THE MACRO-ECONOMIC WEALTH-INCOME RATIO OF HOUSEHOLDS

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The Wealth-Income Ratio of households, although less known than the capital-product ratio, has not been ignored by economic analysis. But most of the studies concerning this ratio put the stress on one unique cause of variation: the saving ratio of households. Doing so, they neglect other important factors such as the behaviour of households in incurring debt, and the influence of inflation on the variation of nominal income and on capital gains. This paper first provides a simple formula expressing the Wealth-Income Ratio as a function of all these factors. Then it shows, using data from France and United States, that this relationship is a useful tool for analysing the observed evolution of the ratio. Finally, it comes back to the famous question of the "constancy" of the Wealth-Income Ratio in the long run.

Until now the capital-product ratio has been studied more often than the wealth-income ratio. However this latter has not been ignored by economic analysis and has inspired some important contributions (e.g. Modigliani [1966]) which we shall refer to in due time.

Exactly like the capital-product ratio, the wealth-income ratio can first be envisaged from a micro-economic point of view: for instance, one can try to describe, in cross-section or panel data, the variations of the wealth-income ratio during the life-cycle (King and Dicks-Mireaux [1982], Babeau [1982]). Some micro-economic models of wealth accumulation also provide an estimation of the same ratio over shorter or longer periods (Babeau *et al.* [1974]).

The recent publication in some countries of national and sectorial balance sheets (see INSEE [1980], C.S.O. [1979], Ruggles [1981] and Goldsmith [1980]) prompts us to a macro-economic approach to the household wealth-income ratio. Because of the many accounting heterogeneities which may exist, it is probably too soon to launch an international comparison of cross-section data. But it is now possible, taking one or two countries as illustrations, to study more precisely the different factors of variation of the macro-economic wealth-income ratio.

In a first step, we shall build an accounting model for the wealth-income ratio. This model will use the main pieces of information extracted from the household balance sheet. Then two countries will be taken as illustrations: U.S.A. and France. The period covered will approximately be the same for the two countries: the three post world war II decades (1950–80).

In the last section of our study, it will be necessary to come again to the debatable question of the "stability" in time of the wealth-income ratio. Although our results on this point are rather contradictory, it is possible to put forward some findings concerning the main factors of short term or long term variations.

I. An Accounting Model of the Wealth-income Ratio

This section is intended to present a rather simple expression of the wealth-income ratio, using as much as possible of the data which are (or shall be) provided by sectorial flow or stock accounts.

We shall use the following variables:

W_b, household wealth, net of capital consumption but gross of debt;

W_n, household wealth, net of capital consumption *and* of debt;

Y_b, household gross disposable income, that is to say household income gross of capital consumption but net of taxes;

Y_n, household disposable income net of capital consumption;

S_b, household gross saving, that is to say household saving gross of capital consumption and of debt repayments;

S_n, household net saving: household saving net of capital consumption but gross of debt repayments;

a, household gross saving rate; we have $a = S_b / Y_b$;

r, nominal growth rate of household gross disposable income;

f, household borrowing rate, ratio of amounts currently borrowed to disposable income;

l, the proportion of disposable income devoted to debt repayments: only capital reimbursements are here considered since interest payment is a consumption item. Actually we shall not be able to measure separately f and l; so we are obliged to put $f - l = m$;

$m = f - l$, the household borrowing rate, net of debt repayments;

d, the rate of capital consumption measured as a proportion of W_b;

p, the rate of variation in the mean nominal price of gross wealth (W_b).

The data in the household balance sheet are evidently of a discrete nature; but given our purpose, we do not lose much in accuracy by presenting the following relationships in a continuous time and we make a substantial gain in calculation. So all variables will hereafter be considered as continuous time functions.

With the given symbols, we obtain first:

$$S_n = aY_b - dP_b.$$

The instantaneous variation of gross wealth has three elements:

- net saving (which includes debt repayments);
- net variation in the incurrence of debt (variation of the stock variable which is equal to new borrowings less repayments: $(f-l)Y_b = mY_b$;
- positive or negative capital gains expressed as a price variation of gross wealth: pW_b.

So, noting $\dot{W}_b$ for the time derivative of W_b, we have:

$$\dot{W}_b = S_n + mY_b + pW_b$$

or substituting for S_n:

$$\dot{W}_b = (a+m)Y_b + (p-d)W_b. \tag{1}$$

If we are, in a first step, interested in the ratio

$$R_b = \frac{W_b}{Y_b}, \text{ noting } \hat{R}_b = \frac{\dot{R}_b}{R_b},$$

we have:

$$\hat{R}_b = \hat{W}_b - \hat{Y}_b$$

where

$$\hat{Y}_b = \frac{\dot{Y}_b}{Y_b} = r \quad \text{and} \quad \hat{W}_b = \frac{\dot{W}_b}{W_b}$$

can be calculated using (1).

We obtain finally:

(2) $$\dot{R}_b = (p - d - r)R_b + (a + m).$$

Relations (1) and (2) are differential equations. The equilibrium path, defined by growth at the same rate of flows and stocks, can be a useful reference. In this case, we have:

$$Y_b = Y_{b0}\, e^{rt} \quad \text{and} \quad W_b = W_{b0}\, e^{rt}$$

where Y_{b0} and W_{b0} are respectively gross disposable income and gross wealth at time $t = 0$.

Then:

$$R_b = W_{b0}/Y_{b0} \text{ and of course } \dot{R}_b = 0.$$

Coming back to the differential equation of relation (2), a solution can be found as follows.

Relation (2) can be written:

$$\dot{R}_b = (p - d - r)\left(R_b + \frac{a + m}{p - d - r}\right).$$

Put

$$T = R_b + \frac{a + m}{p - d - r}.$$

This gives:

$$\hat{T} = \frac{\dot{T}}{T} = \frac{\dot{R}_b}{T} = p - d - r$$

from which we draw:

$$T = R_b + \frac{a + m}{p - d - r} = k\, e^{(p-d-r)t}$$

where k is the constant of integration.

We finally obtain as a solution:

$$R_b = \frac{a+m}{r+d-p} + k\, e^{(p-d-r)t}. \tag{3}$$

Two cases have to be considered. If $(p-d-r)>0$, the system diverges from the equilibrium path. The rate of increase of the price of wealth being greater than the sum of the rate of capital consumption and the rate of income variation, it is intuitively easy to understand why R_b is pushed up to higher values. If, on the contrary, $(p-d-r)<0$, the second term of the right hand side of relation (3) goes to 0 as t increases. Hence:

$$\bar{R}_b = \frac{a+m}{r+d-p} \tag{4}$$

This equilibrium value of the wealth-income ratio can of course be only observed in the very long term and therefore it remains quite theoretical. We can give an idea of the speed of convergence of R_b to $\bar{R}_b$. It is indeed easy to show that the relative deviation $(R_b-\bar{R}_b)/\bar{R}_b$ is decreasing in $e^{(p-d-r)t}$ as time increases and that it is reduced by half at the end of the period $\log 2/(r+d-p)$. For instance, for $r=0.07$, $d=0.02$ and $p=0.04$, the difference is reduced by half in approximately 14 years, by three quarters in 28 years, and so on. In spite of this rather slow convergence, we shall show with American and French data that it is interesting to compare the mean value observed for long periods with the equilibrium value of the ratio.

Relation (4) also has the advantage of showing in what direction the factors influence the ratio, and it is not surprising to verify that the equilibrium value of the wealth-income ratio is higher when a, m and p are high and r and d low.

The role of r in the stability of $\bar{R}_b$ has already been underlined. Consider now the special case where $r=0$, so that the stability condition becomes $p-d<0$. As d is probably rather low, if we exclude negative price variation, p has practically to be equal to zero in order that the stability condition is verified. We then obtain the very special case:

$$\bar{R}_b = \frac{a+m}{d} \tag{5}$$

which corresponds to the equilibrium value of the ratio in a stationary economy where population, productivity and prices all remain constant.

We can also make the meaning of relation (4) precise, writing $r-p=r'$, where r' is the variation rate of "real" income. The stability condition for $\bar{R}_b$ becomes $-r'<d$, and this seems quite plausible since it is only denied for strong negative values of r'. If moreover we neglect provisionally m and d, we get:

$$\bar{R}_b = \frac{a}{r}. \tag{6}$$

This relation has already been obtained by other authors (Modigliani [1975]) and we shall come again to it at the end of this paper because it stresses an interesting direct link between the savings rate and the wealth-income ratio.

If we are interested in short term fluctuations of R_b, we can look at the wealth-income ratio when income fluctuates around its trend (defined by the growth rate r). The observation of relation (3) shows that in this case R_b fluctuates too, but in countercyclical way.

So far we have only considered the ratio $R_b = W_b/Y_b$. But the ratio $R'_n = W_n/Y_b$, where wealth is net of debt, is often judged to be more meaningful. Going from R_b to R'_n is not difficult. By definition, we have:

$$W_n = W_b - C$$

where C, the value of the capital to reimburse can be obtained rather easily. We have by definition:

$$\dot{C} = mY_b$$

and on the equilibrium path, we can write:

$$\frac{\dot{C}}{C} = r, \text{ hence } \frac{m}{r} = \frac{C}{Y_b}.$$

But

$$\bar{R}'_n = \bar{R}_b - \frac{C}{Y_b} = \bar{R}_b - \frac{m}{r},$$

and this gives, replacing $\bar{R}_b$ by its expression in relation (4):

$$\bar{R}'_n = \frac{a+m}{r+d-p} - \frac{m}{r}. \tag{7}$$

The influence of a, d and p on $\bar{R}'_n$ is the same as on R_b. The influence of m and r is a bit more difficult to specify. As far as m is concerned, if we put $p = d$, relation (7) simplifies to:

$$\bar{R}'_n = \frac{a}{r} \tag{8}$$

and the borrowing rate has no influence on the ratio. If $p > d$, an increase in m contributes to raising $\bar{R}'_n$: the wealth accumulated through increase in debt takes advantage of the superiority of p over d; there is a sort of "leverage effect". On the contrary, if $p < d$ an increase of m reduces, all other things equal, the value of $\bar{R}'_n$: the nominal value of assets bought thanks to borrowing is indeed decreasing while the nominal value of liabilities remains constant; so net worth and $\bar{R}'_n$ are decreasing. Concerning the sign of the influence of r, the derivation of relation (7) leads to the conclusion that, in the vast majority of usual cases, a rise of r contributes to reducing $\bar{R}'_n$; and so the influence of r on $\bar{R}_b$ and $\bar{R}'_n$ is of the same sign.

Apart from $\bar{R}_b$ and $\bar{R}'_n$, we could also have thought of calculating the ratio:

$$\bar{R}'_b = \frac{W_b}{Y_n} = \frac{W_b}{Y_b - dW_b} = \frac{1}{1/\bar{R}_b - d}.$$

Replacing $\bar{R}_b$ by its expression in relation (4) gives:

$$\bar{R}'_b = \left[\frac{r+d-p}{a+m} - d\right]^{-1} \tag{9}$$

where the sign of the influence of a, m, r and p is straightforward. Concerning the sign of the influence of d, it can be shown that the derivative of (9) is always negative if $a+m<1$ (not a strong condition). This conclusion was not so obvious.

Finally, the calculation of $\bar{R}_n = W_n/Y_n$ goes as follows.[1]

$$\bar{R}_n = \frac{W_n}{Y_b - dP_b} = \frac{\bar{R}'_n}{1-d\bar{R}_b} = \frac{\bar{R}_b - m/r}{1-d\bar{R}_b}$$

and hence:

$$\bar{R}_n = \frac{ar+m(p-d)}{r[(r+d-p)-d(a+m)]} \tag{10}$$

where it is easy to see that $\bar{R}_n$ is higher when a and p are high and r is low. Concerning the influence of d and m, the calculation of the partial derivatives of (10) leads to the conclusion that, under certain conditions[2] always met for medium and long periods, as we will see below in the case of the U.S.A. and France, we have:

$$\frac{\delta \bar{R}_n}{\delta d} < 0 \quad \text{and} \quad \frac{\delta \bar{R}_n}{\delta m} > 0.$$

So, to sum up, it appears that the four wealth-income ratios do vary in the same way as parameters a, m and p, but usually increase as r and d decline. This was a conclusion needed before going on to the empirical work.

We would like to end this section with a few general remarks concerning the model which was proposed. It is an accounting model built on concepts which are provided by the national accounts (balance sheet). No other theoretical background was referred to than the one used in the national accounts. However, the variables which appear in the relations do not have the same scientific status:

- d, the rate of capital consumption can be said to be a rather technical variable, almost a parameter;
- a and m, savings and borrowing rates, are behavioural variables which are, as we know, at the core of many theoretical frameworks;
- finally r and p are economic surroundings variables; r plays a major role in every macro-economic model, meanwhile p is too often forgotten.

In the equilibrium model which is proposed, r also plays a central role. This is at the equilibrium point, the growth rate of all magnitudes: not only wealth and income but also saving and borrowing, variables of flows and variables of stocks. The other variables, a, m, d and p, have indeed an influence on the *level*

[1]The reader has certainly already found by himself the obvious relationship between the four wealth-income ratios:

$$\bar{R}_b \cdot \bar{R}_n = \bar{R}'_b \cdot \bar{R}'_n.$$

[2]These conditions are $p-d>0$ and $r+d-p>d(a+m)$.

of the magnitudes as well as on the *level* of the wealth-income ratios; but r is the only variable to exert an influence on the *speed* of variation of all the economic *magnitudes* here considered.

II. An Application of the Model to American Households

The data used in this section were constructed by Nancy and Richard Ruggles [1981]. The wealth taken into account covers almost all assets and debts of households (see appendix 1).

According to these data, from the beginning of 1949 to the end 1980, the gross wealth of American households was multiplied by 10.9, which corresponds to a mean annual growth rate of 7.8 percent. Net wealth was multiplied by 9.8 (a mean annual growth rate of 7.4 percent). Gross income was multiplied by 10.1 (a mean annual growth rate of 7.5 percent) and income net of capital consumption by 9.7 (a mean annual growth rate of 7.4 percent). Finally over the period, the ratio R_b rose from 4.12 at the end of 1948 to 4.44 at the end of 1980, an 8 percent increase. But R_n remained practically constant over the period: this difference in the evolution of the two ratios is mainly explained by the rapid growth of household liabilities. Over the period, these liabilities were multiplied by 27.2 (a mean annual growth rate of 10.9 percent) which is far larger than all other multiplication coefficients. In consequence, the rate of increase of debt measured as the ratio of liabilities to gross wealth rose from 6 percent in 1948 to almost 16 percent in 1980. We shall examine successively:

- the main features of the 3 sub-periods considered;
- the variations over the period of the different variables included in the wealth-income ratios;
- the comparison between observed and theoretical wealth-income ratios;
- the factors explaining the short term variations of the wealth-income ratios.

2.1. *The Main Features of the 3 Sub-periods*

After several attempts, we finally divide the period into 3 sub-periods as shown in Tables 1, 2 and 3: 1948–57, 1958–69 and 1970–80. The mean level of the wealth-income ratio was the principal criterion for this division, but linked with this criterion, we observe also differences in income growth rates, wealth price rates and borrowing rates. Tables 1, 2 and 3 provide all the necessary information for the three sub-periods considered. The first five columns provide the values of the variables appearing in relation (4): r, a, m, d and p. Column 6 provides the GNP price variation rate, g, as computed from Ruggles [1981] (Tables 1.1 and 1.3). Column 7 gives the ratio of liabilities to gross wealth, E. Finally, the last two columns provide the values of R_b and R_n year by year.

During the first period, the rather low level of R_b and R_n can be attributed mainly to a strong increase in the income variable and to a moderate increase in the wealth price. One remark has to be made: the rather low level of the wealth-income ratio occurred in this case in spite of a relatively high savings rate.

TABLE 1

UNITED STATES: 1948–57[1]

Year	1 r	2 a	3 m	4 d	5 p	6 g	7 E	8 R_b	9 R_n
1948	11.8	19.4	3.8	2.0	1.4	7.3	6.3	4.12	4.19
1949	1.3	16.8	3.9	2.1	0.1	−0.2	7.0	4.20	4.26
1950	11.5	20.1	5.4	2.2	7.7	3.0	7.5	4.23	4.27
1951	2.3	22.7	3.5	2.3	5.2	7.6	7.7	4.52	4.61
1952	14.7	19.6	4.4	2.3	1.6	1.7	8.3	4.15	4.18
1953	6.2	18.7	4.3	2.4	−0.5	1.7	9.2	4.03	4.03
1954	3.7	17.9	3.9	2.5	6.6	1.8	9.3	4.26	4.28
1955	6.9	18.1	6.3	2.5	5.4	2.0	9.9	4.34	4.33
1956	7.0	19.4	4.6	2.5	3.6	3.5	10.3	4.34	4.33
1957	5.6	18.2	3.2	2.5	−1.5	3.2	11.0	4.16	4.13
Mean[2]	6.5	19.1	4.4	2.4	3.1	2.7	8.7	4.24	4.26

[1] r, a, m, d, p, g and E are in percent. For definition and calculation, see section 1 and appendix 1.

[2] Geometric mean for r, p and g; arithmetic mean for the other magnitudes.

TABLE 2

UNITED STATES: 1958–69[1]

Year	1 r	2 a	3 m	4 d	5 p	6 g	7 E	8 R_b	9 R_n
1958	4.2	16.4	3.2	2.6	8.3	1.8	10.6	4.44	4.43
1959	5.8	17.0	5.5	2.5	3.0	2.2	11.2	4.45	4.42
1960	3.8	16.6	4.1	2.4	0.3	1.1	11.9	4.40	4.33
1961	3.8	16.8	4.0	2.4	6.2	0.7	11.8	4.61	4.53
1962	5.0	16.1	4.7	2.3	−1.8	1.3	12.8	4.42	4.29
1963	5.1	16.7	5.9	2.4	4.3	1.5	13.2	4.51	4.35
1964	7.6	19.4	5.6	2.3	3.4	0.7	13.4	4.49	4.30
1965	7.1	19.6	5.4	2.2	4.1	2.5	13.8	4.52	4.30
1966	7.7	18.4	3.9	2.2	−0.2	2.8	14.3	4.32	4.08
1967	6.9	21.9	3.8	2.3	6.9	3.2	13.7	4.49	4.27
1968	8.0	21.4	5.1	2.3	7.6	4.3	13.4	4.65	4.44
1969	7.9	17.3	4.1	2.2	−0.9	4.9	14.1	4.39	4.21
Mean[2]	6.1	18.3	4.6	2.3	3.4	2.2	12.9	4.47	4.33

[1] r, a, m, d, p, g and E are in percent. For definition and calculation, see section 1 and appendix 1.

[2] Geometric mean for r, p and g; arithmetic mean for the other magnitudes.

In the second period the wealth-income ratios show a slight rise due to an increase in the relative price variation of wealth ($=p-g$); $p-g$ was only 0.4 percent during the first period, and it amounts to 1.2 percent in the second period. In fact, $(p-g)$ does not enter directly in the expression of the wealth-income ratios, but in this expression, compared to the previous period, r is slowing down and p is rising.

During the last period, the mean wealth-income ratios are a bit lower than in the previous one, due to a large increase in nominal income. It is noteworthy

TABLE 3

UNITED STATES: 1970–80[1]

Year	1 r	2 a	3 m	4 d	5 p	6 g	7 E	8 R_b	9 R_n
1970	8.5	18.5	2.8	2.4	1.6	5.3	14.2	4.22	4.02
1971	8.3	18.5	5.4	2.5	5.5	4.7	14.3	4.26	4.05
1972	8.0	19.8	7.3	2.5	6.4	4.0	14.5	4.37	4.15
1973	12.5	20.2	7.2	2.5	2.0	5.1	15.4	4.14	3.88
1974	8.9	20.3	4.3	2.6	2.0	8.1	15.6	4.02	3.77
1975	9.8	21.5	4.0	2.8	7.2	9.2	15.0	4.08	3.87
1976	8.4	19.8	7.0	2.8	7.6	4.8	15.0	4.21	4.00
1977	9.4	19.7	9.4	2.8	4.9	5.6	15.9	4.23	3.98
1978	11.8	20.3	9.8	2.8	8.8	7.3	16.3	4.31	4.04
1979	12.5	19.1	9.1	2.8	8.2	8.4	16.5	4.32	4.04
1980	11.1	19.3	5.3	2.8	10.8	8.7	15.7	4.44	4.20
Mean[2]	9.9	19.9	6.9	2.7	5.9	6.5	15.3	4.24	4.00
Mean[2] 1948–80	7.5	19.0	5.2	2.5	4.2	3.8	12.4	4.32	4.20

[1] r, a, m, d, p, g and 3 are in percent. For definition and calculation, see section 1 and appendix 1.

[2] Geometric mean for r, p and g; arithmetic mean for the other magnitudes.

that the relative price increase of wealth is negative here ($p - g = 5.9 - 6.5 = -0.6$ percent); but the amount people are losing on the assets side is more than recouped on the liabilities side:

$$g \times E = 6.5 \times 0.153 = 1.0 \text{ percent.}$$

During this last period we have also to note that R_b and R_n are again rising from 1974 to 1980.

2.2. *The Variations over the Period 1948–80 of the Variables Included in the Wealth-income Ratios*

The variations observed, over the whole period and the sub-periods, for the variables and ratios constitute a first subject of interest. Table 4 provides the coefficients of variation. The two ratios R_b and R_n seem relatively very stable. The variations in the variables are very different from the one to the other: on one side, d and a are almost as stable as the two ratios; on the other side, r and especially p, which is negative for five years over the period, have a more

TABLE 4

UNITED STATES: COEFFICIENTS OF VARIATION OF THE VARIABLES

Period	R_b	R_n	d	a	m	r	p
1948–80	0.03	0.04	0.09	0.09	0.35	0.57	0.82
1948–57	0.03	0.03	0.06	0.09	0.21	0.65	1.06
1958–69	0.02	0.03	0.04	0.11	0.18	0.86	1.13
1970–80	0.03	0.03	0.05	0.04	0.31	0.18	0.45

erratic evolution. In between, the value of the coefficient of variation of m is partly due to the trend.

We are now able to determine whether the condition of convergence to the theoretical ratio is satisfied. This condition is $p < r + d$ and it is verified for 30 of the 33 years. From another point of view, the relationship between p and d is important as far as the influence of debt on $\bar{R}_n$ and $\bar{R}'_n$ is concerned: p is larger than d in 21 years, and, in mean values, for each sub-period considered. So, in total over the period, debt incurrence has demonstrated a "leverage effect" contributing to the rise not only of $\bar{R}_b$ and $\bar{R}'_b$, but also of $\bar{R}_n$ and $\bar{R}'_n$.

Concerning the linear trends of the variables included in the wealth-income ratios, no result is significant. The highest correlation coefficient over the whole period is for d (0.641); this correlation is positive and rather high for the first and the last sub-periods, but negative and rather high for the second one. Finally, one can say that no variable exhibits any linear trend over the entire period.

2.3. *A Comparison between Observed and Theoretical Values of Wealth-income Ratios*

Calculating year by year the *theoretical value* of the wealth-income ratios is of course meaningless since this value concerns only the very long term, all parameters being held constant. But it may be of interest to compare the mean observed values with the mean theoretical values for shorter or longer periods. Table 5 provides the results of the calculation for the entire period and each sub-period considered.[3] For the whole period the differences between observed and theoretical values are very small. For each sub-period, they appear to be a

TABLE 5

UNITED STATES: THEORETICAL AND OBSERVED VALUES (Th, O) OF HOUSEHOLD WEALTH-INCOME RATIOS

	$R'_n = \frac{P_n}{Y_b}$	$R_n = \frac{P_n}{Y_n}$	$R_b = \frac{P_b}{Y_b}$	$R'_b = \frac{P_b}{Y_n}$
1948–80				
O	3.80	4.20	4.32	4.79
Th	3.74	4.19	4.47	5.01
Difference (in %)	*−1.6*	*−0.2*	*+3.5*	*+4.6*
1948–57				
O	3.89	4.26	4.24	4.67
Th	3.59	3.97	4.32	4.78
Difference (in %)	*−7.7*	*−6.8*	*+1.9*	*+2.4*
1958–69				
O	3.90	4.33	4.47	4.97
Th	4.06	4.55	4.88	5.43
Difference (in %)	*+4.1*	*+5.1*	*+9.2*	*+9.3*
1970–80				
O	3.59	4.00	4.24	4.72
Th	3.83	4.26	4.60	5.12
Difference (in %)	*+6.7*	*+6.5*	*+8.5*	*+8.5*

[3]In fact, we did not use here relations (4) and (10) of the first section but rather discrete time formulas which can be shown to be different only by a factor of $(1+r)$.

little bigger, but in no case do they go beyond 10 percent. The conclusion to draw is that, although the theoretical expressions are strictly valid only for a very long period with constant parameters, they do however constitute a convenient tool for analysing the evolution of wealth-income ratios over more limited periods.

2.4. *The Factors Explaining Short Term Variations of Wealth-income Ratios*

Relation (2) makes it possible to follow the variations of R_b year by year. In order to analyse more precisely than was done until now the factors of variation of the wealth-income ratio, we regressed linearly R_b on variables p, d, r, a, and m. Table 6 provides the results for R_b of the stepwise regression (results concerning R_n, R'_n and R'_b are very similar).

It is not surprising that the variables which mainly explain the short term variations of R_b are the ones which, in Table 4, have the strongest coefficient of variation: p and r. p appears three times in the first place and one time in the second; r appears one time in the first place and two times in the second; m has also a rather high coefficient of variation but we saw that this was due partly to trend: therefore variations in m cannot explain the short time variations of R_b and m comes last three times. In the table, the regression coefficients have the expected sign when they are significant at a 5 percent level. Finally, in the case of the United States, we got the impression that the simple accounting model proposed in the first section of this paper is a useful device for analysing variations of the macro-economic wealth-income ratios of households.

TABLE 6

UNITED STATES: STEPWISE REGRESSION OF R_b ON p, r, a, d AND m

Period	Rank of the Variable in the Regression				
	1	2	3	4	5
1948–80:					
Variable	*p*	*r*	*a*	*d*	*m*
Sign of the regression coefficient[1]	+	−			
Multiple determination coefficient[2]	0.484	0.709	0.735	0.728	0.718
1948–57:					
Variable	*r*	*p*	*a*	*d*	*m*
Sign of the regression coefficient[1]	−	+	+	−	
Multiple determination coefficient[2]	0.425	0.987	0.995	0.996	0.995
1958–69:					
Variable	*p*	*a*	*d*	*r*	*m*
Sign of the regression coefficient	+	−			
Multiple determination coefficient[2]	0.715	0.928	0.938	0.929	0.918
1970–80:					
Variable	*p*	*r*	*m*	*a*	*d*
Sign of the regression coefficient	+	−	+	+	
Multiple determination coefficient[2]	0.658	0.960	0.986	0.993	0.996

[1]The sign of the regression coefficient is given only if it is significant at a 5 percent level.
[2]This is the corrected R^2.

III. An Application of the Model to French Households

Since 1977, some studies of French household wealth have been published: CERC [1979], INSEE [1979]; in 1980, for the first time, sectorial and national balance sheets for three years (1971, 1972 and 1976) have been published (INSEE [1980]). However, no series exists for the three postwar decades. As the relationships provided in the first section are more interesting to apply to medium term or long term data, we undertook to build up the series for each variable appearing in the relationships of the first section. Many sources were used (INSEE, Conseil National du Crédit, Direction de la Prévision, Centre de Recherche Economique sur l'Epargne) and some of them are difficult to match. Appendix 2 provides a brief comment on these different sources.

For the wealth concept here considered, Appendix 2 presents the breakdown of the elements taken into account. There are three main differences from the concept used for American household wealth:

- in French household wealth, professional assets and liabilities of individual entrepreneurs are recorded; in the U.S. only the net worth (equity) was taken in account;
- in French national accounting, durable goods (other than housing) do not form a part of saving; they are considered as consumption; symmetrically we did not consider them as assets in the balance sheet;
- following this latter choice, we did not take into account short term credit in calculating the debit side of the balance sheet.

According to our evaluation, French household gross wealth would have been multiplied in nominal value, from the end of 1949 to the end of 1979, by 31.3 (an annual mean growth rate of 12.2 percent). The wealth net of debt would have been multiplied by 28.1 (a mean growth rate of 11.9 percent). But the debt outstanding would have been multiplied by 169.2 (a mean growth rate of 18.5 percent). In the same period, the gross disposable income of French households has been multiplied by 27.7 (a mean growth of 11.7 percent). Disposable income net of capital consumption varied almost in the same way (a multiplication coefficient of 28.1, a mean annual growth of 11.8 percent). The share of capital consumption in gross disposable income has slightly decreased over the period from 5.3 percent in 1949 to 3.9 percent in 1979.

As a result of these different evolutions, R_b has increased over the period from 3.70 in 1949 to 4.16 in 1979 (a 12.4 percent increase). R_n has only increased from 3.83 to 3.96 (a 3.4 percent increase). This difference in the evolution of the two ratios is of course to be attributed partly to the decrease of the share of capital consumption in disposable income, but chiefly to the increase of the share of debt outstanding in household gross wealth (1.7 percent of wealth in 1949, 8.4 percent in 1979).

3.1. *The Main Features of the Three Sub-periods*

Tables 7, 8 and 9 provide information for the three sub-periods considered. Ratios and coefficients were calculated from the series given in Appendix 2.

Variable g in column 6 corresponds to the price evolution of gross domestic market product (INSEE [1981], page 202).

As for the U.S., it is chiefly the level of R_b and R_n which helped in the subdivision of the period. During the first sub-period 1949–60, only moderate levels are reached for R_b and R_n. This is due partly to rather low savings and borrowings rates, but probably chiefly to a high rate of increase in income. Noteworthy are the sharp declines of R_b and R_n in 1950, 1951 and 1952, due to very high values for r (Korean inflation). In the second sub-period 1961–70, we meet higher levels for R_b and R_n due to the increase of the savings and

TABLE 7

FRANCE: 1949–60[1]

Year	1 r	2 a	3 m	4 d	5 p	6 g	7 E	8 R_b	9 R_n
1949		12.1	1.2	1.6	5.3	nd	1.7	3.70	3.83
1950	14.3	12.3	1.5	1.7	7.0	7.3	1.9	3.53	3.67
1951	21.3	11.1	1.1	1.9	10.3	14.8	2.0	3.27	3.40
1952	15.5	11.3	1.3	1.8	7.5	14.5	2.3	3.12	3.22
1953	2.3	9.3	1.3	1.7	9.0	1.0	2.4	3.38	3.46
1954	8.4	12.1	1.4	1.5	9.7	0.3	2.5	3.50	3.58
1955	8.9	13.3	1.9	1.5	8.1	1.2	2.8	3.58	3.65
1956	9.4	12.7	2.0	1.4	8.9	4.6	3.0	3.66	3.73
1957	11.6	13.2	2.5	1.5	11.4	5.5	3.3	3.76	3.82
1958	12.5	12.5	2.0	1.4	11.4	11.8	3.4	3.82	3.87
1959	11.9	13.1	2.1	1.3	10.3	5.9	3.5	3.88	3.91
1960	11.2	15.2	2.3	1.2	9.1	3.3	3.7	3.93	3.95
Mean[2]	11.6	12.4	1.7	1.5	9.0	6.3	2.7	3.59	3.67

[1] r, a, m, d, p, g and E are in percent. For definition and calculation, see section 1 and appendix 2.

[2] Geometric mean for r, p and g; arithmetic mean for the other magnitudes.

TABLE 8

FRANCE: 1961–70[1]

Year	1 r	2 a	3 m	4 d	5 p	6 g	7 E	8 R_b	9 R_n
1961	8.6	14.5	2.4	1.1	9.9	3.0	3.9	4.11	4.12
1962	14.6	16.7	2.3	1.1	10.1	4.0	3.9	4.09	4.10
1963	11.6	15.7	2.1	1.1	7.8	5.6	4.0	4.09	4.09
1964	9.0	15.5	2.3	1.0	6.3	3.8	4.2	4.13	4.12
1965	7.6	16.2	2.3	1.0	6.3	2.5	4.4	4.24	4.21
1966	7.5	15.7	2.7	1.0	5.4	2.6	4.6	4.30	4.26
1967	8.6	15.9	3.3	1.0	6.2	3.1	5.0	4.35	4.30
1968	8.7	15.7	4.0	1.0	7.0	3.6	5.4	4.44	4.37
1969	11.7	14.3	4.2	1.0	8.1	6.1	5.8	4.45	4.35
1970	12.7	16.7	3.0	1.0	7.7	5.3	5.8	4.40	4.31
Mean[2]	10.0	15.7	2.9	1.0	7.5	4.0	4.7	4.26	4.22

[1] r, a, m, d, p, g and E are in percent. For definition and calculation, see section 1 and appendix 2.

[2] Geometric mean for r, p and g; arithmetic mean for the other magnitudes.

TABLE 9

FRANCE: 1971–79[1]

Year	1 r	2 a	3 m	4 d	5 p	6 g	7 E	8 R_b	9 R_n
1971	12.5	16.8	4.0	1.0	4.3	5.5	6.3	4.26	4.14
1972	12.3	16.9	5.9	1.0	8.5	6.0	6.9	4.30	4.16
1973	13.6	17.3	5.3	1.0	10.5	7.3	7.2	4.37	4.21
1974	16.9	17.4	3.5	1.0	4.6	10.3	7.5	4.08	3.93
1975	16.7	18.6	4.2	1.1	15.4	12.7	7.2	4.23	4.08
1976	12.3	16.4	5.2	1.1	7.3	9.7	8.0	4.21	4.05
1977	12.8	16.9	4.6	1.1	6.6	8.5	8.0	4.14	3.97
1978	14.3	17.8	4.7	1.1	8.5	9.2	8.2	4.12	3.93
1979	12.6	16.7	6.0	1.1	8.8	10.4	8.6	4.16	3.96
Mean[2]	13.8	17.2	4.8	1.1	8.2	8.8	7.5	4.21	4.05
Mean (1949–79)	11.7	14.9	3.0	1.2	8.3	6.3	4.7	3.99	3.96

[1] r, a, m, d, p, g and E are in percent. For definition and calculation, see section 1 and appendix 2.

[2] Geometric mean for r, p and g; arithmetic mean for the other magnitudes.

borrowings rates and to a slightly smaller progression in nominal income. During the third sub-period 1971–79, R_b and R_n are slightly decreasing in spite of increases in the saving and borrowing rates. This evolution is the consequence of strong inflationary pressures: nominal income rises very sharply while the relative price of assets is decreasing ($p - g = 8.2 - 8.8 = -0.6$ percent).

3.2. *The Variations over the Period 1949–79 of the Variables Included in the Wealth-income Ratios*

Table 10 presents the coefficients of variation for all variables over the whole period and the sub-periods. The results are not very different from those which we obtained for the U.S.

It is however worth noting that ratios R_b and R_n are less stable over the period than they were in the U.S. but r and p are here again the most unstable variables, even if their instability is slightly less pronounced than in the U.S. case (there are here no negative variations of p).

The coefficients of variation for a, m and d are easier to interpret if we look at the linear trend of these variables (Table 11). As we can see, and as we

TABLE 10

FRANCE: 1949–79: COEFFICIENTS OF VARIATION OF THE VARIABLES

Period	R_b	R_n	d	a	m	r	p
1949–79	0.09	0.07	0.22	0.16	0.48	0.30	0.27
1949–60	0.07	0.06	0.13	0.11	0.27	0.39	0.14
1961–70	0.03	0.02	0.05	0.05	0.25	0.23	0.20
1971–79	0.02	0.03	0.05	0.04	0.17	0.13	0.38

TABLE 11

FRANCE: LINEAR TREND OF THE VARIABLES: COEFFICIENT OF CORRELATION

	a	m	r	p	d
1949–79	0.885	0.860	0.212	−0.215	−0.790
1949–60	0.772	0.875	−0.191	0.380	−0.943
1961–70	−0.260	0.793	−0.126	−0.241	−0.725
1970–80	−0.108	−0.014	−0.196	−0.091	0.845

already know, there is an upward tendency for m and a downward tendency for d in the long term. The savings rate, a, shows some fluctuations but, on the whole, it displays a slightly rising trend.

We are now able to verify the surmises made in the first section. The main hypothesis ($p < r + d$) is satisfied in 29 of the 31 years, and for each of the three sub-periods. So the assumption of convergence of $\bar{R}_b$ to a finite value was warranted. As far as p and d are concerned, we have for each year of the period $p > d$. So, as a consequence of the "leverage effect" we pointed out in the first section, indebtedness was a most efficient factor in increasing net wealth-income ratios (R_n and R'_n).

3.3. *Comparison between Observed and Theoretical Values for the Wealth-Income Ratios*

Table 12 provides a comparison between observed and theoretical values of R_b and R_n. It appears markedly that the theoretical values are not so close

TABLE 12

FRANCE: THEORETICAL AND OBSERVED VALUES (Th AND O) OF HOUSEHOLD WEALTH-INCOME RATIOS

	$R_n = \frac{P_n}{Y_n}$	$R_b = \frac{P_b}{Y_b}$
1949–79		
O	3.96	3.99
Th	4.28	4.35
Difference in %	*+8.0*	*+8.9*
1949–60		
O	3.67	3.59
Th	3.88	3.84
Difference in %	*+5.7*	*+5.0*
1961–70		
O	4.22	4.26
Th	5.83	5.85
Difference in %	*+38.2*	*+37.3*
1971–79		
O	4.05	4.21
Th	3.47	3.74
Difference in %	*−14.3*	*−11.2*

to the observed ones as was the case for the U.S. For the whole period, theoretical ratios are 8 or 9 percent above the observed ratios: this is due to the trends in parameters such as a, and m. Such trends do not exist in the U.S. case where parameters fluctuate around their means. Their existence is the cause of a "permanent" transitory state of the system; so the steady state ratio can never be reached. For the first two sub-periods the theoretical ratios are above the observed ones: this is specially true for the second sub-period. During the last sub-period, the theoretical values are on the contrary below the observed values; this can be attributed to inflation: a very large increase in *nominal* income, if maintained in the long period, can bring a decline of the ratios as long as there is no compensation in the relative price of assets.

3.4. *The Factors Explaining Short Term Variations of Wealth-Income Ratios*

The results here are very similar to the results obtained for U.S. households (see Table 13). Income and price variations chiefly explain short term movements in R_b. These results are here even more clear cut than in the U.S. case; higher correlation coefficients and a more stable hierarchy in the influence of the variables are obtained. r and p come always in the first two places, followed by a and m. These variables appear always with the expected sign, when significant. Variable d comes last and its influence is never significant, but we may observe that, even though not significant, the sign for d is negative for two sub-periods, which is in agreement with theoretical prediction.

TABLE 13

FRANCE: STEPWISE REGRESSION OF R_b ON p, r, a, d AND m

Period	Rank of the Variable in the Regression				
	1	2	3	4	5
1949–79:					
Variable	*r*	*p*	*a*	*m*	*d*
Sign of the regression coefficient[1]	–	+	+	+	
Multiple determination coefficient[2]	0.590	0.954	0.989	0.993	0.992
1949–60:					
Variable	*r*	*p*	*m*	*a*	*d*
Sign of the regression coefficient[1]	–	+	+		
Multiple determination coefficient[2]	0.918	0.995	0.997	0.997	0.996
1961–70:					
Variable	*r*	*p*	*a*	*d*	*m*
Sign of the regression coefficient[1]	–	+			
Multiple determination coefficient[2]	0.756	0.990	0.992	0.989	0.989
1971–79:					
Variable	*p*	*r*	*m*	*a*	*d*
Sign of the regression coefficient[1]	+	–	+	+	
Multiple determination coefficient[2]	0.720	0.984	0.990	0.996	0.995

[1]The sign of the regression coefficient is given only if it is significant at a 5 percent level.
[2]This is the corrected R^2.

IV. The "Stability" of the Wealth-Income Ratio and the Attempts to Explain It

In the foregoing, the short term variations of the wealth-income ratio were stressed. It is time now to look at long term variations and to come back to the famous "stability" of the ratio. The best known contribution on the subject is Modigliani [1966]. We shall first make a general statement concerning the "stability" of the ratio in the U.S. and in France. Then we shall see if there is really a theoretical framework which can explain the "stability" (or the instability) of the ratio.

4.1. *Is the Wealth-Income Ratio Stable?*

The coefficients of variation displayed in Tables 4 and 10 show that there is not much difference in the variations of R_b and R_n. Therefore in the following, we shall focus on R_b. Concerning this ratio, as already said, we observe between the two countries marked differences in evolution: there is a great stability around the mean in the U.S., but an upward trend in France.

For the U.S., a comparison can be made with Modigliani [1966]. Modigliani's findings cover the period 1900–58, so there are only 10 years overlapping with our own results. Moreover the definitions of income and wealth are not the same in the two studies. Nevertheless, we observe that although the *levels* of the wealth-income ratio are somewhat different in the ten year overlapping period, the *variations* of the two series are rather close: the linear correlation coefficient is 0.68, which is rather high for magnitudes without trend. Table 14 indeed

TABLE 14

United States: Linear Trend of R_b

	1948–80	1948–57	1958–69	1970–80
Regression coefficient	0.004	0.006	−0.003	−0.014
Student t	0.16	0.38	−0.39	−0.83
Correlation coefficient	0.022	0.131	−0.123	0.372

supports the argument that in our study, exactly as in Modigliani's study, there is no trend in the ratio: the values of the linear regression are very low and so are the correlation coefficients. The stability of the ratio is even more obvious in our study than in Modigliani's. Modigliani has to eliminate erratic points (war years, "great crisis") and he gets for R_b a 6 percent coefficient of variation. Without any elimination, we obtain directly over the whole period a 3 percent coefficient and the argument concerning the stability of the ratio appears to be strongly reinforced.

The conclusion is quite different for France. In Table 10, we observed that the coefficients of variation for R_b were significantly higher in France: for the whole period this coefficient is approximately double what it is for the U.S. In Table 15, we see that there are strong linear trends in R_b for France. These trends are positive for the first two sub-periods and negative for the last one.

TABLE 15

FRANCE: LINEAR TREND OF R_b

	1949–79	1949–60	1961–70	1971–80
Regression coefficient	0.034	0.068	0.046	−0.021
Student t	7.33	5.34	8.23	−2.12
Correlation coefficient	0.809	0.872	0.946	−0.624
Detrended coefficient of variation of R_b	0.05	0.04	0.01	0.02

For the entire period, there is an upward trend. All these trends are statistically significant. The coefficients of variation with trend removed (last line of Table 15) are approximately the same as (or even less than) the coefficients for the U.S.

Thus the results for France do not appear to support the "stability" argument. The evolution of R_b could take place in large Kondratief cycles: for instance, R_b would be decreasing during the low phase of approximately 25 years covering the period 1920–45. It would be increasing during the following boom period 1946–73 and decreasing again during the "crisis" 1973–98. This is of course only a guess. To support this thesis one would need a theory showing why, during the "crisis," wealth declines more rapidly than income (or equivalently that its growth is more severely reduced than the growth of income), and why during the boom, wealth grows more rapidly than income. Such a theory should encompass physical growth as well as the consequences of inflation. To conclude this section, let us say that these semi-secular fluctuations are very different from those pointed out by Modigliani [1966], which were medium term and counter-cyclical.

4.2. *Some Theoretical References Explaining the Evolution of the Wealth-income Ratio*

The reference to Kondratief cycles cannot be considered as a theoretical argument. An historical approach to what happened in France concerning R_b could also stress that 1946–73 was the recovery period after the second world war: it can seem quite normal, after the destruction and disorganization of the war, that this recovery was accompanied by an increase in the wealth-income ratio. In fact, more specifically theoretical contributions have tried to explain the "stability" and not the "variability" of the wealth-income ratio (referring either to the influence of the *capital-output ratio* or to the *life-cycle theory*.

In a very simple, primitive society, it is possible to record no difference at all between the capital-output ratio in the entire economy and the household wealth-income ratio. In our more complex economies, there is a greater distance between the two ratios. However, it has sometimes been argued that the stability of the wealth-income ratio could be attributed to the "technical" stability of the capital-output ratio: willy-nilly, households would be obliged to keep the productive assets which are required for the economy to function. Modigliani [1966] refuted this argument, showing that during the 1900–58 period, the capital-output ratio was in fact less stable than the wealth-income ratio. This author believes that if there is any cross-influence from one ratio to the other, this

influence is rather from the wealth-income ratio to the capital-output ratio than the reverse.

Modigliani's thesis [1966] is that only the life-cycle theory is able to explain the "stability" of the wealth-income ratio. We will not introduce here a complete debate on the strengths and weaknesses of the life-cycle theory, but we have, in the present case, strong doubts concerning the explanatory power of this theory as presented in Modigliani [1966]:

1. Neither bequests nor uncertainty about life duration are taken into account in this model.
2. The macro-economic consumption function which is specified could in fact correspond as well to the traditional Keynesian function as to a specific life-cycle equation.
3. There is no place in the ratio considered for the debt-incurrence behaviour which has proved to be, since the second world war, a very important variable of household choice.
4. In Modigliani's wealth-income ratio, price variations are considered to be exogenous; all inflationary consequences are left aside.

Thus it appears that the life-cycle theory does not offer a decisive explanation of the "stability" of the wealth-income ratio in our definition and measure.

Let us stress that our empirical findings are controversial: a remarkable stability for the U.S. and large fluctuations for France were obtained. So rather than speculate on the so-called stability of the ratio, it would probably be more productive to think about possible relationships linking the variables contained in relation (4). Maybe there exist some relationships between variables which would lead to offsetting effects: for instance an increase in the rate of growth of income (in the denominator of relation (4)) could produce a higher rate of saving (in the numerator of relation (4)). Under some conditions, it could turn out that these offsetting effects were sufficient to explain the "stability" of the ratio. Under other conditions, the offsetting forces are insufficient and the ratio displays large fluctuations or even a very long run trend. This observation points to a general growth model including all variables of relation (4). Such a model does not exist, as far as we know. For the U.S., Lawrence Summers [1982] has pointed out an important factor of variation of the wealth-income ratio: working on macro-economic series for 1950–78, he found that the ratio of wealth to labour income was positively influenced by the *real rate of return* (before or after tax). Other short term or long term determinants will probably be found.

Let us sum up now the main steps of our development.

1. We first provided an accounting expression of the wealth-income ratio using technical, behavioural and environment variables. All variables are to be taken out of balance sheet accounts.
2. We found that the variables included in the accounting relationship displayed very different *short term evolutions*: d, the rate of capital consumption, is by far the most stable variable in the two countries studied. More interesting is probably the fact that the most unstable variables were also the same in the two countries: income variation r

and wealth price variation p. The stability of the behavioural variables (saving rate, a, and borrowing rate, m) was found to be intermediate between the technical and environment variables.

3. In the *medium and long term*, the evolution of the variables included in the accounting formula is different from what it is in the short term: r and p are probably linked to inflation cycles (although the correlation between p, the wealth price variation, and g, the GNP price variation, is less than could be expected), but they show no long term trend in either country. In the case of France, a and m exhibit some upward trend. The technical variable itself, d, manifests some long term trend reflecting for instance either the increase of the share of durable goods in total wealth (United States) or the decrease of the share of professional assets (France).
4. Given what has been said in 2., it is not a surprise to verify that r and p are the two main factors explaining *the short term variations of the wealth-income ratio*. The influence of d, the rate of capital consumption, is quite normally insignificant. But neither a nor m seem able to influence the wealth-income ratio significantly in the short term.
5. Concerning *the medium and long term evolution* of the wealth-income ratio, we showed, in the case of France, that rather important variations could take place, linked to variations of the saving and borrowing rates. Indeed France experienced after the second world war an exceptional economic growth.
6. We next showed that for the U.S., where the wealth-income ratio is very stable, a steady state formula could give a good approximation of the mean value of the ratio for periods of reasonable length, 10 years or more. This is not the case for France where the wealth-income ratio is much more unstable.
7. Finally, we expressed strong doubts about the explanatory power of traditional theoretical frameworks forecasting the "stability" of the wealth-income ratio. First, this ratio may not be as stable as has been said. Second, if it is, it may happen that this stability comes from other factors than the ones pointed out in traditional theories. The casual conjunction of offsetting forces can, over shorter or longer periods, give the impression of a necessary stability of the wealth-income ratio.

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APPENDIX 1

UNITED STATES 1947–80

The data were taken from Ruggles (1981).

Column 1: Gross Wealth (Table 2-40, line 40, Total Wealth). The definition of wealth encompasses Reproducible Assets (Residential Structures, Consumer Durables, Inventories), Fixed Claim Assets (Deposits, Credit Market Instruments...), Equities Held (Corporate Stock, Non-Corporate Equity, Pension and Insurance, Estates and Trusts).

Column 2: Fixed Claim Liabilities (Table 2-40, line 41).

Column 3: Gross Disposable Income = Household Gross Current Income less Tax Payments (Table 1-40, line 26 minus line 35).

Column 4: Capital Consumption Allowances (Table 2-40, line 45).

UNITED STATES: (DATA IN BILLIONS OF DOLLARS)

	Gross Wealth (1)	Liabilities (2)	Gross Disposable Income (3)	Capital Consumption Allowances (4)	Net Saving (5)
1947	808.2	45.4	184.7	14.1	20.7
1948	851.2	53.2	206.5	16.1	23.9
1949	877.9	61.4	209.1	17.5	17.6
1950	985.3	74.1	233.1	19.5	27.4
1951	1076,6	82.5	238.4	22.6	31.6
1952	1134.6	94.5	273.5	24.8	28.8
1953	1169.3	107.1	290.4	26.9	27.4
1954	1281.9	118.7	301.2	29.5	24.4
1955	1398.1	138.9	322.1	31.6	26.8
1956	1496.4	154.6	344.8	34.9	32.0
1957	1514.0	166.4	364.0	37.6	28.8
1958	1684.1	178.6	379.2	39.7	32.4
1959	1784.1	200.7	401.2	41.7	26.5
1960	1832.8	217.7	416.3	42.9	26.0
1961	1992.1	234.9	432.0	44.4	28.1
1962	2003.7	256.0	453.4	45.6	27.4
1963	2151.2	284.0	476.6	47.2	32.6
1964	2303.3	312.5	512.6	49.4	50.3
1965	2485.0	342.4	549.2	51.2	56.3
1966	2558.6	365.4	591.5	53.9	55.0
1967	2838.1	389.5	632.2	58.7	79.6
1968	3170.9	424.6	682.6	64.1	82.3
1969	3229.2	454.9	736.4	71.3	56.3
1970	3373.2	477.5	798.8	78.0	69.7
1971	3679.4	524.5	864.3	84.8	75.0
1972	4077.7	592.9	933.1	92.8	93.0
1973	4344.5	668.2	1049.3	100.9	111.3
1974	4597.8	717.1	1143.1	113.9	118.7
1975	5120.5	766.8	1254.8	128.9	140.8
1976	5731.2	862.3	1360.5	142.6	126.3
1977	6289.8	1002.8	1488.5	158.6	134.8
1978	7166.0	1166.6	1663.8	178.1	159.8
1979	8081.1	1336.3	1871.9	200.8	156.4
1980	9234.2	1445.6	2080.5	226.7	174.1

Column 5: Net Saving (Table 2-40, line 58). The variable p was calculated using the Revaluation provided by Table 2-40 and which can also be obtained as a difference in relation (1).

APPENDIX 2

FRANCE 1949–79

The series used have been specially set up for this study.

Column 1: Gross Wealth: the definition used can be found in INSEE (1980). Consumer durables are excluded. Assets and liabilities of non-corporate enterprises are included. Data concerning the period 1970–79 were obtained from INSEE and from the Banque de France. For the period 1949–69, the data were taken from Babeau and others (1974) and Masson and Strauss-Kahn (1978).

Column 2: Liabilities: short term credits for consumer durables are excluded; the information was furnished by the Direction de la Prévision (Ministère de l'Economie et des Finances).

FRANCE: (DATA IN BILLIONS OF FRANCS)

	Gross Wealth (1)	Liabilities (2)	Gross Disposable Income (3)	Capital Consumption Allowances (4)	Net Saving (5)
1949	240	4.0	65.1	3.5	4.4
1950	263	5.1	74.4	4.1	5.1
1951	296	6.0	90.3	5.0	5.0
1952	325	7.3	104.3	5.3	6.4
1953	360	8.7	106.7	5.4	4.5
1954	405	10.3	115.7	5.5	8.5
1955	451	12.7	126.0	5.9	10.9
1956	505	15.3	137.9	6.4	11.1
1957	579	19.1	153.9	7.4	12.9
1958	662	22.6	173.1	8.1	13.5
1959	751	26.6	193.7	8.5	16.9
1960	848	31.5	215.5	9.0	23.8
1961	962	37.2	234.1	9.7	24.3
1962	1,100	43.3	268.3	10.3	34.5
1963	1,227	49.6	299.5	11.6	35.6
1964	1,350	57.1	326.4	12.7	37.9
1965	1,486	65.0	351.1	13.8	43.0
1966	1,620	74.0	377.3	14.9	44.3
1967	1,783	88.6	409.8	16.2	49.0
1968	1,979	106.4	455.6	17.1	52.9
1969	2,212	127.1	497.8	19.0	52.2
1970	2,471	144.0	561.1	21.3	72.4
1971	2,686	169.2	631.4	23.6	82.5
1972	3,051	211.0	709.1	26.1	93.7
1973	3,523	253.7	805.7	29.9	109.4
1974	3,845	286.7	941.8	36.7	127.2
1975	4,645	333.2	1099.0	42.8	161.6
1976	5,223	398.0	1241.3	49.6	154.0
1977	5,795	462.7	1399.9	55.7	180.9
1978	6,586	537.4	1600.5	62.3	222.6
1979	7,505	645.6	1801.6	70.1	230.8

Column 3: Gross Disposable Income: the series is taken from INSEE (1981), (pp. 288–289).

Column 4: Capital Consumption Allowances: this series was obtained from the Division "Synthèse des comptes nationaux" (INSEE).

Column 5: Net Saving has been calculated as the difference between Gross Saving (INSEE 1981) and Capital Consumption Allowances.

The variable p (revaluation rate) has been calculated as a difference in relation (1).