

First version 11 January 2002

This version 31 August 2003

HOUSE PRICE SHOCKS, NEGATIVE EQUITY AND HOUSEHOLD CONSUMPTION IN THE UK

by

Richard Disney*, Andrew Henley† and David Jevons‡

Abstract

We examine the impact of unanticipated housing capital gains on consumption behaviour during the British housing market cycle using individual household data from the British Household Panel Survey and county-level house price data. We condition the models on household real financial capital gains using Family Resources Survey data. We find a marginal propensity to consume out of unanticipated positive shocks to housing wealth of around 0.09 to 0.14, depending on specification. Among our novel findings are asymmetric behaviour between house price rises and falls, and a disproportionate impact on saving if the household had negative housing equity.

Keywords: Saving, Housing wealth, House prices, Negative equity
JEL Classification: D91, E21, R31

* School of Economics, University of Nottingham, and Institute for Fiscal Studies

† School of Management and Business, University of Wales Aberystwyth

‡ Oxford Economic Research Associates (OXERA)

Correspondence: Professor Andrew Henley, School of Management and Business,
University of Wales Aberystwyth, SY23 3DD, Wales, UK.

Te|l: +44 (0) 1970 622504, email: andrew.henley@aber.ac.uk.

The research was supported by Economics and Social Research Council funding, grant R000223349. Thanks to Martin Browning, to participants in a seminar at the Bank of Sweden, at Watson Wyatt, at the Royal Economic Society Annual Conference and the ESEM meetings in Venice for comments. The data used in this paper were made available through the UK Data Archive. The British Household Panel Survey data were originally collected by the Institute for Social and Economic Research at the University of Essex, funded by the ESRC. The usual disclaimers apply.

HOUSE PRICE SHOCKS, NEGATIVE EQUITY AND HOUSEHOLD CONSUMPTION IN THE UK

1. Introduction

The paper examines the impact of shocks to the value of housing wealth on household consumption in the UK. Unlike previous studies for the UK, which largely use aggregated data, we utilise long differences in household panel data following the basic method utilised on United States data by Skinner (1989, 1996) and Engelhardt (1996).

The paper has several findings. The central result is an average marginal propensity to consume (mpc) out of unanticipated gains in housing wealth in the range 0.09 to 0.14, depending on the specification, over the period 1993-2001. This mpc is similar to or slightly higher than previous estimates for the US based on household data. The difference probably arises from the distinction between anticipated and unanticipated changes in housing wealth.

We also have novel findings relative to the US literature. First we examine the argument that consumption responses to house price shocks are asymmetric, as also suggested by both Engelhardt and Skinner. We find the reverse result from the US evidence, namely that consumption impacts of house price changes are stronger when house prices are rising.

We also have a new result concerning ‘negative equity’ – that the elasticity of consumption with respect to house price shocks is greatest when house prices are rising for households that had zero or negative equity values in their housing stock. The straightforward interpretation of this last result is that negative equity induces precautionary saving so that house price inflation that lifts households out of negative equity induces a disproportionately large consumption response (here, an average marginal propensity to consume out of surprise gains in housing wealth for such households may be as high as 0.4).

We follow the US literature in using household survey data to obtain these results, and so our methods contrast with existing UK studies of the housing wealth-consumption relationship that have typically used time series analysis – whether at the national or regional level (Muellbauer and Murphy, 1990, 1995; Carruth and Henley, 1990a, 1990b; Miles, 1992, 1993a; Davey, 2001). However, our methods also depart from the US studies in two respects. First, we use local house price variation over time

from county-level surveys of house prices rather than self-reported values of housing wealth as our proxy for changes in household housing wealth, for two reasons. Such data can be constructed on a consistent basis in the UK, unlike the US, where regional house price data are typically too aggregated to capture local market variations. Moreover, there is a danger that self-reported values correlate with saving behaviour where no allowance is made for home improvements (data on which is not available in complete form in our data set).

Our second methodological departure is that our estimating equations allow for the accumulation (decumulation) of financial wealth through capital gains (losses) rather than relying simply on a measure of ‘active’ saving.¹ We show that, for our sample, omission of financial gains and losses (‘passive’ saving/dissaving) biases downwards the estimated mpc out of housing wealth shocks.

The plan of the remainder of the paper is as follows. The next section briefly discusses the issues and the existing literature. Section 3 describes the data sets, and how we utilise them. Section 4 describes the econometric procedures and the main results. Section 5 concludes.

2. Issues and previous literature

In the basic life cycle model of saving, increases in the value of housing wealth should increase consumption, even when there are bequest motives and borrowing constraints (Skinner, 1994). A similar story arises in the permanent income hypothesis, if housing wealth is treated as annuitisable wealth, and also in a simple ‘story’ where the household attempts to maintain a constant income-wealth ratio.² There has been discussion in the United Kingdom literature as to whether the house price boom of the mid-1980s fuelled the consumption boom in the economy at that time (Muellbauer and Murphy, 1990; Attanasio and Weber, 1994) and, more recently, as to the contribution of realised capital gains – both on financial wealth and housing wealth – to the decline in the UK household saving ratio since the mid-1990s from around 10% to less than 4% of post-tax income by mid-2000 (Davey, 2001). Similar arguments have been discussed in the United States – see, for example, Bosworth, Burtless and Sabelhaus (1991).

¹ It is inconsistent to model the impact of capital gains (losses) in housing wealth whilst ignoring capital gains (losses) in financial wealth in the calculation, particularly as there is much evidence from the US that the decline in the measured ‘active’ saving rate has been driven by rising financial wealth, especially in the equity market – see below.

² Moreover, we are here focussing on house price ‘surprises’, the impact of which on saving may differ from the impact of *anticipated* gains in housing wealth.

Housing wealth is intrinsically less liquid than financial wealth. Thus while ‘active’ saving in financial assets seems to be highly responsive to real capital gains and losses on financial assets,³ active saving may be less responsive to changes in housing wealth. Housing bequest motives may be strong, and households may be unwilling to extend their debt, or to move, in order to release housing wealth.⁴ Moreover, it has been argued that individuals partition their wealth into fungible and non-fungible ‘accounts’ as a form of self-control mechanism (Thaler, 1990). Thus the magnitude of the propensity to consume out of housing wealth, and the circumstances and types of household where the greatest response is observed, are ultimately empirical issues. Nevertheless, given that home ownership is a key form of household wealth-holding in the United Kingdom, even a small response may generate large aggregate impacts on active financial saving.

Time series evidence for the United States based on aggregate consumption and aggregate housing wealth, whether estimated as a specific consumption function or through an Euler equation, generally gives a marginal propensity to consume out of housing wealth of 0.04 to 0.05 (Peek, 1983; Bhatia, 1987; Skinner, 1994, 1996). US evidence based on household data sets gives very mixed results. Typically these studies use a self-reported measure of ‘active’ saving and a measure of self-reported housing wealth (or equity, net of mortgage) less any reported value of home improvement work, since there may be a negative correlation between active saving and the latter. For example, first differences of the Panel Survey of Income Dynamics from 1976-81 in Skinner (1989) give a positive effect of housing wealth on consumption across households, but controlling for selection of movers and allowing for taste differences seems to eliminate these effects.

There are few United Kingdom studies that provide a coefficient that can be interpreted as a ‘marginal propensity to consumer from housing wealth’. Nevertheless, Muellbauer and Murphy (1995) obtain a mpc of 0.045. Carruth and Henley (1990b) obtain estimates that imply a mpc of 0.04. Miles (1993a) obtains a simulated mpc of 0.02, but Miles (1997), using cross section data, gets higher responses but the coefficients are very unstable. (We also find that the estimated mpc on housing wealth in general, as opposed to unanticipated changes in wealth, is insignificantly different from zero.)

³ For US evidence: see, *inter alia* Gale and Sabelhaus (1999), Poterba (2000) and Dynan and Maki (2001) for recent surveys. For the UK, see Davey (2001).

⁴ Especially elderly households: see, for example, Venti and Wise (1990). But see, for the UK, Disney, Henley and Stears (2002).

A further empirical finding from the US literature is that there seems to be an asymmetry of response between gains and falls in housing wealth. One explanation for possible asymmetric behaviour in response to housing capital gains is that housing gains may be anticipated, but losses not so (Skinner, 1993). Skinner (1996) finds greater sensitivity of consumption to falls in housing wealth – indeed there is no significant effect of rising house values on consumption in his work, whereas for falls the marginal propensity to consume is 0.1. However Engelhardt (1996) gets significant responses to shocks in both directions (0.004 to 0.08 to rises, 0.04 to 0.13 for falls) albeit again with greater responsiveness to house price falls. However, results are highly sensitive to estimation method, such as the choice of treatment of outliers. To our knowledge, there are no studies of house price-consumption response asymmetries for the UK.

There is also evidence that households may respond differently to housing shocks which imply nominal wealth losses, as opposed to changes in real prices, although such studies focus primarily on the impact of nominal losses on housing mobility (Engelhardt, 2001; Genosove and Mayer, 2002). The amount of equity contained in the housing also has an effect on mobility (Genosove and Mayer, 1997). Since mobility is a major source of equity release, this is an important indirect determinant of the impact of housing wealth on consumption, with Disney, Henley and Stears (2002) finding clear differences in financial saving responses to house prices shocks between movers and non-movers among elderly households in the UK. Thus it is important to check estimated results for conditioning on movers versus non-movers, and to investigate whether there are selection effects in moving behaviour.

3. Data

We utilise household level longitudinal data on savings and holdings of financial wealth in order to identify the cross-sectional variation in house price movements on household saving behaviour over time. The British Household Panel Survey (BHPS) provides longitudinal data on “active” saving; that is non-negative transfers from current income into financial wealth. The BHPS is an annually repeated panel survey of around 5000 households resident in Great Britain to the south of the Caledonian Canal, commencing in 1991.

The precise form of the question on saving asked of each individual in the household is *“do you save any amount of your income for example by putting something away now and then in a bank, building society, or Post Office account other than to meet regular bills?”* Note that

this form of the question purges holdings of financial assets of those that arise simply because of the discreteness of the payment period. The average amount saved in this way each month over the last year is recorded. From Wave 2 onwards a similar supplementary question is asked about monthly contributions to private pension schemes. We define “active” saving as the sum of these two aggregated across all adult household members. Summary information on this saving measure for each wave from 1992 to 2001 is reported in Table 1. Just under a half of all households report some active saving. The average for those who save is £182 per month, and for all households is £84 per month. The BHPS does not ask about consumption spending, so we infer the mpcs from the estimated relationship between this measure of saving and housing gains and losses.

Turning to real housing gains and losses, we have in principle two alternative methods for calculating the real appreciation in the value of the household’s home over the period of analysis. The first is to make use of each respondent’s annual estimate of the current market value of his or her home. However this measure of housing capital gain is contaminated by expenditure on improvements and additions and by moving behaviour, both of which are likely to correlate with measures of financial saving.⁵ The BHPS provides only incomplete information on home improvement activity.⁶ An alternative approach, adopted here, is to use changes in average market value in the locality in which the household was resident at the start of the period. More precisely we use the change in the average market price of a semi-detached residence in the 1993 county of residence (out of 65 counties deflated by the UK retail price index, excluding mortgage repayments, as reported on a quarterly basis by the Halifax Bank.⁷).

Table 2 reports the distribution of real house price shocks measured in this way across the BHPS sample of owner-occupiers over the period 1993 to 2001.⁸ The average real housing gain over the full period is £35,985, although as the lower median value indicates there is some skewness in the distribution of gains. There is widespread

⁵ Home improvements (raising housing equity) may be negatively correlated with financial saving measures, if partially or wholly funded out of financial wealth. Moving will involve transactions costs, which may again be borne out of financial wealth, but may also be utilised to release housing equity, especially among older households.

⁶ Information is available where improvements and additions were financed through an additional mortgage or loan advance. There is some evidence of overestimation of house values particularly during the early 1990s when the housing market was in recession, and this further complicates the use of self-reported gains. Nevertheless, as Engelhardt (1996) notes, self-reported or perceived gains may be a more informative driver of savings decisions than actual gains.

⁷ The Halifax Bank (formerly Halifax Building Society) is the largest lender for home purchase in the UK.

⁸ The aggregate context for these changes in house prices is shown in the time series presented in Figure 1.

variation in the scale of the house price changes across households. In fact 4.1% of owner-occupiers experienced a real fall in house prices over this period. The period 1993 to 1995 was a period of slowing falling house prices after the “bust” at the beginning of the 1990s. Real losses were widespread with 87.7% of the sample experiencing a real fall in house prices. The average negative shock up to 1995 was over £2000. The period from 1995 to 2001 was one of recovery, with quite sharp rises observed towards the end of the period. 97.6% of the sample experienced real housing appreciation, and the average gain was nearly £38,000. However, as the table reveals, there was considerable variation across the sample in the scale of real gains.

Anticipated gains in house prices may not induce changes in measured saving behaviour, and so we focus on the impact on consumption of ‘surprises’ to house prices. Therefore we derive year-on-year surprises as the residuals from an AR(2) process using the county level price data for 1991-2001 with fixed effects (at the county level) and time dummies. We then use the cumulated residual as the household-specific gain or loss.⁹ Note that 94% of the variation in county level house prices is ‘explained’ by the autoregressive structure, and so the shocks are identified off the remaining 6%, and also that, by construction, the number of positive and negative house price shocks is approximately equal (whereas, as we saw, total gainers exceed total losers).

As discussed in Section 2, in order to estimate the true relationship between a real house price shock and active saving, account must be made of any correlation between the housing shock and other financial components of the household balance sheet, by controlling for the effect of “passive” saving (Engelhardt 1996) which occurs through the real appreciation or depreciation of financial wealth. This has not typically been done in studies of this kind. Unfortunately, the BHPS does not question respondents on an annual basis about levels of financial wealth.¹⁰ Consequently for information on financial wealth we use the annually repeated cross-sectional Family Resources Survey (FRS).¹¹

⁹ Most robust results were obtained using the cumulated residual from 1993 to 1999 when the housing market temporarily peaked (see Figure 1), and these are the results reported in this paper.

¹⁰ Information on financial wealth holding was gathered in wave 5, but this exercise has only been repeated in wave 10. We have cross checked out instrumented values for 2000 against the BHPS 2000 data but it should be noted that some imputation procedures using FRS may be required even given the new BHPS data (Banks, Smith and Wakefield, 2003).

¹¹ The FRS covers the same geographical area as the BHPS, and has achieved a sample for each fiscal year (April to March) of 23,000-25,000 households, since 1993/1994. The questionnaire includes detailed information on financial asset balances. Financial wealth is defined as including money left in any current account at the end of the month, the balance of any form of interest-bearing deposit or savings account and the value of stocks, shares, national savings and premium bond issues. Assets held by children in the household are also included. However it should be noted that this measure ignores the liabilities side of the household balance sheet as not information on (non-mortgage) debt is solicited.

The model estimated on FRS is a reduced form to explain financial asset holdings in terms of the demographic characteristics and economic activity status of the head of household and spouse (if present), household composition and housing tenure status. This model is used to impute financial asset holdings for each individual in owner-occupier households in the BHPS from 1993, and household financial wealth is then obtained by aggregating within households.¹² In effect therefore we construct an instrumental variable for (unobserved) financial wealth for BHPS households using the right-hand side variables as instruments.

We use data from nine available surveys up to the fiscal year 2001/2002. The Family Resources Survey is collected to inform government policy on the social security system, and the questionnaire is designed to illicit detailed information on individual level wealth within a critical wealth band of £1,500 to £20,000, with censoring outside this band. Table 3 therefore reports a tobit estimation using data pooled from all seven available cross-sections, with upper and lower censoring points imposed to coincide with the questionnaire design.

The results show that nearly all the demographic variables included have very well determined coefficients, with sensible signs and values. Liquid wealth increases with age, but at a declining rate. Wealth peaks at 59.2 years of age. Children drain financial resources, and at a higher rate as they are older. Divorce, widowhood and ethnic status each have a substantial depressant effect. The economically inactive have higher financial wealth. The achievement of a university degree is associated with substantially higher wealth. Relative to the base of outright ownership, other forms of housing tenure are associated with lower wealth, especially rental status and in particular public sector rental. Finally the data reveal, *ceteris paribus*, significant regional variations in wealth, with households in Wales fairing particularly badly and households in Scotland and Northern England also showing lower wealth (relative to the London base). The ranking of the coefficients on these regional dummy variables correlates closely and positively with average regional house prices, pointing to the dominance of a scale rather than a portfolio effect.

4. Estimating the Impact of Housing Gains on Saving

¹² The FRS survey is conducted throughout the year on a fiscal year (April to March) cycle. The BHPS is conducted in the final quarter of each year, broadly in the middle of each FRS survey period, and so FRS 1993/1994 is matched to BHPS 1994 etc.

Defining cumulative household active saving from period 0 to the current period as s_a , and household financial assets as A , then the identity relationship between the change in financial assets and active and passive saving over the same period (capital gains on holding financial wealth), s_p , for household i is as follows:

$$(1) \quad A_i - A_{0i} \equiv \Delta A_i \equiv s_{ai} + s_{pi}$$

All variables are expressed in real terms. In order to investigate the effect of housing gains on active saving we specify an estimating equation with cumulative active saving as the dependent variable and right-hand side variables in “long” differences to control for both the stock adjustment impact of the initial level of financial assets and the scale of passive saving, and to model the impact of real housing shocks:

$$(2) \quad s_{ai} = \alpha_0 + \alpha_1 \hat{A}_{0i} + \alpha_2 s_{pi} + \alpha_3 \Delta h_i + \alpha_4 \Delta h_i \cdot D_{0i}^{ne} + Z'_i \gamma + \varepsilon_i$$

where Δh_i is the real house price shock, D_{0i}^{ne} is a dummy variable to investigate the differential impact of a shock on a household initially in negative equity, Z'_i are other control variables, α_j and γ are coefficients and ε_i is an error term. $\hat{\cdot}$ denotes that the asset variable is imputed. Equation (2) as it stands cannot be estimated because we cannot directly observe or impute s_{pi} . We therefore replace s_{pi} with our imputed change in financial assets, $\Delta \hat{A}_i$, to give:

$$(3) \quad s_{ai} = \beta_0 + \beta_1 \hat{A}_{0i} + \beta_2 \Delta \hat{A}_i + \beta_3 \Delta h_i + \beta_4 \Delta h_i \cdot D_{0i}^{ne} + Z'_i \gamma' + \varepsilon'_i$$

Using the identity in (1) the underlying marginal propensity to consume from housing wealth (given by $-\alpha_3$ in equation 2) is now $-\beta_3/(1-\beta_2)$, and that for a household in negative equity (given by $-(\alpha_3 + \alpha_4)$ in equation (2) is now $-(\beta_3 + \beta_4)/(1-\beta_2)$.

Table 4 reports estimates of equation (3). All estimates are obtained using a tobit regression estimator, in order to deal with problem of the censoring of active saving at zero. The distribution of active saving across households is highly right skewed. So around 200 observations are omitted from the sample whose cumulative active saving between 1993 and 2001 is above £30,000. A disproportionate number of these are

households where the head is self-employed. We report results which show the effect of removing the self-employed from the sample. All monetary variables are converted to 1995 prices using the UK retail price (excluding mortgage repayments) index. Estimation includes control variables as follows: real household income in each year covered by the period in question, a binary variable for initial outright home ownership (i.e. no mortgage), a quadratic in the initial age of the household head, the ethnic minority status, gender and initial marital status (married/cohabiting, separated/divorced or widowed) of the household head, binary variables for a change in marital status, binary variables for the initial economic status of the household head and spouse (employed, self-employed, retired), binary variables for the retirement of the head or spouse during the period, binary variables for education to degree level of the head and the spouse, initial number of adults in the household and numbers of children in different age bands (0-2, 3-4, 5-11, 12-15, 16-18), binary variables for a head and a spouse smoker, and a binary variable for membership of an occupational (company) pension scheme.

Column (1) reports a base specification that includes the initial level of real financial assets and the real housing unanticipated gain or loss on the right hand side. As mentioned previously, the real housing gain (or loss) is modelled as a price surprise from an AR(2) regression of real house prices including fixed effects (for country differences) and year dummies. The coefficient for the effect of the real house price shock on the level of real household saving between 1993 and 2001 has the anticipated negative sign, but is not statistically significant.

However, as column (2) reveals, this estimate is biased downwards by the omission of the effect of passive saving (the change in financial assets) on active saving. Once the change in real financial assets is included the coefficient on the real housing gain rises in absolute size by over a half, although is still insignificant.

Symmetry in consumption responses

Columns (3) and (4) examine the issue of the symmetry of real housing gains and losses. In column (3) both unanticipated real housing gains and real losses attract significant negative coefficients. In column (4) we exclude those households with a self-employed head from the sample and the size and significance of the coefficients improves. This is unsurprising since it might be expected that much reported active saving by self-employed may be business-related rather than related to household consumption smoothing or precautionary purposes. The results point to a pronounced

asymmetry in behaviour. We reiterate that the house price surprise variable is constructed so that there are approximately as many gainers as losers, so this reverse asymmetry from the US results is not arising because of the smaller number of households experiencing overall real losses of housing wealth over the whole period. Households appear to reduce saving in response to unanticipated real housing gains. They also reduce saving in response to real housing losses.¹³ The estimated mpc's from losses are approximately three times as large as those for gains. (*?Why do housing losses encourage spending? ?U-shaped relationship between spending and unanticipated housing shocks?)*

Column (5) reports a two equation model in which the choice to save is separated from the amount saved (as in Cragg, 1971). Since it is difficult to conceive of variables that affect both the decision to save and the amount saved, both the probit (on the decision to save) and the truncated regression (on how much to save >0) include the same regressors. Identification rests on the assumption that the error structure in (3b) (how much to save) has a zero mean conditional on saving being positive (Melenberg and van Soest, 1996). The likelihood ratio test rejects the tobit model in favour of the two equation model, but the results suggest that the tobit estimates on the mpc out of housing wealth are not significantly biased.

Selection bias from the inclusion of mover households

The sample used so far includes both households who stay at the same address between 1993 and 2001 and those who move (at least once) during this period. House moving by owner-occupiers may be associated with significant portfolio adjustments between housing and financial wealth. Disney, Henley and Stears (2002) find significant differences in passive saving behaviour between movers and non-movers in a sample of older (over 50 years of age) households. Moving may provide a ready vehicle through which to release housing capital gains. Given this it is important to consider the question of the impact of mover-stayer selection bias on our estimates.

Column (6) re-estimates the specification in column (4) for non-movers on their own. The moving decision is identified using additional information about household composition, residence type and the size of the household relative to that of the residence in 1993, along with a dummy variable capturing a stated preference in 1993 for moving house. As the sample size information shows 68% of the 1993 sample of owner-occupiers remained at the same address through to 1999. In the specification cited here,

¹³ This is the correct interpretation as the gains and losses variables are defined as absolute amounts, i.e. the

the selectivity correction is not included as, in contrast to Disney, Henley and Stears (2002), it is not significant. The change in the coefficient for housing gains between columns (6) and (5) is very small although there is some increase in the absolute size of the coefficient for housing losses.

Households with negative equity

Households may make a greater adjustment to their saving behaviour in response to housing capital gains if those gains correspond to a reduction in household balance sheet “distress”. During the early part of the 1990s nominal house price falls were common and a significant minority of households experienced negative housing equity (i.e. their loan to house value ratio exceeded unity). The proportion of owner-occupier households in negative equity in the estimation sample in 1993 is 7%. Column (7) includes the interaction of the real housing capital gain with the initial negative equity dummy variable for the sub-sample that excludes the self-employed, again distinguishing those with negative equity by whether they faced equity gains or losses.¹⁴ The results suggest that the marginal propensity to consume from real housing gains is almost four times higher for households in negative equity, and that the interaction is significant. However, we do not observe a significant interaction effect when the household incurred equity losses. This negative equity effect seems to be a novel result in the literature.

Alternative measures of changes in housing wealth

Since much of the existing literature uses self-reported housing values, we experimented with an alternative measure of the house price surprise variable using the response to this question in the survey data. Note that, unlike some of the US literature, we are unable to adjust these self reported values for home improvements, which may correlate with financial wealth changes. Using the change in self-reported house value, however, generated a marginal propensity to consume out of housing wealth insignificantly different from zero (0.0002, s.e. 0.0036). We cannot infer from this result whether the coefficient is dampened by the combining of anticipated and unanticipated gains (losses) or whether it arises because of the correlation of gains in house values arising from home improvements that correlate with changes in financial assets.

negative sign on a real housing loss is omitted.

5. Conclusion

Macroeconomic research has suggested that personal sector spending and saving behaviour in the UK may have become closely related to movements in house prices since financial deregulation of the housing finance industry during the 1980s. Life-cycle theory would suggest that unanticipated housing gains ought to result in offsetting effects on saving, although in practice these may be small and attenuated by capital market rigidities, bequest motives and the effects of precautionary saving.

This paper has presented the first attempt at a micro-econometric investigation of this issue using British data on owner-occupier households. Our results suggest that the marginal propensity to consume from real housing gains during the past decade was between 0.09 and 0.14 for the average household, that is a £1000 unanticipated real housing capital gain may have resulted in an average £90 to £140 reduction in active saving over the period 1993 to 2001. This result is stronger than Engelhardt's (1996) estimate of an mpc of 0.03 for United States owner-occupiers over the period 1984 to 1989. The estimate is robust to a number of econometric specifications and estimates over sub-samples. *What about real losses – effects are three times larger and in opposite direction.* Furthermore we find that considerably stronger effects of real housing shocks on saving are to be found for households initially in negative equity, especially when house prices are rising. At the mean, our mpc estimates for those obtaining unanticipated housing gains from initial negative equity exceed 0.4. Finally our results suggest that households respond significantly to positive real housing wealth shocks, but negatively to unanticipated real losses. We do not find the reverse asymmetry in response that is described for North American households. Moreover, our asymmetry holds for households with initial negative equity.

These results may partially explain the observed macroeconomic correlation between house prices and consumption. In Great Britain in 1995 16 million owner-occupiers¹⁵ had housing with an average value of £79,000. The average real gain between 1995 and 2001 was close to 40%, translating to an increase in real housing wealth of £506 billion. If, say, ten per cent of this gain was unanticipated, with an estimated mpc of 0.09 this translates in to an increase in consumption of £4.6 billion, or a 1% growth over

¹⁴ Henley (1998) describes the construction of this variable for the BHPS data.

¹⁵ Source: Office for National Statistics, Housing Statistics in Great Britain, September 2000.

the 1995 total.¹⁶ This result suggests that house price changes do indeed have important impacts on the macroeconomy and that policy instruments may be required to maintain macroeconomic stability in the face of fluctuations in house prices.

Bibliography

- O. Attanasio and G. Weber (1994), “The UK consumption boom of the late 1980s: aggregate implications of microeconomic evidence”, *Economic Journal*, 104: 1269-1302.
- J. Banks, Z. Smith, and Wakefield, M. (2003), “Financial wealth and wealth dynamics among the over fifties in Britain, 1995-2000”, *mimeo*, Institute for Fiscal Studies.
- K.B. Bhatia (1987), “Real estate assets and consumer behaviour”, *Quarterly Journal of Economics*, 102: 437-443.
- B. Bosworth, G. Burtless and J. Sabelhaus (1991), “The decline in saving: some microeconomic evidence”, *Brookings Paper on Economic Activity*, 26: 313-336.
- A. Carruth and A. Henley (1990a), “Can existing consumption functions forecast consumer spending in the late 1980s?”, *Oxford Bulletin of Economics and Statistics*, 52: 211-222.
- A. Carruth and A. Henley (1990b), “The housing market and consumer spending”, *Fiscal Studies*, 11(3): 27-38.
- J. Cragg (1971), “Some statistical models for limited dependent variables with applications to the demand for durable goods”, *Econometrica*, 51, 751-763.
- M. Davey (2001), “Saving, wealth and consumption” and “Mortgage equity withdrawal and consumption”, *Bank of England Quarterly Bulletin*, Spring, 92-104.
- R. Disney, A. Henley and G. Stears (2002), “Housing costs, house price shocks and savings among older households in Britain”, *Regional Science and Urban Economics*, 32, 607-626.
- K. Dynan and D. Maki (2001), “Does stock market wealth matter for consumption?” *mimeo*, Washington: Board of Governors of the Federal Reserve System.
- G. V. Engelhardt (1996), “House prices and home owner saving behaviour”, *Regional Science and Urban Economics*, 26: 313-336
- G.V. Engelhardt (2001), “Nominal loss aversion, housing equity constraints and household mobility: evidence from the United States”, *mimeo*, Centre for Policy Research, Syracuse University, NY.
- W. Gale and J. Sabelhaus (1999), “Perspectives on the household saving rate”, *Brookings Papers on Economic Activity*, 1, 181-224.
- D. Genosove, D. and C. Mayer, C. (1997) ‘Equity and time to sale in the real estate market’ *American Economic Review* 87. June, 255-269.

¹⁶ 1995 households final consumption expenditure was £455 billion, source Office for National Statistics.

- D. Genesove and C. Mayer (2002), "Loss aversion and seller behaviour: evidence from the housing market", *Quarterly Journal of Economics* (forthcoming).
- A. Henley (1998), "Changes in the distribution of housing wealth in Great Britain, 1985-91", *Economica*, 65: 363-80.
- A. Melenberg and A. van Soest (1996), "Parametric and semi-parametric modelling of vacation expenditures", *Journal of Applied Econometrics*, 11, 1, 59-76.
- D. Miles (1992), "Housing markets, consumption and financial liberalisation in the major economies", *European Economic Review*, 36, 1093-1136.
- D. Miles (1993a) "House prices, personal sector wealth and consumption: some conceptual and empirical issues", *Manchester School*, 61, June, 33-59.
- D. Miles (1997) "A household level study of the determinants of incomes and consumption", *Economic Journal*, 107, January, 1-25.
- J. Muellbauer and A. Murphy (1990), "Is the UK balance of payments sustainable?", *Economic Policy*, 347-382.
- J. Muellbauer and A. Murphy (1995) 'Explaining regional consumption in the UK' *mimeo*, Nuffield College, Oxford.
- J. Peek (1983), "Capital gains and personal saving behavior", *Journal of Money, Credit and Banking*, 15: 1-23.
- J. Poterba (2000), "Stock market wealth and consumption", *Journal of Economic Perspectives*, 14, Spring, 99-118.
- J. Skinner (1989) 'Housing wealth and aggregate saving' *Regional Science and Urban Economics*, 19, 305-324.
- J. Skinner (1994) 'Housing and saving in the United States' 191-214 in: Y. Noguchi and J.M. Poterba (eds) *Housing Markets in the United States and Japan*, Chicago: Chicago University Press, for National Bureau of Economic Research.
- J. Skinner (1996) 'Is housing wealth a sideshow?' in D. Wise (ed) *Advances in the Economics of Aging*, Chicago: Chicago University Press, for National Bureau of Economic Research.
- R. Thaler (1990) "Anomalies: Saving, fungibility and mental accounts", *Journal of Economic Perspectives*, 4, 193-206.
- S. Venti and D. Wise (1990) "But they don't want to reduce housing equity", 13-29 in D. Wise (ed) *Issues in the Economics of Aging*, Chicago: Chicago University Press for National Bureau of Economic Research.

Table 1:
Active Saving by Households

Year	% of households with active saving or contribution towards a Personal Pension	Mean non-zero active saving (1995 £'s per month)	Mean active saving of all households (1995 £'s per month)
1992	45.0	165.63	74.55
1993	44.4	167.66	74.37
1994	45.6	169.91	77.45
1995	44.8	184.63	82.79
1996	45.2	188.95	85.31
1997	48.0	186.44	89.57
1998	48.8	191.84	93.64
1999	46.6	187.30	87.28
2000	47.2	186.38	88.00
2001	46.2	196.00	90.46
All Years	46.1	181.97	83.82

Source: computed from BHPS Waves 2 to 11, using sample household weights

Table 2:
Distribution of Real House Price Changes across Owner-Occupier Households

1995 prices	1993-2001	1993-1995	1995-2001
<0	4.1%	87.7%	2.4%
0 to 10000	20.6%	12.3%	13.5%
10000 to 20000	22.1%	-	18.9%
20000 to 30000	2.6%	-	9.5%
30000 to 40000	11.7%	-	9.9%
> 40000	39.0%		45.8%
Average change	£35,985	-£2,381	£37,862
Median change	£30,367	-£2,982	£32,847

Source: computed from BHPS Waves 3, 5 and 11 and county house price data from Halifax plc.

Table 3:
Reduced Form Model of Household Financial Assets

Dependent variable: individual financial assets	Coefficient	Standard Error
Age	170.52	5.96***
Age squared	-1.44	0.06***
Female	-211.86	30.79***
No. of adults in household	-274.36	23.35***
No. of children 0-4	27.97	41.96
No. of children 5-10	-139.01	35.76***
No. of children 11-15	-208.93	39.71***
No. of children 16-18	-223.87	66.37***
Married/Cohabiting couple	-1308.77	52.21***
Separated/divorced	-455.21	74.63***
Widowed	-184.43	69.92***
Ethnic minority	-363.88	83.91***
Self-employed	111.39	60.91*
Unemployed	-122.68	112.11
FT education/inactive	251.72	65.06***
Long term sick	-457.73	93.44***
Retired	114.67	66.30**
Degree	629.07	48.25***
Spouse with degree	210.21	64.70***
Home mortgaged	-765.42	42.83***
Home rented (private sector)	-966.85	64.79***
Home rented (public sector)	-1785.04	52.25***
Region: North	-328.32	82.98***
Yorkshire & Humber	-359.57	72.04***
North West	-372.47	67.55***
East Midlands	-450.52	70.97***
West Midlands	-512.81	60.85***
East Anglia	-234.02	84.39***
South East	-120.05	58.25**
South West	-158.20	68.22**
Wales	-495.02	87.17***
Scotland	-446.90	72.39***
Intercept	3307.59	172.83***
Year dummy 1994/1995	288.06	61.00***
1995/1996	121.00	62.03*
1996/1997	182.43	62.15***
1997/1998	206.90	62.41***
1998/1999	291.22	62.25***
1999/2000	180.18	60.94***
2000/2001	311.21	62.02***
2001/2002	276.13	60.73***
Sigma	3954.80	12.10***
N	70,660	
Log likelihood	-676546.0	

Source: computed from pooled annual Family Resource Surveys, 1993/1994 to 2001/2002

Estimation: Tobit with censoring at £1,500 and £20,000

Note: * denotes significance at 10%, ** at 5%, *** at 1%

**Table 4:
Tobit Saving Regression Estimates 1993-2001**

	(1)	(2)	(3)	(4)	(5a)	(5b)	(6)	(7)
	Tobit	Tobit	Tobit	Excluding self-employed Tobit	Excluding self-employed Cragg		Excluding self-employed and movers Tobit	Excluding self-employed and movers Tobit
					Probit (y>0)	Truncated		
A	0.609 (0.201)**	1.002 (0.220)**	1.082 (0.223)**	1.191 (0.237)**	0.22×10^{-4} $(0.69 \times 10^{-5})^{**}$	0.905 (0.247)**	1.054 (0.285)**	1.050 (0.297)**
ΔA		0.728 (0.170)**	0.759 (0.170)**	0.639 (0.180)**	0.11×10^{-4} $(0.58 \times 10^{-5})^{+}$	0.540 (0.175)**	0.536 (0.236)*	0.511 (0.243)*
House price surprise	-0.008 (0.015)	-0.012 (0.015)						
House price surprise gain			-0.034 (0.018)+	-0.047 (0.019)*	0.73×10^{-7} (0.66×10^{-6})	-0.044 (0.017)**	-0.040 (0.027)+	-0.040 (0.023)+
House price surprise gain * -ve equity								-0.167 (0.084)*
House price surprise loss			-0.109 (0.059)+	-0.149 (0.061)*	-0.22×10^{-5} (0.20×10^{-5})	-0.125 (0.053)*	-0.195 (0.082)*	-0.173 (0.103)+
House price surprise loss * -ve equity								-0.339 (0.296)
Δ real self-reported house value								
Sigma	7439.7 (134.3)**	7403.2 (133.6)**	7392.2 (133.4)**	7286.6 (138.8)**		10628.6 (443.3)**	7272.3 (170.4)**	7220.0 (171.0)**
N	1827	1827	1827	1646	1646		1112	1085
LogL	-16654.3	-16645.1	-16642.9	-14911.3	-507.9	-14222.4	-9944.9	-9717.5
LR (41)					271.4**			

mpc	0.008	0.044					
mpc gain			0.141	0.129		0.095	0.086
mpc gain (-ve equity)							0.082
mpc loss			0.452	0.414		0.272	0.436
mpc loss (-ve equity)							0.342
							1.035

Notes: Standard errors in brackets; * denotes significance at 10%, ** at 5%, *** at 1%; regressions include additional demographic and other controls as described in the text. Full results available on request. Reported coefficients are marginal effects (i.e. conditional on saving being non-negative). LR(40) is a likelihood ratio test of the Tobit vs.

Figure 1: Annual Change in Average UK House Prices 1957-2001

