How Do House Prices Affect Consumption? Evidence From Micro Data: Appendix

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1 Cohort definitions and life-cycle patterns

Panel A of Table A.1 shows the nine regional cohorts that we consider, together with the age of the head of the household in 1988 and 2000. We exclude elderly households since their consumption patterns are likely to be heavily influenced by health considerations which affect their subjective discount rate. The fact that we have regional consumption and house price data will allow us to investigate whether regional house prices explain regional consumption patterns, beyond what is explained by UK wide house prices.[3]

Panel B of Table A.1 shows the cohorts of homeowners and renters that we consider. Being able to distinguish between homeowners and renters is important for understanding the link between house prices and consumption for several reasons. First, renters are short in housing and therefore the wealth effect associated with a house price increase should be negative. Second an increase in house prices does not directly lead to a relaxation of the borrowing constraints renters face. Thus, unless the house price increase is due to improved future aggregate economic conditions, which also benefit renters, an increase in house prices should have a negative effect on the consumption of renters.

Panel B of Table A.1 reports for each cohort of homeowners and renters the minimum, maximum and mean cell size. Mean cell size is relatively small for old renters. Due to cell size considerations, when we construct cohorts based on homeownership status we cannot split cohorts further based on the region where the household lives. Homeowners and renters differ along several important dimensions. Homeowners are on average older than renters (median age of 40 as compared with 36 for renters), have larger families (mean family size of 3 as compared with 2.8 for renters), 104% greater income, and 33% greater consumption than renters.

In Figure A.1 we plot annual consumption and income, similarly to Figure 2, but with the sample restricted to homeowners. As expected, the labor income of homeowners is on average higher. Comparing the consumption profiles in Figures 2 and A.1, we can see that, for each cohort, the consumption growth of homeowners is higher than that of the population as a whole. Obviously, one needs to be careful in interpreting this finding. Homeownership is endogenous, and correlated with income

[3] Lustig and Van Nieuwerburgh (2004) use US regional data to test the extent to which borrowing against housing allows for consumption risk sharing across regions.

growth and demographic variables that may affect the growth rate of consumption.

To illustrate homeownership patterns over the life-cycle Figure A.2 plots, for the different cohorts, the proportion of renters, homeowners with a mortgage, and homeowners outright. The proportion of renters is highest early in life, but declines steadily over life to reach roughly twenty percent from age forty-five onwards. Early in life and in mid-life the vast majority of homeowners have a mortgage outstanding. Because of this one may expect that mortgage payments, and more generally the leverage of the household, affect consumption patterns.

2 Comparison of the model with the data

Table A.2 reports summary statistics from the simulated data and compares them to the BHPS data for several different age groups. The model is fairly successful in matching homeownership rates in mid- and late life, but is less successful in early life. The reason is that in the simulated data households seem to take longer than in the BHPS data to accumulate the downpayment needed to become homeowners. One possible explanation for this is that some households receive *inter-vivos* transfers from their parents to help them buy their first houses. Table A.2 also shows the average annual moving probabilities in the BHPS and simulated data. The largest differences are in the moving probability for young homeowners. Households in the model take longer to become homeowners, and are less likely to move early in life. In addition, middle-aged and older renters are more likely to move in the model than in the BHPS data. We could match the data better by assuming an age-varying probability of a forced move, or an age-varying preference for housing relative to nondurable consumption. However this would complicate the model and we proceed with the relatively simple specifications of Table A.2.

3 Moving probabilities and alternative cohort definitions

Tables A.3 and A.4 report moving probabilities from one region to another, and between rental and owner-occupied housing, by age. These tables show that young

households frequently switch homeownership status. In order to further address the issue of endogenous homeownership, we use a variable in the FES data which measures the length of time that the head of the household has lived at the present address. As a first approach, we restrict the sample to those households who have lived for more than six months at the present address. This means dropping five (fourteen) percent of homeowning (renting) households. We then construct cohorts of homeowners and renters for this restricted set of households, excluding households which changed homeownership status recently.[4]

As a second approach, we construct broader cohorts of renters, so as to include in the analysis households that switch from renters at $t-1$ to homeowners at t. Most households who switch from renting to homeowning do so early in life. Therefore, we have constructed cohorts of renters that include both renters who have lived at the present address for more than six months, and homeowners younger than 32 years of age who have lived at the present address for less than six months, i.e. the group of "new homeowners." We classify the latter as renters for the purpose of computing cohort averages. The cohorts of homeowners were defined as in our first approach to exclude recent movers, that is they include those who own a house and who have lived at the present address for more than six months.[5]

In order to investigate the extent to which the transition from renting to homeowning is correlated with house prices, and also to pick a suitable cutoff age for our definition of the new homeowners group, we have estimated the ratio of the size of the new homeowners group to the size of the renters group, for those younger than a given age. This ratio, an estimate of the transition rate from renting to homeowning, averages about 20 percent when we set the cutoff age to 32. This cutoff age maximizes the correlation between the ratio and house price changes. The maximized correlation is 18 percent, but marginally insignificant with a robust p-value just above 10 percent. The significance of the correlation decreases further when we include quarter fixed effects in the regression. Thus there seems to be some evidence that the transition from renting to homeowning is positively correlated with house price changes, but the evidence is statistically weak.

[4]Households who were renters at time $t-1$, bought the *same* house they were living in and became homeowners at t will still be included in the sample, but there are not likely to be many such households.

[5]This approach still excludes households that switch from homeowners at $t-1$ to renters at t. Identifying such households is difficult given the nature of the data available. However, since we have restricted the sample to households with head not older than 60 years of age, these households are likely to be far fewer than those switching from renting to homeowning.

Table A.5 shows estimation results for our baseline regression. Column (i) replicates the results shown in column (vi) of Table 5. Column (ii) shows the results when we restrict the sample to households who have lived at the present address for more than six months, and column (iii) shows the results when we include new homeowners as well in the cohort of renters. As can be seen from table A.3, the results in columns (ii) and (iii) are similar to those in column (i). The estimated coefficients on income changes are slightly larger, and those on house price changes slightly smaller, but they are of a similar order of magnitude. It is still the case that the effects of house prices on consumption are largest for old homeowners and smallest for young renters. Table A.6 shows that we also obtain similar results for the IV regressions and for the wealth effects of house price changes.

In this section we have used length of time at the present address to at least partially deal with the bias that may arise because of households switching homeownership status in response to house prices. In unreported results, we have used the same variable to deal with regional mobility in the definition of regional cohorts. When we restrict the sample to households who reported living at the present address for at least six months, we obtained similar results for regional cohorts.

4 Other robustness checks

We have carried out several other robustness checks which we now describe. Since the results are similar to those already reported we merely give a brief summary here. First, we have considered an expanded set of instrumental variables. In addition to the second lag of changes in consumption, income, house prices, mortgage payments, interest rate and inflation rate, we have also included the third lag of these variables. Second, we have tried to minimize the impact of measurement error by truncating the values of income and consumption changes below and above the 5th and 95th percentiles of their respective distributions, at their 5th and 95th percentile values, respectively. In addition, and bearing in mind that measurement error is more likely to be an issue for those cohorts whose quarter cell sizes are not very large, we have estimated regressions that weight observations by the inverse of cell size.

Third, we have expanded the dataset by constructing an unbalanced panel. Our baseline results use a pseudo-panel that is balanced in the sense that over the whole sample we have data on households with certain fixed birth years. But this means

that our panel is on average thirteen years older at the end of the sample than at the beginning, and by the end of the sample we have no observations on people younger than 30. This is unfortunate since we are interested in the behavior of young renters, who are disproportionately people in their 20's.

To address this issue we have added four new cohorts of homeowners/renters that enter the dataset after 1988: two with birth year between 1970 and 1974, and two with birth year between 1975 and 1979. Obviously, there are no observations for these cohorts at the beginning of the sample period. Therefore we set them to missing values and estimate an unbalanced panel. In addition to the previously included dummy variables (young/old renters and young/old homeowners), we have created two additional dummy variables: one for the youngest renters and another for the youngest homeowners. As before we interact these dummy variables with house price changes. For a cut-off age of 28 and for the baseline regression the estimated coefficients of house price changes times the dummies for youngest homeowners and renters are both negative but not statistically significant (the t statistics are around minus one). We have experimented with the cut-off age for the dummy variables for the youngest groups, but the results are not very sensitive to cut-off ages between 25 and 30. Thus we find that the effects of house prices on consumption appear to be smallest for the very young, but our estimates of these effects are not statistically significant.

If predictable house price changes influence consumption by relaxing borrowing constraints, then the effect should be weaker for households with unused borrowing capacity. We have tested this hypothesis in two different ways. First, we have restricted the sample to households that own their houses outright, without any mortgage borrowing. For some quarters and for the very young cohorts there were no owners outright, and we dropped these observations from the analysis. For this restricted sample the estimated coefficient on predictable house price changes was positive but not significantly different from zero. Second, we have used the length of time at the present address combined with the behaviour of regional house price indices to identify homeowners with positive home equity. More precisely, we have constructed cohorts restricting the sample to homeowners whose house prices have increased by at least 10%, 25%, and 50% since they first started living at their current address. The estimated coefficient on predictable house price changes decreases in size and statistical significance as we move from 10% to 25%, and then to 50%. The estimated coefficients (and t statistics) are respectively: 1.46 (2.94), 1.41 (2.61), 1.05 (1.62). Both these results are consistent with the hypothesis that the response of

consumption to predictable house price changes is related to borrowing constraints. However, there may also be a role for precautionary savings or rule-of-thumb consumption behavior, since homeowners that have benefited from moderate 10% or 25% house price increases show some response to predictable movements in house prices.

Finally, we have explored whether lagged house prices affect consumption. When we include the first lag of house price growth in the regression, the estimated coefficient is negative but insignificantly different from zero. When we include both the first and second lags of house price changes the estimated coefficients on these variables are both positive, but insignificantly different from zero. In all specifications the estimated coefficient on current house price changes remains positive and statistically significant.

Table A.1, Panel A: Regional Cohort Definition and Cell Size

Cohort	Region	Year of birth	Age in 1988	Age in 2000	Min cell size	Max cell size	Mean cell size
N1	North	1940-1949	39-48	51-60	64	160	99
N2	North	1950-1959	29-38	41-50	82	161	112
N3	North	1960-1969	19-28	31-40	58	209	105
C1	Center	1940-1949	39-48	51-60	53	120	74
C2	Center	1950-1959	29-38	41-50	51	141	79
C3	Center	1960-1969	19-28	31-40	28	159	71
S1	South	1940-1949	39-48	51-60	77	205	113
S2	South	1950-1959	29-38	41-50	94	201	124
S3	South	1960-1969	19-28	31-40	65	286	117

Note to Table A.1, Panel A: This table shows the regional cohort definitions and quarterly cell sizes. We consider three regions: North, Center and South. North: Scotland, North West, North East, Yorkshire and Humberside. Center: East Midlands, West Midlands, Wales, Eastern Anglia. South: South East, South West, London.

Table A.1, Panel B: Homeownership Cohort Definition and Cell Size

Cohort	Homeownership	Year of birth	Age in 1988	Age in 2000	Min cell size	Max cell size	Mean cell size
H1	Homeowner	1940-1944	44-48	56-60	69	166	99
R1	Renter	1940-1944	44-48	56-60	18	54	28
H2	Homeowner	1945-1949	39-43	51-55	95	209	127
R2	Renter	1945-1949	39-43	51-55	19	56	31
H3	Homeowner	1950-1954	34-38	46-50	84	185	116
R3	Renter	1950-1954	34-38	46-50	23	51	35
H4	Homeowner	1955-1959	29-33	41-45	91	192	119
R4	Renter	1955-1959	29-33	41-45	22	75	43
H5	Homeowner	1960-1964	24-28	36-40	84	226	115
R5	Renter	1960-1964	24-28	36-40	29	104	55
H6	Homeowner	1965-1969	19-23	31-35	12	206	75
R6	Renter	1965-1969	19-23	31-35	25	118	57

Note to Table A.1, Panel B: This table shows the homeownership cohort definitions and quarterly cell sizes.

Table A.2: BHPS Data and Simulated Data

Panel A: BHPS Data			
	Age Group		
	20-39	40-59	60-79
Fraction homeowners	0.61	0.78	0.66
Annual moving probability	0.17	0.04	0.03
Annual mov. prob. renters	0.23	0.07	0.04
Annual mov. prob. homeowners	0.12	0.04	0.02
Panel B: Heterogeneous discount rate model			
	Age Group		
	20-39	40-59	60-79
Fraction homeowners	0.24	0.68	0.59
Annual moving probability	0.21	0.10	0.08
Annual mov. prob. renters	0.23	0.22	0.10
Annual mov. prob. homeowners	0.05	0.05	0.07
Panel C: Heterogeneous moving probability model			
	Age Group		
	20-39	40-59	60-79
Fraction homeowners	0.26	0.76	0.63
Annual moving probability	0.20	0.09	0.09
Annual mov. prob. renters	0.21	0.17	0.13
Annual mov. prob. homeowners	0.05	0.06	0.08

Note to Table A.2: This table shows the proportion of homeowners, annual unconditional moving probability, and moving probability conditional on homeownership status, by age. Panel A shows the data from the British Household Panel Survey. Panels B and C show the results obtained from simulated data. Panel B shows the results for 70 percent of the households facing the baseline parameters shown in Table 5, and for the remaining 30 percent facing the same parameters except for a lower discount factor equal to 0.85. Panel C shows the results for 70 percent of the households facing the baseline parameters shown in Table 5, and for the remaining 30 percent facing the same parameters except for a higher moving probability equal to 0.10.

Table A.3: Regional Transition Probabilities: North (N), Center (C), South (S).

Age Group	N-N	N-C	N-S	C-N	C-C	C-S	S-N	S-C	S-S
20-24	0.960	0.029	0.011	0.000	1.000	0.000	0.000	0.000	0.994
25-29	0.992	0.004	0.003	0.008	0.980	0.008	0.008	0.011	0.981
30-34	0.993	0.002	0.005	0.005	0.990	0.004	0.003	0.007	0.991
35-39	0.991	0.004	0.004	0.000	0.990	0.008	0.002	0.006	0.991
40-44	0.997	0.001	0.001	0.003	0.990	0.005	0.001	0.003	0.995
45-49	0.994	0.003	0.003	0.001	0.996	0.003	0.000	0.004	0.996
50-54	0.998	0.000	0.000	0.003	0.992	0.003	0.001	0.001	0.998
55-59	0.998	0.002	0.000	0.000	0.998	0.002	0.000	0.004	0.996
60-64	0.997	0.002	0.002	0.000	1.000	0.000	0.000	0.006	0.992
65-69	1.000	0.000	0.000	0.003	0.997	0.000	0.001	0.000	0.998
70-74	0.998	0.002	0.000	0.000	0.997	0.003	0.000	0.000	1.000
75-79	0.996	0.002	0.002	0.000	0.998	0.002	0.000	0.004	0.996
80-84	1.000	0.000	0.000	0.000	0.988	0.009	0.000	0.002	0.998
85-89	1.000	0.000	0.000	0.000	0.990	0.010	0.000	0.000	1.000

Note to Table A.3: This table shows annual transition probabilities for households living in different regions, North (N), Center (C), and South (S), for different age groups. The data are from the British Household Panel Survey for the years 1991 to 1999. North (N): Scotland, North West, North East, Yorkshire and Humberside. Center (C): East Midlands, West Midlands, Wales, Eastern Anglia. South (S): South East, South West, London.

Table A.4: Renter (R)/Homeowner(H) Transition Probabilities

Age Group	R-R	R-H	H-R	H-H	Frac. R	Frac. H	Mean Cell Size
20-24	0.877	0.123	0.065	0.935	0.60	0.40	84
25-29	0.888	0.112	0.046	0.954	0.40	0.60	287
30-34	0.910	0.090	0.026	0.974	0.31	0.69	530
35-39	0.914	0.086	0.013	0.987	0.26	0.74	643
40-44	0.941	0.059	0.010	0.990	0.23	0.77	615
45-49	0.964	0.036	0.005	0.995	0.21	0.79	581
50-54	0.942	0.058	0.006	0.994	0.21	0.79	495
55-59	0.965	0.035	0.004	0.996	0.23	0.77	411
60-64	0.985	0.015	0.005	0.995	0.27	0.73	391
65-69	0.984	0.016	0.006	0.994	0.32	0.68	447
70-74	0.983	0.017	0.002	0.998	0.37	0.63	478
75-79	0.991	0.009	0.006	0.994	0.41	0.59	368
80-84	0.996	0.004	0.013	0.987	0.47	0.53	261
85-89	0.988	0.012	0.015	0.985	0.55	0.45	133

Note to Table A.4: This table shows annual transition probabilities from renter to renter, renter to homeowner, homeowner to renter, and homeowner to homeowner for different age groups. The table also shows the proportion of homeowners and renters. The data are from the British Household Panel Survey for the years 1991 to 1999.

Table A.5: Endogeneity of Homeownership: Benchmark Regression Results.

Independent Variable	(i)	(ii)	(iii)
Real interest rate	0.070	0.076	0.075
	(0.028)	(0.028)	(0.027)
Δy_t	0.344	0.360	0.371
	(0.032)	(0.032)	(0.032)
Δp_t	1.700	1.705	1.652
	(0.290)	(0.292)	(0.283)
$\Delta p_t \times$ Young Homeowner	-0.676	-0.636	-0.631
	(0.373)	(0.368)	(0.358)
$\Delta p_t \times$ Young Renter	-1.676	-1.827	-1.655
	(0.343)	(0.339)	(0.336)
$\Delta p_t \times$ Old Renter	-0.958	-1.097	-1.078
	(0.354)	(0.354)	(0.345)
Δm_t	0.007	0.015	0.014
	(0.098)	(0.098)	(0.095)
$\Delta m_t \times$ Young Homeowner	-0.217	-0.175	-0.179
	(0.123)	(0.122)	(0.119)
Δ Age	-0.110	-0.105	-0.089
	(0.051)	(0.051)	(0.051)
Δ Age squared	0.001	0.001	0.001
	(0.000)	(0.000)	(0.000)
Δ Ln Family size	0.152	0.165	0.178
	(0.036)	(0.036)	(0.036)
R^2	0.625	0.613	0.635

Note to Table A.5: The dependent variable is Δc_t, where c is the log of real non-durable consumption. The independent variables include the real interest rate, quarterly changes in household income, quarterly changes in house prices (Δp), quarterly changes in house prices interacted with dummy variables for young homeowners, and young and old renters, and quarterly changes in mortgage payments (Δm_t), also interacted with a dummy for young homeowners. Young (old) are those younger (older) than forty years of age. The equation was estimated using synthetic cohort techniques and data for the the cohorts of homeowners and renters. The columns differ in the way the cohorts of homeowners and renters are defined. In (i) homeowners (renters) in quarter t are those who reported being homeowners (renters) in that quarter. In (ii) homeowners (renters) are those who reported being homeowners (renters) in quarter t and who reported living at the current address for at least six months. In (iii) homeowners (renters) are those who reported being homeowners (renters) in quarter t and who reported living at the current address for at least six months. In addition in (iii) we classify as renters those who reported being homeowners who have lived at their present address for less than six months and who are younger than 32 years of age. All regressions include quarter dummies and cohort dummies (not reported). The standard errors shown in parentheses are corrected for heteroscedasticity and first order serial correlation.

Table A.6, Panel A: Endogeneity of Homeownership: IV Regressions.

Independent Variable	(i)	(ii)	(iii)
Real interest rate	0.120	0.137	0.117
	(0.069)	(0.076)	(0.073)
Δy_t	0.369	0.354	0.391
	(0.121)	(0.118)	(0.125)
Δp_t	4.164	3.822	3.533
	(0.974)	(0.919)	(0.927)
$\Delta p_t \times$ Young Homeowner	-1.354	-1.136	-1.198
	(0.868)	(0.868)	(0.872)
$\Delta p_t \times$ Young Renter	-2.791	-2.982	-2.635
	(0.821)	(0.821)	(0.839)
$\Delta p_t \times$ Old Renter	-2.377	-2.344	-2.372
	(0.829)	(0.832)	(0.838)
Δm_t	-0.669	-0.483	-0.488
	(0.260)	(0.330)	(0.330)

Table A.6, Panel B: Endogeneity of Homeownership: Wealth Effects.

Independent Variable	(iv)	(v)	(vi)
Innov. in real int. rate	0.056	0.062	0.062
	(0.028)	(0.028)	(0.028)
Innov. in income	0.355	0.379	0.390
	(0.034)	(0.035)	(0.034)
Innov. in Δp_t	1.112	1.076	1.068
	(0.328)	(0.331)	(0.321)
In. in $\Delta p_t \times$Young Homeowner	-0.348	-0.264	-0.277
	(0.429)	(0.430)	(0.417)
In. in $\Delta p_t \times$Young Renter	-1.107	-1.211	-1.057
	(0.390)	(0.387)	(0.379)
In. in $\Delta p_t \times$Old Renter	-0.411	-0.563	-0.559
	(0.399)	(0.402)	(0.390)
In. in Δm_t	-0.010	0.023	0.024
	(0.095)	(0.094)	(0.091)
In. In $\Delta m_t \times$Young Homeowner	-0.098	-0.117	-0.133
	(0.126)	(0.126)	(0.122)

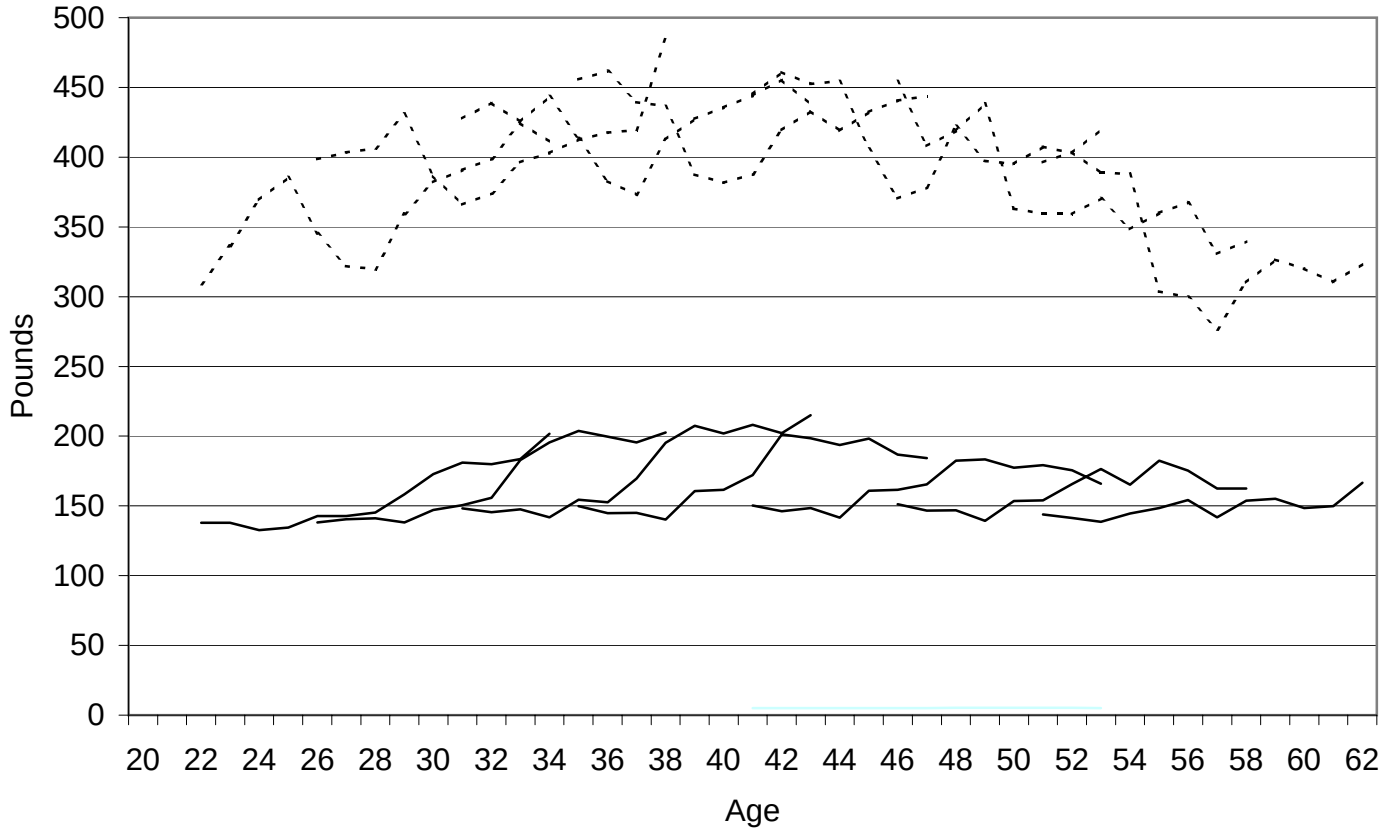
Note to Table A.6: In specifications (i) through (iii) the dependent variable is Δc_t, where c is the log of real non-durable consumption. The independent variables include the real interest rate, quarterly growth in household income, quarterly growth in house prices (Δp), also interacted with dummies for young homeowners and young and old renters, and quarterly changes in mortgage payments (Δm_t). The regressions include changes in age, age squared, changes in family size, quarter dummies and cohort dummies (not reported). The equations were estimated using synthetic cohort techniques and instrumental variables. The instruments used were the second lag of changes in non-durable consumption, income, house prices, mortgage payments, the second lag of nominal interest rates and inflation, and the second lag of changes in family size. In columns (iv) through (vi) the dependent variable is the innovation in Δc_t. The independent variables are the innovations in income, house prices, the real interest rate, and real mortgage payments obtained as the residuals of the first stage regressions in the IV estimation. The columns differ in the way the cohorts of homeowners and renters are defined. In (i) and (iv) homeowners (renters) in quarter t are those who reported being homeowners (renters) in quarter t. In (ii) and (v) homeowners (renters) are those who reported being homeowners (renters) in quarter t and who reported living at their current address for at least six months. In (iii) and (vi) homeowners (renters) are those who reported being homeowners (renters) in quarter t and who reported living at their current address for at least six months. In addition in (iii) and (vi) we classify as renters those who reported being homeowners who live at the present address for less than six months and who are younger than 32 years of age. Standard errors are shown in parentheses. The standard errors are corrected for first order serial correlation and heteroscedasticity.

Table A.7: House Size Choices in Simulated Data

	(i)	(ii)
Panel A: Dependent Variable Renter-Homeowner		
Income	0.063	0.078
	(0.004)	(0.004)
Financial savings	0.217	0.032
	(0.011)	(0.001)
Δp_t	-1.651	-2.285
	(0.345)	(0.321)
Panel B: Dependent Variable Δh_t		
Δy_t	-0.011	-0.007
	(0.002)	(0.001)
$\Delta y_t \times$ Young Homeowner	0.068	0.069
	(0.004)	(0.005)
$\Delta y_t \times$ Young Renter	0.744	0.614
	(0.010)	(0.009)
$\Delta y_t \times$ Old Renter	0.561	0.244
	(0.011)	(0.016)
Δp_t	0.084	0.063
	(0.007)	(0.008)
$\Delta p_t \times$ Young Homeowner	-0.247	-0.232
	(0.014)	(0.015)
$\Delta p_t \times$ Young Renter	-0.515	-0.469
	(0.027)	(0.030)
$\Delta p_t \times$ Old Renter	-0.391	-0.180
	(0.033)	(0.039)
Renter-Homeowner	-0.214	-0.172
	(0.006)	(0.007)

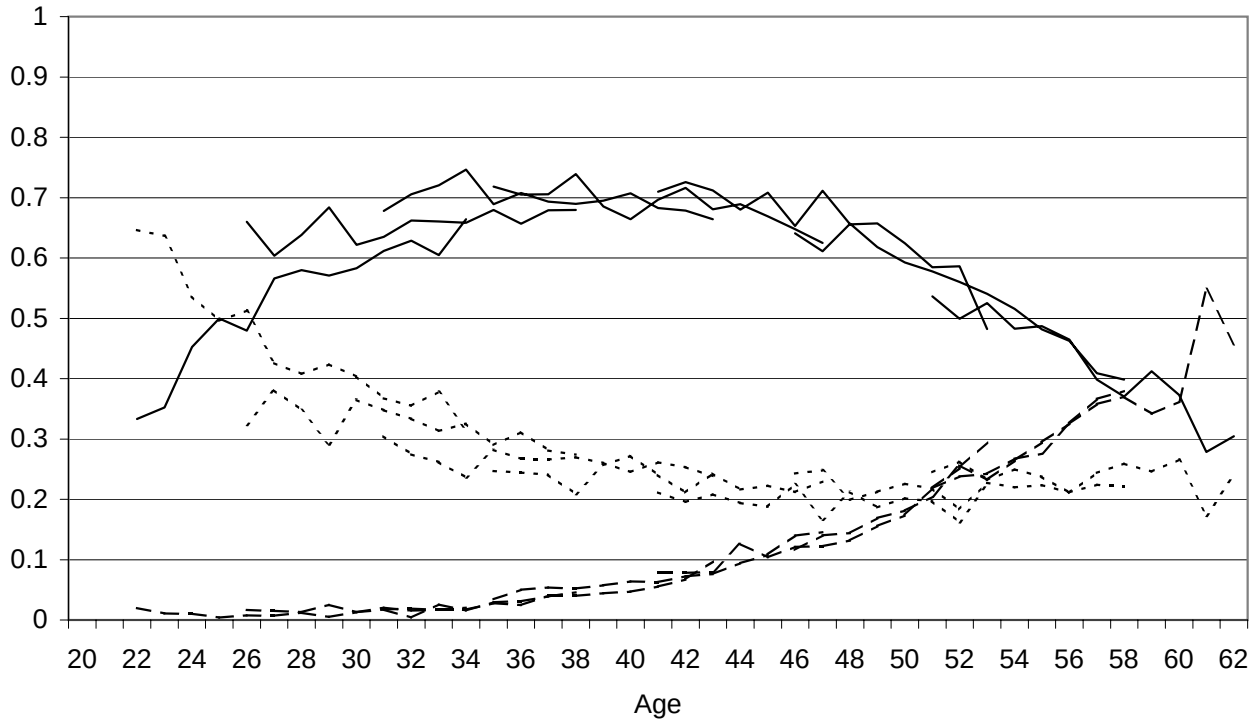
Note to Table A.7: The dependent variable in Panel A is a dummy variable that takes the value of one in periods in which the household switches from renting to owning, and zero otherwise. The independent variables include household income, financial savings, and the growth in house prices (Δp). The dependent variable in Panel B is Δh_t, where h is the log of real house size. The independent variables include the growth in household income, growth in house prices (Δp), growth in income and house prices interacted with dummy variables for young homeowners, young renters, and old renters. Young are those younger than 40 years of age. Old are those older than 40 years of age, but younger than 60 years of age. We also include as independent variables a second order polynomial of age (estimated coefficients not reported). In columns (i) the data were generated by the model with 70 percent of the households facing the baseline parameters shown in Table 5, and the remaining 30 percent facing the same parameters except for a lower discount factor equal to 0.85. In column (ii) the data were generated by the model with 70 percent of the households facing the baseline parameters shown in Table 5, and the remaining 30 percent facing the same parameters except for a higher moving probability equal to 0.10. We estimate jointly the decision to become a homewoner, and the impact of house price changes on house size. Both equations include as independent variables a second order polynomial on age.

Figure A.1: Non Durable Consumption and Income Over the Life Cycle for Homeowners



Note to Figure A.1: This figure plots log real non-durable consumption (solid line) and real income (dashed line) over the life-cycle for different cohorts, and with the sample restricted to homeowners. The data is from the UK Family Expenditure Survey. The age-cohort income and consumption were obtained by regressing consumption and income on year-cohort dummies.

Figure A.2: Proportion of Renters (dashed), Owners with Mortgage (solid), and Owners Outright



Note to Figure A.2: This figure plots the proportion of renters, homeowners with mortgage, and owners outright over the life-cycle for different cohorts. The data is from the UK Family Expenditure Survey for the years 1988 to 2000.