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1. Introduction

During the 1990s, particularly in the second half of the decade, Portuguese households' indebtedness increased at a strong pace. From a value of nearly 20 per cent of disposable income, in 1990, it increased to 40 per cent, in 1995, reaching 118 per cent in 2004 (Chart 1). In 2003, within the euro area, that value was only below that of the Netherlands (Chart 2).

To correctly assess the consequences of the rise in households indebtedness on financial stability, on the transmission of monetary policy and on the evolution of economic activity, developments occurred on the assets side – financial and real – cannot be ignored. In the case of difficulties arising on debt servicing from the current income of households, as a result of an adverse shock (for example the increase in interest rate and/or in unemployment), the possibility to unpledge a fraction of wealth may contribute to minimize the impact of the shock on households consumer decisions and, ultimately, to enable the solvency of the respective liabilities. In fact, both real (especially as regards credit for house purchase) and financial assets are frequently used as a guarantee for loans. It should be noted, however, that the mobilization of real assets, which have by nature low liquidity, to meet the payment of debts may be a slow process that involves additional costs.

The aggregate level indicators provide information on average terms but do not allow by themselves to adequately evaluate the financial situation of individual households, which is expected to present a high heterogeneity according to its demographic and socio-economic characteristics. The wealth accumulation by the households is a dynamic process that reflects consumption and savings decisions as a function of current circumstances and expectations about the future. Using a simple model of consumption and savings throughout the life cycle it can be shown that the diversity of households' individual characteristics, namely the age of its members, implies the existence of significant inequalities in the distribution of savings and wealth. That diversity also implies significant differences on the distribution of the impact of a change in the interest rate, a rise in unemployment or a drop in the assets prices on the households' consumption and financing decisions. These considerations clearly point to the importance of having information at a microeconomic level.

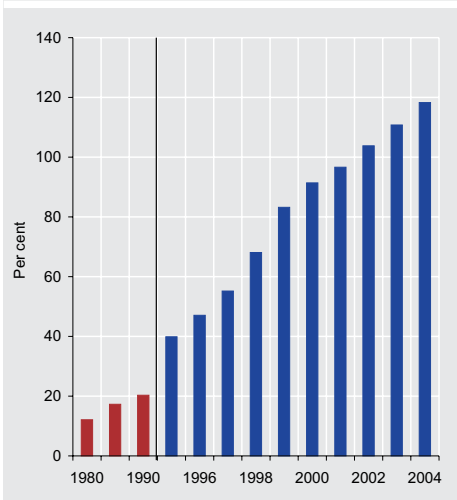
This article presents a set of aggregate indicators regarding the wealth of Portuguese households that are complemented with a more detailed analysis of the distribution of some ratios, with emphasis on indebted households. This analysis used the microeconomic data from the Households' Wealth and Indebtedness Survey. The results obtained both with aggregated and disaggregated data, suggest, globally, that the net wealth situation of households does not present high fragilities. There are, however, groups, namely

* The opinions of this article represent the views of the authors and are not necessarily those of the Banco de Portugal. The authors are entirely responsible for any errors and omissions.

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**CHART 1
HOUSEHOLDS' INDEBTEDNESS**

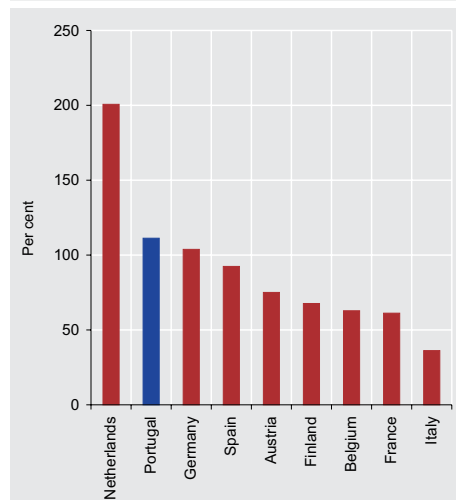
As a percentage of disposable income



SOURCES: INE and Banco de Portugal.

**CHART 2
HOUSEHOLDS' INDEBTEDNESS**

As a percentage of disposable income, in 2003
International comparisons



SOURCE: Eurostat.

the younger age households, where situations of some vulnerability can be found, in particular, when the distribution of the debt-to-asset ratio is analysed. Therefore, these groups will be more sensitive to eventual unfavourable shocks such as a continuous rise in unemployment, a significant rise in interest rates and a drop in the prices in the real estate market.

In section 2, a brief analysis of households' wealth is made using aggregate data. On the basis of a simple model of life cycle, section 3 starts with the presentation of some theoretical foundations for the empirical analysis that takes into account the heterogeneity of households. This is followed by the presentation of a set of summary statistics characterising households' wealth obtained using disaggregated data and by the analysis of the debt-to-asset ratio for several subclasses of households. In section 4, some conclusions are pointed out.

2. Evolution of households' wealth: aggregate data

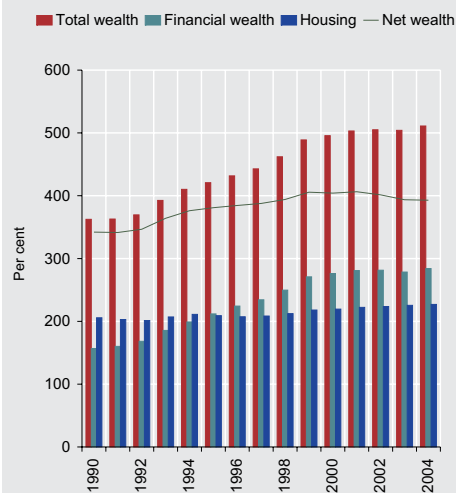
According to estimates of the financial and non-financial wealth¹ of Portuguese households for the period 1980-2004, this sector total wealth, as a percentage of disposable income, presented an upward trend over the considered period (Chart 3). The value of the housing stock² as a percentage of the disposable income also showed a slight increasing path, especially in the second half of the 1990s. In what concerns financial wealth, an upward trend was visible during the 1990s. As to its composition, in global terms, the financial assets portfolio remains dominated by deposits although it become more diversified (Chart 4). For this diversification may have contributed the liberalisation process started in the 1980s with the opening of the banking system to private initiative, followed by the modernization of the banking system, the emergence of new institutions and financial products, the liberalisation of interest rates, the abolition of credit limits and the liberalisation of capital flows at the end of 1992. The privatization process initiated in 1989 contributed strongly to increase the depth and the liquidity of the capital market, which al-

1. Cardoso and Cunha (2005).

2. Given the lack of information regarding non-financial wealth, it was considered as a non-financial asset only the housing component, which represents almost the total non-financial wealth of households. The value of the housing stock represented 44.4 per cent of total wealth of households in 2004 (56.7 per cent in 1990).

**CHART 3
HOUSEHOLDS' WEALTH**

As a percentage of disposable income

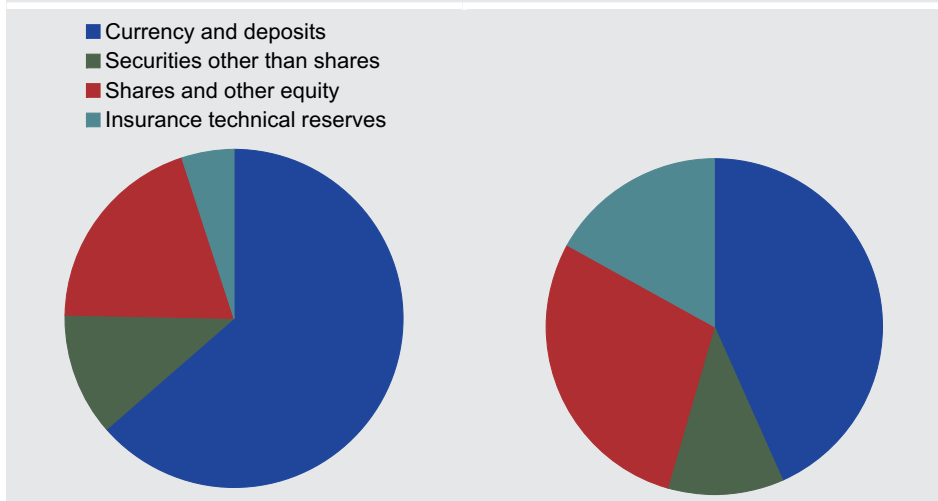


SOURCE: Cardoso and Cunha (2005).
NOTE: Trade credit was excluded in the calculation of net wealth.

**CHART 4
FINANCIAL ASSETS**

1990

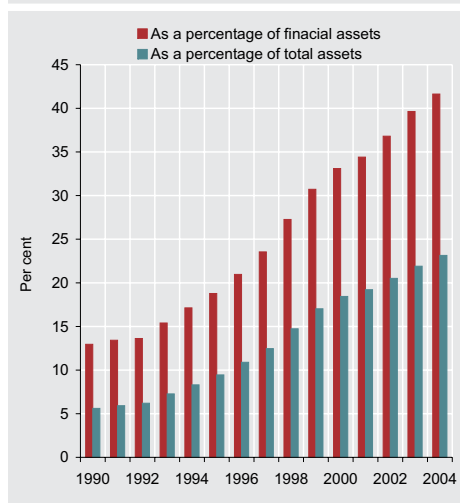
2004



SOURCE: Cardoso and Cunha (2005).

lowed investors, in particular households, to diversify their portfolios. In turn, households' investments in life insurance and pension funds, seen as a necessary complement to the public schemes of retirement, have gained increasing importance since the beginning of the 1990s. In the case of life insurance this evolution may reflect, partially, the increase of credit for house purchase. The increasing importance of investment on pension funds reflects, on the one hand, the rise in the number of companies which established defined benefit pension schemes and, on the other hand, voluntary households decisions with the aim of obtaining a complement to social security public schemes of retirement. It should be said that the last ones have benefited in this period from fiscal incentives which are a stimulus for its constitution.

CHART 5
LIABILITIES AS A PERCENTAGE OF
FINANCIAL ASSETS AND OF TOTAL ASSETS



SOURCE: Cardoso and Cunha (2005).
 NOTE: Liabilities do not include trade credit.

Considering values of wealth net of liabilities it can be seen, from 2000 onwards, that the rise in households' financial investment was more than compensated by the higher indebtedness leading to the decrease in the weight of net financial wealth as a percentage of households' disposable income. In the same period, total net wealth recorded some stabilisation due to the strong contribution of house acquisition.

In the analysis of the financial situation of households, the debt-to-asset ratio is also a frequently used measure as it gives information about the higher or lower capacity of households to solve the debt agreed. During the period from 1990 to 2004, both the ratio of liabilities to financial assets and the ratio of liabilities to total assets increased (Chart 5). In the same period, an upward trend can also be seen in the ratio of debt to real assets.

3. Households' wealth and indebtedness: microeconomic analysis

3.1 THEORETICAL FOUNDATIONS

Most theories regarding consumption and income evolution throughout the life of economic agents admit, that individuals smooth their consumption pattern during life, even though their income presents a very marked temporal pattern. In fact, labour income is null when individuals are very young, go through an increasing path, reach a maximum, and start decreasing slightly before retirement when it is zero (or equal to the retirement pension). In this context, it's expected that early in life, when labour income is very low or inexistent, individuals finance the "desirable" consumption level by demanding credit. When income increases (typically on intermediate ages) individuals will save, partly to repay the previously agreed credit. Finally, savings accumulated during this phase of the life cycle (when income reach a maximum) will finance consumption after retirement, where incomes - essentially from pensions - are lower.

Using a very simple model, it may be possible to simulate the consequences, on consumers' decisions, of a strong slowdown in the interest rate, as the one that took place in the recent past in the Portuguese economy. Assuming each agent lives 80 years, an additive

utility function is used, divided in four phases, each with 20 years. In the first phase, the agent, who does not inherit any asset, has no wage and only consumes. In the second and third phases, the agent receives labour income, pays interest agreed and earns interest on investments made (i.e., in net terms, pays interest in the case of a negative liquid position). It is also assumed that labour income in the third phase is globally higher than that in the second. In the last phase, the agent retires, with no wage and only spending accumulated savings and respective interests.

With a logarithmic additive utility function, i.e.,

$$U = \log c_1 + \log c_2 + \log c_3 + \log c_4$$

where c_1 , c_2 , c_3 and c_4 represent consumption in each phase of the life cycle, it is easy to show that, if the interest rate is constant throughout life, the agent consumption in period i will be

$$c_i = \frac{1}{5-i} z_i \quad (1)$$

where z_i is the initial wealth (in period i), understood as net assets detention in the beginning of the period and respective interests at rate r , plus the present value of its current and future labour income, summarized as w_i :

$$z_i = (1+r)a_i + \sum_{j=i}^4 \frac{w_j}{(1+r)^{j-i}} \quad (2)$$

It should be noted that $w_1 = w_4 = 0$. In turn, net assets detention develops according to $a_i = a_{i-1} + s_{i-1}$, where s_i is the previous period savings.

It is assumed that an unexpected strong decrease in the interest rate r occurs. It is a simplified hypothesis, but facilitates the model resolution, and, given the duration of each phase, does not seem to be especially abusive. This change will have different consequences according to the phase of the life cycle in which the agent is.

In general terms, equation (2) shows that there is a direct income effect, given by the term $(1+r)a_i$. Given that a_i was determined in the previous period, it does not change with the variation on r . If the agent is a net creditor (a_i positive), the interest rate decrease will reduce the interest component of his total wealth. If the agent is a net borrower (a_i negative) his total wealth will increase because he has to pay less interest. In turn, the decrease in the interest rate will lead to an increase in the present value of future labour income.

For borrowers, the effect of the interest rate decrease is unequivocal: total wealth increases, which induces an increase in current consumption through equation (1). For creditors, the effect is uncertain though if the agent is retired (and therefore without labour income) the effect will always be negative.

With a reasonable calibration of the model, the effects of the decrease in r on different variables may be analysed, by comparison with a situation of a high interest rate but with the same flow of future labour income. Table 1 presents the simulation results of the interest rate decrease effects on income, on consumption and on individuals' indebtedness in different phases of the life cycle. It has no effect on income of very young agents (who have no labour income, neither wealth). However, total wealth (which includes the present

TABLE 1

IMPACT OF THE INTEREST RATE REDUCTION

	Young no-workers	Young workers	Adult workers	Retired
Income in the period	0	++	+	--
Indebtedness at the end-of-period	++	+	-	0
Consumption in the period ^(a)	++	++	+	--

NOTE:

(a) Proportional to total wealth in the period (see equation (1)).

value of future incomes) increases through the reduction of the discount rate (see equation (2)). Therefore consumption of this age group will increase, which is only possible through indebtedness.

For workers in the second phase of the life cycle, the present value of future labour income increases with the decrease in the interest rate. In addition, and given that these agents are typically net borrowers, the interest burden decreases. This implies that total wealth increases (see equation (2)), as well as current income, due to the debt burden decrease. Consumption, naturally, increases. The effect on indebtedness at the end-of-period must be lower than for those not yet in the labour market.

Regarding workers in the third phase of the life cycle, the effect of the interest rate change on their total wealth must be positive, given that these agents are yet typically net borrowers. There is no future income effect, given that is assumed that, in the next phase, wages are null. Income must increase through the reduction of debt servicing. Consumption increases, and indebtedness at the end-of-period decreases, given that the debt balances were already low at the beginning of the period.

Finally, for the retired the impact of the interest rate change is negative on total wealth, on income (only interests) and on consumption. The effect on indebtedness must be null.

Despite the limitations of this analysis, given the very simplified hypotheses, the results of this simulation are consistent with the evolution observed recently in Portuguese indebtedness, in the context of the strong decrease in interest rates. There is evidence that the younger individuals were the ones that contributed more to the increase in indebtedness. Using this model, it should also be said that these individuals will also be the most affected in the case of an interest rate rise. In this case, the present value of future labour income will fall and, by having no assets (that earn interests), they will not benefit from a rise in interest rates. Therefore, they will reduce significantly their consumption.

3.2 SUMMARY STATISTICS CHARACTERIZING HOUSE- HOLDS' WEALTH

The analysis presented in this section is based on microeconomic data obtained from the Households' Wealth and Indebtedness Survey (*Inquérito ao Património e Endividamento das Famílias, IPEF*)³ of 2000. These data concern a sample of households for which detailed information on income, wealth and debt is available, complemented with other aspects such as the age, the education level, and the labour market situation of the household head. The information from the *IPEF* is very useful, on the one hand, because it allows the analysis of the distribution of variables such as households' debt, wealth and income. On the other hand, it enables the analysis of different ratios, such as indebtedness and debt burden, by subgroups of households according to their age, income, education and labour situation of their members. It must, however, be used with some caution given that there is evidence that some groups of households are under represented, in particular the younger age ones. It should also be noted that the *IPEF* results show some inci-

dence of non-response due to refusal or lack of knowledge, with particular incidence on financial wealth variables⁴, which implies that extrapolations for the universe should be avoided. Nevertheless, indicators calculated for subgroups of the sample are less affected by these problems which enable to take conclusions with some confidence.

Table 2 presents some summary statistics that characterise the composition and the distribution of households' wealth, based on the 2000 sample of the *IPEF*. According to the indicators presented in Table 2, the difference between the average and median values reflects the asymmetric character of the wealth distribution. The net financial wealth average value for the sample aggregates stands around €120 thousand while the median value does not reach €65 thousand, which means that the average is too much influenced by very high extreme values. As expected, given the dynamic nature of the wealth accumulation process, the results show that the distribution of wealth is more asymmetric than that of income. The asymmetry is more evident in the financial component.

The observation of the Lorenz curves provides more detailed and graphically intuitive information on wealth inequality (Chart 6). These curves relate the cumulative relative frequencies of the sample with the proportion of wealth, income, etc. The closer the curve is to the diagonal the lower will be the inequality distribution of the variable in study. In Chart 6 it is clear that the distribution of wealth, particularly financial wealth, is strongly concentrated. It should be noted, for example, that 10 per cent of the households hold almost 74 per cent of financial assets.

As mentioned, it is expected that the distribution of wealth changes according to the demographic and socioeconomic characteristics of households. Charts 7A to 7C present data concerning the median values of households net wealth, financial assets and non-financial assets disaggregated simultaneously by the age of the households' head and in-

3. This survey was carried out by the *INE* with the support of the Banco de Portugal.

4. For details on the *IPEF* sample see Farinha (2003 and 2004).

TABLE 2

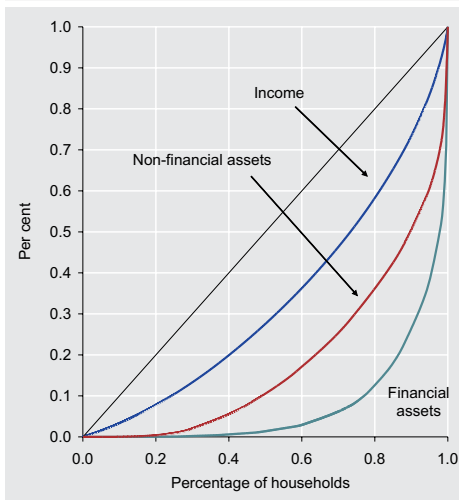
WEALTH AND INCOME DISTRIBUTION IN 2000

(EUR thousands)

	Income	Total wealth	Financial assets	Non-financial assets	Net wealth	Debt
Percentiles						
10%	0.504	2.619	0.000	1.247	1.870	0.000
25%	0.716	22.421	0.125	14.964	18.206	0.000
50%	1.052	70.580	1.621	64.844	64.220	0.000
75%	1.540	132.306	7.856	124.700	124.700	0.838
90%	2.283	220.718	24.192	207.001	214.982	19.952
Minimum						
Minimum	0.319	0.000	0.000	0.000	-379.042	0.000
Maximum						
Maximum	10.725	5082.750	2162.289	5075.269	5082.750	488.822
Observations with positive values						
Number	3 763	3 639	3 133	3 465	3 561	1 140
Percentage	100.0	96.7	83.3	92.1	94.6	30.3
Average						
Average	1.293	126.147	12.240	113.907	119.781	6.366

SOURCE: *INE*.

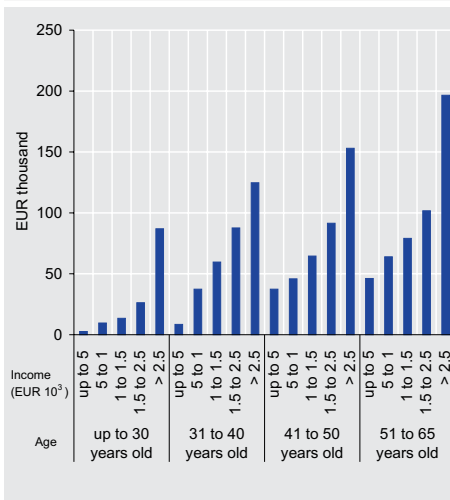
**CHART 6
INCOME AND WEALTH LORENZ CURVES**



SOURCE: INE.

**CHART 7A
NET WEALTH MEDIAN**

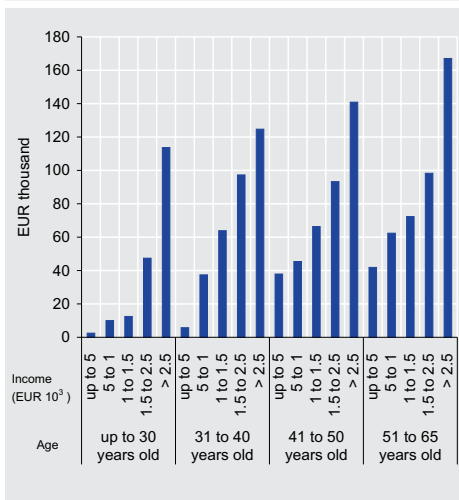
By classes of age and income



SOURCE: INE.

**CHART 7B
NON-FINANCIAL ASSETS MEDIAN**

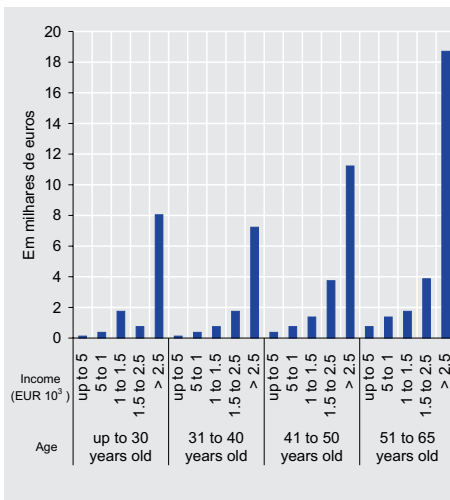
By classes of age and income



SOURCE: INE.

**CHART 7C
FINANCIAL ASSETS MEDIAN**

By classes of age and income



SOURCE: INE.

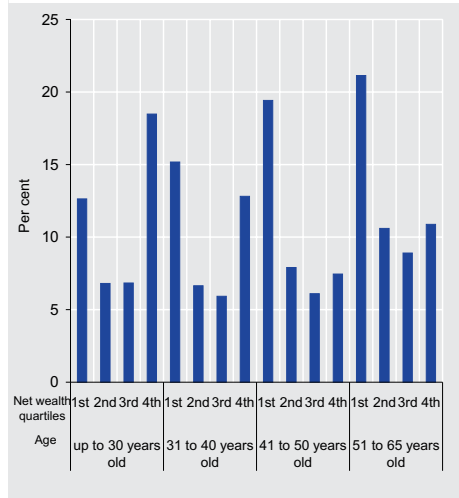
come⁵. The intersection of the two variables enables to analyse the impact of each one on wealth, isolating the effect of the other. According to the results obtained, net wealth - total assets less households' debt - seems to change directly with income and the age of the households' head. In fact, the three charts point to the following conclusions:

- in each age class, the income effect is positive, i.e., higher income is associated with higher net wealth, financial assets and non-financial assets;
- in general, net wealth, financial assets and non-financial assets increase with age, despite the class of income considered;

5. Median values are used because they give more information about the central values of the distribution than the average (which is influenced by extreme values).

CHART 8A
FINANCIAL ASSETS AS A PERCENTAGE OF TOTAL ASSETS

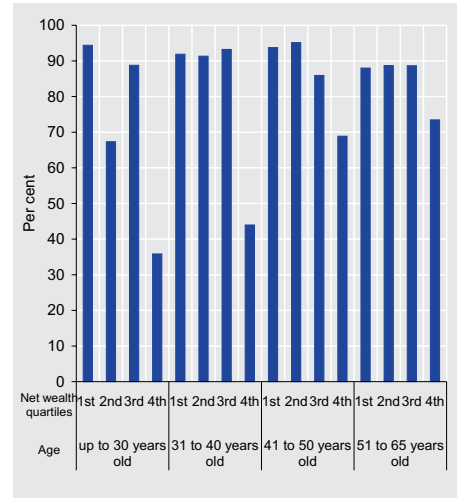
By classes of age and net wealth quartiles



SOURCE: INE

CHART 8B
DEPOSITS AS A PERCENTAGE OF FINANCIAL ASSETS

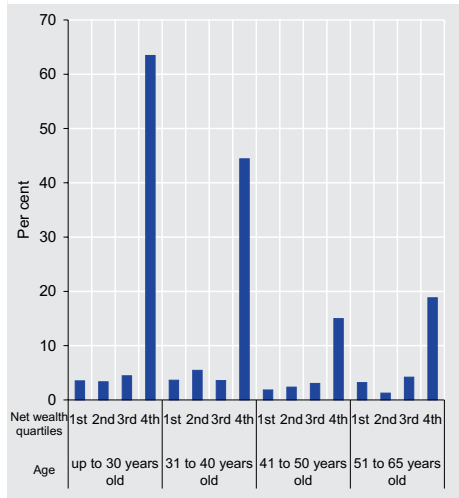
By classes of age and net wealth quartiles



SOURCE: INE.

CHART 8C
SHARES DIRECTLY ACQUIRED AS A PERCENTAGE OF FINANCIAL ASSETS

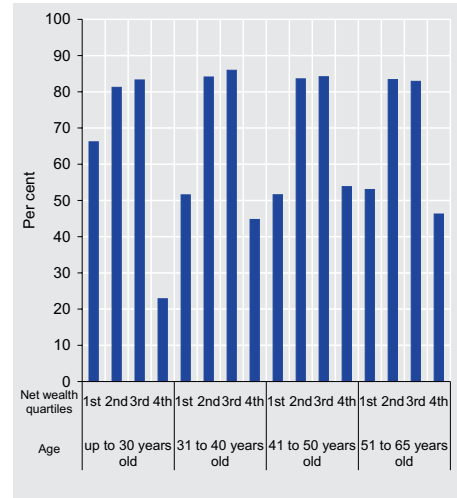
By classes of age and net wealth quartiles



SOURCE: INE.

CHART 8D
HOUSING AS A PERCENTAGE OF NON-FINANCIAL ASSETS

By classes of age and net wealth quartiles



SOURCE: INE.

- the effect of age on wealth is more pronounced in the case of households with lower income.

Results on the composition of households' wealth by type of investment are presented in Graphs 8A to 8D, using age and net wealth classes of the households' sample. These results suggest that:

- in general, the majority of wealth, i.e. more than 80 per cent, is invested in non-financial assets, despite the age or the level of households wealth;
- the proportion of financial assets increases with age in the case of households with lower wealth. In the other classes the relation is not clear;

- households' portfolios are dominated by deposits, except in the case of households whose head is less than 40 years old and that belongs to the highest quartile of net wealth (Charts 8B and 8C). These households show an attraction for more risky products;
- around 80 per cent of non-financial assets correspond to the value of the main house in the subclasses of intermediate wealth, despite the age stratum. In the extreme classes of wealth, housing represents between 40 and 50 per cent of total assets despite the class of age over 30 years (Chart 8D).

3.3 FINANCIAL SITUATION OF HOUSEHOLDS WITH DEBT

The disaggregated data at microeconomic level enables to analyse separately and with detail the financial situation of indebted households, which is crucial to obtain indications of the principal vulnerabilities presented by the sector.

Globally, the information from the *IPEF* of 2000, as well as data on an aggregated level, suggests that the less favourable situations, though having some expression, do not

TABLE 3
PERCENTAGE OF HOUSEHOLDS WITH NEGATIVE NET WEALTH

Classes of income (EUR thousands)				
up to .5	.5 to 1	1 to 1.5	1.5 to 2.5	> 2.5
1.9	2.4	2.6	2.7	1.3
Classes of age				
up to 30 years old	31 to 40 years old	41 to 50 years old	51 to 65 years old	
6.1	4.0	2.1	1.4	
Classes of education				
No education or basic schooling (1 st cycle)	Basic schooling (2 nd cycle)	Basic schooling (3 rd cycle)	Secondary or upper level schooling	
1.8	4.0	2.7	2.8	

SOURCE: *INE*.

TABLE 4
BY CLASSES OF TOTAL WEALTH

Classes of wealth ^(a)	% households with debt	Debt/income ^(b)		Debt burden	
		average	p75	average	p75
R1	16.2	1.731	7.858	0.067	0.171
R2	21.3	2.671	6.921	0.061	0.146
R3	21.4	5.318	12.815	0.049	0.120
R4	25.5	5.469	14.987	0.086	0.184
R5	28.3	14.339	30.820	0.108	0.196
R6	36.3	13.360	25.183	0.133	0.192
R7	37.6	9.588	20.542	0.107	0.163
R8	40.0	10.516	27.136	0.109	0.185
R9	42.4	7.153	17.173	0.074	0.171

SOURCE: *INE*.

NOTES:

(a) For example, households included in R1 are the sample 10 per cent less wealthy and those in R10 are the 10 per cent more wealthy.

(b) Monthly income.

seem to be a source of great concerns. It should be noted, for example, that the net wealth value of the 10th percentile is positive, i.e., even the 10 per cent less wealthy have on average more assets than liabilities on their balance (Table 2). In fact, according to these data, the percentage of households with negative net wealth is below 5 per cent in the generality of the samples considered, except for those households where the head is less than 30 years old (Table 3).

Table 4 shows information regarding the percentage of indebted households for the various subclasses defined according to the value of the percentiles of total wealth. According to this information, the percentage of households with debt is relatively small in households with lower wealth (around 16 per cent), being around 34 per cent in the 10 per cent more wealthy. Considering only households with debt in each subclass, it can be seen that both the median value and the 75th percentile value for the debt-to-income ratio increase with wealth until a certain level and then tend to decrease. The debt burden shows, in turn, a similar pattern. The highest values of the debt-to-income ratio and of debt burden appear on the third quartile of wealth.

Finally, Charts 9A to 9C, present the median and the 75th percentile values of the debt-to-asset ratio for the different subsamples defined according to the degree of indebtedness (relatively to income), the debt burden and the age of the households head. This information suggests the following conclusions:

- the situation of households as given by the debt to total assets ratio seems relatively comfortable for the generality of the households' classes; even the 75th percentile of the ratio does not exceed, in general, the value of 50 per cent;
- the higher vulnerabilities are found on the youngest age classes, on the more indebted and on those with the highest debt burden.

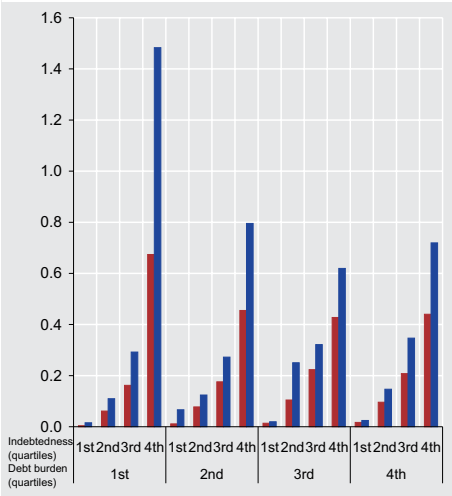
4. Conclusions

In aggregate terms, the last two decades showed that households' wealth increased at higher rates than those of the disposable income. Therefore, despite the strong increase in indebtedness, net wealth as a percentage of disposable income kept an upward trend until the end of the 1990s, followed by a relative stabilization in the most recent period. However, liabilities grew more than assets, so that the debt-to-asset ratio increased in aggregate terms, reaching the value of 23.1 per cent in 2004 that compares with 5.6 per cent in 1990. As disaggregated data at microeconomic level is available it is possible to assess if some households' strata are more vulnerable in the case of occurrence of an adverse shock in interest rates, in economic activity and/or in asset prices. The results obtained suggest that, despite the high inequality of wealth distribution, no very serious situations were found in what concerns the possibility of households' insolvency, even in the more vulnerable strata, particularly the younger ones. This reflects, to a large extent, the fact that credit for house purchase – secured by a mortgage – constitutes a large amount of the increase in credit obtained by households.

However, even if the actual financial situation of households does not represent a very high risk to financial stability in the short term, the fact that highly indebted households, are more sensitive to changes in interest rates, implies that consumption volatility may rise, in the case of a sharp increase in interest rate and/or in unemployment. This situation may also have implications on financial stability. According to the life cycle model, the

CHART 9A
HOUSEHOLDS WITH DEBT

Debt-to-asset ratio – median value and 75th percentile
By classes of indebtedness^(a) and debt burden



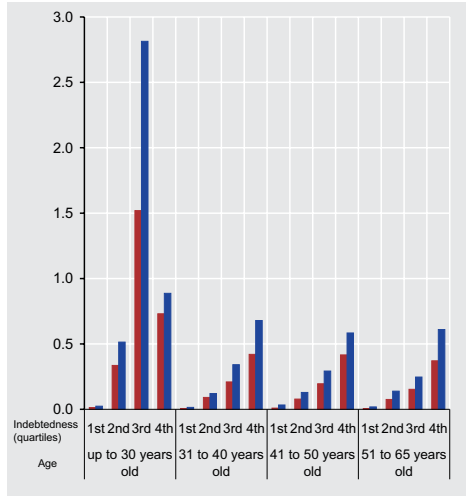
SOURCE: INE.

NOTE:

(a) Indebtedness: total households' debt over monthly income.

CHART 9B
HOUSEHOLDS WITH DEBT

Debt-to-asset ratio – median value and 75th percentile
By classes of indebtedness^(a) and age



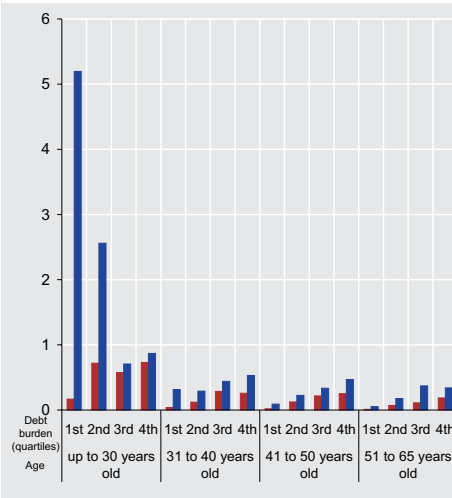
SOURCE: INE.

NOTE:

(a) Indebtedness: total households' debt over monthly income.

CHART 9C
HOUSEHOLDS WITH DEBT

Debt-to-asset ratio – median value and 75th percentile
By classes of debt burden and age



SOURCE: INE.

more serious situations may occur in the youngest age groups, highly indebted, with a lower income and a higher propensity to switch to unemployment.

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