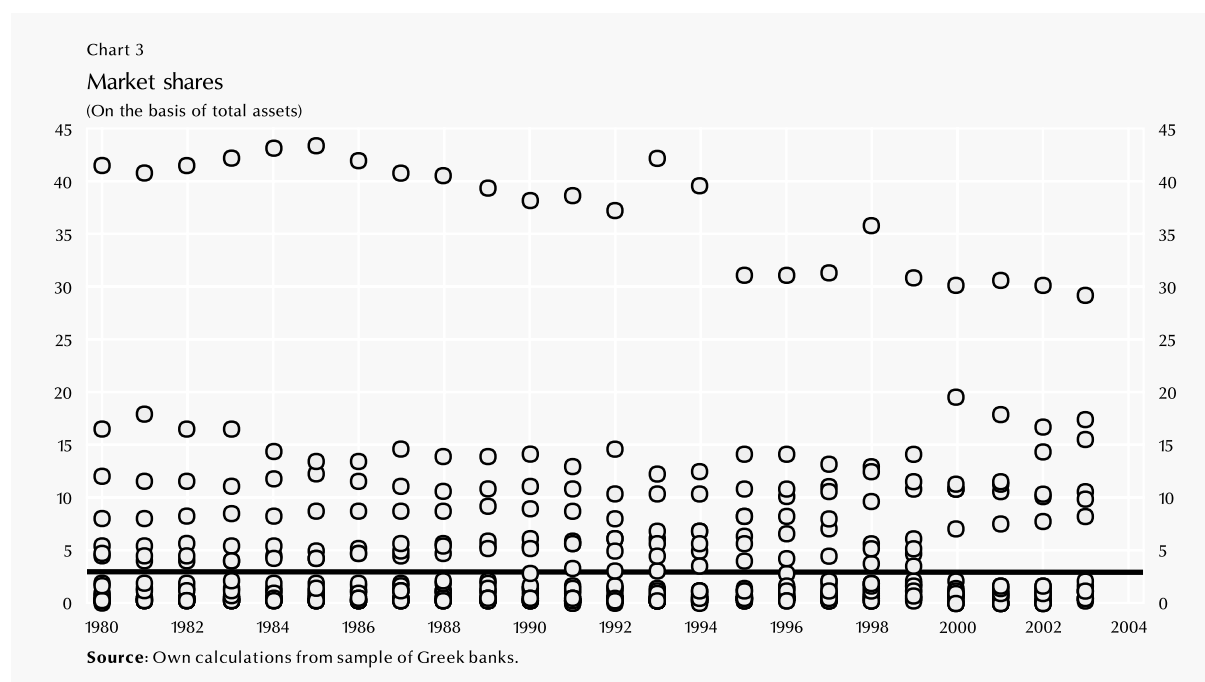
like the levels witnessed in the 1980s.[4] A qualitatively similar picture is drawn in Chart 2, which graphs three and four-firm concentration ratios. What these pictures show is that concentration is still high in the sector.

Chart 3 delves more deeply into the question of market shares and concentration and gives a more complete picture of the structural changes that have been occurring. The declining share of the National Bank of Greece which was evident in the 1990s has continued. At the same time, the share of a number of other banks has been rising, with the result that there are now around 6 banks with enough market share to enable them to have an impact. Since 2000, these banks have pulled away from the remainder with market shares well under 3%. Three of these banks, Alpha Bank, Eurobank and Pireaus Bank, are those which have been growing rapidly and to a large extent through acquisitions; the other two are the older publicly-owned banks, the

Agricultural Bank and the Commercial Bank, which have had a roughly constant market share of around 10% over the last few years.

The impact of these changes on competition is unclear. On the one hand, rising concentration might be expected to have reduced competition; on the other hand, the declining dominance of the National Bank and the rising shares of several other banks are likely to have caused competition to increase.

Tables 2 and 3 examine various characteristics of the banking sector depending on the size of the

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4 The Herfindahl-Hirschman index is calculated as:

$$HH = \Sigma_i MS_i^2$$

where MS_i is the market share of bank i. We calculate market shares on the basis of both total assets and total assets plus OBS items. The index, which measures the size dispersion of firms in a particular market, can vary between zero for an atomistically competitive market to 10,000 for a monopolised one.

Table 2
The impact of size on bank characteristics

	Years	Size 1	Size 2	Size 3
Real growth of total assets (%)	1980-1998	23.7	10.8	4.5
	1980-2003	30.7	13.6	6.8
	1999-2003	120.4	23.6	18.5
Real growth of total assets plus OBS items (%)	1980-1998	36.6	19.3	8.4
	1980-2003	39.2	20.9	10.0
	1999-2003	104.8	24.0	20.7
Rate of return on assets (%)	1980-1998	0.98	1.19	0.52
	1980-2003	1.00	1.22	0.76
	1999-2003	0.92	1.26	1.78
Rate of return on equity (%)	1980-1998	5.94	20.59	15.42
	1980-2003	6.65	18.77	16.38
	1999-2003	6.05	10.01	21.52
OBS business (% of total assets plus OBS business)	1980-1998	37.4	43.2	29.4
	1980-2003	39.9	47.5	33.4
	1999-2003	44.8	57.9	56.6
Investment in bonds (% of total assets plus OBS business)	1985-1998	5.1	5.1	7.8
	1985-2003	5.4	5.4	7.5
	1999-2003	7.4	5.7	6.7
Reliance on interbank market for funds (interbank deposits/total deposits, %)	1992-1998	17.2	19.9	14.4
	1992-2003	20.2	20.2	12.8
	1999-2003	31.5	20.4	9.9
Operating costs/total assets (%)	1980-1998	3.6	3.1	2.1
	1980-2003	3.6	3.1	2.1
	1999-2003	3.3	3.1	2.2
Staff costs/total assets (%)	1980-1998	2.4	2.2	1.6
	1980-2003	2.3	2.0	1.6
	1999-2003	1.8	1.6	1.5
Real loans per worker (000s euro)	1980-1998	901	655	1,071
	1980-2003	899	814	1,079
	1999-2003	1,087	1,121	1,089
Real deposits per worker (000s euro)	1980-1998	781	766	1,356
	1980-2003	813	906	1,435
	1999-2003	1,304	1,709	589
Real profits per worker (000s euro)	1980-1998	18.43	18.99	−5.49
	1980-2003	20.86	24.00	2.96
	1999-2003	40.30	34.52	16.15

Note: The figures are means for each size category across all the years in the sample. We discuss the picture shown by median values for each variable in the text where they show a different picture from the means because of outliers.
Source: Own calculations using sample collected (see text).

Table 3
The impact of ownership on bank characteristics

	Years	Privately-owned	Publicly-owned
Real growth of total assets (%)	1980-1998	25.5	7.8
	1980-2003	28.3	11.4
	1999-2003	36.2	37.2
Real growth of total assets plus OBS items (%)	1980-1998	39.8	13.4
	1980-2003	37.8	15.8
	1999-2003	32.9	34.6
Rate of return on assets (%)	1980-1998	1.50	0.65
	1980-2003	1.49	0.75
	1999-2003	1.45	1.36
Rate of return on equity (%)	1980-1998	21.57	10.62
	1980-2003	19.24	11.22
	1999-2003	12.96	14.89
OBS business (% of total assets plus OBS business)	1980-1998	47.7	31.3
	1980-2003	51.1	34.4
	1999-2003	60.8	50.4
Investment in bonds (% of total assets plus OBS business)	1985-1998	4.0	7.9
	1985-2003	4.0	7.9
	1999-2003	4.2	7.8
Reliance on interbank market for funds (interbank deposits/total deposits, %)	1992-1998	16.0	18.4
	1992-2003	14.9	20.2
	1999-2003	12.9	22.9
Operating costs/total assets (%)	1980-1998	3.3	2.8
	1980-2003	3.1	2.8
	1999-2003	2.8	2.7
Staff costs/total assets (%)	1980-1998	2.0	2.1
	1980-2003	1.8	2.0
	1999-2003	1.4	1.7
Real loans per worker (000s euro)	1980-1998	585	1,044
	1980-2003	750	1,034
	1999-2003	1,189	989
Real deposits per worker (000s euro)	1980-1998	1,107	911
	1980-2003	1,241	945
	1999-2003	1,590	1,116
Real profits per worker (000s euro)	1980-1998	25.92	3.74
	1980-2003	27.55	9.73
	1999-2003	31.03	42.11

Note: The figures are means by ownership category across all the years in the sample. We discuss the picture shown by median values for each variable in the text where they show a different picture from the means because of outliers.
Source: Own calculations using sample collected (see text).

bank[5] and whether it is publicly or privately-owned. For ease of comparison, the results from the earlier sample (up to 1998) are also reported alongside the full sample (1980-2003) and the sub-period 1999-2003. Many of the characteristics which were present continue to hold, although by looking at sub-periods some interesting changes emerge. On the whole, one can say that the differences between private and publicly-owned banks have narrowed, with public banks tending to converge on the characteristics of private banks. This suggests that ownership is less important for bank behaviour and perhaps results from the greater independence which publicly-owned banks acquired in the second half of the 1990s.

Thus, although small private banks still tend to grow faster than large publicly-owned banks over the whole period, in the last few years (1999-2003) there is no significant difference between public and private banks, with the former's total assets including OBS items growing at real rates of around 35% per annum.[6] In the period up to 1998, medium-sized private banks were the most profitable; the difference between public and privately-owned banks disappears in the years 1999-2003 and it is big rather than medium-sized banks which are the most profitable.

On the asset side of the balance sheet, OBS business has been growing through time in all categories of banks, with the difference between public and private banks in the later period having narrowed significantly. Although large, publicly-owned banks still tend to have more invested in bonds, reflecting the legacy of their heavy investment in government bonds in the early 1990s, in the later period (1999-2003) the proportion of assets invested in bonds by small and medium-

sized banks has been rising. This reflects the growth of private bond issues by companies which are generally held by the banking system. On the liabilities side, reliance on the interbank market is greater for smaller banks, as might be expected, and for publicly-owned banks; moreover, the differences have been widening over time.
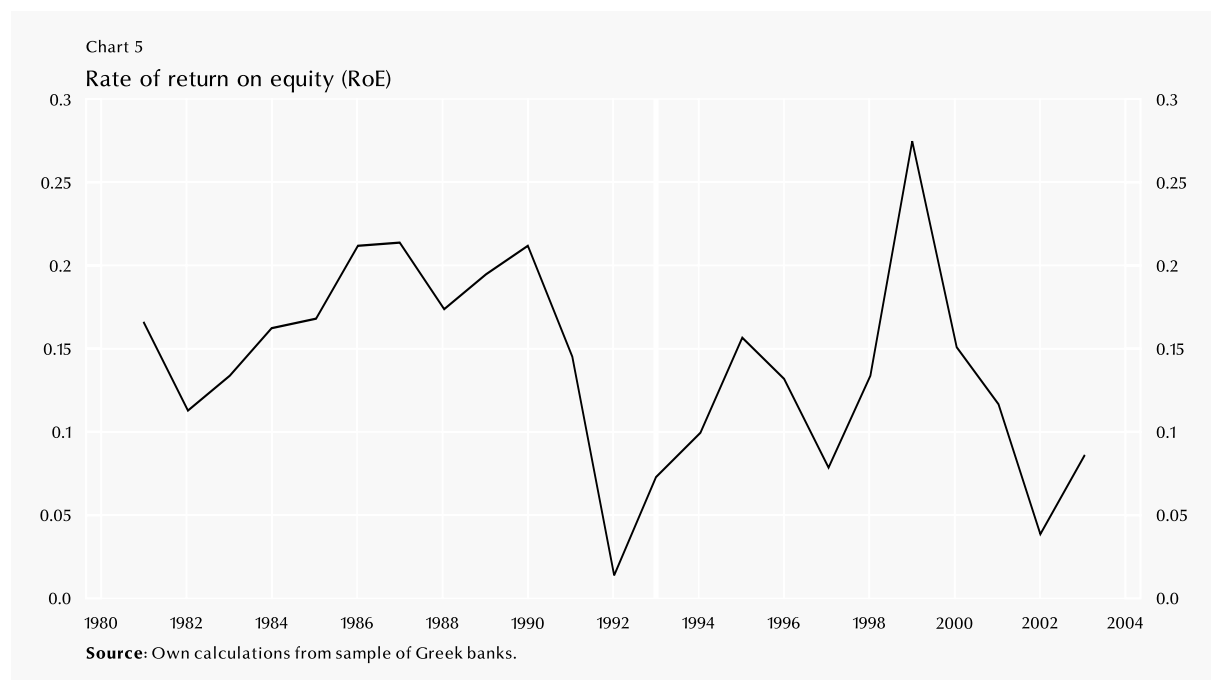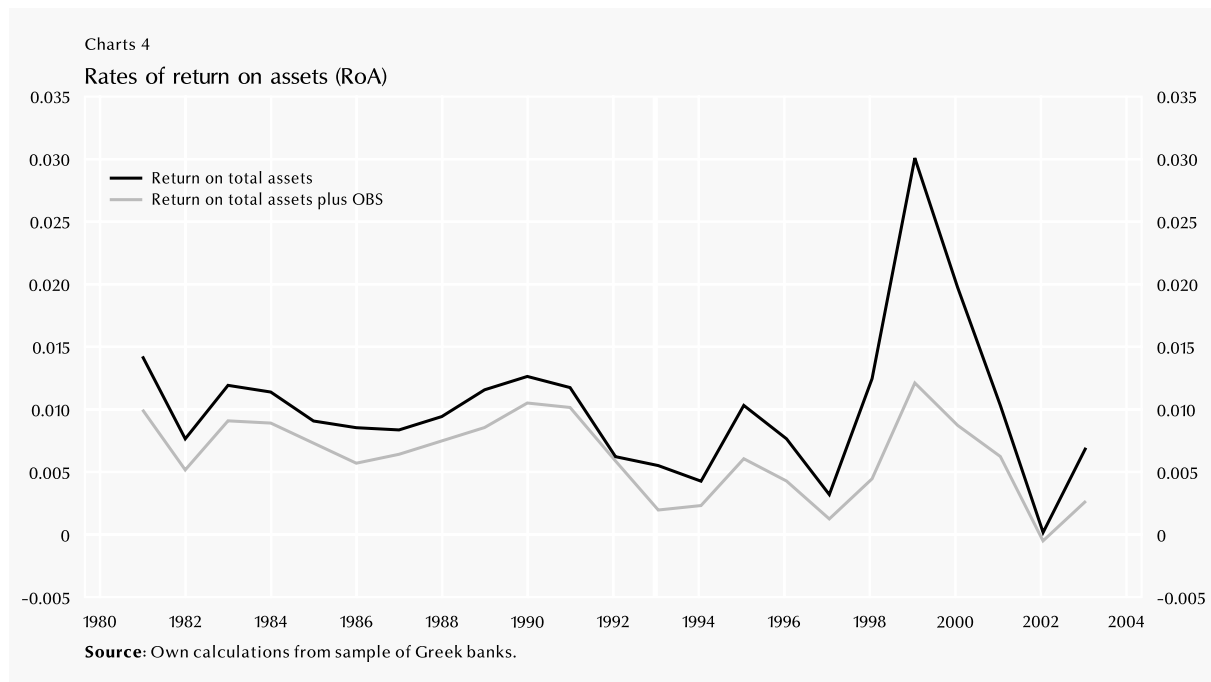
Finally, there are the various measures of efficiency. Large banks tend to have smaller costs (both total operating costs and staff costs) and more loans and deposits per worker. Public banks also have smaller operating costs, although relatively higher staff costs. In the last few years, private banks' operating costs have been declining and are now at almost the same level as those of public banks. The picture with regard to loans and deposits per worker is more mixed, with private banks having less loans and more deposits per worker than their publicly-owned counterparts, although latterly private banks have experienced higher loans per worker as well.

2. The determinants of bank profitability – multivariate analysis

Whilst the descriptive statistics presented above give us some idea of what might influence profitability, a more precise examination of the determinants of bank profitability and the relative contribution of each determinant can only really be uncovered using multivariate techniques. In Charts 4 and 5

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5 Size 1 denotes the smallest third of banks in a given year, size 2 the middle third and size 3 the largest third.
6 The mean is somewhat skewed upwards by the presence of a few banks with exceptionally high growth rates. The median growth rate of real assets including OBS items between 1999 and 2003 was 11% for public banks compared to 21% for private banks.

Charts 4
Rates of return on assets (RoA)

— Return on total assets
— Return on total assets plus OBS

Source: Own calculations from sample of Greek banks.

Chart 5
Rate of return on equity (RoE)

Source: Own calculations from sample of Greek banks.

we plot the various measures of profitability through time – the rate of return on total assets, the rate of return on total assets plus OBS business and the rate of return on equity.[7] There is a tendency for

7 The vertical lines indicate the year 1993 since the econometric estimations cover the period 1993-2003. As we noted above, because of a change in accounting conventions a number of the explanatory variables are only available from 1993 onwards and this limits the sample period for the regressions.

all measures to trend downwards over the whole period. The sharp increase in profitability in the period 1998-2000 was related to the stock market boom. Banks generally took advantage of the boom to sell and in many cases repurchase shares, thus allowing them to realise capital gains that had accrued (but which did not appear in their balance sheets since shares are not valued at market prices). The subsequent fall in profitability after 2000 represents a return to more normal profit levels.

In order to explain profitability and to examine whether its determinants have changed over the recent period, we re-estimate the panel regressions presented in Eichengreen and Gibson (2001). That is, we start with a basic model of the persistence of profits which provides evidence about the timing and extent of structural change and we then augment it with various explanatory variables representing the effect of both bank characteristics (such as size, asset and liability management strategies, efficiency) and market characteristics (concentration, market share).[8] The estimated model is a fixed-effects model (that is, we control for factors which differ across banks but are constant through time and which we cannot measure directly – so-called unobserved bank heterogeneity) and includes time dummies:

$$\pi_{it} = \alpha + \beta(\pi_{it-1}) + \Sigma\gamma_i XM_{it} + \Sigma\delta_i XB_{it} + \Sigma\lambda_t D_t + \mu_t \quad (1)$$

where π_{it} is the profitability of bank i at time t; $\Sigma\gamma_i XM_{it}$ are the various market characteristics and $\Sigma\delta_i XB_{it}$ are the bank characteristics (both vary across time and banks with the exception of concentration); and, finally, $\Sigma\lambda_t D_t$ are time dummies capturing environmental factors which are the same for all banks but vary through time (e.g. business cycle effects and, more specifically, the

stock market boom and its effect mentioned above). Profitability, the market characteristics and the bank characteristics are measured as the deviation from the mean for each bank across the whole time period in order to control for the fixed effects mentioned above. The coefficient on the lagged dependent variable, β, gives us some information about the structure of the market. A value of β between 0 and 1 implies that any shock to profits will persist but that eventually profits return to their normal (average) level. In competitive industries, we expect this to occur quickly, while in less competitive industries we might anticipate high persistence and a value of β closer to 1. If β lies between 0 and –1, then profits revert to normal in an oscillating manner. This might occur in periods of rapid change in the structure of the financial system which can cause bank profitability to become highly volatile.

Equation (1) is estimated using data over the period 1993-2003 (189 observations) and the results are presented in Tables 4-6 for three measures of profitability: the return on assets, the return on total assets including OBS items, and the return on equity.

The value of β differs somewhat depending on the measure of profitability used. However, more significant is the difference between the results presented here and those for the period 1993-98. In the results for the shorter sample period, we found negative persistence, which we attributed to the fact that the banking system between 1993 and 1998 was passing through a period of rapid structural change following financial liberalisation

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8 For a discussion of the various methods of examining bank profitability and efficiency, see Bikker and Bos (2004).

T a b l e   4
Rate of return on total assets (excluding OBS business)

Variable	Coefficient	Standard error	t-statistic	Significance	Short-run elasticity	Long-run elasticity	Mean
Lagged profitability	0.0029	0.0934	0.0312				0.010
Ownership	0.0000	0.0115	0.0001		0.000	0.000	
Size	0.0448	0.0265	1.6896	*	-1.366	-1.370	13.997
Size squared	-0.0021	0.0010	-2.0715	**			
Proportion of OBS business	0.0006	0.0154	0.0386		0.032	0.032	0.533
Loan/deposit ratio	-0.0018	0.0003	-5.5907	***	-0.298	-0.199	1.646
Operating expenses	-0.0024	0.1138	-0.0213		-0.007	-0.008	0.031
Staff expenses	0.0282	0.0233	1.2080		1.795	1.800	0.637
Deposits per 1,000 workers	0.0002	0.0045	0.0362		0.022	0.022	1.356
Loans per 1,000 workers	-0.0001	0.0070	-0.0202		-0.015	-0.015	1.025
Interbank deposits/total deposits	0.0070	0.0181	0.2890		0.128	0.128	0.182
Leverage (x1,000)	0.0673	0.0230	2.9261	***	0.087	0.087	0.013
Own capital	0.0902	0.0319	2.8236	***	1.055	1.058	0.117
Liquidity	0.0248	0.0037	6.7344	***	0.691	0.693	0.279
Herfindahl index (x10,000)	-0.0007	0.1030	-0.0064		-0.010	-0.010	0.157
Market share	0.0013	0.0007	2.2053	**	0.639	0.641	4.808
Constant	-0.2485	0.1824	-1.3625				
Year dummies	$F_{(9,136)} = 3.73$ (0.00)						
Fixed effects	$F_{(27,136)} = 3.62$ (0.00)						
Number of observations	189						
Number of banks	28						

Notes: *** implies significant at 1% level; ** at 5% level; and * at 10% level; the figures show the p-values.
Size effect is bell-shaped with a turning point (maximum) at 10.729 compared to mean of log size of 13.977.
Source: Own calculations using sample collected (see text).

Table 5
Rate of return on total assets plus OBS business

Variable	Coefficient	Standard error	t-statistic	Significance	Short-run elasticity	Long-run elasticity	Mean
Lagged profitability	0.4128	0.0695	5.9374	***			0.005
Ownership	-0.0047	0.0056	-0.8301		-0.468	-0.796	
Size	0.0115	0.0107	1.0752		-0.478	-0.813	14.803
Size squared	-0.0005	0.0004	-1.2355				
Proportion of OBS business	-0.0031	0.0075	-0.4134		-0.355	-0.605	0.533
Loan/deposit ratio	-0.0003	0.0001	-2.5381	**	-0.119	-0.202	1.646
Operating expenses	-0.0087	0.1370	-0.0637		-0.027	-0.046	0.014
Staff expenses	0.4472	0.3497	1.2787		0.881	1.501	0.009
Deposits per 1,000 workers	0.0030	0.0020	1.5176	0.13	0.878	1.495	1.356
Loans per 1,000 workers	-0.0058	0.0030	-1.9597	**	-1.283	-2.185	1.025
Interbank deposits/total deposits	0.0109	0.0083	1.3087		0.425	0.723	0.182
Leverage (x1,000)	0.0344	0.0101	3.4059	***	0.095	0.162	0.013
Own capital	-0.0008	0.0259	-0.0300		-0.010	-0.018	0.062
Liquidity	0.0126	0.0015	8.2619	***	0.757	1.288	0.279
Herfindahl index (x10,000)	0.0148	0.0462	0.3203		0.497	0.846	0.157
Market share	0.0003	0.0003	1.0530		0.318	0.541	4.808
Constant	-0.0766	0.0811	-0.9439				
Year dummies	F(9,136) = 4.31 (0.00)						
Fixed effects	F(25,136) = 2.26 (0.00)						
Number of observations	187						
Number of banks	26						

Notes: *** implies significant at 1% level; ** at 5% level; and * at 10% level; the figures show the p-values.
Size effect is bell-shaped with turning point (maximum) at 12.405 compared to mean log size of 14.803
Source: Own calculations using sample collected (see text).

which led to high variability of profits. For the longer period up to 2003, the coefficient on lagged profitability is now positive and is significant in the case of profitability measured relative to total assets plus OBS items. The value of 0.4 (see Table 5) indicates quite a bit of persistence which is suggestive of an absence of competitive conditions. A similar result is found by Athanasoglou *et al.* (2004). This should be balanced against the results in Tables 4 and 6 for the other measure of profitability, where, although β is positive, it is not significantly different from zero, suggesting the presence of competitive forces. This is consistent with the findings of Mamatzakis and Remoundos (2003) for the period 1989-2000.

Table 7 examines the question of persistence over a longer period by estimating equation (1) without the various bank and market characteristics. As in the period up to 1998, the results for the whole period (1982-2003) indicate fairly high levels of persistence. In the previous article, as we reduced the sample period from 1982-98 to 1983-98, 1984-98 and so forth, the coefficient on lagged profits began to shrink showing a sharp fall at the end of the 1980s and into the 1990s. This supported our conclusion that a period of structural change followed on the heels of liberalisation (1987 onwards). With the extension of the sample period to 2003, there is a fall in the degree of persistence, but it never becomes negative, suggesting that the period of rapid change is over.

Turning now to the importance of individual bank characteristics, the effect of size is much less significant than before. The coefficients suggest a non-linear bell-shaped relationship between size and profitability – that is, profitability increases with size before declining. However, whereas previously the turning point was close to average bank size, it is now the case that there are very few observations in our sample on the upward sloping part of the curve. That is, for the size of banks that we have in our sample, the relationship between size and profitability is downward sloping – as size increases so bank profitability falls. This perhaps suggests that economies of scale have been exhausted and that growing bigger in and of itself can no longer help to improve profitability. A similar conclusion is reached by Kamberoglou *et al.* (2004) in their study of the cost efficiency of the Greek banking sector which estimates scale economies directly from a translog cost function.

We include a number of variables designed to capture asset management (the proportion of OBS business and the loan/deposit ratio) as well as liability management (leverage and interbank deposits as a proportion of total deposits). The earlier results provided some support for the hypothesis that banks that engage in OBS business are more profitable (at least in terms of the rate of return on equity). This result is much weaker now – it is both less significant and the elasticity for the return on equity equation is almost half its size in the previous paper. This perhaps reflects the fact that more banks are active in OBS business as we noted in Section 1 above; the market is thus likely to be more competitive and hence the extent to which banks engage in OBS business is less useful in helping us distinguish between banks according to their profitability. The loan/deposit ratio has a stronger negative effect now, indicating that making loans does not enhance profitability; in the period up to 1998, it was negative but significant only in the equation for the return on assets. The elasticity suggests

Table 6
Rate of return on total equity

Variable	Coefficient	Standard error	t-statistic	Significance	Short-run elastic-ity	Long-run elastic-ity	Mean
Lagged profitability	0.1237	0.0778	1.5893	0.11			0.128
Ownership	-0.0809	0.1761	-0.4592		-8.089	-9.231	
Size	0.7655	0.4141	1.8487	*	-1.141	-1.302	13.997
Size squared	-0.0326	0.0157	-2.0699	**			
Proportion of OBS business	0.3998	0.2362	1.6929	*	1.664	1.899	0.553
Loan/deposit ratio	-0.0180	0.0043	-4.2325	***	-0.232	-0.264	1.646
Operating expenses	1.3783	1.7568	0.7846		0.333	0.381	0.031
Staff expenses	0.8578	0.3568	2.4042	**	4.268	4.871	0.637
Deposits per 1,000 workers	0.0459	0.0659	0.6965		0.486	0.555	1.356
Loans per 1,000 workers	0.0008	0.1008	0.0083		0.007	0.008	1.025
Interbank deposits/total deposits	0.1463	0.2628	0.5568		0.208	0.237	0.182
Leverage (x1,000)	1.2741	0.3645	3.4955	***	0.129	0.147	0.013
Own capital – omitted							
Liquidity	0.2535	0.0550	4.6117	***	0.553	0.631	0.279
Herfindahl index (x10,000)	2.9230	1.5930	1.8349	*	3.577	4.082	0.157
Market share	0.0134	0.0099	1.3514	0.18	0.502	0.573	4.808
Constant	-5.5756	2.8362	-1.9659				
Year dummies	$F_{(9,137)} = 1.06 \ (0.39)$						
Fixed effects	$F_{(25,137)} = 2.66 \ (0.00)$						
Number of observations	187						
Number of banks	26						

Notes: *** implies significant at 1% level; ** at 5% level; and * at 10% level; the figures show the p-values.
Size effect is bell-shaped with turning point (maximum) at 11.755 compared to mean size of 13.997.
Source: Own calculations using sample collected (see text).

Table 7

Persistence of profitability

Date of regression $\pi_{it} = \alpha_i + \beta_{\pi i,t-1} + \Sigma\gamma_t T_t$	The coefficient on lagged profitability (β) as measured by:		
	rate of return on assets	rate of return on assets (incl. OBS business)	rate of return on equity
1982-2003	0.54*	0.65*	0.52*
1983-2003	0.53*	0.65*	0.51*
1984-2003	0.53*	0.64*	0.49*
1985-2003	0.50*	0.62*	0.48*
1986-2003	0.48*	0.62*	0.47*
1987-2003	0.46*	0.61*	0.45*
1988-2003	0.44*	0.60*	0.42*
1989-2003	0.41*	0.57*	0.39*
1990-2003	0.36*	0.54*	0.34*
1991-2003	0.35*	0.56*	0.28*
1992-2003	0.34*	0.57*	0.23*
1993-2003	0.33*	0.57*	0.21*
1994-2003	0.32*	0.54*	0.18*
1995-2003	0.29*	0.47*	0.24*
1996-2003	0.27*	0.46*	0.08
1997-2003	0.25*	0.33*	0.18

* implies significant at 5% level of significance.
Source: Own calculations using sample collected (see text).

that a 10% increase in the ratio causes profitability to fall by 2-3%.

With respect to liability management, reliance on the interbank market for funds has no impact on profitability. This is in line with the previous results. Leverage still has a significant positive effect and the elasticity at 1-1.5% is similar across the two periods.

The results for the efficiency indicators are mixed and no clear picture emerges. There is still some evidence that staff costs are positively associated with profitability, which may indicate that banks with more or better paid staff offer better quality or simply the fact that profitable banks share their rents with their employees (we discuss this in more detail below). The fact that Greek banks could improve profitability by becoming more efficient is provided by research which focuses on cost efficiency directly and suggests that there is significant room for efficiency improvements in the Greek banking sector (Christopoulos and Tsionas, 2001, Christopoulos et al., 2002, Tsionas et al., 2003, and Kamberoglou et al., 2004).[9]

Finally, as we found in the earlier results, there is no evidence that banks which hold more liquidity

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[9] These conclusions are reached on a sample period of 1993-1998 in these papers; the exception is Kamberoglou et al. (2004) who have data from 1993-1999.

or capital sacrifice profitability. On the contrary, the effects of liquidity and own capital are generally positive and, in many cases, significant. The elasticities suggest a smaller effect than in the results for the period up to 1998.

Turning now to market characteristics. One of the important debates in the industrial organisation literature is the extent to which profitability is affected by market power. The structure, conduct and performance literature argues that concentration (structure) should raise profits (performance) since banks in concentrated markets can raise prices and limit quantities (conduct). Contestable market theory, on the other hand, argues that concentration, in and of itself, need not imply a non-competitive market. What matters is ease of entry: low-cost entry constrains incumbents to act as if the market were competitive. Since the Greek banking market is highly concentrated and, as we noted in the previous section, there has been a rise in concentration in recent years, clearly some test of these hypotheses is necessary.

A positive relationship between concentration and profits is equally consistent with other hypotheses. The efficient structures hypothesis which is consistent with contestable market theory holds that concentration may reflect firm-specific efficiencies. That is, firms in concentrated markets may earn higher profits simply because they are more efficient and not because they are exploiting the market power that concentration brings. Since more efficient firms might be expected to capture a higher market share, one way of distinguishing between market power and efficient structure theories is to include both market share and concentration in any regression explaining profitability. If, controlling for market share, concentration

continues to have a positive impact on profitability, then this is evidence in favour of the structure, conduct and performance hypothesis. It suggests that firms are using market power (as reflected by high concentration) to raise profits even when we take into account the fact that firms with higher market share may be in that position because they are more efficient.

As with the previous results, and in contrast to the results of Mamatzakis and Remoundos (2003) and Athanasoglou et al. (2004), the results for the period 1993-2003 suggest that market concentration does positively affect profitability even if the effect is significant in the return on equity equation only. Moreover, the results for concentration hold even with the inclusion of market share. This is not consistent with the efficient structures hypothesis. The fact that concentration is not significant in either the return on total assets or the return on total assets plus OBS business may reflect expense preference behaviour. That is, bank management might prefer to spend the rents accruing from market power on higher expenditure rather than allowing them to be reflected in higher profits. This could take the form of managers facing pressure from workers who want to capture the rents in the form of higher wages. A test of this hypothesis is conducted by rerunning equation (1) and replacing the dependent variable by value added (that is profits plus staff costs). If the effect of concentration becomes more positive, then this provides evidence of expense preference behaviour. The results (not reported here) provide no evidence of this, as was the case with the period 1993-1998.

Finally, there is the risk aversion theory. This states that banks with market power choose to take less risk rather than higher profits. If we

replace the dependent variable by value added plus provisions (an indicator, albeit imperfect, of risk), then support for the hypothesis implies a negative impact of concentration – that is, concentration lowers not only returns and profits but also provisions, reflecting the lower risk adopted. In the earlier paper, we found evidence supporting this theory. The results up to 2003 (again not reported) provide support for this. In the return on assets equation, concentration is negative and becomes more so when we switch the dependent variable to value added plus provisions. In the return on assets including OBS business, the impact of concentration moves from being positive and insignificant to being negative and insignificant. Finally, in the return on equity equation the positive and significant effect of concentration is again reversed. This provides support for the idea that banks in Greece continue to prefer to exploit market power to reduce risk rather than to take higher profits.

3. Concluding comments

The purpose of this paper has been to update the results of our earlier work (Eichengreen and Gibson, 2001) using data for Greek banks that extend to 2003 rather than 1998. Four main conclusions come out of the new results. First, it is now clear that the level of concentration in the Greek banking system reached its lowest level in the mid-1990s and has subsequently risen slightly. The effect on competition, however, is not entirely clear. Although rising concentration would usually be associated with reduced competition, we have to take into account that at the same time the dominance of the bank with the

largest market share has been reduced, whilst a number of other banks have significantly increased their market share allowing them to have an impact on the market. The results of the econometric analysis provide evidence in support of the structure, conduct and performance hypothesis rather than the contestable markets theory, since there is evidence that concentration is positively related to profitability (even when market shares are included in the equation). In addition, higher market shares increase profitability. However, there is also evidence that banks in Greece use market power to reduce risk and not just to increase profits. These results are in line with those from the previous paper.

Second, it appears that the period of rapid structural change which followed in the footsteps of liberalisation has now come to an end. Support for this comes from the fact that profitability is now more persistent. The coefficient on lagged profitability has changed from being negative, although not less than –1 (and in some cases significant), suggesting that shocks imply a return to long-run levels of profitability in an oscillating fashion, to being positive (although not always significantly so).

Third, there is some evidence that during the period examined banks were not able to raise their profitability by increasing their size alone. Whilst the relationship between profitability and size is still non-linear and bell-shaped, the turning point is much closer to the smallest bank size in the sample. This suggests that the part of the size-profitability relationship that is important for the Greek banking system is the downward-sloping part of the curve – that is increasing size, other things held constant, is not a way of

improving profitability. This could be interpreted as implying that banks have not benefited from economies of scale. To some extent, given the small size of Greek banks, this is a surprising result. However, growing bigger is only a necessary condition for reaping economies of scale; it is not sufficient. Moreover, it should not be forgotten that growing bigger offers opportunities for reaping economies of scope which we have not attempted to measure here.

Finally, the differences between publicly- and privately-owned banks have tended to disappear, with the characteristics of publicly-owned banks converging on those of the privately-owned ones. This, together with the insignificance of the dummy for ownership in the regressions, suggests that publicly-owned banks are operating more like their privately-owned counterparts in line with the various administrative changes which have accompanied liberalisation of the financial system.

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The effect of merger and acquisition announcement on Greek bank stock returns[*]

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1. Introduction

Over the last two decades, the banking sector has witnessed a large number of mergers and acquisitions[1] (M&As). The major factors behind M&As were technological advances, globalisation of financial markets and enhanced supervision of credit systems. Additionally the creation of a single financial market in the European Union (EU) and the introduction of the euro facilitated to a large extent bank mergers and acquisitions.

In Greece, the phenomenon of bank M&As was more intense in the second half of the 1990s. In addition to the factors already noted above, increased M&A activity in Greece in this particular period is attributed to entry into the euro area, domestic banks' desire to fend off potential hostile takeover bids from other EU banks and to protect themselves against increased non-systematic risk, as well as to the privatisation of a number of state-controlled banks.[2]

According to the relevant literature,[3] benefits arising from M&As fall into two main categories:

- firstly, benefits arising for the management team of such banks (e.g. salary protection and greater prestige) and

1 For a definition of the terms "merger" and "acquisition" see Athanosoglou and Brissimis (2004).
2 For a more detailed presentation of developments within the Greek banking system during this period, see Hondroyiannis *et al*. (1999), Gibson and Demenagas (2002).
3 See Amihud and Miller (1998), Berger *et al*. (1999), Voloudakis (2002) and Athanasoglou and Brissimis (2004).

- secondly, benefits for shareholders, who expect to maximise the value of their stocks through M&As.

The empirical methods used to analyse the effects of bank M&As appear to fall into two categories:

(a) those evaluating the effect of M&As on bank cost and/or profit efficiency and

(b) those attempting to evaluate the stock market reaction to announcements concerning the bank M&As under examination, on condition, of course, that the shares of the banks in question are listed on the stock market.

This study looks at the effect of announcing an intention to proceed with an M&A between Greek banks on the stock price of the acquiring bank and the bank being acquired (target bank).[4] In order to assess any implied benefits, the "event study analysis" method has been used (see Rhoades, 1994, Pilloff and Santomero, 1998, for an overview of the applications of this method to the banking sector).[5] This method involves examining the "abnormal returns"[6] (and their statistical significance) which the shares of both the acquiring bank and the target bank may exhibit before and after the date of the announcement of an intended M&A.

We examine announcements made in the two-year period 1998-1999 concerning seven out of the total number of eight bank M&As originally examined in the Athanasoglou and Brissimis study (2004), which drew conclusions concerning the impact of M&As on banks' cost and profit efficiency and on the exploitation of economies of scale. One of the eight cases could not be studied,

as the shares of the banks involved were not listed on the Athens Exchange.

Selecting this particular sample, which involves M&As among Greek banks, makes it possible for us to draw a link between abnormal returns and changes which occurred in cost and profit efficiency. In other words, we will examine whether it is possible for the stock market to forecast changes in the performance of banks as a result of M&As as well as to distinguish M&As which will ultimately lead to improved performance from those which will fail to produce any benefit. We will also examine the efficiency of the Greek stock market in its semi-strong form.[7] In this direction, we analyse the time required for the content of the announcement of an M&A to be incorporated into share prices.

In Part 2, the theoretical framework underlying the effect of the announcement of an M&A on stock returns is presented in more detail and a brief overview is given of relevant material which has been published internationally. In Part 3, the methodology used to analyse the impact is presented, while the analysis of data from the sample is looked at in Part 4. In Part 5, the empirical evidence is interpreted and evaluated and, finally, in Part 6, the study is completed with a presentation of the conclusions, summarised as follows:

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4 The terms "acquiring bank" and "target bank" are also used in cases where the M&A involves the merger of two institutions.
5 Note that the event study analysis method was originally developed by Fama *et al. (*1969).
6 Abnormal returns are those which are not interpreted using an asset pricing model. See also Part 3 for a detailed explanation.
7 A stock market is considered efficient in its semi-strong form when share prices incorporate directly and fully all publicly available information, i.e. all events which investors may be informed about from published news reports and data. For further information concerning the forms of an efficient market, see Thomadakis and Xanthakis (1990).

- Firstly, the cumulative average abnormal return of the acquiring banks is higher than that of the target banks and lasts longer.

- Secondly, concerning the results obtained by Athanasoglou and Brissimis (2004), it appears that, with two exceptions, investors discounted the positive effect of M&As on bank cost and profit efficiency.

- Thirdly, there is evidence of non-effective reaction of the stock market to announced M&As, as abnormal returns are observed for several days following the announcement date, especially as regards acquiring banks.

2. The reaction of the stock market to announcements of bank M&As: a theoretical approach and an overview of the literature

2.1 Theoretical approach

As noted above, one important factor behind greater bank concentration via M&As is the maximisation of their stock price. Any announcement of an intended M&A arouses considerable interest on the part of the banks' shareholders as it gives them an opportunity to check the validity of the two following hypotheses:

Firstly, "the information hypothesis", according to which the management of the bank which announces an intention to go ahead with the acquisition of another bank (target bank) may be aware that the book value or stock market value of the target bank is underestimated.

Secondly, "the inefficient management hypothesis", according to which, following the announcement of the M&A, the management of the target bank may be obliged to improve the operation of the bank in order to make it more efficient and thereby possibly prevent the takeover.

However, an intended M&A does not necessarily lead to the maximisation of the value of the new bank which will come into existence. If the utility function of the management of the acquiring bank is increasing proportionately to the scale of the bank, it is possible that the management in question will proceed with the M&A simply to derive the greatest possible personal benefit without taking into account the total cost involved in acquiring the target bank, which may be far higher than the value of the target bank itself. A similar case arises when the management of the acquiring bank overestimates its own ability to identify undervalued target banks, thus eventually paying a relatively high price ("hubris hypothesis", see Roll, 1986).

According to the two hypotheses above, any announcement of an intended M&A can be expected to cause the following changes to take place in share prices:

(a) *Acquiring banks' shares:*
The reaction is positive when the M&A involves banks which provide similar services and/or are active in the same market. The reaction is negative or non-existent when it is perceived that the M&A serves only the personal interests of the management of the acquiring bank rather than the interests of the shareholders.

(b) *Target banks' shares:*

The reaction is positive, as either it is felt that the target bank's share price is undervalued or that the management of the target bank was ineffective and that, therefore, the acquisition will result in efforts to improve the operation and organisational structure of the bank, which will in turn lead to improved performance.

Researchers looking into how the stock market reacts to announcements of M&As consider that this reaction is a major indication of how much the M&A is expected to affect the overall efficiency of the banks involved. In other words, they attempt to analyse whether there are any possible returns on bank shares as a result of the announcement of an intended M&A. The hypothesis tested is that these returns, as they develop around the announcement date, can explain the increased stock market value of the banks which will come into existence as a result of an M&A compared to the total stock market value of the individual banks involved in the M&A.

2.2 An overview of the relevant literature

Empirical research into the impact of the announcement of a bank M&A on stock prices has concentrated mainly on bank M&As in the USA, while it is relatively limited as far as the European banking system is concerned. The general conclusion drawn from analysing events in the USA is that positive abnormal returns are observed in the case of target banks' shares, while the results for acquiring banks are mixed. In general, despite the benefits which theoretically should arise from an M&A and the partial transfer, as observed by several researchers, of wealth from the shareholders

of the acquiring bank to the shareholders of the target bank, it appears that, in total, stock returns in the USA are not affected by the announcement of an M&A, as acquiring banks show a loss on average which offsets the profits of target banks' shares (see Piloff and Santomero, 1998). By contrast, in the EU, abnormal returns are observed chiefly in the case of target banks but also, to a lesser extent, in the case of acquiring banks.

The empirical results[8] detailed in international literature may be summarised as follows:

(a) *Acquiring banks*

Many studies find that, following M&A announcements in the USA, stock prices of acquiring banks show positive but low abnormal returns before the announcement for a period of ten days or less (see Pettway and Trifts, 1985, James and Wier, 1987, Bertin *et al.*, 1989). By contrast, in another case, abnormal returns appear to be negative for a period of four days before the announcement (see Houston and Ryngaert, 1994).[9] The results are also contradictory in cases where the abnormal returns cover both the period before and after the announcement date. Specifically, in some studies a positive abnormal return is

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8 All results reported in this part are statistically significant.
9 In studies based on weekly data, negative abnormal returns were observed for a period of 4 to 20 weeks after the announcement date (see Wall and Gup, 1989, Trifts and Scanlon, 1987), while in studies carried out using monthly data, negative abnormal returns were noted for a period of up to 36 months following the announcement date (see Madura and Wiant, 1994). In these cases, i.e. in cases where the abnormal returns continue for a relatively long period following announcement date, a possible cause is the inefficient operation of the stock market, or the fact that investors gradually change their expectations because the M&As appear to have brought about fewer benefits than had initially been discounted at the announcement date (see Piloff and Santomero, 1998).

observed on the announcement date and on both the day before or the day after (see Desai and Stover, 1985, Cornett and De, 1991),[10] while other studies report negative abnormal returns for a period of one day before the announcement to one day after the announcement (see Kaen and Tehranian, 1989) and for a period of five days before and after the announcement date (see Baradwaj *et al.*, 1990, 1992). Finally, on another occasion, abnormal returns varied from positive to negative depending on the period when the analysis was carried out (see Dubofsky and Frazer, 1989).

(b) *Target banks*

Most researchers find that the stock market reaction to M&A announcements in the USA was positive for target banks' shares for a period of 15 days before and after the announcement date (see Hannan and Wolken, 1989, Cornett and De, 1991).[11] In another case of M&A, positive abnormal returns are only noted during the four days preceding the announcement (see Houston and Ryngaert, 1994).[12] Moreover, in instances where abnormal returns are pinpointed for shares of both the acquiring and the target banks, the latter appear to benefit more than the former (see Zhang, 1995, Becher, 2000).

Finally, in contrast to what was observed in the USA, M&A announcements in the EU caused the stock market value of both the target and the acquiring bank to rise, as positive abnormal returns were observed which lasted for a period of 20 days before until 20 days after the announcement date (see Cybo-Ottone and Murgia, 2002).[13]

Overall, according to the empirical findings, investors in the USA felt that M&As favoured the management of the acquiring banks more than the shareholders, while, by contrast, EU investors felt M&As were beneficial for shareholders, given the possible benefits of economies of scale and scope. On almost every occasion, target banks demonstrated positive abnormal returns. This was so because investors felt that M&As would bring benefits in terms of greater operating efficiency on the part of the new banks coming into existence (for the reasons noted above) as well as because it was felt that the new management would operate more efficiently compared with the management of the target banks. Moreover, it was also observed that share prices of acquiring and target banks react considerably earlier than the M&A announcement date, indicating the dispersion of rumours or "inside information" about the M&A through the stock market before the official announcement. Finally, it appears that investors did not fully discount the future impact of M&As on the date of the announcement, as abnormal returns are evident for a period after this date. This is true for both acquiring and

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10 Cornett and De (1991), however, observe that the positive abnormal return for acquiring banks became gradually negative for a period of up to 15 days from the announcement date.

11 Cornett and De (1991) also note that the cumulative average abnormal returns following the announcement date remain positive for a period of up to 15 days following the announcement date, despite the occurrence of negative abnormal returns in the same period, mainly due to the systematic appearance of positive abnormal returns up to the announcement date.

12 In studies which use weekly data, positive abnormal returns extend for a period beginning 40 weeks prior to the announcement date and continuing for 30 weeks after this date (see Trifts and Scanlon, 1987, Neely, 1987, De Cossio *et al.*, 1988, and Hawawini and Swary, 1990). Trifts and Scanlon (1987) in particular observed that acquiring banks presented positive cumulative abnormal returns for the period beginning 40 weeks before the announcement date and continuing up to 20 weeks after the date. However, for the separate 20-week period following the announcement date, the results were statistically insignificant.

13 The study relates to M&As between companies of the financial sector, of which at least one was a bank.

target banks and provides evidence of an inefficient reaction on the part of the stock market.[14]

3. Methodology: event study analysis

Using the methodology known as event study analysis,[15] any abnormal returns which the share price may demonstrate as a result of specific events or news, such as the announcement of M&As, are examined. A key supposition underlying this method is the hypothesis of stock market efficiency, i.e. that stock market prices fully and immediately incorporate investors' expectations, which are based on all available information. As a result, the announcement of an event leads to a rapid adjustment of the stock price connected with this event.

According to event study methodology, expected normal returns from the share within a period of $[t_0 \pm t_i]$ days are considered in relation to the announcement date (t_0). The difference between actual and expected returns represents the abnormal returns.

To estimate the expected returns, an asset pricing model is used such as the market model. Based on this, there is a linear relationship between the return on a share[16] i and the market portfolio return m, according to equation (1):

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \tag{1}$$

where:

R_{it} = the expected return of share i at time (date) t

R_{mt} = the return of the market portfolio m at time (date) t

α_i, β_i = the coefficients of the model

ε_{it} = statistical margin of error for which the expected value $E(\varepsilon_{it}) = 0$ and the variation $Var(\varepsilon_{it}) = \sigma^2_{\varepsilon i}$

Econometric estimation of equation (1) and, by extension, of the expected returns of share i is usually carried out using the classic Ordinary Least Squares (OLS) method for a specific period.[17]

The estimated coefficients in equation (1) are used to calculate the expected returns of each bank share, while the abnormal returns are calculated as the difference between the expected returns and actual returns during the period of $[t_1, t_2]$ days before and after the announcement date (t_0), according to the relationship (2):

$$AR_{it} = R_{it} - (\hat{\alpha}_i + \hat{\beta}_i R_{mt}) \tag{2}$$

where:

AR_{it} = the abnormal return of share i on day t

$\hat{\alpha}, \hat{\beta}$ = estimates of coefficients $\alpha_i + \beta_i$.

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14 See footnote 7.

15 For a more detailed presentation of the event study methodology, see Dodd and Warner (1983), Campbell et al. (1997).

16 The returns (R_t) on shares and on the market price index are calculated as follows: $R_t = \ln(P_t / P_{t-1})$, where P_t is the closing price of the share (or the index) on day t.

17 The Ordinary Least Squares method is widely used in empirical event study research to evaluate the market model (see Rhoades, 1994). For an unbiased evaluation of the parameters of the model, we assume that the data follow the usual distribution and are distributed independently and identically (Independent and Identical Distribution, IID). In the event that this assumption is not valid, the evaluation of the market model's coefficients will be biased and the results will be asymptotic. However, some violation of the above assumption does not have any particularly negative effect when carrying out event study research (see Brown and Warner, 1985, Campbell et al., 1997), as statistical tests approach their distributions asymptotically.

We assume that $AR_{it} \sim N\ [0, Var(AR_{it})]$ with $Var(AR_{it}) \approx \sigma^2_{\varepsilon i}$ in case equation (1) is estimated over a relatively long period. So, the statistical significance of the abnormal returns may be checked via an estimation of the standard abnormal return SAR_{it} which is defined by relationship (3):

$$SAR_{it} = \frac{AR_{it}}{\sqrt{Var(AR_{it})}} \tag{3}$$

Similarly, we can check the statistical significance of the average abnormal return of a number N of events (AAR_t) through relationship (4).

$$SAAR_t = \frac{AAR_t}{\sqrt{Var(AAR_t)}} \tag{4}$$

where:

$$AAR_t = \frac{1}{N} \sum_{i=1}^{N} AR_{it} \text{ and } Var(AAR_t) = \frac{1}{N^2} \sum_{i=1}^{N} \sigma^2_{\varepsilon i}$$

It is noted that, while calculating abnormal returns provides an indication of the impact of the event under examination on share prices, this indication refers only to individual time points. To investigate the real, ongoing impact of an event on share prices, abnormal returns must be calculated cumulatively for the full period of $[t_1, t_2]$ days for each share, in accordance with relationship (5):

$$CAR_{i,[t_1,t_2]} = \sum_{t=t_1}^{t_2} AR_{it} \tag{5}$$

where:

$CAR_{i,[t_1,t_2]}$ = cumulative abnormal return for the period $[t_1, t_2]$.

In addition, concerning the variation in $CAR_{i,[t_1,t_2]}$ it is true that:

$$Var\ (CAR_{i,[t_1,t_2]}) = (t_2 - t_1 + 1)\ \sigma^2_{\varepsilon i}$$

To check the statistical significance of CAR, ratio (6) is used:

$$SCAR_{[t_1,t_2]} = \frac{CAR_{[t_1,t_2]}}{\sqrt{Var(CAR_{[t_1,t_2]})}} \tag{6}$$

As in the case of average abnormal return, we can check the statistical significance of the cumulative average abnormal return (CAAR) using the relationship (7):

$$SCAAR_{[t_1,t_2]} = \frac{CAAR_{[t_1,t_2]}}{\sqrt{Var(CAAR_{[t_1,t_2]})}} \tag{7}$$

where:

$$CAAR_{[t_1,t_2]} = \frac{1}{N} \sum_{i=1}^{N} CAR_{i[t_1,t_2]} \text{ and}$$

$$Var(CAAR_{[t_1,t_2]}) = \frac{1}{N^2} \sum_{i=1}^{N} \sigma^2_{i,[t_1,t_2]}$$

In each case of statistical hypotheses tests, the critical values were obtained by the t-student distribution at 5% level of significance.

In the literature, the calculation period of the cumulative abnormal returns is usually between 10 and 50 days before and after the announcement date. In this study, the time period $[t_1, t_2]$ is determined as $[-20, +20]$, i.e. 20 days before and 20 days after the announcement date t_0, while intermediate periods of time are used to validate the results.

4. Data analysis

As mentioned previously, this study examines the impact of announcing an intended M&A involving Greek banks listed on the stock market during the period 1998-1999. These announcements include

neither those concerning co-operation between Greek and foreign banks nor those concerning the purchase of foreign branches.

In the method which we have selected, the date of the M&A announcement to the daily press is of considerable significance. The announcement date is taken to be either the date on which a bank or banks expressed through the press their interest in an M&A or the date on which a relevant announcement was published by the Board of Directors of the banks involved, thus bringing the potential M&A to the attention of investors. Announcement dates were retrieved from the financial newspaper "Naftemporiki" or from announcements by the Athens Exchange (Athex).

As for share prices, daily prices are usually used in international literature to estimate the coefficients of the market model, with the exception of certain studies which use weekly or monthly prices for the period preceding the announcement date (see Lobue, 1984, Neely, 1987, De and Duplichan, 1987, Trifts and Scanlon, 1987, Wall and Gup, 1989, Hawawini and Swary, 1990), while, in other studies, prices in the period following the announcement date are also used (see James and Wier, 1987, Trifts and Scanlon, 1987, Baradwaj *et al.*, 1992). One exception was the study by Cornett and De (1991), where share prices in the period following the announcement of an intended M&A were used exclusively.

In this study, a comparatively long time period was used in order to assess the coefficients of equation (1), so that they approach their real, long-term values, and to avoid any possible bias in their estimation from systematically positive returns, especially in the period before and after the announcement date. To estimate the normal returns, daily closing prices were used for the period 1.1.1996-31.12.2003. However, note that for the shares of some of the banks examined, data were not available for the full period, either because banks were listed on the stock market after 1.1.1996 or because the M&A took place before 31.12.2003 and, as a result, the target bank's share ceased to be tradable on the stock market. Finally, for the market portfolio m, the Athex Composite Index closing prices were used.

For reasons already noted above, the sample of M&As studied here is the same as the one used by Athanasoglou and Brissimis (2004).[18] Out of the eight cases (A-H) in their study, case A was excluded, as it involved an M&A between banks not listed on the stock market and thus it was not possible to examine them in this study. The distinction between acquiring and target banks was drawn on the basis of the ranking of Table 1[19] in Athanasoglou and Brissimis (2004). The total of the seven cases examined includes six acquiring banks, one of which participated in two M&As (cases B and D). There were eight target banks, while in case G, in order to make the results comparable with those of Athanasoglou and Brissimis (2004), two target banks[20] were examined together. However, in cases B, C and D, target banks' shares were not listed on the Athex, and therefore only five remaining banks were examined.

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18 For more details, see Part 4.1.3 and Table 9, Athanasoglou and Brissimis (2004).
19 In that table, the distinction is drawn according to the corresponding Government Gazettes in which the announcement of each M&A was published.
20 In this case, the average results of the two target banks which took part in the M&As were examined.

Chart 1

Average daily abnormal stock returns of acquiring and target banks

(Percentages)

Acquiring banks
Acquiring banks excluding cases B and D
Target banks

Days before and after the announcement date (0)
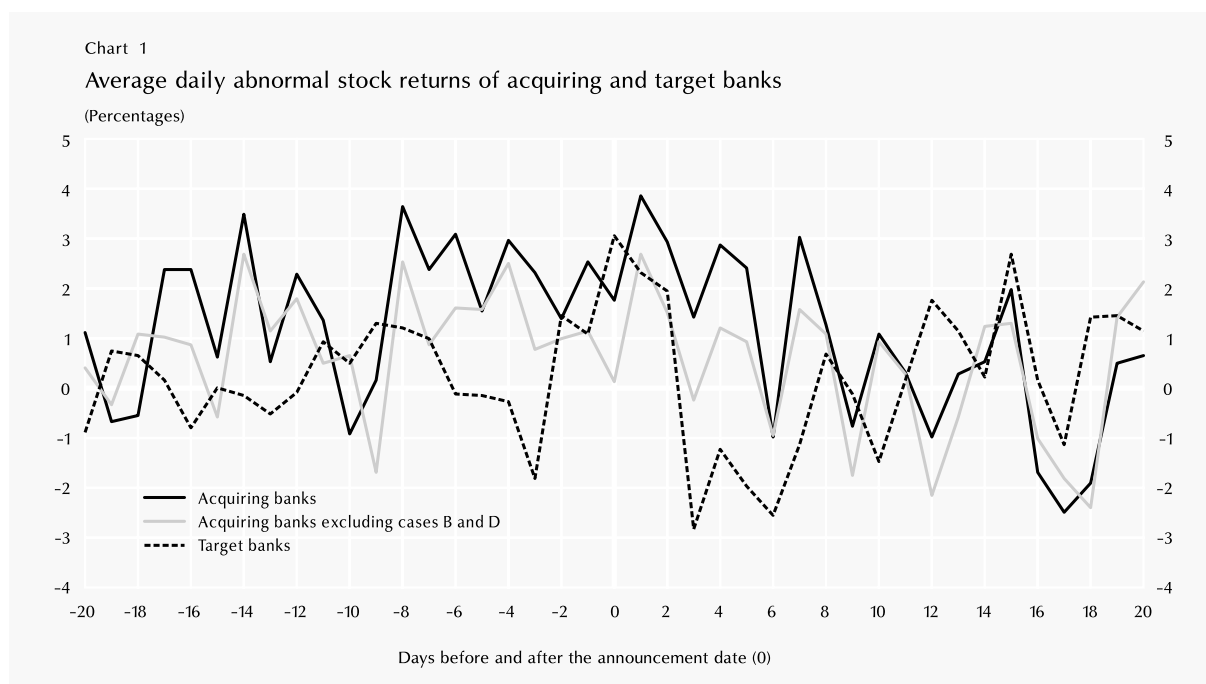
5. Empirical results

5.1. Evaluation of daily abnormal returns

Chart 1 and Table 1 show the average daily annual abnormal return [AARt, relationship (4)] for all cases of M&As both for acquiring and for target banks. The examination of these returns shows that there is a clear differentiation between the returns achieved by the two groups of banks. In more detail, for most days within the period before and for eight days after the announcement date, acquiring banks show a positive and statistically significant average abnormal return, which thereafter demonstrates non-systematic development (see Table 1). Apart from cases B and D,[21] these banks demonstrate positive (negative) and significantly lower (higher) average abnormal returns, while the number of statistically significant returns is considerably smaller than the corresponding number for all acquiring banks, even

though the pattern of the daily development of these returns did not change during the period under examination in comparison with that of all the cases in total. In addition, both for the total number of cases examined and for the total excluding cases B and D, a considerable number of negative abnormal returns are noted from the sixth day after the announcement date, in contrast with the very positive abnormal returns achieved during the period preceding the announcement date.

In the case of the target banks, positive and statistically significant abnormal returns are observed during the period of two days before and two days after the announcement date, followed by negative abnormal returns which con-

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21 The share prices of the banks in cases B and D demonstrated exceptionally marked fluctuations, especially during the period before the date of the M&A announcement [–20, 0].

Table 1
Average daily abnormal stock returns of acquiring and target banks
(Percentages)

Days	Banks		
	Acquiring	Acquiring excluding cases B and D	Target
−20	**1.1**	0.4	−0.9
−19	−0.7	−0.3	0.7
−18	−0.5	1.1	0.6
−17	**2.4**	1.0	0.1
−16	**2.4**	0.9	−0.8
−15	0.6	−0.6	0.0
−14	**3.5**	**2.7**	−0.2
−13	0.5	**1.1**	−0.5
−12	**2.3**	**1.8**	−0.1
−11	**1.4**	0.5	0.9
−10	−0.9	0.6	0.5
−9	0.2	**−1.7**	**1.3**
−8	**3.6**	**2.5**	1.2
−7	**2.4**	0.9	1.0
−6	**3.1**	**1.6**	−0.1
−5	**1.6**	**1.6**	−0.2
−4	**3.0**	**2.5**	−0.3
−3	**2.3**	0.8	**−1.8**
−2	**1.4**	1.0	**1.5**
−1	**2.5**	**1.1**	1.1
0	**1.8**	0.1	**3.1**
1	**3.9**	**2.7**	**2.3**
2	**2.9**	**1.5**	**1.9**
3	**1.4**	−0.2	**−2.8**
4	**2.9**	**1.2**	−1.2
5	**2.4**	0.9	**−2.0**
6	−1.0	−0.9	**−2.5**
7	**3.0**	**1.6**	−1.1
8	**1.3**	1.1	0.7
9	−0.8	**−1.8**	−0.1
10	**1.1**	0.9	**−1.5**
11	0.3	0.3	0.2
12	−1.0	**−2.1**	**1.8**
13	0.3	−0.6	1.1
14	0.5	**1.2**	0.2
15	**2.0**	**1.3**	**2.7**
16	**−1.7**	−1.0	0.2
17	**−2.5**	**−1.8**	−1.1
18	**−1.9**	**−2.4**	**1.4**
19	0.5	**1.4**	**1.5**
20	0.7	**2.1**	1.2

Note: Numbers in bold denote statistical significance at 5% level of significance. In the first column, the days before the announcement date (0) are indicated with a negative sign.

Chart 2

Cumulative average abnormal stock returns[1] of acquiring and target banks

(Percentages %)

Days before and after the announcement date (0)

1 Returns are calculated as the average of the cumulative abnormal returns for each bank category.
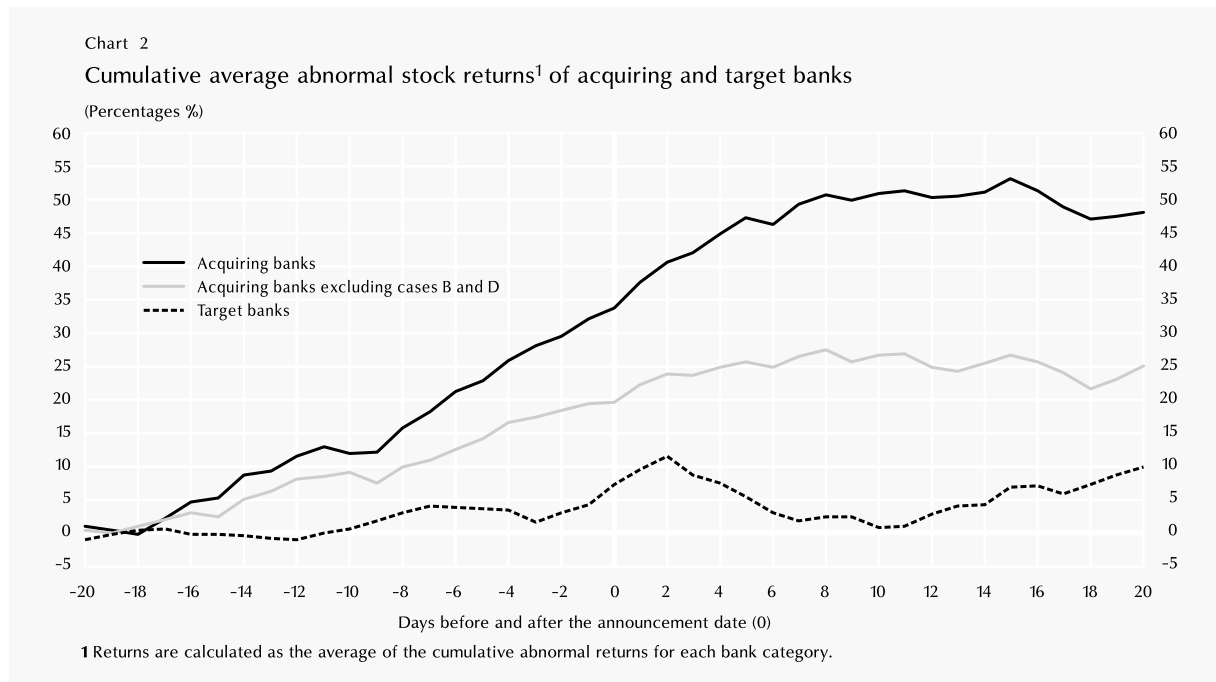
tinue up to the tenth day after the announcement (with statistically significant abnormal returns on the 3rd, 5th, 6th and 10th day), while thereafter these returns become positive (with statistically significant those on the 12th, 15th, 18th and 19th day).

On the day of the announcement, acquiring banks noted an average (statistically significant) abnormal return of 1.8% (0.1%, and statistically insignificant, excluding cases B and D), which is markedly lower than that of the target banks, whose shares showed a corresponding (and statistically significant) return of 3.1%. These results, excluding cases B and D, are in line with similar studies for US banks, where the abnormal return for acquiring banks is either negative, or positive (statistically insignificant). Concerning target banks, the abnormal return on the announcement date observed in this study is noticeably lower than that noted in other studies.[22]

5.2 Evaluation of cumulative abnormal returns

As already noted, the continuing impact of the M&A announcement on banks' share prices is evident from the cumulative abnormal return [CAR_1, relationship (5)] which is observed for a period before and after the announcement date. In general, an examination of Chart 2 shows that the cumulative average abnormal return for acquiring banks is significantly higher than that of target banks and lasts for a longer time. This conclusion is still true even if cases B and D are excluded from the group of acquiring banks.

More specifically, the cumulative average abnormal return of shares of acquiring banks is positive and statistically significant for 17 days before the

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22 For example, note that Cornett and De (1991) estimate an abnormal return of 6.1% for target banks in the US equivalent on the date of the announcement.

Table 2

Cumulative average abnormal stock returns[1] of acquiring and target banks at different day intervals

(Percentages)

Day intervals [from (t1)-to (t2)]	Banks		
	Acquiring	Acquiring excluding cases B and D	Target
[–20, –15]	**5.3**	2.4	–0.1
[–15, –10]	**7.4**	**6.2**	0.7
[–10, –5]	**9.9**	**5.5**	**3.7**
[–5, 0]	**12.5**	**7.2**	**3.4**
[0, 5]	**15.2**	**6.3**	1.3
[5, 10]	**6.0**	1.8	**–6.6**
[10, 15]	**3.2**	1.0	**4.5**
[15, 20]	**–2.9**	–0.3	**5.7**
[–17, 8]	**50.7**	**26.3**	2.0
[–10, 2]	**27.7**	**15.3**	**11.5**
[–1, 1]	**8.1**	**4.0**	**6.5**
[–20, 0]	**33.8**	**19.7**	**7.3**
[0, 20]	**16.1**	**5.6**	**5.7**
[–20, 20]	**48.2**	**25.1**	**10.0**

Note: Numbers in bold denote statistical significance at 5% level of significance.
1 Returns are calculated as the average of the cumulative abnormal returns for each bank category.

announcement date of the merger and continues to rise up to 8 days after that date, when it achieves its highest price (50.7%), while it fluctuates slightly thereafter (see Chart 2 and Table 2).

This return reduces by approximately a half (26.3%) when cases B and D are excluded from the group of acquiring banks (see Chart 2 and Table 2), as in these cases the abnormal returns of banks were exceptionally high and unexpected on the basis of their cost and profit efficiency (see Table 3). In contrast, for shares of target banks, the positive and statistically significant cumulative average abnormal return lasts for a relatively shorter period [–10,2] and reaches 11.5% with relatively sharp fluctuations. It should be remembered that in international literature the corresponding time period for

both categories of banks is shorter than or equal to 20 days.

In addition, the cumulative average abnormal returns which shareholders potentially achieved, as calculated for various time intervals within the period [–20, 20], are shown in Table 2. Specifically for the whole period under examination [–20, 20], the cumulative average abnormal return of shares of acquiring banks (48.2%) was approximately five times that of target banks. However, this important differentiation between the returns of the two groups of banks is chiefly evident in the period before the announcement (33.8% compared with 7.3%) and, to a lesser extent, in the period after the announcement (16.1% compared with 5.7%). If cases B and D are excluded from the total, this difference is reduced significantly for the period

Table 3

Cumulative average abnormal stock returns per M&A case at different day intervals

(Percentages)

Day intervals [from (t₁) to (t₂)]	M&A cases[1]						
	B	C	D	E	F	G	H
[−20, −15]	6.7	**13.6**	**20.8**	−2.3	**6.5**	**−4.9**	**5.7**
[−15, −10]	7.7	**34.8**	**14.5**	−2.3	1.8	−1.3	**6.1**
[−10, −5]	**14.8**	**17.9**	**31.2**	−1.5	**−3.9**	**−4.7**	**5.1**
[−5, 0]	**11.1**	**23.3**	**46.1**	−0.5	−0.9	**7.3**	**5.0**
[0, 5]	**43.3**	**−14.8**	**41.1**	**7.0**	1.1	**9.7**	1.9
[5, 10]	**45.0**	0.2	**−7.8**	0.2	**−8.4**	2.4	**−7.5**
[10, 15]	**21.8**	**−5.8**	−2.4	−1.2	**−3.9**	**13.5**	**−4.7**
[15, 20]	**−10.8**	**−25.2**	**−10.5**	**13.5**	**4.8**	**4.9**	−2.2
[−1, 1]	**17.4**	**−12.5**	**23.9**	**11.3**	−2.5	**7.6**	**10.4**
[−20, 0]	**53.3**	**78.2**	**99.3**	−5.1	**15.4**	4.3	**19.3**
[0, 20]	**79.5**	**−56.8**	15.6	**21.8**	**−8.7**	**25.9**	−5.5
[−20, 20]	**126.8**	**28.5**	**107.8**	**12.8**	5.4	**28.7**	**10.6**

Note: Numbers in bold denote statistical significance at 5% level of significance.
1 For these cases see also Table 9 in Athanasoglou and Brissimis (2004).

before the announcement (19.7% compared with 7.3%), as well as for the whole period under examination (25.1% compared with 5.7%), while in the period after the announcement date this difference no longer exists. Note that the cumulative average abnormal return for acquiring banks exceeds in general that of target banks, except from certain specific time intervals.

This positive effect for acquiring banks is attributed, on the one hand, to the fact that banks which participated in M&As were active in the same market offering similar products and, on the other hand, to the expectations of the shareholders that the M&A will benefit the value of their shares. It is noted that the specific findings of this study are in accordance with corresponding findings for the EU; however, they are higher (lower) for acquiring (target) banks and their differences are particularly marked in the case of acquiring banks.

The results for the cumulative abnormal returns are analysed further and their overall statistical significance is examined. More specifically, Charts 3 and 4 show the number of positive and negative (statistically significant) cumulative abnormal returns for the categories of acquiring and target banks as a percentage of the total number of M&As. These positive returns for acquiring banks reach their highest percentage (approximately 75%) in the period [−1, 1]. This percentage falls successively in the five-day period before and after the announcement date, with the exception of the first and last five-day periods [−20, −15] and [15, 20], when the percentage remains stable or rises, respectively. By contrast, negative returns are at a low percentage, mainly during the period after the announcement date. As for target banks, the period [−1, 1] exhibits the highest concentration of positive returns (80% approximately), while there is a much lower percentage of positive and negative returns in the rest of the periods under examination.

Chart 3

Percentages of statistically significant cumulative abnormal stock returns for the total of acquiring banks
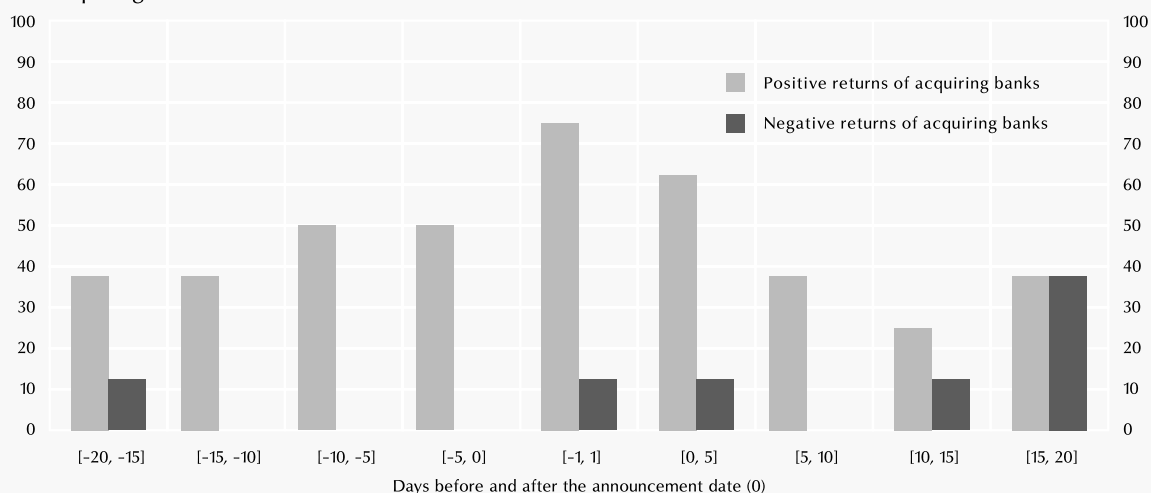
Days before and after the announcement date (0)

■ Positive returns of acquiring banks
■ Negative returns of acquiring banks

Note: The respective percentages have been calculated, for each bank category, as the ratio of the number of cases with a statistically significant cumulative abnormal return over the total number of cases.

Chart 4

Percentages of statistically significant cumulative abnormal stock returns for the total of target banks
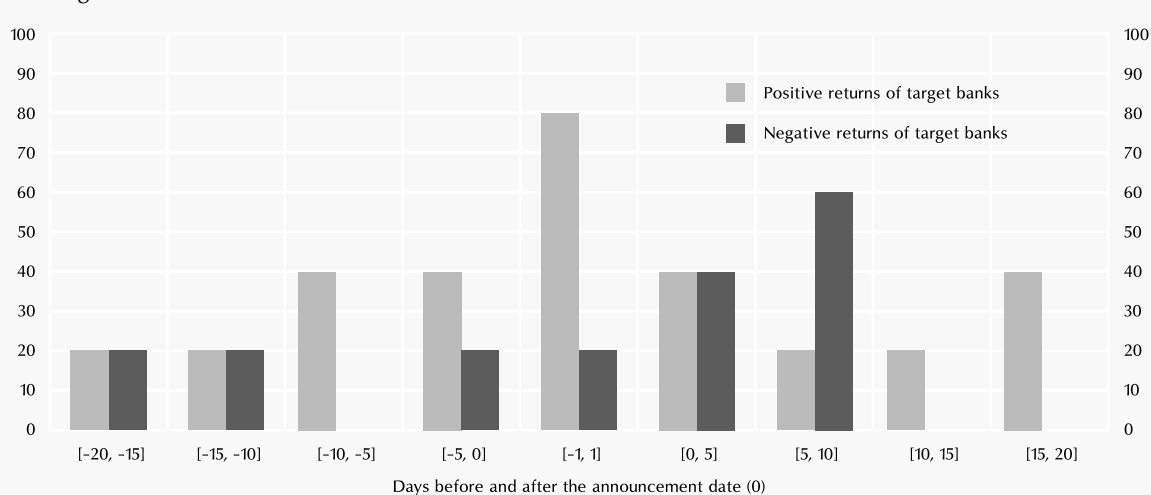
Days before and after the announcement date (0)

■ Positive returns of target banks
■ Negative returns of target banks

Note: The respective percentages have been calculated, for each bank category, as the ratio of the number of cases with a statistically significant cumulative abnormal return over the total number of cases.

Therefore, both for target banks and especially for acquiring banks, information is disseminated throughout the stock market considerably earlier than the official announcement date. This indicates either rumour dispersion concerning M&As or that inside information is exploited in carrying out transactions, a phenomenon which, as previously mentioned, can be observed in other cases

of M&As involving banks in the USA and the EU, albeit to a comparatively lesser extent. Moreover, it can be seen that the impact of announcing M&As is not fully discounted on the announcement date, especially in the case of acquiring banks, while cumulative abnormal returns remain statistically significant for a period following the announcement, thus indicating a possible violation of the efficient market hypothesis in its semi-strong form. It should be noted, however, that the length of this period is reduced sharply for acquiring banks when cases B and D are excluded (see Table 2).

5.3 Analysis of individual cases of bank M&As on the basis of abnormal stock returns

The fact that the sample being examined is small represents a disadvantage for this study and makes it more difficult to formulate more general conclusions. It does, however, make it possible to evaluate each M&A separately and compare it with the corresponding results of the Athanasoglou and Brissimis study (2004) regarding the effects of the same individual cases of M&As on banks' cost and profit efficiency. Table 3 shows the cumulative average abnormal returns over different time intervals for each case of M&As for the period [–20, 20]. It is clear that cases B and D present exceptionally high (and statistically significant) returns (126.8% and 107.8% respectively), although the performance in both cases is negative as far as profit efficiency is concerned, while improved cost efficiency is only achieved in case B.[23] The abnormal return achieved in case D concerns almost exclusively the period before the announcement date, indicating the effect of intense rumour dispersion or abuse of inside information. In case B, a high return was achieved

both before and after the M&A announcement date. As a result, in addition to what has previously been noted for case D, it appears that in case B the efficient market hypothesis in its semi-strong form is violated. However, with the exception of these two cases of M&As, in all other cases conclusions are in line with those drawn by Athanasoglou and Brissimis (2004). More analytically, out of the rest of individual cases of M&As (C, E, F, G and H), G and C, which also report the best performance in the Athanasoglou and Brissimis study (2004), have achieved the largest increase in stock market value, while cases E, H and F follow. Therefore, it appears that positive abnormal stock returns in these cases reflect investors' expectations of a corresponding improvement in cost and profit efficiency of the banks which participated in the M&As.

6. Conclusions

In this study, we have examined the impact of announcing M&As among Greek commercial banks on their stock prices during the two-year period 1998-1999. In this direction, we used the "event study" analysis method using a sample of announcements concerning imminent M&As, which was the same as the one used by Athanasoglou and Brissimis (2004).

According to the results, both acquiring and target banks reported particularly high positive abnormal returns during the period under examination. This is true even after the exclusion of two cases of M&As, which experienced exceptionally high

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23 See Athanasoglou and Brissimis (2004).

returns. More particularly, acquiring banks showed significantly higher cumulative abnormal returns than those of target banks, which also lasted for a longer period of time. When the two previously noted extreme cases are excluded from acquiring banks, this relationship continues to hold in general; however, the difference in the level of returns between the two bank categories is considerably reduced.

Abnormal returns mainly of the acquiring as well as of target banks are more evident in the period before the announcement date, thus indicating either a rumour dispersion effect or abuse of inside information in the pre-announcement period. The efficient market hypothesis in its semi-strong form seems to be violated during the period under examination, as abnormal returns, particularly of acquiring banks, remain evident for several days after the announcement date. However, this phenomenon is less marked after the exclusion of the two extreme cases.

During the examination of individual cases of M&As, the cases which, according to Athanasoglou and Brissimis (2004), showed the greatest improvement in cost and profit efficiency presented the highest returns in this survey as well (with the exception of the two cases noted previously). These returns are thought to reflect investors' expectations of improved performance of the banks involved in M&As.

The findings of this study appear to be in line with those concerning the banking system in the USA as far as target banks are concerned. In addition, they are in line with associated results for both acquiring and target banks in the European Union, even though in the case of Greek banks, returns reach relatively higher levels for acquiring banks and lower ones for target banks.

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The redistributional impact of inflation in Greece*

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1. Introduction

Although issues relating to the distribution and redistribution of production and income have always been at the very epicentre of economists' interest, only a few empirical studies have ever been conducted in this area. This is chiefly because it is impossible to approach these issues objectively, since every approach as a rule involves controversial and subjective judgements that are inextricably linked to the political and social conditions holding for a given time and place. Moreover, any discussion of distribution issues will almost invariably provoke a reaction from social groups and can lead to social and political unrest that may sometimes turn to violence.

Generally speaking, income can be redistributed between different social groups in both direct and indirect ways. Direct redistribution is usually noticed by social groups (though its true magnitude may not be), initially leads to reactions, these reactions gradually weaken and, eventually, redistribution is "accepted" to some extent. Direct redistribution would include, for example, an increase or decrease in the tax rates for different social groups, an increase in the income of other groups, and workers' incomes increasing at different rates.[1] Indirect income redistribution can take many forms and dimensions, which are not usually per-

[1] For 2000-2003, the cumulative increase in real earnings was 9.6% for the economy as a whole (or 10.7% for the average wage earner), as opposed to just 4.2% for workers receiving the minimum wage laid down by the National Collective Labour Agreement (see Bank of Greece, 2004).

ceived by social groups and which do not tend to be subject to negotiation. This paper aims to focus on one such indirect means of income redistribution: the redistributional effects of price changes in Greece over the last five years. These effects arise because the prices of different goods and services have not fluctuated uniformly and different population groups have quite different consumption patterns. Our research indicates that this redistribution has acquired noteworthy dimensions over the past five years and that it has functioned to the detriment of vulnerable social groups, such as the unemployed, those with low income and —to a lesser extent— pensioners and people with a relatively low educational level. It has also had a negative effect on various social indices, such as the poverty rate, the poverty gap and economic inequality, since the above social groups face a high risk of poverty and financial insecurity.

This paper will attempt to answer specific questions, including the extent to which price changes serve to alter income distribution, and indeed to the detriment of vulnerable social groups such as the poor, pensioners and the elderly; the extent to which this redistribution has worsened a range of social indices, such as those referring to inequality, the poverty rate and the poverty gap; and how incomes policy can take the indirect redistributive effect of prices into account. Section 2 of this paper will detail the statistical data used in this paper, along with some methodological issues required for the analysis. Section 3, which presents our empirical findings, is followed by some conclusions.[2]

2. Methodological approach

2.1 The Consumer Price Index[3]

The Consumer Price Index (CPI) is a statistical measure that records fluctuations in the general price level for goods and services consumed by households. In other words, it determines the impact of changes in retail prices on the amount households spend on the purchase of a specific basket of goods and services. The CPI therefore reflects price changes for a defined, in terms of quantity and quality, set of goods and services purchased by households over a given period of time. An index of this kind is of particular use when, for example, evaluating the purchasing power of money, calculating real wages, deflating macroeconomic statistics, readjusting rents (Law 2741/1999) and automatically bringing salaries and other contractual obligations into line with the cost of living index. Moreover, after the Maastricht Treaty, price stability has been one of the convergence criteria Member States must meet in order to participate in Stage Three of EMU. Thus,

2 The redistributional impact of inflation in Greece has not been studied extensively. Adopting a similar analysis to that adopted in this paper, Livada (1990) examines the issue for 1981-87, while more recent studies by Professor D. Tserkezos published in periodicals and the daily press (*Oikonomikos Tachydromos* 2003: n. 14, n. 34 and 2001: n. 35, *To Vima*: 28 November 2004, 16 May 2004, 18 May 2003, 3 February 2002, 16 September 2001, *Kathimerini*: 30 April 2004) have addressed the same issue. Turning to the international literature, a number of studies – chiefly on the USA, but also more recently on the UK – have addressed the problem of the unequal effect of inflation on different population groups (Amble and Stewart, 1994, Berndt *et al.*, 1997, Bils and Klenow, 2001, Garner *et al.*, 1996, Hagemann, 1982, Hamilton, 2001, Hobijn and Lagakos, 2003a, 2003b, Lebow and Rudd, 2003, Michael, 1979, Pollak, 1980.

3 The literature dealing with methodological and other problems relating to the calculation and revision of the CPI is particularly extensive (*inter alia*, see Rossi, 2001, Triplett, 2001, and Greenless and Mason, 1996.

Member States calculate their Harmonised Indices of Consumer Prices (HICPs) for the sole purpose of providing data for international comparisons of inflation.[4]

In Greece, the CPI is calculated and published on a monthly basis by the National Statistical Service of Greece (NSSG).[5] The index is revised at regular intervals, given that the composition of households' consumption (the consumption pattern) and living conditions change over time as a result of social and economic developments and technological progress. The weights, in particular, are re-assessed and the sample of items included in the index is kept in line with the most up-to-date consumption pattern. With this in mind, the NSSG conducts a Household Budget Survey (HBS) every 5-7 years using a nationwide sample of households. HBSs provide a highly detailed record of households' consumption expenditure (the most recent HBS included 725 goods).[6] The weights for the different goods and services consumed by households are compiled on the basis of the results of these surveys and then used to estimate the overall CPI. The most recent review of the CPI (base year: 1999=100) was based on the results of the last available HBS (1998/99). Moreover, this revision extended the range of the index from urban areas only to the entire country.[7] Three observations need to be made on the way in which the NSSG estimates the CPI: firstly, the weights for the individual CPIs are compiled on the basis of households' monetary expenditure, meaning that their imputed expenditure is not taken into account (the most recent HBS, 1998/99, found imputed expenditure to account for some 16% of total expenditure). Secondly, household expenditure on few goods was not included in the analysis (drugs, prostitution etc.),

while the weight of certain other goods and services (electrical power consumption etc.) was, for the sake of greater reliability, evaluated on the basis of data from other sources. Thirdly, the statistical sample included only private households and took into account neither collective residences (hospitals, old people's homes, orphanages etc.) nor expenditure by foreign visitors in Greece.

The NSSG uses the following variation of the Laspeyres equation to calculate the CPI:

$$I_t = \sum_{}^{k} w I_{it} \qquad (1)$$

where I_t and I_{it} are, respectively and for the period (month) t, the overall CPI and the individual prices indices of the items i (=1,2,...k) in the "consumer basket". The weights, w_i, for each of the indices are equal to the share of the households' total monetary expenditure accounted for by these items in the base year (in line with the HBS).[8]

2.2 Definitions and data

The present analysis rests on the fact that different social groups display considerably differentiated consumption patterns with different weights for individual expenditures. For example, empirical studies reveal, and economic theory tells us, that as a population's standard of living improves, the share of its expenditure accounted for by essential goods (food, housing, etc.) will fall and the corresponding share for luxury goods will rise. Engel's law predicts that the percentage of income spent on food will fall as an individual's income increases, and this is equally true for different income groups, for countries with different degrees of economic development, and over time. Thus, relatively poorer population groups spend a larger share of their income than other groups on food and essential goods and a smaller share on recreation, health, education etc. In other words, their income elasticity of demand for food is less than one. The opposite is true of recreation services.

This paper utilised primary data from the most recent HBS, which was conducted between November 1998 and October 1999, and recalculated the share of total expenditure accounted for by various consumer products in the case of different population groups. In other words, we decomposed the aggregate consumption pattern

used by the NSSG to weight the individual prices that together form the overall CPI and we estimated the different consumption patterns of the various population groups. In doing so, we calculated weights for each group of households, depending on the educational level of household heads, the degree of urbanisation of the area in which they reside, their professional characteristics, their financial situation (poor and non-poor, their expenditure quartile) etc. These weights were then used to calculate the CPI for each group. In mathematical terms, the CPI for household group g (I_t^g) was calculated on the basis of the formula:

$$I_t^g = \sum_{i=1}^{K} w_t^g I_{it} \qquad (2)$$

where w_t^g is the aggregate expenditure share of item i for the households in group g in the base period, i.e. it is the weight for index I_t^g for household group g.

Similarly, the inflation (π_t^g) faced by group g households in period t compared with period t–1, i.e. the percentage change from period t–1 to period t in the level of prices experienced by the group, can be calculated using the formula:

$$\pi_t^g = 100\left(\frac{I_t^g}{I_{t-1}^g} - 1\right) \qquad (3)$$

When ranking households and estimating inequality and poverty indices, households' total consumption expenditure was taken to reflect

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their welfare level.[9] It should be noted that, with this in mind, we included both the value of households' purchases and their imputed expenditure (self-production consumption, payment in kind, imputed rents etc.) in our definition of consumption expenditure.[10] Another two important issues were taken into account solely and exclusively when ranking households on the basis of their financial situation or welfare level and calculating social indices (Section 3.4). The first relates to the existence of economies of scale in household consumption and the second to the fact that adults have different needs from children.[11]

3. Empirical results

3.1 Differences in consumption patterns

Based on the methodology described, the most significant difference in the inflation faced by different population groups will stem from differences in the consumption patterns (expenditure shares of individual consumer goods and services) of the households of which these groups are comprised. It would therefore facilitate our later analysis to record at this point the most significant differences observed in the contents of the baskets of goods of different population groups. Consequently, Table 1 sorts the population into groups on the basis of demographic, professional and other –chiefly economic– features. These sorting criteria were selected on the basis that they appeared to be the most interesting of those included in the study, based on the primary data in the most recent HBS.

Table 1 presents the consumption shares of the 12

main groups of items included in the COICOP classification used by the NSSG, as these were estimated on the basis of the results of the 1998/99 HBS for each population group. In the table's first section, the population is sorted into five educational groups on the basis of the household head's educational level. The data indicate that the consumption expenditure breakdown differs significantly between households in relation to educational level. And one can indeed make out an inverse relationship between educational level and a household's expenditure share both on food and alcoholic beverages/tobacco, and a direct correla-

9 This was done both for theoretical reasons −consumption expenditure is considered a better indicator of households' permanent income than their current income− and because the NSSG consider HBS income data less reliable than the corresponding consumption expenditure data. For a comparative analysis of income and consumption data in earlier HBSs and the corresponding National Accounts data, see Kanellopoulos (1986) and Sarris and Zografakis (1993).

10 Moreover, various corrections were made to the primary HBS data with a view to achieving a better proxy of the population's welfare level. Thus, household expenditure was expressed at constant average 1999 prices (since the survey took place over one year, during which prices increased by some 2.6%); a very small number of households (54 out of 6,276) were excluded from the initial sample due to incomplete or unreliable data, while the original sample was made more representative by being re-weighted in line with the Labour Force Survey results for 1999. Finally, the imputed values of the services provided by private vehicles were estimated and added to consumption expenditure (similarly, expenditure on the purchase of private vehicles was removed from consumption expenditure).

11 Essentially, this related to the selection of the so-called "family equivalence scales", which take into account both consumption economies of scale and the different needs of adults and children. The distributions used to rank households are distributions of equivalent consumption expenditure *per capita*. These are calculated by dividing the expenditure of every household by the number of equivalent adults in it; the resulting ratio was then applied to every member of the household. The Eurostat family equivalence scales were used to calculate the number of equivalent adults for each household, whereby the head of the household is assigned a weighting of 1.0, other members of the household aged 13 and over a weighting of 0.5 and children under 13 a weighting of 0.3. Compared to other equivalence scales used in similar empirical studies, the Eurostat scales suppose moderate consumption economies of scale (Hagenaars *et al.*, 1994). For a detailed treatment of these issues, see Mitrakos (2003, 2004) and Papatheodorou (2004).

Table 1
Structure of consumption expenditure by household characteristics

Classification criterion:	Food & non-alcoholic beverages	Alcoholic beverages & tobacco	Clothing and footwear	Housing	Consumer durables	Health	Transport	Communications	Recreation and culture	Education	Hotels, cafés & restaurants	Miscellaneous goods & services	Total
National total	**18.5**	**3.9**	**9.9**	**11.7**	**8.6**	**7.3**	**12.9**	**3.8**	**4.7**	**2.7**	**9.7**	**6.4**	**100.0**
Educational level of household head													
– University graduate	13.8	2.4	10.2	10.8	9.9	7.3	14.8	3.6	6.4	3.8	10.0	6.9	100.0
– Upper secondary education completed	17.1	3.8	10.5	11.9	8.0	6.4	13.7	3.9	5.1	3.2	9.7	6.7	100.0
– Lower secondary education completed	19.0	4.9	10.3	12.4	7.5	7.5	12.6	3.8	4.2	3.1	8.4	6.2	100.0
– Primary education completed	22.3	5.0	9.4	11.8	7.8	7.3	12.2	3.8	3.3	1.8	9.4	5.9	100.0
– Primary education not completed	26.4	4.7	8.2	13.6	8.8	10.6	7.1	3.7	2.6	0.3	8.7	5.4	100.0
Region of residence													
– Urban areas	17.2	3.7	9.8	12.2	8.8	7.4	12.9	3.8	5.0	3.0	9.7	6.6	100.0
– Semi-urban areas	20.9	4.1	10.4	11.6	7.7	6.6	13.8	3.6	4.4	2.3	8.8	6.0	100.0
– Rural areas	23.0	4.9	10.1	9.6	8.2	7.1	12.5	3.5	3.5	1.7	10.1	5.7	100.0
Status in employment													
– Employee	16.7	4.0	10.4	12.0	8.3	6.2	13.6	3.5	5.4	3.4	9.7	6.6	100.0
– Employer	15.0	3.1	11.3	10.3	8.8	5.8	14.7	4.0	4.9	4.1	11.3	6.6	100.0
– Self-employed	18.7	5.0	9.8	10.6	7.5	6.3	14.7	3.9	4.1	2.8	10.1	6.5	100.0
Sector of activity													
– Primary sector	22.8	5.8	10.1	9.4	8.0	5.8	13.3	3.5	3.4	1.7	10.1	6.1	100.0
– Secondary sector	18.1	4.6	9.9	12.0	7.7	6.6	14.3	3.7	4.5	3.3	9.2	6.0	100.0
– Tertiary sector	15.7	3.6	10.6	11.4	8.4	6.2	14.0	3.7	5.5	3.6	10.4	6.9	100.0
Occupational status													
– Agricultural worker	22.7	5.8	10.1	9.4	7.8	5.8	13.5	3.5	3.4	1.7	10.2	6.0	100.0
– Non-agricultural employer	14.6	3.0	11.4	10.8	9.0	6.2	13.3	4.0	5.1	4.5	11.5	6.7	100.0
– Salaried worker in the private sector	20.2	5.4	9.6	13.5	7.2	6.7	13.4	3.5	3.9	2.4	8.5	5.8	100.0
– Salaried worker in the public sector	18.9	5.4	10.7	11.1	7.4	6.2	14.8	3.4	3.9	3.7	8.6	5.9	100.0
– Salaried employee in the private sector	14.8	3.6	11.8	12.2	8.2	5.7	12.9	4.0	5.9	3.4	10.5	7.2	100.0
– Salaried employee in the public sector	14.9	2.8	10.2	10.8	9.7	6.1	14.9	3.3	6.7	4.3	9.7	6.6	100.0
– Non-agricultural self-employed	19.5	5.6	10.0	11.2	7.2	5.7	13.5	4.1	3.8	3.0	9.9	6.5	100.0
– Other professional status	19.4	3.1	9.0	15.6	9.7	9.5	8.9	4.7	4.4	1.8	8.0	5.9	100.0
– Senior official or manager	14.2	3.4	9.4	10.4	7.4	7.0	18.7	3.9	5.2	3.3	10.4	6.7	100.0
– Pensioner	23.0	3.4	8.6	11.7	9.1	10.1	10.7	3.7	3.7	1.0	8.8	6.2	100.0
– Unemployed	20.8	6.1	8.6	14.8	7.4	9.1	9.4	4.5	3.7	2.1	7.8	5.6	100.0
Distribution of consumption expenditure													
– Poor households	33.5	5.8	5.3	19.1	4.8	5.9	7.0	4.5	2.2	1.1	6.4	4.4	100.0
– Not poor households	17.6	3.8	10.2	11.3	8.7	7.4	13.4	3.7	4.9	2.8	9.7	6.5	100.0
Quartiles of consumption expenditure													
– 1st (poorest)	32.7	6.1	5.9	18.2	5.2	5.6	5.9	4.5	2.6	1.4	7.0	5.0	100.0
– 2nd	25.4	5.4	8.9	15.3	6.7	5.5	8.2	4.2	3.5	2.1	8.7	5.9	100.0
– 3rd	20.2	4.3	10.6	12.1	7.7	6.4	10.7	4.1	4.8	2.9	9.6	6.5	100.0
– 4th (richest)	12.7	2.7	10.6	9.2	10.3	8.5	16.9	3.3	5.4	3.0	10.5	6.8	100.0

Source: Calculations based on primary HBS data of 1998/99 (NSSG).

tion between educational level and expenditure on transport, recreation and education. For households whose head has not completed primary education, the share of food and alcoholic beverages/tobacco (26.5% and 4.7% respectively) is almost double that for households whose head is a university graduate (13.8% and 2.4%). A similar correlation, though less marked, can be seen in the shares of housing and health. In contrast, as the educational level of a population improves, the share of transport, recreation and education displays a marked increase. The second part of Table 1 groups households in accordance with the degree of urbanisation of their place of residence. Households are thus presented as urban, semi-urban or rural. It is clear that the degree of urbanisation correlates positively with the share of household expenditure on housing, recreation, education, communications, and miscellaneous goods and services, while it correlates negatively with the corresponding shares for food, alcoholic beverages/tobacco, and hotels/restaurants.

Table 1 then goes on to divide households in terms of the employment status of their heads, applying criteria relating to their profession, position in employment, the sector of economic activity in which they are employed and a combination of the above factors. The data reveal that workers in the primary sector, pensioners and the unemployed spend a particularly large share of their expenditure on food. With the exception of pensioners, the same population groups also display a particularly large share of expenditure on alcoholic beverages/tobacco. Thus, the consumption share of alcoholic beverages/tobacco is 6.1% for the unemployed, compared with 3.9% for the population as a whole. In the case of agricultural workers, the large shares of food and alcoholic beverages/

tobacco are offset by the relatively small shares of education, recreation, housing, health and consumer durables. In the case of the unemployed, they are chiefly offset by the smaller shares of transport, education, recreation, hotels/restaurants and consumer durables. Similarly, the relatively large share of consumption expenditure on food and health in the case of pensioners is offset by the smaller shares of education, recreation, transport, alcoholic beverages/tobacco and clothing/footwear. In the case of senior officials and the self-employed, the significantly smaller shares of food and alcoholic beverages/tobacco are chiefly offset by the relatively large shares of education and recreation.

The final section of Table 1 groups households included in the HBS in accordance with their economic situation or "welfare level" (approximated by the distribution of equivalent expenditure *per capita* as defined in Section 2.2). Thus, the HBS households are ranked from poorest to richest and then sorted into four quartiles, as well as into poor and not poor – the poverty threshold used equates to 60% of the median of the equivalent expenditure *per capita* of the population as a whole (the Eurostat definition). Sorted in this way, it is clear that household consumption patterns differ significantly according to households' economic situation and standard of living. The share of food, alcoholic beverages/tobacco and housing increases monotonically as we move from the richest to the poorest consumption expenditure quartile, while the shares of all services (excluding communications), consumer durables and clothing/footwear fall steadily (see Chart 1). Finally, in terms of poor and not poor households, the share of food, alcoholic beverages/tobacco and housing in poor households is almost double that of not poor households, while the share of clothing/

Chart 1

Aggregate shares of (equivalent) consumption expenditure by quartile (1st quartile: the poorest, 4th quartile: the richest)

(Percentages)

Quartiles of consumption expenditure

Source: Calculations based on primary HBS data of 1998/99 (NSSG).

Legend:
- Food & non-alcoholic beverages
- Alcoholic beverages & tobacco
- Clothing and footwear
- Housing
- Consumer durables
- Health
- Transport
- Communications
- Recreation and culture
- Education
- Hotels, cafés & restaurants
- Miscellaneous goods & services
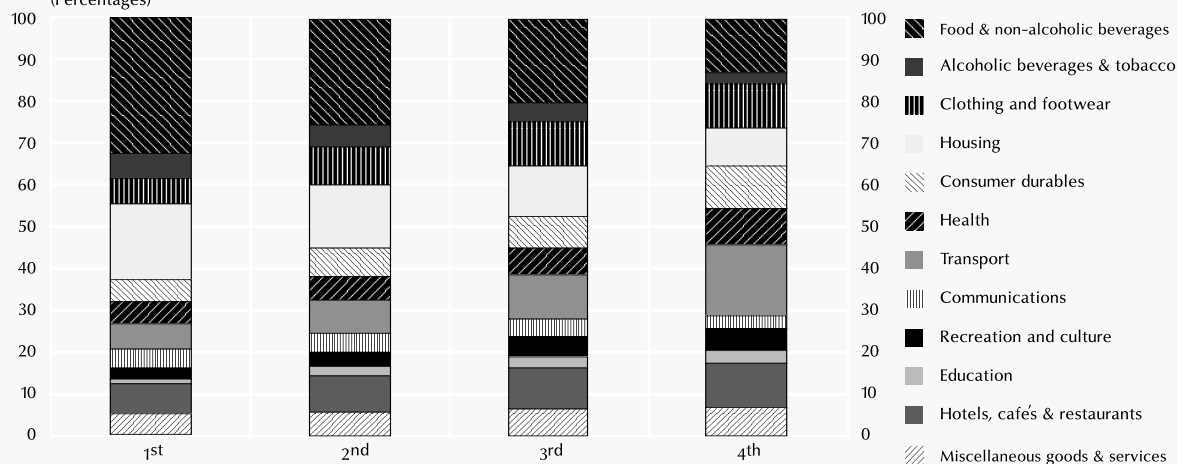
footwear, consumer durables, transport, recreation, education, hotels/restaurants and miscellaneous services is considerably smaller in the case of poor, compared with not poor households.

3.2 Estimates of the inflation faced by different population groups

This study began by focusing on the consumption patterns (consumer shares) of the different population groups selected. It then moved on to estimate both the monthly CPI for each group of households and its average annual changes in accordance with equations (2) and (3) in Section 2.2. It should be noted that the consumption pattern for each group of households was calculated using the detailed results of the 1998/99 HBS (725 goods and services) and was assumed to remain stable throughout the period under examination; the monthly CPI (for each good and service) available from the NSSG covered the period from January 1999 until December 2004, while the annual changes in these indices (inflation) covered the period from 2000 to 2004. The CPI for each population group was calculated on the basis of the consumption patterns of the various groups of households and of changes in the price of each good and service over time. These values are listed for each year in Table 2, which also shows the difference between the inflation faced by each population group and average aggregate inflation to facilitate comparative analysis. A negative (or positive) difference for a given population group means that, during the period in question, the particular group faced lower (or higher) inflation than the population as a whole, chiefly due to differences in its consumption pattern.

The first line of Table 2 lists average annual inflation for the given period on the basis of the results of the study. Note that these values accord with the official inflation figures published by the

Table 2

Additional inflation (in excess of average inflation for the total population) faced by population groups

(Percentage points)

Classification criterion:	2000	2001	2002	2003	2004
Inflation (%) in the total population	***2.68***	***3.44***	***3.63***	***3.53***	***2.90***
Educational level of household head					
— University graduate	–0.04	–0.17	–0.12	0.02	0.14
— Upper secondary education completed	–0.04	–0.04	–0.05	–0.04	0.04
— Lower secondary education completed	–0.04	0.08	0.05	–0.01	0.02
— Primary education completed	0.00	0.08	0.08	0.00	–0.10
— Primary education not completed	0.33	0.17	0.21	0.19	–0.15
Region of residence					
— Urban areas	–0.02	–0.03	0.01	0.02	0.05
— Semi-urban areas	0.12	–0.05	–0.09	–0.04	–0.11
— Rural areas	0.01	0.07	–0.01	–0.06	–0.09
Status in employment					
— Employee	–0.01	–0.02	–0.02	–0.04	0.09
— Self-employed	–0.08	0.02	–0.03	–0.08	0.02
— Employer	–0.06	–0.18	–0.14	–0.04	0.14
Sector of activity					
— Primary sector	–0.11	0.11	–0.01	–0.12	–0.08
— Secondary sector	–0.04	0.00	–0.01	–0.03	0.09
— Tertiary sector	–0.01	–0.06	–0.05	–0.05	0.10
Occupational status					
— Non-agricultural employer	0.08	–0.17	–0.09	0.03	0.20
— Senior official or manager	–0.11	–0.15	–0.13	–0.08	0.11
— Non-agricultural self-employed	–0.17	0.08	–0.01	–0.10	–0.03
— Agricultural worker	–0.11	0.10	–0.02	–0.12	–0.08
— Salaried worker in the private sector	0.06	0.12	0.10	0.00	0.05
— Salaried employee in the private sector	–0.04	–0.06	–0.04	–0.06	0.12
— Salaried worker in the public sector	0.04	0.01	–0.07	–0.11	0.05
— Salaried employee in the public sector	–0.06	–0.16	–0.14	–0.04	0.10
— Unemployed	0.10	0.25	0.26	0.09	0.03
— Pensioner	0.18	0.03	0.10	0.19	–0.16
— Other professional status	–0.19	0.05	0.01	0.03	–0.10
Distribution of consumption expenditure					
— Poor households	0.09	0.49	0.40	0.30	–0.32
— Not poor households	0.00	–0.05	–0.03	–0.01	0.03
Quartiles of consumption expenditure					
— 1st (poorest)	0.45	0.46	0.39	0.34	–0.27
— 2nd	0.54	0.19	0.22	0.21	–0.14
— 3rd	0.30	0.02	0.05	0.07	0.02
— 4th (richest)	–0.42	–0.19	–0.18	–0.16	0.11

Source: Calculations based on primary HBS data of 1998/99 and on the CPI (NSSG).

NSSG, except for 2000, when official inflation stood at 3.2% compared with an estimated 2.7% in our study. This difference arose because, the detailed results of the HBS of 1998/99 not yet being available, the NSSG calculated inflation for 2000 on the basis of the basket of goods exam- ined by the previous HBS in 1993/94. Moreover, until its most recent revision (1999=100), the CPI employed by the NSSG included only urban households, as a consequence of which the NSSG slightly overestimated the official inflation figures for 2000 during a particularly critical period in

which the primary goal of Greek economic policy was to fulfil the criteria for participation in the euro area.[12]

We can draw certain conclusions from the data in Table 2. Firstly, households whose head is relatively less educated generally face higher inflation, both compared with average inflation for the population as a whole, and —more importantly— compared with population groups with a relatively higher educational level. Indeed, with the exception of 2000, households whose head had not completed primary education faced inflation 0.19-0.33 percentage point higher than the average, while households whose heads were high school graduates or degree-holders faced a discernibly lower level of inflation. Secondly, there does not appear to be a permanent and significant difference in the inflation faced by households residing in areas with a different degree of urbanisation. While urban households faced slightly lower inflation than to the population as a whole —and especially rural households— during the first two years of the study period (2000-01), exactly the opposite was true for the years that followed (2002-04). It should, however, be noted that the present analysis reveals households in semi-urban areas to be better off in terms of inflation, because they have faced below-average inflation since 2000. Thirdly, although the occupational features of those in employment do not appear to be linked to a clearly differentiated inflationary situation, pensioners and the unemployed faced consistently and markedly higher inflation (except in 2004). The additional inflationary burden borne by the unemployed approached (*cumulatively*, 2001-2004) one percentage point. In contrast, the inflation faced by other population groups, such as salaried employees, the self-

employed and those employed in the secondary or the tertiary sector, does not seem to have deviated significantly from average inflation.

Finally, these results make it clear that inflation was higher than average for the financially weaker and poorer sections of the population throughout the four-year study period (2000-2003). Indeed, prices increased by approximately half a percentage point more *per annum* for the lowest quartile of consumption expenditure and for the poor (as defined by Eurostat) than for the population as a whole. Moreover, this difference is significantly larger if comparisons are made between quartiles rather than with average inflation. Thus, the difference between the average annual inflation faced by the 1st (poorest) and the 4th (richest) consumption expenditure quartiles reached 0.87 percentage point in 2000 and fluctuated between 0.65 and 0.50 percentage point over the next three years before becoming negative (–0.38 point) in 2004 (see Chart 2).

To sum up, these results indicate that the way in which the prices of individual goods and services changed between early 2000 and 2004, combined with each population group's differentiated consumption pattern, brought about a significant redistribution to the detriment of the vulnerable and economically weaker social groups, such as people with a relatively low educational level, pensioners, the unemployed and, above all, the poorest sections of the population (see Chart 3). The additional inflationary burden faced by these groups would seem to come about mainly during

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12 In March 2000, an average annual rate of increase of 2% for the Greek HICP —not the overall CPI— made it possible for Greece to satisfy the convergence criterion relating to inflation.

Chart 2

Inflation differential between 1st (the poorest) and 4th (the richest) quartile households

(Percentage points)
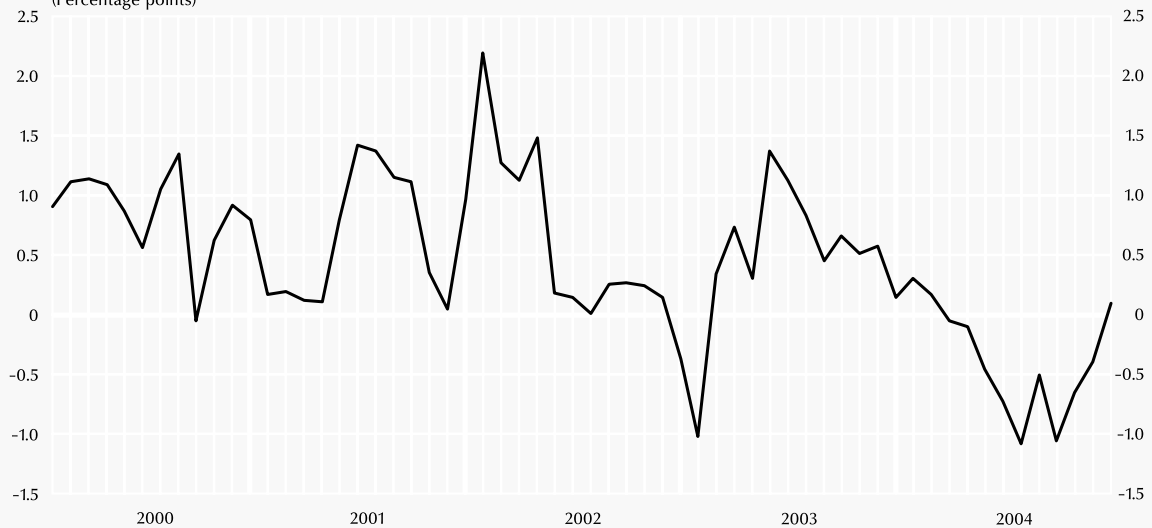
Source: Calculations based on primary HBS data of 1998/99 and on the CPI (NSSG).

Chart 3

Inflation for selected population groups

(Percentages)

Pour households
Household head: pensioner
Total population (CPI)
Primary education not completed by household head
Unemployed household head
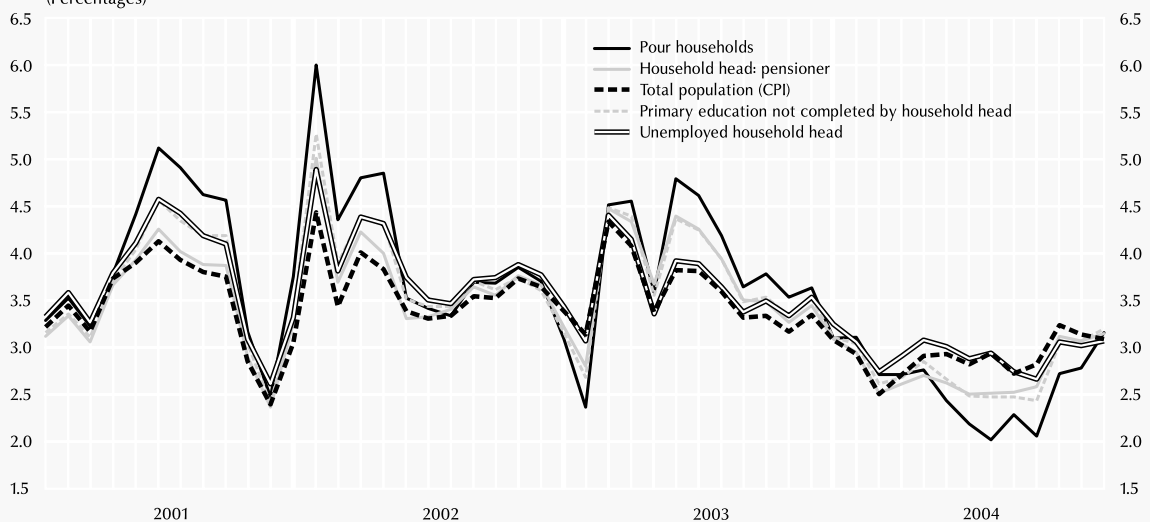
Source: Calculations based on primary HBS data of 1998/99 and on the CPI (NSSG).

periods of high inflation (e.g. May-June 2001, December 2001-April 2002, May 2003-August 2003), which is to say in periods when the aggregate price level was rising relatively rapidly. During such periods, households in the above groups seem to be more vulnerable to additional price increases, as a consequence of which they face inflation up to 35% above the average. That

said, as the next section will examine in detail, after the first quarter of 2004 the significant fall in the price of food, which makes up a relatively large part of the basket of goods of the economically weaker groups, led to their suffering less inflation than the population as a whole.[13]

This last conclusion is especially important, given that, as a series of studies on Greece have revealed, the population groups hit by higher than average inflation are the most important poverty cores.[14] Consequently, the redistribution brought about by the way in which prices changed during the period in question provides economic and social policy makers with a further reason for intervening to protect the groups hit by higher inflation from an additional loss of purchasing power.[15]

3.3 Inflationary burden by category of expenditure

We have already noted that, in line with this study's methodology, any additional inflationary burden faced by a particular group of households can be interpreted chiefly in terms of the different structure of that group's goodsbasket, but also by differences in the way individual prices change. Indeed, combining the results of the two previous tables would allow us to argue that the relatively high share of food in the consumption expenditure of households with a low educational level, pensioners, the unemployed and relatively poor sections of the population can explain at least part of their additional inflationary burden, to the extent, of course, that the CPI for food changes more rapidly than the overall CPI. The link between additional inflationary burdens, consumption patterns and the rate of change in individual indices is examined below.

As we stressed above, groups facing higher inflation —e.g. households whose head has not completed primary education, pensioners and, above all, the unemployed and economically weak— are also the most significant cores of poverty. Which is why this section will examine the relationship between inflationary burdens, consumption patterns and poverty. Table 3 presents the inflation and consumption pattern of the population as a

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13 Something similar occurred in January 2003, when the CPI for food fell significantly in relation to January 2002, chiefly due to a 32.8% and 29.2% fall in the price of fresh vegetables and potatoes respectively. This fall was, to some extent, a result of the very large increases that took place in January 2002 as a result of unfavourable weather conditions – a rise of 88.8% for fresh vegetables and 61.8% for potatoes compared with January 2001 (base effect). The CPI for food increased from 103.8% in January 2001 to 117.1% in January 2002.

14 See Kanellopoulos (1986), Tsakloglou (1990), Sarris and Zografakis (1993), Papatheodorou (1997), Tsakloglou and Panopoulou (1998), Mitrakos, Panopoulou and Tsakloglou (2001), Lyberaki and Tinios (2002), Mitrakos and Tsakloglou (2003), Ministry of Labour and Social Security (2003), Karamesini (2004), Papatheodorou and Petmezidou (2004).

15 Livada (1990), who utilised data from the 1981/82 HBS, comes to the same conclusion for 1981-87 in terms of the existence of a systematic inflationary bias in Greece against pensioners, the elderly and households whose head has a relatively low educational level. However, Livada's study differs from the present paper in noting an additional inflationary burden on higher-income groups and on small families (single-person households and childless couples). Based on the international literature for the USA, Hobijn and Lagakos (2003a) note that the annual inflation for the elderly between 1984 and 2001 was on average 0.38% higher than that faced by people employed in urban areas (the figure used by the social security authorities when reviewing benefits). Amble and Stewart (1994) find also higher inflation for the elderly between 1987 and 1993, while earlier studies by Hagemann (1982) for 1967-74 and Michael (1979) for 1972-82 show pensioners —usually along with the lowest income groups and groups with a relatively low educational level— facing a continually heavier inflationary burden. In contrast, Garner et al. (1996) conclude that the poor faced almost the same inflation as the population as a whole (although slightly higher during 1985-92 and lower during the two subsequent years). Most of the earlier studies on the United Kingdom (Fry and Pashardes, 1985, Muellbauer, 1974, Tipping, 1970) conclude that the economically weaker groups faced higher inflation, while a more recent study by Crawford and Smith (2002) establishes that during 1976-2000 the poorest decile of households faced an average annual inflation of 6.8% compared with 7.1% for the richest decile.

Table 3

Changes in prices of individual groups of items and their contribution to the inflation faced by the poor

Main groups of goods and services	Percentage shares	Percentage changes in prices for the total population				
		2000	2001	2002	2003	2004
Total population						
Food & non-alcoholic beverages	18.51	1.89	5.43	5.33	4.98	0.51
Alcoholic beverages & tobacco	3.90	2.81	7.55	7.24	4.19	4.63
Clothing and footwear	9.91	2.07	3.29	3.56	1.99	4.10
Housing	11.69	7.06	2.64	3.33	4.43	4.80
Consumer durables	8.60	1.32	2.40	1.63	1.96	1.61
Health	7.26	2.99	2.71	4.74	4.31	4.63
Transport	12.91	4.40	1.34	0.76	3.04	3.50
Communications	3.76	−10.80	−0.93	−4.60	−4.19	−4.32
Recreation and culture	4.68	0.99	3.45	3.31	2.88	2.84
Education	2.70	3.15	3.54	3.95	4.49	4.42
Hotels, cafés & restaurants	9.65	4.52	4.61	6.72	4.78	4.25
Miscellaneous goods & services	6.42	2.02	3.92	3.58	3.14	2.24
Total	**100.00**	**2.68**	**3.44**	**3.63**	**3.53**	**2.90**

	Percentage shares	Percentage price changes for poor households				
		2000	2001	2002	2003	2004
Poor households*						
Food & non-alcoholic beverages	33.51	1.79	5.43	5.38	4.83	0.81
Alcoholic beverages & tobacco	5.83	2.82	7.77	7.42	4.27	4.75
Clothing and footwear	5.31	2.08	3.38	3.68	1.99	4.14
Housing	19.05	7.21	3.00	3.54	4.68	4.88
Consumer durables	4.84	1.43	2.82	1.39	1.41	1.21
Health	5.93	2.12	2.00	3.54	3.92	3.41
Transport	7.01	6.04	2.15	1.17	2.80	3.39
Communications	4.48	−10.88	−1.00	−4.68	−4.24	−4.36
Recreation and culture	2.21	0.44	2.94	3.01	1.95	3.70
Education	1.07	3.29	3.53	4.11	4.77	4.57
Hotels, cafés & restaurants	6.36	4.01	4.06	6.94	5.00	3.85
Miscellaneous goods & services	4.38	2.08	3.79	3.40	3.09	2.20
Total	**100.00**	**2.77**	**3.93**	**4.03**	**3.83**	**2.58**

	Average 2000-2004 (percentage points)	Contribution of the different rates of price changes to the inflation differential between the poor and the total population (percentage points)				
		2000	2001	2002	2003	2004
Food & non-alcoholic beverages	0.55	0.25	0.82	0.82	0.70	0.18
Alcoholic beverages & tobacco	0.11	0.06	0.16	0.15	0.09	0.10
Clothing and footwear	-0.14	-0.10	-0.15	-0.16	-0.09	-0.19
Housing	0.37	0.55	0.26	0.28	0.37	0.37
Consumer durables	-0.07	-0.04	-0.07	-0.07	-0.10	-0.08
Health	-0.10	-0.09	-0.08	-0.13	-0.08	-0.13
Transport	-0.12	-0.14	-0.02	-0.02	-0.20	-0.21
Communications	-0.04	-0.08	-0.01	-0.04	-0.03	-0.03
Recreation and culture	-0.07	-0.04	-0.10	-0.09	-0.09	-0.05
Education	-0.06	-0.05	-0.06	-0.06	-0.07	-0.07
Hotels, cafés & restaurants	-0.18	-0.18	-0.19	-0.21	-0.14	-0.17
Miscellaneous goods & services	-0.06	-0.04	-0.09	-0.08	-0.07	-0.05
Total	**0.31**	**0.09**	**0.48**	**0.39**	**0.28**	**-0.34**

* The poverty line is defined as the 60% of the consumption's median.
Source: Calculations based on primary HBS data of 1998/99 and on the CPI (NSSG).

whole (1st panel) and of the poor (2nd panel) by the main groups of items for 2000-04.[16] The 3rd panel of Table 3 records the contribution of each separate category of expenditure to the observed difference between the inflation faced by the poor and that faced by the population as a whole. Note that poverty has been defined on the basis of the distribution of equivalent consumption expenditure —the poverty threshold being defined as 60% of the median— since the results do not differ significantly from alternative definitions.

The data in Table 3 point to a fundamental conclusion: just three of the 12 groups of goods and services are responsible for the total additional inflationary burden on poor households. Thus, the relatively high share of food (33.51%), alcoholic beverages/tobacco (5.83%) and housing (19.05%) in the baskets of goods of poor households, along with the way in which the prices of these goods change, account for the additional inflationary burden on these households. In the case of the three index strata (goods groups) "food", "alcoholic beverages/tobacco", and "housing" *(including heating oil)*, the average annual additional bur-

den for 2001-2003 is estimated at 0.65, 0.11, and 0.37 percentage point, respectively. Indeed, the same three index strata offset any "inflationary gains" arising from the other nine. Throughout the period under examination, the other nine groups of goods and services typically contributed negatively to the difference in inflation that arose at the expense of the poor (i.e. they contributed to lower inflation for the poor than for the population as a whole).

Having identified the three groups of goods and services (food, alcoholic beverages/tobacco and housing) that lead to additional inflation for poor households, we can examine in more depth the contribution of these groups both to average infla-

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16 Note that for the purposes of the table, goods and services have been grouped into just 12 categories and that price changes are different for the population as a whole (1st panel of the table) and for the poor (2nd panel of the table). This is because the study's analysis was based on some 200 CPIs for individual goods and services, as a consequence of which each of the 12 groups of goods and services in the table again represents a different basket of individual products whose prices change at different rates. Thus, the average increase for 2000 of the goods included in food was 1.89% (in relation to the previous year) for the population as a whole as compared to 1.79% for the poor.

Chart 4

Contribution of "Food & non–alcoholic beverages", "Alcoholic beverages & tobacco" and "housing" to overall inflation (CPI)

(Percentage points)

Overall inflation
Food & non-alcoholic beverages
Alcoholic beverages & tobacco
Housing

2000   2001   2002   2003   2004

Source: Calculations based on primary HBS data of 1998/99 and on the CPI (NSSG).
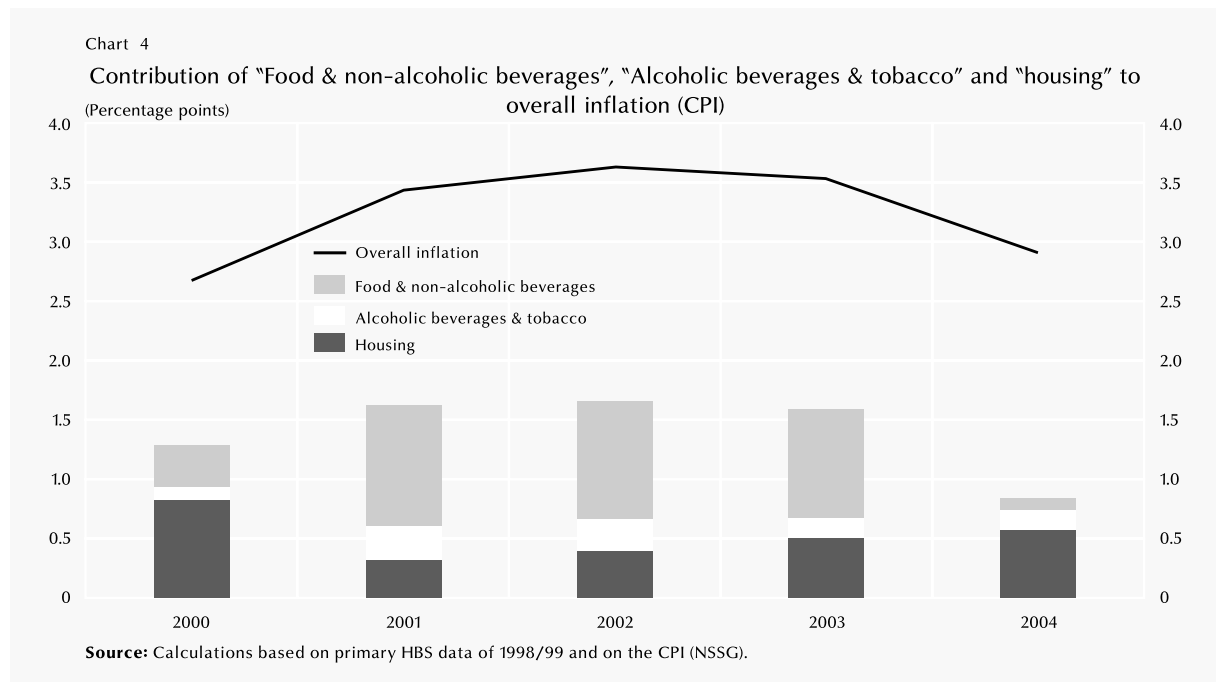
tion for the population as a whole and to the inflation faced by the specific population groups under examination. Table 4 presents the contribution of the three groups of goods and services to average inflation. The data reveal that, during 2000-03, food, alcoholic beverages/tobacco and housing contributed some 1.29-1.66 percentage points annually to the increase in the overall CPI and thus contributed some 46% to the country's final overall inflation. The smaller contribution of food during 2004 limited the contribution of the above three groups as a whole to 0.84 percentage point (or 29.5% of average inflation). However, the especially significant contribution of food (26%-29%) during 2001-03 should be noted. These results are illustrated in Chart 4.

Tables A1, A2, and A3 in Appendix A present detailed results for each of the three groups separately as well as for every population group included in the study. These tables once again

illustrate the contribution of different rates of price change for the three index strata to the inflation differential between individual population groups and the population as a whole. On the basis of the data in Table A1, the inflationary burden stemming from food was not evenly distributed across population groups. These goods create additional inflation for households whose head has not completed primary education, households resident in rural and semi-urban areas, households whose head works in agriculture or is a pensioner or unemployed, as well as households belonging to the groups that consumed the least. In contrast, the relatively minor contribution of food to the consumption habits of households with a higher educational level and standard of living, which live in urban areas and whose head does not work as a farmer or a manual worker, contributes to their below average cost of living. It should also be stressed that every previous statement regarding the role of food in inflation for

separate population groups holds not only for 2001-03, but also for 2000 and 2004, when the CPI for food changed at a considerably slower rate than the overall CPI. Consequently, the quite differentiated share of food in household expenditure can in itself explain the positive or negative contribution of this sub-index to the inflation faced by different population groups.

As we saw in Table 3, throughout 2001-2004 the CPI for the "alcoholic beverages/tobacco" goods group changed far more rapidly than the overall CPI. Thus, despite this sub-index's relatively minor contribution to total household expenditure (3.9%), it still affected overall inflation by a noteworthy 0.11-0.29 percentage point throughout the period under examination (see Table 4). That said, as Table A2 (see Appendix A) makes clear, the additional inflationary burden arising from "alcoholic beverages/tobacco" was more significant for the inflation faced by the unemployed, agricultural workers and the poorest sections of the population, since a higher rate of change in the prices of these goods is combined with a relatively larger share. In the case of pensioners, however, the very small share of alcoholic beverages/tobacco in their expenditure seems to have prevailed over rapid increases in the prices of these products, meaning that the latter had a negative effect on the inflation faced by this particular population group. In every other population group —defined by their educational, geographical, professional, or economic features— "alcoholic beverages/tobacco" would seem to have moved inflation in the same direction as had food.

The contribution of a different rate of price change for housing to the inflation differential between individual population groups and the population as a whole is detailed in Table A3 (Appendix A). Except from 2002 and especially 2001, the prices of goods in the housing group rose more rapidly than the overall price level, while their share in total household expenditure rose to 11.7% and their effect on overall inflation ranged (depending on the year) between 0.31 and 0.83 percentage point. Housing accounts for a much higher share of the total expenditure of the poor (the bottom two expenditure quartiles), the unemployed and households whose head has not completed primary education. It is clear that the same population groups bear a heavier inflationary burden because of their housing expenditure, while the respective inflationary burden is smaller for household groups resident in rural areas, those in the highest quartile of consumption expenditure and those whose heads work in the primary sector, because of the relatively smaller share of housing expenditure in the total expenditure of these groups.

In conclusion, it is the consumption pattern of each individual population group that also essentially determines the rate of change in the average weighted price of its goodsbasket, i.e. the inflation it faces. In view of this, Appendix B contains a solution to a problem relating to the maximisation or minimisation of two theoretical consumption patterns which lead, respectively, to the greatest and the smallest inflation. These two theoretically evaluated consumption patterns are then related to the actual baskets of goods of individual population groups. The results once again indicate that poor households and households whose head is unemployed or educated to a low level employ a consumption pattern which correlates more closely to that which leads to the greatest possible inflation. In contrast, both at the beginning of the period in question and

T a b l e 5

Contribution of "state-controlled" prices of goods and services to overall inflation

(Percentage points)

	2000	2001	2002	2003	2004
a. Overall inflation:	2.68	3.44	3.63	3.53	2.90
b1. Average annual change in "state-controlled" prices	−3.33	2.98	1.04	0.74	0.69
– Difference of the two inflation rates (a–b1)	6.01	0.46	2.59	2.79	2.21
– Contribution of "controlled" prices to overall inflation	−0.30	0.27	0.09	0.07	0.06
b2. Average annual change in "state-controlled" prices, excluding telecommunications	1.85	5.39	4.27	3.31	3.09
– Difference of the two inflation rates (a–b2)	0.83	−1.95	−0.64	0.22	−0.19
– Contribution of "state-controlled" prices, excluding telecommunications, to overall inflation	0.10	0.28	0.22	0.17	0.16

Source: Calculations based on primary HBS data of 1998/99 and the CPI (NSSG).

in 2004, their consumption pattern was closer to the theoretical pattern that leads to the smallest possible inflation. This was chiefly due to the significantly smaller increase in the prices of food compared with the average increase in the overall CPI for these years. The exact opposite is true of households whose head is a degree-holder, company executive or professional, or is a member of groups with the highest consumption: during 2001-03, these households display a consumption pattern more closely linked to that theoretically leading to minimum inflation, while in 2000 and 2004 it is linked to that leading to maximum inflation.

3.4 Prices: the role of the state

Recent years have seen economic policy makers putting special emphasis on stabilising prices as part of Greece's preparation for inclusion in the euro area and later in view of the rules of the Stability and Growth Pact. Efforts at reducing inflation were bolstered partly by reducing indirect taxation on certain goods and services (e.g. a reduction in the rate of VAT for electricity and the special consumption tax on fuel and cars) and

partly by controlling prices and by market deregulation (e.g. in the telecommunications sector).[17] This section will examine the extent to which a state can influence the inflation faced by different socio-economic groups and in this way improve the purchasing power of vulnerable groups (by means of relative prices). However, it is obvious that economic policy implemented via the price mechanism may well not have redistributional issues as its goal. It is usually accepted that it may be more effective for a state to formulate its pricing policy with a view to limiting or removing public enterprises' deficits and then to manage redistributional issues by increasing income, through the tax and benefits system etc.

Table 5 presents the average annual price changes for goods and services whose prices are to some extent "controlled" — it would perhaps

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17 See Ministry of National Economy (1999), Ch. 2, p. 27: "The mix of economic policy means followed during the period covered by the Convergence Programme and especially in the current year, plus the measures taken in late 1998 and in 1999 with the reduction of the taxation on fuel, cars, electrical power and the restraint imposed on Public Power Corporation charges and public enterprises' rates in general, helped reduce inflation".

be better to say they are directly affected — by the state, and the contribution of this sub-index to overall inflation. This group comprises services offered by public enterprises (electricity, telecommunications, water, natural gas), transport (city transport, trains, aeroplanes), council taxes and the mandatory contribution to state television, plus expenditure on care in state hospitals. The first row of Table 2, which lists inflation for the population as a whole, has been appended to Table 5. These data reveal that the average annual change in prices "controlled" by the state is significantly lower than the average annual change in prices as a whole throughout the period under examination. This difference was particularly significant in 2000, when it was as high as six percentage points. To some extent, this can be attributed to Greece's attempts to satisfy the requirements for inclusion in the euro area. The difference was significantly smaller during the first year of euro area membership (2001), but rose again during 2002-04. However, the considerable decrease in telecommunications prices after the deregulation of the market was to play a key role in creating this difference throughout the period under examination. The data in Table 5 reveal that the average annual change in prices for the remaining "state-controlled" goods and services (i.e. not including telecommunications) is higher than average inflation for the population as a whole in three of the five years under examination. This divergence was particularly significant in 2001, when it reached 1.95 percentage points. It would therefore seem that economic policy during this period, chiefly the deregulation of the telecommunications market, played a part in constraining the general rate of inflation and, to some extent, allowing Greece to satisfy the criteria for participation in Stage Three of EMU.

The favourable course of inflation for "state-controlled" goods and services, including telecommunications, resulted, as was natural, in the relatively limited contribution of these prices to overall inflation. In fact they contributed no more than 0.1 percentage point during 2002-2004, though this figure was larger during the first year of Greece's participation in the third stage of the monetary union (0.27 percentage point) and negative (–0.30 percentage point) in the preceding year. Nevertheless, if we once again exclude telecommunications from the above goods and services, on the grounds that the significant drop in telecommunications prices was chiefly due to the deregulation of the market in question and not to governmental price restraint, the results are somewhat different. In fact, excluding telecommunications, the contribution of the other "public-sector" goods to overall inflation increased significantly to 0.28 percentage point in 2001, gradually falling to 0.16 percentage point during the final year of the period under examination (2004).

The last observation is of interest, though at this point it is worth examining the degree to which the contribution of "state-controlled" prices to the reduction in inflation helped the economically weaker and socially vulnerable population groups. The answer is to be found in the data presented in Table 6, which lists the additional inflationary burden or relief for different population groups stemming from goods and services whose prices are "controlled" by the state. The table's first column also lists the aggregate share of the goods in question in the financial expenditure of each population group. These data reveal that expenditure on "state-controlled" goods and services accounts for 8.97% of the consumption expenditure of the population as a whole. However, this percentage

is not evenly distributed across the various population groups. As one might expect, these goods account for a larger share of the basket of goods of the economically weaker population groups, including poor households (where they account for 13.3%), the two lowest consumer spending quartiles (13.0% for the first and 10.7% for the second), the unemployed (10.5%), people who have not completed primary education (10.2%) and pensioners (9.8%).

However, the contribution of these "price-controlled" goods to the inflation faced by the aforementioned population groups is usually positive, in that it slightly increases the inflation faced by these groups in relation to inflation for the population as a whole. This increase is particularly significant in the lowest quartile of the consumption expenditure distribution and for the poor households group, except 2000 when the average price level for the goods in question fell by 3.3%. In contrast, certain economically more powerful population groups, employers in the main, but also the self-employed to a lesser degree, enjoyed a slightly negative contribution to their inflation from the goods and services whose prices are "controlled" by the state.[18] The effect of this group of goods and services on the inflation faced by households with a salaried head —and, indeed, on most other population groups— has yet to be studied. It should also be noted that the previous observations remain unchanged —actually, they are marginally strengthened— if we remove telecommunications from the group of "controlled" goods (see Table 6 for the inflationary contribution of "controlled" goods, respectively including and excluding telecommunications, for certain population groups). Consequently, although beneficial in terms of overall inflation,

economic policy, as this was pursued more through the deregulation of the telecommunications market rather than through state-fixed or state-controlled prices for certain goods and services, would not seem to have favoured (not that it set out to) the economically weaker and socially vulnerable population groups above others.

3.5 The effect of the price mechanism on inequality and poverty

It should now be clear that the price mechanism —perhaps it would be better to say the way in which relevant price changes in combination with the differentiated consumption pattern of different population groups— may well function to the detriment of sensitive groups such as the poor, pensioners and the unemployed. This section will explore the extent to which this redistributional function of prices exerts a negative effect on different social indices, such as inequality, the poverty rate and the poverty gap. The various inequality and poverty indices are thus estimated and then compared, both before and after the redistributional effect of the price mechanism.

In the international literature, the now accepted approach to measuring the level of inequality or poverty between the members of a society attempts to describe the features and the spread of a distribution and to incorporate them in a simple

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18 This can once again be explained by the different share of the various goods and services that make up the group whose prices are "controlled" by the state in the consumption of different population groups, as well as by the different rates of change in the respective prices of these goods and services. For example, first quartile households spend 0.80% and 2.53% of their total expenditure, respectively, on water and electricity, as opposed to 0.50% and 1.63%, respectively, for the population as a whole.

Table 6

Contribution of the different rate of change in "state-controlled" prices to the difference between overall inflation and that faced by individual population groups

(Percentage points)

Population groups	Percentage share of groups in consumption	2000	2001	2002	2003	2004
Educational level of household head						
— University graduate	8.5	0.03	–0.02	0.00	–0.01	–0.01
— Upper secondary education completed	8.9	–0.02	–0.02	–0.02	–0.02	–0.02
— Lower secondary education completed	9.2	0.00	0.01	0.00	0.00	0.00
— Primary education completed	9.2	–0.04	0.00	0.00	0.01	0.01
— Primary education not completed	10.2	0.01	0.06	0.04	0.06	0.06
— Primary education not completed, excluding telecommunications	6.6	0.02	0.06	0.05	0.06	0.06
Region of residence						
— Urban areas	9.2	0.00	0.01	0.00	0.00	0.00
— Semi-urban areas	8.4	–0.03	–0.04	–0.02	0.00	0.00
— Rural areas	8.3	–0.04	–0.04	–0.03	–0.01	–0.01
Status in employment						
— Employee	8.4	0.02	–0.02	–0.01	–0.01	–0.01
— Self-employed	8.9	–0.06	–0.02	–0.03	–0.02	–0.01
— Employer	8.4	–0.08	–0.07	–0.06	–0.04	–0.03
— Employer, excluding telecommunications	4.4	–0.04	–0.06	–0.04	–0.03	–0.02
Sector of activity						
— Primary sector	8.3	–0.04	–0.04	–0.03	–0.01	0.00
— Secondary sector	8.8	–0.01	–0.01	–0.01	–0.01	–0.01
— Tertiary sector	8.5	0.00	–0.03	–0.02	–0.02	–0.02
Occupational status						
— Non-agricultural employer	8.6	–0.08	–0.06	–0.05	–0.04	–0.03
— Senior official or manager	8.5	–0.05	–0.03	–0.03	–0.03	–0.02
— Non-agricultural self-employed	9.4	–0.07	–0.02	–0.03	–0.01	–0.01
— Agricultural worker	8.3	–0.04	–0.04	–0.03	–0.01	–0.01
— Salaried worker in the private sector	8.9	0.07	0.00	0.02	0.00	0.00
— Salaried employee in the private sector	8.4	–0.04	–0.04	–0.04	–0.04	–0.03
— Salaried worker in the public sector	8.1	–0.02	–0.01	–0.01	0.00	0.005
— Salaried employee in the public sector	7.9	0.06	–0.03	0.00	–0.01	–0.01
— Unemployed	10.5	–0.07	0.07	0.03	–0.01	0.01
— Unemployed, excluding telecommunications	6.2	0.02	0.07	0.05	0.02	0.03
— Pensioner	9.8	0.02	0.03	0.03	0.04	0.04
— Pensioner, excluding telecommunications	6.1	0.02	0.04	0.03	0.04	0.04
— Other professional status	11.5	–0.02	0.08	0.03	0.03	0.02
Distribution of consumption expenditure						
— Poor households	13.3	–0.06	0.18	0.11	0.11	0.12
— Poor houselolds, excluding telecommunications	8.8	0.03	0.19	0.15	0.13	0.14
— Not poor households	8.7	0.00	–0.02	–0.01	–0.01	–0.01
Quartiles of consumption expenditure						
— 1st (poorest)	13.0	–0.07	0.16	0.10	0.10	0.11
— 1st (poorest), excluding telecommunications	8.5	0.02	0.17	0.13	0.12	0.13
— 2nd	10.7	–0.06	0.06	0.03	0.02	0.03
— 2nd, excluding telecommunications	6.5	0.00	0.07	0.05	0.04	0.05
— 3rd	9.3	–0.05	–0.01	–0.02	–0.01	–0.01
— 4th (richest)	7.5	0.05	–0.05	–0.03	–0.02	–0.03

Source: Calculations based on primary HBS data of 1998/99 and on the CPI (NSSG).

statistical index.[19] In accordance with the definition proposed by Cowell (1995), an inequality index is a synoptic measure which illustrates the differences that can be observed between the incomes of members of a given population. In other words, every inequality index attempts to describe and incorporate the features and range of a distribution in a simple statistical measure. Nonetheless, an "ideal" and generally accepted index for inequality and poverty has yet to emerge. Each index corresponds directly or indirectly to a different function of societal welfare and is thus susceptible, to a lesser or greater extent, to different types of transfers. Since no social welfare function can ever be universally accepted as best, no inequality index can be universally accepted as superior to all others. The form and features of the particular social welfare function chosen cannot but determine and lead to the construction of various inequality indices which, since they are based on different norms, will not necessarily produce the same results. Consequently, every attempt to select a specific inequality index incorporates subjective judgements, whether directly or indirectly.[20] Much the same is true of poverty indices, although the need to choose between numerous alternative definitions of the poverty threshold leads to additional subjectivity problems.

Since there can be no general agreement as to the choice of the most suitable index for measuring and analysing the degree of inequality and poverty in a distribution, we judged it best to employ six inequality indices and three poverty indices in this section. The inequality indices used are: the Gini (G) coefficient, the variance of the logarithms (L), the Theil index (T), the mean logarithmic deviation (N, also known as the second Theil index) and the Atkinson index (A) when the inequality aversion

factor is 0.5 and 2. These indices were selected on the basis of the following criteria: firstly, they satisfy all the requirements considered especially desirable in the relevant literature (symmetry, independence in terms of the mean, independence in terms of population size, and the transfers principle). Secondly, they cover a wide range of different forms of sensitivity in terms of changes in overall inequality. Thus, the variance of the logarithms, the mean logarithmic deviation and the Atkinson index ($\varepsilon=2$) are relatively more sensitive to changes at the lower end of the distribution, the Theil index and the Atkinson index ($\varepsilon=0.5$) to changes at the upper end, and the Gini coefficient to changes in the vicinity of the median (Lambert, 1999, Cowell, 2000). Thus, a combination of these indices satisfies a significant range of preferences with regard to the degree of response of an index to different types of change. Thirdly, most of these indices have features that render them of particular use when examining the features of inequality.[21] Appendix C lists the relevant equations for estimation and summarises the fundamental features, attributes, particular sensitivities and the possibility of decomposing the six inequality indices selected for use in this paper.

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19 The literature dealing with the measurement of inequality is exceptionally extensive. For particularly interesting surveys, see, *inter alia*, Atkinson (1970), Sen (1992), Champernowne (1974), Kakwani (1980), Kanbur (1984), Foster (1985), Jenkins (1991), Cowell (1995) and Lambert (1999). For the application of these techniques to Greek data, see Mitrakos (2003).
20 For an extensive treatment of this issue, see, *inter alia*, Mitrakos (2003) and Papatheodorou (2004).
21 The indices *L*, *T* and *N* allow the structure of a population's inequality to be examined in detail and aggregate inequality to be decomposed into inequality "between" population groups and inequality "within" population groups. Moreover, the *L* index follows a well-known distribution and can be used to check the statistical significance of the results of the decomposition analysis. The *G* index allows the contribution of particular sources of income or consumption expenditures to total inequality to be evaluated, while, finally, the widely used *A* index reveals the effect of social preferences regarding inequality aversion.

Table 7

Estimations of inequality and poverty indices before and after the redistributional impact of the price mechanism

Inequality/poverty	Before the impact of prices	After the impact of prices	Percentage change
Indices of inequality			
Gini coefficient *(G)*	30.97	31.18	0.68
Variance of logs *(L)*	31.40	31.86	1.46
Theil index *(T)*	16.72	16.94	1.32
Mean logarithmic deviation *(N)*	16.05	16.27	1.37
Atkinson index $(A, \varepsilon=0.5)$	7.82	7.92	1.28
Atkinson index $(A, \varepsilon=2.0)$	27.22	27.56	1.25
Indices of poverty			
Poverty rate (P)	17.90	18.04	0.78
Foster index $(F, \alpha=1)$	4.36	4.44	1.83
Foster index $(F, \alpha=2)$	1.57	1.60	1.91

Source: Calculations based on primary HBS data of 1998/99.

Finally, the poverty rate *(P)* and the Foster index *(F)*, proposed by Foster, Greer and Thorebecke (1984), are used as poverty indices. In contrast with the poverty rate, the F index is sensitive both to the degree of poverty (the poverty gap) and the distribution of resources among the poor.[22] Although it fails to conform with several of the desired properties of an inequality index (symmetry, independence in terms of the mean, independence in terms of population size and the principle of transfers between the poor, epicentrality, monotonicity), it is nonetheless used because it provides a relatively clear indication of the extent of poverty in a given population. These properties are satisfied by *F*, which was calculated with values of α=1 and α=2 assigned to the "poverty aversion" parameter in line with the relevant literature.[23] Both *P* and *F* are "cumulatively disaggregated", meaning they measure the contribution of any given population group to aggregate poverty. The unit of analysis in this section is the population member, while the distribution used is that of equivalent consumption expenditure *per capita*

before and after the effect of the price changes. Following Eurostat practice, the poverty threshold is set at 60% of the median equivalent consumption expenditure of all households.

Table 7 presents the values of the inequality and poverty indices before and after the redistributional effect of the price mechanism. *Ceteris paribus*, the manner in which individual prices fluctuated during 1999-2004 led in itself to a dis-

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22 The two poverty indices, *P* and *F*, are calculated on the basis of the following relationships:

$$P = \frac{q}{n} \text{ and } F = \frac{1}{n} \sum_{i=1}^{n} \left(\frac{z - x_i}{z} \right)^{\alpha}$$

where *n* is the size of the population, *q* the number of population members with expenditure below the poverty threshold, *z* the poverty threshold, α the poverty aversion parameter and x_i a variable that takes the value *z* if the expenditure of member *i* is above the poverty threshold, and the value of the expenditure if the latter is below the poverty threshold.

23 The equation given for the *F* index in the previous footnote shows that, when α=1, the index value will give us the poverty gap, i.e. the average distance of all the poor from the poverty threshold expressed as a percentage of this threshold. As the value of α increases, index F will assign greater significance to the relatively larger distances separating the poor from the poverty threshold, in this way incorporating a relatively larger social aversion to extreme cases of poverty.

cernible rise in the level of economic inequality in Greece. The smallest difference in inequality —at 0.7%, roughly half that recorded by the other indices, which are more sensitive at the extremities of the distribution— was recorded by the Gini inequality index, which is most sensitive around the median. In line with the definition of poverty used above, 17.9% of Greece's population — some 1.9 million people— were living below the poverty threshold before the effect of the price mechanism. For the same distribution, the poverty gap —i.e. the amount by which the consumption of all the poor would have to be increased to reach the level of the poverty threshold, expressed as a percentage of the poverty threshold (index F, $\alpha=1$)— was 4.4%. As expected, the effect of the price mechanism on relative poverty was similar to its effect on inequality. The percentage of the poor and, more importantly, both indices proposed by Foster *et al*. (1984) increased after the price effect. Moreover, the changes recorded are of greater magnitude when the F index ($\alpha=1$) is used instead of the poverty rate, and still more so as the parameter expressing social aversion to the intensity of poverty and the poverty gap increases. In absolute terms, the relatively small increase in the poverty rate, of 0.14 percentage point or 0.8%, equates to an increase in the number of poor well in excess of 15,000, coupled with a 1.8% increase in the poverty gap. Consequently, the price mechanism exerts by itself a negative influence on the social indices of inequality and poverty. *Ceteris paribus*, and in accordance with the hypotheses underlying the present study, there would seem to be extremely strong evidence that the way in which individual CPIs change, combined with the structure of consumption expenditure of individual population groups, has increased both inequality and poverty by 0.7-1.9% over the last five years.

4. Summary and conclusions

This study aimed to highlight the indirect nature of the redistributional function of the price change mechanism in Greece between 1999 and 2004. The study was grounded in the fact that different socio-economic groups display widely different consumer patterns, chiefly as a consequence of the different welfare level they enjoy. Thus, having access to the primary data of the most recent HBS (conducted in 1998/99) —the data on which the NSSG based its most recent revision of the overall CPI— we took a new look at the consumption patterns of particularly sensitive population groups, such as the unemployed, pensioners, farmers and the poor. Combining the consumption patterns of these groups with the way in which the prices of the various goods and services which their "household basket" comprised changed, we were able to estimate the average annual inflation faced by each population group and to compare it with the official rate of inflation. We then identified the groups of goods and services that seemed to constitute a greater burden on those population groups that faced greater inflation in relation to average inflation, placing an emphasis on public goods (those produced or directly controlled by the state) and the role played by the deregulation of the telecommunications market. Finally, we investigated the extent to which the redistributional function of prices affected various social indices, especially those relating to inequality and poverty.

Before moving on to our conclusions, we would

like to point out and clarify the rather restricted hypotheses that underlie our analysis. First of all, the analysis was based on the structure of consumption expenditure as this was revealed by the data in the most recent HBS. Although the chief aim of the HBS was to collect the data required to conduct a revision of the official overall CPI, the validity of our findings presupposes that HBS data have been reliably recorded, especially with relation to the population groups we used in our study (based on educational, geographical, professional, familial and other criteria). Moreover, the HBS sample is made up of private households and thus excludes by definition such small —but in all likelihood vulnerable— social groups as the homeless and individuals resident in institutions, asylums, etc. It is also likely that immigrants as a group, especially illegal immigrants, are seriously under-represented in the HBS sample; given the number of such immigrants now resident in Greece, this is a serious omission. Finally, attention should also be drawn to another two important hypotheses on which our study rests. Firstly, that every household pays the same prices for the goods it consumes. Although the study utilises different CPIs calculated by the NSSG for some 200 sub-categories of goods and services, it is obvious that this hypothesis ignores both the different pricing policies adopted by businesses (supermarkets, retailers, etc.) for different customers and the different levels of information and access of households to different markets or points of sale. The second hypothesis assumes that household consumption patterns do not change during the period under examination, i.e. that consumers do not adapt their consumption habits so as to take into account changes in the relative prices of goods and services. This is a grave limitation, as it essentially implies that all goods are fully complementary among them (or, in economic theory terms, that they display Leontief indifference curves). Moreover, it implies that, despite changes in the relative prices of the goods households consume, their real incomes remain unchanged over time.

Having taken the above observations into account, the analysis gave rise to several interesting conclusions. Firstly, *ceteris paribus*, the price mechanism —or the way in which the prices of individual goods and services change in combination with the different consumption patterns of different population groups— itself exerts a significant redistributional impact, chiefly at the expense of the economically weaker and vulnerable social groups, such as people with a relatively low educational level, pensioners, the unemployed and the poorer sections of the population. The aforementioned groups faced an annual average inflation considerably above the official overall rate of inflation almost throughout the period of the study. This can well be interpreted as stemming from the different structure of their consumption expenditure, and mostly from the special importance therein of food, housing and alcoholic beverages/tobacco. That said, it should be noted that between April and December 2004 the drastic reduction in vegetable prices (from –10% in April to –28% in July on an annual basis) saw the inflation faced by the economically weaker population groups fall to levels below those faced by the population as a whole.

With reference to the previous conclusion, it should be noted that the inflation faced by other large population groups during the period under examination —chiefly workers, including salaried employees, workers in the secondary and the ter-

tiary sector etc.— does not seem to have been significantly different from the official overall inflation. We can draw a similar conclusion for the household groups formed along geographical lines (urban areas, rural areas etc).

The gentler inflation experienced by goods and services whose prices are "controlled" by the state resulted in their having a relatively limited effect on overall inflation. The significant reduction in the prices of telecommunications services following the deregulation of the market in question played a key role in the above. However, the contribution of the group of "controlled" goods to the inflation faced by the economically weaker groups was usually positive, in the sense that it pushed their inflation slightly above the average for the population as a whole. In contrast, certain economically more powerful population groups —employers in the main, but also, to a lesser degree, the self-employed— enjoyed a slightly negative contribution to their inflation from the prices of "state-controlled" goods and services. It should also be noted that the effect of this sub-index on the inflation faced by households with a salaried head — and, indeed, on most other population groups— has yet to be studied. Consequently, although beneficial in terms of overall inflation, economic policy, as this was pursued more through the

deregulation of the telecommunications market rather than through the fixing or controlling of prices for certain goods and services, would not seem to have favoured (not that it set out to) the economically weaker and socially vulnerable population groups above others.

The above observations have made it clear that the way in which relative prices change, combined with the structure of consumption expenditure of individual population groups, may well function to the detriment of socially sensitive groups such as the poor, pensioners, the unemployed, the economically weaker and, generally speaking, individuals facing a relatively high risk of poverty and insecurity. Moreover, the study also indicates that the price mechanism exerts in itself a negative effect on various social indices. *Ceteris paribus* and based on the hypotheses underlying our analysis, the redistributional impact of prices over the last five years would indeed seem to have slightly increased the poverty rate, as well as to have significantly worsened —by 0.7% to 1.9%— both the inequality index and the poverty gap. Therefore, the price mechanism provides in itself economic and social policy makers with an additional further reason for intervening in support of vulnerable social groups.

Appendix A

Detailed tables on the contribution of the prices of "food", "beverages-tobacco" and "housing" to the additional inflation faced by individual population groups

T a b l e A1

Contribution of the different rate of change in "Food & non-alcoholic beverages" prices to the difference between overall inflation and that faced by individual population groups

(Percentage points)

Population groups	Percentage share of groups in consumption	2000	2001	2002	2003	2004
Educational level of household head						
— University graduate	13.8	–0.08	–0.26	–0.24	–0.20	–0.05
— Upper secondary education completed	17.1	–0.02	–0.07	–0.08	–0.06	–0.02
— Lower secondary education completed	19.0	0.02	0.04	0.01	0.01	0.00
— Primary education completed	22.3	0.06	0.21	0.19	0.16	0.05
— Primary education not completed	26.4	0.14	0.40	0.45	0.36	0.09
Region of residence						
— Urban areas	17.2	–0.01	–0.07	–0.06	–0.06	–0.03
— Semi-urban areas	20.9	0.03	0.14	0.12	0.11	0.04
— Rural areas	23.0	0.04	0.26	0.18	0.17	0.10
Status in employment						
— Employee	16.7	–0.03	–0.09	–0.11	–0.09	0.00
— Self-employed	18.7	–0.01	0.02	–0.03	–0.02	0.04
— Employer	15.0	–0.07	–0.18	–0.18	–0.14	–0.05
Sector of activity						
— Primary sector	22.8	0.03	0.27	0.14	0.13	0.14
— Secondary sector	18.1	–0.01	–0.01	–0.05	–0.04	0.02
— Tertiary sector	15.7	–0.05	–0.15	–0.16	–0.13	–0.02
Occupational status						
— Non-agricultural employer	14.6	–0.08	–0.20	–0.20	–0.15	–0.06
— Senior official or manager	14.2	–0.08	–0.23	–0.22	–0.19	–0.05
— Non-agricultural self-employed	19.5	0.01	0.06	0.02	0.01	0.05
— Agricultural worker	22.7	0.03	0.26	0.13	0.13	0.14
— Salaried worker in the private sector	20.2	0.00	0.03	0.00	–0.01	0.04
— Salaried employee in the private sector	14.8	–0.06	–0.19	–0.19	–0.16	–0.04
— Salaried worker in the public sector	18.9	0.01	0.12	0.04	0.04	0.04
— Salaried employee in the public sector	14.9	–0.07	–0.20	–0.21	–0.17	–0.01
— Unemployed	20.8	0.04	0.17	0.09	0.08	0.03
— Pensioner	23.0	0.10	0.22	0.29	0.24	–0.02
— Other professional status	19.4	0.03	0.03	0.07	0.04	0.01
Distribution of consumption expenditure						
— Poor households	33.5	0.25	0.82	0.82	0.70	0.18
— Not poor households	17.6	–0.02	–0.05	–0.05	–0.05	–0.01
Quartiles of consumption expenditure						
— 1st (poorest)	32.7	0.25	0.78	0.76	0.66	0.15
— 2nd	25.4	0.13	0.38	0.38	0.33	0.01
— 3rd	20.2	0.03	0.09	0.09	0.08	0.01
— 4th (richest)	12.7	–0.11	–0.32	–0.32	–0.28	–0.04

Source: Calculations based on primary HBS data of 1998/99 and on the CPI (NSSG).

T a b l e A2

Contribution of the different rate of change in "Alcoholic beverages & tobacco" prices to the difference between overall inflation and that faced by individual population groups

(Percentage points)

Population groups	Percentage share of groups in consumption	2000	2001	2002	2003	2004
Educational level of household head						
— University graduate	2.4	−0.04	−0.13	−0.12	−0.07	−0.08
— Upper secondary education completed	3.8	0.00	−0.01	−0.01	−0.01	−0.01
— Lower secondary education completed	4.9	0.03	0.08	0.08	0.04	0.05
— Primary education completed	5.0	0.03	0.09	0.08	0.05	0.05
— Primary education not completed	4.7	0.02	0.06	0.06	0.03	0.04
Region of residence						
— Urban areas	3.7	−0.01	−0.02	−0.02	−0.01	−0.01
— Semi-urban areas	4.1	0.01	0.01	0.01	0.01	0.01
— Rural areas	4.9	0.03	0.08	0.07	0.04	0.05
Status in employment						
— Employee	4.0	0.00	0.00	0.00	0.00	0.00
— Self-employed	5.0	0.03	0.09	0.08	0.05	0.05
— Employer	3.1	−0.02	−0.06	−0.06	−0.03	−0.04
Sector of activity						
— Primary sector	5.8	0.05	0.16	0.15	0.08	0.09
— Secondary sector	4.6	0.02	0.06	0.06	0.03	0.04
— Tertiary sector	3.6	−0.01	−0.02	−0.02	−0.01	−0.01
Occupational status						
— Non-agricultural employer	3.0	−0.02	−0.07	−0.06	−0.04	−0.04
— Senior official or manager	3.4	−0.01	−0.03	−0.03	−0.02	−0.02
— Non-agricultural self-employed	5.6	0.05	0.14	0.13	0.07	0.08
— Agricultural worker	5.8	0.05	0.15	0.14	0.08	0.09
— Salaried worker in the private sector	5.4	0.04	0.12	0.11	0.06	0.07
— Salaried employee in the private sector	3.6	−0.01	−0.03	−0.03	−0.01	−0.02
— Salaried worker in the public sector	5.4	0.04	0.11	0.11	0.06	0.07
— Salaried employee in the public sector	2.8	−0.03	−0.09	−0.09	−0.05	−0.05
— Unemployed	6.1	0.06	0.18	0.17	0.09	0.11
— Pensioner	3.4	−0.02	−0.05	−0.05	−0.02	−0.03
— Other professional status	3.1	−0.02	−0.06	−0.06	−0.03	−0.04
Distribution of consumption expenditure						
— Poor households	5.8	0.06	0.16	0.15	0.09	0.10
— Not poor households	3.8	0.00	−0.01	−0.01	−0.01	−0.01
Quartiles of consumption expenditure						
— 1st (poorest)	6.1	0.06	0.18	0.17	0.10	0.11
— 2nd	5.4	0.04	0.12	0.11	0.07	0.07
— 3rd	4.3	0.01	0.04	0.03	0.02	0.02
— 4th (richest)	2.7	−0.03	−0.09	−0.09	−0.05	−0.06

Source: Calculations based on primary HBS data of 1998/99 and on the CPI (NSSG).

T a b l e A3

Contribution of the different rate of change in "Housing" prices to the difference between overall inflation and that faced by individual population groups

(Percentage points)

Population groups	Percentage share of groups in consumption	2000	2001	2002	2003	2004
Educational level of household head						
— University graduate	10.8	–0.09	–0.02	–0.02	–0.04	–0.04
— Upper secondary education completed	11.9	0.00	0.01	0.02	0.02	0.02
— Lower secondary education completed	12.4	0.03	0.03	0.04	0.04	0.04
— Primary education completed	11.8	0.07	–0.01	–0.02	0.00	0.00
— Primary education not completed	13.6	0.27	0.03	0.02	0.06	0.07
Region of residence						
— Urban areas	12.2	0.00	0.02	0.03	0.03	0.03
— Semi-urban areas	11.6	0.21	–0.06	–0.05	–0.02	0.00
— Rural areas	9.6	–0.02	–0.08	–0.12	–0.12	–0.13
Status in employment						
— Employee	12.0	–0.02	0.02	0.03	0.03	0.03
— Self-employed	10.6	–0.03	–0.04	–0.05	–0.05	–0.06
— Employer	10.3	–0.07	–0.05	–0.05	–0.06	–0.06
Sector of activity						
— Primary sector	9.4	–0.04	–0.07	–0.11	–0.11	–0.13
— Secondary sector	12.0	0.00	0.02	0.03	0.02	0.02
— Tertiary sector	11.4	–0.04	0.00	0.00	–0.01	0.00
Occupational status						
— Non-agricultural employer	10.8	–0.06	–0.03	–0.03	–0.04	–0.04
— Senior official or manager	10.4	–0.06	–0.04	–0.04	–0.05	–0.05
— Non-agricultural self-employed	11.2	0.00	–0.02	–0.02	–0.02	–0.02
— Agricultural worker	9.4	–0.05	–0.07	–0.11	–0.11	–0.13
— Salaried worker in the private sector	13.5	–0.09	0.01	0.01	–0.01	–0.02
— Salaried employee in the private sector	12.2	–0.03	0.03	0.05	0.04	0.04
— Salaried worker in the public sector	11.1	0.15	0.03	0.05	0.07	0.09
— Salaried employee in the public sector	10.8	–0.08	–0.03	–0.03	–0.05	–0.04
— Unemployed	14.8	0.16	0.13	0.14	0.17	0.16
— Pensioner	11.7	0.10	–0.02	–0.04	–0.01	–0.01
— Other professional status	15.6	0.22	0.12	0.14	0.18	0.18
Distribution of consumption expenditure						
— Poor households	19.1	0.55	0.26	0.28	0.37	0.37
— Not poor households	11.3	–0.02	–0.02	–0.02	–0.02	–0.02
Quartiles of consumption expenditure						
— 1st (poorest)	18.2	0.55	0.21	0.24	0.33	0.33
— 2nd	15.3	0.33	0.09	0.12	0.17	0.18
— 3rd	12.1	0.07	0.00	0.01	0.02	0.02
— 4th (richest)	9.2	–0.21	–0.07	–0.09	–0.12	–0.13

Source: Calculations based on primary HBS data of 1998/99 and on the CPI (NSSG).

Appendix B

A mathematical model

As noted above, it is chiefly the importance each group of households ascribes to different categories of goods, combined with the way in which the relative prices of the individual goods change over time, that determines a different (average weighted) inflation for each group. In other words, it is their consumption pattern that determines the average price of each population group's basket of goods over time. With this in mind, we can evaluate theoretical consumption patterns that lead either to the greatest or the smallest inflation and then see which population groups' baskets of goods correlate with these patterns to a greater or lesser extent.

We shall therefore evaluate two consumption patterns (two baskets of goods and services), the first leading to the greatest possible inflation (on the basis of the given changes in the individual CPIs over time) and the second to the smallest one. We now compare these two theoretical consumption patterns with those of individual population groups. The greater the degree of correlation between the "greatest inflation" theoretical pattern and the actual consumption pattern of a particular group (as derived from HBS data), the greater the possibility of the population group in question facing above average inflation during the period in question, and *vice-versa*.

The two theoretical patterns are evaluated using the mathematical solution to a problem whereby the total value (shares times prices) of two baskets of goods must be maximised (or minimised). The pattern defines groups of goods and services ($\overline{w}_{it}$) for each year which, on the basis of individual indices (I_{it}) observed in the

market, result in the largest average weighted price increase:

$$\max \sum_i I_{it} \times \overline{w}_{it} \text{ with limitations:}$$

1. $\sum_i \overline{w}_{it} = 100$

2. $\overline{w}_{it} \geq$ than (to) the lower limit

3. $\overline{w}_{it} \leq$ than (to) the upper limit

Groups of goods and services ($\widetilde{w}_{it}$) with the smallest average weighted price increase were evaluated in the same way:

$$\min \sum_i I_{it} \times \widetilde{w}_{it} \text{ with limitations:}$$

1. $\sum_i \widetilde{w}_{it} = 100$

2. $\widetilde{w}_{it} \geq$ than (to) the lower limit

3. $\widetilde{w}_{it} \leq$ than (to) the upper limit

In both the above problems, we set variance limits for the groups to mirror those that emerge from the HBS, our rationale being that there are minimum and maximum "acceptable" limits within which every population group operates (e.g. food — but also expenditure on health, education, etc.— cannot account for 0% of a total basket of goods). Failure to set upper and lower limits would result in greater divergence, though this would be of purely theoretical significance. Consequently, for all 45 different population groups, upper and lower expenditure limits were chosen for every sub-index (e.g. expenditure on food

Table B1a
Theoretical consumption pattern leading to maximum inflation
(Percentage points)

Main groups of goods and services	2000	2001	2002	2003	2004
Food & non-alcoholic beverages	12.72	33.51	33.51	33.51	12.72
Alcoholic beverages & tobacco	2.30	6.10	6.10	2.22	6.10
Clothing and footwear	5.31	5.31	5.31	5.31	11.81
Housing	19.05	9.16	9.16	16.50	19.05
Consumer durables	4.84	4.84	4.84	4.84	4.84
Health	10.60	5.21	10.60	5.21	10.60
Transport	18.68	5.91	5.91	5.91	5.91
Communications	3.30	3.30	3.30	3.30	3.30
Recreation and culture	2.21	2.77	2.21	2.21	4.67
Education	5.14	5.14	3.20	5.14	5.14
Hotels, cafés & restaurants	11.47	11.47	11.47	11.47	11.47
Miscellaneous goods & services	4.38	7.28	4.38	4.38	4.38
Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Source: Calculations based on primary HBS data of 1998/99 and on the CPI (NSSG).

Table B1b
Theoretical consumption pattern leading to minimum inflation
(Percentage points)

Main groups of goods and services	2000	2001	2002	2003	2004
Food & non-alcoholic beverages	33.51	12.72	12.72	12.72	33.51
Alcoholic beverages & tobacco	2.22	2.22	2.22	6.10	2.22
Clothing and footwear	7.99	8.50	9.02	11.81	5.31
Housing	9.16	19.05	19.05	9.16	9.16
Consumer durables	10.34	10.34	10.34	10.34	10.34
Health	5.21	10.60	5.21	5.53	5.21
Transport	5.91	18.68	18.68	18.68	13.46
Communications	4.67	4.67	4.67	4.67	4.67
Recreation and culture	7.08	2.21	7.08	7.08	2.21
Education	0.28	0.28	0.28	0.28	0.28
Hotels, cafés & restaurants	6.36	6.36	6.36	6.36	6.36
Miscellaneous goods & services	7.28	4.38	4.38	7.28	7.28
Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Source: Calculations based on primary HBS data of 1998/99 and on the CPI (NSSG).

accounted for 12.7% of the expenditure on the basket of goods for richer households, while very poor households spend one third —33.5%— of their total income on these same goods). In the pattern we used the average annual prices of the goods for 2000-2004 and calculated two different theoretical consumption patterns per year.

Tables B1a and B1b present the theoretical consumption patterns as these were estimated above. The theoretical consumption pattern leading to the maximum possible inflation spends the upper limit on those goods whose prices increased more than those of other sub-indices until the basket of goods is complete. The

T a b l e B2

Degree of inflation divergence on the basis of the two theoretical patterns

(Percentages)

	2000	2001	2002	2003	2004
a. Maximum inflation	3.40	4.10	4.32	3.94	3.34
b. Minimum inflation	2.07	2.93	2.97	3.09	2.09
c. Divergence (percentage points)	1.33	1.16	1.36	0.85	1.25
d. Overall inflation	2.68	3.44	3.63	3.53	2.90
Ratio (c)/(d)	**0.50**	**0.34**	**0.37**	**0.24**	**0.43**

Source: Calculations based on primary HBS data of 1998/99 and on the CPI (NSSG).

consumption pattern leading to the smallest inflation works on the opposite principle: expenditure on food and hotel/restaurant services is equal to the upper limit set (for 2001-2003), but the other sub-indices were either present in smaller shares or at their lower limit. These data reveal that food would seem to contribute to higher inflation during 2001-03 and to play a less important role in 2000 and 2004, while exactly the opposite is true of housing. Expenditure on consumer durables, communication and hotels/restaurants contributes to the corresponding baskets of goods without any changes, since the prices of these groups changed uniformly throughout the period.

Table B2 estimates the average weighted price increase (inflation) emerging from each of the two extreme theoretical consumption patterns as well as the range of divergence that can be created in inflation as a result of these patterns. The range of divergence, except for 2003, is greater than one percentage point. Given that this divergence is affected by the level of inflation, it is divided by the real mean annual CPI to render it comparable over time. This ratio provides a more accurate image of the possible inflation divergence over time. According to this index, the maximum possible divergence in 2000 was in the region of 50% of inflation during that period. This means that the divergence bet-

ween two population groups could theoretically reach half that of overall inflation. In 2001, 2002 and 2003, this divergence was limited to 34%, 37% and 24%, respectively. Finally, in 2004, the divergence rose again to 43% of overall inflation.

As we noted above, the theoretical consumption patterns for both 2000 and 2004 were considerably different from those for 2001-2003. This leads us to conclude that no given population group was closer to either the maximum or the minimum possible inflation for the entire period, but only for limited periods of time. Tables B3a and B3b correlate the theoretical consumption pattern to the real consumption patterns of individual population groups. The first table correlates the real patterns with the "maximum inflation" pattern, and the second with the "minimum inflation" one. The data reveal that poor households, households whose head was unemployed, or households whose head had not completed primary education all faced a level of inflation during 2001-2003 that was closer to the maximum possible inflation. In contrast, in both 2000 and 2004, they faced inflation closer to the minimum possible value. This is mainly due to the significantly smaller increase in the prices of food in relation to the average increase of the overall CPI in these years. Households whose head was a university graduate, senior official,

T a b l e B3a

Degree of correlation between the actual consumption patterns of individual population groups and the theoretical consumption pattern leading to maximum inflation

Population groups	2000	2001	2002	2003	2004
Educational level of household head					
— University graduate	0.76	0.52	0.53	0.60	0.58
— Upper secondary education completed	0.76	0.72	0.72	0.79	0.68
— Lower secondary education completed	0.73	0.79	0.81	0.85	0.72
— Primary education completed	0.66	0.86	0.88	0.89	0.66
— Primary education not completed	0.54	0.89	0.93	0.92	0.66
Region of residence					
— Urban areas	0.76	0.73	0.75	0.81	0.70
— Semi-urban areas	0.69	0.81	0.81	0.84	0.64
— Rural areas	0.60	0.87	0.88	0.87	0.59
Occupational status					
— Legislators, senior officials and managers	0.70	0.58	0.59	0.63	0.58
— Professionals	0.76	0.40	0.39	0.50	0.51
— Technicians and associate professionals	0.79	0.63	0.61	0.71	0.67
— Clerks	0.77	0.63	0.63	0.71	0.66
— Service workers and shop and market sales workers	0.72	0.74	0.73	0.82	0.75
— Skilled agricultural and fishery workers	0.59	0.86	0.86	0.85	0.56
— Craft and related trades workers	0.74	0.80	0.81	0.85	0.69
Status in employment					
— Employee	0.76	0.70	0.70	0.78	0.68
— Self-employed	0.72	0.77	0.77	0.79	0.62
— Employer	0.73	0.60	0.59	0.66	0.61
Sector of activity					
— Primary sector	0.59	0.86	0.86	0.85	0.56
— Secondary sector	0.77	0.74	0.75	0.80	0.68
— Tertiary sector	0.76	0.66	0.66	0.73	0.66
Occupational status					
— Non-agricultural employer	0.73	0.62	0.61	0.69	0.66
— Senior official or manager	0.82	0.48	0.49	0.54	0.54
— Non-agricultural self-employed	0.69	0.82	0.81	0.84	0.65
— Agricultural worker	0.60	0.86	0.86	0.85	0.57
— Salaried worker in the private sector	0.72	0.75	0.75	0.79	0.64
— Salaried employee in the private sector	0.73	0.62	0.60	0.70	0.70
— Salaried worker in the public sector	0.74	0.80	0.80	0.86	0.71
— Salaried employee in the public sector	0.74	0.58	0.57	0.65	0.56
— Unemployed	0.67	0.83	0.87	0.91	0.76
— Pensioner	0.63	0.85	0.89	0.89	0.64
— Other professional status	0.69	0.75	0.79	0.86	0.76
Distribution of consumption expenditure					
— Poor households	0.55	0.91	0.91	0.96	0.64
— Not poor households	0.74	0.73	0.75	0.79	0.67
Quartiles of consumption expenditure					
— 1st (poorest)	0.52	0.92	0.92	0.97	0.63
— 2nd	0.58	0.91	0.90	0.96	0.69
— 3rd	0.64	0.85	0.85	0.90	0.69
— 4th (richest)	0.74	0.40	0.43	0.45	0.50

Source: Calculations based on primary HBS data of 1998/99 and on the CPI (NSSG).

Table B3b

Degree of correlation between the actual consumption patterns of individual population groups and the theoretical consumption pattern leading to minimum inflation

Population groups	2000	2001	2002	2003	2004
Educational level of household head					
— University graduate	0.61	0.83	0.85	0.85	0.64
— Upper secondary education completed	0.76	0.80	0.81	0.80	0.78
— Lower secondary education completed	0.82	0.78	0.76	0.74	0.83
— Primary education completed	0.87	0.70	0.68	0.69	0.89
— Primary education not completed	0.91	0.60	0.54	0.47	0.91
Region of residence					
— Urban areas	0.78	0.81	0.81	0.77	0.80
— Semi-urban areas	0.84	0.74	0.74	0.76	0.86
— Rural areas	0.88	0.64	0.62	0.69	0.89
Occupational status					
— Legislators, senior officials and managers	0.64	0.74	0.76	0.83	0.65
— Professionals	0.49	0.81	0.88	0.87	0.53
— Technicians and associate professionals	0.64	0.78	0.81	0.80	0.67
— Clerks	0.68	0.80	0.83	0.82	0.70
— Service workers and shop and market sales workers	0.75	0.74	0.77	0.72	0.76
— Skilled agricultural and fishery workers	0.86	0.63	0.62	0.72	0.88
— Craft and related trades workers	0.81	0.76	0.75	0.75	0.83
Status in employment					
— Employee	0.75	0.80	0.82	0.81	0.77
— Self-employed	0.77	0.75	0.75	0.80	0.80
— Employer	0.63	0.76	0.78	0.82	0.66
Sector of activity					
— Primary sector	0.86	0.63	0.63	0.72	0.88
— Secondary sector	0.76	0.80	0.80	0.80	0.79
— Tertiary sector	0.70	0.79	0.82	0.82	0.72
Occupational status					
— Non-agricultural employer	0.65	0.75	0.77	0.78	0.66
— Senior official or manager	0.50	0.82	0.83	0.88	0.56
— Non-agricultural self-employed	0.81	0.71	0.72	0.75	0.83
— Agricultural worker	0.86	0.63	0.63	0.73	0.87
— Salaried worker in the private sector	0.76	0.75	0.75	0.80	0.79
— Salaried employee in the private sector	0.67	0.78	0.82	0.80	0.68
— Salaried worker in the public sector	0.81	0.78	0.77	0.74	0.83
— Salaried employee in the public sector	0.65	0.79	0.84	0.85	0.69
— Unemployed	0.85	0.72	0.67	0.56	0.85
— Pensioner	0.90	0.70	0.64	0.62	0.91
— Other professional status	0.83	0.78	0.73	0.57	0.82
Distribution of consumption expenditure					
— Poor households	0.89	0.55	0.54	0.40	0.90
— Not poor households	0.78	0.79	0.79	0.79	0.80
Quartiles of consumption expenditure					
— 1st (poorest)	0.90	0.52	0.51	0.38	0.90
— 2nd	0.91	0.60	0.61	0.51	0.90
— 3rd	0.88	0.68	0.69	0.67	0.88
— 4th (richest)	0.48	0.81	0.79	0.88	0.52

Source: Calculations based on primary HBS data of 1998/99 and on the CPI (NSSG).

academic or professional, or was a member of a higher consumption group displayed exactly the opposite. These households faced lower inflation during 2001-2003 and greater inflation in 2000 and 2004.

Finally, the different changes in the prices of individual sub-indices result in a different population group being burdened more or less each time. In periods when food prices increase significantly in relation to other goods, it is vulnerable social groups that are hardest hit, since food accounts for a larger part of their consumption pattern. Consequently, these groups face inflation that can be up to 50% greater than that faced by other groups, which spend less on food.

Appendix C

Properties, value limits and relative sensitivity of inequality indices

Inequality index	Formula	Properties				Value limits min - max	Relative sensitivity	Decomposability
		Symmetry	Independence in terms of the mean	Independence in terms of population size	Pigou-Dalton principle			
Gini (G) coefficient	$\dfrac{1}{2n^2\mu}\displaystyle\sum_{i=1}^{n}\sum_{j=1}^{n}\left|y_i-y_j\right|$	holds	holds	holds	weak	0 to 1	around the median	by source
Variance of logarithms (L)	$\dfrac{1}{n}\displaystyle\sum_{i=1}^{n}\left(\log y_i-\log\mu^*\right)^2$	holds	holds	holds	rarely doesn't hold*	0 to infinity	at lower limit	weakly by groups
Theil (T) index	$\dfrac{1}{n}\displaystyle\sum_{i=1}^{n}\left(\dfrac{y_i}{\mu}\right)\log\left(\dfrac{y_i}{\mu}\right)$	holds	holds	holds	strong	0 to $\log n$	at upper limit	weakly by groups
Mean logarithmic deviation (N)	$\dfrac{1}{n}\displaystyle\sum_{i=1}^{n}\log\left(\dfrac{\mu}{y_i}\right)$	holds	holds	holds	strong	0 to infinity	at lower limit	strictly by groups
Atkinson index (A, $\varepsilon\neq 1, \varepsilon>0$)	$1-\dfrac{1}{\mu}\left[\dfrac{1}{n}\displaystyle\sum_{i=1}^{n}y_i^{1-\varepsilon}\right]^{\frac{1}{1-\varepsilon}}$	holds	holds	holds	weak	0 to $1-n^{-\frac{\varepsilon}{1-\varepsilon}}$**	at lower limit (as the aversion factor, e, increases)	no

* This is contrary to the transfer principle for very high income groups only, specifically for incomes greater than $\hat{\mu}e$, where $\hat{\mu}$ is the geometric mean and e the base of the natural logarithms.
** This maximum value for a non-continuous distribution holds for $\varepsilon\neq 1$ only. When $\varepsilon=1$, the maximum value is one.

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Socio-economic differences in the job satisfaction of high-paid and low-paid workers in Greece[*]

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1. Introduction

1.1 Quality in work: More jobs through better jobs

Within Europe the aim of promoting the quality of available work, along with that of creating full employment, has recently risen to the top of the political agenda. "Previously, during periods of low employment rates, the emphasis was on job creation. Quantity took precedence over the quality —the nature and content— of the jobs created" (Eurofound, 2002, p. 3). Following, however, the Conclusions of the Extraordinary European Council in Lisbon (2000), which were subsequently reaffirmed by the Social Policy Agenda approved by the Council of Nice (2000), Member States adopted the goal of improving quality in work as a complementary and mutually supportive objective to those of full employment and social cohesion. Quality promotion was therefore firmly established as one of the three overarching objectives of the EU's Employment Guidelines for the period 2003-2005.

Indeed, this renewed focus on job quality was deemed necessary for confronting the profound challenges resulting from Europe's transition to a competitive and knowledge-based economy. In the light of the increased globalisation of economic activity, rapid technological, social and demographic

change, the ongoing restructuring of workplace organisation, as well as the need to combat Europe's persistent long-term unemployment problem, new and flexible employment patterns were deployed as a means of providing employers with adequate leeway to respond to ever-changing circumstances. Sabethai (2000), for example, documents the widespread use of such flexible forms of work (e.g. shifts, overtime, part-time employment, contracts of temporary duration, seasonal employment etc.) in Greece in the late 1990s, as well as numerous legislative measures concerning the utilisation of labour that sought to adapt employment and production needs of Greek enterprises to changes in demand. Nonetheless, while the shift towards atypical forms of employment may have favoured job creation and the adjustment of the economy to cyclical fluctuations, concerns were expressed regarding the potential downsides in terms of job quality, such as the impact on job security, work-life balance, possibilities of further training and career prospects, health and safety at work etc. It was within this context that some commentators claimed that quantity-quality trade-offs exist, and that quality improvements can have negative effects, leading to either increases in labour costs or obstacles to hiring and firing and/or wage flexibility (European Commission, 2002, p. 81).

Concerns about job quality also came to the fore following the strong evidence of a close link between quality in work, on the one hand, and labour market segmentation and social exclusion, on the other. The European Commission (2001a) was the first to argue that those employed in jobs of relatively poor quality, which combine low skills with temporary or precarious work and lack of career development opportunities, are at much higher risk of job loss or of dropping out of the labour force. Moreover, "previous experience of unemployment and labour market exclusion, in turn, lowers the probability of returning to employment in general and into high quality employment in particular, thus leading to substantial risk of vicious circles of low-quality/low-productivity employment, and unemployment, inactivity and social exclusion" (European Commission, 2002). Indeed, the European Commission (2003a, p. 138) reports for Greece that between 1995 and 2000 it was among the EU countries with the least favourable career opportunities for people in low-quality employment, with above EU-average transition rates into unemployment, and below EU-average transition into high quality employment. Also striking is the persistence of the no job/low quality trap in Greece, with more than 20% of unemployed Greeks in 1999 moving into low-quality employment in 2000, and almost 20% in inactivity. Little above 5% moved into high-quality jobs (*ibid.*, 2003a, p. 138).

The fear of a vicious cycle between low-quality jobs and non-employment was further exacerbated by the possibility that the trend of increasing employment in the services sector would lead to a proliferation of dead-end jobs of bad quality. For Greece, in particular, which has experienced rapid growth of the services sector over the past twenty years, it has been argued that the demand for high profitability by Greek firms, in the face of slow growth of productivity and high unemployment, has enabled the propagation of low-wage/ bad jobs in the Greek economy (Ioakimoglou and Soumeli, 2002).

The focus of the EU on job quality was also stimulated by the acknowledgement that the full

potential of job creation cannot be achieved if the jobs on offer are unattractive in terms of quality of work, consequently proving difficult to fill (Eurofound, 2001, p. 4). This problem has recently become starker in European labour markets, as marked improvements in the quality of the European labour supply have been met by an increasing demand for high-quality jobs, characterised by reasonable pay, high skill requirements, relative job security, work-life balance, access to training and possibilities for career advancement (European Commission, 2001b, p. 9). An acute example of this phenomenon can be found in Greece, where a common complaint on behalf of Greek employers is that the large stock of young educated Greek workers are unwilling to take up jobs that are perceived by them as of bad quality. These jobs, instead, are regarded as suitable for low-skilled economic immigrants only.

Finally, placing greater emphasis on job quality was also dictated by the evidence that better quality in work results in faster employment growth and higher productivity (European Commission, 2003b, pp. 6-8). Specifically, better jobs are expected to be more attractive to non-participants, especially women. Safer jobs that offer access to training are also more likely to result in productivity gains, by reducing turnover and absenteeism and by leading to the production of better goods and services, respectively. At the same time employees are likely to reciprocate to their employer's gift-exchange offer of better working conditions by exerting greater effort (much in the spirit of the "reciprocity" arguments put forward by Fehr and Falk, 2002). Furthermore, high-quality employment is also believed to contribute to the positive mental and psychical well-being of employees, thus serving as a pre-

condition for a rich, satisfying and productive life (Eurofound, 2001, p. 7).

It is not least for these reasons that European decision-makers in the Barcelona European Council (2002) sought for more and better jobs, stressing that the objective of creating better jobs complements and reinforces that of creating more jobs. Quality promotion was hence acknowledged as a cornerstone for modernising Europe's social model, as a means of ensuring the dynamic positive complementarity between flexible and competitive economic policies, on the one hand, and social cohesion, achieved through strong and supportive social systems, on the other. Fostering more jobs through better jobs thus became a key element for achieving the EU's strategic goal, proclaimed in the Lisbon 2000 Summit, "to become the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion".

1.2 Low-paid workers and the two-tier labour market

Along with the increased emphasis on work quality, the strong rise in earnings inequality in some countries since the late 1980s also raised concerns that this could result in a growing proportion of the workforce falling into the category of the "working poor". In fact, within the EU there was an attempt to link the declining relative (and sometimes real) position of low-paid workers with the perceived low quality of work, with the Commission arguing that such low-paid jobs suffer a "double penalty" as they are also of low quality (Jones and Sloane, 2004, p. 2). In other words, it was asserted that in the context of skill-biased technological change, growing international trade

with low-wage countries and deregulation of the traditional institutional framework that supported the wages of low-skilled workers (trade unions, centralised collective bargaining, minimum wages etc.), a two-tier labour market was fostered in Europe. In this dual market "the first tier is made up of jobs subject to decent pay, relative job security and career prospects, involving generally good working conditions. The second tier comprises not only the unemployed and discouraged workers, but also those employed in jobs of low quality which have low pay, precarious employment relationships or lack of further education and career development prospects" (European Commission, 2001a, p. 79). In the light of this alleged segmentation, one report put forward the claim that "policies towards low-wage jobs should centre on their quality at least as importantly as on the level of pay which they provide" (Salverda *et. al.,* cited in Leontaridi and Sloane, 2004, p. 1).

Of course, the theoretical framework underlying the EU's rationale of low wage jobs also being of low quality is the dual labour market hypothesis. According to this theory, the lack of perfect mobility, and subsequent lack of competition, between distinct labour markets fosters the development of "good" and "bad" jobs, whereby the former enjoy not only better working conditions than the latter, but also higher pay. In this case significant differences in the utility derived from work among otherwise identical individuals arise, with those in superior jobs enjoying greater job satisfaction. Such differences cannot be sustained, however, in markets that are characterised by a perfect flow of information and lack of barriers to mobility. For in that case Adam Smith's (1776) paradigm of compensating wage differentials would prevail. According to Smith, employers offering jobs char-acterised by many disamenities would be expected in the long run to compensate for these with higher pay, all other things equal, in order to recruit and retain their workers. Thus, according to the theory of compensating (or equalising) differences, in perfectly competitive labour markers one expects to observe low-paid jobs with relatively good working conditions, and jobs with bad working conditions paying high wages. Two otherwise similar individuals, who have the same demographic, human-capital and job characteristics, but who work in different tiers (i.e. one as low-paid and the other as high-paid), should therefore enjoy similar utility from their jobs.

This study therefore attempts, firstly, to detect whether or not significant differences in perceived job quality exist among high- and low-paid workers in Greece, and, secondly, to uncover the differential effect that certain socio-economic variables exert on the utility from high- or low-paid work, respectively. By understanding if (and how) the determinants of job satisfaction between low-paid and high-paid workers differ, appropriate policy responses could then be developed to address the difference in quality between "good" and "bad" jobs. To do so we follow the practice of an ever-increasing number of economists who use self-reported job satisfaction data to proxy the overall quality of work as perceived by the individual worker. This is the approach of Leontaridi and Sloane (2001), who have shown with British data that low-paid workers in the UK report greater job satisfaction than their higher paid counterparts, presumably because the former obtain compensation in the form of non-pecuniary benefits. Jones and Sloane (2004) have also recently illustrated that job satisfaction in the low-wage economy of Wales is not lower than in the rest of the UK. In a

similar spirit to these studies, this paper shows that low-paid workers in Greece are significantly less satisfied with their jobs, compared to equivalent higher-paid workers, based on data from eight waves (1994-2001) of the European Community Household Panel (ECHP). Further analysis of the specific facets of jobs reveals that this discrepancy is the result of greater dissatisfaction among low-wage employees with their pay and the type of work that they perform.

The structure of the paper is organised as follows: Section 2 begins by describing the different attempts that have been made to quantify the concept of job quality, one of which is the use of self-reported survey responses on job satisfaction. Since we adopt this approach for the rest of the paper, Section 3 offers a brief literature review of the growing research that has taken place using subjective well-being data. In Section 4 the data used in this study and summary statistics are presented. Section 5 provides a simplified account of the econometric methodology and describes the empirical estimates of the relationship between low pay status and job satisfaction in Greece, while Section 6 offers some policy recommendations. Section 7 concludes the discussion. For those interested in the technical details of estimation, an extensive discussion of the model specification and econometric methodology can be found in the Appendix.

2. Defining quality in work

Quality in work is a multifaceted concept, which makes any attempt to quantify the term highly contentious. The broadest description has been offered by "Employment in Europe" (European Commission, 2001a, p. 65), which defined job quality as "a relative concept regarding a job-worker relationship which takes into account both objective characteristics related to the job and the match between worker characteristics, on the one hand, and job requirements, on the other. It also involves subjective evaluation of these characteristics by the respective worker on the basis of his or her characteristics, experience, and expectations". As is evident from the above definition, the difficulty of precisely assessing some of these elements explains the lack of any agreed definition of job quality among academics and policy-makers. In fact, it is for this reason that the European Commission (2001b, p. 7) has suggested that "given its relative and multidimensional nature, there can be no one single measure or index of employment quality", which, in turn, implies that "an empirical analysis of job quality has to be based on data on both objective job and worker characteristics and subjective evaluations of the job-worker match" (European Commission, 2001a, p. 65). The Commission went on to suggest a set of indicators covering 10 main elements of quality within two broad categories – the characteristics of the job itself, and the work and wider labour market context. These include: (i) intrinsic job quality; (ii) skills, lifelong learning and career development; (iii) gender equality; (iv) health and safety at work; (v) flexibility and security; (vi) inclusion and access to the labour market; (vii) work organisation and work-life balance; (viii) social dialogue and worker involvement; (ix) diversity and non-discrimination; and (x) overall work performance.

Due to the complexity associated with evaluating and monitoring all these indicators, however, most studies have focused on a subset of

the more easily quantifiable measures of job quality. The Commission itself has classified jobs according to certain key objective characteristics, such as job security, training possibilities and career prospects, and productivity and pay. Based on these three criteria, it distinguished jobs into four types: "dead-end jobs", "jobs of reasonable quality", "low pay/productivity jobs" and, finally, "jobs of good quality" (European Commission, 2001a, p. 74). Using this grouping, it showed that, while a majority of jobs in the EU are of relatively high quality, a quarter of the workforce remain in jobs of lower quality, and that Spain and Greece, in particular, show above average employment shares of individuals in both "low pay/productivity jobs" and "dead-end jobs" (*ibid.*, p. 75).

More recently economists have followed a different approach to the issue of measuring job quality, one that is based on self-reported satisfaction data from individual questionnaires. Specifically, many have argued that since overall subjective job satisfaction is the reflection of the worker's weighting in his/her mind of all the job's aspects (such as pay, job security, the type of work, hours and times of work, working conditions, commuting etc.), "then the former should serve as a reasonable proxy for the overall quality of work as perceived by the individual worker" (Hamermesh, 2001; Leontaridi and Sloane, 2004, p. 2). Indeed, the strength of this approach seems to lie in the fact that subjective assessments of job satisfaction have been found to be strong predictors of worker behaviour, such as quits, absenteeism and worker productivity (*inter alia*, Freeman, 1978; Clegg, 1983). It is this method that we will therefore adopt for the rest of this study.

3. Subjective job satisfaction

3.1 Subjective well-being and job satisfaction

There has been a surge of interest among economists in recent years regarding the use of subjective survey questions on the individual's well-being and its domains, such as job satisfaction or health satisfaction. As mentioned above, much research has now started with the premise that subjective well-being (SWB) can serve as an empirical proxy for the theoretical concept of utility, thus overcoming the traditional economic practice of evaluating individual preferences by means of revealed behaviour in market situations. This initiative has followed the lead of many years of psychological research, which illustrated that comparisons of different measures of SWB are often mutually consistent. For example, self-reported SWB has been found to be correlated with physiological measures such as the amount of smiling or frowning, changes in facial muscles (see Kahneman *et al.*, 1999) or the evaluation of the individual's experience by a third party observer (Kahneman *et al.*, 1997). Van Praag (1991) has also shown that individuals belonging to the same language community have a very similar understanding of concepts such as welfare, well-being and happiness. In addition, the use of subjective well-being data was encouraged by the robust econometric findings that were spurred by Freeman's (1978) pioneering work on the inverse relationship between job satisfaction and quit behaviour.

Of course, it has been acknowledged that survey questions about satisfaction suffer from a number of weaknesses, such as the discrepancy between remembered utility and experienced utility. For

example, it has been argued that when evaluating retrospectively the utility of an event (remembered utility), individuals give a relatively higher weight to events with a high intensity (peak effect) and those that have occurred last (end effect) (hence the term peak-end evaluation rule, which was coined by the Nobel-prize winner Kahneman). Another problem arises due to the presence of the adaptation phenomenon (Easterlin, 2001). Specifically, the evidence of wealthier individuals and economies being happier at a given point in time, but not over time, has led to the assertion that individuals adapt to new situations, such as an income increase or becoming handicapped, by changing their expectations. Both of these issues therefore arouse suspicion concerning the use of time-series data on subjective happiness.

In spite of these problems, economists have reported a number of interesting and robust results regarding the effect of individual socio-economic characteristics on SWB and its domains. Concentrating specifically on the domain of job satisfaction, which is taken as a proxy of the individual's utility from work (U), most of the empirical literature now follows the theoretical exposition of Clark and Oswald (1996). According to these authors, job satisfaction depends not only on absolute income (y) and working hours (h), as in standard indifference curve microeconomics, but also on a set of individual (i) and job-specific (j) features:

$$U = u(y, h, i, j) \; u'_y > 0, \; u'_h < 0 \tag{1}$$

Based on this model, the estimating equations usually regress the indices of job satisfaction on a set of demographic (age, gender, marital status, number of children etc.), human-capital (education, training), economic (wages and salaries, other income), work-related (firm size, hours of work, contractual arrangement) and social (unionisation, institutions) determinants. In this manner the literature has found that unemployed individuals report substantially lower levels of well-being than the employed and are permanently "scarred" as a result of their jobless experience (Clark and Oswald, 1994; Theodossiou, 1998). It has also been argued that much of the wage effect on job satisfaction operates through relative wages (Clark and Oswald, 1996; Clark, 1999; Grund and Sliwka, 2003) or through the individual's own judgement about his past and future financial situation (Easterlin, 2001; Lydon and Chevalier, 2002).[1] Interesting demographic differences have emerged in that women consistently declare higher job satisfaction scores than men (Clark, 1997) and the age effect has been reported as being U-shaped with middle-aged people being the least satisfied (Blanchflower and Oswald, 1999). Finally, satisfaction levels have been found to be negatively correlated with both education (Clark and Oswald, 1996; Sloane and Williams, 1996) and union status (Blanch-

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1 In this case researchers assume a utility function that depends not only on absolute income, but also on relative income, i.e. $U = u(y, y^*, h, i, j)$, where y^* is the reference level of income against which the individual compares his/her own earnings. The idea is that utility either declines with an increase in comparison income when this gives rise to feelings of relative deprivation, or increases when higher wages of co-workers are regarded as a signal of a higher potential wage for the individual himself (what is known as the "tunnel effect" – see Panos, Theodossiou and Nikolaou, 2004, for an empirical investigation of these two hypotheses). Contention exists, though, among economists as to what is exactly the comparison benchmark. While Clark and Oswald (1996) have defined it as the econometrically predicted "going rate" for the job, that is the income of comparable employees of given characteristics, Clark (1999) and Grund and Sliwka (2003) have recently argued that it is the wage of the prior period that serves as reference.

flower and Oswald, 1999; Drakopoulos and Theodossiou, 1997).[2]

3.2 Greek specific research on job satisfaction[3]

In Greece the empirical research on job satisfaction is limited, with most of the relevant studies originating in the health sciences. Recent papers that have focused on the job satisfaction of Greek teachers include those of Koustelios (2001) and Stamouli and Ipfling (2001). Koustelios' (2001) sample of 345 teachers from 40 public schools in Thessaloniki showed that they are satisfied with the job itself and supervision, while they are dissatisfied with their pay and promotion opportunities. Holding a supervisory post or having promotion prospects also appears to have a positive effect on job satisfaction. Stamouli and Ipfling's (2001) cross-national research of four countries (Greece, Germany, Austria, Switzerland) also revealed that teachers with greater work autonomy and those with good working conditions (such as administrative support, nice school environment, student acknowledgement) are more satisfied in all countries. A notable difference is that for Greek teachers the vacation period seems to be more relevant for their job satisfaction compared to their Central European counterparts.

Two more studies worth mentioning are those of Blanchflower and Oswald (1999) and Kaiser (2002), both of which examine job satisfaction in the whole of Europe including Greece. Blanchflower and Oswald (1999), using information from two waves (1995 and 1996) of the Eurobarometer survey, show that job satisfaction levels in Greece are the lowest in the EU, and Greece appears to be one of the most stressed countries in Europe. Kaiser (2002) confirms these results using data

from the European Community Household Panel (ECHP) for the period 1994-1997. According to Kaiser, Greeks have the lowest average satisfaction in the EU with respect to their jobs in general, as well as to two specific aspects of their jobs, notably the number of working hours and job security. A similarly bleak picture also emerges from the empirical analysis of this paper, to which we now turn.

4. Statistical data and descriptive statistics

4.1 Data and description of main variables

The empirical analysis uses statistical data for Greece drawn from the eight waves of the European Community Household Panel (ECHP), covering the period 1994-2001. Designed centrally at Eurostat, but in close coordination with the Member States, the ECHP is a questionnaire database that contains information on more than 60,000 nationally representative households and 120,000 observations per year for all EU-15 countries.[4] In constructing the ECHP, emphasis was placed on developing comparable social statistics across Member States on income, labour, poverty

2 Though difficult to test, several hypotheses for these facts have been put forward. For example, it has been argued that more educated workers are less satisfied since education raises aspiration targets. The lower, *ceteris paribus*, satisfaction of union workers has been attributed to voice mechanisms that allow workers to express their dissatisfaction, or to the fact that dissatisfaction is used by unions as a means to increase demands.

3 This section is heavily based on the literature review for Greece (Appendix 3) that was undertaken as part of the EPICURUS project by Panos, G. A. and E. Vasileiou at the University of Macedonia.

4 In the first wave of the ECHP (1994) the sample comprised 60,500 representative households and 130,000 interviewees aged 16 years or over, from 12 Member States. From 1995 onwards Austria was also included, while in 1996 and 1997 Finland and Sweden, respectively, joined the survey as well.

and social exclusion, housing, health, as well as other social indicators concerning living conditions of private households and persons. More important for our purposes, it contains a considerable amount of information on the personal, human-capital and employment characteristics of workers, as well as their stated satisfaction with their jobs. In particular, in the ECHP respondents are asked to rate their satisfaction levels with their main activity status (whether it is employment, unemployment or inactivity). The employed are also asked to state their preference with respect to specific components of their jobs, such as earnings, job security, type of work, working hours, working times, working conditions/environment and distance to job/commuting. Each of these are given a number from one to six, where a value of one corresponds to "not satisfied at all", six reflects "full satisfaction" and the integers from two to five represent intermediate levels of utility. It is these self-reported responses that constitute the dependent variables in the econometric analysis that follows below.

Using the available ECHP data on Greece, the total number of interviewees for each of the eight years of the survey was approximately 11,000, resulting in a total of 85,748 observations on 15,374 individuals for the pooled sample.[5] Keeping (for the purpose of retaining homogeneity in the sample) only those in paid employment, who are between 16 and 65 years of age, and excluding the self-employed and those in unpaid work in family enterprises resulted in a pooled sample of 20,785 observations on 5,314 individuals, of whom 3,162 are males and 2,152 are females. Although our sample excludes full-time students, those working in paid apprenticeship or those receiving job-related training were included,

given that training possibilities constitute a key component of the quality of jobs.

As the main focus of this study is on investigating whether significant differences in job satisfaction exist between high- and low-paid workers in Greece, we then proceeded to identify the fraction (in the ECHP) of Greek employees who are low-paid. In doing so, we firstly derived gross hourly earnings for each individual in the sample, by using the available information on current gross monthly earnings and the number of weekly hours of work in the main job. We then adopted a conventional definition that classifies as low-paid those earning less than two-thirds of the median of the hourly wage distribution per year. Such a relative measure is commonly used in the literature, since an absolute metric poses difficult conceptual and methodological problems for making international comparisons of the incidence of low pay (OECD, 1996, p. 69). Considering as low-paid those workers whose wages are less than two-thirds of the median wage is also the accepted definition of the Institute of Labour (INE) of the Greek Confederation of Labour (GSEE) (Ioakimoglou and Soumeli, 2002). Furthermore, given that the presence of part-time workers introduces the additional complexity of disentangling differences in time worked from differences in wage rates, hourly earnings were constructed in order to neutralise the effect of diverse working hours among part-time and full-time workers. Using this definition, Table 1 illustrates that the overall incidence

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5 The decision to pool the eight years of data was made in order to maximise the number of observations in the sample and to control for certain unobservable effects that change over time but are constant across individuals (such as inflation and other political and economic disturbances within the country). This is achieved via the inclusion of yearly dummy variables in the econometric analysis.

Table 1
Median wages, thresholds, and low-wage workers in Greece, 1994-2001

Years	Median wages	Low-wage threshold	Low-paid workers (%)
1994	1,214.674	809.7827	17.70
1995	1,269.095	846.0635	16.65
1996	1,448.031	965.3543	16.80
1997	1,630.435	1,086.957	17.66
1998	1,702.517	1,135.011	16.62
1999	1,760.870	1,173.913	16.90
2000	1,795.196	1,196.797	18.46
2001	1,835.228	1,223.485	17.22
1994-2001	*1,550.311*	*1,033.541*	*17.24*

Notes: Amounts in the second and third column quoted in drachmas (not adjusted for inflation). The threshold refers to 2/3 of the median of the gross hourly wage distribution. The last column indicates the proportion of employees whose wages are below the threshold.
Source: Own calculations using ECHP data.

of low-paid employment in Greece, based on ECHP data for the period 1994-2001, is 17.24%.[6] This figure closely mirrors the results of both Ioakimoglou and Soumeli (2002) and Marlier and Ponthieux (2000), who have shown, using slightly different definitions and data, that low-wage workers in Greece amount to 16-17% of the total population.

4.2 Descriptive statistics

Having identified the overall incidence of low pay in Greece, Table 2 depicts the composition of low wage employment in relation to categories of jobs and individuals. Specifically, Table 2 shows the percentage of workers in each category who are low-paid (incidence), the distribution of low wage employment among the particular categories, and the concentration indicator, a measure of the prevalence of low-paid employment in each group relative to the overall incidence in the population. This indicator is useful for conducting cross-national comparisons, as a value greater than one suggests a higher than average risk of being low-paid in any country. Taking the cate-

gory of "employment sector" as an example, Table 2 illustrates that being employed in the private sector is associated with a higher than average probability of being low-paid, since the concentration value is 1.48. This is in stark contrast to public sector workers, whose concentration value is 0.21, thus implying that the public sector in Greece acts as a safeguard against low-wage employment. These figures are a reflection of the fact that, as shown in column 1, almost 26% of private sector employees are low-paid, compared to only 4% in the public sector. Moreover, from column 2 one can see that among the 17% of workers who are classified as low-paid in our

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6 It should be borne in mind, though, that in Greece "there is a large number of atypical low-paid workers who are employed in the parallel economy, and who therefore do not form part of the [official] statistics" (Ioakimoglou and Soumeli, 2002). Thus, the 17% figure should be seen as a minimum estimate. Of course, it should be pointed out that low-wage employees do not necessarily live in low-income households. In Greece, especially, "a person's likelihood of being poor depends to a large extent on the income of his (closely knit) family and not exclusively on his individual income" (*ibid.*, 2002). Apart from the fact that workers' households often have two wages, as well as the continued support by parents and the extended family, non-labour income (such as property income) is also common.

Table 2

Incidence, distribution and concentration of low-wage employment in Greece, 1994-2001

Category	Incidence (%)[1]	Distribution[2]	Concentration[3]
Total	*17.24*	*100*	*1*
By sex			
Female	22.69	49.93	1.32
Male	13.90	50.07	0.81
By age			
16-25	47.37	40.41	2.75
26-35	16.35	29.56	0.95
36-45	9.06	15.02	0.53
46-55	8.97	10.47	0.52
56-65	14.41	4.55	0.84
By marital status			
Not married	30.60	61.31	1.77
Married	10.18	38.69	0.59
By working time status			
Part-time	19.08	5.90	1.11
Full-time	17.18	94.1	1.00
By sector			
Public sector	3.66	8.22	0.21
Private sector	25.55	91.78	1.48
By position in hierarchy			
Supervisory	2.29	0.84	0.13
Intermediate	4.15	1.80	0.24
Non-supervisory	18.99	97.35	1.10
By contractual arrangement			
Permanent	10.65	49.03	0.62
Fixed/short term	24.79	12.84	1.44
Casual/no contract	44.27	37.21	2.57
Other arrangement	26.73	0.92	1.55
By training incidence			
No training/education	21.93	76.91	1.27
Training/education	9.53	23.09	0.55
By educational attainment			
Tertiary	6.78	12.06	0.39
Second stage secondary	18.71	40.43	1.09
Below second stage secondary	24.67	47.51	1.43
By health			
Very good	17.72	72.76	1.03
Good	15.34	19.78	0.89
Fair	19.23	6.13	1.12
Bad	20.23	0.98	1.17
Very bad	36.11	0.36	2.09
By status last year			
Employed	14.14	73.09	0.82
Self-employed	16.75	0.90	0.97
Unemployed	45.10	12.48	2.61
Inactive	49.59	13.54	2.87
By sector of economic activity			
Agriculture	44.44	3.81	2.58
Industry	18.69	32.09	1.08
Services	15.67	64.10	0.91
By occupation			
Legislators/managers	4.25	0.58	0.25
Professionals	3.41	3.38	0.20
Technicians/associate prof.	11.01	5.47	0.64
Clerks	10.63	11.32	0.62
Service and sales	31.61	26.17	1.83
Skilled agriculture/fishery	38.06	2.74	2.21
Craft/trade	23.20	25.39	1.35
Plant/machine operators	13.47	7.83	0.78
Elementary	30.14	17.12	1.75

Note: Low pay is defined as less than 2/3 of median hourly earnings of all employees aged 16-65.
1 Percentage of workers in each category who are low-paid.
2 Percentage share of all low-wage employment in each category.
3 Incidence of low-wage employment in each category divided by overall incidence of low-paid employment. A value greater than 1 indicates a higher than average risk of being low-paid, while a value less than 1 indicates a smaller probability.
Source: Own calculations using ECHP data.

Chart 1

Mean job satisfaction in EU countries (2001)

(All employees aged 16-65)

Mean job satisfaction scores*

Country	Score
Austria	5.00
Denmark	4.86
Nederlands	4.74
Ireland	4.63
Finland	4.54
Belgium	4.43
France	4.41
UK	4.34
Spain	4.23
Portugal	4.07
Italy	3.98
Greece	3.89

* Job satisfaction (1 to 6) scores are explained in the Appendix.

Source: Own calculations using ECHP data.
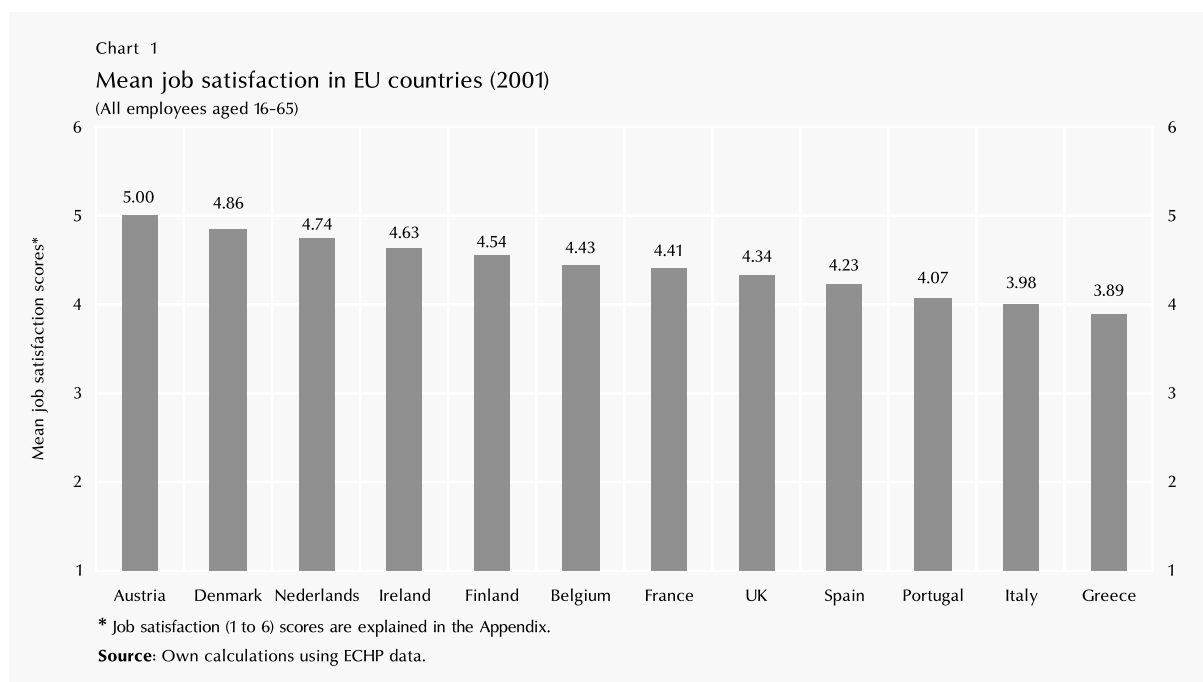
sample, 92% work in private sector jobs, compared to only 8% who are employed in the public sector.

From the remaining rows (categories) in Table 2 it is clear that the likelihood of low-wage employment in Greece is higher for women and younger workers, as well as those with lower educational qualifications and absence of training opportunities in their jobs. This is not surprising, given that wages tend to increase with working experience, training and the level of educational attainment, as has been noted a long time ago by Becker (1964) and Mincer (1976), the two pioneers of human capital theory. In fact, our sample confirms that low-paid workers have fewer years of general experience and job tenure (11 and 3.5, respectively), compared to their higher-paid counterparts (17 and 9 years). Single workers and, to a lesser extent, those who work in part-time jobs are also at higher than average risk of

being in the low-pay category. In addition, low wages are relatively less common in fairly "stable" jobs, such as jobs with contracts of indefinite duration. The persistence of the no pay/low pay cycle that was mentioned above is also evident, since those who enter or re-enter employment after being unemployed or inactive a year earlier are much more likely to be in low-wage jobs, compared to those who were employed. From Table 2 it is also apparent that fears of high-paid jobs in the shrinking manufacturing sector being increasingly replaced by low-paid jobs in the growing services sector have not yet materialised in Greece, as the possibility of low pay seems to be greater in the non-services sectors. Lastly, the occupational breakdown suggests that while being in a non-manual occupation (such as sales) is not a guarantee of being in a relatively high-paid job, very few managerial, technical and professional workers receive low wages. All of these correlations are in close agreement with

Chart 2
Job satisfaction in Greece (2001)
(All employees aged 16-65)
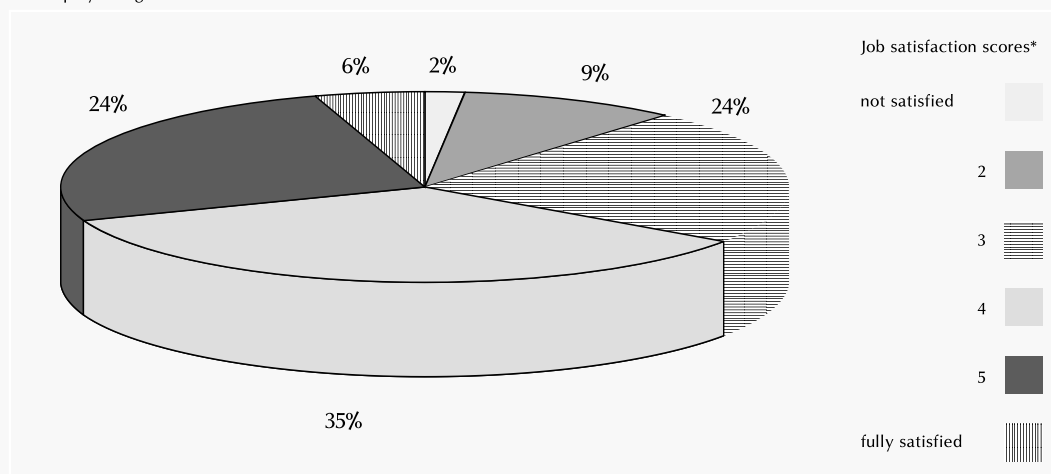
* Job satisfaction scores (1 to 6) are explained in the Appendix.
Source: Own calculations using ECHP data.

the results that other authors have reported for many other countries, thus indicating that the risk of low-wage employment in Greece tends to be concentrated among the same types of workers and employment categories as elsewhere (OECD, 1996, p. 70; Marlier and Ponthieux, 2000, p. 4; and articles in the volume of Asplund *et al.*, 1998).

Moving on to an analysis of the raw job satisfaction data, Chart 1 demonstrates that in 2001 Greece had the lowest average job satisfaction among the EU countries for which such data were available, thus confirming the findings of Blanchflower and Oswald (1999) and Kaiser (2002) for earlier years. From Chart 2, which illustrates the distribution of job satisfaction responses in Greece in 2001, it can be seen that 11% of Greeks ranked themselves at the bottom of the job satisfaction ladder (i.e. gave a score of 1 or 2), while 59% were in the middle rungs (scores 3 and 4).

The remaining 30% of Greek employees reported a satisfaction value of 5 or 6, which constitutes one of the smallest fractions in the EU. Table 3 now depicts the means of overall job satisfaction and satisfaction with specific facets of jobs, broken down by various categories of interest for this study. As an example, one can see from column 1 of this table that the average job satisfaction score of high-paid workers in Greece in the years 1994-2001 was 4.02, which is larger than the average satisfaction value of 3.17 that low-paid workers reported. Accordingly, the following patterns emerge:

- Men in Greece seem to be more satisfied with their pay and security, compared to women, in line with Papapetrou's (2004) finding that average wages of Greek women are 25% less than those of men. Nevertheless, women express greater satisfaction with their working hours, times, conditions and type of work.

Table 3
Mean job satisfaction scores for all Greek employees, 1994-2001

	Overall	Pay	Security	Type of work	Hours	Times	Conditions	Commuting
Low-paid	**3.17 (1.23)**	**2.60 (1.05)**	**3.01 (1.39)**	**3.44 (1.31)**	**3.46 (1.23)**	**3.57 (1.24)**	**3.63 (1.31)**	**4.02 (1.36)**
High-paid	**4.02 (1.17)**	**3.39 (1.09)**	**4.25 (1.44)**	**4.15 (1.24)**	**4.14 (1.14)**	**4.12 (1.23)**	**3.98 (1.29)**	**4.15 (1.33)**
By gender								
Female	3.87 (1.24)	3.21 (1.14)	4.00 (1.53)	4.08 (1.27)	4.07 (1.20)	4.12 (1.24)	4.17 (1.23)	4.13 (1.35)
Male	3.88 (1.22)	3.29 (1.11)	4.06 (1.50)	3.99 (1.29)	3.99 (1.19)	3.97 (1.26)	3.77 (1.33)	4.12 (1.32)
By age								
16-25	3.55 (1.21)	2.96 (1.08)	3.36 (1.38)	3.77 (1.27)	3.77 (1.20)	3.78 (1.23)	3.88 (1.28)	4.07 (1.32)
26-35	3.81 (1.19)	3.20 (1.09)	3.88 (1.47)	4.01 (1.25)	3.95 (1.18)	3.95 (1.25)	3.93 (1.29)	4.01 (1.35)
36-45	4.03 (1.21)	3.35 (1.11)	4.31 (1.47)	4.14 (1.26)	4.13 (1.18)	4.12 (1.27)	3.96 (1.30)	4.24 (1.32)
46-55	4.00 (1.22)	3.40 (1.15)	4.34 (1.49)	4.11 (1.29)	4.16 (1.15)	4.17 (1.21)	3.92 (1.30)	4.18 (1.32)
56-65	3.83 (1.33)	3.32 (1.23)	4.10 (1.63)	3.91 (1.43)	4.03 (1.23)	4.05 (1.30)	3.80 (1.45)	4.14 (1.36)
By marital status								
Not married	3.70 (1.24)	3.08 (1.11)	3.67 (1.49)	3.90 (1.29)	3.87 (1.19)	3.90 (1.24)	3.91 (1.30)	4.02 (1.33)
Married	3.97 (1.21)	3.35 (1.11)	4.23 (1.49)	4.09 (1.27)	4.10 (1.17)	4.09 (1.26)	3.93 (1.31)	4.18 (1.33)
By working time status								
Part-time	3.37 (1.51)	2.58 (1.19)	3.37 (1.79)	3.93 (1.49)	4.05 (1.42)	4.22 (1.34)	4.00 (1.36)	4.21 (1.43)
Full-time	3.91 (1.20)	3.29 (1.11)	4.07 (1.48)	4.03 (1.27)	4.02 (1.17)	4.01 (1.25)	3.92 (1.30)	4.12 (1.33)
By sector of economic activity								
Agriculture	2.89 (1.27)	2.56 (1.11)	2.64 (1.47)	2.84 (1.35)	3.20 (1.21)	3.18 (1.32)	2.91 (1.41)	3.93 (1.45)
Industry	3.57 (1.20)	3.15 (1.11)	3.57 (1.45)	3.68 (1.28)	3.89 (1.15)	3.94 (1.20)	3.47 (1.32)	3.99 (1.33)
Services	4.04 (1.20)	3.33 (1.12)	4.28 (1.47)	4.21 (1.23)	4.10 (1.18)	4.09 (1.26)	4.14 (1.23)	4.19 (1.33)
By sector								
Public sector	4.38 (1.10)	3.52 (1.10)	4.91 (1.30)	4.48 (1.16)	4.44 (1.09)	4.38 (1.22)	4.19 (1.25)	4.32 (1.34)
Private sector	3.58 (1.19)	3.10 (1.10)	3.50 (1.37)	3.75 (1.27)	3.77 (1.17)	3.81 (1.23)	3.76 (1.31)	4.00 (1.32)
By job status								
Supervisory	4.66 (1.02)	3.93 (1.14)	5.00 (1.14)	4.75 (1.10)	4.32 (1.22)	4.37 (1.27)	4.44 (1.26)	4.37 (1.40)
Intermediate	4.35 (1.07)	3.53 (1.13)	4.69 (1.33)	4.48 (1.14)	4.15 (1.18)	4.19 (1.30)	4.09 (1.30)	4.20 (1.40)
Non-supervisory	3.79 (1.22)	3.19 (1.10)	3.92 (1.50)	3.93 (1.28)	3.99 (1.18)	3.98 (1.24)	3.87 (1.30)	4.10 (1.32)
By contractual arrangement								
Permanent	4.10 (1.10)	3.46 (1.04)	4.50 (1.26)	4.24 (1.17)	4.17 (1.09)	4.13 (1.19)	4.07 (1.22)	4.19 (1.29)
Fixed/short term	3.50 (1.15)	3.10 (1.06)	2.74 (1.23)	3.75 (1.26)	3.78 (1.12)	3.80 (1.16)	3.77 (1.29)	4.06 (1.31)
Casual/no contract	2.88 (1.08)	2.60 (1.01)	2.44 (1.08)	3.12 (1.21)	3.33 (1.14)	3.44 (1.18)	3.27 (1.28)	3.85 (1.27)
Other arrangement	3.75 (1.12)	3.39 (1.11)	3.49 (1.34)	3.85 (1.36)	3.75 (0.97)	3.86 (1.12)	4.09 (1.27)	4.34 (1.26)
By training incidence								
No training/education	3.62 (1.22)	3.13 (1.09)	3.76 (1.50)	3.72 (1.28)	3.87 (1.17)	3.88 (1.23)	3.73 (1.30)	4.07 (1.30)
Training/education	4.27 (1.12)	3.46 (1.14)	4.44 (1.42)	4.46 (1.15)	4.24 (1.17)	4.23 (1.26)	4.20 (1.25)	4.20 (1.38)
By educational attainment								
Tertiary	4.35 (1.13)	3.53 (1.14)	4.56 (1.40)	4.61 (1.11)	4.33 (1.14)	4.40 (1.19)	4.34 (1.17)	4.20 (1.37)
Second stage secondary	3.89 (1.15)	3.29 (1.07)	4.05 (1.45)	4.03 (1.21)	4.01 (1.15)	3.97 (1.24)	4.02 (1.25)	4.13 (1.30)
Below second stage secondary	3.43 (1.22)	2.97 (1.09)	3.53 (1.50)	3.48 (1.27)	3.75 (1.19)	3.74 (1.24)	3.42 (1.32)	4.04 (1.33)
By health								
Very good	3.94 (1.21)	3.32 (1.11)	4.06 (1.48)	4.08 (1.26)	4.05 (1.17)	4.04 (1.24)	3.99 (1.28)	4.16 (1.31)
Good	3.77 (1.19)	3.15 (1.10)	4.00 (1.53)	3.94 (1.28)	3.94 (1.19)	3.97 (1.26)	3.79 (1.30)	4.03 (1.35)
Fair	3.61 (1.37)	2.93 (1.24)	3.84 (1.71)	3.71 (1.43)	4.01 (1.26)	4.01 (1.35)	3.61 (1.48)	4.05 (1.49)
Bad	3.50 (1.51)	2.79 (1.24)	3.90 (1.87)	3.59 (1.53)	4.09 (1.40)	4.11 (1.37)	3.57 (1.48)	4.13 (1.56)
Very bad	3.66 (1.70)	2.88 (1.23)	4.02 (1.85)	3.97 (1.46)	4.02 (1.64)	4.00 (1.80)	3.27 (1.76)	4.30 (1.67)

Note: Standard errors in parentheses.
Source: Own calculations using ECHP (1994-2001) data.

• While full-time workers report greater satisfaction with respect to their pay, security, and type of work, part-time employees in Greece receive greater satisfaction from their working hours and conditions. Overall, full-time workers seem to be happier than those who work part-time, which probably reflects the fact that part-time work in Greece is still limited and to a large extent involuntary. Specifically, among the 5.34% of employees who work in a part-time job in our sample, almost 47% declare that they do it because they were unable to find other work, while only 7.5% preferred this type of working arrangement. Furthermore, given that "part-time employment in Greece is directly interwoven with low pay, low-skilled jobs, limited prospects of career development, low social benefits and partial insurance coverage which also entails low pension rights" (Ioakimoglou and Soumeli, 2002), it is understandable why such workers report lower job satisfaction ratings.

• Public sector workers in Greece are more satisfied with their jobs in general, and with all of the facets in particular, compared to private sector employees. This is consistent with Papapetrou's (2003, p. 45-7) finding that female and male wages in the Greek private sector are on average 37% and 34% less than in the public sector, respectively. The high level of security satisfaction expressed by Greek public sector workers can also be explained by the element of permanency in such jobs.

• Workers on permanent contracts receive greater utility from their jobs, especially with regard to the security of their employment, while those in casual work suffer the most.

• Married individuals, those in possession of more human capital, those who are employed in supervisory positions and those working in the services sector are more satisfied with all of the components of their jobs.

• Finally, and more important for the purposes of this study, low-paid workers in Greece are less satisfied with all aspects of their work compared to their high-paid counterparts.

5. Econometric methodology and results

5.1 Statistical methodology

These correlations may be spurious, as the influence of other factors that may obscure the relationship between the low pay and job satisfaction variables has not yet been controlled for. As shown above, we cannot be certain on the basis of the raw data only that low-paid workers in Greece are less satisfied than high-paid workers solely because of the fact that they are low-paid. Since a large proportion of low-paid workers possess other characteristics that might have a negative effect on job satisfaction (e.g. they are more likely to be single, low-skilled, on non-permanent contracts, etc.), it might be these features that cause low-paid workers to appear as less satisfied, rather than the fact of being low-paid itself. Therefore, in order to uncover the true *ceteris paribus* effect of the low pay variable on job satisfaction, a multivariate regression methodology is required to net out the effects of other variables.

As mentioned in Section 3, the estimation of job satisfaction equations usually involves job satisfaction "as the dependent variable" being regressed

on a set of demographic, human capital, economic, work-related and other social determinants. In our case the set of independent variables also includes a dummy variable that distinguishes between high- and low-paid workers by taking the value 1 for low-paid employees and 0 otherwise. The estimated coefficient on this low pay variable uncovers the difference in average job satisfaction between high- and low-paid workers, having controlled for the effect of all other factors that affect job satisfaction and that may be correlated with low pay status. Of course, given the difficulty of conditioning on every possible determinant of job satisfaction (since the researcher usually faces data constraints), it may be the case that the estimated coefficient on the low pay dummy also captures the effect of these "unobservable" variables and is thus biased. To give a relevant example, it is known from a number of studies that union density has an effect on job satisfaction and that it is also a determining factor for the probability of a worker being low-paid.[7] It follows that if a union-proxy variable is not included in the equation, the coefficient on the low pay dummy will also capture the effect of union status on job satisfaction, thus giving rise to what is known as "omitted variable bias". In the results that are presented below we have therefore made an attempt to correct for this problem, and the reader interested in the technical details of how we achieve this can find a discussion in the Appendix. In what follows we offer a simplified account of the main results.

5.2 Empirical results for overall job satisfaction

From the estimation of a job satisfaction equation for the entire sample of workers (see Table A2 in the Appendix), we find that low-paid employees in Greece are significantly less satisfied with their jobs compared to those who are high-paid, all other things equal.[8] Two "statistically identical" individuals, who have the same characteristics, would therefore not be equally satisfied with their jobs if one of them worked in the low pay tier of the labour market and the other in the high pay tier. In reality, the individual who is low-paid would, on average, receive lower utility from his/her work. This is evidence in favour of the dual labour market hypothesis, as it indicates that non-pecuniary benefits do not seem to compensate low-wage workers in Greece, as would be expected in a labour market with perfectly competitive market forces. The idea that there exist "bad jobs" and "good jobs" in the Greek labour market is therefore supported by our data.

From the coefficients of Table A2 one can also derive an estimated value of the amount of money that low-paid workers in Greece would need to receive, in order to have their utility equalised to that of their higher-paid counterparts. Alternatively, such a calculation allows us to put an approximate monetary value on the disutility of low-pay employment in Greece, i.e. on the "implicit" (shadow) cost that workers are "paying" for being in low-paid jobs that are also of low quality. This is done by looking at the relative size of the coefficients on the low pay and wage variables, as this provides information about how the wages of a

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7 While union status has been found to increase worker satisfaction with pay and security, overall, union workers usually report less satisfaction compared to non-union workers (Lillydahl and Singell, 1993). Furthermore, low-union density is also generally considered as a factor that contributes to low-paid employment (Ioakimoglou and Soumeli, 2002).

8 Given that data for the type of contractual arrangement were not available for wave 1 in Greece, the regression output that is reported in this paper has been estimated on the basis of the 1995-2001 period.

marginal individual would need to change in the face of a change in his/her pay status, in order to keep his/her utility from work constant (Blanch-flower and Oswald, 2004). In our case, the calculus suggests that if a previously high-paid worker were to work in a low-paid job, he/she would need to be compensated with approximately 1,400 drachmas extra per hour if he/she were to retain the same utility as before the change. As an indication of the magnitude of this figure, one can note that the mean gross hourly wage of a low-paid worker in Greece in the years 1994-2001 was 826 drachmas, while that of a high-paid worker was 2,034 drachmas. Thus, in order for a low-paid employee to enjoy the same utility as that of a higher-paid counterpart, he/she would need to receive on average approximately (826 + 1,400 =) 2,226 drachmas per hour. It is therefore clear that equalising the average wages of workers in the two tiers would not be enough to provide them with equal utility. Rather, it would be necessary to offer low-paid workers an additional (2,226–2,034 =) 192 drachmas per hour, presumably to compensate them for the fact that low-paid jobs are also of inherent "bad" quality. Of course, these calculations should be treated cautiously, but they do illustrate the quantitative importance of the estimated coefficients.

From the other explanatory variables we observe further that higher absolute wages have a significant positive effect on individual job satisfaction, consistent with the traditional income-leisure trade-off of microeconomic theory.[9] Job satisfaction is also found to be U-shaped in age (thus confirming that the middle-aged are less satisfied), while we do not discover any significant effect of marital status or of the presence of young children in the household. After conditioning on the main

job and worker characteristics, we also find that Greek men are less satisfied with their jobs compared to women. This might seem surprising, given that Papapetrou (2004) and others have found substantial and significant male-female earnings differentials across occupations and countries, while there is also evidence of discrimination against women in areas such as hiring/firing and promotion. Nevertheless, the fact that women consistently report higher job satisfaction scores than men is well established in the literature. Attempts to explain this paradox have usually focused on the difference in aspirations between the two genders, with women supposedly expecting less from their jobs due to more frequent career breaks and previous discriminatory behaviour in the workplace. The narrower gap between their current working state and what women expect might therefore explain their greater happiness (Clark, 1997).

Considering now the variables that capture the "stability" or "precariousness" of the employment relationship, it is found that temporary, part-time, and private sector workers in Greece are strongly dissatisfied compared to those on permanent, full-time, and public sector contractual arrangements. These results seem to confirm popular worries that increased labour market flexibility affects the job security of employees, provided that only a

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9 The positive coefficient on total hours of work, however, is inconsistent with traditional microeconomic theory. Nevertheless, it should be mentioned that we have not managed to exclude from our hours variable the effect of overtime (for which Greek employees receive up to 150% extra pay), which in the low-wage economy of Greece constitutes a recurrent and welcome element of workers' income. Thus, the positive impact of the hours variable on job satisfaction may reflect the fact that the compensatory wage effect of overtime outweighs the disutility of any additional hours of work. The positive wage effect is further reinforced by the fact that the total hours variable also includes time worked in additional jobs.

minority of individuals who work on non-permanent and part-time contracts do so by choice.

Significant differences in the subjective evaluation of jobs are also found among those who have different human capital characteristics. In Greece, workers with tertiary education and above the second level of secondary education are more satisfied with their work, compared to those who have not completed the second stage secondary level. This is also the case for workers who possess more job tenure, probably reflecting the positive impact of specific training or the superior quality of the worker-employer job match. In addition, those who believe that their current job is not utilising their skills to the full extent (i.e. self-reported over-qualification) have lower satisfaction scores than those who are content with their skills-job match. The provision of training by employers as a means of upskilling and career development also leads to significantly higher job satisfaction. Finally, very good health, which can also be considered a form of human capital in accordance with Mincer (1976), is an additional factor that leads to higher utility from work.

Another important result that has surfaced from the econometric analysis is that the well-documented non-pecuniary costs of unemployment seem to exert a negative effect on workers' satisfaction with their jobs. This is evident from the fact that, everything else being equal, an "ex-unemployed" worker is more likely to be unhappy with his current job compared to someone who was employed a year earlier. In contrast, ex-inactive employees are happier with their current jobs, which is consistent with the fact that most of these people are women and younger individuals. This specific group is more likely to be in the process of entering or re-entering employment, after having taken some time off due to various care responsibilities or further education.

Finally, there is also evidence that absenteeism, non-supervisory positions in the hierarchy and working outside of Attica negatively impacts on the perceived quality of jobs.

5.3 Empirical results for facets of job satisfaction and by sector

Given that we have established that there exist significant differences in the perceived job quality among high- and low-paid workers in Greece, which points towards the existence of a segmented labour market, we now proceed to investigate the reasons for this discrepancy. To this end, seven satisfaction equations have been estimated with some of the available components of jobs (pay, security, type of work, working hours, working times, working conditions/environment and commuting) as dependent variables this time (see Table A3 in the Appendix). The results indicate that, with the exception of travelling distance to work, low-paid workers are particularly less satisfied with their pay and the type of work that they perform. Negative coefficients are also found with respect to the remaining facets, though these are not significant at conventional statistical levels. Overall, these findings seem to support the assertion that low-wage jobs in Greece are inherently of bad quality, though the insignificance of the working hours, security and working conditions variables does point towards the existence of some compensating forces.

As an additional task, we have split the sample into low- and high-paid segments in order to

unearth any differences in the manner in which the explanatory variables determine the satisfaction of the two types of workers. In the previous estimation of overall job satisfaction the coefficients of the chosen control variables were constrained to be the same for both low-paid and high-paid workers. However, it may be the case that the individual's type interacts with the other personal and workplace characteristics, in which case high- or low-paid employees will report different satisfaction values to any of these given traits. This disparity in the job satisfaction determination process would be possible if differences in institutional arrangements, hierarchical structures, and firm policies for the two types of workers existed.

Estimating two separate job satisfaction equations for the high- and low-pay segments reveals a number of interesting features (see columns 2 and 3 of Table A2). Gender and working time arrangements only affect the utility of high-paid workers in a significant manner, with males or part-time workers being less satisfied. General education and additional years of tenure also seem to exert an exclusive effect on the utility of the higher-paid, though employer-provided training is found to have a much larger marginal effect on the stated satisfaction of low-paid employees. The negative impact of non-supervisory duties, previous unemployment, and of working in Northern or Central Greece, is only evident for the high-paid group. In contrast, having been inactive a year earlier has a slight beneficial effect on the satisfaction of low-wage employees. Finally, individuals on casual contractual arrangements suffer from a significantly larger negative effect on job satisfaction in the low-wage tier of the labour market. On the whole, these results

seem to imply that differences in personal and workplace characteristics among low-paid workers do not lead to significant deviations in perceived job quality as much as they do among employees in higher-paid jobs.

5.4 Oaxaca decomposition

Having estimated job satisfaction equations for the whole sample and for the two groups separately also allows for a breakdown according to standard Oaxaca or related decompositions. By applying this methodology it is possible to investigate, firstly, the extent to which differences in job satisfaction among high- and low-paid employees in Greece are attributable to the endowments or characteristics differential between them and, secondly, what is the unexplained part of this discrepancy, i.e. that part whereby two "identical" individuals of average characteristics, one employed in a high-paid job and one in a low-paid job, report a different satisfaction value, possibly due to the presence of institutional factors. Such a procedure is widespread in decomposing wage differences between various categories of interest (see Papapetrou, 2003 and 2004, for a recent application of this technique to the Greek labour market), but, to the authors' knowledge, has not yet been attempted with subjective satisfaction data. The results that follow therefore constitute a significant novelty of this paper.

Table A4 in the Appendix presents the breakdown of the difference in job satisfaction between high- and low-paid employees for the entire sample. The top section of the table, which decomposes the difference according to the Oaxaca procedure, illustrates that the most influential factor affecting the satisfaction disparity of individuals in the two

groups is the fact that they have the different characteristics that were identified in this paper; this accounts for almost 90% of the total discrepancy. The remaining 10% is "unexplained", reflecting disparate institutional features of the high- and low-pay labour markets. Given the greater weight of the endowments explanation, the bottom section of the table shows which part of the explained difference in satisfaction is attributable to specific employee characteristics. While the difference in mean wages understandably explains the lion's share of the overall satisfaction differential (56%), tenure (3.5%), age (-9%), the sector of employment (12%), employer-provided training (3%), non-permanent contractual arrangements (16.5%), and tertiary education (4%) also contribute to the difference in satisfaction between high- and low-wage employees in Greece.

6. Policies and recommendations

As mentioned at the beginning of this paper, the aim of improving the quality of work is considered by the EU as closely interlinked with the move towards a competitive and knowledge-based economy, as stated in the Lisbon 2000 agenda. This reflects the evidence of a strong positive correlation between job quality, faster employment growth and higher productivity. At the same time, the declining economic prospects of workers on the lower rungs of the income distribution have raised concerns regarding the emergence of a two-tier labour market in Europe. In this paper evidence was presented that low-paid workers in Greece do in fact seem to suffer from a double penalty, as their jobs are also of bad quality. In view of this segmentation, combined with the fact that Greece remains a low-wage economy, it becomes clear that policies that centre on the quality of jobs are of equal importance to those that focus on the level of pay that they provide. This, however, requires the design of a regulatory framework that promotes the transition of workers from one state (low pay/low quality) to another (high pay/high quality), by improving the dynamics that lead to jobs of superior quality and by encouraging occupational and regional mobility of those workers who are trapped in low wage/low quality employment. Concerted efforts to promote life-long training and raise the qualifications of employees, to ease young workers' access to the labour market, to open up possibilities for career advancement and to strengthen measures that help reconcile work and private and family lives would be conducive to achieving this goal (European Commission, 2001a, p. 80).

The empirical findings of this paper illustrate that such policy implications are relevant for the Greek labour market as well. The issue of balancing flexibility, on the one hand, and security, on the other —i.e. of supporting the competitiveness of firms in the global economy without resorting to precarious forms of employment— is a delicate one for the Greek economy. The fact that additional years of tenure do not have a significant impact on the perceived job quality of low-wage workers may indicate the lack of rank progression or training opportunities in this sector. In addition, since both temporary contracts and involuntary part-time work are generally related to extreme worker dissatisfaction, it becomes clear that emphasis should be put on making these contractual forms function as stepping stones for reintegrating individuals into high-quality employment. This can be achieved by focusing on increasing the share of voluntary part-time work, as well as introducing

more flexibility in permanent contracts and more security in fixed-term ones. Implementation of the EU Directives for temporary and part-time work is also essential to ensure that workers under different contract statutes enjoy similar access to life-long learning, good working conditions, appropriate protection against discrimination or unfair dismissal, support in the case of job loss, decent pay, and the right to transfer acquired social rights in the case of job mobility (European Commission, 2003b, p. 14).

Policies that enhance the quality and efficiency of investments in human resources are also relevant, given that higher educational attainment and more employer-provided training leads to a better perception of quality at work. However, the fact that more educational qualifications do not contribute to additional utility from work in low-wage jobs may reflect the discomfort of educated low-paid workers whose higher job aspirations have not materialised as expected. This highlights the need for general education and vocational training systems that do not contribute to skills mismatches in the labour market.

The strong negative correlation between absenteeism and job quality may also partly reflect the need for better working conditions with more health and safety, given that lost days at work are usually a consequence of accidents at work, work-related illnesses and occupational diseases. In this respect the EU has called for an intensification of efforts aimed at implementing the provisions of the Health and Safety at Work Directives.

Finally, policies that allow employees to adjust work with their working time preferences and in particular with their other responsibilities such as

care for children and other dependants would also add to the improvement in quality of jobs. In Greece there is currently little flexibility in working time arrangements, with more than 90% of all employees working on fixed start and end times. Moreover, about 30% of Greek employees work outside core working hours, compared to an EU average of 20%, while more than half of them claim that they work in the evening at least sometimes (European Commission, 2003a, p. 148). These facts point to the need for policies that will reconcile the work-life balance in Greece in a more satisfactory fashion.

7. Conclusions

Following the establishment of job quality as one of the three overarching objectives of the EU's Employment Guidelines, and in the face of concerns regarding the declining economic prospects of workers on the lower rungs of the income distribution, which has supposedly led to the emergence of a two-tier labour market in Europe, this study examined whether or not significant differences in perceived job quality exist among high- and low-paid workers in Greece. To do so we followed the practice of an ever-increasing number of economists who use self-reported job satisfaction data to proxy the overall quality of work as perceived by the individual worker. Using data from the eight waves of the ECHP, evidence was presented that low-paid workers in Greece do in fact seem to suffer from a double penalty, as their jobs are also of bad quality. Further analysis of the specific facets of jobs revealed that this fact is the result of lower average satisfaction among low-wage employees with their pay and the type of work that they perform. In view of this segmenta-

tion, combined with the fact that Greece remains a low-wage economy, it becomes evident that policies that centre on the quality of jobs are of equal importance to those that focus on the level of pay that they provide. This, however, requires the design of a regulatory framework that promotes the transition of workers from one state (low pay/low quality) to another (high pay/high quality), by improving the dynamics that lead to jobs of superior quality and by encouraging occupational and regional mobility of those workers who are trapped in low wage/low quality employment.

Appendix

This section provides a detailed discussion of the model specification and econometric procedure that underpins the results that were presented in the main body of this paper. We have followed an increasingly popular trend in the economics literature, which estimates regression models based on subjective data. Given the ordinal nature of such data, most of this research uses ordered probit regression techniques with the aim of identifying the main determinants of self-reported well-being levels. Specifically, it usually seeks to identify the probability of observing a self-reported satisfaction value i ($i = 1, 2,..., k$), as a function of appropriate individual and labour market variables. In our case, where the interest lay in revealing potential differences in job satisfaction between high- and low-paid workers, we have also included in the regressions a dummy variable indicating whether or not individuals are low-paid. The estimated coefficient on the low-pay dummy will then unveil any differences in job satisfaction between the two groups of workers, *ceteris paribus*. In other words, we have estimated a model of the form:

$$JS = Xb + Ia + u \qquad (2)$$

where JS (job satisfaction) is the categorical dependent variable, X is a vector of personal and labour market characteristics that affect job satisfaction, I is a dummy variable taking the value 1 if low-paid and 0 otherwise, and $u \sim N (0, \sigma_i^2)$ is the random disturbance term. Of course, if there exist unobservable variables that affect job satisfaction and are correlated with the low-pay dummy (i.e. if $Cov (I, u) \neq 0$), then it is well known that the estimated coefficient a will be biased.

It is for this reason that a "treatment effects model" has been utilised, which considers the effect of an endoge-

nously chosen binary treatment on another endogenous continuous variable, conditional on two sets of independent variables. Such techniques use either Heckman's two-step consistent estimator or full maximum-likelihood, and estimate all of the parameters in the model

$$JS = Xb + Ia + u \text{ (regression equation)} \qquad (3)$$

$$I = 1 \; iff \; Z\gamma + \varepsilon > 0 \text{ (treatment equation)} \qquad (4)$$

where equation (3) is defined as before, while in (4) Z is a matrix of identifying variables believed to determine whether assigned treatment in the low-wage sector occurs or not, but with at least one not affecting job satisfaction, $\varepsilon \sim N (0, 1)$ and $Cov (\varepsilon, u) = \varrho$. A point worth making at this stage is that since these models require that the dependent variable is continuous, we have transformed the ordinal job satisfaction variable into a standardised z-score. This is standard procedure following Freeman's (1978) finding that such a transformation does not lead to distortions in the regression results. It should also be noted that in all of the regressions robust (Hubert-White) standard errors are reported that also correct for correlation at the individual level.

Identification of the model is achieved provided that at least one non-overlapping variable in Z, compared to X, is present. For this purpose two identifying restrictions have been used in the selection equation, but not in the main job satisfaction equation. These consist of, firstly, dummy variables capturing the number of rooms in the household per person, ranging from "1 room" to "more than 3 rooms". Secondly, dummies of an index summarising the presence of good features in the household have also been included. The good features consist of whether or not the dwelling possesses a separate kitchen, bath or shower, indoor flushing toilet, hot running water, and a place to sit outside. For both of these identifiers it is pos-

Table A1
Probit estimates of low pay incidence in Greece, 1995-2001

Categories	Low pay incidence		Marginal effect
Personal			
Male	−0.555	(0.054)***	−0.067
Age	−0.138	(0.015)***	−0.015
Age^2	0.002	(0.000)***	0.000
Married	−0.278	(0.059)***	−0.032
Child less than 12 years old	−0.181	(0.055)***	−0.019
Unemployed for 5 years	0.069	(0.048)	0.008
Work-related			
Tenure	−0.033	(0.005)***	−0.004
Total hours	−0.555	(0.054)***	0.004
Full-time	0.041	(0.002)***	−0.043
Private	−0.317	(0.101)***	0.073
Absenteeism	0.760	(0.092)***	0.001
Duties			
Intermediate	0.128	(0.191)	0.015
Non-supervisory	0.572	(0.165)***	0.043
Contract			
Fixed/short term	0.274	(0.062)***	0.035
Casual work	0.540	(0.052)***	0.079
Other	0.259	(0.221)	0.034
Human capital			
Training	−0.160	(0.051)***	−0.016
Overqualified	0.052	(0.040)	0.006
Third level	−0.352	(0.079)***	−0.034
2nd secondary	−0.128	(0.055)**	−0.013
Health			
Good	0.043	(0.046)	0.005
Fair	0.133	(0.087)	0.016
Bad/Very Bad	0.262	(0.194)	0.034
Status last year			
Self-employed	−0.117	(0.159)	−0.011
Unemployed	0.311	(0.064)***	0.041
Inactive	0.353	(0.070)***	0.048
Region			
Northern GR	0.293	(0.058)***	0.034
Central GR	0.105	(0.063)*	0.011
Aegean islands	0.092	(0.077)	0.010
Identifying variables			
2 rooms per person	−0.304	(0.064)***	−0.027
More than 3 rooms per person	−0.399	(0.155)**	−0.031
Less than 2 good features	0.515	(0.158)***	0.081
3 good features	0.443	(0.096)***	0.065
4 good features	0.224	(0.062)***	0.026
5 good features	0.069	(0.052)	0.007
Constant	0.407	(0.396)	
Observations	15,213.00		
Wald test (58)	1,914.64 ***		
Pseudo R^2	0.37		

Notes: *Standard errors in parentheses: robust to arbitrary heteroscedasticity and the repeat sampling of individuals over time. *: significant at 10%; **: significant at 5%; ***: significant at 1%. All regressions include controls for occupation (9), industry (10) and time (7).*

Reference groups: *Duties: supervisory; Contract: permanent; Education: below 2nd stage; Health: very good; Status last year: employed; Region: Attica; Rooms per person: 1; Good features: 6.*

Source: Own calculations using ECHP data.

tulated that while their existence is correlated with the probability of an individual belonging in the low-paid group, it is uncorrelated with the utility that he/she receives from his/her work. Additional statistical tests, which are discussed in more detail below, also indicate that the restrictions for identifying the endogeneity effects are adequate.

The estimation of the selection equation (4) makes use of the probit method to identify the factors that determine whether an individual works in the low pay or high pay tier. The regression results, as well as the marginal effects of the included variables, are presented in Table A1.[10] As usual, positive coefficients imply a greater likelihood of an individual having low wages, whereas the marginal effects indicate the change in the probability that an individual is low-paid when each of the independent variables, calculated at the mean values of the sample, is increased by one unit. For instance, if an employee works full-time, the probability that he/she will be low-paid decreases by almost 4%, while being employed in the private sector increases the likelihood of low-pay employment by 7%.

In line with the results of many other studies (see articles in the volume of Asplund *et al.*, 1998), it is also revealed that the probability of being in the low-wage group in Greece is U-shaped in age (so that the middle-aged are less likely to be low-paid) and negatively related with marriage and with the male gender. In addition, greater human capital reduces the chances of an individual falling into the low-pay category, since those with more years of tenure, higher educational qualifications, and those who receive training are more likely to receive higher wages. The fact that there is a negative correlation between those who have children under the age of 12 in the household and low-wage employment confirms the Malthusian rationale of income being a crucial determinant of fertility patterns. Furthermore, those who are employed in non-

supervisory positions, on non-permanent contracts, and who suffer from very bad health are more likely to be low-paid. Finally, the widespread concerns over the presence of a vicious circle between low pay and no pay are verified by the fact that individuals who were unemployed or inactive a year earlier face a higher probability of being in the low-pay category.

With respect to the identifying restrictions now, it is clear that these are highly correlated with low pay status. Specifically, compared to those who live in households with only one room per person, those with two or more than three rooms per person are less likely to be low-paid. Accordingly, those with fewer good household features face a greater likelihood of being low-paid. The Wald test statistic for the joint significance of these selection variables in the probit equation is $\chi^2 (6) = 59.59$, which is significant at the 1% level.

Following the estimation of the probit model, the predicted probabilities of being in the low-pay segment are then calculated. The predictions are subsequently included in the regression of the main job satisfaction equation, in place of the low-pay dummy. The estimates that have been corrected for endogeneity are depicted in Table A2 and have been extensively discussed in Section 5.2 of the main text. It is noteworthy, though, that the implementation of this technique leads to an increase in the marginal effect of the low-pay dummy, compared to a simple application of OLS (not presented here, but available from the authors upon request).

In Table A3 estimates of the impact of the low-pay determinant on the facets of job satisfaction (pay, security, type of work, working hours, working times, working conditions/environment and commuting) are presented, using

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10 A description of all the variables used in this study can be found in Appendix Table A5.

T a b l e A2
Estimates of overall job satisfaction in Greece, 1995-2001

Categories	All		Low-paid		High-paid	
Low pay	*–0.138*	*(0.062)***				
Personal						
Male	–0.067	(0.023)***	–0.061	(0.072)	–0.080	(0.025)***
Age	–0.017	(0.008)**	–0.034	(0.019)*	–0.012	(0.009)
Age^2	0.000	(0.000)**	0.000	(0.000)	0.000	(0.000)
Married	–0.025	(0.027)	0.046	(0.072)	–0.042	(0.028)
Child less than 12 years old	0.030	(0.021)	–0.012	(0.058)	0.036	(0.022)*
Unemployed for 5 years	–0.027	(0.022)	–0.039	(0.044)	–0.022	(0.025)
Work-related						
Lnpay	0.409	(0.030)***	0.356	(0.081)***	0.410	(0.034)***
Tenure	0.004	(0.002)**	–0.000	(0.006)	0.003	(0.002)*
Total hours	0.010	(0.001)***	0.013	(0.004)***	0.010	(0.001)***
Full-time	0.197	(0.045)***	0.146	(0.096)	0.206	(0.050)***
Private	–0.200	(0.027)***	–0.240	(0.133)*	–0.188	(0.028)***
Absenteeism	–0.007	(0.003)**	–0.015	(0.008)*	–0.005	(0.003)
Duties						
Intermediate	–0.116	(0.043)***	0.274	(0.235)	–0.120	(0.044)***
Non-supervisory	–0.171	(0.038)***	0.201	(0.226)	–0.173	(0.038)***
Contract						
Fixed/short term	–0.274	(0.033)***	–0.274	(0.068)***	–0.276	(0.038)***
Casual work	–0.412	(0.029)***	–0.484	(0.065)***	–0.347	(0.034)***
Other	0.041	(0.082)	–0.151	(0.180)	0.124	(0.089)
Human capital						
Training	0.096	(0.019)***	0.232	(0.059)***	0.076	(0.019)***
Overqualified	–0.157	(0.017)***	–0.177	(0.041)***	–0.154	(0.018)***
Third level	0.085	(0.033)**	0.015	(0.088)	0.096	(0.036)***
2nd secondary	0.078	(0.026)***	0.049	(0.055)	0.081	(0.028)***
Health						
Good	-0.154	(0.020)***	-0.064	(0.049)	-0.168	(0.021)***
Fair	-0.089	(0.042)**	-0.013	(0.091)	-0.101	(0.046)**
Bad/Very Bad	-0.057	(0.102)	-0.120	(0.230)	-0.038	(0.112)
Status last year						
Self-employed	-0.068	(0.072)	-0.122	(0.157)	-0.062	(0.082)
Unemployed	-0.070	(0.037)*	-0.008	(0.060)	-0.111	(0.049)**
Inactive	0.069	(0.042)*	0.127	(0.066)*	0.003	(0.055)
Region						
Northern GR	-0.079	(0.023)***	-0.108	(0.063)*	-0.065	(0.025)***
Central GR	-0.077	(0.026)***	-0.063	(0.067)	-0.081	(0.028)***
Aegean islands	-0.003	(0.031)	0.009	(0.072)	-0.001	(0.034)
Constant	-2.985	(0.288)***	-2.800	(0.662)***	-3.065	(0.331)***
Observations	15,206		2,433		12,773	
Wald test(d.f.)	4,324.43 (54)***		651.00 (53)***		2,079.14 (53)***	
Log-likelihood	-22,502.52		-7,274.33		-19,421.28	
Lambda			0.09		-0.08	

Notes: Standard errors in parentheses: robust to arbitrary heteroscedasticity and the repeat sampling of individuals over time.

*: significant at 10%; **: significant at 5%; ***: significant at 1%. The ordinal dependent variable of overall job satisfaction has been transformed to a continuous z-core variable; all regressions include controls for occupation (9), industry (10) and time (7); column 1 includes Heckman estimates, where the selection is a probit regression of the treatment lowpay dummy as in Table A1; column 2 includes Heckman ML estimates of the job satisfaction of low-paid workers; column 3 includes Heckman ML estimates of the job satisfaction of high-paid workers.

Reference groups: *Duties: supervisory; Contract: permanent; Education: below 2nd stage; Health: very good; Status last year: employed; Region: Attica; F test statistic for the joint significance of the identifying restrictions in an overall job satisfaction regression: $F_{(6, 4044)} = 1.53$*

Source: Own calculations using ECHP data.

T a b l e A3

Estimates of effect of low pay status on facets of job satisfaction in Greece, 1995-2001

	Pay	Security	Type of work	Hours	Conditions	Times	Commuting
Lowpay	*-0.188*	*-0.011*	*-0.113*	*-0.042*	*-0.046*	*-0.034*	*0.178*
	(0.094)**	*-0.053*	*(0.058)***	*-0.058*	*0.096*	*-0.075*	*(0.093)**
Observations	15,213.00	15,213.00	15,213.00	15,213.00	15,213.00	15,213.00	15,213.00
Wald test (54)	3,015.77***	9,639.1***	3,683.91***	2,486.37***	2,152.64***	2,111.51***	715.76**
Log-likelihood	−23,017.70	−20,605.33	−22,829.87	−23,531.61	−23,704.82	−23,911.20	−24,667.64

Notes: Standard errors in parentheses: robust to arbitrary heteroscedasticity and the repeat sampling of individuals over time.
*: significant at 10%; **: significant at 5%; ***: significant at 1%. Results for the remaining explanatory variables are available from the authors upon request; all columns include Heckman ML estimates, where the first step is a probit regression of the treatment lowpay dummy on the regressors of the underlying regression model and the chosen selection variables; the 'Times' and 'Conditions' regressions have been estimated using only rooms per person as selection variables, whereas the rest use the good household features dummies as wel; F-test statistics for the joint significance of the selection variables in each job satisfaction regression: Pay – F(6, 4044) = 0.90; Security – F(6, 4044) = 1.62; Type of Work – F(6, 4044) = 1.61; Hours – F(6, 4044) = 1.56; Times – F(6, 4044) = 0.39; Conditions – F(2, 4044) = 1.64; Commuting – F(6, 4044) = 0.32.

treatment effect modelling as above. The application of this two-step empirical procedure once again results in coefficients that differ with respect to OLS estimates. Specifically, while the OLS output (not reported here) does not reveal any significant effect of low-pay status on the individual facets of job satisfaction, the estimates that are corrected for endogeneity are significant for pay and type of work at the 5% level, as discussed in the main text.

Statistical tests that examine the adequacy of the restrictions that identify the endogeneity effects were repeatedly undertaken. Regressions were run in each case to ascertain statistically that our chosen instruments are uncorrelated with the job satisfaction measures that were used. Specifically, the variables used as identifying restrictions were entered as regressors in the job satisfaction equations together with the other covariates. In all regressions the instruments as a group did not add any significant explanatory power as tested by an F test. The relevant F statistics are reported at the end of their respective tables.

Given the desire to investigate whether the explanatory variables exert a differential effect on the satisfaction of

the two types of workers, a Heckman-type selection correction model was employed for both the low-pay and the high-pay sample. This model, commonly known as a "switching regression model with endogenous switching", was most notably espoused by Lee (1978).

The switching regression model consists of two job satisfaction equations, one for each sector:

$$JS_{Hi} = X_i b_H + u_{Hi} \tag{5}$$

$$JS_{Li} = X_i b_L + u_{Li} \tag{6}$$

and one "selection equation" that determines which sector the individual ends up in:

$$I_i^* = Z_i \gamma + \varepsilon_i \tag{7}$$

where I^* is a latent variable which describes the agent's propensity of joining each sector, and Z is a vector of variables determining the employee's selection, at least one not affecting his job satisfaction. Of course, I^* is unobserved, but we know that:

Table A4

Oaxaca decomposition of job satisfaction difference between high-paid and low-paid workers in Greece

Raw differential	*0.727*
(mean job satisfaction of high-paid – mean job satisfaction of low-paid)	
Differential due to:	
Endowments	0.601
Coefficients	0.076
Interaction	0.05
Decomposition of explained difference	
Lnpay	0.336
Age	-0.055
Age^2	0.045
Tenure	0.022
Private	0.074
Training	0.017
Fixed contract	0.015
Casual work	0.100
Tertiary education	0.023

Source: Own calculations using ECHP (1994-2001) data.

$$I_i = 1 \ \ iff \ \ I_i^* > 0 \tag{8}$$

$$I_i = 0 \ \ iff \ \ I_i^* \leq 0 \tag{9}$$

Thus, our observed *JS* data are defined as follows:

$$JS_i = JS_{Li} \ \ iff \ \ I_i > 0 \tag{10}$$

$$JS_i = JS_{Hi} \ \ iff \ \ I_i = 0 \tag{11}$$

$$Cov(u_{Hi}, u_{Li}, \varepsilon_i) = \begin{bmatrix} \sigma_{HH} & \sigma_{HL} & \sigma_{H\varepsilon} \\ \sigma_{HL} & \sigma_{LL} & \sigma_{H\varepsilon} \\ \sigma_{H\varepsilon} & \sigma_{L\varepsilon} & 1 \end{bmatrix} \tag{12}$$

and it is evident that since $E(u_{Li}/I_i^* > 0) \neq 0$ and $E(u_{Hi}/I_i^* \leq 0) \neq 0$, estimation by OLS will result in inconsistency.

The estimation of the selection equation therefore follows the probit method, and then the coefficients from the probit are used for the calculation of the inverse Mill's ratio, as is illustrated in the following two steps:

Firstly, from (7) we retrieve $\hat{\gamma}$ from which we construct

$$\sigma_{L\varepsilon} = Cov(u_L, \varepsilon) \times \frac{\varphi(Z\hat{\gamma})}{\Phi(Z\hat{\gamma})} \tag{13}$$

and

$$\sigma_{H\varepsilon} = Cov(u_H, \varepsilon) \times \frac{\varphi(Z\hat{\gamma})}{1-\Phi(Z\hat{\gamma})} \tag{14}$$

Secondly, the job satisfaction equations are estimated including the respective Mill's ratios as independent variables, as follows:

$$JS_{Hi} = X_i b_H - \sigma_{H\varepsilon} + \eta_{Hi} \tag{15}$$

$$JS_{Li} = X_i b_L - \sigma_{L\varepsilon} + \eta_{Li} \tag{16}$$

The estimated coefficients of b_H and b_L should now provide unbiased estimates of the effect of X. The estimates reported in columns 2 and 3 of Table A2 have therefore allowed for this correction.

T a b l e A5

Description of variables

Variable	Description
Job satisfaction scores (1 = 'not satisfied', 6 = 'fully satisfied')	
Overall job satisfaction	Respondent satisfaction rating with work or main activity
Job satisfaction: facets	Respondent satisfaction rating of facet i of present job (i = earnings, job security, type of work, number of working hours, working times, work conditions/environment, distance to work/commuting)
Identifying variables	
1 room pp	1, if individual lives in household with 1 room per person (not counting kitchen, bathroom and toilets), 0 otherwise
2 rooms pp	1, if individual lives in household with 2 rooms per person (not counting kitchen, bathroom and toilets), 0 otherwise
3 rooms pp	1, if individual lives in household with more than 3 rooms per person (not counting kitchen, bathroom and toilets), 0 otherwise
< 2 good features	1, if accommodation individual lives in has less than two good features, 0 otherwise
3 good features	1, if accommodation individual lives in has 3 good features, 0 otherwise
4 good features	1, if accommodation individual lives in has 4 good features, 0 otherwise
5 good features	1, if accommodation individual lives in has 5 good features, 0 otherwise
6 good features	1, if accommodation individual lives in has 6 good features, 0 otherwise (omitted)
Job and personal characteristics	
Lowpay	1, if individual is low-paid, 0 otherwise
Lnpay	natural log of gross hourly wage of main job (including overtime)
Age	age of respondent at date of interview
Age^2	age squared
Tenure	job tenure at date of interview
Married	1, if individual is married, 0 otherwise
Male	1, if gender is male, 0 otherwise
Hours	Total number of hours worked per week (in main plus additional jobs, including paid overtime)
Child < 12yrs	1, if household has 1 or more children under 12, 0 otherwise
Unemployed 5yrs	1, if individual has been unemployed during 5 years before joining the survey, 0 otherwise
Full-time	1, if main job is full-time, 0 otherwise
Private	1, if current job is in the private sector, 0 otherwise
Absenteeism	Days absent from work because of illness or other reason during last 4 working weeks, not counting holiday weeks
Human capital	
Training	1, if individual had formal training or education that gave skills needed for present type of work, 0 otherwise
Overqualified	1, if individual feels has skills or qualifications to do more demanding job than the one has now, 0 otherwise
Below 2nd stage secondary	1, if highest level of education completed is less than 2nd stage of secondary education, 0 otherwise (omitted)
Second stage secondary	1, if highest level of education completed is second stage of secondary education, 0 otherwise
Third level	1, if highest level of general or higher education completed recognised third level education, 0 otherwise

T a b l e A5 *(continued)*

Description of variables

Variable	Description
Job satisfaction scores (1 = 'not satisfied', 6 = 'fully satisfied')	
Duties	
Supervisory	1, if job status in current job is supervisory (omitted), 0 otherwise
Intermediate	1, if job status in current job is intermediate, 0 otherwise
Non-supervisory	1, if job status in current job is non-supervisory, 0 otherwise
Contract	
Permanent	1, if employment contract in main job is permanent, 0 otherwise (omitted)
Fixed/short term	1, if employment contract in main job is fixed-term or short-term, 0 otherwise
Casual work	1, if employment contract in main job is casual work with no contract, 0 otherwise
Health	
Health: very good	1, if health in general is very good, 0 otherwise (omitted)
Health: good	1, if health in general is good, 0 otherwise
Health: fair	1, if health in general is fair, 0 otherwise
Health: poor	1, if health in general is poor, 0 otherwise
Health: very poor	1, if health in general is very poor, 0 otherwise
Status last year	
Employed	1, if most frequent activity last year was employment, 0 otherwise (omitted)
Self-employed	1, if most frequent activity last year was self-employment, 0 otherwise
Unemployed	1, if most frequent activity last year was unemployment, 0 otherwise
Inactivity	1, if most frequent activity last year was inactivity, 0 otherwise
Region	
Attica	1, if region in which the household is situated is Attica, 0 otherwise (omitted)
Northern GR	1, if region in which the household is situated is Northern Greece, 0 otherwise
Central GR	1, if region in which the household is situated is Central Greece, 0 otherwise
Aegean Islands, Crete	1, if region in which the household is situated are the Aegean Islands or Crete, 0 otherwise
Other controls	
Industry	A set of 10 dummies for one-digit industry, taking the value 1 if the respondent's job belongs to the corresponding industry classification, 0 otherwise. The one-digit industries include: agriculture; mining and manufacturing; construction; retail trade; hotels and restaurants; transport and communication; financial services; public administration; education; health, social services and other (omitted: agriculture)
Occupation	A set of nine dummies for one-digit occupation, taking the value 1 if the respondent's job belongs to the corresponding occupational classification, 0 otherwise. The one-digit occupations include: legislators, senior officials and managers; professionals; technicians and associate professionals; clerks; service and shop and market sales workers; skilled agricultural and fishery workers; craft and related trades workers; plant and machine operators and assemblers; elementary occupations (omitted: elementary occupations)
Year	A set of seven dummies taking the value 1 for observations that belong to the corresponding wave of the ECHP, 0 otherwise. Years of sample comprise: 1995, 1996, 1997, 1998, 1999, 2000 and 2001 (omitted category: 1995)

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Working Papers

(August-December 2004)

This section contains the abstracts of Working Papers authored by Bank of Greece staff and/or collaborators and published by the Bank of Greece. The unabridged version of these publications is available in print or in electronic format at www.bankofgreece.gr.

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Testing long-run purchasing power parity under exchange rate targeting

Sophocles N. Brissimis, Dimitrios A. Sideris and Fragiska K. Voumvaki

Purchasing power parity (PPP) has long attracted the interest of economists and has served as a useful building block in a large number of open economy macroeconomic models. In its relative version it states that changes in nominal exchange rates should equal inflation differentials or, equivalently, that real exchange rates should be constant. Yet, even in its long-run version, PPP has often proved difficult to establish empirically. Various explanations for the failure of long-run PPP based on theoretical or statistical arguments have, therefore, been put forward. The main theoretical arguments are the nature of shocks in the economy and problems related to transaction costs, while the statistical arguments (pointing to an apparent rather than a real failure of PPP) mainly relate to the low power of the statistical tests used and to measurement errors in prices.

In this paper we offer an alternative hypothesis by considering the relevance of long-run PPP in a framework that allows for influences caused by the implementation of an exchange rate rule by the authorities when they are targeting the exchange rate. The novelty of our approach is in emphasising that the coefficient estimates of long-run PPP may compound two distinct effects coming from the behaviour of policymakers intervening in the foreign exchange market in support of a policy rule and of market participants engaging in goods arbitrage. Specifically, market participants, on the one hand, tend to establish PPP in the long run, although their short-run behaviour may be influenced by interventions of the monetary authorities in the foreign exchange market. The monetary authorities, on the other hand, may undertake interventions in the market to support an exchange rate rule that they may follow. If the short-run behaviour of market participants is actually affected by interventions which, in turn, are governed by a policy rule, then testing for long-run PPP by examining the behaviour of exchange rates and relative prices alone, would produce a long-run coefficient between these two variables which depends on the policy rule parameter. Thus, there is a potential bias towards not accepting PPP even as a long-run relationship.

The validity of the theoretical arguments is assessed by drawing on the performance of two European Union countries, Greece and France, for the post-Bretton Woods period. The choice of this sample was motivated by the fact that the monetary authorities of the two countries were pursuing —although in a different institutional setting— an implicit or explicit exchange rate target for the whole or part of the period analysed. Long-run PPP is tested as an equilibrium relationship using the Johansen multivariate cointegration technique. The model specification advocated by this technique allows for different short-run and long-run effects.

The empirical results support the validity of our theoretical postulates. In particular, the results are very supportive of long-run PPP in the case of Greece, once policy effects are taken into account. For France, the results revealed that biases due to

policy effects are not as important as in the case of Greece, confirming that the competitive disinflation policy pursued by the French authorities succeeded only in maintaining competitiveness in the long run rather than improving it.

Our results can be viewed as complementary to the growing body of recent empirical evidence of long-run PPP over the recent float. The new element introduced by our analysis is the investigation of the short-run PPP dynamics and the mechanism establishing this arbitrage condition in the long run in the presence of an intervention policy under exchange rate targeting, which potentially biases empirical tests of long-run PPP. However, our findings show that policy behaviour, while affecting short-run adjustment to PPP and our ability to uncover long-run PPP, cannot prevent the long-run tendency towards purchasing power parity.

The drachma, foreign creditors and the international monetary system: tales of a currency during the 19th and the early 20th century

Working Paper No. 16
Sophia Lazaretou

Fixed exchange rate regimes can be regarded as "rules with escape clauses" which allow the monetary authorities to suspend convertibility temporarily and enact a discretionary policy only under well-understood contingencies, such as wartime emergencies and financial panics. Seen from this perspective, adherence to the specie convertibility rule enabled peripheral countries to establish credibility for the nation's economic policy and, thus, to obtain access to core countries' capital markets. Countries with poor records of adherence were charged considerably more for borrowing. Through institutional arrangements, countries could lower borrowing costs on global capital markets and this was a strong incentive to adopt the gold standard rule quickly. This paper attempts to examine whether Greece can be considered as an example of a country that followed a fixed exchange rate regime with the accepted "escape clauses" for war and financial emergencies. The following questions are addressed. First, under what circumstances did the government choose to "escape"? Second, how aggressively did the Greek government try to return to a fixed exchange rate regime? And third, did adherence to the specie convertibility rule enable the country to derive important benefits in the form of long-term foreign borrowing? The evidence assembled in the paper, both historical and empirical, supports the conclusion that Greece seems to have tried very hard to adhere to "good housekeeping rules". Furthermore, the existence of a time series for market yields on Greek bonds provides an opportunity to corroborate previous evidence gleaned from the case studies. Empirical findings reveal that Greek bond spreads were lower and less persistent in the years when the country adhered to the convertibility rule.

Financial markets and economic growth in Greece, 1986-1999

Working Paper No. 17
George Hondroyiannis, Sarantis Lolos and Evangelia Papapetrou

A large body of the empirical research on the relationship between finance and growth focuses on banking, the traditional intermediation channel. However, over the last two decades, the new element in many countries, especially the developing ones, has been the increasing role for stock markets as providers of intermediation. This development derives from measures to liberalise the financial sector. As a result, there has been renewed research interest in the role of the stock markets as a stimulus to economic growth. Recent advances in the endogenous growth literature have determined the role of financial intermediaries by showing that these can contribute to economic growth through various aspects of productive activity.

The purpose of this paper is to contribute to the empirical investigation of the finance-growth nexus, recognising the separate roles of banking and the stock market. Utilising time-series methods and applying vector error-correction (VEC) model estimation, we examine whether financial intermediation exerts a causal influence on economic growth in the case of Greece, over the period 1986-99. We also test the dynamic interactions among financial variables and economic growth and look into the extent to which the financial sector contributes to the country's economic growth process. Greece is a medium-size EU country with a less mature financial market compared to other advanced economies. Over the last two decades, its financial market has undergone a process of liberalisation at an accelerating pace and expanded considerably, while the fairly remarkable growth rates achieved by the Greek economy after the early 90s have enabled the country to enter the euro area.

The paper provides empirical evidence on two aspects of financial intermediation for the case of Greece, employing monthly data for the period 1986-1999. The first concerns the linkage between real economic activity and total private financial intermediation, whether through banks or the stock market. The second aspect refers to the relationship between the industrial sector's financing and economic performance to investigate the specific role of industry in the growth process. To this end, two models are analysed. In the first model the linkages among real output, total stock market capitalisation and total bank credit to the private sector are examined, while in the second model the relationship among real output, industrial stock capitalisation and bank credit to industry is considered.

The relationship between financial intermediation and economic growth is explained in a temporal Granger-causal framework. This is accomplished by examining the dynamic relationships among the three variables in a multivariate system. The empirical results indicate the existence of a long-run relationship among the three variables in both models. The tests employed show that there exists Granger causality in at least one direction. In the long run real economic activity in Greece should be considered endogenous, affected by

changes in stock market capitalisation and bank credit. Thus, the results suggest that a bi-directional causality exists between real economic activity and stock market capitalisation and also between real economic activity and bank credit. In addition, structural breaks were not detected in the long-run relationships. These findings hold true for the model concerning the whole economy and also for the model for the Greek industrial sector.

However, the estimated coefficients are small in magnitude, suggesting that the interrelation between financing (stock market and bank) and overall economic activity is limited. Thus, in the long run, economic performance is only partially related to financing through intermediation. Besides, the contribution of the stock market financing to the growth process is substantially smaller compared to bank financing. The limited contribution of the stock market to growth is not surprising, given its minor role traditionally played in Greece. However, the limited role of bank financing, shown in our results, is noticeable and needs further investigation, considering the contribution that it is usually thought to have to economic growth.

The global implications of regional exchange rate regimes

We examine the implications of a regional, fixed-exchange-rate regime for global exchange rate volatility. The paper uses a three-country general equilibrium model whose main features include perfect competition, nominal wage rigidities, active monetary policy (forward looking Taylor rules) and a variety of shocks (supply, fiscal and monetary). A generic calibration of the model that relies heavily on parameters commonly used in the literature serves as a useful benchmark. Its purpose is to illuminate the role played by various factors that have been emphasised in the optimum currency area literature (the degree of labour market flexibility and the existence of various types of international asymmetries).

We find that a regional fixed-exchange rate regime tends to decrease global exchange rate volatility if there is sufficient symmetry in the world economy. The results tend to be more ambiguous in the presence of asymmetries, a factor that has been emphasised by the optimum currency area —OCA— theory. In particular, the reduction in volatility is greater when (1) the "ins" have more flexible labour markets than the "outs" (2) the pegging is done by a country with a relatively more flexible labour market and more volatile productivity, and (3) negative correlation in productivity across countries is present. Based on the relationship obtained between country characteristics and volatility, we speculate that global exchange rate volatility would be more likely to decline under a bilateral EUR/USD targeting or if it were the US —rather than the EMU members— that unilaterally targeted the EUR/USD rate.

Testing for long-run PPP in a system context: evidence for the US, Germany and Japan

Working Paper No. 19
Dimitrios Sideris

The present paper extends the current literature on PPP by re-examining the validity of the PPP hypothesis for the three key currencies of the recent floating exchange rate period, the US dollar, the German mark and the Japanese yen, in a multilateral framework. We argue that PPP testing is more adequate in a system context, which takes into account the dynamic interactions of exchange rates and prices of more than two economies, simultaneously. Some form of causality among the variables of the system is also assessed empirically with the aid of weak exogeneity tests. The results illustrate the importance of the multilateral testing. The system analysis provides positive evidence for PPP: weak PPP is supported for the US and Germany but also for the US and Japan, in contrast to evidence of earlier empirical studies, which rejects weak PPP between Japan and the US. The analysis also provides some support for PPP between Germany and Japan. These results probably imply that both Germany and Japan preserved steady price competitiveness with the US for the period analysed, and this is reflected in the third Japan – Germany relationship, which can be considered as a secondary relationship. The system analysis also provides interesting results concerning the weak exogeneity of the variables. It indicates that US prices are the weakly exogenous variable for the long-run relations and thus function as the driving variable in the system. This implies that any shocks that hit US prices are passed through to German and Japanese prices via the equilibrium real exchange rate. The results thus support the hypothesis that the US monetary policy is transmitted to the prices of Germany and Japan.

Monetary policy and financial system supervision measures

(July 2004 - January 2005)

Monetary policy measures of the Eurosystem

1 July, 2 August, 2 September, 7 October, 4 November, 2 December 2004

The Governing Council of the ECB decides that the minimum bid rate on the main refinancing operations and the interest rates on the marginal lending facility and the deposit facility will remain unchanged at 2.0%, 3.0% and 1.0% respectively.

13 January 2005

The Governing Council of the ECB decides that the minimum bid rate on the main refinancing operations and the interest rates on the marginal lending facility and the deposit facility will remain unchanged at 2.0%, 3.0% and 1.0% respectively.

14 January 2005

The Governing Council of the ECB decides to increase the allotment amount for each of the longer-term refinancing operations to be conducted in the year 2005 from €25 billion to €30 billion. This increased amount takes into consideration the higher liquidity needs of the euro area banking system anticipated in 2005. The Eurosystem will however continue to provide the bulk of liquidity through its main refinancing operations.

Bank of Greece decisions concerning the establishment and operation of credit institutions and the supervision of the financial system

19 July 2004

– Credit institutions which are not members of the Athens Exchange are allowed to finance legal persons for conducting stock exchange transactions.

– To achieve correct and consistent implementation of the relevant provisions, the Bank of Greece clarifies some of its decisions referring to the interest rates charged by credit institutions and to the information provided to credit institution customers.

– The "Christoforos K. Varvias & Associates S.A. – Financial Services" is authorised to operate as a money transfer intermediary.

– The "Advanced Chronocash Financial – Electronic Fund Transfer S.A." is authorised to operate as a money transfer intermediary.

– Ceilings are set on the amount of non-innovative hybrid securities issued by credit institutions that may be included in their core capital.

27 July 2004

The Bank of Greece withdraws the authorisation of the "Arab Bank plc" branch operating in Greece.

4 August 2004

– "CBN Greece S.A." is authorised to operate as a money transfer intermediary.

– "Moneylink S.A." is authorised to operate as a money transfer intermediary.

9 September 2004

– The Bank of Greece approves the merger of "Emboriki Bank" with several of its subsidiaries ("Emboriki Investment Bank" inclusive). The merger will be effected through absorption of the above firms by "Emboriki Bank".

– "Smith & Smith Hellas S.A." is authorised to operate as a money transfer intermediary.

10 November 2004

"Athens Tourism Enterprises S.A." is authorised to operate as a money transfer intermediary.

21 December 2004

The ceiling on Postal Savings Bank (PSB) financing of natural persons for the purchase of goods and for covering other personal needs is set at 15% of the PSB's own funds, on condition that its provisions for doubtful loans will at least equal the amount provided for by Law 2238/1994 (1% of the amounts lent).

19 January 2005

Alpha Bank is authorised to acquire 100% of the share capital of the Belgrade-based bank "Jubanka a.d. Beograd".

26 January 2005

The provisioning ratios for claims (i) from non-performing consumer loans one year past due or in permanent arrears and (ii) from doubtful consumer loans are increased, respectively, from 70% to 90% and from 84% to 100%. At the same time, the provisioning ratio on performing loans backed by residential mortgages is lowered from 0.7% to 0.5%, provided that the amount of the loan does not exceed 70% of the objective value of the residential property.

Decisions of the Bank of Greece

Re: Clarifications on Bank of Greece Governor's Acts 1087/1987, 1216/1987, 1955/1991, 2286/1994, 2326/1994 and 2501/2002 on credit institutions' interest rate determination and on information disclosure to credit institutions' customers (Banking and Credit Committee decision 178/3/19 July 2004)

The Banking and Credit Committee, having regard to:

a) the provisions of the Statute of the Bank of Greece, in particular Articles 2 and 55A thereof, as currently in force;

b) Legislative Decree 588/1948 on credit control, as currently in force;

c) Article 13, paragraph 5 and Article 18, paragraph 5, first indent, of Law 2076/1992 "Taking up and pursuit of business of credit institutions and other provisions", as currently in force;

d) the Treaty establishing the European Community and the principles underlying monetary policy conduct by the European System of Central Banks;

e) Bank of Greece Governor's Act 1087/1987, in conjunction with Bank of Greece Governor's Acts 1216/1987, 1955/1991, 2286/1994 and 2326/1994 regarding, *inter alia*, the free determination of interest rates by credit institutions;

f) Bank of Greece Governor's Act 2501/2002 on information disclosure to credit institutions' customers with respect to the terms and conditions governing the provision of bank services;

g) the fact that bank and non-bank interest rates are two separate types of interest rates, the determination of each of which is subject to different criteria and, hence, to distinct, non-overlapping provisions (Article 2, paragraph 3, of Legislative Decree 588/1948 in conjunction with Article 1 of Law 1266/1982, as currently in force, and Article 15, paragraph 5, of Law 876/1979, respectively);

h) the fact that bank interest rates are freely determined, according to the principles underlying monetary policy conduct by the European System of Central Banks, i.e. free competition, open-market economy, under Articles 2, 4 and 105.1 of the Treaty establishing the European Community and Article 2 of the Statute of the European System of Central Banks and the European Central Bank;

i) the need to clarify some provisions of the aforementioned Bank of Greece Governor's Acts with a view to ensuring correct and uniform implementation thereof and thus easier achievement of the Acts' objectives;

j) Hellenic Bank Association document 865/23 June 2004 requesting the interpretation of the provisions on bank interest rate determination;

k) the Bank of Greece Governor's document dated 23 May 2002, which, in reply to a request of the Hellenic Bank Association similar to that in j) above, provides detailed, legally grounded, clarifications,

has decided to clarify the relevant provisions of Bank of Greece Governor's Acts 1087/1987, 1216/1987, 1955/1991, 2286/1994 and 2326/1994, as well as

Bank of Greece Governor's Act 2501/2002, last indent of Section A, paragraphs 1(f), 2a(iv), 2a(vi) and 3 of Section B, paragraphs 1(e) and 2 of Section C, and Section F, as follows:

1. Setting an administrative ceiling on bank rates or correlating them with the current ceiling on non-bank rates is incompatible with the principles referred to in indents (g) and (h) above. As far as its content and purpose are concerned, the ceiling on non-bank rates does not belong to the factors determining bank rates. The latter are set freely, following an assessment of relevant risks, conditions prevailing in financial markets and the overall obligations of banks stemming from the provisions which govern their operation. Therefore, agreements concluded following the liberalisation of bank rates (Bank of Greece Governor's Act 1087/1987 etc.) and setting bank rates which exceed the administrative ceiling on non-bank rates shall not be considered unfair for this reason.

2. a) Paragraph 2, indent a (iv), of Section B of Bank of Greece Governor's Act 2501/2002 on floating rates conforms with the above principle and aims at ensuring full transparency and effectively informing bank borrowers on how the initially agreed interest rate of a loan agreement may change.

b) Changes in floating rates shall be exclusively associated with changes in general and broadly accessible interest rate indicators, such as the European Central Bank key interest rates, the Euribor, bond yields, yields on short-term securities, etc., which shall be explicitly specified in the loan agreement.

The loan agreement shall also explicitly set out the method for the adjustment of the contractual interest rate:

i) as a maximum multiple of the change in the interest rate indicator, or

ii) as the interest rate indicator plus a margin subject to a ceiling.

If more than one indicators are selected, the weight of each indicator in the calculation of the floating rate adjustment shall also be specified in the loan agreement.

c) The phrase "... as well as ... the loan" in paragraph 2, indent a (iv), Section B, of Bank of Greece Governor's Act 2501/2002 refers exclusively to prior information to be provided to prospective borrowers on the factors that may affect the evolution of the interest rate agreed to be used as benchmark rate. Such factors shall not determine *per se* the contractual interest rate.

3. a) One-off costs, expenses on behalf of third parties, as well as special service fees charged by credit institutions in the context of their lending operations (including cash withdrawals via credit cards) shall not be specified as percentages but as fixed amounts, as per the case, the level of which shall be reasonable on account of the nature and type of the service provided (Section B, paragraph 2, indent a (vi), and Section F of Bank of Greece Governor's Act 2501/2002).

b) The requirement for a reasonable and service-specific level of costs and fees shall also apply to deposits and other banking operations (Section B, paragraphs 1 (f) and 3 of Bank of Greece Governor's Act 2501/2002).

4. No fees shall be charged for the periodical statements issued with respect to the minimum information required under Section C, paragraph 2, of Bank of Greece Governor's Act 2501/2002.

5. a) The minimum information requirements under Section B of Bank of Greece Governor's Act 2501/2002 shall not replace the requirement on credit institutions to explicitly set out, in every agreement, the rights and obligations of their counterparties.

b) Any clause allowing for a unilateral modification, on the part of a credit institution, of an agreement (Section C, paragraph 1(e), of Bank of Greece Governor's Act 2501/2002) shall be accompanied by an explicit determination of specific and reasonable criteria for such a modification.

* * *

Re: Recognition of certain types of securities as core capital items of credit institutions (Banking and Credit Committee decision 178/7/19 July 2004)

The Banking and Credit Committee, having regard to:

a) Bank of Greece Governor's Act 2053/18 March 1992 "Definition of own funds of credit institutions established in Greece", as currently in force;

b) Bank of Greece Administration's Circular 17/21 October 2002 "Clarifications on the minimum requirements for the recognition of certain types of securities as core capital items of credit institutions";

c) the advisability of setting specific requirements for the recognition of non-innovative hybrid securities issued by credit institutions as core capital items, in line with international practice,

has decided as follows:

a) Hybrid securities that meet the basic requirements of Bank of Greece Administration's Circular 17/2002 and are included in the credit institutions' core capital as "Lower Tier 1 capital" may not exceed 30% of core capital. Specifically with respect to securities providing the issuing bank with a call option and offering a stepped-up yield to investors if the issuer does not exercise the call option, their share in the Tier 1 capital of the issuing bank may not exceed 15%.

b) The Department for the Supervision of Credit and Financial Institutions is authorised to amend the aforesaid Bank of Greece Administration's Circular in line with the above provisions and adjust the following requirements for the recognition of the said hybrid (innovative and non-innovative) securities as core capital items:

— the minimum Capital Adequacy and Upper-Tier-1-Capital-to-Weighted-Assets ratios that shall apply to the credit institution at the initial issuance and up to maturity of the securities, and

— the period after which the issuing bank may exercise any existing call option.

* * *

Re: Amendment to Bank of Greece Governor's Act 2442/29 January 1999 "Adequacy of credit institutions' provisioning coverage of loans", as currently in force (Bank of Greece Governor's Act 2557/26 January 2005)

The Governor of the Bank of Greece, having regard to:

a) the provisions of the Statute of the Bank of Greece, notably Article 55A, as currently in force;

b) Article 1 of Law 1266/1982 ''Authorities responsible for the conduct of monetary, credit and exchange rate policies, and other provisions'', taken together with Article 12 of Law 2548/1997;

c) Article 18 of Law 2076/1992 ''Taking up and pursuit of business of credit institutions, and other relevant provisions'', as amended by Article 38, par. 3, of Law 2937/2001;

d) Bank of Greece Governor's Act 2442/29 January 1999 "Adequacy of credit institutions' provisioning coverage of loans'', as amended by Bank of Greece Governor's Act 2513/15 January 2003;

e) Bank of Greece Governor's Act 2054/18 March 1992 "Solvency ratio of credit institutions established in Greece", as currently in force;

f) Bank of Greece Governor's Act 2523/12 June 2003 on consumer credit and personal loans;

g) Circular 412/12 May 2003 of the Department for the Supervision of Credit and Financial Institutions, providing instructions and clarifications on the implementation of the Bank of Greece Governor's Acts referred to in d), e) and f) above for the calculation of provisions;

h) the advisability of adjusting the minimum provisioning ratios for certain categories of loans;

i) the fact that the applicable provisioning framework does not relieve credit institutions of their obligation to develop risk management systems;

has decided to amend the provisions of Bank of Greece Governor's Act 2442/29 January 1999, as currently in force, as follows:

1. The minimum provisioning ratios set forth in par. 1 of Bank of Greece Governor's Act 2442/29 January 1999, as currently in force, applying to loans to natural persons according to Bank of Greece Governor's Act 2523/2003, are increased as follows:

   i) from 70% (as it resulted after the increase provided for in par. 3(b) of Bank of Greece Governor's Act 2513/15 January 2003) to

90% for loans under categories (d) and (e) of par. 1 of Bank of Greece Governor's Act 2442/29 January 1999, as currently in force; and

   ii) from 84% (as it resulted after the increase provided for in par. 3(b) of Bank of Greece Governor's Act 2513/15 January 2003) to 100% for loans under category (f) of par. 1 of Bank of Greece Governor's Act 2442/29 January 1999, as currently in force.

2. The minimum provisioning ratio applying, under par. 1 (a) of Bank of Greece Governor's Act 2442/29 January 1999, to the balances of performing loans backed by residential mortgages is reduced from 0.7% (as it resulted after the reduction provided for in par. 3(a) of Bank of Greece Governor's Act 2513/15 January 2003) to 0.5%, subject to the provisions of par. 3(a) of Bank of Greece Governor's Act 2513/15 January 2003.

3. The amounts resulting from the adjustment of provisioning ratios under par. 1 and 2 above shall be taken into account as follows for the evaluation of the capital adequacy of credit institutions: by 50% on the data reported on 31 March 2005 and by 50% on the data reported on 30 September 2005.

Statistical
section

Tables

T a b l e I.1

Consumer price index

(Percentage changes with respect to the corresponding period of the previous year)

Period	General index	General index excluding food and fuel	General index excluding fresh fruit/vegetables and fuel	Goods	Services	Sub-indices		
						Food and non-alcoholic beverages	Fresh fruit and vegetables	Fuel
2001	3.4	3.7	3.8	3.2	3.7	5.1	9.2	−4.8
2002	3.6	3.6	3.6	3.2	4.3	5.3	13.8	−1.7
2003	3.5	3.1	3.2	3.1	4.2	5.0	10.7	3.9
2004	2.9	3.2	3.3	2.3	3.8	0.5	−11.9	7.5
2002 I	4.0	3.4	3.3	4.0	3.9	9.9	43.2	−7.4
II	3.5	3.9	3.9	3.0	4.4	4.7	9.0	−4.9
III	3.5	3.6	3.7	2.7	4.6	4.0	4.5	−0.4
IV	3.6	3.5	3.5	3.0	4.5	2.9	1.0	6.7
2003 I	3.8	3.4	3.6	3.4	4.5	2.3	−5.4	15.9
II	3.7	3.0	3.1	3.4	4.1	8.3	27.6	−2.4
III	3.4	2.9	3.0	2.9	4.1	6.1	19.2	0.9
IV	3.2	3.3	3.2	2.5	4.3	3.3	4.6	1.9
2004 I	2.7	3.2	3.3	1.8	4.0	3.3	2.6	−5.7
II	2.9	3.2	3.3	2.3	3.9	−0.7	−16.3	11.6
III	2.8	3.4	3.4	2.1	3.9	−1.3	−22.8	9.6
IV	3.2	2.9	3.0	2.9	3.5	0.8	−11.3	15.5
2002 Jan.	4.4	3.2	3.3	5.2	3.3	12.9	59.0	−6.4
Feb.	3.4	3.2	3.1	3.1	3.9	8.6	38.1	−10.3
March ..	4.0	3.7	3.6	3.8	4.4	8.1	33.4	−5.5
Apr.	3.8	3.5	3.4	4.0	3.6	7.2	26.7	−2.9
May	3.8	4.3	4.2	2.4	4.9	3.0	−0.6	−6.8
June ...	3.3	3.8	3.9	2.5	4.5	3.9	2.2	−4.8
July	3.3	3.5	3.7	2.7	4.4	3.9	1.7	−1.0
Aug. ...	3.5	3.6	3.6	2.9	4.5	4.2	6.1	0.5
Sept. ...	3.5	3.8	3.7	2.7	4.8	3.9	5.8	−0.8
Oct. ...	3.7	3.6	3.5	3.2	4.6	4.1	8.1	4.3
Nov. ...	3.6	3.5	3.5	3.1	4.5	4.0	6.3	4.0
Dec. ...	3.4	3.5	3.5	2.8	4.3	0.8	−9.1	12.1
2003 Jan.	3.1	3.6	3.7	2.1	4.7	−1.4	−19.6	13.7
Feb.	4.3	3.5	3.8	4.1	4.7	3.7	−0.5	18.6
March ..	4.1	3.1	3.4	4.1	4.1	4.7	5.5	15.4
Apr.	3.4	3.1	3.4	2.6	4.5	5.8	10.9	−1.9
May	3.8	2.8	2.9	3.9	3.7	10.3	40.2	−3.7
June ...	3.8	3.0	3.0	3.6	4.2	8.9	34.6	−1.6
July	3.6	2.9	2.9	3.2	4.1	7.4	28.5	0.5
Aug. ...	3.3	2.9	3.0	2.8	4.0	5.6	17.0	1.6
Sept. ...	3.3	3.1	3.2	2.8	4.2	5.2	12.6	0.7
Oct. ...	3.2	3.2	3.2	2.5	4.2	3.7	4.9	1.1
Nov. ...	3.3	3.2	3.1	2.9	4.1	3.3	5.6	6.3
Dec. ...	3.1	3.4	3.3	2.2	4.5	3.0	3.2	−1.4
2004 Jan.	2.9	3.2	3.2	2.3	3.9	3.5	4.9	−3.0
Feb.	2.5	3.1	3.1	1.5	4.0	3.7	4.7	−8.7
March ..	2.7	3.3	3.4	1.8	4.2	2.8	−1.3	−5.4
Apr.	2.9	3.2	3.2	2.3	3.9	0.4	−10.2	8.3
May	2.9	3.2	3.3	2.4	3.8	−1.0	−17.4	14.9
June ...	2.8	3.3	3.5	2.1	3.9	−1.5	−20.9	11.7
July	2.9	3.8	3.8	2.2	4.0	−2.5	−28.2	10.0
Aug. ...	2.7	3.1	3.2	1.9	4.0	−0.7	−20.3	9.2
Sept. ...	2.8	3.2	3.3	2.2	3.7	−0.7	−19.5	9.5
Oct. ...	3.2	3.0	3.0	3.1	3.5	0.3	−13.6	17.5
Nov. ...	3.1	2.9	3.1	2.8	3.6	0.2	−16.2	16.7
Dec. ...	3.1	2.8	2.9	2.8	3.5	1.9	−4.1	12.1

Source: Calculations based on National Statistical Service of Greece (NSSG) data (CPI 1999=100).

Table I.2

Wholesale price index

(Percentage changes with respect to the corresponding period of the previous year)

Period	General index	Sub-indices		Exported products (primary and industrial)	Final imported products
		Final domestic products for home consumption			
		Primary	Industrial		
2001	2.3	10.0	2.7	0.7	1.9
2002	2.4	11.2	2.6	1.9	0.4
2003	2.1	8.6	2.7	0.1	1.1
2004	2.4	−1.7	4.5	3.4	0.5
2002 I	4.3	34.7	2.6	2.4	0.6
II	1.7	6.9	2.2	1.2	0.2
III	1.6	4.8	2.4	1.3	0.2
IV	2.0	0.6	3.1	2.7	0.6
2003 I	1.7	−2.5	3.6	1.1	1.5
II	2.2	19.6	1.9	−2.0	0.9
III	2.2	12.2	2.4	0.2	1.0
IV	2.2	7.1	3.1	1.0	0.8
2004 I	1.8	4.6	2.8	1.6	0.0
II	2.6	−8.1	5.4	5.6	0.6
III	2.4	−6.0	4.9	4.1	0.5
IV	2.8	3.1	4.7	2.5	0.9
2002 Jan.	5.1	44.4	2.7	2.4	0.8
Feb.	3.6	29.5	2.0	1.9	0.5
March	4.2	30.5	3.0	2.8	0.5
Apr.	3.7	23.3	2.7	2.8	0.4
May	1.2	1.4	2.1	1.2	0.2
June	0.3	−3.4	1.8	−0.3	0.0
July	0.8	−0.7	2.3	0.5	−0.1
Aug.	2.1	9.2	2.5	1.7	0.4
Sept.	1.9	6.0	2.5	1.7	0.4
Oct.	2.4	5.6	3.1	3.2	0.3
Nov.	2.1	4.5	2.9	2.2	0.5
Dec.	1.4	−6.8	3.2	2.7	0.9
2003 Jan.	0.5	−14.2	3.5	1.4	1.4
Feb.	2.6	2.5	4.1	1.9	1.6
March	2.0	4.9	3.0	0.0	1.4
Apr.	1.0	6.5	1.8	−2.2	1.0
May	2.4	28.1	1.7	−3.3	0.9
June	3.1	26.6	2.2	−0.3	1.0
July	2.9	20.9	2.2	0.7	1.2
Aug.	2.2	10.6	2.5	0.7	1.0
Sept.	1.5	5.6	2.5	−0.7	0.9
Oct.	1.9	7.5	2.7	0.2	0.9
Nov.	2.6	7.9	3.5	1.8	0.9
Dec.	2.0	5.9	3.0	1.1	0.6
2004 Jan.	2.3	10.6	2.7	1.9	0.0
Feb.	1.4	4.7	2.5	0.5	−0.1
March	1.6	−0.7	3.1	2.3	0.0
Apr.	2.8	−2.3	5.0	4.6	0.7
May	3.1	−8.5	5.9	7.5	0.7
June	1.9	−13.5	5.4	4.8	0.6
July	2.3	−8.2	5.3	4.1	0.5
Aug.	2.2	−7.1	4.9	4.0	0.3
Sept.	2.7	−2.5	4.6	4.2	0.7
Oct.	2.9	−2.2	5.2	4.1	0.9
Nov.	2.6	1.5	4.7	2.2	0.8
Dec.	2.9	9.7	4.1	1.1	0.9

Source: NSSG.

T a b l e I.3

Industrial production index (2000=100)

(Percentage changes with respect to the corresponding period of the previous year)

Period	Industry				Main categories of goods				
	General index	Manu-facturing	Mining-quarrying	Electricity-town gas-water supply	Energy	Inter-mediate goods	Capital goods	Consumer durables	Consumer non-durables
2000	7.2	5.1	13.4	11.5	12.3	6.2	7.3	12.7	1.9
2001	–1.8	–2.5	2.4	–0.1	–0.3	–0.5	–13.0	–14.4	0.7
2002	0.8	–0.1	9.7	1.8	2.3	1.6	–7.2	–15.4	2.3
2003	0.3	–0.4	–5.2	5.8	2.9	–0.4	0.8	–3.6	–1.4
2002 IV	2.5	2.0	14.5	1.0	2.9	1.9	6.5	–17.8	3.4
2003 I	–1.5	–2.3	–11.3	6.2	4.1	–1.9	–11.1	–5.5	–3.7
II	0.9	0.3	–5.8	6.7	2.9	–2.0	9.4	–8.5	0.4
III	1.6	0.8	–3.8	7.1	6.4	–0.6	8.5	–0.3	–2.4
IV	0.1	–0.5	–0.1	3.0	–1.8	3.0	–2.7	–0.2	0.1
2004 I	1.5	0.4	5.9	4.2	2.2	0.2	3.3	–0.6	1.7
II	2.1	2.7	9.2	–3.5	–0.5	4.9	–1.4	20.0	1.6
III	0.9	1.5	–5.9	1.1	–0.5	–0.4	–0.9	3.1	4.3
2002 Jan.	–3.6	–7.6	13.4	8.4	4.7	–7.8	–32.0	–25.7	5.2
Feb.	–0.3	–1.5	19.7	–1.4	2.2	2.9	–26.3	–12.4	7.0
March.	2.7	2.7	11.9	–0.6	6.8	1.8	–7.0	–12.8	4.6
Apr.	5.3	5.1	8.5	4.9	4.8	13.5	–16.6	–8.3	5.9
May	–1.3	–2.6	11.1	0.2	–1.3	–1.4	–11.9	–16.2	3.5
June	1.1	–0.7	8.8	6.8	4.1	1.4	–2.0	–21.0	0.5
July	0.7	–0.5	1.6	5.4	1.7	1.2	1.8	–14.3	0.0
Aug.	–1.5	–2.4	7.5	–1.3	1.2	0.4	1.8	–19.9	–5.4
Sept.	–1.2	–0.5	–2.7	–3.7	–4.6	1.7	0.7	–4.3	–1.4
Oct.	–0.2	0.0	5.2	–2.9	–0.1	0.4	2.2	–10.8	–0.8
Nov.	1.3	–0.5	17.1	3.9	5.8	–1.5	0.8	–14.4	1.3
Dec.	7.0	7.2	25.0	1.9	3.0	8.1	16.4	–26.2	11.3
2003 Jan.	1.6	4.6	–8.8	–5.6	–1.6	8.8	–9.4	9.3	0.1
Feb.	–3.6	–6.4	–16.0	15.1	6.9	–5.8	–21.1	–9.1	–5.9
March.	–2.1	–3.9	–8.9	10.4	7.2	–6.8	–2.2	–11.6	–5.0
Apr.	–1.9	–3.3	–0.8	5.0	6.1	–7.4	–1.2	–20.6	–1.9
May	3.6	2.9	–8.0	12.1	10.3	–1.0	9.2	–6.3	1.7
June	1.0	1.2	–7.9	3.5	–6.5	2.4	19.3	2.8	1.4
July	1.9	2.4	–6.0	2.8	3.0	1.6	7.2	1.8	–0.3
Aug.	–2.4	–5.3	–4.1	8.8	6.1	–5.3	1.1	–0.8	–9.7
Sept.	4.9	4.3	–1.4	10.8	10.6	0.8	14.4	–1.8	2.3
Oct.	0.6	–0.5	0.3	6.3	–2.0	1.7	–3.5	2.4	3.2
Nov.	–2.6	–2.8	–11.5	2.0	–4.5	2.4	–6.8	–0.6	–5.0
Dec.	2.5	2.0	14.5	1.0	0.9	5.3	1.5	–2.3	2.3
2004 Jan.	–2.7	–5.9	–1.5	9.9	6.1	–9.8	3.4	–23.3	–5.0
Feb.	2.2	2.2	6.6	0.7	0.7	2.2	–1.6	0.3	5.1
March.	4.5	4.4	12.0	2.5	0.1	7.6	7.2	16.5	4.4
Apr.	3.3	3.3	12.9	–0.2	–2.2	6.5	1.3	17.6	5.2
May	2.3	3.9	4.6	–6.1	–2.6	7.0	1.3	20.6	1.1
June	0.8	1.1	10.2	–4.0	3.5	1.3	–5.7	21.6	–1.4
July	2.1	2.6	3.7	0.0	0.0	1.3	6.8	12.8	3.3
Aug.	0.5	2.3	–13.9	–0.3	–3.1	–3.2	–4.8	6.7	9.3
Sept.	0.0	–0.1	–7.6	3.8	1.7	–0.2	–6.3	–7.5	1.1
Oct.	–3.6	–4.9	–2.2	1.9	–3.5	–4.0	–3.6	–12.4	–2.6
Nov.*	2.8	3.4	–11.4	5.6	7.7	0.2	–0.1	–12.5	2.9

* Provisional data.
Source: NSSG, revised industrial production index with 2000 as the base year.

Table I.4

Retail sales volume (2000=100)

(Percentage changes with respect to the corresponding period of the previous year)

Period	General index	Sub-indices			
		Food-beverages-tobacco	Clothing and footwear	Furniture and fixtures	Books-stationery-other items
2000	8.8	7.4	13.3	11.5	8.3
2001	4.4	2.3	3.3	4.7	5.9
2002	4.5	4.5	2.8	4.4	5.2
2003	4.6	5.4	1.6	4.0	7.5
2002 III	5.5	7.6	0.9	5.7	6.3
IV	5.9	7.0	3.9	2.9	3.3
2003 I	6.7	7.7	−3.5	13.7	7.2
II	2.6	1.3	10.5	−1.7	11.5
III	5.9	4.7	7.8	3.6	8.8
IV	3.5	7.7	−4.9	1.7	3.2
2004 I	4.9	6.2	0.6	5.7	6.6
II	5.1	7.8	−1.4	6.2	4.6
III	4.7	8.2	3.0	3.6	5.7
2002 Apr.	−1.9	−4.7	−3.2	1.7	2.2
May	7.9	10.8	2.1	−0.1	12.8
June	5.8	7.7	−0.6	3.6	7.7
July	3.6	4.6	1.6	1.9	7.0
Aug.	4.3	9.7	−8.8	6.7	3.3
Sept.	8.6	8.7	10.0	9.0	8.0
Oct.	5.4	6.4	7.7	0.7	4.1
Nov.	4.8	6.4	3.9	2.2	0.0
Dec.	7.2	7.9	1.5	5.1	5.0
2003 Jan.	8.2	9.6	−4.2	19.8	11.6
Feb.	4.6	7.0	−8.5	10.1	3.5
March	7.3	6.6	5.0	10.8	6.3
Apr.	4.2	4.2	12.3	−8.0	21.2
May	1.8	−0.8	12.3	1.8	8.1
June	1.7	0.3	6.2	1.4	5.3
July	2.1	−0.1	5.5	2.0	3.0
Aug.	11.2	9.1	12.5	6.9	12.6
Sept.	5.2	5.3	6.4	2.2	11.2
Oct.	3.2	6.8	−5.6	5.7	1.2
Nov.	6.5	9.4	1.3	2.8	9.5
Dec.	1.4	7.2	−8.7	−2.4	0.5
2004 Jan.	2.9	7.2	−3.9	−3.4	2.2
Feb.	6.4	4.8	5.6	13.0	10.1
March	5.4	6.5	0.2	9.1	8.1
Apr.	5.9	8.6	−3.5	9.7	4.9
May	4.3	6.7	−5.3	7.9	4.5
June	5.0	8.2	5.7	1.4	4.5
July	6.6	13.7	2.0	2.7	4.3
Aug.	3.3	3.5	5.0	4.7	8.0
Sept.	4.3	7.6	2.5	3.5	5.3
Oct.	6.2	10.0	6.2	3.4	4.9
Nov.	2.8	. . .	. . .	. . .	. . .

Sources: NSSG and Eurostat. Revised index of retail sales volume (excluding VAT).

T a b l e I.5

Gross value added at basic prices and gross domestic product at market prices

		Million euro	Annual percentage changes (at constant 1995 prices)					
		1995	1999	2000	2001	2002	2003	2004
1.1	Primary sector (agriculture)	7,277	3.5	−4.2	−4.1	−1.3	−4.2	. . .
1.2	Secondary sector	16,550	2.4	5.4	6.4	2.0	5.5	. . .
1.2.a	Mining and quarrying	476	−17.9	23.2	2.2	8.4	−4.8	. . .
1.2.b	Manufacturing	9,572	1.3	4.6	3.3	2.4	2.5	. . .
1.2.c	Electricity - town gas - water supply	1,751	13.4	4.8	1.3	1.8	6.3	. . .
1.2.d	Construction	4,751	2.3	5.7	14.4	0.8	11.2	. . .
1.3	Tertiary sector	50,031	2.0	5.1	5.2	3.6	4.9	. . .
1.3.a	Trade	10,018	−0.8	3.1	11.4	1.4	6.7	. . .
1.3.b	Hotels - restaurants	4,821	−5.7	5.4	6.2	5.2	5.2	. . .
1.3.c	Transport - communications	4,978	33.4	16.2	1.3	5.9	6.0	. . .
1.3.d	Financial intermediaries	3,112	11.0	10.0	5.9	−5.2	8.9	. . .
1.3.e	Real estate management and other activities	12,577	−5.9	3.5	3.6	1.6	2.8	. . .
1.3.f	Public administration - security	5,308	0.9	−2.8	1.1	8.0	2.4	. . .
1.3.g	Education	3,298	−2.2	1.6	−1.2	12.2	1.4	. . .
1.3.h	Health	3,855	−2.0	3.0	2.5	4.9	4.9	. . .
1.3.i	Other activities	2,064	9.6	7.6	15.2	7.4	6.0	. . .
1.4	Gross value added	73,858	2.1	4.4	4.8	3.0	4.4	. . .
1.5	Imputed bank services	−2,175	2.8	13.7	12.1	−9.4	13.1	. . .
1.6	Gross value added at basic prices	71,683	2.1	4.1	4.5	3.5	4.1	. . .
2.1	Final consumption	70,655	2.4	4.2	1.8	3.4	3.1	3.9
2.1.a	Private consumption	58,405	2.5	2.0	3.0	3.0	4.4	3.5
2.1.b	Public consumption	12,250	2.1	14.8	−3.1	5.3	−2.5	5.5
2.2	Gross fixed capital formation	14,867	11.0	8.0	6.5	5.7	13.7	5.8
2.2.a	Residential	4,031	3.7	−4.3	4.8	8.8	7.3	−6.5
2.2.b	Non-residential construction	5,391	6.6	8.9	8.2	0.7	13.2	12.6
2.2.c	Equipment	4,680	21.4	14.1	4.9	6.9	18.3	6.5
2.2.d	Other investment	765	−2.4	7.6	20.1	20.0	3.4	2.0
2.3	Stocks and statistical discrepancy (percentage of GDP)	251	0.0	0.7	0.1	0.4	0.1	0.0
2.4	Domestic final demand	85,774	3.8	5.6	2.4	4.2	5.3	4.3
2.5	Exports of goods and services	14,087	18.1	14.1	−1.1	−7.7	1.0	7.3
2.5.a	Exports of goods	8,344	6.3	8.7	−1.6	−7.1	4.2	−10.0
2.5.b	Exports of services	5,743	29.0	18.2	−0.7	−8.1	−1.3	20.0
2.6	Final demand	99,861	6.1	7.2	1.7	2.0	4.6	4.8
2.7	Imports of goods and services	19,934	15.0	15.1	−5.2	−2.9	4.8	8.3
2.7.a	Imports of goods	18,084	8.5	15.2	−6.3	3.2	6.6	7.5
2.7.b	Imports of services	1,849	52.9	14.4	−0.4	−26.5	−5.3	13.0
2.8	GDP at market prices	79,927	3.4	4.5	4.3	3.6	4.5	3.7

Source: NSSG/National Accounts, September 2004: final data for 1999 and revised data for 2000-2003. Ministry of Economy and Finance (Stability and Growth Programme 2004-2007) for 2004.

Table II.1

Balance of payments

(Million euro)

	January – November			November		
	2002	2003	2004*	2002	2003	2004*
I CURRENT ACCOUNT BALANCE (I.A+I.B+I.C+I.D)	**–7,013.8**	**–7,055.9**	**–5,083.7**	**–1,516.0**	**–1,251.8**	**–1,367.6**
I.A TRADE BALANCE (I.A.1– I.A.2)	**–20,706.4**	**–20,382.8**	**–23,046.8**	**–1,985.6**	**–1,787.7**	**–2,312.3**
Non-oil trade balance	–17,541.6	–16,736.8	–18,875.4	–1,679.3	–1,453.9	–1,887.6
Oil trade balance	–3,164.8	–3,646.0	–4,171.4	–306.3	–333.8	–424.7
I.A.1 *Exports of goods*	*9,446.5*	*10,088.0*	*11,416.3*	*845.9*	*907.7*	*1,180.2*
Oil	1,012.7	1,186.2	1,401.1	83.9	72.9	167.5
Other	8,433.8	8,901.8	10,015.2	762.0	834.8	1,012.7
I.A.2 *Imports of goods*	*30,152.9*	*30,470.8*	*34,463.1*	*2,831.6*	*2,695.5*	*3,492.6*
Oil	4,177.5	4,832.2	5,572.5	390.2	406.7	592.2
Other	25,975.4	25,638.6	28,890.6	2,441.4	2,288.8	2,900.4
I.B SERVICES BALANCE (I.B.1– I.B.2)	**10,474.4**	**11,099.8**	**14,811.5**	**259.4**	**354.3**	**593.7**
I.B.1 *Receipts*	*19,995.9*	*19,993.1*	*25,015.7*	*1,185.4*	*1,274.2*	*1,578.9*
Travel	10,043.3	9,273.8	10,119.0	248.5	250.0	248.0
Transport	7,818.5	8,599.6	12,094.7	742.8	832.8	1,150.2
Other	2,134.0	2,119.7	2,802.0	194.1	191.4	180.7
I.B.2 *Payments*	*9,521.4*	*8,893.3*	*10,204.3*	*926.0*	*919.9*	*985.3*
Travel	2,344.0	1,945.6	2,078.5	265.1	220.0	210.0
Transport	4,626.9	4,396.6	5,230.7	434.1	445.5	505.8
Other	2,550.6	2,551.1	2,895.1	226.8	254.4	269.4
I.C INCOME BALANCE (I.C.1– I.C.2)	**–1,864.4**	**–2,376.0**	**–2,287.8**	**–128.6**	**–69.7**	**–74.2**
I.C.1 *Receipts*	*1,487.2*	*1,397.9*	*1,528.5*	*127.8*	*104.5*	*143.5*
Compensation of employees	474.2	309.9	253.3	32.1	24.1	20.6
Interest, dividends, profits	1,013.1	1,088.0	1,275.2	95.7	80.4	122.9
I.C.2 *Payments*	*3,351.6*	*3,773.9*	*3,816.2*	*256.4*	*174.2*	*217.7*
Compensation of employees	226.0	153.2	172.1	18.6	18.2	17.7
Interest, dividends, profits	3,125.6	3,620.7	3,644.1	237.8	156.0	200.0
I.D TRANSFERS BALANCE (I.D.1– I.D.2)	**5,082.5**	**4,603.1**	**5,439.3**	**338.9**	**251.4**	**425.2**
I.D.1 *Receipts*	*7,236.5*	*6,962.6*	*8,082.0*	*499.9*	*656.7*	*710.5*
General government (EU transfers)	5,101.1	4,729.7	5,850.3	310.6	475.4	525.1
Other (emigrants' remittances, etc.)	2,135.4	2,232.9	2,231.7	189.3	181.3	185.4
I.D.2 *Payments*	*2,154.0*	*2,359.5*	*2,642.7*	*161.0*	*405.4*	*285.3*
General government	1,575.8	1,857.6	2,037.6	120.3	356.9	224.2
Other	578.2	501.9	605.0	40.7	48.4	61.1
II FINANCIAL ACCOUNT (II.A+II.B+II.C+II.D)	**8,377.8**	**7,730.9**	**6,005.9**	**1,394.4**	**1,137.5**	**1,004.4**
II.A DIRECT INVESTMENT[1]	**–516.6**	**–599.2**	**563.9**	**–42.9**	**–326.2**	**–49.5**
By residents abroad	–546.1	–466.5	–450.6	–73.8	–22.6	–19.9
By non-residents in Greece	29.6	–132.6	1,014.5	30.8	–303.6	–29.6
II.B PORTFOLIO INVESTMENT[1]	**10,983.3**	**10,640.5**	**10,484.1**	**1,473.1**	**–513.5**	**–1,205.9**
Assets	–1,265.3	–7,944.7	–10,223.3	27.3	–1,723.1	–2,049.4
Liabilities	12,248.7	18,585.2	20,707.4	1,445.8	1,209.6	843.4
II.C OTHER INVESTMENT[2]	**–32.0**	**–6,180.4**	**–6,735.2**	**82.3**	**2,017.2**	**1,985.8**
Assets	–7,790.2	–5,019.4	–11,356.3	–1,274.2	359.6	–1,046.6
Liabilities	7,758.2	–1,161.0	4,621.1	1,356.5	1,657.6	3,032.5
(General government loans)	–4,078.1	–2,459.5	–804.7	–1,074.3	–169.0	–67.7
II.D CHANGE IN RESERVE ASSETS[2]	**–2,057.0**	**3,870.0**	**1,693.0**	**–118.0**	**–40.0**	**274.0**
III ERRORS AND OMISSIONS	**–1,364.0**	**–675.0**	**–922.1**	**121.6**	**114.3**	**363.2**
RESERVE ASSETS[3]				*9,088.0*	*5,144.0*	*2,700.0*

1 (+) net inflow, (–) net outflow.
2 (+) decrease, (–) increase.
3 Reserve assets, as defined by the European Central Bank, include only monetary gold, the reserve position in the IMF, the special drawing rights and the Bank of Greece claims in foreign currency on residents of non-euro area countries. Conversely, reserve assets do not include claims in euro on residents of non-euro area countries, claims in foreign currency and in euro on residents of euro area countries, and the Bank of Greece participation in the capital and reserves of the ECB.
* Provisional data.
Source: Bank of Greece.

Table II.2

Effective exchange rate of the euro calculated on the basis of Greece's external trade*

(Period averages)

| Period | Index (1990=100) | Percentage changes over:[1] | |
		Previous period	Previous year
1997	64.3	−1.9	−1.9
1998	60.5	−5.9	−5.9
1999	59.9	−0.9	−0.9
2000	56.2	−6.2	−6.2
2001	55.9	−0.6	−0.6
2002	56.4	0.9	0.9
2003	58.0	2.9	2.9
2004	58.5	0.8	0.8
2002 I	55.9	−0.01	−0.3
II	56.2	0.5	1.0
III	56.6	0.7	1.4
IV	56.8	0.4	1.6
2003 I	57.5	1.2	2.8
II	58.2	1.2	3.5
III	58.1	−0.2	2.6
IV	58.2	0.3	2.5
2004 I	58.5	0.5	1.8
II	58.2	−0.6	0.01
III	58.4	0.3	0.5
IV	58.8	0.8	1.0
2003 Jan.	57.3	0.6	2.4
Feb.	57.6	0.4	3.0
March	57.7	0.2	3.2
Apr.	57.8	0.2	3.3
May	58.4	1.1	3.9
June	58.4	0.1	3.4
July	58.2	−0.3	2.8
Aug.	58.1	−0.3	2.7
Sept.	58.0	−0.2	2.4
Oct.	58.1	0.3	2.5
Nov.	58.1	−0.1	2.2
Dec.	58.5	0.7	2.6
2004 Jan.	58.6	0.2	2.3
Feb.	58.6	−0.1	1.8
March	58.4	−0.4	1.3
Apr.	58.1	−0.5	0.5
May	58.3	0.4	−0.2
June	58.2	−0.1	−0.3
July	58.3	0.2	0.2
Aug.	58.4	0.01	0.5
Sept.	58.4	0.1	0.8
Oct.	58.6	0.3	0.9
Nov.	58.8	0.3	1.3
Dec.	59.0	0.4	0.9
2005 Jan.	58.9	−0.3	0.4

* The effective exchange rate is the value of a representative basket of foreign currencies, each of which is weighted on the basis of its importance in the country's external trade. Up to end-2000, the effective exchange rate of the drachma was calculated weighting the individual bilateral exchange rates of the drachma against the other currencies, as these rates were formulated in the foreign exchange market. On 1 January 2001, Greece adopted the euro. In the present table, the weighting of the euro exchange rate vis-à-vis the other currencies is calculated on the basis of the country's non-oil external trade. As from January 2001, the change in the index is limited, since trade with the 11 other euro area countries (which accounts for a large share of total trade) is conducted in euro. This index should not be confused with the effective exchange rate of the euro, which is calculated on the basis of the external trade of the euro area as a whole.
1 A positive sign indicates an appreciation of the euro, while a negative sign a depreciation.
Source: Bank of Greece.

T a b l e II.3

Bilateral exchange rates of the euro*

(Units of national currency per euro, period averages)

Period	US dollar	Percentage change over: Previous period	Previous year	Japanese yen	Percentage change over: Previous period	Previous year	Danish krone	Percentage change over: Previous period	Previous year	Pound sterling	Percentage change over: Previous period	Previous year
1997	1.134	−10.7	−10.7	137.1	−0.7	−0.7	7.48	1.7	1.7	0.692	−14.9	−14.9
1998	1.121	−1.1	−1.1	146.4	6.8	6.8	7.50	0.2	0.2	0.676	−2.3	−2.3
1999	1.066	−4.9	−4.9	121.3	−17.2	−17.2	7.44	−0.8	−0.8	0.659	−2.6	−2.6
2000	0.924	−13.3	−13.3	99.5	−18.0	−18.0	7.45	0.1	0.1	0.609	−7.6	−7.6
2001	0.896	−3.1	−3.1	108.7	9.3	9.3	7.45	0.03	0.03	0.622	2.1	2.1
2002	0.945	5.5	5.5	118.1	8.6	8.6	7.43	−0.3	−0.3	0.629	1.1	1.1
2003	1.131	19.7	19.7	131.0	10.9	10.9	7.43	0.003	0.003	0.692	10.1	10.1
2004	1.243	9.9	9.9	134.4	2.6	2.6	7.44	0.1	0.1	0.679	−1.9	−1.9
2002 I	0.876	−2.1	−5.1	116.0	4.8	6.4	7.43	−0.1	−0.4	0.615	−1.0	−2.8
II	0.919	4.9	5.3	116.5	0.4	8.8	7.43	0.04	−0.3	0.629	2.3	2.3
III	0.984	7.0	10.4	117.3	0.7	8.3	7.43	−0.1	−0.2	0.635	1.0	2.6
IV	1.000	1.7	11.7	122.5	4.4	10.7	7.43	0.0004	−0.2	0.636	0.2	2.5
2003 I	1.074	7.3	22.5	127.7	4.2	10.1	7.43	0.03	−0.02	0.670	5.3	9.0
II	1.136	5.9	23.7	134.7	5.5	15.6	7.43	−0.1	−0.1	0.701	4.7	11.6
III	1.124	−1.1	14.3	132.1	−1.9	12.7	7.43	0.1	0.04	0.699	−0.4	10.0
IV	1.189	5.8	18.9	129.5	−2.0	5.7	7.44	0.1	0.1	0.697	−0.2	9.6
2004 I	1.251	5.2	16.5	134.0	3.5	5.0	7.45	0.2	0.3	0.680	−2.5	1.5
II	1.204	−3.7	6.0	132.1	−1.4	−1.9	7.44	−0.1	0.2	0.667	−1.9	−4.9
III	1.222	1.5	8.7	134.4	1.7	1.7	7.44	−0.04	0.1	0.672	0.8	−3.8
IV	1.296	6.1	9.0	137.1	2.0	5.9	7.43	−0.03	−0.03	0.695	3.4	−0.3
2003 Jan. ...	1.063	4.4	20.3	126.2	1.6	7.8	7.43	0.1	−0.004	0.657	2.4	6.6
Feb. ...	1.077	1.4	23.8	128.6	1.9	10.6	7.43	−0.01	0.02	0.670	1.9	9.5
March .	1.081	0.3	23.4	128.2	−0.3	11.8	7.43	−0.1	−0.1	0.683	1.9	10.8
Apr. ...	1.085	0.4	22.5	130.1	1.5	12.4	7.43	−0.03	−0.1	0.689	0.9	12.2
May ...	1.158	6.8	26.3	135.8	4.4	17.2	7.42	−0.01	−0.1	0.713	3.5	13.5
June ..	1.166	0.7	22.2	138.1	1.6	17.2	7.43	0.01	−0.1	0.702	−1.5	9.1
July ...	1.137	−2.5	14.6	135.0	−2.2	15.3	7.43	0.1	0.04	0.700	−0.3	9.7
Aug. ..	1.114	−2.0	13.9	132.4	−1.9	13.8	7.43	−0.01	0.1	0.699	−0.2	9.9
Sept. ..	1.122	0.7	14.4	128.9	−2.6	8.9	7.43	−0.1	0.003	0.697	−0.3	10.5
Oct. ..	1.169	4.2	19.2	128.1	−0.6	5.4	7.43	0.04	0.01	0.698	0.1	10.7
Nov. ..	1.170	0.1	16.9	127.8	−0.2	5.1	7.44	0.1	0.1	0.693	−0.7	8.7
Dec. ..	1.229	5.0	20.7	132.4	3.6	6.6	7.44	0.1	0.2	0.702	1.3	9.3
2004 Jan. ...	1.261	2.7	18.7	134.1	1.3	6.3	7.45	0.1	0.2	0.692	−1.4	5.3
Feb. ...	1.265	0.3	17.4	134.8	0.5	4.8	7.45	0.04	0.3	0.677	−2.2	1.1
March .	1.226	−3.0	13.5	133.1	−1.2	3.9	7.45	−0.02	0.3	0.671	−0.8	−1.7
Apr. ...	1.199	−2.3	10.5	129.1	−3.0	−0.8	7.44	−0.1	0.2	0.665	−0.9	−3.4
May ...	1.201	0.2	3.7	134.5	4.2	−1.0	7.44	−0.04	0.2	0.672	0.9	−5.8
June ..	1.214	1.1	4.1	132.86	−1.2	−3.8	7.43	−0.1	0.1	0.664	−1.1	−5.4
July ...	1.227	1.1	7.9	134.08	0.9	−0.7	7.44	0.02	0.03	0.666	0.2	−5.0
Aug. ..	1.218	−0.7	9.3	134.54	0.3	1.6	7.44	0.01	0.1	0.669	0.5	−4.3
Sept. ..	1.222	0.3	8.9	134.51	−0.02	4.3	7.44	0.02	0.1	0.681	1.8	−2.2
Oct. ..	1.249	2.2	6.8	135.97	1.1	6.1	7.44	−0.003	0.1	0.691	1.5	−0.9
Nov. ..	1.299	4.0	11.0	136.09	0.1	6.5	7.43	−0.1	−0.1	0.699	1.0	0.8
Dec. ..	1.341	3.2	9.1	139.14	2.2	5.1	7.43	0.03	−0.1	0.695	−0.5	−1.0
2005 Jan. ...	1.312	−2.2	4.0	135.63	−2.5	1.1	7.44	0.1	−0.1	0.699	0.5	0.9

* To 31 December 1998, rates for the ECU; from 1 January 1999, rates for the euro. A positive sign indicates an appreciation of the euro, while a negative sign a depreciation. On 1 January 2001, Greece adopted the euro. Therefore, the evolution of the exchange rate of the drachma vis-à-vis the currencies of non-euro area countries is identical with the evolution of the exchange rate of the euro vis-à-vis these currencies. Up to end-2001, however, the differentiation observed in the annual rates of change is attributable to the deviation of the drachma from its central parity in 2000.
Sources: Bank of Greece and European Central Bank (ECB).

T a b l e II.3 *(continued)*

Bilateral exchange rates of the euro*

(Units of national currency per euro, period averages)

Period	Swedish krona		Percentage change over: Previous period	Previous year	Swiss franc		Percentage change over: Previous period	Previous year	Norwegian krone		Percentage change over: Previous period	Previous year	Australian dollar		Percentage change over: Previous period	Previous year	Canadian dollar		Percentage change over: Previous period	Previous year
1997	8.65	1.6	1.6	1.644	4.9	4.9	8.02	−2.2	−2.2	1.528	−5.9	−5.9	1.569	−9.4	−9.4
1998	8.92	3.1	3.1	1.622	−1.3	−1.3	8.47	5.6	5.6	1.787	17.0	17.0	1.665	6.1	6.1
1999	8.81	−1.2	−1.2	1.600	−1.4	−1.4	8.31	−1.8	−1.8	1.652	−7.6	−7.6	1.584	−4.9	−4.9
2000	8.45	−4.1	−4.1	1.558	−2.6	−2.6	8.11	−2.4	−2.4	1.589	−3.8	−3.8	1.371	−13.4	−13.4
2001	9.26	9.5	9.5	1.510	−3.1	−3.1	8.05	−0.8	−0.8	1.732	9.0	9.0	1.387	1.1	1.1
2002	9.16	−1.0	−1.0	1.467	−2.9	−2.9	7.51	−6.7	−6.7	1.737	0.2	0.2	1.483	6.9	6.9
2003	9.12	−0.4	−0.4	1.521	3.6	3.6	8.00	6.5	6.5	1.738	0.1	0.1	1.582	6.7	6.7
2004	9.12	0.003	0.003	1.544	1.5	1.5	8.37	4.7	4.7	1.689	−2.8	−2.8	1.617	2.2	2.2
2002 I	9.16	−3.4	1.7	1.473	−0.001	−3.9	7.81	−2.0	−4.8	1.692	−3.3	−2.8	1.397	−1.3	−0.9
II	9.16	−0.02	0.3	1.465	−0.6	−4.1	7.52	−3.7	−6.2	1.666	−1.5	−2.2	1.428	2.2	6.1
III	9.23	0.8	−2.0	1.464	−0.1	−2.8	7.40	−1.6	−7.6	1.796	7.8	3.5	1.536	7.6	11.7
IV	9.09	−1.5	−4.0	1.467	0.2	−0.5	7.32	−1.1	−8.2	1.792	−0.3	2.4	1.570	2.2	10.9
2003 I	9.18	1.0	0.3	1.466	−0.02	−0.5	7.58	3.5	−3.0	1.809	1.0	6.9	1.620	3.2	16.0
II	9.14	−0.4	−0.1	1.518	3.5	3.6	7.96	5.0	5.8	1.774	−1.9	6.5	1.589	−1.9	11.3
III	9.16	0.2	−0.7	1.545	1.8	5.6	8.25	3.7	11.5	1.709	−3.7	−4.9	1.553	−2.2	1.1
IV	9.01	−1.7	−0.9	1.554	0.6	5.9	8.22	−0.3	12.4	1.661	−2.8	−7.3	1.566	0.8	−0.2
2004 I	9.18	1.9	−0.01	1.569	0.9	7.0	8.64	5.0	14.0	1.633	−1.7	−9.7	1.649	5.3	1.8
II	9.15	−0.4	0.03	1.538	−2.0	1.3	8.26	−4.3	3.9	1.689	3.4	−4.8	1.637	−0.8	3.0
III	9.16	0.1	−0.06	1.536	−0.1	−0.6	8.39	1.5	1.7	1.723	2.0	0.8	1.600	−2.3	3.0
IV	9.01	−1.6	0.05	1.534	−0.2	−1.3	8.20	−2.3	−0.3	1.713	−0.6	3.1	1.582	−1.1	1.0
2003 Jan. . . .	9.18	0.9	−0.5	1.462	−0.4	−0.8	7.34	0.6	−7.4	1.822	0.8	6.6	1.636	3.1	15.8
Feb. . . .	9.15	−0.3	−0.4	1.467	0.3	−0.7	7.54	2.8	−3.1	1.811	−0.6	6.8	1.630	−0.4	17.4
March .	9.23	0.9	1.8	1.470	0.1	0.1	7.85	4.0	1.7	1.795	−0.9	7.5	1.594	−2.2	14.7
Apr. . . .	9.15	−0.8	0.2	1.496	1.8	2.1	7.83	−0.2	2.7	1.781	−0.8	7.7	1.585	−0.6	13.2
May . . .	9.16	0.02	−0.7	1.516	1.3	4.0	7.87	0.5	4.7	1.787	0.3	7.2	1.602	1.0	12.7
June . .	9.12	−0.4	0.04	1.541	1.7	4.7	8.16	3.7	10.2	1.755	−1.8	4.6	1.580	1.6	8.1
July . . .	9.19	0.7	−0.9	1.548	0.4	5.8	8.29	1.6	11.9	1.718	−2.1	−4.1	1.569	−0.7	2.4
Aug. . .	9.24	0.6	−0.1	1.540	−0.5	5.2	8.26	−0.4	11.1	1.711	−0.4	−5.2	1.557	−0.8	1.5
Sept. . .	9.07	−1.8	−1.1	1.547	0.5	5.6	8.20	−0.7	11.3	1.697	−0.9	−5.4	1.533	−1.5	−0.7
Oct. . .	9.01	−0.6	−1.0	1.549	0.1	5.7	8.23	0.4	12.1	1.687	−0.6	−5.4	1.549	1.0	0.1
Nov. . .	8.99	−0.2	−1.0	1.559	0.7	6.2	8.20	−0.4	12.0	1.634	−3.1	−8.5	1.536	−0.8	−2.4
Dec. . .	9.02	0.3	−0.8	1.554	−0.3	5.9	8.24	0.6	13.0	1.663	1.8	−8.0	1.613	5.0	1.6
2004 Jan. . . .	9.14	1.3	−0.4	1.566	0.7	7.1	8.59	4.3	17.1	1.637	−1.5	−10.1	1.635	1.3	−0.1
Feb. . . .	9.18	0.4	0.3	1.573	0.5	7.2	8.78	2.1	16.3	1.626	−0.7	−10.2	1.682	2.9	3.2
March .	9.23	0.6	0.1	1.567	−0.4	6.6	8.54	−2.7	8.9	1.637	0.7	−8.8	1.631	−3.0	2.3
Apr. . . .	9.17	−0.8	0.1	1.555	−0.8	3.9	8.30	−2.8	5.9	1.614	−1.4	−9.4	1.607	−1.5	1.4
May . . .	9.13	−0.4	−0.3	1.540	−0.9	1.6	8.21	−1.1	4.3	1.703	5.5	−4.7	1.654	2.9	3.3
June . .	9.143	0.2	0.3	1.519	−1.4	−1.4	8.29	1.0	1.5	1.748	2.6	−0.4	1.649	−0.3	4.4
July . . .	9.196	0.6	0.1	1.527	0.5	−1.3	8.48	2.3	2.2	1.714	−2.0	−0.3	1.622	−1.6	3.4
Aug. . .	9.186	−0.1	−0.6	1.539	0.8	−0.1	8.33	−1.7	0.9	1.715	0.1	0.2	1.601	−1.3	2.8
Sept. . .	9.092	−1.0	0.3	1.543	0.3	−0.3	8.36	0.3	2.0	1.740	1.5	2.5	1.577	−1.5	2.9
Oct. . .	9.062	−0.3	0.6	1.543	−0.03	−0.4	8.23	−1.5	0.1	1.705	−2.0	1.1	1.560	−1.1	0.7
Nov. . .	8.998	−0.7	0.05	1.522	−1.4	−2.4	8.14	−1.1	−0.7	1.687	−1.1	3.2	1.554	−0.4	1.2
Dec. . .	8.982	−0.2	−0.5	1.536	1.0	−1.2	8.22	1.0	−0.3	1.746	3.5	5.0	1.633	5.1	1.3
2005 Jan. . . .	9.048	0.7	−1.0	1.547	0.7	−1.2	8.21	−0.1	−4.4	1.715	−1.8	4.7	1.606	−1.7	−1.8

* To 31 December 1998, rates for the ECU; from 1 January 1999, rates for the euro. A positive sign indicates an appreciation of the euro, while a negative sign a depreciation. On 1 January 2001, Greece adopted the euro. Therefore, the evolution of the exchange rate of the drachma vis-à-vis the currencies of non-euro area countries is identical with the evolution of the exchange rate of the euro vis-à-vis these currencies. Up to end-2001, however, the differentiation observed in the annual rates of change is attributable to the deviation of the drachma from its central parity in 2000.
Sources: Bank of Greece and European Central Bank (ECB).

Table III.1

Monetary aggregates of the euro area[1,2]

(Outstanding balances in billion euro, not seasonally adjusted)

End of period	Currency in circulation (1)	Overnight deposits (2)	M1 (3)=(1)+(2)	Deposits with an agreed maturity of up to 2 years (4)	Deposits redeemable at notice of up to 3 months (5)	M2 (6)=(3)+(4)+ +(5)	Repurchase agreements (repos) (7)	Money market fund units (8)	Money market paper and debt securities with an initial maturity of up to 2 years (9)	M3[3] (10)=(6)+(7)+ +(8)+(9)
2001	239.7	2,039.2	2,279.0	1,088.8	1,316.6	4,684.4	218.5	398.0	145.9	5,446.8
2002	341.2	2,158.3	2,499.4	1,075.7	1,406.3	4,981.0	226.9	470.5	127.7	5,806.4
2003	397.9	2,331.4	2,729.3	1,039.0	1,529.6	5,297.9	208.7	582.0	88.4	6,177.0
2002 Jan.	246.5	1,976.8	2,223.3	1,081.0	1,335.0	4,639.3	216.2	416.6	141.8	5,413.9
Feb.	240.3	1,972.2	2,212.5	1,076.8	1,339.1	4,628.4	221.1	427.0	138.8	5,415.2
March . .	254.3	1,969.1	2,223.4	1,088.5	1,343.1	4,655.0	229.6	431.2	137.2	5,468.4
Apr.	261.7	2,001.1	2,262.8	1,092.1	1,336.1	4,691.0	228.1	437.5	134.7	5,506.6
May	273.8	2,001.2	2,275.0	1,099.6	1,338.1	4,712.4	234.8	442.6	144.0	5,549.6
June	285.7	2,048.4	2,334.1	1,074.9	1,343.5	4,752.2	229.6	439.2	132.8	5,569.6
July	296.6	2,015.9	2,312.4	1,083.7	1,346.5	4,742.3	228.8	450.3	125.5	5,562.7
Aug.	301.1	1,984.6	2,285.7	1,096.9	1,351.9	4,734.2	236.5	463.4	126.5	5,576.7
Sept.	306.7	2,057.4	2,364.1	1,073.6	1,354.1	4,791.4	238.3	460.4	131.3	5,622.7
Oct.	313.9	2,041.0	2,354.8	1,093.7	1,362.2	4,810.4	235.6	463.1	133.7	5,643.4
Nov.	321.4	2,093.1	2,414.5	1,086.3	1,374.6	4,875.0	229.6	477.6	131.1	5,713.8
Dec.	341.2	2,158.3	2,499.4	1,075.7	1,406.3	4,981.0	226.9	470.5	127.7	5,806.4
2003 Jan.	312.1	2,128.7	2,440.8	1,077.2	1,405.5	4,923.8	233.0	534.9	109.2	5,800.5
Feb.	319.3	2,131.9	2.451.2	1,079.6	1,420.7	4,950.8	233.3	547.2	109.0	5,841.1
March . .	327.2	2,170.3	2.497.5	1,072.9	1,435.8	5,003.6	224.0	550.8	99.4	5,880.3
Apr.	336.3	2,190.9	2,527.2	1,082.1	1,443.1	5,052.4	230.5	565.5	122.6	5,970.9
May	343.8	2,217.7	2,561.5	1,097.4	1,450.5	5,109.4	231.7	571.5	103.7	6,016.3
June	351.0	2,254.4	2,605.4	1,060.6	1,464.0	5,130.1	215.0	570.5	99.9	6,015.5
July	361.5	2,223.3	2,584.8	1,064.1	1,475.3	5,124.3	219.9	585.0	94.1	6,023.3
Aug.	362.7	2,210.5	2.573.2	1,070.1	1,482.7	5,126.0	217.1	587.3	92.5	6,022.8
Sept.	364.8	2,250.7	2,615.6	1,038.6	1,482.8	5,136.9	211.5	576.9	87.6	6,013.0
Oct.	371.3	2,249.1	2,620.4	1,049.6	1,487.9	5,157.9	224.7	582.3	99.6	6,064.5
Nov.	379.2	2,288.6	2,667.8	1,043.5	1,494.8	5,206.1	224.7	585.1	99.5	6,115.4
Dec.	397.9	2,331.4	2,729.3	1,039.0	1,529.6	5,297.9	208.7	582.0	88.4	6,177.0
2004 Jan.	389.1	2,314.0	2,703.1	1,021.5	1,547.2	5,271.7	214.6	591.6	90.9	6,168.8
Feb.	393.5	2,310.1	2,703.6	1,016.2	1,553.8	5,273.5	228.6	599.2	92.2	6,193.5
March . .	399.6	2,346.2	2,745.8	1,005.3	1,559.1	5,310.2	219.4	602.0	89.7	6,221.4
Apr.	409.4	2,361.6	2,771.0	1,006.1	1,567.5	5,344.5	225.5	610.8	94.7	6,275.5
May	416.6	2,372.3	2,788.9	1,015.1	1,573.4	5,377.4	221.9	609.7	90.9	6,300.0
June	423.0	2,410.5	2,833.5	988.8	1,585.7	5,407.9	217.7	609.2	95.0	6,329.9
July	436.2	2,398.4	2,834.6	1,000.2	1,593.3	5,428.1	223.0	613.1	92.7	6,356.8
Aug.	433.4	2,362.7	2,796.0	1,003.2	1,599.0	5,398.3	226.0	624.1	93.8	6,342.2
Sept.	438.0	2,420.0	2,858.0	993.6	1,600.8	5,452.4	218.7	609.6	92.8	6,373.5
Oct.	444.4	2,422.4	2,866.7	1,019.4	1,604.8	5,490.9	230.7	617.1	92.6	6,431.3
Nov.* . . .	448.7	2,464.5	2,913.3	1,003.7	1,611.4	5,528.3	224.3	613.5	95.6	6,461.6

1 Monetary aggregates comprise monetary liabilities of MFIs and central government (Postal Savings Bank, Ministry of Finance) vis-à-vis non-MFI euro area residents excluding central government.
2 Euro area-11 up to end-2000. Euro area-12 from 1 January 2001 onwards.
3 M3 and its components exclude non-euro area residents' holdings of money market fund units, money market paper and debt securities with an initial maturity of up to 2 years.
* Provisional data.
Source: ECB.

T a b l e III.2

Greek contribution to the main monetary aggregates of the euro area[1]

(Outstanding balances in billion euro, not seasonally adjusted)

| End of period | Overnight deposits | | | Deposits with an agreed maturity of up to 2 years | Deposits redeemable at notice of up to 3 months[2] | Repurchase agreements (repos) | Money market fund units | Debt securities of up to 2 years | Total[3] (M3 excluding currency in circulation) |
| | | Sight deposits and current accounts | Savings deposits | | | | | | |
	(1)=(1.1)+(1.2)	(1.1)	(1.2)	(2)	(3)	(4)	(5)	(6)	(7)=(1)+(2)+ +(3)+(4)+ +(5)+(6)
2001	70.8	16.1	54.7	29.4	2.4	24.2	9.7	0.1	136.7
2002	71.7	15.2	56.5	28.9	2.3	20.0	10.7	0.2	133.8
2003	79.5	17.6	61.9	32.3	2.0	10.8	15.7	0.5	140.8
2004	91.7	20.7	71.0	33.4	1.9	9.5	15.2	0.5	152.3
2002 Jan.	69.2	14.3	54.9	26.5	2.4	23.9	9.8	0.1	131.9
Feb.	68.9	13.8	55.1	27.3	2.4	23.0	9.4	0.1	131.1
March . .	67.4	12.5	54.9	27.2	2.4	24.2	9.3	0.1	130.7
Apr.	69.3	13.7	55.6	26.9	2.4	22.9	8.9	0.0	130.4
May	69.0	13.3	55.7	26.6	2.4	22.8	8.9	0.0	129.8
June	70.6	14.2	56.4	26.0	2.3	22.6	8.7	0.0	130.2
July	70.8	14.3	56.5	26.0	2.3	22.5	8.9	0.0	130.6
Aug.	71.3	14.1	57.2	26.3	2.3	22.8	8.9	0.1	131.7
Sept.	72.3	14.7	57.6	25.4	2.3	22.9	9.1	0.1	132.2
Oct.	70.0	13.5	56.5	26.6	2.3	23.2	9.0	0.1	131.2
Nov.	69.1	13.3	55.8	27.3	2.3	22.0	9.1	0.2	130.0
Dec.	71.7	15.2	56.5	28.9	2.3	20.0	10.7	0.2	133.8
2003 Jan.	70.3	14.2	56.1	28.9	2.2	20.2	12.0	0.2	133.7
Feb.	71.8	14.4	57.4	27.1	2.2	19.2	12.9	0.2	133.5
March . .	72.5	14.9	57.6	27.3	2.2	16.8	14.1	0.2	133.2
Apr.	72.7	14.6	58.1	28.7	2.2	16.3	14.4	0.3	134.7
May	71.9	14.5	57.4	28.8	2.0	15.7	14.7	0.3	133.4
June	74.9	16.7	58.2	29.7	2.1	13.5	15.7	0.4	136.3
July	72.9	15.8	57.1	32.0	2.1	13.0	15.8	0.4	136.3
Aug.	74.0	16.1	57.9	33.0	2.2	12.2	15.7	0.4	137.5
Sept.	74.9	17.1	57.8	32.7	2.1	12.0	15.6	0.4	137.7
Oct.	74.0	16.2	57.8	33.3	2.1	11.8	15.6	0.5	137.3
Nov.	74.1	15.4	58.7	32.9	2.1	11.6	15.5	0.5	136.7
Dec.	79.5	17.6	61.9	32.3	2.0	10.8	15.7	0.5	140.8
2004 Jan.	79.5	17.2	61.6	32.5	2.1	10.6	15.2	0.5	139.7
Feb.	79.6	17.3	62.3	32.1	2.1	10.5	15.2	0.5	139.9
March . .	82.1	17.8	64.3	31.8	2.1	9.5	15.8	0.4	141.6
Apr.	81.4	17.8	63.6	33.5	2.2	9.1	15.9	0.4	142.5
May	82.5	17.0	65.5	32.2	2.1	8.9	15.6	0.4	141.8
June	84.9	18.3	66.6	32.4	2.1	9.4	15.8	0.4	145.0
July	85.5	18.3	67.2	33.0	2.1	9.3	15.9	0.4	146.2
Aug.	84.9	17.7	67.2	33.2	2.1	9.6	15.8	0.4	146.1
Sept.	86.0	18.7	67.3	33.4	2.1	10.5	15.3	0.5	147.8
Oct.	86.4	18.9	67.5	33.6	2.0	10.4	15.4	0.5	148.2
Nov.	87.5	19.6	67.9	33.8	2.0	10.1	15.3	0.5	149.1
Dec.	91.7	20.7	71.0	33.4	1.9	9.5	15.2	0.5	152.3

1 The Greek contribution begins upon Greece's entry into the euro area (1 January 2001). For statistical reasons, however, the data on monetary aggregates were extended to cover previous years as well.

2 Including savings deposits in currencies other than the euro.

3 The Greek M3 (and likewise any euro area national M3) can no longer be accurately calculated, since part of the quantity of euro banknotes and coins that have been put into circulation in a euro area country is held by residents of other euro area countries and/or by non-residents. Due to these technical problems, the compilation of the Greek M0, M1, M2 and M3 was interrupted in January 2003.

Source: Bank of Greece.

Table III.3

Greece: deposits of domestic firms and households with OMFIs,[1] by currency and type

(Outstanding balances in million euro, not seasonally adjusted)

| End of period | Total deposits | By currency | | By type | | |
		Deposits in euro[2]	Deposits in other currencies	Sight deposits	Savings deposits	Time deposits[3]
2001	101,809.5	79,566.0	22,243.5	13,385.2	58,323.1	30,101.1
2002	104,761.1	87,732.3	17,028.8	13,367.3	60,406.1	30,987.7
2003	115,750.1	98,119.3	17,630.8	15,395.8	65,141.1	35,213.2
2004	128,424.6	110,206.7	18,217.9	18,274.2	73,954.2	36,196.1
2002 Jan.	97,542.0	78,693.6	18,848.4	11,839.1	58,355.2	27,347.7
Feb.	98,302.4	79,029.9	19,272.4	11,356.7	58,674.4	28,271.3
March	96,741.8	77,970.2	18,771.6	10,267.5	58,309.6	28,164.7
Apr.	98,685.7	80,274.3	18,411.5	11,584.4	58,979.2	28,122.2
May	97,779.9	79,934.6	17,845.3	10,795.2	59,174.0	27,810.7
June	98,751.5	81,549.4	17,202.1	11,758.3	59,654.1	27,339.2
July	99,132.9	81,816.4	17,316.4	11,888.0	59,768.1	27,476.8
Aug.	99,924.1	82,255.7	17,668.4	11,656.2	60,475.4	27,792.5
Sept.	101,076.4	84,497.2	16,579.2	12,328.6	61,820.2	26,927.6
Oct.	100,492.7	83,175.9	17,316.8	11,399.8	60,572.9	28,519.9
Nov.	100,771.6	83,612.4	17,159.2	11,686.3	59,933.8	29,151.4
Dec.	104,761.1	87,732.3	17,028.8	13,367.3	60,406.1	30,987.7
2003 Jan.	102,687.7	85,423.3	17,264.4	11,703.0	59,707.7	31,277.0
Feb.	102,455.9	85,527.5	16,928.4	12,419.8	60,981.4	29,054.7
March	103,684.4	86,637.5	17,046.9	12,996.7	61,203.6	29,484.0
Apr.	105,407.4	87,642.8	17,764.6	12,664.5	61,690.6	31,052.2
May	104,593.8	86,997.3	17,596.5	12,586.4	60,809.6	31,197.8
June	108,637.5	90,199.0	18,438.5	14,702.7	61,700.5	32,234.3
July	108,694.9	89,934.1	18,760.8	13,670.6	60,471.2	34,553.1
Aug.	110,793.2	91,498.3	19,294.9	14,035.9	61,242.3	35,515.0
Sept.	111,384.5	92,881.7	18,502.8	14,958.4	61,151.5	35,274.5
Oct.	111,068.9	92,207.8	18,861.1	14,024.4	61,020.5	36,024.0
Nov.	110,668.9	92,383.7	18,285.2	13,157.4	61,846.9	35,664.6
Dec.	115,750.1	98,119.3	17,630.8	15,395.8	65,141.1	35,213.2
2004 Jan.	114,996.0	96,977.6	18,018.4	14,874.7	64,645.4	35,476.0
Feb.	115,491.9	97,036.0	18,455.9	15,089.7	66,332.2	34,070.0
March	117,571.4	98,647.3	18,924.1	15,479.0	67,322.0	34,770.4
Apr.	118,835.4	99,526.4	19,309.0	15,687.6	66,697.8	36,450.0
May	118,645.4	99,905.7	18,739.7	14,995.6	68,548.9	35,100.9
June	120,997.2	102,774.4	18,222.8	16,078.1	69,641.4	35,277.7
July	122,396.3	103,778.5	18,617.8	16,368.9	70,186.6	35,840.9
Aug.	122,065.6	103,347.9	18,717.7	15,579.5	70,397.0	36,089.1
Sept.	123,471.3	104,687.8	18,783.6	16,727.8	70,396.8	36,346.7
Oct.	123,971.8	105,394.3	18,577.5	16,840.4	70,593.6	36,537.8
Nov.	124,875.8	106,408.6	18,467.2	17,304.0	70,903.5	36,668.3
Dec.	128,424.6	110,206.7	18,217.9	18,274.2	73,954.2	36,196.1

1 Other Monetary Financial Institutions (OMFIs) comprise credit institutions (other than the Bank of Greece) and money market funds.
2 Including (until 31 December 2001) deposits in drachmas and the other euro legacy currencies.
3 Including blocked deposits.
Source: Bank of Greece.

Table III.4

Domestic MFI loans to domestic enterprises and households, by branch of economic activity

(Balances in million euro)

End of period	Total	In euro	In foreign currency	Agricul- ture	Industry[1]	Trade	Housing	Tourism	Consumer credit	Other
2001	74,027.4	66,722.6	7,304.8	3,724.2	12,614.9	15,524.3	15,652.2	2,171.3	7,852.0	16,488.5
2002	86,510.5	80,099.7	6,410.8	3,224.7	14,364.0	15,670.8	21,224.7	2,903.2	9,755.4	19,367.7
2003	101,178.1	95,649.4	5,528.7	3,082.7	15,865.1	16,514.4	26,534.2	3,488.2	12,409.6	23,283.9
2004	117,201.7	111,951.1	5,250.6	3,248.0	15,675.6	18,821.6	33,126.8	4,040.0	17,053.8	25,235.9
2002 Jan.....	73,982.0	66,648.1	7,333.9	3,230.0	12,435.1	15,174.6	16,024.7	2,236.0	7,783.7	17,097.9
Feb.....	75,202.2	67,723.9	7,478.3	3,030.3	12,724.5	15,846.7	16,417.5	2,267.5	7,944.7	16,971.0
March ..	76,235.3	69,080.0	7,155.3	3,139.4	13,168.1	15,788.0	16,891.9	2,316.4	8,129.8	16,801.7
Apr.....	76,958.0	69,886.9	7,071.1	3,196.1	12,801.1	15,939.4	17,362.1	2,341.0	8,301.2	17,017.1
May ...	78,009.6	71,192.8	6,816.8	3,193.0	12,912.6	16,064.7	17,721.8	2,372.2	8,508.3	17,237.0
June ...	79,960.9	73,475.3	6,485.6	3,167.7	13,360.0	16,516.2	18,194.3	2,414.5	8,678.1	17,630.1
July	81,233.9	74,622.8	6,611.1	3,167.7	13,720.8	16,570.9	18,759.9	2,411.6	8,868.0	17,735.0
Aug. ...	82,041.4	75,311.8	6,729.6	3,191.4	13,625.4	16,580.6	19,304.9	2,399.3	8,997.7	17,942.1
Sept. ...	82,662.6	75,930.7	6,731.9	3,212.8	13,785.6	16,059.8	19,503.8	2,560.0	9,228.1	18,312.5
Oct. ...	83,996.1	77,164.1	6,832.0	3,221.6	13,961.2	16,161.2	19,914.7	2,635.0	9,420.9	18,681.5
Nov. ...	85,614.8	78,732.9	6,881.9	3,167.1	14,528.2	15,663.2	20,416.6	2,761.1	9,612.9	19,465.7
Dec. ...	86,510.5	80,099.7	6,410.8	3,224.7	14,364.0	15,670.8	21,224.7	2,903.2	9,755.4	19,367.7
2003 Jan.....	88,241.8	81,751.6	6,490.2	2,964.2	14,529.2	16,321.5	21,599.4	2,978.4	9,884.9	19,964.2
Feb.....	88,787.7	82,332.2	6,455.5	2,980.5	14,485.6	16,310.3	22,062.6	3,049.0	10,023.3	19,876.4
March ..	89,363.0	83,075.2	6,287.8	2,994.0	14,422.3	16,053.5	22,366.8	3,095.5	10,247.3	20,183.6
Apr.....	90,770.3	84,710.6	6,059.7	3,043.0	14,565.0	16,113.4	22,747.1	3,149.2	10,344.7	20,807.9
May ...	92,497.1	86,811.4	5,685.7	3,027.6	14,866.7	16,488.6	23,183.1	3,085.8	10,432.6	21,412.7
June ...	94,344.1	88,447.4	5,896.7	3,062.3	15,165.2	16,139.3	23,705.7	3,201.0	10,600.9	22,469.7
July	96,253.7	90,203.0	6,050.7	3,062.9	15,674.1	16,307.5	24,267.2	3,207.5	10,871.8	22,862.7
Aug. ...	97,350.8	91,177.5	6,173.3	3,102.1	15,681.4	16,700.8	24,573.2	3,255.1	11,075.2	22,963.0
Sept. ...	97,747.2	91,865.5	5,881.7	3,103.0	15,544.4	16,612.9	25,043.9	3,278.1	11,301.1	22,863.8
Oct. ...	98,403.4	92,480.6	5,922.8	3,117.3	15,481.2	16,393.0	25,559.5	3,321.0	11,670.4	22,861.0
Nov. ...	99,829.3	94,044.9	5,784.4	3,093.6	15,780.9	16,633.3	25,808.6	3,392.4	12,063.2	23,057.3
Dec. ...	101,178.1	95,649.4	5,528.7	3,082.7	15,865.1	16,514.4	26,534.2	3,488.2	12,409.6	23,283.9
2004 Jan.....	102,748.9	96,982.9	5,766.0	3,055.4	16,005.1	16,822.7	26,902.8	3,536.8	12,690.8	23,735.3
Feb.....	103,899.7	98,214.0	5,685.7	3,042.0	15,948.2	17,060.8	27,334.5	3,587.7	13,041.9	23,884.6
March ..	105,263.2	99,372.4	5,890.8	3,095.5	15,831.8	17,012.4	27,894.2	3,661.6	13,442.3	24,325.4
Apr.....	106,447.1	100,530.0	5,917.1	3,150.5	15,734.1	17,134.7	28,465.8	3,703.2	13,798.6	24,460.2
May ...	108,835.0	103,158.1	5,676.9	3,242.6	15,950.4	17,773.5	29,080.6	3,766.9	14,169.3	24,851.7
June ...	109,806.8	104,096.1	5,710.7	3,324.8	15,831.1	17,952.6	29,035.7	3,801.5	14,585.6	25,275.5
July	111,624.2	105,976.3	5,647.9	3,348.0	15,997.2	18,214.6	29,822.1	3,862.7	14,985.2	25,394.4
Aug. ...	111,905.0	106,222.2	5,682.8	3,376.4	15,740.2	18,062.7	30,244.2	3,841.8	15,327.8	25,311.9
Sept. ...	113,392.1	107,821.5	5,570.6	3,402.8	15,743.6	18,335.8	30,832.5	3,865.3	15,722.9	25,489.2
Oct. ...	114,868.1	109,490.1	5,378.0	3,397.8	15,988.2	18,687.8	31,404.7	3,987.5	16,114.1	25,288.0
Nov. ...	115,636.5	110,275.4	5,361.1	3,303.2	15,755.2	18,612.8	32,138.9	3,930.4	16,580.3	25,315.7
Dec. ...	117,201.7	111,951.1	5,250.6	3,248.0	15,675.6	18,821.6	33,126.8	4,040.0	17,053.8	25,235.9

1 Comprising manufacturing and mining.
Source: Bank of Greece.

Table III.5
ECB and Bank of Greece interest rates
(Percentages per annum)

1. ECB interest rates				2. Bank of Greece interest rates				
With effect from[1]	Deposit facility	Main refinancing operations[3]	Marginal lending facility	With effect from	Overnight deposit facility, first tier[4]	Overnight deposit facility, second tier[4]	14-day intervention rate	Lombard rate
1999 1 Jan.	2.00	3.00	4.50	**1999** 14 Jan.	11.50	9.75	12.00	13.50
4 Jan.[2]	2.75	3.00	3.25	21 Oct.	11.00	9.75	11.50	13.00
22 Jan.	2.00	3.00	4.50	16 Dec.	10.25	9.25	10.75	12.25
9 Apr.	1.50	2.50	3.50	27 Dec.	10.25	9.00	10.75	11.50
5 Nov.	2.00	3.00	4.00					
2000 4 Feb.	2.25	3.25	4.25	**2000** 27 Jan.	9.50	8.50	9.75	11.00
17 March	2.50	3.50	4.50	9 March	8.75	8.00	9.25	10.25
28 Apr.	2.75	3.75	4.75	20 Apr.	8.00	7.50	8.75	9.50
9 June	3.25	4.25	5.25	29 June	7.25	–	8.25	9.00
28 June[3]	3.25	4.25	5.25	6 Sept.	6.50	–	7.50	8.25
1 Sept.	3.50	4.50	5.50	15 Nov.	6.00	–	7.00	7.75
6 Oct.	3.75	4.75	5.75	29 Nov.	5.50	–	6.50	7.25
				13 Dec.	4.75	–	5.75	6.50
				27 Dec.	3.75	–	4.75	5.75
2001 11 May	3.50	4.50	5.50					
31 Aug.	3.25	4.25	5.25					
18 Sept.	2.75	3.75	4.75					
9 Nov.	2.25	3.25	4.25					
2002 6 Dec.	1.75	2.75	3.75					
2003 7 March	1.50	2.50	3.50					
6 June	1.00	2.00	3.00					

1 The date refers to the deposit and marginal lending facilities. For main refinancing operations, unless otherwise indicated, changes in the rate are effective from the first operation following the date indicated. The change on 18 September 2001 was effective on that same day.

2 On 22 December 1998 the ECB announced that, as an exception measure between 4 and 21 January 1999, a narrow corridor of 50 basic points would be applied between the interest rate for the marginal lending facility and that for the deposit facility, aimed at facilitating the transition of market participants to the new regime.

3 Until 21 June 2000: fixed-rate tenders, from 28 June 2000: minimum bid rate in variable rate tenders.

4 On 29 June 2000 the second tier of the deposit facility was abolished; the interest rate thereafter applies to the unified deposit acceptance account.

Sources: ECB and Bank of Greece.

T a b l e III.6

Greek government paper yields

(Percentages per annum, period averages)

| Period | Yield on one-year Treasury bills | Yield on government bonds | | | | | |
		3-year	5-year	7-year	10-year	15-year	20-year
2000	6.22	5.99	5.98	6.05	6.10	6.26	6.35
2001	4.08	4.28	4.58	4.82	5.30	5.51	5.76
2002	3.50	4.06	4.45	4.78	5.12	5.24	5.52
2003	2.34	2.82	3.37	3.83	4.27	4.32	4.91
2004	2.27	2.87	3.37	3.81	4.25	4.53	4.77
2002 Jan.	3.48	4.27	4.51	4.95	5.24	5.36	5.55
Feb.	3.59	4.37	4.73	5.07	5.31	5.41	5.60
March	3.81	4.58	5.00	5.27	5.51	5.58	5.78
Apr.	3.86	4.59	4.99	5.27	5.51	5.60	5.84
May	3.98	4.63	5.00	5.27	5.52	5.60	5.86
June	3.87	4.46	4.81	5.09	5.36	5.47	5.71
July	3.65	4.23	4.59	4.90	5.21	5.33	5.57
Aug.	3.44	3.90	4.29	4.60	4.95	5.07	5.34
Sept.	3.24	3.59	3.98	4.33	4.73	4.86	5.18
Oct.	3.13	3.52	3.95	4.34	4.79	4.94	5.32
Nov.	3.02	3.40	3.87	4.26	4.76	4.90	5.33
Dec.	2.87	3.19	3.63	4.05	4.58	4.71	5.13
2003 Jan.	2.70	2.91	3.36	3.81	4.43	4.51	4.97
Feb.	2.50	2.65	3.31	3.89	4.24	4.27	4.83
March	2.41	2.82	3.38	3.83	4.26	4.33	4.90
Apr.	2.46	2.99	3.50	3.96	4.38	4.45	5.02
May	2.25	2.64	3.12	3.57	4.02	4.09	4.73
June	2.02	2.38	2.88	3.33	3.81	3.86	4.57
July	2.08	2.62	3.18	3.65	4.12	4.16	4.83
Aug.	2.28	2.98	3.51	3.91	4.29	4.34	4.90
Sept.	2.26	2.91	3.47	3.91	4.32	4.37	4.96
Oct.	2.30	2.94	3.52	3.95	4.38	4.43	5.02
Nov.	2.41	3.06	3.67	4.09	4.51	4.55	5.10
Dec.	2.38	2.97	3.58	4.02	4.45	4.49	5.04
2004 Jan.	2.21	2.71	3.34	3.81	4.37	4.33	4.94
Feb.	2.17	2.91	3.28	3.90	4.35	4.28	4.91
March	2.06	2.71	3.26	3.71	4.17	4.43	4.75
Apr.	2.16	2.90	3.45	3.90	4.35	4.72	4.88
May	2.30	3.08	3.63	4.07	4.49	4.86	5.01
June	2.41	3.19	3.73	4.15	4.55	4.89	5.03
July	2.36	3.07	3.61	4.03	4.44	4.79	4.93
Aug.	2.30	2.91	3.43	3.85	4.28	4.63	4.78
Sept.	2.37	2.91	3.40	3.79	4.22	4.56	4.70
Oct.	2.32	2.76	3.25	3.65	4.11	4.47	4.61
Nov.	2.33	2.66	3.12	3.53	3.97	4.33	4.47
Dec.	2.30	2.59	2.98	3.36	3.77	4.10	4.24

Source: Bank of Greece.

Table III.7

Greece: bank rates on new euro-denominated deposits of, and loans to, euro area residents

(Percentages per annum)

| Period | Deposits by households | | | Deposits by non-financial corporations | | Repurchase agreements (repos)[3] |
	Overnight[1,2]	Savings[2]	With an agreed maturity of up to 1 year[3]	Overnight[2]	With an agreed maturity of up to 1 year[3]	
2002 Sept.	1.57	1.57	3.13	0.84	3.36	3.22
Oct.	1.56	1.57	3.17	0.90	3.39	3.01
Nov.	1.55	1.55	3.15	0.84	3.46	3.17
Dec.	1.10	1.09	2.93	0.74	3.10	2.97
2003 Jan.	1.10	1.09	2.83	0.74	2.88	2.75
Feb.	1.10	1.10	2.73	0.75	2.79	2.71
March	1.06	1.05	2.68	0.69	2.40	2.54
Apr.	1.05	1.04	2.70	0.73	2.67	2.46
May	1.04	1.03	2.61	0.70	2.66	2.45
June	0.82	0.81	2.44	0.55	2.41	2.10
July	0.80	0.79	2.38	0.60	2.36	2.04
Aug.	0.81	0.79	2.29	0.52	2.31	2.00
Sept.	0.81	0.80	2.30	0.55	2.30	1.98
Oct.	0.87	0.85	2.27	0.62	2.37	1.98
Nov.	0.87	0.85	2.29	0.54	2.33	1.94
Dec.	0.87	0.86	2.22	0.59	2.35	1.98
2004 Jan.	0.88	0.86	2.26	0.55	2.18	1.99
Feb.	0.88	0.87	2.18	0.57	2.17	1.98
March	0.89	0.87	2.29	0.54	2.13	1.95
Apr.	0.89	0.88	2.26	0.56	2.13	1.97
May	0.90	0.89	2.24	0.56	2.23	1.95
June	0.91	0.90	2.29	0.54	2.16	1.97
July	0.91	0.91	2.32	0.56	2.18	1.97
Aug.	0.92	0.91	2.31	0.60	2.19	1.96
Sept.	0.93	0.92	2.33	0.53	2.12	1.97
Oct.	0.94	0.93	2.35	0.53	2.17	1.98
Nov.	0.95	0.94	2.36	0.51	2.18	2.00
Dec.	0.96	0.94	2.30	0.55	2.20	2.01

1 Weighted average of the current account rate and the savings deposit rate.
2 End-of-the-month rate.
3 Average monthly rate.
Source: Bank of Greece.

T a b l e III.7 *(continued)*

Greece: bank rates on new euro-denominated deposits of, and loans to, euro area residents

(Percentages per annum)

Period	Loans to households[1]					Loans to non-financial corporations[1]		
		Consumer loans[4]		Housing loans[4]			With a floating rate or an initial rate fixation of up to 1 year[4]	
	Loans without defined maturity[2,3]	With a floating rate or an initial rate fixation of up to 1 year	Average rate on total consumer loans	With a floating rate or an initial rate fixation of up to 1 year	Average rate on total housing loans	Loans without defined maturity[3,5]	Up to €1 million	Over €1 million
2002 Sept.	14.40	10.86	10.43	4.62	4.74	7.31	6.64	5.33
Oct.	14.51	10.69	10.45	4.65	4.81	7.28	6.37	4.98
Nov.	14.48	10.87	10.61	4.56	4.75	7.23	5.78	4.54
Dec.	14.54	10.58	10.45	4.42	4.61	7.23	5.76	4.50
2003 Jan.	14.71	10.46	10.17	4.53	4.77	7.15	5.53	4.39
Feb.	14.68	11.13	10.60	4.58	4.81	7.09	5.59	4.27
March	14.66	10.82	10.76	4.58	4.87	7.04	5.37	4.06
Apr.	14.76	11.15	10.82	4.58	4.93	7.07	5.55	4.14
May	14.58	11.13	10.70	4.59	4.93	6.95	5.68	3.76
June	14.54	10.61	10.44	4.53	4.86	6.84	5.15	3.47
July	14.24	10.41	10.33	4.37	4.66	6.70	5.06	3.68
Aug.	14.05	10.24	10.37	4.48	4.76	6.67	4.95	3.60
Sept.	14.14	10.37	10.60	4.62	4.81	6.67	5.14	4.27
Oct.	14.22	10.57	10.58	4.57	4.81	6.68	5.24	4.68
Nov.	14.27	10.36	10.46	4.35	4.63	6.72	5.14	3.66
Dec.	14.08	9.60	9.86	4.31	4.53	6.78	5.13	3.78
2004 Jan.	13.92	9.82	9.94	4.36	4.68	6.74	5.12	3.92
Feb.	13.97	9.94	9.99	4.35	4.63	6.85	5.16	4.09
March	14.00	9.44	9.87	4.37	4.63	7.13	4.88	3.45
Apr.	14.06	9.56	9.85	4.36	4.55	7.11	5.15	3.49
May	13.79	9.82	10.07	4.33	4.54	7.02	4.91	3.45
June	13.89	9.71	10.05	4.30	4.54	7.06	4.89	3.58
July	13.84	9.60	9.67	4.24	4.43	7.03	4.84	3.53
Aug.	13.77	9.70	10.05	4.34	4.53	7.06	4.95	3.52
Sept.	13.62	9.37	9.91	4.23	4.43	7.05	4.87	3.80
Oct.	13.72	9.68	9.87	4.29	4.45	7.02	4.86	3.83
Nov.	13.75	9.40	9.72	4.23	4.36	7.05	5.06	3.61
Dec.	13.41	8.58	9.36	4.21	4.37	6.97	5.04	3.77

1 Charges are not included.
2 Weighted average of interest rates on loans to households through credit cards, open loans and current account overdrafts.
3 End-of-month rate.
4 Average monthly rate.
5 Weighted average of interest rates on corporate loans through credit lines and sight deposit overdrafts.
Source: Bank of Greece.

T a b l e   IV.1

Net borrowing requirement of central government on a cash basis[1,2,3]

(Million euro)

	January-December		
	2002	2003	2004*
Central government	**7,102**	**10,526**	**15,605**
– State budget	6,674	10,833	15,377
(Ordinary budget)[4]	2,128	4,106	8,841
(Public investment budget)	4,546	6,727	6,536
– OPEKEPE[5]	428	−307	228
Percentage of GDP	5.0	6.9	9.5

1 This table will henceforth show the borrowing requirement of central government on a cash basis. The borrowing requirement of public organisations will henceforth be calculated by the NSSG on the basis of detailed data collected directly from these entities, in the framework of a special quarterly survey concerning their financial results (revenue-expenditure) and their financial situation (loans, investment in securities, deposits etc.).

2 As shown by the movement of relevant accounts with the Bank of Greece and credit institutions.

3 Excluding the repayment of debts of the Greek government to the Social Insurance Institute (IKA) through bond issuance (Law 2972/2001, Article 51). These debts amounted to €3,927.9 million and were repaid in three instalments (2002: €1,467.4 million, 2003: €1,549.5 million and 2004: €911 million).

4 Including the movement of public debt management accounts.

5 Payment and Control Agency for Guidance and Guarantee Community Aid. It replaced DICAGEP (Agricultural Markets Management Service) as of 3 September 2001.

* Provisional data and estimates.

Source: Bank of Greece.

T a b l e IV.2

Financing of borrowing requirement of central government

(Million euro)

	January-December					
	2002		2003		2004*	
	Amount	Percen-tage of total	Amount	Percen-tage of total	Amount	Percen-tage of total
Greek Treasury bills and government bonds[1,2]	11,929	168.0	13,378	127.1	16,829	107.8
Change in balances of central government accounts with the credit system[3]	90	1.3	−871	−8.3	−1,929	12,4
External borrowing[4]	−4,917	−69.2	−1,981	−18.8	705	4.5
Total	**7,102**	**100.0**	**10.526**	**100.0**	**15,605**	**100.0**

1 Comprising domestically issued Treasury bills and government bonds as well as privatisation certificates.

2 Excluding government bond issuance for the repayment of debts to IKA (Law 2972/2001, Article 51). Also see footnote 3 in Table IV.1.

3 Including changes in central government accounts with the Bank of Greece and other credit institutions, as well as the change in the OPEKEPE account.

4 Comprising government borrowing abroad and securities issuance abroad, as well as the change in government deposits with foreign banks. Excluding non-residents' holdings of domestically issued government bonds.

* Provisional data.

Source: Bank of Greece.

T a b l e IV.3
State budget results
(Million euro)

	Year			Percentage changes		January – November			Percentage changes	
	2003	2004*	Budget 2005	2004*/03	Budget 2005/04*	2002	2003	2004*	2003/02	2004*/03
I. REVENUE[1]	41,704	46,247	49,710	10.9	7.5	37,012	37,201	40,179	0.5	8.0
1. Ordinary budget	39,881	43,200	46,310	8.3	7.2	34,608	35,980	37,953	4.0	5.5
2. Public investment budget	1,823	3,047	3,400	67.1	11.6	2,404	1,221	2,226	–49.2	82.3
(Own revenue)	77	100	100	29.9	0.0	…	…	…	–	–
(Revenue from the EU)	1,746	2,947	3,300	68.8	12.0	…	…	…	–	–
II. EXPENDITURE[1]	51,551	57,514	58,227	11.6	1.2	40,541	45,878	50,671	13.2	10.4
1.1 Ordinary budget	43,116	47,914	50,177	11.1	4.7	34,878	38,530	42,834	10.5	11.2
(Interest and other expenditure)[2]	9,416	9,523	9,800	1.1	2.9	8,271	8,635	9,171	4.4	6.2
1.2 Ordinary budget primary expenditure	33,700	38,391	40,377	13.9	5.2	26,607	29,895	33,663	12.4	12.6
2. Public investment budget	8,435	9,600	8,050	13.8	–16.1	5,663	7,348	7,837	29.8	6.7
III. STATE BUDGET RESULTS	–9,847	–11,267	–8,517			–3,529	–8,677	–10,492		
Percentage of GDP	–6.4	–6.9	–4.8			–2.5	–5.7	–6.4		
1. Ordinary budget	–3,235	–4,714	–3,867			–270	–2,550	–4,881		
2. Public investment budget	–6,612	–6,553	–4,650			–3,259	–6,127	–5,611		
IV. PRIMARY SURPLUS	–431	–1,744	1,283			4,742	–42	–1,321		
AMORTISATION PAYMENTS[2,3]	21,615	20,374	21,786	–5.7	6.9	18,330	19,371	18,761	5.7	–3.1
MINISTRY OF NATIONAL DEFENCE PROGRAMMES FOR THE PROCUREMENT OF MILITARY EQUIPMENT	987	1,798	1,600	82.2	–11.0	…	581	569	–	–2.1

1 For comparability purposes, tax refunds are included in expenditure and have not been deducted from revenue.
2 1Including expenditure on national defence debt servicing. Excluding expenditure on short-term commercial paper amortisation payments.
3 Excluding redemption of Treasury bills held by the private sector and of short-term commercial paper.
* Provisional data.
Source: State General Accounting Office.

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