

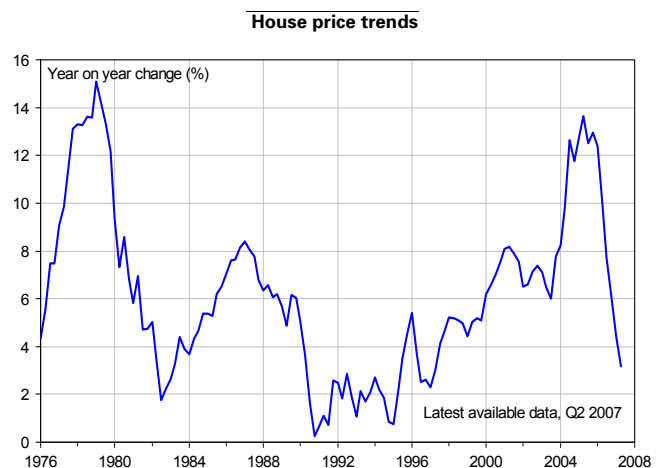


## The impact of the housing slowdown on US consumption

- Household consumption has been one of the main drivers of growth in the United States since 2002. However, a number of factors could drag down US consumption looking to 2008, the housing slowdown among them;
- The housing market has been showing signs of weakness since the end of 2005, but it has been slowing more sharply since mid-2006. Prices are expected to continue levelling off in the coming quarters and to weigh on consumption *via* two channels, namely the impact of declining household wealth, and the effects of the drying up of mortgage equity withdrawal (MEW);
- The first channel is the traditional one: when the price of households' housing assets falls, their housing wealth declines, all other things being equal; consequently, their permanent income is revised downwards leading to a slowdown in their consumption. A 5% slowdown in house prices would slow consumption by 0.7% in the short term, and by 0.3% in the long run.
- The second channel, MEW, allows American homeowners to raise cash when house prices are rising. This cash is reckoned to be a major factor sustaining consumption since 2002. Conversely, the housing downturn would lead to a drop in MEW, thereby potentially depressing consumption. The amounts withdrawn by this means has fallen from USD 700 billion in the first quarter of 2006 to USD 360 billion in the second quarter of 2007.
- Actually, MEW appears to have only a limited impact on consumption: in a 5% annual house price slowdown scenario, annual MEW would decline by USD 130 billion (1% of GDP), which would reduce consumption by 0.1% only. This relatively small effect could be accounted for by the depth and liquidity of the US credit markets, which allows households to substitute other forms of financing for MEW.

This study was prepared under the authority of the Treasury and Economic Policy General Directorate and does not necessarily reflect the position of the Ministry of the Economy, Finance and Employment.

Source: OFHEO.



## 1. Strong house price growth in the United States since 2003 partly accounts for the vigour of consumption there

Household consumption has been one of the main drivers of growth since 2002, contributing an average 2 percentage points to annual GDP growth. Several factors help to account for this steep rise, namely:

- **vigorous growth in gross disposable income** (+2.8% per year, in real terms, between 2002 and 2007) due to falling unemployment over the period (from 5.8% in 2002 to 4.6% in 2007);
- **falling interest rates** (10-year rates eased from 6.7% in 2000 to 4.6% in 2007) and the partially-related decline in the saving rate (from 2.9% in 2000 to 0.7% in 2007);
- **a rising stock market** (the Dow Jones gained 41% between 2002 and 2007), after the crisis in the early-2000s (see Part 3);
- **finally, the steep rise in house prices between 2003 and 2006**. US house prices rose at an average annual rate of 11.4% between Q4 2003 and Q2 2006, a rate not seen since the early 1990s, which could thus be a key factor accounting for the vigour of consumption. This is because a sharp rise in property wealth can affect consumption *via* two channels, namely: (1) the **"housing wealth" channel**, which pushes up households' permanent income; and (2) the **mortgage equity withdrawal (MEW) channel**, which has allowed households to release cash in line with the rising value of their property.

### 1.1 Rising house prices can boost consumption via the so-called "wealth effect" ...

The first way in which rising house prices can benefit household consumption stems from a classic effect, well-documented in the literature, namely the wealth effect (see box 1). This effect was notably modelled in the permanent income theory developed by Milton Friedman, and in the life cycle hypothesis developed by Modigliani.

According to this type of approach, agents consume as a function of their permanent income, anticipating future income streams, or of their "wealth", which is equivalent to the present value of the expected future income stream.

Two main types of wealth effect may be distinguished, depending on the category of asset whose value is rising,

namely the financial wealth effect (for financial assets), and the housing wealth effect (for housing assets):

- the **"financial wealth" effect** stems from the change in wealth resulting from a change in the value of a household's financial assets. A rise in the market price of securities will increase the financial wealth of the household owning securities;
- the **"housing wealth" effect** similarly stems from a change in wealth resulting from a change in house prices. A rise in house prices will increase housing wealth for households owning property.

In the event of a change in the level or rate of change in house prices, the existence of a "wealth effect" can lead to a change in the pace of consumption. To this traditional effect, which is theoretically valid for all countries, is added a second effect in the United States peculiar to the specific nature of the home loan market there, namely mortgage equity withdrawal.

### 1.2 ...but also *via* a "mortgage equity withdrawal" effect

As in France, American households with a fixed-rate loan<sup>1</sup> can benefit from a fall in interest rates and refinance their existing loan, i.e. they can repay their fixed-rate loan early and take out a new one on easier terms. Thus, they reduce their monthly instalments on the old loan (early repayment penalties are very low or non-existent in the United States).

More importantly, and contrary to what happens in France, when the value of the collateral (the housing asset) rises<sup>2</sup> American households can increase their borrowings in proportion to this rise in value. In that way households can recover the difference between the value of the new loan and that of the old one; the additional capital thus extracted is referred to as a "cash out" (see Box 2).

The portion of this additional cash not intended for the purchase (or renovation) of a home is referred to as mortgage equity withdrawal (MEW). The capital thus released can be used to finance consumption, purchase non-housing assets, or repay other borrowings.

(1) Slightly over 70% of mortgage lending is at fixed rates.

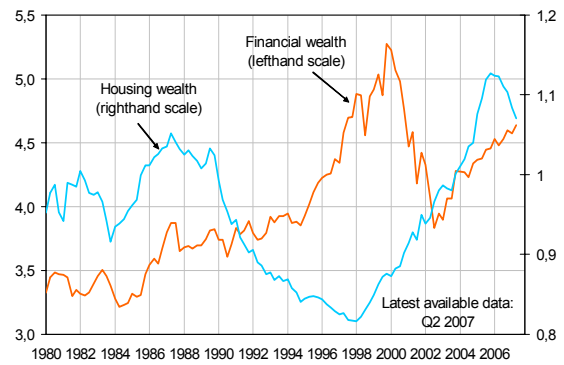
(2) This mechanism is not independent from the previous one, since in general asset prices rise when interest rates fall.

## Box 1: Recent trends in household wealth in the United States

Household financial wealth in the US contracted sharply between 2001 and 2003, due to the slide in equity prices and difficulties in the real economy during the period. After bouncing back vigorously in the course of 2003 and early-2004, it has recovered a stable annual growth rate of around 5% in recent years (see Chart 1).

House prices have risen steeply since 2003 due to growing demand, initially sustained by low interest rates (the 10-year rate was 4.0% in September 2002), then, in a second phase (starting in 2005) by bank credit on particularly easy terms. It was this period, notably, that witnessed the growth in sub-prime-type lending, a form of lending designed for households that do not qualify for a conventional mortgage. This led to a surge in housing wealth, which rose at a year on year rate of 9.9% in Q2 2005.

Chart 1: household wealth (as a share of disposable income)



Source: Federal Reserve.

Starting in 2006, difficulties began to emerge in the American property market, and prices have been slowing ever since, putting a sharp brake on the growth in household wealth which has actually declined in recent quarters, turning negative in 2007, in year on year terms.

Households' ability to obtain additional cash thanks to the rise in the value of their housing assets can lead to one of two consequences:

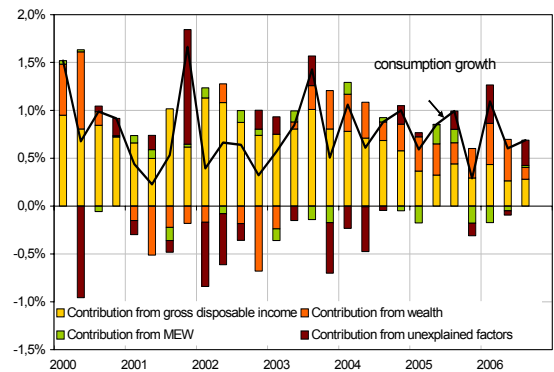
- either it amounts to an easing of credit conditions and thus enables households to increase their consumption;
- or it serves as an alternative to another type of credit, substituting for it (for example, households refrain from taking out another consumer loan), in which case the impact of MEW on consumption is likely to be negligible since households would have increased their consumption in any case by resorting to other types of credit.

### 1.3 Since 2002, these two effects appear to have helped stimulate consumption, which could be undermined by the housing downturn

The steep rise in house prices between 2002 and 2006 contributed both to a significant increase in MEW and to the pronounced rise in housing wealth, ultimately boosting consumption (see Chart 2 and equation in the appendix).

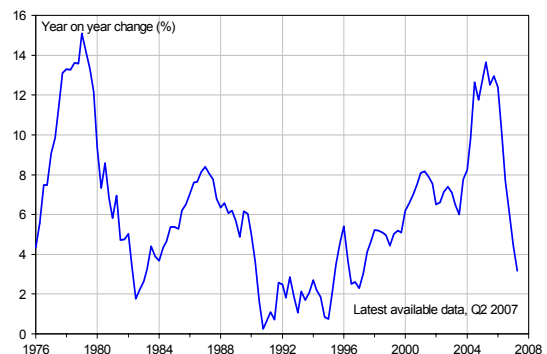
The US housing market has gone into reverse since mid-2006, leading to a rapid slowdown in prices in this sector. This could lead to the demise of the "housing wealth" and "MEW" effects, thereby potentially depressing household consumption. Part 2 presents the results of econometric estimates aimed at evaluating the potential risk to the American economy. In Part 3 these estimates are used to forecast future consumption trends.

Chart 2: contributions to consumption growth



Source: BEA, DGTPE calculations, estimates of contributions based on the econometric equation presented in the Appendix.

Chart 3: house price trends



Source: OFHEO

## Box 2: quantitative illustration of the MEW mechanism

We assume that an American household buys a home in January 2006 for an initial value of USD 200,000, with a 50% down payment and a loan repayable in 15 constant annual instalments with a fixed rate of 6%. The constant annual instalment works out to USD 10,296, with an initial annual interest charge payable on 1 January 2006 of USD 6,000 (6% x USD 100,000).

In June 2006 rates were down from 6% to 5% and the household's property had appreciated by 10%. The household can then exercise an option in the mortgage contract allowing it to refinance its loan. More specifically, it can then borrow the capital outstanding at a lower rate plus the additional value of the home-as-collateral (in this case 10% x USD 200,000, i.e. USD 20,000), making a total of USD 120,000 at 5%. This operation in fact amounts to a USD 20,000 consumer loan financed at a mortgage rate. For the sake of convenience we assume that no capital has been repaid between 1 January and 1 June.

Due to the lower interest rates, the new loan can result in interest payments greater than, equal to or lower than those on the previous loan. In our example, the new interest charge remains constant (5% x USD 120,000 = USD 6,000), but this is not so for the annual instalment. Thus, to keep the annual instalments constant (or to reduce the new instalments), the household can opt to extend the maturity of the loan. In our example, to keep the annual instalment constant at USD 10,296, the household needs to extend the maturity of the loan from 15 to 18 years.

A December 2002 study by the Federal Reserve showed that refinancing transactions carried out in 2001 and early-2002 led to extension of the loan's maturity in 80% of cases. Concerning monthly instalments, these were higher following the rescheduling in 26% of cases (and 42% in the case of mortgage equity withdrawals).

As a result of this rescheduling, the household has increased its indebtedness, maintained its debt service charge (with an equivalent annual instalment), avoided interest-rate risk (by borrowing at a fixed rate), and has an additional USD 20,000 in cash.

**Table 1: amounts withdrawn each quarter via the MEW mechanism**

	Q1 2006	Q2 2006	Q3 2006	Q4 2006	Q1 2007	Q2 2007
MEW as % of gross disposable income	7.4	5.9	4.9	3.6	3.8	3.6
MEW in USD Bn	700.1	568.5	474.8	356	382.8	360

## 2. Econometric estimates suggest a housing price slowdown would slow consumption

A simple accounting estimate will not be sufficient to assess the potential impact of a change in the house price growth on consumption *via* the "wealth" and "MEW" effects: this is because a change in the MEW is not automatically passed on in consumption, since part of the cash released in a MEW may serve to repay loans outstanding and/or to purchase assets. An econometric estimate has therefore been carried out with an error-correction model (see Appendix). This has the advantage of permitting a distinction between short-term effects (over a few quarters) and long-term ones (assuming no change in the state of the economy).

### 2.1 The housing price slowdown would indeed lead to a reduction in MEW, but the impact on consumption would be limited

The effect of "MEW" on consumption is statistically significant, but small: if house prices slow by 5%, annual MEW would decline by 1.3% (as a percentage of gross disposable income). This would trim consumption growth by 0.1%, in a short term horizon only (the long-term effect being nil).

There are three explanations for the fact that the impact is small:

(1) A sharp slowdown in house prices need not necessarily entail an immediate and total halt to MEW: there are

still some mortgage refinancing opportunities available to certain households even when prices are falling. That is because households do not refinance their mortgages in "real time", and there may be a lag between the moment when refinancing is advantageous to them and the moment at which they negotiate with their bank. This time lag may be accounted for in a variety of ways: physical delays, adjustment costs (refinancing penalties), expectations of a rise in prices (if households expect prices to go on rising it is worth their while delaying their application for refinancing). As a result, even when prices fall refinancing remains advantageous for some households.

(2) MEW partly substitutes for other forms of household financing: MEW corresponds to cash withdrawn from the mortgage market and not intended for reinvestment in property (in the form of either purchases or renovations). This cash withdrawn can substitute for other forms of financing. Looking back, it has been found that the sharp rise in household mortgage debt since 2001 has been counterbalanced by a slowdown in debt in the form of consumer credit<sup>3</sup>. Conversely, a reduction in MEW associated with a slowdown in house prices could have a limited impact on consumption if households decided at the same time to increase their recourse to consumer credit and/or to sell assets.

### Box 3: The dynamics of wealth effects on consumption

The impact of a change in housing wealth on consumption is stronger than that of a change in financial wealth, but it is slower to materialise. This may be due to the fact that not all households own financial assets, whereas 68.2% of households in the United States (in the second quarter of 2007) are homeowners: consequently a decline in financial wealth affects a smaller proportion of the population.

In the table below, we present a range of estimates of these effects *via* the elasticity of consumption to wealth, which measures the percentage impact on consumption of a 10% change in financial wealth and in housing wealth.

**Table 2: elasticity of consumption to wealth**

Author	Method	% impact on consumption	
		of a 10% downward shock to equity prices	of a 10% downward shock to property prices
DGTPE	Error correction model	-0.6 after 1 quarter -0.4 after 2 quarters	-1.5 after 4 quarters -0.7 after 2 years
	NIGEM macroeconomic model	-0.7 (*) after 2 years	-1.3 immediately
OCDE	Federal Reserve model		-0.75 after 2 years
Case, Quigley, Schiller (2005)	Panels	-0,2	-0,5 à -0,9
Benjamin, Chinloy, Jud (2002)	Times series	-0,2	-0,8

(\*) For further details see DP.AE no.76 (June 2005): "Les conditions monétaires et financières courantes et passées dans la zone euro et aux États-Unis" (Current and past monetary and financial conditions in the euro area and the United States).

(3) Not all changes in MEW lead to a change in consumption on the same scale (in real terms), since part of the cash withdrawn may be used to repay current borrowings. According to a survey of consumers<sup>4</sup>, in practice less than a quarter of the cash withdrawn was used for consumption in the United States in the early-2000s (16% of the cash withdrawn from the mortgage market served to finance consumer spending, 35% home renovations, 21% asset purchases, and 26% repayment of other loans)<sup>5</sup>.

#### 2.2 The "housing wealth" effect ought to weigh more heavily on consumption

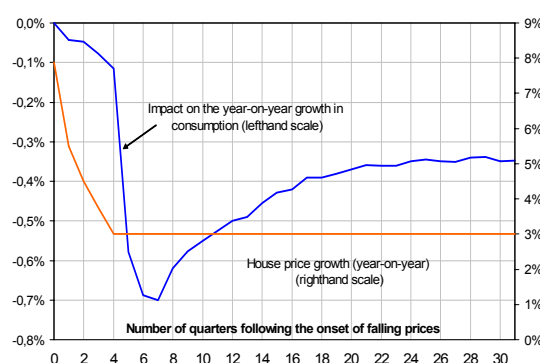
The impact of falling house prices on consumption *via* the wealth effect appears to be greater than that of MEW:

- the wealth effect works over the long term, unlike the MEW effect; the "wealth" channel is the only one to have a lasting impact on consumption (a 5%

slowdown in house prices would entail a 0.3% slowdown in consumption over the long term);

- in the short term, the wealth effect is even stronger (a 5% slowdown in house prices would entail a 0.7% drop in consumption after four quarters).

**Chart 4: impact of a 5% slowdown in house prices**



### 3. End-2007 and 2008 actual consumption trends will depend as much on the scale of the consolidation in the housing sector as on compensating factors

#### 3.1 We have looked at two scenarios to evaluate the impact of house price changes on consumption

The housing crisis in the United States broke out in mid-2006. A sharp correction has since set in, and in the third

quarter of 2007 household residential investment was down 16.4% year on year. This correction has been transmitted to prices, which have slowed sharply since then. Taken in isolation, this slowdown would be expected to have a significant impact on American household consumption (see part 2).

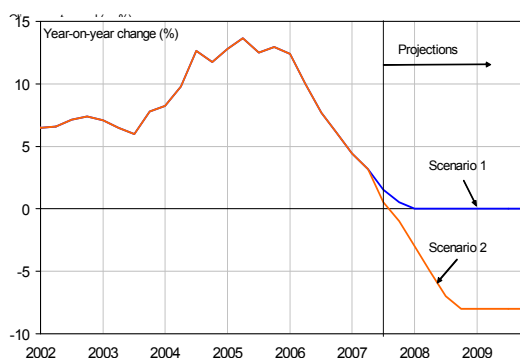
- The rate of growth in consumer credit fell from 9.4% year on year in 2000 to 5.1% in 2004. MEW increased from 2.3% of gross disposable income in 2000 to 6.4% in 2004.
- See Klyuev and Mills (2006): "Is housing wealth an ATM?", *IMF Working Paper*. The survey covers the period 2001-002.
- A study by Goldman Sachs (cf. US Economic Weekly, Nov. 18 2005) suggests a stronger impact, with 2/3 of MEWs giving rise to additional consumer spending.

However, a house price trends scenario is needed in order to assess the scale of this effect.

Below we propose a residential investment scenario pointing to a continuing decline in housing market activity in 2007 and in 2008 (albeit at a slower pace than that observed at the end of 2006). This scenario also forecasts a further slowdown in prices, with a year-on-year change on the order of 0% at the end of 2007 (representing a 5 percentage-point fall relative to the currently observed rate, and 13 percentage points compared with the rate at the end of 2005).

We also consider a second, more pessimistic, scenario in which prices slow further, by 15 percentage points relative to their current level, over a period of 2 ½ years, corresponding to a 21% slowdown since the onset of the crisis. In this scenario, house prices would start falling in the fourth quarter of 2007. Table 2 below shows the impact on consumption suggested by our equations.

Chart 5: projected house price trends



Source: DGTPEI calculations.

Table 3: the impact of a house price slowdown on consumption growth (in %)

	1 yr	2 yrs	3yrs	4 yrs
Scenario 1	-0.2	-1.5	-1.7	-1.2
Scenario 2	-0.3	-1.9	-2.7	-2.2

Source: DGTPE calculations.

### 3.2 However, other effects may offset the impact of falling house prices on consumption

Table 4: most recent data from quarterly accounts (% quarterly change)

	2006				2007		
	T1	T2	T3	T4	T1	T2	T3
Consumption	1.2	0.6	0.3	0.5	0.2	0.9	1.0
GDP	1.1	0.6	0.7	1.0	0.9	0.3	0.7

Source: BEA.

At this juncture, in mid-2007, we have yet to see the rebound in saving that the foregoing results suggest. This

is because household spending is influenced by other factors than house prices, and these factors will determine future trends also:

**Trends in consumer credit (which, as we have seen, can substitute for MEW) could have a decisive impact.** The chief consequence of the subprime crisis of summer 2007 was to trigger a crisis of confidence in the banking and financial sectors. This could prompt a tightening of credit, primarily due to funding difficulties in the money markets. The October 2007 Senior Loan Officer Opinion Survey (a quarterly survey by the Federal Reserve of banks' perceptions of their lending activity over the past 3 months) appears to bear this out. Indeed 26% of banks questioned reported a tightening of consumer credit conditions and a fall in household demand for credit; 50% reported a fall in demand for mortgage loans.

**Conversely, other factors could have a positive impact:**

- In the third quarter of 2007, gasoline prices fell even though (WTI) oil prices rose. This could partly account for the vigour of Q3 consumption; but this effect could prove short-lived (oil prices spiked sharply upwards in October).
- Our scenario does not take financial wealth trends into account. Yet leaving aside the summer 2007 correction, the US stock market has been buoyant in recent years, helping to keep consumption resilient and to distract attention from the housing wealth effect. That is because consumption reacts faster to a financial wealth effect than to a housing wealth effect. Trends in the determinants of financial wealth could, therefore, play a decisive role in consumption trends in 2008.
- With the dollar's depreciation, US residents holding foreign securities have seen the value of their assets rise, and this wealth effect could offset the wealth effect associated with the housing downturn<sup>6</sup>. Capital outflows recorded in the US balance of payments in August 2007 may have reinforced this positive wealth effect for households over the recent period.
- Finally, unemployment in October 2007 was 4.7%, which is still very low, allowing gross disposable income to continue to grow vigorously (at an annualised rate of 4.1% in the third quarter of 2007, coming after 3.4% in the second quarter).

**Luc EYRAUD, Aurélien FORTIN, Sophie RIVAUD**

(6) It is estimated that a 10% dollar depreciation would boost net income from external assets by around 0.3 percentage point of GDP.

## Appendix: Modelling wealth effects

### 1 - Modelling consumption with an error-correction model

The following variables are used:

CONSO: household consumption, in volume;

MEWRDB: MEW as a proportion of gross disposable income (our calculation is inspired by the method proposed by Greenspan and Kennedy (2005): "Estimates of Home Mortgages Originations, Repayments, and Debt on One-To-Four Family Residences");

TXDINTERET: real 10-year interest rate;

RICHFI: real financial wealth, calculated as the difference between total household wealth and their housing wealth (data taken from "Flow of Funds" published by the Federal Reserve);

RICHIMMO: real housing wealth;

RICH: total wealth in real terms;

PRIXIMMOR: real house prices (OFHEO index deflated by the consumer price index), a variable used in the equation to determine MEW;

RDB: gross disposable income, in real terms;

D2001T4: proxy used to correct the equation for the "9/11" effect.

The letter L before the name of a variable means that it is considered in its logarithmic form. The letter D means that we are considering the primary difference. Figures in parentheses (-x) indicate the number of quarters by which the impact lags.

The estimated consumption equation is:

$$\begin{aligned} \text{DLCONSO} = & -0.21*\text{LCONSO}(-1) + 0.17*\text{LRDB}(-1) + 0.04*\text{LRICH}(-2) - 0.02 + 0.16*\text{DLRDB} + 0.06*\text{DLRICHFI}(-1) \\ & (-4.8) \quad (4.0) \quad (4.2) \quad (-1.6) \quad (3.5) \quad (3.7) \\ & + 0.04*\text{DLRICHFI}(-2) + 0.15*\text{DLRICHIMMO}(-4) + 0.063*\text{DMEWRDB} + 0.012*\text{D2001T4} \\ & (2.8) \quad (4.25) \quad (2.9) \quad (3.0) \end{aligned}$$

$$R^2 \text{ adjusted} = 0.47$$

$$DW = 2.06$$

Estimation period: Q1 1985 – Q4 2005.

This equation, which is estimated in a single step, is not statistically different from what would be obtained from a 2-step equation where the long-term equation is estimated separately.

### 2 - Corrections to income and consumption

In the current theoretical literature there is confusion between the permanent income hypothesis and the life cycle hypothesis, which shows that a household consumes a portion of its current, future and expected wealth. The literature refers to the life cycle-permanent income hypothesis. According to this model, households consider two factors when determining their consumption, namely gross disposable income and their stock of wealth.

In order to discriminate clearly between these two explanatory factors, it is necessary to exclude property income (financial income and rental income) from gross disposable income in order to avoid counting them twice, wealth being equal to the present value of future income streams from property.

Data supplied by the Bureau of Economic Analysis are corrected in order to isolate households in the strict sense of the term (in American accounting the "household" category also comprises pension funds and non-profit organisations). Also in American accounting the "persons" category comprises three different kinds of agent: households in the broad sense of the term, which itself includes households in the strict sense of the term, pension funds held by households, and Non Profit Institutions Serving Households (NPISHs, e.g. organisations that provide medical assistance, leisure organisations, religious organisations, etc.).

Non-profit organisations have not been removed from the "persons" category, because the data necessary to remove them have been available only since 1992 and the income of these organisations is low in relation to aggregate gross disposable income (USD 200 billion versus nearly USD 9,000 billion). On the other hand, pension funds need to be removed from the "persons" category in order to distinguish actual households. This has entailed three operations:

- Internal operations by households in the strict sense of the term and pension funds' operations are deconsolidated.
- Pension fund and household income are separated.
- Pension fund and household expenditures are separated.

## Appendix: Modelling wealth effects (contd.)

Finally, we recalculate gross disposable income such that it can be broken down exclusively into saving and consumption. In the US national accounts, disposable income is not allocated exclusively to either consumption or saving. It is also used for transfers to the rest of the world or to government, as well as for interest payments. Within the framework of this study, however, it is more useful to limit ourselves to a "consumption/saving" trade-off at the time of the income allocation decision. Accordingly, transfers and interest payments are deducted from gross disposable income.

### 3 - Modelling MEW

The following equation links the volume of mortgage equity withdrawals to house price and interest rate movements.

$$\text{DMEWRDB} = -0.003 - 0.65 * \text{DMEWRDB}(-1) - 0.35 * \text{DMEWRDB}(-2) + 0.27 * \text{DLPRIXIMMO} - 0.008 * \text{DTXDINTE-RET}(-1)$$

(-1.5) (-6.8) (-3.7) (2.2) (-3.2)

R<sup>2</sup> adjusted =0.4 DW = 2.05

Estimation period: Q1 1985 - Q4 2005

### 4 - House prices and net wealth

The impact of a house price slowdown on housing wealth is measured in accounting terms. It will be noted that a change in house prices affects only the housing asset (like all wealth, the wealth considered is net wealth). Since this represents 1.7 times housing wealth, any 10% change in house prices will entail a change in housing wealth on the order of 17% (=1.7\*10%).

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