Asset wealth and consumption: weakly correlated in France, strongly in the United States

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Household wealth has posted major gains in many countries in recent years, through investment in financial and non-financial assets, but also—and mainly—thanks to the rising value of initial assets, particularly real estate.

As a result, household consumpttion may have become more sensitive to fluctuations in asset prices. But an increase or decrease in wealth has a far smaller impact on consumption in France than in the United Kingdom and, even more so, the United States. For every unit of additional wealth measured in local currency, Americans spend an average 5.8 cents per dollar more in the long term, the British 3.6 pence per pound, and the French 0.4 eurocents per euro. As a percentage of income, asset size is of comparable magnitude in France and the U.K., and smaller in the U.S. However, it is not the decisive factor. Risk aversion and the opportunities for increasing consumption in the event of wealth appreciation are more effective explanations of the differences between the three countries studied.

At a time when the real-estate crisis in the U.S. and the real-estate slowdown in France are affecting household wealth, these estimates suggest that a contraction in personal assets should have a far milder impact on consumption in France than in the U.S. and U.K. ■

Asset wealth and consumption

In the United States, the real-estate crisis may undermine household consumption

The downturn in the U.S. real-estate market, which began two years ago, has triggered a drop in residential investment that has trimmed U.S. growth by a quarter-point per quarter, i.e., by two points since the start of the crisis. Until last summer, however, U.S. growth had not been affected beyond this strictly direct effect on investment. The financial-market turmoil and the tightening of bank credit supply that can ensue are one of the mechanisms liable to transmit the real-estate market slump to other segments of the U.S. economy. Another is the impact of the slump on household wealth values and, in consequence, on personal consumption.

The fall in real-estate market prices and the impact of financial turbulence on financial-asset prices mark the end of a period of sustained growth in household wealth under way since the mid-1990s, starting in the U.S. Measuring the impact of household wealth on consumption—i.e., the "wealth effect"—is therefore of special importance in the U.S.

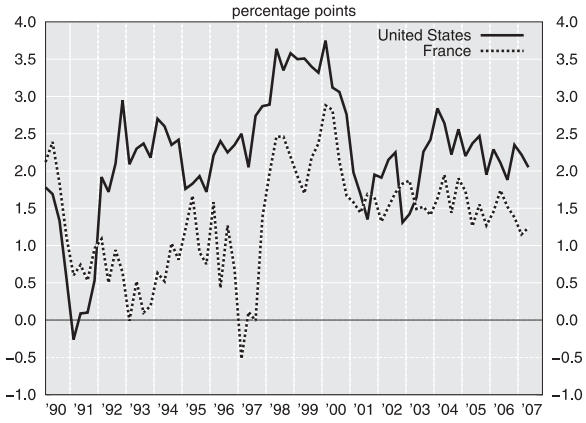
In France, the real-estate market downswing has admittedly been far milder than in the U.S., but prices have slowed sharply in the past year after a decade or so of robust growth. Financial turmoil has caused the stock market to drop since the summer. Determining the size of the wealth effect in France is therefore equally important.

In France, the wealth effect seems far more modest

Our study concludes that changes in asset values impact household consumption in France, but distinctly less so than in the U.S. We also draw comparisons with the United Kingdom: the structure of its real-estate and financial markets lies somewhere in between the French and U.S. profiles, and the magnitude of the wealth effect is also in an intermediate position.

The first part spells out the differences in consumption behavior between France, where the saving rate has stabilized since the early 1990s, and the U.S., where the rate has been steadily declining. These differences are largely due to a stronger wealth effect in the Anglophone countries. We quantify the effect in the second part, which also explores other short-term determinants of consumption such as the unemployment rate, inflation, and interest rates. We conclude with a detailed examination of asset structure and institutional mechanisms as potential explanations for wealth-effect differences between France and the U.S.

1 - Contribution of household effective consumption to GDP growth



Sources: Federal Reserve Economic Data; INSEE; authors' computations

Purchasing power[1] alone does not explain the slackness of consumption in France compared with the U.S.

Consumption is less buoyant in France than in the U.S.

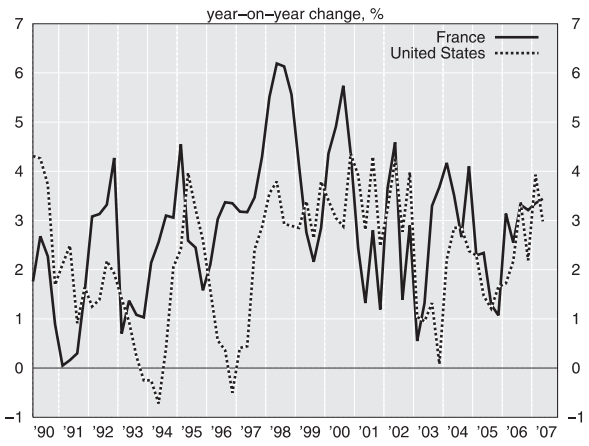
Since the early 1990s, consumption has been contributing 2.2 percentage points to year-on-year GDP growth in the U.S. Although consumption has been the most vigorous component of French growth during the period, actual final consumption[2] has contributed on average only 1.3 points to the rise in French GDP.

A faster rise in U.S. purchasing power

An explanation often provided for the strength of U.S. consumption is the vigor of household purchasing power, which greatly exceeded that of France in the 1990s. The reasons for this better performance have been reasonably well identified: first, the U.S. achieved productivity gains thanks to the faster development of new information and communication technologies (NICTs); second, the population grew at a higher trend rate in the U.S. than in France[3].

However, in recent years, the purchasing-power curves have converged significantly. Between 2000 and 2007, purchasing-power growth was only marginally more buoyant in the U.S., averaging 3.0% versus France's 2.7%. Yet household consumption has risen at a far more subdued pace in France, gaining 2.5% versus 3.2% in the U.S. Most of this gap is thus due to households' saving behavior.

2 - Year-on-year change in inflation-adjusted gross disposable income



Sources: Federal Reserve Economic Data; INSEE; authors' computations

1. "Purchasing power" here denotes gross disposable income in real terms, i.e., adjusted for inflation.
2. Throughout this section, in order to make the data more comparable, we examine actual final consumption (P41 of the European System of Accounts: ESA95) and adjusted gross disposable income (B7) of French households. The other two sections and our econometric estimates refer instead to consumption expenditures (P31) and gross disposable income (B6).
In France, actual final consumption has two major components: consumption expenditures directly financed by households and individual consumption expenditures by general government (GG). The latter comprise benefits in kind financed by GG but whose recipients are clearly identifiable, such as reimbursed medical expenses. By contrast, the National Income and Product Account (NIPA) used in the U.S. treats all social benefits as a component of household income and therefore measures only total consumption expenditures. In particular, NIPA does not inherently distinguish between benefits in cash and in kind. The main difference between the two consumption concepts hinges on services provided free of charge, such as healthcare expenditures that patients do not have to pay for in advance: these are not included in the U.S. concept of consumption.
3. The U.S. labor force grew 12.5% in the 1990s, i.e., at twice the French rate of 6.1%.

The main engine, however, has been a rise in U.S. propensity to consume

Since the early 1990s, the share of income that is consumed has risen in the U.S. but remained broadly stable in France. Symmetrically, while the saving rate fluctuated around 13% in France during the period, the U.S. ratio continued its gradual decline begun in the early 1980s. The downtrend has steepened since 2000, and the saving ratio of U.S. households now stands at a historical low *(Chart 3)*.[4]

A stronger wealth effect in the U.S. and U.K.

Wealth effects may explain these differences in saving-ratio profiles

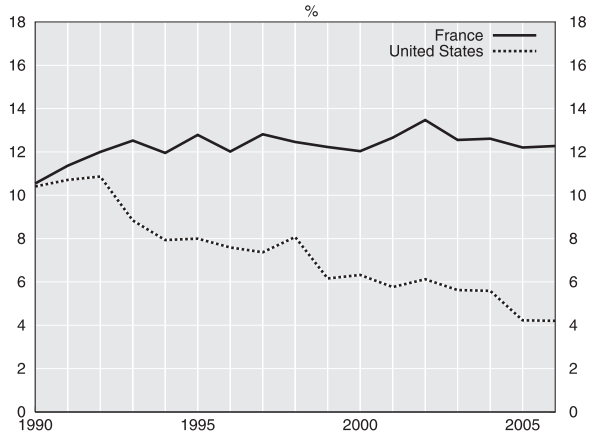
Permanent-income and life-cycle theories offer an explanation for the medium-term strength of consumption: the increase in household wealth. If households experience an unexpected rise in wealth and feel that the rise will persist, they will regard their permanent income—i.e., their average lifetime earnings—as having increased. They can then decide to raise their consumption immediately and permanently. This mechanism is known as the wealth effect. The different patterns of change in the saving ratio in French and U.S. households might thus be partly due to a difference in the size of the wealth effect between the two countries.

Financial and real-estate assets have very different characteristics

Many studies have sought to distinguish the effects of real-estate wealth from those of financial wealth. Real-estate wealth does possess three major distinctive features with respect to financial wealth:

- First, real-estate wealth provides a housing service to its owners. Some owner-occupiers may even be able to stay in their present homes all their lives. The increase in value of their homes generates no additional income stream, hence no rise in their permanent income. Moreover, the effect of an

3 - Adjusted saving ratio



Sources: Federal Reserve Economic Data; INSEE; authors' computations

4. Despite differences in national accounting systems between the two countries, this comparison is based on a definition of the saving ratio that is as harmonized as possible. In particular, the income included in the denominator includes social benefits in both countries. In any event, Boissinot and Catte (2007) show that the differential between changes in the French and U.S. saving ratios cannot be explained solely by differences in accounting definitions.

We must also note that U.S. saving is often calculated as the balance between disposable personal income and personal outlays. Our analysis is confined to personal consumption expenditures, a narrower consumption concept than personal outlays. This results in a slightly higher saving ratio for the total period.

increase in real-estate assets on the prospects of capital gains for households, although tangible, is dampened by owners who plan to sell their homes in order to buy smaller ones. The effect on consumption is stronger for households who have the possibility to take out new loans by using their homes as collateral with the banks. Rather than a wealth effect in the strict sense, this mechanism is more properly described as a lifting of the "liquidity constraints" that prevent households from borrowing as much as they would like.

- Second, the purchase of a dwelling generally supposes the prior formation of a down payment (although in recent years this constraint has been loosened in the U.S. and the U.K.). For tenants planning to buy a home, higher real-estate prices increase the size of the down payment needed and may drive them to reduce rather than increase consumption.
- Conversely, in countries with high home-ownership rates—they exceed 50% in the three countries studied—the effects of real-estate value growth are less concentrated in the population than the effects of rising values of other assets such as equities. They can therefore have more powerful macroeconomic effects, as the propensity to consume diminishes in step with the rise in income.

But their wealth effects are not easy to separate

Empirical studies yield contrasting results for the ranking of real-estate wealth effects and financial wealth effects. For example, Case, Quigley, and Shiller (2001) obtain stronger effects for real-estate wealth than for financial wealth on a panel of OECD countries, whereas Ludwig and Slok (2002) obtain the opposite result. Given this empirical difficulty of separating the two effects at a macroeconomic level, the estimates described here do not distinguish between them. Individual data could be usefully applied in order to take the investigation further.

Aggregate wealth effects stronger in Anglophone countries

Using the quantitative approach, we find a major wealth effect in the U.S. and a mildly weaker one in the U.K., whose value ranks in between those of France and the U.S. (see *Box 3* for a concise description of the theoretical mechanisms at work, and *Boxes 4-6* for the empirical results).

In the U.S., a dollar of additional wealth translates into a long-term increase in consumption of nearly 6 cents in annualized terms (average since 2000). Since 1995, the increase in U.S. households' net asset value has contributed an estimated twelve points or so to the reduction in their saving ratio.

We estimate a somewhat weaker effect in the U.K., where one pound of additional wealth raises annual consumption by some 3.6 pence (average since 2000). But the effect is distinctly stronger than the value measured in France, where we find that households increase consumption by only 0.4 eurocents per euro of additional wealth (average since 2000).

Thus, despite a higher increase in the wealth/income ratio, French consumption has been slacker

Households' wealth/income ratio has risen more sharply in France

The ratio of *total* assets (financial[5] and real-estate) to gross disposable income (GDI) rose fairly sharply in France, the U.S., and the U.K. between 1978 and 2006.[6] In the past five years, the increase in the ratio has become more pronounced in France *(Chart 4a)*. Despite slower GDI growth at the end of the period, total wealth grew no less vigorously in France than in the other two countries. Between end-2002 and end-2006, the average annual growth of real

5. The methods used to compute the series are broadly comparable between countries, but some significant differences remain: Boxes 1-2.
6. The starting point is 1987 for the U.K.

GDI was slightly higher in the U.S. (at 2.4% versus 2.1% in France and the U.K.), while between end-1998 and end-2006 it was very similar in the three countries (2.7% in France versus 2.8% in the U.S. and U.K.).

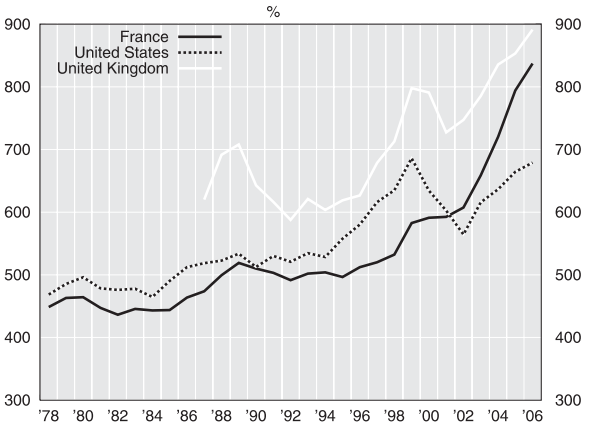
An even more clearcut phenomenon for net asset value

If we now look at asset value *net of loans to households* by country *(Chart 4b)*, the changes in the net asset value/GDI ratio display the same profile as total assets. But indebtedness is lower in France than in the U.K. and U.S., leading to slightly different results:

- the U.S. figure has not returned to the level prior to the bursting of the Internet bubble
- the U.K. increase has been significantly dampened by heavy borrowing
- France outranked the U.K. in 2006.

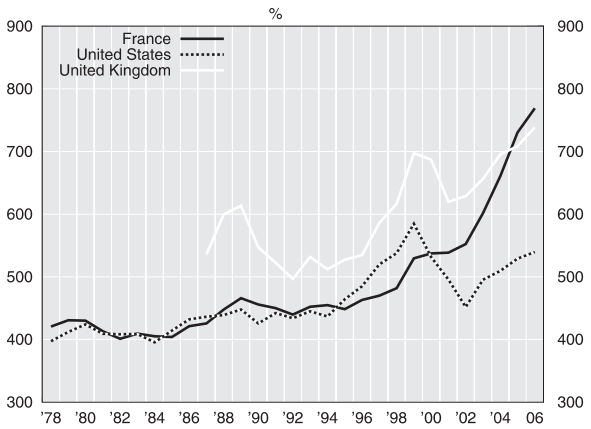
In 2006, the value of household assets net of loans was equal to 7.6 years of income in France, roughly the same figure as in the U.K. (7.4) and well above the U.S. figure (5.4).

4a - Ratio of total household assets to gross disposable income



Sources: financial and non-financial national accounts; Data Insight

4b - Ratio of total household assets net of loans to gross disposable income



Sources: financial and non-financial national accounts; Data Insight

Table 1
Change in saving ratio and its long-term determinants between 1995 and 2006

	France	United States	United Kingdom
Change in gross disposable income (GDI)	+53%	+81%	+68%
Change in net asset value	+162%	+121%	+133%
Contribution of net asset value/GDI ratio to long-term change in saving ratio[1]	-1.2 points	-5.1 points	-7.0 points
Actual change in saving ratio	+0.2 points	-5.4 points	-5.6 points

1. Given the econometric specification used for France *(Box 4)*, the long-term change in the French saving ratio does not depend exclusively on the change in the net asset value/GDI ratio.It also depends on the change in the ratio of GDI excluding property income (noted RDBhrp) to GDI. Explanation: with S for saving, C for consumption, P for prices, α for the income elasticity of consumption and W for wealth:
$\log(C/P) = \alpha.\log(RDB_{hrp}/P) + (1-\alpha).\log(W/P)$
$\Rightarrow \Delta S = -\Delta\log(C/RDB) = -(1-\alpha).\Delta\log(W/RDB) + \alpha.\Delta\log(RDB/RDB_{hrp})$
The relative increase in property income as a share of total household income contributes 2.4 points to the rise in the saving ratio: it is not shown in table 1. According to our model, the long-term determinants of consumption in France contribute a total 1.2 points to the rise in the saving ratio.
Interpretation: In the U.S., the growth in income (81%) and wealth net of loans (121%) between 1995 and 2006 contributed 0.26*ln(1.81/2.21) = -5.1 percentage points to the long-term change in the saving ratio.
Sources: BEA; ONS; Bank of France; INSEE; authors' computations

Whether total or net of loans, asset values have therefore risen sharply in France in the 2000s, and even more so than in the U.S. and U.K. Yet the growth in net wealth of French households appears to have contributed only about one point to the decline in their saving ratio since 1995 *(Table 1)*. The overall impact of a downturn in the real-estate market or in the financial markets thus seems to be significantly weaker in France than in the U.S.

Short-term effects

In the short term, unemployment, inflation, and interest rates also impact consumption

In the short run, household consumption and savings may depend on other factors besides income and wealth. For instance, a rise in the unemployment rate heightens the risk of losing one's job, potentially stimulating the formation of precautionary savings. A rise in inflation—apart from its automatic effect on households' purchasing power—tends to depreciate the value of their cash balances. This may incite households to save more in order to rebuild the balances. By contrast, households may also anticipate their consumption expenditures to guard against future price rises. The same ambivalence characterizes the influence of interest rates: when they rise, they make borrowing more expensive and incite households to delay consumption in order to take advantage of higher returns on savings, but they also contribute to the concurrent rise in investment income.

Weather fluctuations also have visible effects on aggregate consumption. An exceptionally mild winter can also lead households to reduce energy consumption or postpone clothing purchases. [7]

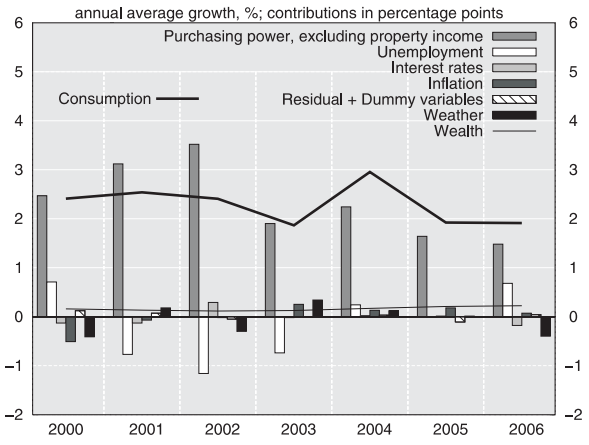
France and the U.S. diverge on these short-term determinants as well.

A decisive influence of the unemployment rate in France

The consumption profile of French households since 2000 is mainly correlated with their purchasing power and unemployment. The exceptionally mild temperatures in late 2000, 2002, and 2006 also restrained consumption—particularly of energy products—in those specific periods. We estimate that the growth in asset value contributed only 0.2 points per year to the rise in consumption. Lastly, inflation and interest rates appear to have a very limited influence in France, unlike in the U.S.—apart from inflation's accounting

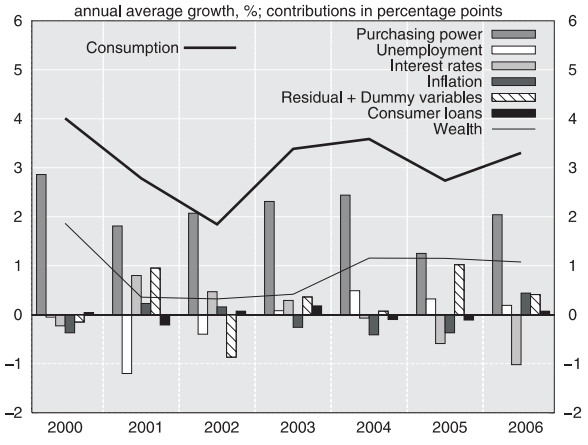
7. Box 3.

5 - Contributions to consumption growth in France



Sources: Data Insight; INSEE; authors' computations

6 - Contributions to consumption growth in the United States



Sources: Federal Reserve Economic Data; authors' computations

impact on purchasing power. Only at end-2000, when prices rose quite strongly, does inflation seem to have significantly dampened household consumption in France *(Chart 5)*.

Inflation and interest rates influence U.S. consumption

In the U.S., once the effects of the bursting of the technology-stocks bubble had passed in 2003, rising prices in the stock market and real-estate market powerfully stimulated consumption growth. These contributions have been relatively stable at approximately 0.3 points per quarter. Yet household-consumption growth has not held steady during the period. Its fluctuations are due to the changes in purchasing power and, to a significant degree, to changes in inflation and interest rates *(Chart 6)*.

Closer ties between household wealth and consumption in the U.S.

Two factors may explain the weaker wealth effect in France

The major differences in the size of estimated wealth effects in the U.S. and France may be attributed to households' risk aversion and the institutional mechanisms that facilitate the conversion of their wealth into consumable income.

Risk aversion apparently stronger in France

The assets that contribute most strongly to variations in household wealth are also, intrinsically, those whose prices register the widest swings, i.e., the riskiest assets. Household that are more risk-averse will therefore tend to hold a smaller share of risky assets in their portfolios and to be more parsimonious in consuming the returns on those assets. The composition of household wealth can thus provide some indications on risk aversion. Excluding real estate, household assets fall into the following broad categories: [8]

- cash and deposits
- securities
- life insurance and pension funds.

Risk aversion apparently stronger in France

In the three countries studied, the share of "cash and deposits" is falling, while that of life insurance and stakes in pension funds is rising *(Chart 7)*.

However, these common trends concern very different absolute levels: the proportion of securities directly held by households (in particular: stocks, bonds, and shares in money-market and non-money-market mutual funds) is far larger in the U.S. than in France or the U.K.[9] U.S. households also directly hold a larger

8. We set aside some assets whose total value is relatively low, such as inter-agent loans and accounting discrepancies. These are partly registered between households and are intrinsically different from more "traditional" assets.
9. This ranking is not affected by the contraction in the proportion of such assets in the U.S. at the end of the period—due to the bursting of the Internet bubble—or by the doubling of the proportion in France between 1978 and 2006.

Table 2 **Main components of total household assets in France, the United Kingdom, and the United States**

%

	December 1978			December 1987			December1996			December 2006		
	France	U.K.	U.S.	France	U.K.	U.S.	France	U.K.	U.S.	France	U.K.	U.S.
Cash and deposits	18.7	-	16.7	17.3	15.8	14.9	17.3	15.3	9.1	10.0	13.6	8.4
Securities	5.1	-	36.8	11.1	10.0	34.1	12.9	14.0	4.2	10.6	7.9	3.0
Life insurance/pension funds	3.2	-	11.9	4.2	24.5	15.9	11.3	33.1	21.5	12.5	28.7	20.9
Real estate	72.9	-	34.6	67.4	49.7	35.1	58.5	37.5	28.2	66.8	49.8	35.7

Sources: financial and non-financial national accounts; Data Insight; authors' computations

percentage of listed stocks (20.7% of families owned such assets in 2004[10]) than their French counterparts (13.7% of the over-15s in 2006[11]). Lastly, lower-risk financial assets are more common in France. Deposits are more widespread—for example, there is nearly one "Livret A" tax-exempt savings passbook in circulation per French person—as are instruments such as bond funds and money-market funds.

These data seem to indicate that U.S. households are less risk-averse than their French counterparts, which may therefore partly explain why the wealth effect is stronger in the U.S. However, asset structure does not reveal risk-related behavior except in a given institutional setting. If financial markets are shallower and less liquid in France than in the U.S., they probably offer fewer opportunities for risk diversification. We therefore cannot rule out the possibility that the smaller share of risky assets in household portfolios in France also reflects a lesser ability to diversify risk.

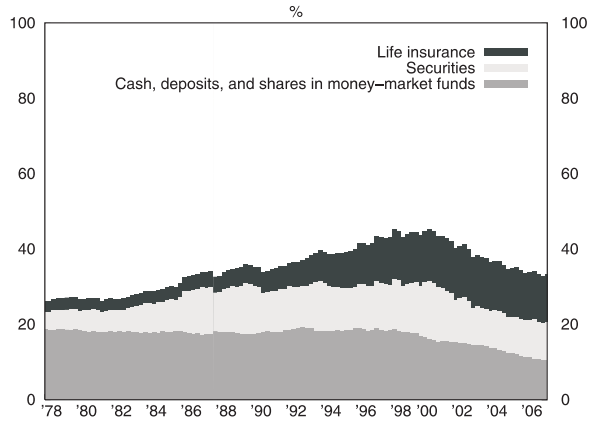
Real-estate wealth less easily convertible into cash in France

In the United States, home-owners can take out new loans when the value of their homes increases

Since 1978, French households have held between one-half and three-quarters of their total assets in the form of real estate. In the U.S., the share is considerably smaller, fluctuating between 25% and 36%. The U.K. ranks between the two. In France, unlike in the U.S., a rise in the value of real-estate assets cannot be used directly to finance an increase in consumption. In the U.S., home equity loans enable households to leverage the increase in real-estate asset value without having to resell their properties and realize the corresponding capital gains. This mechanism for obtaining new credit can be used to finance consumption. Indeed, U.S. home equity loans have grown so sharply since the late 1990s *(Chart 8)* that the real-estate wealth effect may have intensified since the early 2000s, possibly exceeding the average effects estimated here for the total period 1954-2006. As the mechanism does not exist in France, real-estate wealth effects are therefore, for this reason as well, probably weaker than in the U.S. ■

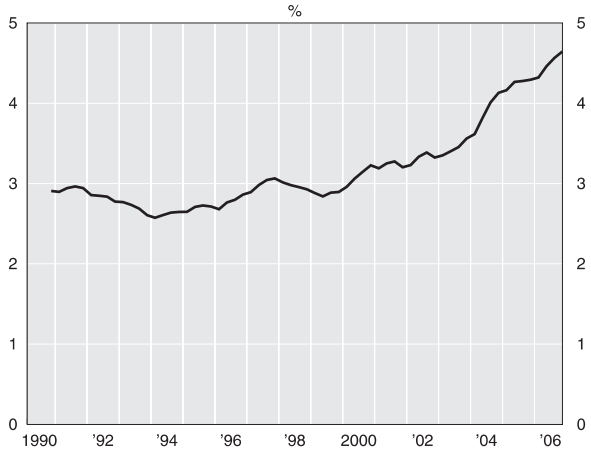
10. The percentage rises to 48.6% if we take into account total shares held—irrespective of whether they are owned directly or not—according to the Federal Reserve Board's Survey of Consumer Finance.
11. 14.5% including employee share ownership, according to a recent survey on securities ownership (TNS-SOFRES/Euronext 2006).

7 - France: main categories of household assets



Sources: Data Insight; financial quarterly national accounts; INSEE; authors' computations

8 - United States: home equity loans as a share of real-estate assets



Sources: Flows of Funds

Box 1 - Construction and reconstruction of asset series

We use the series published by the central banks and statistical institutes of the countries studied, including quarterly financial accounts for France,[1] Flows of Funds[2] for the U.S., and United Kingdom Economic *Accounts* for the U.K.[3]

The data include statistics on:

- flows: flows of net purchases (i.e., purchases minus sales) for financial and real-estate assets, or net borrowings (i.e., new issuances minus reimbursements) for financial liabilities; real flows for income, consumption, and other aggregates
- valuation: for certain assets whose value can fluctuate with changes in market prices
- outstandings/stocks: cumulative flows and valuations for a given period (these data on outstandings mainly concern asset series)
- rates: unemployment, short- and long-term interest, and so on.

As some series are unavailable at quarterly frequencies, we have had to reconstruct them from annual series.

In the specific case of real-estate assets, we have reconstructed quarterly series for France and the U.K. from flow series (gross fixed capital formation, which covers new real estate) and series of real-estate value indices. We made the quarterly flow and valuation series consistent with the published annual series by means of a statistical method. This involved minimizing, over the entire period, the sum of the squares of the changes in the differences between (1) values estimated spontaneously from a value index and (2) the annual values.[4] For the U.S., quarterly series of real-estate inventories were directly available in the Flows of Funds.

To obtain quarterly financial series for France since 1978, we performed an estimate using series with a pre-2000 base and back-casting cumulative totals from the 1994 outstandings expressed in base-2000 terms. We adjusted the valuation of unlisted shares to the one of listed shares.

Series on financial liabilities are generally available directly. When the real-estate asset has been measured net of loans, only real-estate loans have been subtracted from the asset. ■

1. Available at http://www.bank-france.fr/fr/stat_conjoncture/series/cptsnatfintrim/html/cptsnatfintrim.htm.
2. Available at http://www.federalreserve.gov/releases/z1/.
3. Available at http://www.statistics.gov.uk/statbase/TSDtables1.asp.
4. Method similar to the one used in French quarterly accounts (Fabre and Prost 2005).

Box 2 - Broadly comparable asset series

Scopes of coverage of the series are broadly comparable but some differences remain. For instance, U.K. non-financial assets comprise only residential real estate: farming assets or commercial buildings are therefore not included in household wealth, whereas they are in the series available in France and, to some extent, in the U.S. In any event, the category is by far the largest, as it accounts for some 94% of UK households' tangible non-financial assets.

For valuation, we have used real-estate index series for the U.K. and France in order to reconstruct quarterly outstandings, which were directly available for the U.S.

The valuation of some financial assets such as unlisted shares may continue to follow highly distinctive procedures in each country. For instance, U.S. national accountants use information contained in income-tax returns (dividends paid on unlisted shares), and multiply the corresponding dividends by the market capitalization/dividends ratio for listed shares. In France, in keeping with ESA 95 recommendations, market valuation of unlisted shares is estimated on the basis of market values of listed shares: the value of stockholders' equity in unlisted firms is multiplied by the market capitalization/stockholders' ratio for listed companies (price-to-book). The U.K. partly applies ESA 95 recommendations on valuation of unlisted shares. ■

Box 3 - Theoretical determinants of long- and short-term consumption

Permanent income and long-term life cycle

The standard theoretical framework for analyzing changes in long-term consumption consists of the permanent-income and life-cycle models. Their main contribution is to postulate that consumers maximize utility by taking present and future income into account. The latter includes not only earned income but also income from assets, including valuation effects.

Let A_t be the stock of assets held by households at the end of period t, Y non-asset income earned in the period, and C_t the consumption of a single good, taken as numeraire. The change in wealth between t and (t+1) is written: $A_t = Y_t - C_t + (1 + r_t)A_{t-1}$.

Assuming no uncertainty about length of life (written T), future income, and the mean return on the asset (written r_t), and no motive for wealth transmission between two generations, the asset stock at date T should be zero. The equations for wealth transmission between two consecutive periods can therefore be summed as:

$$\sum_{k=0}^{T-t} \frac{C_{t+k}}{\prod_{j=0}^{k}(1 + r_{t+j})} = A_{t-1} + \sum_{k=0}^{T-t} \frac{Y_{t+k}}{\prod_{j=0}^{k}(1 + r_{t+j})}.$$

Under this constraint, with δ the households' psychological discount rate, the program for maximizing consumers' intertemporal utility leads to an equation describing the optimal change in consumption, known as a Euler equation:

$$\frac{U'(C_{t+1})}{U'(C_t)} = \frac{1+\delta}{1+r_t}$$

Assuming quadratic consumer utility, consumption at each date can be written as a function of initial wealth and the discounted flow of future income.

$$C_t = R.\left[A_{t-1} + \sum_{k=0}^{T-t} \frac{Y_{t+k}}{\prod_{j=0}^{k}(1 + r_{t+j})}\right]$$

$$\text{avec } R = \left[\sum_{k=0}^{T-t} \frac{(1+\delta)^k}{(1 + r_{t+k})\left(\prod_{j=0}^{k-1}(1 + r_{t+j})\right)^2}\right]^{-1}$$

The allocation between consumption and saving therefore depends not only on present income, as in a conventional Keynesian model, but also on discounted future income and wealth at the end of the previous period.

Inflation, unemployment rate, consumer loans: short-term determinants

However, the description above concerns a theoretical long-term link between consumption, wealth, and income. Several factors can explain deviations from this theoretical model. We have incorporated them into the short-term consumption dynamics.

- Inflation and interest rates, by modifying the real value of household assets, can have an ambiguous effect on their consumption for, in both cases, the income effect competes with the substitution effect.
- The unemployment rate can influence consumption in several ways. First, it can shape the formation of household expectations. The level of the unemployment rate may be linked to the likelihood of expected future income: an increase in the level raises the probability of being unemployed and diminishes income expectations. All other things being equal, this should result in a lower level of consumption. Second, the change in the unemployment rate is an indicator of future uncertainty and may be linked to the variance in future income. If households are inclined to form precautionary savings (as is the case with utility functions whose forms are more general than quadratic: Leland, 1968), their consumption level must therefore decrease all the more as the variation in the unemployment rate is wider.
- The existence of liquidity constraints can explain why current income—even when its variations can be expected—significantly affects consumption, contrary to the outcome described in the permanent-income and life-cycle models. We try to capture this factor via the influence of gross disposable income (GDI) and, where appropriate, short-term consumer credit.
- Other, more transient factors, such as weather conditions or government bonuses to sustain the consumption of specific products, can also prompt households to anticipate or postpone certain purchases. This can alter their short-term consumption dynamics. ■

Box 4 - Determinants of household consumption in France

As consumption, income, and wealth are non-stationary series for all three countries studied, we have modeled their interdependence using an error-correction model. We applied a two-stage method: first, we tested the existence of a long-term relationship with the Stock-Watson method (1993); second, we injected the estimated long-term relationship into a short-term equation written in first-difference terms.

The estimated long-term relationship for France is written as follows:[1] $\log(C_t) = \underset{(c)}{0.977} \cdot \log(Y_t) + \underset{(16.76)}{0.023} \cdot \log(A_{t-1})$

C_t stands for household consumption expenditures in volume terms,[2] at chained previous-year prices. Y_t is gross disposable income, deflated by the household consumer price index,[3] from which we have removed property income (D4) and real-estate rents, tracked by the gross operating surplus (GOS) of "pure" households. These series derive from the quarterly national accounts.

A_{t-1} denotes household wealth at the end of the previous quarter, deflated by the household consumer price index, from which we have removed all household debts *(Box 1)*.

We have estimated the equation for the period 1985Q1-2006Q1,[4] i.e., starting from the liberalization of financial markets in France.[5] This period is long enough to capture several cycles of change in financial and real-estate wealth. We constrain the sum of the income and wealth coefficients to unity in order to ensure the long-term stability of the saving ratio. A Shin test (1994) confirms that this is indeed a cointegration relationship.[6]

The wealth coefficient obtained is far smaller than for the U.S. and U.K. A one-euro reduction in net wealth of French households has been correlated with a 0.4-eurocent decrease in consumption since the early 2000s.

The short-term dynamics are described by the following equation:[7]

$$\Delta\log(C_t) = \underset{(9.97)}{0.006} - \underset{(2.81)}{0.24} \cdot \Delta\log(C_{t-1}) + \underset{(1.56)}{0.07} \cdot \Delta\log(Y_{t-2})$$
$$+ \underset{(4.78)}{0.19} \cdot \Delta\log(Y_{t-3}) - \underset{(4.29)}{0.14} \cdot CE_{t-1} - \underset{(2.06)}{0.0016} \cdot \Delta\left(R_{t-4}^{3m}\right)$$
$$- \underset{(1.67)}{0.0016} \cdot \Delta\left(R_{t-1}^{10a}\right) - \underset{(4.09)}{0.0035} \cdot \Delta\left(Infl^2\right) - \underset{(6.24)}{0.016} \cdot \Delta(u_t)$$
$$- \underset{(4.64)}{0.31\%} \cdot Climat\_T4 + \underset{(10.40)}{1.23\%} \cdot I87T4 + \underset{(10.26)}{1.09\%} \cdot I89T4$$
$$- \underset{(11.29)}{1.17\%} \cdot I93T1 + \underset{(10.60)}{0.85\%} \cdot I95T3\_96T1 - \underset{(11.36)}{1.23\%} \cdot I96T4\_97T1$$

Estimation period: 1985Q2-2006Q4

$\overline{R^2} = 0.66$ $\quad SER = 0.33\%$ $\quad DW = 1.99$

AR-LM (4)=0.23 (P-Value=93%)

Jarque-Bera=0.20 (P-Value=90%)

The stability of the coefficients over the past ten years is accepted at the 5% limit by a CUSUM test on the square of the residuals.

In addition to lagged consumption and income variables and the error-correction mechanism CE_{t-1}, the short-term determinants specified here are: nominal three-month interest rates R^{3m}, nominal interest rates on ten-year government bonds R^{10a}, the square of inflation $Infl^2$, which enables us to take account of specific reactions to high-inflation spells, and the unemployment rate u_t.

Our equation also includes a weather variable. It tracks the temperature divergence in Q4 from the average of the past five years. A positive divergence of one degree Celsius reduces household consumption by 0.3 percentage points.[8]

Lastly, we have incorporated various time dummies. I95T3-96T1 is a dummy set at -1 in 1995Q3-1995Q4 and 1 in 1996Q1. As in the macroeconomic model developed by the French Directorate-General for the Treasury and Economic Policy (DGTPE) (Bourquard *et al.* 2005), it takes into account the impact of the end-1995 strikes on the consumption profile. I96T4-97T1 is a dummy set at -1 in 1996Q4 and 1 in 1997Q1, which takes into account the effect of the abolition of the government car-scrapping bonus.

We obtained this model from a far broader initial specification that included four short-term lags for consumption, income, interest rates, inflation, the square of inflation, the unemployment rate, and the relationship of credit flows to consumption and income. Unlike for the U.S., the inclusion of a wealth variable or of the relationship between the flow of cash advances and income

1. Note: we find the same elasticities with a one-stage estimation process.
2. By estimating a relationship between (1) consumption volume and (2) income and wealth, both deflated by the household consumer price index, we can rule out a situation where the link between wealth and consumption involves real-estate prices. Such a linkage would be problematic as real-estate prices exert a simultaneous influence on the value of rents consumed and of real-estate assets.
3. Specifically, this is the consumption deflator computed from the national accounts, not the consumer price index (CPI).
4. The available sample goes up to 2006Q4 but, in practice, the inclusion of leads and lags for the explanatory variables using the Stock-Watson method reduces the sample.
5. The French government powerfully contributed to the opening of French capital markets between 1982 and 1985, in particular by allowing households to acquire securities on the money market via mutual funds. In a related development, France definitively replaced credit controls with regulation through central-bank key rates beginning in 1987.
6. The Shin test (1994) is based on a null cointegration hypothesis. The critical values at the 10% and 5% limits are 0.16 and 0.22 respectively. The test statistic for our equation is 0.14, which allows us to accept the cointegration hypothesis at the usual limits. We estimated the long-term variance of residuals using the method recommended by Andrews (1991).
7. Student's t statistics are shown in parentheses. We computed the variances of the equation parameters using the Newey-West method (1987).
8. The similar variables for the other three quarters are not significant. In a previous article of the French edition of "*Conjoncture* in France" ("Aléas climatiques, aléas économiques: les effets du climat sur l'activité économique en France," June 2007), the main weather effects were also observed for the months of October to December. The estimates reported showed that an additional degree Celsius tended to lower household consumption of "water, gas, electricity (FG1)" by 3%, of "heating and motor fuels (FG2)" by 1.5%, and of "clothing and leather goods (FC1)" by 1%. As the first category accounts for 3.4%, the second for 4.3% and the third for 4.9% of household consumption expenditures in 1985-2006, this translates into an aggregate effect on household consumption of more than 0.2 points—the same order of magnitude as the one estimated with our equation.

in the short-term part of the equation yields poorer results in an end-of-period dynamic simulation. We have therefore chosen not to include them in this specification.

In conclusion, although the Stock-Watson method leads to the estimation of a sizable long-term influence of wealth, and although the error-correction mechanism is significant in the short-term dynamics, the weakness of the effect obtained does not invalidate other econometric specifications in which consumption depends solely on long-term income. Several other studies achieve satisfactory modeling of French consumption while totally ignoring the wealth effect (Bourquard *et al*. 2005). ■

Box 5 - Determinants of household consumption in the U.S.

The long-term relationship for the U.S. estimated with the Stock-Watson method (1993) is written as follows:

$$\log(C_t) = \underset{(10.01)}{-0.84} + \underset{(c)}{0.74}.\log(Y_t) + \underset{(8.78)}{0.26}.\log(A_{t-1})$$

Estimation period: 1954Q4-2006Q1

C_t stands for household consumption expenditures in volume terms, at chained previous-year prices. Y_t is gross disposable income, deflated by the household consumer price index.

A_{t-1} denotes household wealth at the end of the previous quarter, deflated by the household consumer price index, from which we have removed all household debts, as in the French specification.

The long-term wealth elasticity of consumption is 26%. This result is fully consistent with earlier studies,[1] and indicates an average marginal propensity to consume wealth of 5.8 cents per dollar of additional wealth since the early 2000s.

The short-term dynamics are described by the following equation:[2]

$$\begin{aligned}
\Delta\log(C_t) = {} & \underset{(6.34)}{0.0055} - \underset{(3.87)}{0.22}.\Delta\log(C_{t-1}) + \underset{(2.16)}{0.11}.\Delta\log(C_{t-3}) + \underset{(5.80)}{0.25}.\Delta\log(Y_t) \\
& + \underset{(2,49)}{0,12}.\Delta\log(Y_{t-1}) - \underset{(2,89)}{0,049}.CE_{t-1} \\
& - \underset{(4.35)}{0.0085}.\Delta(u_t) - \underset{(2.39)}{0.0049}\Delta^2(u_t) + \underset{(2.07)}{0.032}.\Delta\log(A_{t-1}) + \underset{(1.92)}{0.033}.\Delta\log(A_{t-4}) \\
& + \underset{(1.78)}{0.042}.\Delta\left(FCred_{t-2}/Y_{t-2}\right) + \underset{(1.96)}{0.054}.\Delta\left(FCred_{t-3}/Y_{t-3}\right) - \underset{(5.84)}{0.0049}.\Delta\left(R^{3m}_{réel,t-1}\right) \\
& - \underset{(5.21)}{0.0059}.\Delta(Infl_{t-1}) - \underset{(1.69)}{0.00013}.\Delta\left(Infl_t^2\right) + \underset{(8.90)}{1.09\%}.I65T4 + \underset{(10.80)}{1.03\%}.I68T268T3 \\
& + \underset{(13.57)}{1.25\%}.I78T2 - \underset{(9.82)}{1.72\%}.I81T4 - \underset{15.36}{1.20\%}.I87T1 + \underset{(6.41)}{1.07\%}.I01T3T4
\end{aligned}$$

Estimation period: 1954T4-2007T1 $\quad \overline{R^2} = 0.62 \quad SER = 0.43\% \quad DW = 1.99$

AR-LM (4)=0.93 (P-Value=45%)

Jarque-Bera=0.20 (P-Value=90%)

The U.S. equation reveals determinants fairly similar to those of the equation estimated for France and displaying the same notations. However, some differences should be noted:

- We introduced wealth, with two different lags, into the short-term equation. We could have estimated an alternative specification without these terms, but it displayed inferior performances in a dynamic simulation for the recent period.
- We explicitly modeled the influence of flows of cash advances $FCred_t$ [3] in the short-term equation as a ratio of flows of credit extended to current income. This variable seeks to capture the influence of banks' credit-supply policy. As it can also capture credit-demand effects, we introduced it on a lagged basis to limit the risk of inverse causality, from consumption toward credit.[4]
- We introduce the unemployment rate in first-difference and second-difference form in the short term equation. This choice reflects the two channels through which unemployment can influence consumption *(Box 3)*.

1. For example, Ludvigson and Steindel (1999), who find an elasticity of 29% for 1953-1997, or Beffy and Monfort (2003), who estimate it at 26% for 1960-2001.
2. Student's t statistics are shown in parentheses. We computed the variances of the equation parameters using the Newey-West method (1987).
3. We have not included home equity loans, whose amounts have been published only for the recent period.
4. This risk is not, however, totally excluded if the same causes drive households to consume more and to rely more heavily on consumer loans, and if those causes persist.

- As with France, we estimated the influence of weather on household consumption. A variable taking into account the nationwide temperature divergence in Q1 from the average of the past five years can have a significant impact. However, its presence tends to undermine the equation's predictive performance in the recent period. We have therefore omitted it. ■

Box 6 - How large is the wealth effect in the U.K.?

The long-term relationship for the U.K. estimated with the Stock-Watson method (1993) is written as follows:

$$\log(C_t) = \underset{(16.56)}{-0.76} + \underset{(c)}{0.78}.\log(Y_t) + \underset{(13.95)}{0.22}.\log(A_{t-1})$$

Estimation period: 1991Q1-2006Q2

The variables C_t, Y_t, and A_{t-1} are defined as for the U.S.

The long-term wealth elasticity of consumption is 22%. It therefore lies between the French and U.S. values, although it is closer to U.S. elasticity. It indicates a marginal propensity to consume wealth of 3.6 pence per pound of additional wealth since the early 2000s.[1] ■

1. Here as well, the results are compatible with those of earlier studies. For example, Boone, Giorno, and Richardson (1998) estimate the marginal long-term propensity in the 1990s at 4.0 pence, Beffy and Monfort (2003) at 1.8 pence.

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