

THE STOCK MARKET, THE HOUSING MARKET AND CONSUMER BEHAVIOUR

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INTRODUCTION

There is growing recognition that asset markets can have strong effects on private consumption and aggregate demand. Buoyant equity markets have often been credited with strong demand growth in the latter part of the 1990s, and subsequent economic weakness is partly attributed to the slump in stock markets since 2000. At the same time, financial market deregulation over the past two decades may have given a greater role to conditions in the residential property market in determining aggregate demand. Indeed, the increase in house prices in the 1990s is sometimes seen as having amplified the stock-market effect, and continued buoyancy in house markets over the past two years may have provided some offsets to the equity market slump. For policy making it is important to establish the existence and strength of these effects.

This paper analyses the roles of household financial wealth and housing wealth across the G7 countries, with the exception of Germany,¹ in determining private consumption. It estimates the possible impact of the different types of wealth on consumption and tests whether financial deregulation may have modified such relationships. The main results are, first, that for all countries, wealth channels are identified; second, that these effects vary significantly across countries; and, third, that for some countries, their importance has tended to rise markedly over the recent past.

The paper proceeds as follows. Firstly, the recent evolution of financial and housing wealth is presented. Secondly, the traditional channels through which wealth affects consumption are described briefly. Thirdly, the econometric methodology used to estimate wealth effects on consumption is outlined, and estimates of the sensitivity of consumption to various forms of wealth are presented. Fourthly, the impacts of recent financial and housing market movements on consumption are quantified. The following section tests the estimated relationships extensively to detect whether there has been a change in consumer behaviour over the recent past. Finally, the last section briefly summarises the main findings.

RECENT DEVELOPMENTS IN FINANCIAL AND HOUSING WEALTH

With the exception of Japan, the G7 countries experienced a rapid rise in household wealth during the 1990s, largely driven by sharp increases in asset valuations. This development was generally accompanied by a decline in households saving rates, except in France. Households in the United Kingdom and the United States

saw a particularly sharp acceleration in the stock of wealth in the latter part of the decade whereas in Canada, France and Italy, the increase was less marked.

In the 1980s and early 1990s, share prices grew steadily but at a relatively modest pace in most countries. Since the mid-1990s, however, stock markets have experienced a sharp increase followed by a slump starting in 2001. By September 2002, broad share price indices had tumbled by over 40 per cent from their 2000 peaks in the United Kingdom and the United States, and by close to 50 per cent in the euro area and Japan (Figure 1). Collapse at this speed and on this scale, even if shareholders did not fully factor in paper gains at the height of the boom, can be expected to substantially reduce consumption and aggregate demand.

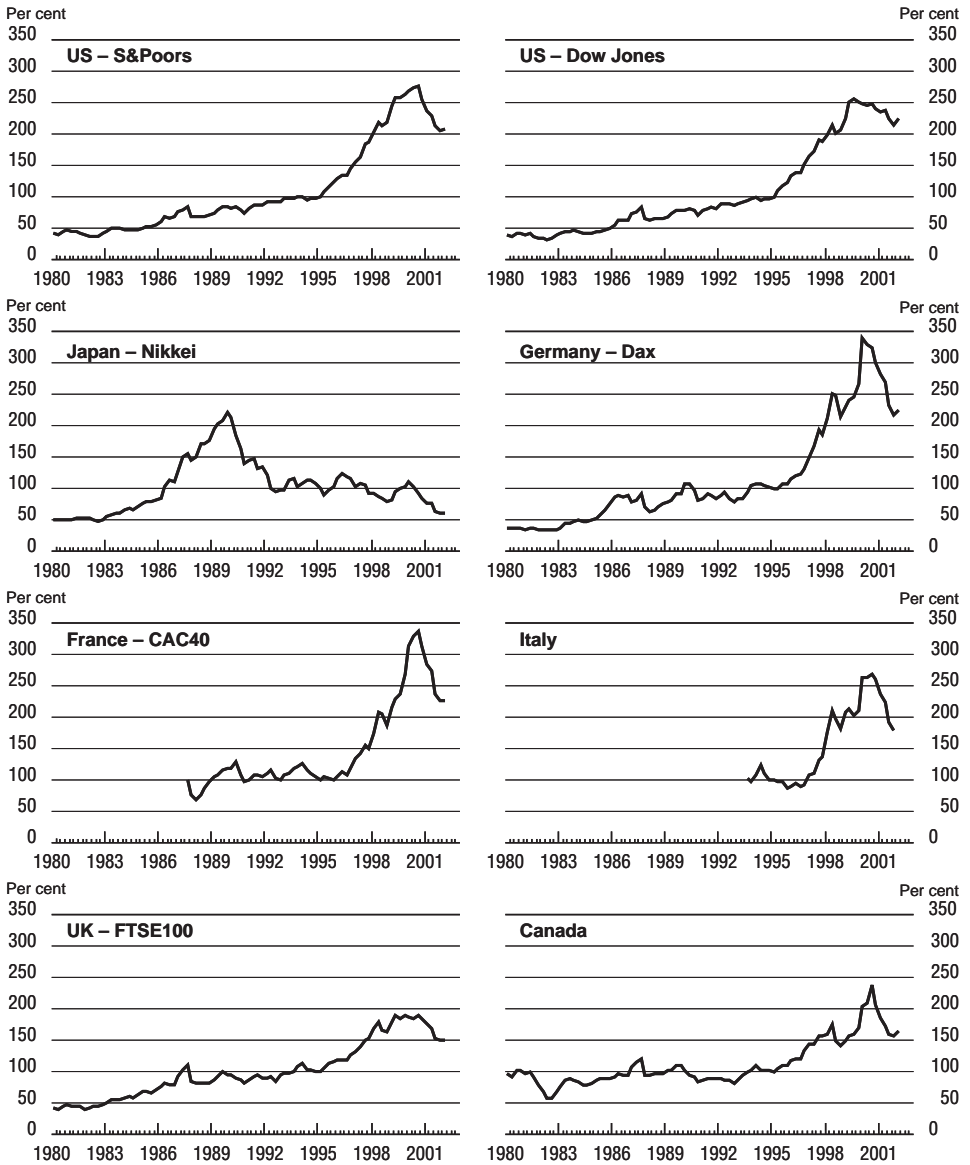
The amplitude of house price fluctuations has differed markedly across countries and over time within countries (Figure 2). Measured by the standard deviation of the annual growth rate of real house prices, fluctuations over the 1970-2001 period have been particularly strong in Italy, Japan and the United Kingdom. Conversely, the fluctuations have been comparatively small in France and, especially, the United States. In contrast to stock market developments, house price movements have differed significantly across countries in recent years. Between 1995 and 2001, real residential property prices grew by more than 20 per cent in France and the United States, and by nearly 50 per cent in the United Kingdom, but declined markedly in Germany and Japan, while remaining unchanged in Canada and Italy.

Mostly as a result of diverging asset price trends, the composition of household wealth has changed in recent decades in favour of shares and other financial assets (Figure 3). This movement was not even across countries and substantial differences remain between the English speaking countries (Canada, the United Kingdom and the United States) and the others. In the English speaking countries, financial wealth was already the most important component of total wealth in 1980 and accounted for about two-thirds or more of total wealth in the late 1990s. In France, Italy and Japan, financial wealth has climbed from low levels but only to about half of household total wealth, with a corresponding decline in the relative weight of real estate.

The proportion of wealth held in shares has increased to a different extent across countries since 1990. Among the G7 countries, the increase was most important in France and Italy, whereas it was more moderate in the United Kingdom and almost inexistant in Japan (Table 1). However, over the past two years, the relative weight of shares has receded dramatically with the collapse of their prices.

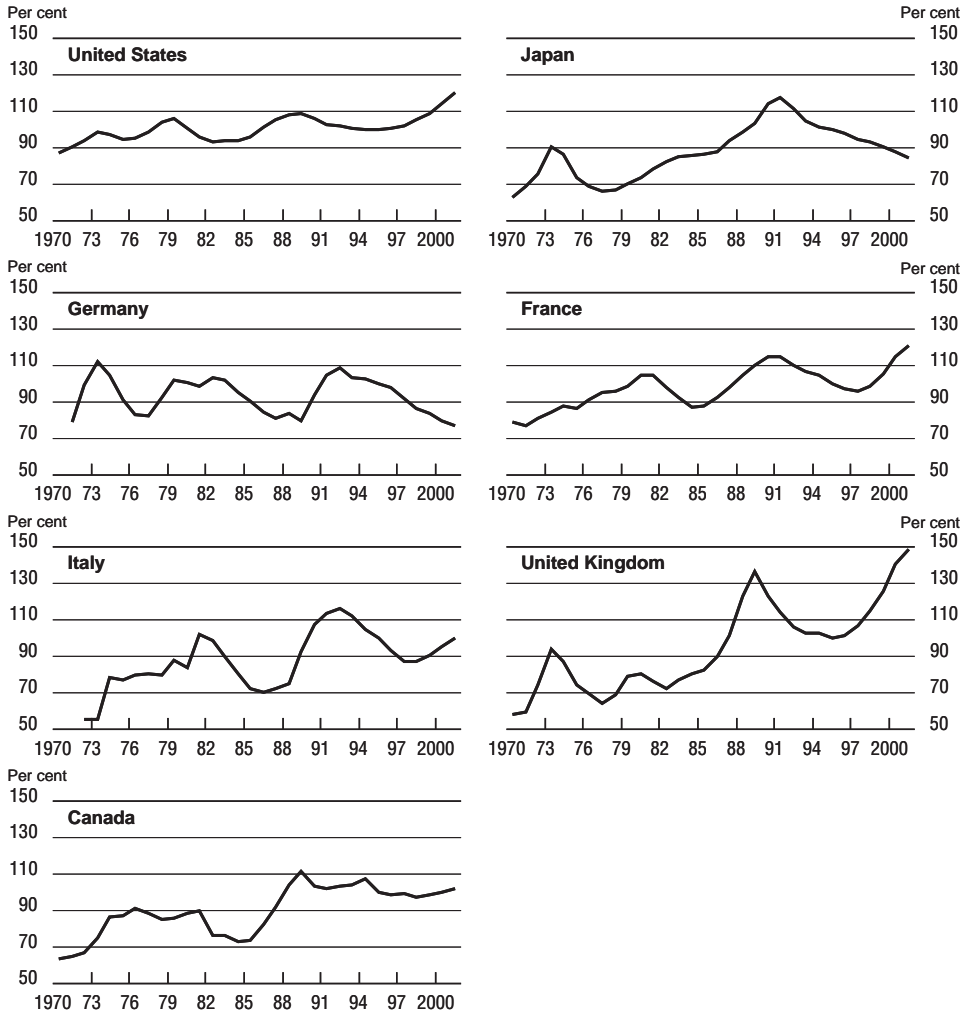
Looking at the evolution over the 1990s, the proportion of the population holding shares remained small, though it increased slightly in the countries reviewed. A relatively small percentage of the French, German and Italian population owns shares. By contrast there is a wider share ownership in the United Kingdom, possibly to some

Figure 1. **Real share prices, 1980-2002**
Index 1995 Q1 = 100



1. Share prices are deflated by the consumption deflators.

Figure 2. Real house price developments, 1970-2001¹
(1985 = 100)



1. House prices are deflated by the consumer price index. Data on residential property prices are not strictly comparable across countries due to differences in definition. In most countries, the house price index covers house prices on a national basis. However, in Germany, the index refers to the prices of houses located in western Germany. In Japan, the price index refers to residential land prices. Furthermore, depending on the country, the index relates to prices of existing and/or new houses, to prices of houses for owner-occupation only or also to prices of second residences, to prices of houses for which a loan has been applied for only or to a mix-adjusted house price index taking into account several differences in property type.

Source: Bank for International Settlements.

Figure 3. Total wealth decomposition in 1980 and 1999



1. Financial wealth is defined as financial assets minus financial liabilities, including mortgages. Housing wealth is defined as housing assets minus home mortgages. Other wealth is defined as net worth minus financial wealth and housing wealth.

Source: OECD, *Financial Accounts of OECD Countries*; United States, Federal Reserve, *Flow of Funds Accounts of the United States*, September 2000; Japan, Economic Planning Agency, *Annual Report on National Accounts 2000*; France, INSEE, *25 ans de Comptes du Patrimoine (1969-93)*, and *Rapport sur les Comptes de la Nation*; Italy, Banca d'Italia, *Supplementi al Bollettino Statistico*; United Kingdom, *National Accounts, Financial Statistics*; Canada, *National Balance Sheet Accounts*.

extent reflecting past privatisation programmes, and in the United States where private pension schemes have increased shareholding. The distribution of share holding across households has evolved little and those holding shares still belong disproportionately to the high-income population (Table 2). Using data from Table 2, Norman *et al.* (2002) estimated that for the population in the first three quartiles of the income distribution in each country, only 3.1 per cent own shares in Italy, 6.8 per cent in Germany, 10.4 per cent in France, 13.1 per cent in the United States and 19.1 per cent in the United Kingdom. This is important as the agents with the largest propensity to consume out of wealth are traditionally thought to be those with lower wealth holdings and lower income.

By contrast, the proportion of owner-occupiers is large and has been on an upward trend in the countries under review. Canada, Italy, Japan, the United Kingdom

Table 1. **Proportion of household wealth in shares**
% of total wealth

	1980	1995	2000
Canada	13.3	14.1	18.9
France ¹	5.7	17.5	26.8
Germany	2.2 ²	7.5	12.9
Italy ¹	2.5	9.6	26.5
Japan	4.7	5.8	5.3
United Kingdom	5.5	13.6	14.6
United States	9.6	19.6	25.3

1. France and Italy's estimates for household equity holding include unquoted shares.

2. 1990.

Source: OECD.

and the United States have an owner-occupation rate of 60 per cent or more while France and Germany are in the 40 to 50 per cent range. The allocation of property wealth across households appears more evenly distributed than that of financial wealth. In the United States for instance, IMF (2002) using 1998 Survey of Consumer Finances data, showed that holding of shares (direct and indirect) as a ratio of income by decile of the income distribution surpasses housing wealth defined similarly only in the upper decile.

CHANNELS BY WHICH FINANCIAL WEALTH AND HOUSING WEALTH AFFECT CONSUMPTION

The effect of wealth on private consumption has traditionally been analysed in the framework of the permanent income hypothesis or the life-cycle model, where the level of consumption depends on households' "permanent income", *i.e.* the current and expected future labour income stream, plus their stock of wealth (Friedman, 1957, Ando and Modigliani, 1963). Given expected permanent income, households are assumed to try to spend evenly over their life, borrowing in early age, saving during the middle of their working lives and dis-saving in the later years. An unexpected increase in wealth (whether it is housing wealth or financial wealth) should therefore push consumers to spread the wealth gain over the remainder of their life, spending a bit more and saving a bit less.

In this framework, two main financing channels can be distinguished. The increase in wealth may add to higher consumption directly by households liquidating their assets. Another channel is that the increase in wealth raises borrowing capacity, which in turn may increase spending for liquidity-constrained households. The

Table 2. Pattern of share holdings across selected G7 countries

Income group (€) ^{1,2}	Percentage of population	Years	
Germany³		1997	2000
< 1 300	21.1	1.7	3.0
1 300-2 050	29.4	3.9	5.8
2 050-3 050	33.1	8.3	11.4
3 050-4 100	9.8	14.6	20.4
> 4 100	6.6	18.7	25.9
Total	100.0	6.2	9.8
France		1997	2000
< 1 500	32.3	6.1	7.4
1 500-2 300	32.2	10.1	11.2
2 300-3 050	18.3	15.5	14.3
3 050-3 800	8.4	19.1	21.1
> 3 800	8.5	32.6	31.4
Total⁴	100.0	12.0	12.7
Italy		1995	1998
< 850	17.6	0.2	0.6
850-1 700	33.4	2.0	2.4
1 700-2 600	22.9	5.0	5.7
2 600-3 450	13.5	10.3	11.9
> 3 450	12.6	21.7	31.7
Total	100.0	5.0	7.8
United Kingdom⁵		1993	1996
Lower quartile	25.0	8.2	13.4
Middle-lower quartile	25.0	14.8	15.6
Middle-upper quartile	25.0	27.0	26.5
Highest quartile	25.0	41.3	37.9
Total	100.0	22.8	23.3
United States		1995	1998
< 850	12.6	2.3	3.8
850-2 100	24.8	8.4	7.2
2 100-4 150	28.8	13.9	17.7
4 150-8 350	25.2	24.7	27.7
> 8 350	8.6	43.6	56.6
Total	100.0	15.2	19.2

Note: The table shows the proportion of each income group holding direct equities excluding mutual funds – for example, in 1997, 1.7 per cent of all German income earners earning less than EUR 1 300 per month owned direct equities excluding mutual funds. Percentage of population in each respective income group for latest available year.

1. Income groups by monthly net income, rounded to nearest unit of 50 (€, £, \$).
2. UK data by income quartiles, based on net household income.
3. German data include employee share ownership schemes.
4. Total does not sum exactly due to rounding.
5. Includes unit trusts, PEPs and government gilts.

Source: Bank of England, Deutsches Aktieninstitut, Deutsche Bundesbank, Banque de France/Paris Bourse, Banca d'Italia, Institute for Fiscal Studies and Federal Reserve Board.

magnitude of each of these effects depends upon a number of factors including the liquidity of asset markets, the extent of regulation in financial markets and the demographic distribution of asset ownership. The overall importance of the wealth effects is the results of the combination of these factors and channels.

Financial wealth effect on private consumption depends also on the nature of the assets. In France and Italy households appear to hold a large proportion of shares compared with share holding in the English speaking countries, but these holdings contain a large part of unquoted share, which may be less liquid and more difficult for households to value.² Moreover, there are no large-scale private pension schemes in France, Germany and Italy whereas the inclusion of asset holding in the form of private pension funds in the United Kingdom and in the United States results in a much greater proportion of wealth in quoted shares than in other countries. At the same time, it is likely that changes in the value of these locked-in pensions funds feed less directly into private consumption. Poterba (2000) suggested that consumers may keep “mental accounts” of assets that are earmarked for a specific purpose. Both of these factors could reduce the marginal propensity to consume out of financial wealth.

Regarding housing assets, there are other reasons for the wealth effect to be ambiguous. Owner-occupiers may perceive house price increases as an addition to their wealth, and reduce their saving out of current income. It is also possible that owners do not feel wealthier when the value of their property goes up since their implicit rental costs have gone up as well. However, in this case the increased implicit rental cost could induce the owners to trade down and the resulting housing equity withdrawal could be used to increase consumption. Households planning to purchase their own homes may, however, reduce their consumption in the wake of higher house prices as they will have to save more for higher down-payments and repayments. For these reasons, the strength of the housing wealth effect is uncertain.

Even if households regard their residential property to be wealth, their capacity to adjust current spending in response to shifting house prices is strongly dependent on the functioning of the financial system. This is notably the case when rising property values would encourage households to increase their current spending. To fund such spending increases, consumers would have to draw down other liquid assets or to borrow. Should credit not be forthcoming, households would be constrained in responding to higher house prices. In practice, households' ability to borrow is strongly dependent on their capacity to supply assets that can serve as a security for repayments and real estate is the most widely used collateral asset. By increasing borrowing secured on rising property values, households can withdraw part of the rise in housing wealth and use some of the proceeds to finance extra consumption. As for financial wealth, quantifying the importance of these wealth effects is an empirical question.

WEALTH EFFECTS: SPECIFICATION AND ESTIMATION ISSUES

The econometric analysis of the impact of different forms of wealth on private consumption adopted here consists of two steps. Firstly, owing to the non-stationary nature of the data, the long-term determinants of consumption are estimated using co-integration techniques. The dynamic evolution of consumption is then derived from these long-run relations, using an error-correction model. This allows the derivation of the speed of adjustment towards the desired level of consumption, and provides estimates of the short-term propensities to consume out of the different categories of wealth.

Estimation of the long-term level of consumption and its growth rate is based on the methodology used in Boone *et al.* (1998). Within the life-cycle/permanent income theory framework, a long-run relationship between the consumption to income ratio and wealth is estimated. Two specifications are used, in which wealth enters alternatively aggregated or disaggregated, as different categories of wealth may affect consumption with different magnitude as discussed above. The corresponding consumption equations can be written more formally as:

$$\ln(cy) = \alpha + \lambda(tw) + ect_{1a} \quad (1a)$$

$$\ln(cy) = \alpha + \beta(fe) + \gamma(he) + \delta(ow) + ect_{1b} \quad (1b)$$

where cy is the consumption to disposable income ratio, tw represents total wealth, fe financial wealth defined as financial assets minus financial liabilities other than mortgages, he housing wealth defined as housing assets minus home mortgages, ow other wealth defined as net worth minus fe and he . All the explanatory variables are in levels and expressed as ratios to disposable income, while the dependent variable, $\ln(cy)$, is the ratio of private consumption to disposable income expressed in logarithmic form.³ Disposable income embodies labour income, property income and transfer income minus taxes. α is a constant, β , γ , δ and λ are long-term propensities to consume out of financial wealth, housing wealth, other wealth and total wealth respectively. ect_{1a} and ect_{1b} are the residuals from the two regressions.

These specifications allow the identification of a target level of consumption in terms of wealth, as well as an estimate of the marginal propensity to consume out of each category of wealth. The deviations from the long-term relationship (estimated in terms of a cointegrating vector) can then be included as an error correction term in a dynamic equation explaining the short-term fluctuations of the consumption-to-income ratio. The short-run equations also include lagged differences of the long-run components, and can be enriched by taking into account:

- The interest rate to reflect substitution effects.

- The inflation rate as a proxy for uncertainty as well as the real depreciation of non-indexed financial assets.
- Fluctuations in the unemployment rate as a proxy for uncertainty surrounding the future stream of income.

As for the long-run relationships, two specifications, one with aggregated wealth and another with disaggregated wealth,⁴ are estimated:

$$\Delta(c) = \tau ect_{1a}(-1) + \sum_{i=1}^n \gamma_i \Delta(c)(-i) + \sum_{i=1}^n \theta_i \Delta(y)(-i) + \sum_{i=0}^n v_i \Delta(tw)(-i) + \sum_{i=0}^n \kappa_i \Delta(unr)(-i) + \sum_{i=0}^n \rho_i \Delta(ir)(-i) + \sum_{i=0}^n v_i \Delta(infl)(-i) \quad (2a)$$

$$\Delta(c) = \tau ect_{1b}(-1) + \sum_{i=1}^n \gamma_i \Delta(c)(-i) + \sum_{i=1}^n \theta_i \Delta(y)(-i) + \sum_{i=0}^n v_i \Delta(fe)(-i) + \sum_{i=0}^n \lambda_i \Delta(he)(-i) + \sum_{i=0}^n \lambda_i \Delta(ow)(-i) + \sum_{i=0}^n \kappa_i \Delta(unr)(-i) + \sum_{i=0}^n \rho_i \Delta(ir)(-i) + \sum_{i=0}^n v_i \Delta(infl)(-i) \quad (2b)$$

where Δ represents first-order differences and $ect(-1)$ is the error-correction term from (1a) and (1b) referring to the respective cointegrating vector.⁵ Intuitively, τ should be negative so that when consumption is moving away from its equilibrium value, it adjusts back in the next periods. The larger τ is, the quicker the return to the equilibrium path. Equations (2a) and (2b) can be estimated with OLS.

RESULTS AND INTERPRETATION: THE IMPORTANCE OF FINANCIAL WEALTH AND HOUSING WEALTH EFFECTS

Tables 3 and 4 report estimation results for the G7 countries with the exception of Germany.⁶ Panel A shows the results for the long-term relationship as represented by equation (1), whereas Panel B summarises the results for the short-term dynamics, as in equation (2). The existence of a cointegration relationship is tested with the ADF procedure.⁷ The usual standard tests (see Turner and Seghezza, 1998) are run for the dynamic relationships.

The overall results are satisfactory in the sense that the wealth variable is significant for all countries and of a magnitude similar to that found in previous work. The long-term elasticities range between 2 and 4 per cent for the countries listed in Table 3, with the exception of Canada where the estimation result put it at 6 per cent.⁸ With the disaggregated specification of wealth, the long-run marginal propensity to consume out of financial wealth varies between 4 per cent for the United Kingdom and the United States and 10 per cent or more for Canada and Japan (Table 4).⁹ The estimated long-run marginal propensity to consume out of housing wealth is in the range of between 3 per cent and 5 per cent for France, the United Kingdom and the United States, but exceeds 10 per cent for Canada and Japan. For Italy, the negative coefficient may reflect the specific features of home ownership in this country. It is a somewhat counter-intuitive feature of the results that in the United Kingdom and the United States, the marginal propensity to consume out of financial wealth is broadly similar to the marginal propensity to consume out of housing wealth, whereas in France the marginal propensity to consume out of financial wealth is higher than that of housing wealth. By contrast, for Canada and Japan the marginal propensity to consume out of housing wealth is larger than that of financial wealth but both propensities look excessively high in these countries.

The dynamic specifications for both total and disaggregated wealth are also satisfactory in the sense that the error correction coefficients are always significant with

Table 3. **Private consumption and total wealth: long-run relationship**
Panel A

	United States	Canada	United Kingdom	France	Italy	Japan
Total wealth	0.04 (13.3)	0.06 (9.7)	0.02 (4.5)	0.03 (2.1)	0.03 (6.3)	0.02 (7.5)
Short-term interest rate	-0.003 (-5.0)					
Long-term interest rate		-0.011 (-11.2)		0.003 (2.0)		-0.004 (-2.7)
Inflation rate					-0.009 (-7.2)	-0.011 (-7.0)
Constant	-0.31 (-18.3)	-0.28 (-8.7)	-0.17 (-6.1)	-0.30 (-4.5)	-0.33 (-16.3)	-0.23 (-12.0)
Time period	70:1-99:2	73:1-98:2	79:1-99:2	70:1-98:2	80:1-96:2	70:1-98:2
R2	0.81	0.92	0.41	0.09	0.85	0.89
Dummies			1993			
Cointegration tests						
ADF residuals (2 lags)	5%	5%	10% ¹	10% ¹	10% (1 lag)	5%

1. Without constant.
Source: OECD.

Table 3. Private consumption and total wealth: short-run relationship (cont.)

Panel B

	United States	Canada	United Kingdom	France	Italy	Japan
ΔY	0.42 (4.8)	0.33 (4.1)	0.50 (8.0)	0.50 (6.5)	0.80 (6.8)	0.48 (7.8)
$\Delta Y (-1)$				0.25 (2.7)		0.23 (4.5)
$\Delta Y (-2)$						0.15 (2.7)
$\Delta C (-1)$	0.21 (1.7)				0.25 (2.5)	
$\Delta C (-2)$	0.27 (2.9)	0.45 (5.6)		0.17 (2.0)		
Δ Total wealth	0.09 (2.7)	0.19 (2.3)	0.16 (4.1)			0.10 (4.6)
Δ Total wealth (-1)						
Δ Total wealth (-2)			0.22 (5.6)	0.08 (1.9)		
Δ^2 Total wealth (-1)					0.05 (1.8)	
Δ Unemployment rate		-0.003 (-2.0)				
Δ^2 Unemployment rate	-0.005 (-4.1)					
Δ Inflation rate (-2)			-0.004 (-2.6)	-0.003 (-3.1)		
Δ Interest rate					-0.002 (-1.8)	
Δ Interest rate (-1)	-0.002 (-2.4)	-0.003 (-3.0)				
ECT [-1]	-0.18 (-2.4)	-0.31 (-3.1)	-0.12 (-1.9)	-0.08 (-1.7)	-0.24 (-2.0)	-0.18 (-3.1)
Dummies					1993	
R2	0.82	0.87	0.72	0.92	0.93	0.90
SE	0.01	0.01	0.01	0.01	0.01	0.01
DW	2.00	1.80	1.54	2.01	1.86	1.81
Chow forecast test	0.87	0.62	0.95	0.32	0.38	0.48
Reset test	0.24	0.67	0.39	0.33	0.74	0.02
Serial correlation	0.09	0.12	0.40	0.95	0.14	0.36
Normality	0.03	0.38	0.68	0.57	0.87	0.22
Chow breakpoint test	0.27	0.01	0.00	0.13	0.41	0.06

Source: OECD.

the expected sign. The range of values across countries for the error-correction coefficients is rather narrow, giving a sizeable adjustment to a shock in wealth within four years.¹⁰ However, estimation results for Italy and Japan, and France to a lesser extent, when using disaggregated wealth specifications should be interpreted

Table 4. Private consumption and different components of wealth: long-run relationship

Panel A

	United States	Canada	United Kingdom	France	Italy	Japan
Financial wealth	0.04 (13.1)	0.10 (19.5)	0.04 (5.2)	0.08 (3.0)	0.08 (23.5)	0.12 (16.6)
Housing wealth	0.03 (1.8)	0.19 (3.6)	0.04 (5.2)	0.05 (1.9)	-0.06 (-7.1)	0.34 (8.1)
Other wealth			0.20 (5.8)	0.09 (2.3)		
Interest rate	-0.002 (-3.8)	-0.008 (-8.1)		0.009 (4.9)		
Constant	-0.26 (-12.3)	-0.41 (-10.3)	-0.40 (-9.4)	-0.50 (-4.1)	-0.32 (-27.5)	-0.55 (-17.6)
Time period	70:1-99:2	73:1-98:2	82:1-99:2	70:1-96:2	80:1-96:2	75:1-98:2
R2	0.82	0.93	0.87	0.66	0.95	0.94
Dummies		1982/1993		1978/1987	1982	1989
Cointegration tests						
ADF residuals (2 lags)	1%	5%	5% ¹	5% ¹	5% ¹	1% ¹

1. Without constant.

Source: OECD.

with prudence, either because the estimation period is short due to limited data availability (as for France or Italy), or because the explanatory power of the regression is low (as for France and Japan).

These estimations can be used to decompose changes in the consumption-to-income ratio due to their proximate determinants.¹¹ Over the long run, developments in financial wealth appear to have been a more important driver of consumption than housing wealth (Table 5). As regards consumption fluctuations in the short run, financial wealth effects also play a key role and seem to have increased in importance over the last decade in the United Kingdom and the United States (Figure 4). At the same time, the second most important variable appears to be housing wealth, whose contribution to the dynamics of consumption remains more even across the last decade, except for the United Kingdom where it is rising.

As the importance of financial and housing wealth on the fluctuations of consumption has significantly risen over the last decade, quantifying how recent stock markets and housing markets developments have impacted on short-term consumption is increasingly relevant to policy-makers. The corresponding estimates of the change in consumption are then given by the product of the marginal propensity to consume out of wealth and the estimated change in wealth.

The calibrated wealth effects from a 10 per cent rise in real share prices is larger in the United States than in the United Kingdom given the comparatively high proportion of household wealth held in shares in the United States. Indeed,

Table 4. Private consumption and different components of wealth:
short-run relationship (cont.)

Panel B

	United States	Canada	United Kingdom	France	Italy	Japan
ΔY	0.34 (3.5)	0.29 (4.5)	0.59 (10.2)	0.47 (6.2)	0.77 (16.3)	0.39 (4.3)
$\Delta Y(-1)$		0.20 (2.5)		0.20 (2.3)		0.26 (3.8)
$\Delta Y(-2)$						0.11 (1.7)
$\Delta C(-1)$	0.31 (2.6)					
$\Delta C(-2)$	0.18 (1.7)	0.27 (2.7)		0.19 (2.4)		
Δ Financial wealth			0.08 (3.2)		0.11 (5.1)	
Δ Financial wealth (-1)	0.06 (2.0)	0.20 (2.9)				
Δ Financial wealth (-2)			0.11 (4.4)	0.06 (3.4)		0.17 (5.7)
Δ Housing wealth			0.11 (6.0)			
Δ Housing wealth (-1)						
Δ Housing wealth (-2)					-0.09 (-4.5)	
Δ Other wealth				0.13 (3.8)		
Δ Other wealth (-1)					0.14 (8.0)	
Δ Other wealth (-2)	0.12 (1.7)				0.05 (6.0)	
Δ^2 Other wealth		0.25 (3.0)				
Δ Unemployment rate		-0.004 (-3.0)				
Δ Unemployment rate (-2)			-0.005 (-3.5)			
Δ^2 Unemployment rate	-0.005 (-3.8)					
Δ Interest rate (-1)		-0.004 (-2.5)				
Δ Inflation (-2)				-0.003 (-2.6)		
ECT [-1]	-0.17 (-2.1)	-0.25 (-2.8)	-0.24 (-2.5)	-0.14 (-2.1)	-0.30 (-2.6)	-0.30 (-3.3)
Dummies			1984/1989		1983/1993	1995
R2	0.80	0.90	0.88	0.94	0.97	0.89
SE	0.005	0.01	0.00	0.01	0.00	0.01
DW	1.82	1.91	1.55	2.27	1.93	1.68
Chow forecast test	0.89	0.67	0.77	0.62	0.60	0.47
Reset test	0.04	0.28	0.64	0.55	0.58	0.24
Serial correlation	0.13	0.05	0.38	0.43	0.84	0.26
Normality	0.17	0.57	0.63	0.97	0.32	0.64
Chow breakpoint test	0.79	0.10	0.21	0.94	0.15	0.01

Source: OECD.

Table 5. Contributions to the long-run ratio in selected G7 countries

	Change in C/Y (in log)	Due to changes in			
		Financial wealth	Housing wealth	Interest rates	Other wealth
United States					
1980-90	8.6	7.6	-0.8	1.0	0
1990-99	6.2	9.1	-0.8	0.3	0
1995-99	3.3	10.2	-0.0	0.1	0
Canada					
1980-90	2.2	11.0	0.9	-5.1	0
1990-98	11.3	6.0	-0.2	2.4	0
1995-98	6.1	1.8	-0.4	3.2	0
United Kingdom					
1980-90	0.9	4.0	-3.0	0	-5.6
1990-99	1.6	3.8	-1.0	0	-2.8
1995-99	6.4	4.4	0.3	0	0.1

Note: The sum of the three last columns on the right hand side may not add up to the first column, due to non null residuals in the long-term equation.

Contributions to the long-term equilibrium consumption to income ratio are derived from the cointegrating vector:

$$\frac{C}{Y} = \alpha + \beta_1 FW + \beta_2 HW + \beta_3 OW + \delta Z_t$$

where FW stands for financial wealth, HW for housing wealth, OW for other wealth and Z represents all other variables.

Source: OECD.

Figure 4. Contribution of different wealth components to short-term dynamics of consumption

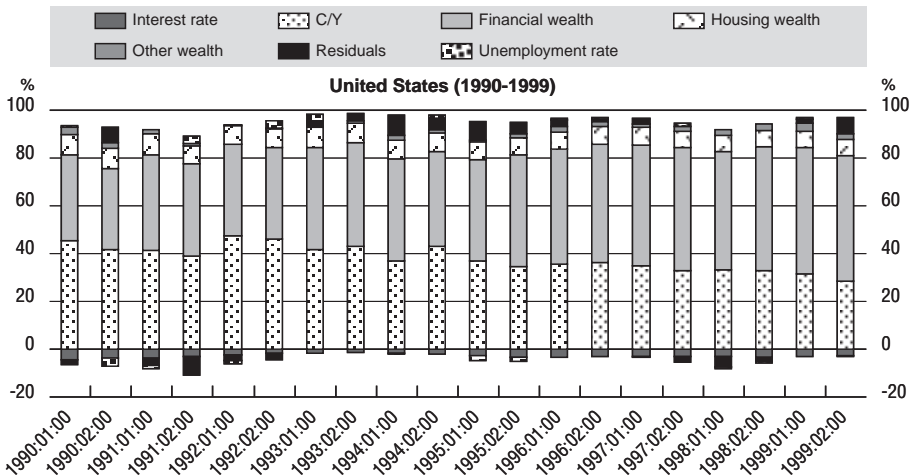
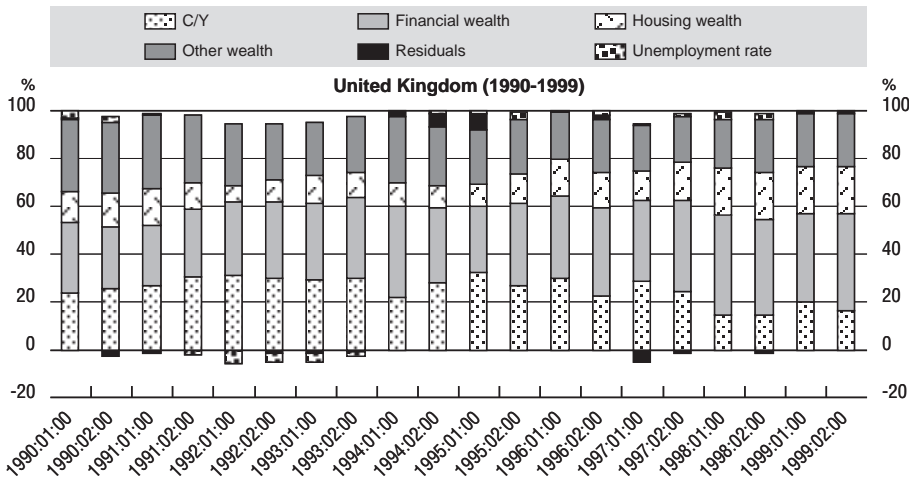


Figure 4. Contribution of different wealth components to short-term dynamics of consumption (cont.)



1. Contributions to the short-run dynamic of consumption are derived from the error-correction model in:

$$\Delta C_t = a(L)\Delta C_{t-1} + b(L)\Delta Y_t + c(L)\Delta FW_t + d(L)\Delta HW_t + d(L)\Delta OW_t + e(L)\Delta Z_t + \beta \left(\frac{C}{Y}_{t-1} - \alpha - \beta_1 FW_{t-1} - \beta_2 HW_{t-1} - \beta_3 OW_{t-1} - \delta Z_{t-1} \right)$$

where Δ stands for the first difference.

For example, financial wealth contribution is given by:

$$\frac{c(L)\Delta FW_t - \beta\beta_1 FW_{t-1}}{\Delta C_t - a(L)\Delta C_{t-1}}$$

Source: OECD.

in the United States, a 10 per cent rise in real share prices is estimated to raise consumption by 0.6 per cent compared to 0.4 per cent for the United Kingdom. As regards housing wealth, the effect is larger for the United Kingdom as the value of property holding is larger relative to disposable income. A 10 per cent rise in real house prices would increase consumption by 0.9 per cent in the United Kingdom compared to 0.3 per cent in the United States.

Overall, the results suggest that movements in share prices since 2000 could have contributed to a cumulated decline in consumption, by an amount of about 2.4 per cent for the United Kingdom and 1.6 per cent for the United States. At the

Table 6. **Impact on consumption of a 10 per cent rise in real share prices and in real house prices in the United States and the United Kingdom**

	Share holding as a % of household disposable income in 1999	Marginal propensity to consume out of financial wealth (%)	Change in consumption (per cent)	Housing wealth holding as a % of household disposable income in 1999	Marginal propensity to consume out of housing wealth (%)	Change in consumption (per cent)
United States	137	4.0	0.6	83	3.0	0.3
United Kingdom	99	4.0	0.4	227	4.0	0.9

Source: OECD.

same time, the rising house prices have only partially offset the capital loss in the United States but it has more than counterbalanced the loss in the United Kingdom. Looking forward and notwithstanding the uncertainty surrounding some of these estimates, this underlies the increasing importance of financial and housing assets for assessing demand conditions.

HAS CONSUMER BEHAVIOUR RECENTLY EVOLVED?

In many countries, a number of economic and regulatory changes have taken place over the past decades, which could be at the origin of a structural change in consumer behaviour, especially with respect to wealth effects. More specifically, changes in the functioning of financial markets have occurred in recent decades following progressive financial deregulation since the late 1970s. This has accompanied, and probably underpinned, reductions in borrowing constraints on consumers, thus weakening liquidity arguments and contributing to a reduction in households' aggregate propensity to save.¹² An important aspect of financial liberalisation in the 1980s and 1990s concerned interest-rate deregulation and liberalisation of the credit market (Girouard and Blöndal, 2001). This section tests whether wealth effects have changed over the recent period, following such structural changes across the G7 countries.

Testing for such structural breaks is not straightforward. It is difficult to select a date at which a break could have occurred on the one hand, and when its impact is fully integrated in consumer behaviour on the other hand. For example, the financial deregulation process took place at different periods in time across countries, and the timing of the impact of the reforms is uncertain. The power of the testing procedures is affected by these considerations, and several procedures have been used in the literature to cope with these difficulties.

This study uses a battery of procedures to test for potential structural breaks. The testing methods are the following:

- i) Estimation over sub-samples (Brechetta and Gerlach, 1997; Miles, 1994).
- ii) Introduction of dummies, allowing a one-off shift (Sefton and In't Velt, 1999) or a smoother change in the coefficients (Bayoumi, 1993; Hendry and Ericsson, 1991).
- iii) Testing the significance of a variable reflecting credit deregulation (Miles, 1994; Westaway, 1993).

Approach i) consists of estimating the relationships over sub-samples. Since the date at which the regime change might have occurred, and subsequent effects fully internalised, is uncertain, a rolling procedure was implemented, where the transition period is moved by one half-year each time and the equation re-estimated in a sequential fashion. This should permit to detect a regime switch, as reflected by different significance and magnitude of the coefficients on the wealth variables in the different sub-samples.

The framework for procedure ii) is to augment the long-run equations to allow for a shift in the coefficients, following a regime change, which may be written as:

$$cy = \alpha + \beta(\text{wealth}) + \text{dummy} * \beta' * (\text{wealth})$$

where *wealth* is either total wealth or the various components of wealth described above. *Dummy* is either a zero-one dummy taking the value zero prior to the break and one after, or a time-varying dummy, following a procedure close to that of Bayoumi (1993). The time-varying dummy takes a value of zero before the regime change (which is assumed not to take place anywhere before 1982), then rises at the same pace as new mortgages, up to the peak and takes the value one afterwards.¹³ The basic idea underlying this approach is that the most important regime change for the wealth effects is likely to be financial deregulation, and the new mortgages variable reflects the increase in consumer credit triggered by financial deregulation.¹⁴ The dates for breaks are those identified by Girouard and Blöndal (2001). The interpretation is the same whatever the type of dummy: before the break, the coefficient(s) on the wealth variable(s) is β , after the break it becomes " $\beta + \text{dummy} * \beta'$ ". This specification implies common dates for the regime switch for all variables, but allows the strength of the impact to differ across variables. Finally, with approach iii), a significant equity withdrawal variable reflects households' increased borrowing capacity.

All the tests were undertaken for the long-run relationships, within the constraints imposed by sample sizes. For the dynamic relationships, only two tests were performed: sub-samples estimation (using cutting dates determined by the results of the rolling tests on the long-run cointegrating vectors), and the significance of housing equity withdrawal variable.

Table 7. **Summary table: structural break tests**

	Sub-sample estimates		0-1 dummies	Net mortgages dummies		Housing equity withdrawals
	Wealth decomposition	Total wealth		Wealth decomposition	Total wealth	
United States	+	+	+	+	-	+
Canada	+	+	+	-	-	+
United Kingdom	+	+	+	-	-	+
France	-	+	-	+	-	+
Italy	+	-	+	+	+	+
Japan	-	-	+	-	-	-

+ Significant effect of financial deregulation.

- No effect of financial deregulation.

Source: OECD.

Table 7 summarises the results from the various tests for a regime change. Three groups of countries can be distinguished based on these results. The first group consists of Canada, the United Kingdom and the United States. The second group includes France and Italy. And, finally, Japan is in a group of its own.¹⁵ For the first group, there is evidence of a break in the sense that the coefficients, either on total wealth or on some of its components are affected. It is however difficult to quantify the impact itself, as its magnitude is not the same across testing procedures. For the second group, the results are more mixed, possibly reflecting slower changes or delayed effects that appear too late in the sample to be econometrically captured. Finally, for Japan, the absence of evidence may be caused by the strong influence of abundant liquidity in the financial markets due to the loose monetary policy since the mid-1980s.

The results of the tests for financial deregulation using housing equity withdrawals, presented in Table 8, are more striking and support the hypothesis that rising housing equity withdrawals may have increased the consumption level in all countries. The equity withdrawal variable appears significant and with similar magnitude for all equations, except Japan, with the value of other coefficients remaining stable for both the disaggregated and aggregate wealth specification.¹⁶ Again, this effect on the long-run level of consumption might not persist in the long term; nonetheless, in our small sample sizes that include the period of deregulation, this effect is significant.¹⁷

SUMMARY

This paper provides evidence of significant wealth effects across countries, though their magnitude varies across countries and type of assets. In line with

Table 8. Private consumption, wealth and housing equity withdrawal: regression results

Panel A: Disaggregated wealth						
	United States	Canada	United Kingdom	France	Italy	Japan
Financial wealth	0.04 (13.4)	0.10 (18.5)	0.05 (9.1)	-0.04 (-2.2)	0.10 (8.7)	0.11 (10.4)
Housing wealth		0.22 (3.6)		-0.04 (-1.1)		0.29 (5.9)
Other wealth			0.18 (5.5)	-0.03 (-0.9)		
Housing equity withdrawal	0.005 (3.9)	0.005 (2.9)	0.008 (5.9)	0.017 (5.9)	0.006 (1.8)	-0.001 (-0.3)
Interest rate	-0.002 (-3.8)	-0.007 (-5.4)				
Constant	-0.22 (-21.3)	-0.43 (-9.7)	-0.36 (-9.5)	0.05 (0.5)	-0.48 (-10.1)	-0.51 (-9.8)
Time period	70:1-99:2	73:1-98:2	82:1-99:2	70:1-97:2	76:1-96:2	77:1-97:2
R2	0.85	0.90	0.92	0.64	0.82	0.93
Dummies			1993	1978		1989
Cointegration tests						
ADF residuals (2 lags)	5%	5%	5%	5% ¹	5% ¹	10%

Panel B: Aggregated wealth						
	United States	Canada	United Kingdom	France	Italy	Japan
Total wealth	0.04 (11.9)	0.10 (10.1)	0.02 (6.7)	-0.04 (-4.1)	0.02 (4.5)	0.03 (8.0)
Housing equity withdrawal	0.003 (1.9)	0.009 (4.2)	0.009 (9.9)	0.017 (7.6)	0.005 (2.4)	-0.006 (-1.4)
Real interest rate	-0.003 (-5.2)			0.003 (3.0)		
Nominal interest rate		-0.002 (-1.8)			-0.005 (-4.4)	
Constant	-0.30 (-16.4)	-0.49 (-11.4)	-0.17 (-11.4)	0.08 (1.4)	-0.27 (-8.3)	-0.32 (-8.3)
Time period	70:1-99:2	73:1-98:2	79:1-99:2	74:2-98:2	80:1-96:2	77:1-97:2
R2	0.82	0.86	0.83	0.68	0.88	0.78
Dummies			1993			
Cointegration tests						
ADF residuals (2 lags)	5%	10%	1%	10%	10%	5%

1. Without constant.

Source: OECD.

results found in recent literature, the long-run marginal propensities to consume out of total wealth range between 2 and 4 per cent for all countries with the exception of Canada where it is estimated at a somewhat unlikely 6 per cent. With the disaggregated specification of wealth, the results are not always very intuitive. The long-run marginal propensity to consume out of financial wealth varies between 4 per cent for the United Kingdom and the United States and 10 per cent or more for Canada and Japan. By comparison, the estimated long-run marginal propensity to consume out of housing wealth varies between 3 per cent and 5 per cent for France, the United Kingdom and the United States, but exceeds 10 per cent for Canada and Japan.

The importance of wealth effects has increased over time for some countries as deregulation and intensifying competition among financial institutions have eased the liquidity constraints facing households. Indeed, tests for the possibility of structural breaks give significant results for Canada, the United Kingdom and the United States. However, less robust evidence was found for the other countries. This result could be ascribed to the uncertainty of statistical estimations, to the lags necessary to capture the impact of regime changes such as financial deregulation on real activity, or more importantly, to delayed or too little financial deregulation.

NOTES

1. Germany was not included because housing wealth was not available over a long enough period for econometric analysis.
2. It is very difficult to get a satisfactory and harmonised way of valuating unlisted or unquoted shares held by households. In France, for example, recent work at the Bank de France and in the Commissariat Général du Plan suggests that the amount of unlisted shares held directly by households has been considerably overstated (CGP, Actionnariat des ménages, 2002).
3. A similar specification, relating the log of the consumption-income ratio to the unlogged wealth-income ratio has been used for instance by Muellbauer (1994). A thorough algebraic analysis on the derivation of the appropriate functional form for consumption equilibrium may be found in Rossi and Visco (1995). Note that $\ln(cy)$ can be approximated by $cy - 1$.
4. The total wealth specification was tested on the ground that for countries where the wealth effect may be weak, it will more easily appear in an aggregated framework. However, the disaggregated wealth effects might not all go in the same direction and their diverse influences provide a non-significant aggregate effect.
5. This approach requires first to check that the variables are $I(1)$, and then that the long run determinants of consumption cointegrate. Tests for integration and cointegration are summarised in Annex I of Boone *et al.* (2001).
6. The wealth data used in estimation are described in the notes to Figure 3, together with the sources. Other data come from the OECD Analytical Database (ADB). The frequency is semi-annual. Samples vary with data availability, but are generally between 1975 and 2000.
7. See Annex I in Boone *et al.* (2001) for the detailed results of the tests.
8. In the United States, recent studies suggest a marginal propensity to consume out of wealth in the range of 3 to 7 per cent (Starr-McCluer, 1998, and Brayton and Tinsley, 1996). For other countries, the evidence remains at best mixed. In Japan, for instance, estimates of the marginal propensity to consume out of wealth range from around 1 per cent (Mutoh *et al.*, 1993) up to around 4 per cent (Horioka, 1996; Ogawa *et al.*, 1996), varying considerably with the definition of wealth (liquid wealth versus total wealth) and income (labour versus disposable income). In France, on the other hand, a variety of studies (Bonnet and Dubois, 1995; Grunspan and Sicsic, 1997) provide no strong evidence of any wealth effect at all. In Italy, Rossi and Visco (1995) present evidence of a marginal propensity to consume out of wealth of the order of 3 to 3½ per cent, once an account is taken of double counting of social security transfers in the measurement of disposable income and pensions wealth.

9. There is some empirical evidence in favour of existence of disaggregated wealth effects. For multi-country analyses, see Case *et al.* (2001), IMF (2002) and Ludwig and Sløk (2002). Wealth effects are presented in terms of marginal propensity to consume in cents per dollar in Case *et al.* (2001) and IMF (2002), while they are in terms of elasticities (percentage increase in wealth) in the case of Ludwig and Sløk (2002). Moreover, all these authors used stock market indices and house prices as proxy variables for the housing and financial wealth components.
10. The speed of adjustment is usually measured by “half-lives”, which are computed as $\ln(0.5)/\ln(1 + \alpha)$, where α is the coefficient on the error-correction term.
11. The wealth variable over-explains, reflecting that the constant and the residuals are not taken into account in the break-down.
12. See Bayoumi (1993) and Caporale and Williams (1997) for such evidence for the United Kingdom.
13. This technique is very close to the estimation of time varying parameters.
14. When the growth rate was too volatile, the dummies were smoothed.
15. Detailed results for each test are given in Annex 2 of Boone *et al.* (2001).
16. However, in the case of the United Kingdom and the United States, the housing wealth variables becomes insignificant when the housing equity variables is included, probably reflecting similar information content.
17. When included in the dynamic relationships, the equity withdrawal variable appears only marginally significant (at the 20 to 30 per cent level), and often with the wrong sign while other coefficients are not significantly modified, which is in line with the sub-samples tests realised on the dynamic regressions. This result may have two interpretations. Either the short-term behaviour of consumers has not been affected so much (yet) by the change in the borrowing markets (maybe because borrowing constraints in the short term have not been alleviated), or the effect is only on the level of consumption (as captured in the long-run relationships).

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