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Is Housing Wealth an "ATM"? The Relationship Between Household Wealth, Home Equity Withdrawal, and Saving Rates

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This paper examines the roles that increasing personal wealth and home equity withdrawal (HEW) have had in the decline in the personal saving rate in the United States. It does so by comparing the U.S. experience with that of Australia, Canada, and the United Kingdom. Mortgage market liberalization and innovation reduce household cash-flow and collateral constraints while making housing wealth more liquid as HEW becomes easier over time. Regression analysis indicates the expected negative relationship between U.S. saving and net worth, with a somewhat smaller coefficient than in previous empirical studies. Changes in HEW are found not to have a significant impact on U.S. saving in the short or long run. In that sense, housing wealth is not an "ATM." [JEL E21, G21]
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Loan advertisers and financial commentators in the United States were quick to link the increasing freedom to access home equity through

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additional secured borrowing with the withdrawal of housing equity to finance consumption. The former celebrated the flexibility of borrowing against housing collateral to consume; the latter fretted that U.S. households were overstretching by adding to their debt burdens and eroding the equity in their houses. The decline in the U.S. personal saving rate, such that households are now consuming more than their disposable incomes, was readily ascribed by some analysts to the rise of home equity withdrawal (HEW) as consumers borrow against their housing wealth to consume.[1]

This paper assesses whether reality matches this perception.[2] First, what role, if any, has financial liberalization played in reducing U.S. saving and fostering HEW? Second, to what degree have increasing housing wealth and HEW been responsible for the decline in U.S. saving?

The answers to these questions are crucial for our understanding of what affects consumption in the United States. With HEW falling, as house price inflation and transactions have declined, its influence on U.S. consumption could be the main channel through which a housing market downturn prompts a wider recession. In other words, if the level of HEW is found to have a direct significant effect on long-run consumption levels, then housing wealth is an "ATM" in that home equity can be tapped readily to finance consumer spending, and its decline should have a noticeable impact on consumption. However, if HEW is not found to be a significant driver of consumption, then housing wealth is not an ATM. In that case, financial innovation may have made it easier to borrow against one's home equity, and so increased the liquidity of housing wealth in one's portfolio. Yet the principal way in which housing prices influence consumption is via the traditional wealth effect, whereby rising housing wealth increases the propensity to consume and reduces the incentive to save to achieve a desired wealth level.

In addressing these issues, this paper compares the U.S. experience with that of Australia, Canada, and the United Kingdom to see if other countries with competitive mortgage markets and similar home ownership rates provide additional insight into the interaction of housing wealth and saving. It does so by first describing financial sector innovation in each country, which helps to calibrate the degree to which constraints on accessing home equity have been relaxed. The paper then uses regression analysis to draw

[1]Goldman Sachs (2006) is a typical example of analysis that posited a strong link between HEW and U.S. consumption. Duca (2006) argued that the increasing reliance of U.S. households on HEW in the first part of the decade explains why the saving rate has fallen so far.

[2]In an earlier version of this paper, we discussed whether the observed declines in saving rates in the four countries under consideration were mere statistical artifacts or real phenomena after adjusting for the effects of inflation, capital gains taxes, and imputed rents (Klyuev and Mills, 2006). Although we found that these adjustments had a significant impact on the level of the saving rate, they did not reverse the declining trend.

possible implications for the U.S. personal saving rate from the slowing housing market.

I. The Likely Impact of Financial Innovation and Liberalization on HEW and Saving

Saving behavior, especially "buffer-stock" saving, is affected by the ease with which households can borrow to finance consumption or durable and house purchases. Financial liberalization and innovation in the provision of borrowing facilities to households eased these constraints in the four countries under consideration (see the Appendix). Initially, measures concentrated on relaxing controls on the ability of financial institutions to attract deposits or to satisfy the potential demand for credit. Liberalization of deposit and lending markets permits intermediaries to raise financing more cheaply and satisfy loan demand if their expected rate of return on capital justifies the extension of their balance sheets and commitment of scarce capital.

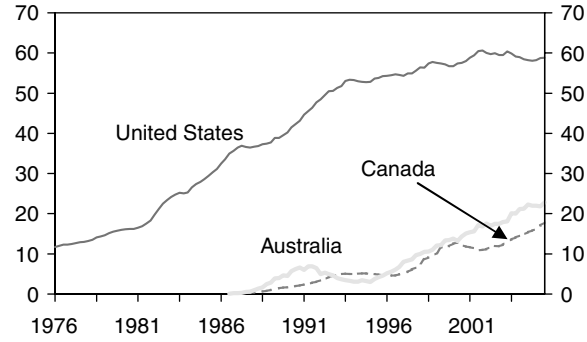
In addition, a reduction in mortgage and refinancing transaction costs can be achieved by increasing competition in loan markets (through new entrants, foreign competitors, and new technology). Competition can be facilitated by the entry of purely wholesale-financed lenders unconstrained by the sunk costs required to attract retail deposits, and by lenders originating mortgages to be securitized in pools of loans backing mortgage-backed securities (MBS). The ability of lenders to securitize mortgages (and other consumer loans) allows access to a wider range of investor capital, increases the ability of lenders to manage their capital, and so potentially reduces the cost of mortgages.[3]

One indication of the ease of entry, competitiveness, and potential for innovation in the mortgage market is the degree to which the stock of mortgages has been securitized. As illustrated in Figure 1, U.S. mortgage securitization expanded rapidly in the 1980s and 1990s so that MBS now finance about 60 percent of the U.S. mortgage stock. Elsewhere, MBS markets have grown rapidly in the past decade. The Australian market increased from about 3 percent of mortgages outstanding in the mid-1990s to about 22 percent in 2006 whereas the market in Canada grew from 4 percent to about 16 percent in the same period. Although no time series is available to show the trend, MBS were first issued in the United Kingdom in the late 1980s and accounted for 12 percent of the mortgage stock by the end of 2004 (CML, 2005, p. 6), a ratio similar to that of Canada.

In addition, advances in credit scoring techniques (through the greater availability of data on pools of borrowers and refinements in predictors of loan delinquency) have reduced default risk premiums, while search costs

[3]A possible adverse effect of securitization is to increase credit rationing for those borrowers whose characteristics do not meet the standardized criteria needed for eligibility into the pools of mortgages to be securitized.

Figure 1. MBS as a Share of Mortgages Outstanding
(In percent)



Sources: Board of Governors of the Federal Reserve System; Reserve Bank of Australia; and Statistics Canada.

have fallen through the use of the Internet to compare loan offers and competition among mortgage brokers.[4] These developments have meant that access to credit is extended to borrowers of more marginal creditworthiness, albeit at higher interest rates (Edelberg, 2006). The expansion of subprime lending, assisted by the recent growth in the issuance of securities backed by subprime mortgages, is also thought to have contributed significantly to the recent increase in home ownership in the United States (Bernanke, 2006; and Doms and Motika, 2006).

Financial innovation, competition, and technological advances should therefore have a number of effects on the housing market. First, liberalization increases the access of marginally creditworthy borrowers to loans and reduces the need for first-time buyers to save for substantial down payments.[5] Second, transaction and search costs are lowered for taking out a mortgage, refinancing it, or moving. Third, borrowing against existing collateral (for example, through home equity loans or second mortgages) should be cheaper and available to more households, thus increasing the accessibility of accumulated housing equity. As credit rationing constraints are relaxed, increasing the supply of credit for any given interest rate, both consumption and house prices are likely to rise simultaneously during a period of transition until a new equilibrium is reached. Hence, financial liberalization and innovation can itself help drive the saving ratio down, at least temporarily.

[4]See Frankel (2006) for a discussion of how the credit scores of mortgages backing nonagency MBS have declined markedly between 2000 and 2005.

[5]Frankel (2006) shows how the share of prime mortgages backing U.S. nonagency MBS issuance fell from around 50 to 25 percent since 1995 as Alt-A (near-prime) and subprime lending grew. Subprime loans constituted 9 percent of U.S. securitized mortgage debt and financed 15 percent of home sales in 2005 (JPMorgan, 2006, p. 29).

Such financial innovation should also allow greater flexibility to households to smooth consumption through times when income is expected to grow, enable households to borrow to maintain consumption when income is subject to shocks, and increase the liquidity of housing wealth relative to financial assets. Hence, one would expect mortgage innovation to lead to a higher and less volatile average propensity to consume from income, and an increase in the value of housing as an investment asset as its liquidity increases.[6] By relaxing immediate cash-flow constraints and providing greater flexibility over the interest paid in the immediate future, such changes may also soften the short-run elasticity of consumption with regard to changes in nominal interest rates. Part of this smoothing will occur through HEW.

As can be envisaged from the components of HEW (see Box 1), it is often strongly linked to the level of housing transactions and increasing housing

Box 1. Defining Home Equity Withdrawal

Home equity withdrawal (HEW) is a generic description of transactions whereby homeowners collectively reduce the equity owned in their homes. HEW can arise as the result of housing transactions, additional borrowing, or a combination of the two. HEW rises when home owners

- Exercise mortgage negative amortization options, thereby increasing their debt, or take out a mortgage with a value in excess of that of the house;
- Remortgage or refinance their existing mortgage with a higher principal;
- Take out a second mortgage or home equity loan;
- Increase their mortgage indebtedness when moving into a new house of similar value;
- Trade down to a lower value house when they have no mortgage or while maintaining their level of secured debt; or
- Sell a house, repaying any remaining mortgage, to move into rental accommodation or to realize a bequest.

Conversely, households inject equity into their holdings of housing wealth when they

- Make a down payment on a first-time purchase;
- Make amortization and additional payments on a mortgage or home equity loan;
- Remortgage, or refinance their existing mortgage, with a lower principal;
- Reduce their mortgage indebtedness when moving into a house of similar value;
- Purchase second homes and investment properties with cash; or
- Finance home improvements other than through a mortgage.

Net HEW is the difference between these two measures. When home improvements are financed through secured borrowing, there should be no impact on net HEW.

[6]Boone, Girouard, and Wanner (2001) find that financial deregulation and innovation raised the marginal propensity to consume in Canada, the United Kingdom, and the United States (Australia was not included in the sample). Borrowers may also seek to reduce interest costs by refinancing unsecured consumer credit through cheaper secured debt, especially if interest on mortgage debt is tax-advantaged relative to unsecured debt (as it has been in the United States since the Tax Reform Act of 1986).

equity because of price appreciation. Indeed, a substantial component of gross HEW has been extracted as a result of housing turnover in the United States since the mid-1990s (Greenspan and Kennedy, 2005). However, HEW has also been found to be strongly positively correlated with the degree of mortgage market completeness (Catte and others, 2004).[7] Financial liberalization and innovation make HEW easier by

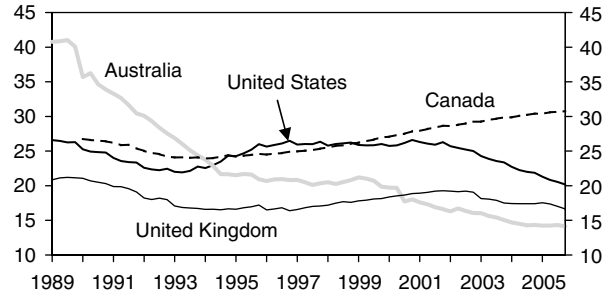
- *Reducing the delay and transaction costs of refinancing*. Innovation in credit scoring and greater competition seem to have resulted in a substantial fall in the transaction costs of refinancing.[8] As a result, households are more likely to refinance their fixed-rate loans when interest rates fall and when they wish to withdraw equity. Krainer and Marquis (2003) attribute the far higher rate of U.S. mortgage refinancing in 2001–02 compared with 1990–91—despite a similar decline in long-term mortgage rates—to the greater build-up of home equity and lower transaction costs. Lower costs also increase the ''churn'' rate on house purchases, providing more opportunities to extract equity. The average life of a mortgage in the United Kingdom fell from seven years in 1995 to three in 2004.
- *Introducing flexible mortgage terms*. A number of new mortgage products include cheap or costless options to borrow against existing equity in one's home. For instance, in Australia and the United Kingdom, ''offset'' mortgages, in which transaction balances are netted off from the borrower's mortgage debt, provide flexibility for the debt to rise as long as a degree of equity is maintained in the house. Similarly, a significant proportion of U.S. mortgages extended in 2004–05 contain negative amortization options, thus permitting the borrower to increase debt flexibly against the equity.
- *Increasing access to second mortgages and home equity loans*. Better credit scoring and mortgage originator competition have increased access to, and lowered the relative rate charged on, second lien mortgages. In the United States, this trend has also been driven by the dramatic growth in the issuance of securitized pools of home equity loans (HELs) and lines of credit (HELOCs), thus reducing their cost.[9] Since the early 1970s, when

[7]This study examined the degree to which HEW as a proportion of disposable income was related to a constructed indicator of mortgage market completeness in eight European Union countries from 1990 to 2002.

[8]In the United States, according to Freddie Mac data, as a proportion of the loan, average fees and points charged on a 30-year fixed rate mortgage fell from 2.5 percent in 1984 to 0.6 percent in 2005. Although the inclusion of zero-point loans in the sample in 1998 resulted in a fall in this data series of about 0.3–0.5 percent, there has nevertheless been a trend decline in this measure of mortgage transaction costs. Consequently, long-term interest rates need to fall significantly less than they did previously to make it worthwhile for the borrower to refinance in net present value terms (Bennett, Peach, and Peristiani, 2001).

[9]Issuance of U.S. HEL and HELOC asset-backed securities rose from $61 billion in 1999 to $515 billion in 2005 (JPMorgan, 2006).

Figure 2. Ratio of Unsecured Credit to Total Household Debt
(In percent)



Sources: Board of Governors of the Federal Reserve System; Bank of England; Reserve Bank of Australia; and Statistics Canada.

unsecured debt accounted for a third of U.S. household borrowing, there has been a trend decline in the share of unsecured to total household debt, encouraged by the withdrawal of the tax deductibility of interest on unsecured debt in 1986. This movement has been most pronounced in Australia but has recently begun to reassert itself in the United Kingdom and the United States following a cyclical upswing in unsecured credit. Canada displays a contrary tendency, with unsecured consumer borrowing growing strongly relative to mortgage debt as a result of the absence of cost-effective HEL products (see Figure 2).

- *Increasing ability to access home equity in retirement*. Although not significant in absolute amounts in any of the four countries, home equity release loans, designed for older home owners to generate income in retirement, are beginning to become more widely available and publicized.[10] Such products enable housing equity to be converted into income without the need to move out of one's home in retirement. Their existence reinforces the belief that home equity can be used as a supplement to pension savings.

Now that we have described the channel whereby financial innovation has increased the ability of households to extract home equity and reduced the cost of doing so, the question remains to what extent HEW drove down household saving, or whether lower household saving was merely correlated with other factors (such as housing transactions, financial liberalization, and house prices) that did so.

[10]Such schemes generally take one of two forms. A home reversion plan entails a home owner selling all or part of his or her home for a lump sum with the right to remain in occupation. On sale, lenders receive their equity share of the proceeds. A lifetime mortgage involves the borrower remortgaging his or her house to take a cash lump sum or annuitized income stream. Interest accumulates and is settled on the sale of the property. In the United Kingdom, roughly £1¼ billion of home reversion mortgages and home income plans were sold each year during 2003–05 (United Kingdom Financial Services Authority, 2006).

II. Data

The personal saving rate in the U.S. National Income and Product Accounts is measured as a ratio of personal saving to personal disposable income. Both saving and income are measured net of consumption of fixed capital, which represents primarily the depreciation of housing stock. The personal sector includes households and nonprofit institutions serving households. Separate accounts for the two subsectors are available for only a limited period for the United States and are not available for the other countries in this study. In addition, households appear not only as consumers and providers of factors of production, but also as producers (''unincorporated businesses''—for example, family farms). Although we are in principle interested only in the former role of the households, separation between the two is statistically infeasible, because, for example, the same assets may be used for both personal and business purposes.

The methodology for calculating personal saving in the four countries in this study is fairly similar. The only exception is the United Kingdom, where the measure used is gross rather than net saving. There are more differences in the definition of disposable income. In particular, whereas interest payments by households are subtracted before disposable income is calculated in Australia and the United Kingdom, so that personal saving equals personal disposable income minus personal consumption, in the United States and Canada some interest payments and transfers are considered to be made out of disposable income. There are also some idiosyncrasies in the treatment of pension funds. Calculating saving rates on a uniform basis for the four countries would be a complicated enterprise, probably resulting in small and stable corrections. For the United States, Canada, and Australia, we opted to use the measures used in the national accounts, which also have the advantage of being recognizable; for the United Kingdom, we subtracted consumption of fixed capital from both saving and disposable income to arrive at the net saving ratio, comparable to that of the other three countries.

HEW was calculated as the difference between borrowing secured by dwellings and net acquisition of residential assets, both from the flow of funds. For Australia and the United Kingdom, residential investment (from national accounts) net of consumption of fixed capital was used as the subtrahend, because the flow-of-funds accounts cover only financial flows. For Australia, borrowing secured by dwellings was calculated from a scaled-up series on the stock of housing debt for the household sector provided by the Reserve Bank of Australia.

Our measure of HEW for the United States is close to a widely cited estimate by Greenspan and Kennedy (2005), but is not identical because of differences in definition (in particular, Greenspan and Kennedy focus on discretionary equity withdrawal) and coverage. The Bank of England regularly publishes a measure of mortgage equity withdrawal (Bank of England, 2006), and the Reserve Bank of Australia has published its

estimates on several occasions (RBA, 2003 and 2005). The evolution of their measures over time is very close to that of ours, but levels are lower largely because they subtract gross rather than net housing investment from borrowing secured by housing.

For regressions reported in Section V, household net worth is calculated as the sum of the value of residential real estate and financial assets minus liabilities, from national balance sheets. The inflation rate is the year-on-year growth rate of the consumer price index (CPI), and the real interest rate is calculated as the nominal interest rate minus inflation. For the United States and Canada, the interest rate is the yield on a three-month treasury bill; for Australia, it is the 90-day bank acceptance rate; and for the United Kingdom, it is the three-month London interbank offer rate.

III. Trends in HEW and Household Saving Across Countries

One way to examine the link between HEW and saving is in the context of an accounting relationship between national accounts and flow-of-funds accounts. In principle, net saving should equal the increase in net assets, real or financial, although in practice the two are somewhat different, because they are estimated from different sources.[11] Figure 3 shows the decomposition of household net saving into net home equity injection (that is, the difference between net investment in housing and net borrowing secured by housing—the reverse of net HEW) and the net flow into financial assets (that is, net acquisition of financial assets minus net unsecured borrowing). One can observe substantial differences across countries.

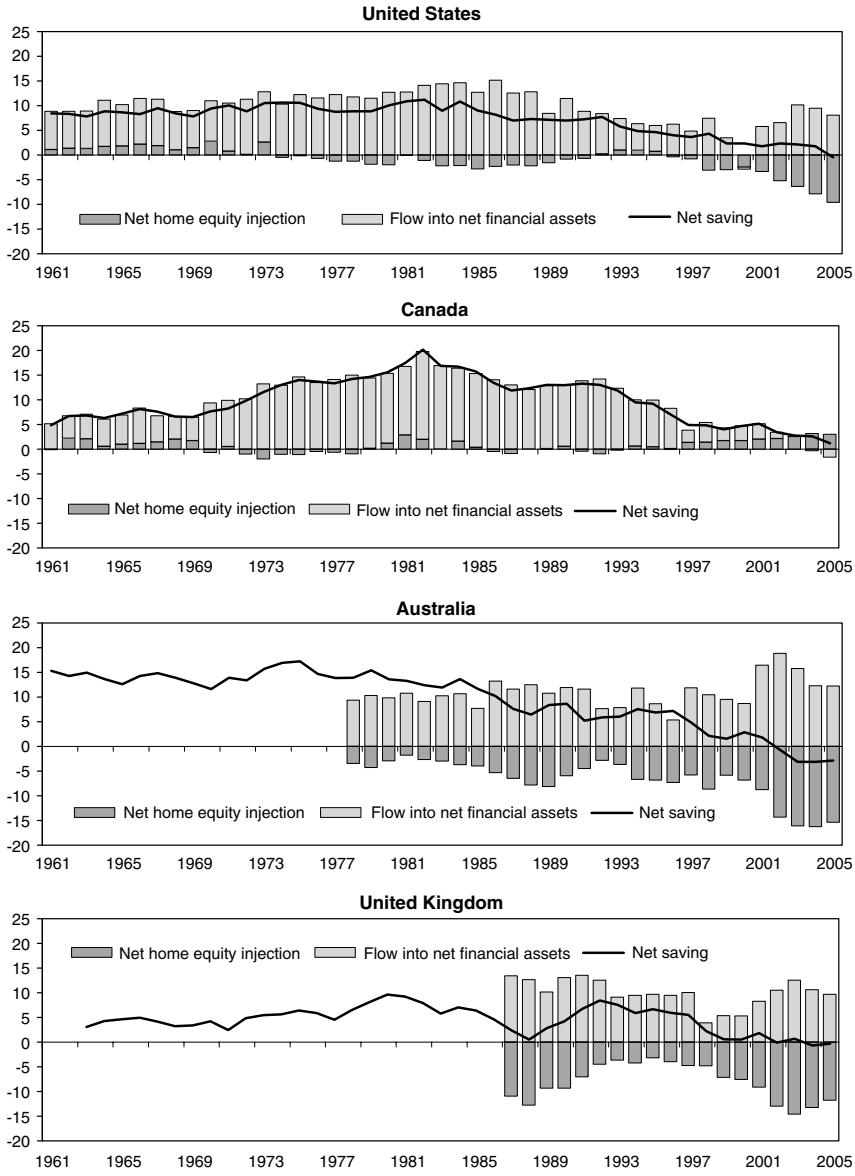
In the United States, from 1961 until the mid-1990s, HEW was fairly small relative to household income and switched from negative to positive and back again, moving generally in the same direction as the saving rate. Only in the past 10 years has a pronounced growth in HEW relative to disposable income coincided with a decline in household saving. At the same time, flows into net financial assets tended to rise, at least after the collapse of the IT bubble, giving credence to the claim that HEW was used largely for portfolio rebalancing (paying off more costly unsecured debt and moving wealth from residential into financial assets).

Canada is unique among the four countries in that it has not witnessed substantial HEW. Moreover, in the past few years home equity injection has picked up noticeably, in a development possibly related to the housing boom in western Canada. The decline in household saving has reflected diminishing flows into financial assets.

Both Australia and the United Kingdom have experienced substantial HEW in the short periods for which data are available. In Australia, since the late 1970s HEW has increased while the saving rate has declined,

[11]This analysis uses comparable definitions across countries; hence it does not necessarily reproduce national accounts definitions.

Figure 3. Uses of Net Saving by Households
(In percent of disposable income)



Sources: Federal Reserve (U.S. flow of funds accounts); Bureau of Economic Analysis (U.S. saving rate); Statistics Canada; Reserve Bank of Australia (Australian flow of funds accounts); Australian Bureau of Statistics (Australian saving rate); Bank of England (U.K. flow of funds accounts); Office for National Statistics (U.K. gross saving rate); authors' calculations.

Note: Net home equity injection is the difference between investment in housing net of depreciation and net borrowing secured on housing; flow into net financial assets is the difference between net acquisition of financial assets and net borrowing not secured on housing. Apart from statistical discrepancy, these two items should add up to net saving.

although fluctuations of the two variables have not been synchronous. In the United Kingdom, HEW and the saving rate have generally moved in opposite directions since the late 1980s. Both countries have recently experienced a sharp reduction in the rate of house price appreciation, which was associated with some decline in HEW and stabilization of the saving rate. Flows into net financial assets have not exhibited an apparent trend in either country.

IV. How Does HEW Affect Household Saving?

Two schools of thought have emerged that differ strongly in the influence on consumption they ascribe to HEW. One believes that the strong negative correlation of HEW with saving rates (particularly in the United States since the mid-1990s) indicates causation and that HEW has a substantial influence in driving consumption growth. This school expects there to be a strong impact on consumption if the U.S. housing market slows and HEW declines sharply. The other school regards any such correlation as being largely driven by independent factors that lead to rising HEW and falling saving (for example, rising income expectations or a positive house price shock). According to this line of argument, although some proceeds from HEW undoubtedly find their way into immediate consumption, the direct impact is unlikely to be substantial or long-lived. Any increase in U.S. saving as a result of a cooling housing market will arise from households' reaction to lower wealth rather than to lower HEW.

The preceding empirical literature provides mixed messages. In two cross-country Organization for Economic Cooperation and Development studies (Boone, Girouard, and Wanner, 2001; and Catte and others, 2004), HEW was found to be strongly positively associated with a high estimated marginal propensity to consume from housing wealth. Indeed, Catte and others (2004) find that HEW dominates housing wealth as a driver of consumption, with 89 percent of HEW estimated to be consumed in the United Kingdom, 63 percent in Canada and Australia, and 20 percent in the United States.

Conversely, survey evidence from home owners about their motives for extracting home equity indicates that a limited proportion is used to finance immediate consumption, although it may boost residential investment through home improvements. A 2004 survey of Australian home owners found that the bulk (72 percent) of HEW was extracted via property transactions, principally through older owners selling to younger buyers with larger mortgages. Two-thirds of HEW was used to acquire financial assets or pay off debts, with household expenditure accounting for 18 percent (RBA, 2005; and Schwartz and others, 2006). A similar picture was painted by a U.K. survey of households conducted in 2003. The majority of HEW arose from housing transactions, with the most commonly cited motives being to save or pay off other debts. Expenditure was, however, a significant reason for many of those withdrawing equity through second mortgages or

refinancing, primarily for the purpose of home improvement (Benito and Power, 2004).[12]

U.S. survey evidence for the uses of some types of HEW comes from questions posed to householders concerning the use of funds released from cash-out refinancing (Canner, Dynan, and Passmore, 2002). Within the survey period (2001–2002H1), 45 percent of those who refinanced their mortgage extracted equity, amounting to an estimated $132 billion. Of this amount, 35 percent was used on home improvements, 26 percent for the repayment of debt, 21 percent for the acquisition of real assets, and 16 percent to finance consumers' expenditure.

Although the format of these surveys differs across countries, a similar picture emerges. This is one of HEW occurring primarily through housing transactions rather than home owners independently increasing their mortgage debt, with households using the equity extracted mainly to acquire financial assets or repay other debts. Spending intentions were focused principally on home improvements (leading to no net effect on HEW) with usually less than 20 percent used to finance consumption directly. Hence, although some HEW is consumed, it appears to be used primarily as a tool for acquiring financial assets, repaying more expensive debts, or improving the housing stock.

V. Econometric Analysis

This section uses an econometric model to explore the reasons for the decline in the household saving rate and the role HEW might play, focusing on four explanatory variables: net worth as a ratio of personal income, the short-term real interest rate, inflation, and HEW as a proportion of personal income. As indicated above, rapid asset price appreciation may leave household wealth unchanged or even rising relative to income, despite a falling saving rate. In a life-cycle model, such as that of Galí (1990), an increase in wealth relative to income would induce households to increase their consumption relative to income, financing it out of wealth, and thus bring down the saving rate. The effect of an increase in the real interest rate on saving is theoretically ambiguous, as the higher reward for saving may be offset by an income effect if net financial assets are positive, but most empirical studies have found the substitution effect to dominate. Higher inflation is expected to be associated with higher saving, owing to the need for households to compensate for the erosion in the real value of their assets and to practice precautionary saving in the face of heightened uncertainty. In addition, the saving rate may exhibit a downward trend, reflecting financial market development—which relaxes liquidity constraints and reduces the need for precautionary saving—and,

[12]In addition, the Dutch National Bank surveys households in the Netherlands annually to assess their use of HEW (van Els, van den End, and van Rooij, 2005). In 2003, respondents said that increases in secured debt were used predominantly for home improvement (70 percent), followed by saving and investment (10 percent), consumption (8 percent), and repayment of other debt (6 percent).

possibly, demographic changes. HEW is included to explore the validity of claims that it may affect the household saving ratio in the short and long run.

The link between household consumption and saving behavior and household wealth, as well as other variables discussed above, is usually analyzed by estimating a consumption function in an error-correction framework (for example, Catte and others, 2004), with household income as an additional explanatory variable. Because the object of our analysis is the saving rate, we opted to use it directly as the dependent variable. Although less common, this approach has been employed elsewhere in the literature (for example, Bayoumi, 1993; and Kennedy and Andersen, 1994).

We modeled the evolution of the saving rate in an error-correction framework in which, in the long run, the saving rate is co-integrated with net worth and, potentially, the real interest rate and inflation. In the short run, the saving rate changes in response to its deviation from long-run equilibrium (the error-correction term) and, potentially, other variables. Because we are interested in the impact of HEW on the saving rate, we included it, as a percentage of household disposable income, both in the long-run and in the short-run relationships.

Our general specification takes the form

$$\Delta s_t = \alpha + \alpha_h \Delta hew_t - \gamma(s_{t-1} - \beta_n nw_{t-1} - \beta_r r_{t-1} - \beta_\pi \pi_{t-1} - \beta_t t - \beta_h hew_{t-1}) + \varepsilon_t, \quad (1)$$

where s is the household saving, *hew* is the HEW, and *nw* is the household net worth (financial and residential assets net of liabilities),[13] all measured as a ratio to disposable income; r is the short-term real interest rate; π is the CPI inflation; and t stands for a time trend. Statistical tests indicate that these variables have a unit root in level but are stationary in first differences, and that they are bound by a co-integrating relationship. Changes in cyclical variables, such as real GDP and the unemployment rate, were initially added to the dynamic equation but were found not to be significant. Annual data were used, with the estimation period being dictated by the availability of housing wealth data.

As can be seen from Table 1, in the long run the U.S. personal saving rate tends to decline when household net worth rises relative to disposable income, with a coefficient slightly greater than two cents on the dollar,[14] and rises with increases in the real interest rate and inflation. In addition, for given values of the explanatory variables, the saving rate trends down over time, probably indicating a reduction in precautionary saving as liquidity constraints were relaxed as a result of increasing completeness of financial markets.

[13]Stock variables are entered as averages of end-of-period and beginning-of-period values.

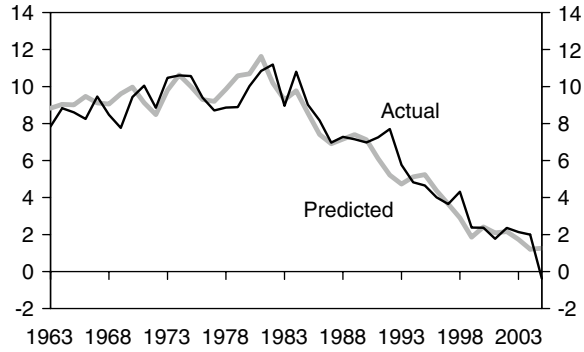
[14]This coefficient is somewhat smaller than values reported in other studies (for example, Maki and Palumbo, 2001).

Table 1. United States: Time-Series Regression Results for Household Saving

	Baseline (1)	No HEW (2)	10-Year Bond (3)	Households Only in HEW (4)	Housing and Financial Wealth Separately (5)	Liability Ratio Instead of Trend (6)	Quarterly Data (7)
Dynamics							
Error-correction term	0.868***	0.844***	0.938***	0.872***	0.866***	0.787***	0.341***
	(0.165)	(0.163)	(0.190)	(0.172)	(0.158)	(0.189)	(0.062)
Δ(HEW)	−0.157		−0.128	−0.180	−0.142	−0.130	−0.054
	(0.160)		(0.163)	(0.190)	(0.159)	(0.142)	(0.042)
Long-run relationship							
Net worth	−0.023***	−0.023***	−0.013***	−0.023***		−0.011	−0.025***
	(0.005)	(0.005)	(0.004)	(0.005)		(0.007)	(0.005)
Housing net worth					0.009		
					(0.031)		
Nonhousing net worth					−0.020***		
					(0.006)		
Real interest rate	0.372***	0.394***	0.403***	0.363***	0.313**	0.138	0.385***
	(0.087)	(0.090)	(0.100)	(0.084)	(0.120)	(0.107)	(0.101)
Inflation rate	0.377***	0.383***	0.507***	0.367***	0.354***	0.239***	0.380***
	(0.055)	(0.056)	(0.070)	(0.056)	(0.051)	(0.082)	(0.075)
Trend	−0.130***	−0.149***	−0.150***	−0.127***	−0.131***		−0.030***
	(0.019)	(0.014)	(0.019)	(0.023)	(0.019)		(0.005)
Liability ratio						−0.133***	
						(0.025)	
HEW	−0.100		−0.134	−0.134	−0.187	−0.094	−0.148
	(0.102)		(0.098)	(0.144)	(0.135)	(0.124)	(0.099)

Notes: Dependent variable is the change in the saving rate. Estimation is done by ordinary least squares and uses annual data (except for column 7) for the 1963–2005 period. All equations include a constant term and, for column 7, a lagged dependent variable. Robust standard errors are in parentheses. *denotes significance at 10 percent; **5 percent; and ***1 percent. HEW stands for home equity withdrawal.

Figure 4. U.S. Saving Rate: Actual vs. Predicted
(In percent of disposable income)



Sources: Bureau of Economic Analysis for "actual" and authors' calculations for "predicted."
Note: "Predicted" is calculated from the long-run relationship, excluding HEW (Table 1, column 2) plus a constant.

As column 1 shows, HEW is not statistically significant[15] either in the long-run relationship or in the dynamic specification, and an equation that omits HEW (column 2) has nearly identical coefficients for the other regressors. As can be seen from Figure 4, the long-run relationship does a fairly good job of tracing the saving rate over the four-decade estimation period, except for the plunge in 2005.[16]

Figure 5 demonstrates that on top of a secular downward trend, the increase in net worth had the largest impact on the decline in the household saving rate since 1990, with the remainder accounted for by lower real interest rates and inflation.

The remaining columns in Table 1 report robustness checks. Using a 10-year treasury bond instead of a three-month treasury bill rate to calculate the real interest rate, employing an alternative definition of HEW,[17] splitting household net worth into housing and financial components,[18] and

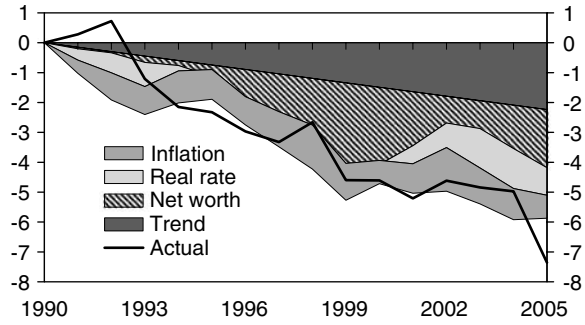
[15]White's robust standard errors are employed to assess significance levels. Use of Newey-West or unadjusted standard errors does not alter the findings.

[16]Some of the drop may reflect the effect of Hurricanes Katrina and Rita.

[17]Because the saving rate is calculated for the personal sector, our main measure of HEW also covers that sector, which includes not only households (and nonprofit organizations) but also unincorporated businesses. Our alternative measure excludes the latter. Both measures are derived using the Federal Reserve's Flow of Funds Table 10: *Derivation of Measures of Personal Saving*. A different measure can be derived from Table 100: *Households and Nonprofit Organizations*, but it tracks the first very closely and yields identical regression results.

[18]Housing net worth is the difference between the value of residential assets and loans secured by housing. Financial net worth is the difference between financial assets and unsecured debt.

Figure 5. Contribution to Change in U.S. Saving Rate Since 1990
(In percent of disposable income)



Sources: Bureau of Economic Analysis for "actual" and authors' calculations for decomposition.

Note: Decomposition is performed on the basis of the long-run relationship, excluding HEW (Table 1, column 2).

estimating the model on quarterly data[19] produced coefficients similar to the baseline, with HEW not statistically significant in the long or the short run at the 10 percent level. In addition, HEW was found to be insignificant when entered only in the co-integrating relationship or only in the dynamic equation, when the nominal interest rate was used instead of the real rate and inflation, when various combinations of the reported specification changes were tried, and when real GDP growth, the unemployment rate, or change in the unemployment rate was added to the dynamic equation.

The regression including net wealth disaggregated into housing and financial wealth (Table 1, column 5) merits highlighting. The current literature is divided on the relative influence of the two wealth channels on saving, with, for example, Juster and others (2006) and Maki and Palumbo (2001) reporting the primacy of the financial wealth, whereas Case, Quigley, and Shiller (2005) find that housing wealth is more important. In our regression, when wealth is disaggregated, the coefficient on housing net worth is close to zero and is not statistically significant, meaning that the impact of changes in financial wealth on saving is much more pronounced than that of changes in housing wealth.[20]

Despite the plausibility of financial liberalization and financial market development reducing the need for precautionary saving, capturing this

[19]The regression on quarterly data included a lagged dependent variable, because otherwise residuals exhibited mild autocorrelation. Coefficients on HEW were not significant in a quarterly regression that omitted the lagged dependent variable.

[20]One reason for that result is the high correlation between net housing wealth and HEW. Indeed, when the latter is excluded from the equation, the coefficient on the former becomes –0.016, but still remains insignificant. HEW remains insignificant in regressions in which net housing wealth is excluded and net financial wealth is used in place of net worth.

Table 2. Australia, Canada, and the United Kingdom: Time-Series Regression Results for Household Saving

	Australia	Canada	United Kingdom
Sample period	1979–2005	1968–2005	1989–2005
Dynamics			
Error-correction term	0.382	0.400***	0.317
	(0.283)	(0.107)	(0.244)
Δ(HEW)	−0.202	−0.032	−0.513**
	(0.172)	(0.306)	(0.201)
Long-run relationship			
Net worth	−0.049*	−0.030*	−0.015
	(0.028)	(0.016)	(0.030)
Real interest rate		0.777***	
		(0.191)	
Inflation rate		1.211***	
		(0.292)	
HEW	−0.439	1.025**	−0.182
	(0.542)	(0.450)	(0.569)

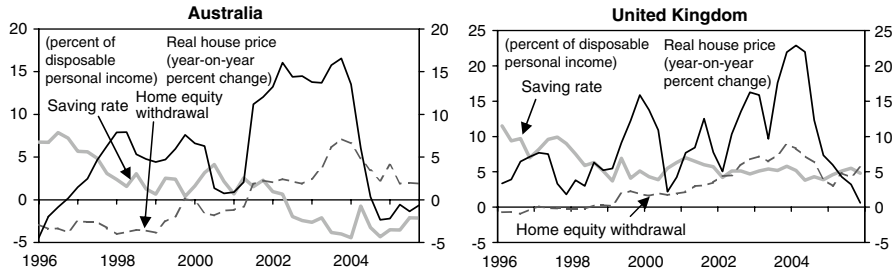
Note: Dependent variable is the change in the saving rate. The estimation is done by ordinary least squares and uses annual data. All equations include a constant term. Robust standard errors are in parentheses. *denotes significance at 10 percent; **5 percent; and ***1 percent.

process through the time trend appears somewhat crude. Unfortunately, there is no established indicator of financial market development, because innovation takes different forms at different times. One measure that has been used in the literature (for example, Kennedy and Andersen, 1994) is the ratio of household liabilities to their personal disposable income, on the premise that a more liberal financial system would allow a household to take on more debt. As reported in column 6 of Table 1, in a regression using that proxy for financial development instead of the time trend, HEW remains insignificant in the long and short run.

Results for the other countries (reported in Table 2) confirm a negative relationship between the saving rate and household net worth, with coefficients of the same order as in the United States.[21] Real interest rates and inflation were positively correlated with the saving rate in Canada, but in the relatively short time series for Australia and the United Kingdom the relationship was found not to be statistically significant. The coefficient on the time trend was not found to be significant in any of these countries, which is perhaps unsurprising given the short samples for Australia and the United Kingdom and the more limited evidence of financial innovation in Canada.

[21]The coefficient for household net worth was not statistically significant in the U.K. regressions.

Figure 6. Australia and the United Kingdom: House Prices, HEW, and Saving Rates
(In percent)



Sources: Australia: Australian Bureau of Statistics and Reserve Bank of Australia; United Kingdom: Communities and Local Government, Office for National Statistics, and Bank of England.

Note: Real house price is an official house price index deflated by CPI.

With respect to HEW, the results varied across countries. HEW was not significant in Australia, and significant only in the short run, but with a fairly large coefficient, in the United Kingdom. Canada stands out as a special case, with a counterintuitively positive and implausibly large coefficient in the long-run relationship and a small, statistically insignificant short-term coefficient. Given the small scale and limited fluctuations in HEW over time, we regard this result as most likely reflecting spurious correlations.

VI. Recent Experience of HEW in Australia and the United Kingdom: Implications for the United States

In light of concerns about the impact of the slowdown in the growth rate of U.S. housing prices, it is instructive to examine the experience of countries that have recently gone through such a slowdown; namely, Australia and the United Kingdom.

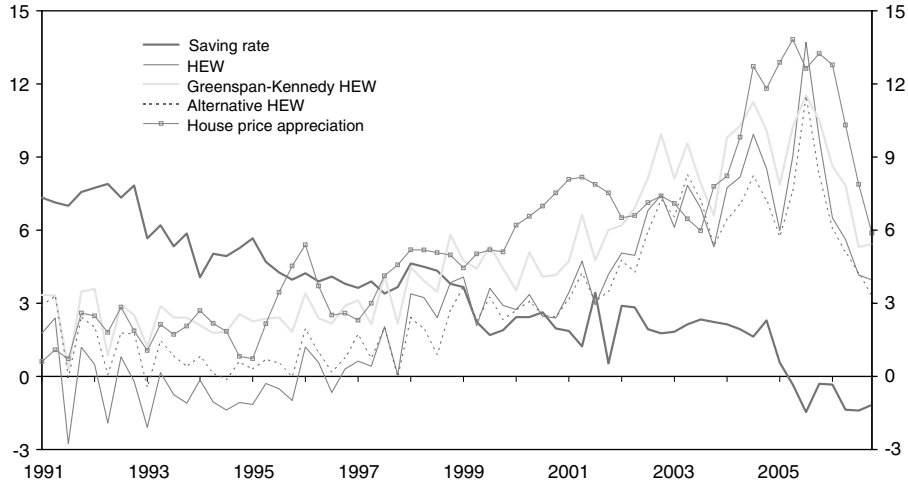
Although there was some decline in HEW[22] around the time of house price deceleration in Australia and the United Kingdom, quarterly data suggest that the rebound in the saving rate was relatively small (Figure 6) and may have reflected the wealth effect. This is broadly consistent with our regression results, finding no significant impact of changes in HEW on saving.

The latest developments in the United States are consistent with this view. As Figure 7 illustrates,[23] a dramatic decline in HEW in the United States over the course of 2006 did not push the personal saving rate up. Strong stock market growth helped to account for the robustness of

[22]The HEW series illustrated here are gross rather than net.

[23]The three measures of HEW shown in Figure 7 are our main measure, the alternative measure described in note 17, and that used in Greenspan and Kennedy (2005).

Figure 7. United States: House Prices, HEW, and Saving Rate
(In percent)



Sources: Bureau of Economic Analysis (saving rate); Office of Federal Housing Enterprise Oversight (OFHEO) (house price index); and Federal Reserve (flow of funds data for calculating HEW).

Note: The saving rate, HEW, Greenspan and Kennedy (2005) HEW, and Alternative HEW are in percent of personal disposable income. House price appreciation is a year-on-year growth rate of the OFHEO index.

consumption, particularly given the evidence that the wealth effect was more pronounced for financial wealth than for housing assets.

VII. Conclusion

The regression results reported here are consistent with earlier studies in finding that U.S. households react to an increase in their net worth and lower real interest rates by reducing their saving rate, as well as survey evidence from the United States and other countries that indicates that a relatively small proportion of HEW is spent directly. HEW was found to have no significant impact on household saving in the short or in the long run. This result indicates that the slowdown in U.S. house price growth should have an effect on the U.S. saving rate, but primarily through its effect on wealth rather than declining HEW.

The inclusion of a trend variable, intended to represent the ongoing effects of financial liberalization and innovation, was strongly significant in the U.S. regression results (although not elsewhere). This result is consistent with the view that financial innovation lowers household saving by increasing access to financial products. Another implication is that households should be able to smooth consumption more effectively over time, thereby lowering its volatility.

These results indicate that those who attributed the sharp recent fall in the U.S. saving rate to HEW were wrong. Housing affects U.S. saving behavior primarily through its effects on wealth. Financial liberalization has increased the liquidity of home equity by making its withdrawal easier, but HEW itself does not explain changes in saving rates. In that sense, U.S. housing wealth is not an "ATM."

APPENDIX

Financial Liberalization and Mortgage Product Innovation

Selected Measures of Financial Liberalization

Australia	Interest rate ceilings (1980) and other controls (1984) on bank deposits abolished. Limits on savings bank assets abolished (1982). Entry of new banks permitted, including foreign banks; abolition of exchange controls (1983). Securitization introduced (1987).
Canada	Ceiling on bank loan interest rate abolished (1967). Restrictions on bank mortgage financing abolished (1967). Bank mortgage subsidiaries permitted (1980). Securitization introduced (1987).
United Kingdom	Abolition of capital controls (1979), money supply and credit controls (1980), and minimum lending rate (1981). Banks allowed to compete with building societies (1981). Building societies allowed to diversify assets and funding sources (1986). Securitization introduced (1987). Second Banking Directive implemented (1993). First issue of covered bonds by a U.K. bank (2003).
United States	Securitization introduced (1971). Deposit interest rate cap (Regulation Q) phased out (1980–86). Elimination of thrift portfolio restrictions (1980).

Sources: Boone, Girouard, and Wanner (2001) and Commonwealth Treasury of Australia.

Recent Mortgage Product Innovations

Australia	Flexible mortgages with variable repayments. Split-purpose loans (for primary and tax-advantaged buy-to-let loans). Deposit bonds (insurance company guarantees payment of deposit at settlement). Nonconforming loans. Redraw facilities and offset accounts. New providers, including mortgage originators and brokers.

Canada	Shorter term mortgages, initial fixed-rate period shortened from five years to one year, more variable-rate loans. Skip-a-payment, early mortgage renewal, and flexible payment schedules. Easier access to subprime loans.
United Kingdom	Flexible mortgages. Offset mortgages (savings and mortgage held in same/linked accounts, with savings offset against mortgage balance). Base-rate trackers. Lifetime mortgages—equity release for retired home owners.
United States	High loan-to-value ratio loans, including second-lien "piggyback" mortgages. Flexible mortgages with variable repayment options, including negative amortization, and low teaser rates; 40- and 50-year mortgages.

Sources: Adapted from Scanlon and Whitehead (2004) and Organization for Economic Cooperation and Development (2005).

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