

Testing the Permanent Income Hypothesis for Irish Households, 1994 to 2005*

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Abstract: The Permanent Income Hypothesis (PIH) states that consumption should depend on long-term income expectations and not on temporary swings in income. This paper uses Irish household data from three *Household Budget Surveys* between 1994 and 2005 to test the PIH. Households that fail to consume their permanent income may do so because they have no access to credit or because they save, be it for a rainy day, a purchase, bequests, or simply because saving conditions are attractive. We find some evidence for credit constraints, for instance for mortgage households in arrears in the mid-1990s. Furthermore, mortgage households during the housing boom consistently consumed less than predicted by their permanent income, which may be related to planned house purchases or the Special Savings Incentive Account scheme.

I INTRODUCTION

The Permanent Income Hypothesis (PIH, Friedman, 1957) states that consumption should depend on permanent income, i.e., what a household expects to earn in steady state, and should not respond to temporary income fluctuations. If current income is above potential, this additional income should be saved; if it is below, a loan should be taken out to smooth consumption.

However, there may be circumstances in which households consume less than their permanent income. The first of these are credit constraints. If a household experiences a drop in income and is unable to secure a loan from a

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bank (be this because the bank does not think he is a good risk or because the bank is itself facing difficulties and trying to cut back on its loan book), consumption drops with actual income.

Such credit constraints are likely to have been binding for many Irish households in the recent financial crisis. Consumption has decreased by 8.8 per cent in real terms between the third quarter of 2008 and the second of 2012, suggesting that many households are unable to smooth consumption. Gerlach-Kristen (2013) provides a first analysis of the 2009/2010 HBS data that studies which groups in society were worst affected. The present paper provides a benchmark for this analysis and helps assess which households historically were most affected by credit constraints.¹

A second reason for the failure of the PIH is uncertainty. A household that fears credit constraints in the future may start saving today and in this way reduce any need in the future to cut back on consumption. Another reason is, especially for elderly households, bequest motives. Furthermore, young households may save for a larger house as their family expands. Finally, savings may also rise if the State offers special saving schemes.

This paper studies the PIH for Irish households over the period 1994 to 2005. We do so using *Household Budget Surveys* (HBSs), which are conducted by the Central Statistics Office (CSO) on a roughly five-yearly basis. In the analysis, we use the surveys from 1994-95, 1999-2000 and 2004-05.² Overall, over 30,000 households were surveyed in these three HBS waves. Which households were given the questionnaires differed from survey to survey, so that we deal with a series of cross-section data sets, and not a panel.

The HBS data allow us to ask for which households the PIH seems to hold, and where there appear to be significant savings. Given that our data cover most of the housing boom where house prices increased, we distinguish between households that own their place outright, households with a mortgage and tenants. Within each of these groups, we control for demographic characteristics, such as age and family size, employment information and financial circumstances.

Our main finding is that the PIH seems to hold for the vast majority of Irish households between 1994 and 2005. The one group that consistently saves out of permanent income are mortgage holders in the 2004-2005 survey. It seems unlikely that credit constraints or precautionary savings mattered at that time, or bequest motives, since those households tend to be young. One possible explanation is that this group of households was saving to purchase

¹ On the importance of analysing household level consumption data to forecast macroeconomic developments, see Dynan (2012).

² There were earlier surveys, but we do not present estimations for these since the range of questions covered differs.

another, larger home when their family expanded. Another explanation is that mortgage holders represent the financially more active group of Irish society. It may have been this group in particular that took advantage of the Special Savings Incentive Account scheme, which the government initiated in 2001 and under which it topped up savings by 25 per cent.

The paper is structured as follows. Section II provides a brief review of the literature and Section III describes the data. Section IV estimates consumption functions and Section V tests the PIH. Section VI concludes.

II BRIEF LITERATURE REVIEW

The literature on consumption is vast. The three classic references are Keynes (1936), Modigliani and Brumberg (1954) and Friedman (1957). Keynes (1936) argued that consumption increases as income rises, but that the marginal propensity to consume out of income decreases as income rises. Thus, households on high incomes tend to save, while households on very low incomes consume what income is available. Modigliani and Brumberg (1954) argued that consumption follows a life-cycle pattern. Young households consume more than they earn by borrowing against their future income. In middle age, these debts are paid back and savings are made, to be subsequently drawn down in old age. The marginal propensity to consume thus varies over the life cycle. Friedman (1957) posited the PIH.

A large number of papers have tested the PIH. Using macroeconomic data, Hall (1978) tested whether disposable income predicts US consumption, which does not seem to be the case. This is compatible with permanent, rather than actual income determining consumption. Using panel data, Hall and Mishkin (1982) construct permanent income by household and then evaluate how food consumption responds to deviations from this. They find a reaction to both permanent and transitory income. The literature refers to responses to transitory income as excess sensitivity (see e.g., Bernanke, 1985). Campbell and Mankiw (1990) show that the PIH holds for about 50 to 60 per cent of US households; the other households exhibit excess sensitivity.

Campbell (1987) and Leland (1968) showed that uncertainty about future income, coupled with risk aversion, is one of the reasons why people save, thus causing the PIH to break down. Tobin and Dolde (1971) argued that many households are not able to consume their permanent income because they are credit, or liquidity, constrained. Credit constraints have been studied by a number of authors (e.g., Hayashi, 1985, Zeldes, 1989, and Jappelli, 1990). Generally, they find that young households tend to be liquidity constrained, as are those with poor education, without work and with little wealth. Deaton

(1991) showed that in the presence of liquidity constraints, consumers will save to create a buffer stock of assets that can be used later on to finance consumption expenditure if income declines and the constraints begin to bind. Bacchetta and Gerlach (1997) show in a cross-country study that credit constraints seem to vary over time and affect consumption.

Not surprisingly given the housing boom before the financial crisis, the literature on Irish consumption has focused on the effect of housing wealth. The literature on wealth effects goes back to Ando and Modigliani (1963) and has in recent years found much interest internationally. A non-exhaustive list of authors includes Benito and Mumtaz (2006) for the UK; Duca, Muellbauer and Murphy (2011) for the US and Slacalek (2009) for a cross-country study. For Ireland, Hogan and O'Sullivan (2007) find that housing wealth has a transitory effect on consumption. Lydon and O'Hanlon (2012) also consider crisis data and show that more housing wealth increases the marginal propensity to consume and raises expenditure through equity withdrawal effects. We add to the Irish literature by going back to basics and examining the PIH.

III THE DATA

Since the Irish property bubble may have affected house owners' consumption in a different way from mortgage holders' and tenants' consumption, we distinguish in the analysis between three types of households.³ In 1994-1995, these represented 46 per cent, 36 per cent and 18 per cent of all households, respectively. These proportions changed to 48 per cent/35 per cent/17 per cent in the 1999-2000 survey and to 49 per cent/33 per cent/18 per cent in the 2004-2005 data.

Table 1 reports for each household group the data we use in the regressions below. If the characteristic in question is a dummy variable, like "gender of household head", we list the population average. For the other variables, we report the median value. Finally, we drop the top and bottom 1 per cent of observations for consumption and income.⁴

³ We include households that do not pay rent but do not own a house outright or with a mortgage, either, in the tenants group.

⁴ In the regressions, we use all consumption observations since any outliers are absorbed by the residuum. For income, we use the censored variables. The rejections of the PIH we report do not depend on this censoring. However, if we use the uncensored income data, we also reject the PIH for young owner and tenant households in the 1999-2000 sample and for tenants receiving a lot of State transfers in 1999-2000. These findings suggest credit constraints were binding in those circumstances, too.

Table 1: Variables Used (Values for 1994-95 / 1999-2000 / 2004-05)

	Minimum		Maximum		Population Median (average per cent for 0/1 Dummies)	
	Outright Owners	Mortgage Holders	Tenants	Outright Owners	Mortgage Holders	Tenants
Consumption (€)	52/67/75	1,189/1,592/2,239	281/412/485	506/707/909	227/390/568	
Disposable income (€)	64/88/134	1,160/1,932/3,148	244/364/517	428/636/1,029	199/322/499	
<i>Demographics</i>						
Age group	0 (15-24 years)	6 (75 years plus)	5/5/5 (65-74 years)	2/2/2 (35-44 years)	2/2/2 (35-44 years)	2/2/2 (35-44 years)
Household size	1	11	2/2/2	4/4/3	3/3/2	3/3/2
Household members below 14 years of age	0	7	0/0/0	1/1/0	0/0/0	0/0/0
Gender household head	0 (male)	1 (female)	26/33/41% female	16/22/35% female	41/48/53% female	
HHH education	0 (no formal education)	6 (higher university degree)	1/2/2 (primary/junior/junior certificate or equivalent)	2/2/3 (junior/junior/leaving certificate or equivalent)	2/2/2 (junior certificate or equivalent)	
HHH social group	0 (managerial)	10 (unclassified)	6/4/5 (semi-skilled/non-manual/manual skilled)	6/3/3 (semi-skilled/lower professional/lower professional)	8/4/5 (own account worker/non-manual/manual skilled)	
<i>Employment</i>						
Farmer	0	1	17/11/9% farmers	3/3/2% farmers	1/1/0% farmers	
Time in unemployment for those unemployed	0	60 years plus	3/2/2 weeks	3/2/4 weeks	2/3/4 weeks	

Table 1: Variables Used (Values for 1994-95/1999-2000/2004-05) (Contd.)

	Minimum		Maximum		Population Median (average per cent for 0/1 Dummies)		
	0 (if support, less than 20% of income)	10 (entire income is State transfer payments)	2/0/2 (20 to 30% less than 20%/20 to 30% of income)	0/0/0	0/0/0	2/2/2 (20 to 30% of income)	Tenants
State transfer payments	0	10	2/0/2	0/0/0	0/0/0	2/2/2	0/0/0
<i>Financial Variables</i>							
Number of non-mortgage loans	0	9	0/0/0	1/1/1	0/0/0	0/0/0	0/0/0
Mortgage payment/disposable income	0	99/102/137%	n/a	11/10/10%	n/a	n/a	n/a
Arrears	0	1	n/a	12/6/2%	n/a	n/a	n/a

Note: Income and consumption in current year euro equivalents. Disposable income includes asset and property income.

In the first line, we show consumption data. The “Minimum” column shows that minimum consumption increased nominally from €52 in the 1994-95 survey to €75 in 2004-05 (taking into account inflation, consumption in 1994-95 was €72 in 2005 prices). Maximum consumption increased from €1,889 (€2,608 in 2005 terms) to €223. While the minimum and maximum consumption barely moved in real terms, the median consumption expenditures by tenure type show a clear increase. Outright owner households consumed €281 (€388 in 2005 prices) in the first survey and €485 in the third; mortgage holders €506 (€698 in 2005 prices) in 1994-95 and €909 in 2004-05; and tenants consumed €227 (€313 in 2005 prices) and €568 respectively. Incomes show similar increases. Interestingly, consumption exceeds income for all tenure types in the 1994-95 and the 1999-2000 surveys. This may reflect expected future income growth during the early years of the Celtic tiger.

In terms of demographics, the head of an outright owner household tends to be from the 65-74 years age bracket for all three HBS vaces, while the other median household heads are from the 35-44 years bracket. Outright owners tend to live as a couple with no children in the household, while mortgage holders tend to live as a couple and have children. Tenant households initially had three grown-up household members. That said, household sizes have shrunk over the sample, and female household heads have become more common. Mortgage holders tend to be best educated and come from more skilled social groups.⁵

Turning to employment and financial data, most farmers own their house outright. Unemployment shows no clear pattern by tenure type, with the typical length of unemployment spell between 2 and 4 weeks. State transfer payments for the median outright owner and the median tenant household make up 20 to 30 per cent of total income, while the median mortgage household is not in receipt of such payments. Only the median mortgage household holds non-mortgage loans.⁶ The size of the mortgage payment relative to income is stable across the three surveys at about 10 per cent. Arrears were most common in 1994-95, with 12 per cent of the mortgage households not having made a payment the previous month. This number fell to 6 per cent in 1999-2000 and to 2 per cent in 2004-05.

⁵ I thank the referee for pointing out that we treat these categorical variables into cardinal ones in the regressions, thus implicitly assuming that the different categories are equidistant and relate linearly to consumption. We did run robustness checks coding the different education and class categories as dummy variables. However, the adjusted R^2 declined, if anything.

⁶ Glick and Lansing (2010) show how high growth rates in household debt between 1997 and 2007 correlate with declines in consumption in 2008 and 2009. Ireland is the country in their sample with the largest debt growth and the steepest decline in consumption. Walshe and O’Leary (2012) review Irish households’ net wealth and the need for deleveraging. For international analyses on deleveraging, see McKinsey (2010), Isaksen, Kramp, Sørensen and Sørensen (2011) and IMF (2012).

We next turn to the regression analysis and assess how consumption depends on permanent income and other household characteristics. Based on these results, we show in Section V by which households the PIH is rejected and why.

V CONSUMPTION FUNCTION ESTIMATES

To test the PIH, we need to estimate how consumption responds to different levels of permanent income. While the existing literature typically estimates permanent income using the time-series dimension of panel household data, following this approach is not possible for Irish data: the HBSs are repeated cross-section surveys, with a new set of households interviewed in each wave.

To obtain a measure of permanent income, we instrument actual disposable income in our regressions with variables that should be related to permanent earnings but have no separate impact on consumption. Preliminary regressions suggest that disposable income is higher if the household head comes from a high social class and is male. In particular, managerial jobs are clearly associated with higher incomes than for instance unskilled manual occupations. Similarly, gender income gaps are a widely documented fact both internationally and over time. The Appendix reports that these variables are highly significant in explaining disposable income. It also shows that a test for their exogeneity in the consumption equation does not reject.⁷ It thus seems that consumption does not differ depending on the social class of the household head or his/her gender. Using these variables as instruments thus appears appropriate.

It should, however, be noted that this approach only allows us to identify what we expect a household to earn given what other households with the same household head gender and social class tend to earn. We thus only make use of cross-sectional data, neglecting the time-series dimension. We do this because the HBSs are a series of cross-sectional data sets and not a panel. Typically, the literature computes permanent income as the average income for one household or household type over time. Lacking this information, making use of the cross-sectional dimension seems the best option available to compute what a household might expect to earn.

⁷ Compatible with this, Beznoska and Ochmann (2012) find that income is related to the gender of the household head, but argue that different consumption levels of households with a male or female head most likely is due to the income differences rather than the gender itself.

To analyse to what extent consumption responds to our measure of permanent income, we start from the general specification

$$C_j = \alpha Y_{perm,j}^\beta,$$

where C_j is the consumption of household j , $Y_{perm,j}^\beta$ is permanent income and β the marginal propensity to consume (MPC) out of permanent income. The PIH predicts that $\beta = 1$. Taking logarithms yields

$$c_j = \alpha + \beta y_{perm,j}^\beta,$$

where $\alpha = \log(\alpha)$. We estimate this regression using disposable income, $y_{disp,j}$, but instrument it with social class and gender of the household head to capture permanent income. Furthermore, we allow α and β to differ across households according to demographics, employment situation and financial circumstances. We thus estimate a consumption function of the form

$$c_j = \alpha_0 + \sum_{dem} \alpha_{dem} + \sum_{emp} \alpha_{emp} + \sum_{fin} \alpha_{fin} + (\beta_0 + \sum_{dem} \beta_{dem} + \sum_{emp} \beta_{emp} + \sum_{fin} \beta_{fin}) y_{disp,j} \quad (1)$$

The summation signs indicate that there are several variables each capturing demographics, the work and the financial situation.

Table 2 shows the estimation output. In interpreting the results, it is important to note that the baseline household in this regression falls in the youngest age bracket (15-24 years), is single, employed and without formal education. The top panel of Table 2 reports the shift factor estimates (α), the bottom the MPC (β). We find that few of the shift factors are significant. Generally, if we estimate a negative shift factor for one household characteristic – e.g., age for the owner group in 1994-95 – then we estimate a positive impact of this same characteristic on the MPC, or vice versa. Thus, the relationship between the age of the household head and consumption is not linear. Being young generally pushes down consumption, but this effect is weaker, the higher the income of this young household, and reverses for high incomes.

Comparing the different tenure groups, we find fewest significant household characteristics for the tenant group. It thus seems that consumption in this group is rather homogenous. For owners, age, education and unemployment length seem to affect consumption, whereas mortgage households' consumption apparently responds to the number of children, education and the farmer dummy. The arrears dummy is significant in the 1994-95 HBS wave.

Table 2: Consumption Function Estimates

Tenure	Owner				Mortgage				Tenant			
	1994-95	1999-2000	2004-05		1994-95	1999-2000	2004-05		1994-95	1999-2000	2004-05	
HBS wave												
Constant	2.199**	1.465	3.687**		-2.551	-0.533	-0.774		-1.662	0.946	0.206	
Age	-0.358**	-0.594**	-0.830**		-0.097	-0.256	-0.107		0.184	-0.150	-0.017	
Size	0.299	-0.446	-0.921		0.894**	0.035	0.459		0.219	0.242	0.558	
Under 14	-0.936**	-0.213	-0.202		-0.728**	0.104	-0.863*		-0.023	-0.417	-0.689*	
Education	0.192	0.550***	0.552***		0.131	0.388**	0.552***		0.398	0.286	0.142	
Farmer	0.221	-1.434	-1.005		3.951	6.106***	2.997**		-4.689	57.553	-7.452	
Transfers	0.007	0.019	-0.255		0.379*	0.308	-0.028		0.120	-0.010	-0.192	
Weeks unemployed	0.079***	0.320*	0.007		0.047	0.005	-0.002		-0.129	0.039	-0.047	
Loans	0.205	0.108	0.549		0-0.061	0.579*	0.713**		0.464	-0.209	0.609	
Mortgage payment	n/a	n/a	n/a		0.097	0.029	0.030		n/a	n/a	n/a	
Arrears	n/a	n/a	n/a		3.264***	-0.111	0.698		n/a	n/a	n/a	
Constant	0.566***	0.757***	0.421		1.373***	1.027***	1.044***		1.308***	0.831***	0.944***	
Age	0.059**	0.094**	0.122**		0.020	0.045	0.019		-0.044	0.018	-0.002	
Size	-0.028	0.073	0.139*		-0.131**	0.004	-0.052		-0.026	-0.028	-0.078	
Under 14	0.141**	0.037	0.028		0.108*	-0.022	0.117*		-0.010	0.058	0.098*	
Education	-0.025	-0.086***	-0.082***		-0.020	-0.058**	-0.078***		-0.068	-0.040	-0.018	
Farmer	-0.056	0.207	0.127		-0.660	-0.948***	-0.445**		0.906	-10.783	1.075	
Transfers	-0.022	-0.000	0.047*		-0.073*	-0.054	0.007		-0.024	0.000	0.035	
Weeks unemployed	-0.013***	-0.055**	-0.001		-0.007	-0.001	0.000		0.023	-0.006	0.008	
Loans	-0.025	-0.016	-0.075		0.015	-0.082	-0.098**		-0.077	0.040	-0.083	
Mortgage payment	n/a	n/a	n/a		-0.015	-0.002	-0.002		n/a	n/a	n/a	
Arrears	n/a	n/a	n/a		-0.556***	0.034	-0.117		n/a	n/a	n/a	
Adjusted R ²	0.700	0.601	0.580		0.621	0.620	0.543		0.730	0.531	0.689	
Observations	3,408	3,620	3,108		2,784	2,619	2,371		1,350	1,127	1,053	

Note: TSLS estimates of equation (1), White standard errors. ***/**/* denotes significance at the 10/5/1 per cent level.

The main coefficient we are interested in is of course the MPC. For the baseline household (young, single, employed, no formal education) this coefficient is significant in eight of the nine regressions. The MPC is sometimes estimated to be larger than unity, and sometimes smaller. However, few households in Ireland have the characteristics of this baseline household, and as the significant interaction terms of household characteristics and income indicate, deviations from this baseline can affect the MPC. We, therefore, next test the PIH for different household characteristics.

V TESTING THE PERMANENT INCOME HYPOTHESIS

Table 3 shows the MPC we estimate for the median households of the different tenure types and HBS waves (the median household characteristics are those reported in Table 1). The confidence bands we estimate are rather broad, so that in general the power to reject the PIH is small. Indeed, it is rejected only once: mortgage households seemed to consume less than their permanent income in 2004-05. We return to this finding below. For all other median households, the PIH is not rejected. Before the current financial crisis, households in Ireland thus mostly seem to have been able to smooth consumption over temporary drops in income.

Table 3: *Marginal Propensities to Consume of Median Household by Tenure Type and HBS Wave*

	<i>Owner</i>	<i>Mortgage</i>	<i>Tenant</i>
1994-1995	0.777 [0.401-1.153]	0.811 [0.494-1.127]	0.957 [0.390-1.523]
1999-2000	1.202 [0.899-1.506]	0.894 [0.662-1.126]	0.730 [0.434-1.026]
2004-2005	1.241 [0.859-1.623]	0.569 [0.322-0.815]	0.819 [0.464-1.174]

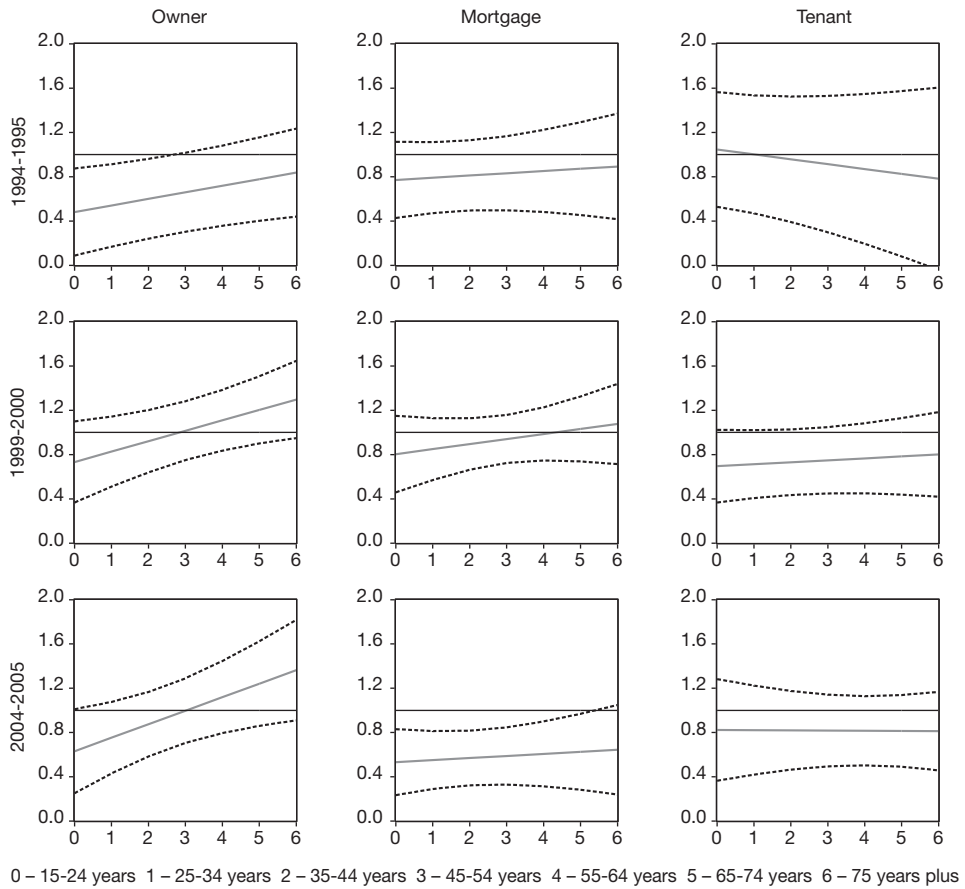
Note: MPC point estimates (95 per cent confidence band). Median household characteristics from Table 1.

To assess how the MPC changes if we vary, for instance, the age of the household head, we present in Figures 1 to 5 the estimated MPC by variable.⁸ Apart from the characteristic whose impact we study, we hold all other values at the median value for the respective household group and HBS wave.

⁸ In the main text, we only present tests for those variables where the PIH is rejected twice (it always rejects for some mortgage households in the 2004-05 wave). The remaining tests are shown in the Appendix.

Figure 1 shows the impact of age. The first column in Figure 1 presents how the MPC changes for owner households as we increase the age of the household head. The top plot shows the MPC for the 1994-95 HBS, the middle one that for the 1999-2000 survey and the bottom plot that for the 2004-05 HBS wave. We plot the estimated MPC as a solid line; the dashed lines trace out the 95 per cent confidence band. The horizontal line at one indicates the unit MPC postulated by the PIH. Whenever it falls outside the confidence band, we reject the PIH. The second and third columns show the estimated MPC for mortgage and tenant households.

Figure 1: *Marginal Propensity to Consume for Increasing Age of the Household Head*

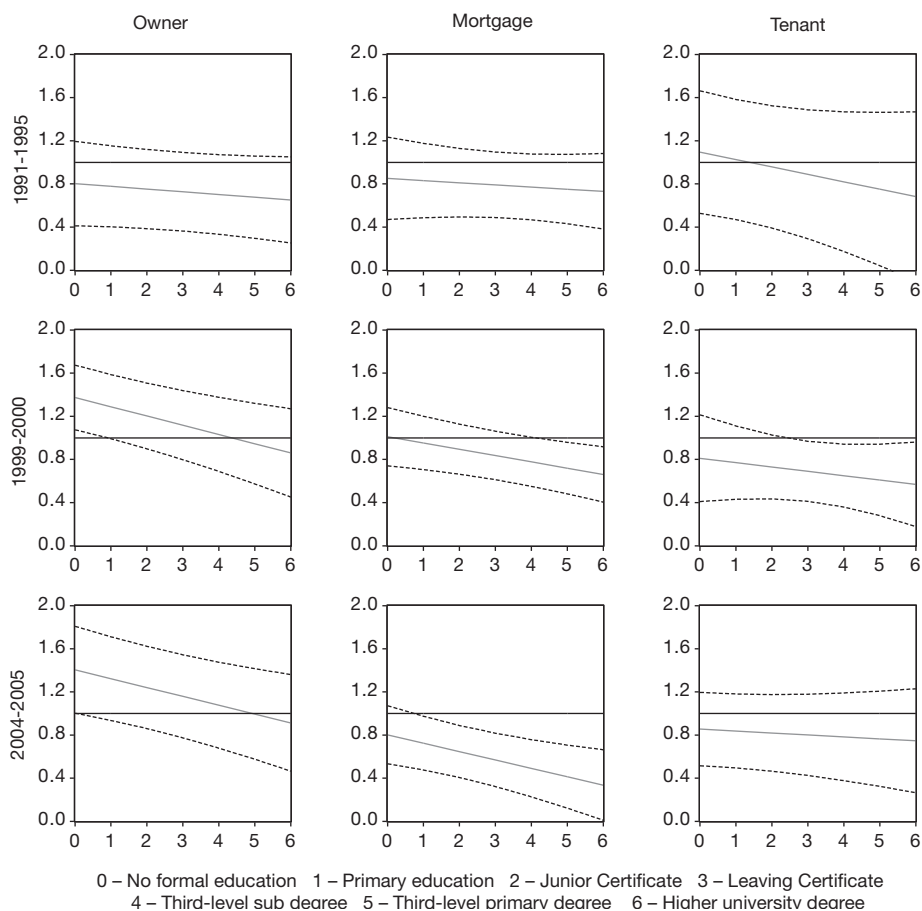


Note: All variables but “age” held at median for tenure type and HBS wave (values in Table 1). Dotted lines traced out the 95 per cent confidence band.

The figure shows that the PIH is rejected for young households (age of head 15 to 44 years) that own their place in the 1994-95 HBS wave and for all ages of mortgage holders in the 2004-05 HBS wave. These households apparently saved some of their permanent income. For all other household types and HBS waves, changes in age do not lead to the rejection of the PIH.

Figure 2 tests the PIH for different education levels of the household head, Figure 3 for the farmer dummy and Figure 4 for the number of non-mortgage loans. Figures 5 shows – for mortgage households only – the MPC for the arrears dummy.

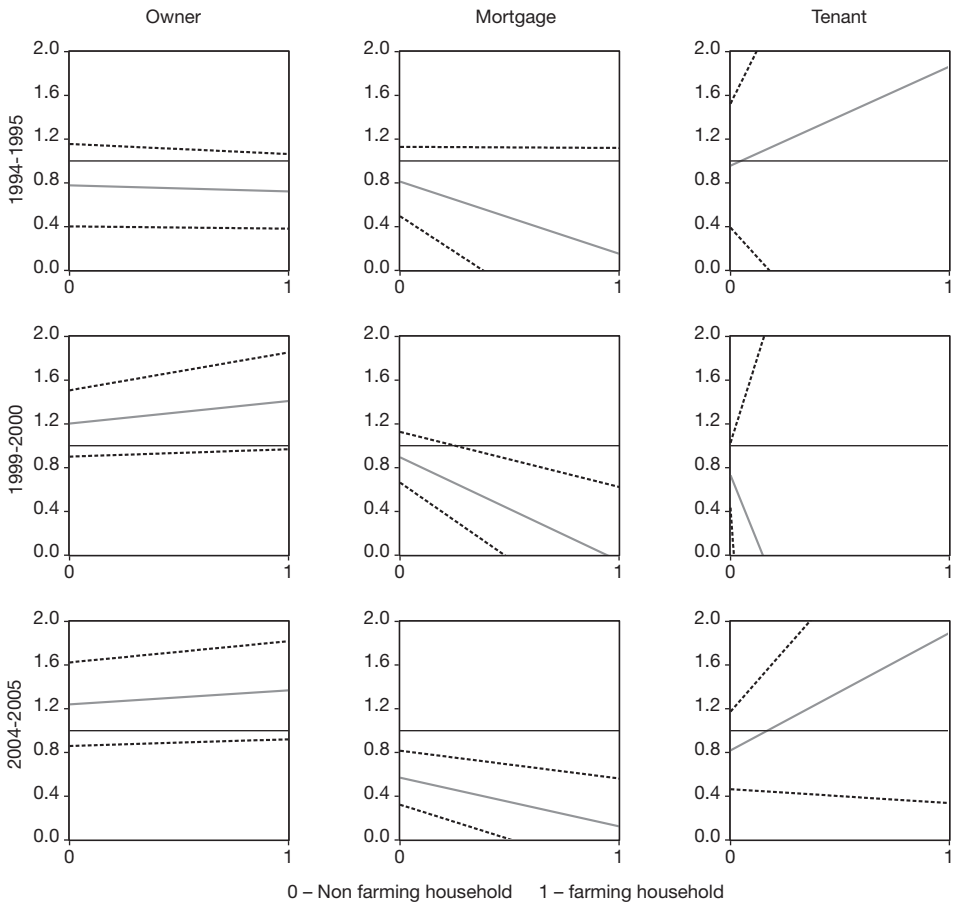
Figure 2: *Marginal Propensity to Consume for Different Education Levels of the Household Head*



Note: All variables but “education” held at median for tenure type and HBS wave (values in Table 1). Dotted lines traced out the 95 per cent confidence band.

Generally, the confidence bands are often very wide and the PIH is rarely rejected. One result that consistently appears, however, is the rejection for mortgage households in 2004-05. In particular, the PIH is rejected for households with fewer than eight members and fewer than three children, where the household head has attended school and where State transfers do not exceed 40 per cent of income. It is unlikely that the PIH is rejected because of credit constraints (these being the boom years of the housing bubble), high uncertainty or bequest motives. One explanation is that mortgage households were saving for down-payments for larger/second homes in their process of moving up the property ladder.

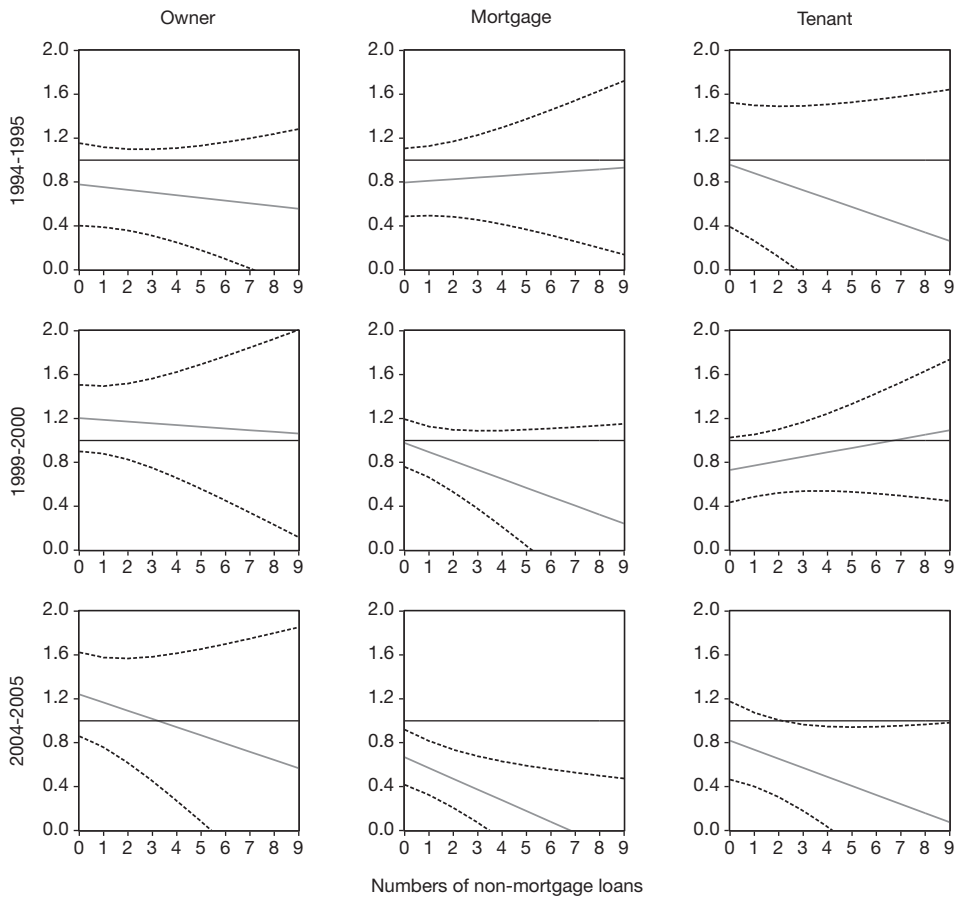
Figure 3: *Marginal Propensity to Consume for Farming Dummy*



Note: All variables but “farmer” held at median for tenure type and HBS wave (values in Table 1). Dotted lines traced out the 95 per cent confidence band.

An alternative explanation is the Special Savings Incentive Account (SSIA) scheme. This programme was initiated in 2001 and saw the state top up savings by 25 per cent. Since mortgage households may well be the most financially literate group in society, it would not be surprising if this group of households availed of the SSIA most extensively and thus saved out of permanent income. Savings made under the scheme were massive – between May 2006 and April 2007, when the accounts expired, a total of €14 billion were paid out to savers (Radio Telefís Éireann, 2004).

Figure 4: *Marginal Propensity to Consume for Increasing Number of Non-Mortgage Loans*



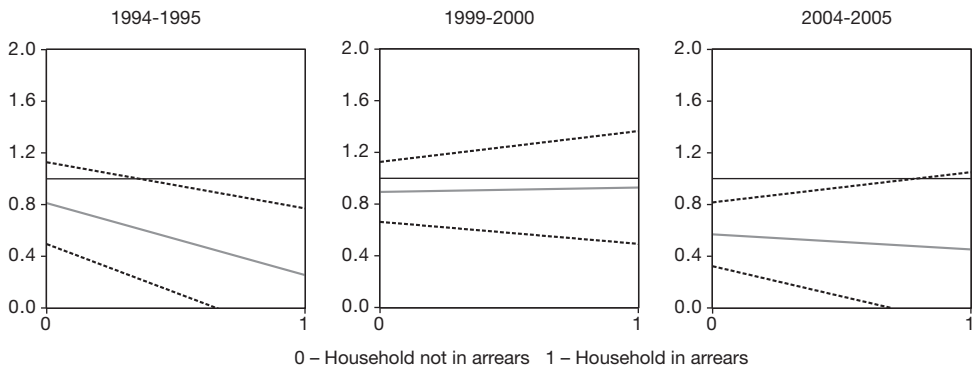
Note: All variables but “loans” held at median for tenure type and HBS wave (values in Table 1). Dotted lines traced out the 95 per cent confidence band.

The only five other instances when the PIH is rejected are the following. First, and as already mentioned above, young owner households seem to have consumed less than their permanent income 1994-95. It is possible that these were savings for a larger place that households planned to buy outright. This would indirectly point to mortgage credit constraints, which might have been due to the limited depth of Irish banking at the time.

Second, in the 1999-2000 survey, better educated mortgage and tenant households apparently saved some of their permanent income. It is possible that tenant households were saving for a down-payment for a first-time house purchase. Mortgage households may have saved to move up the property ladder.

Third, the PIH is rejected for farming mortgage households in 1999-2000. This also might be related to planned purchases; while income uncertainty generally is particularly high for farmers, it seems an unlikely explanation since the rejection of the PIH for farmers is restricted to mortgage households and the 1999-2000 survey.⁹

Figure 5: *Marginal Propensity to Consume for Arrears Dummy*



Note: All variables but “arrears” held at median for tenure type and HBS wave (values in Table 1). Dotted lines traced out the 95 per cent confidence band.

Fourth, second mortgage households in arrears in 1994-95 apparently did not consume all their permanent income. Since households typically go into arrears when disposable has taken a large hit, this again points to credit constraints. Given that the 1994-95 survey is the sample with the highest incidence of arrears (12 per cent of mortgage households in that wave had not met their mortgage payment in the surveyed month), this finding suggests

⁹ A small-sample bias is unlikely to account for this result; we have 99 farming mortgage households in the 1999-2000 HBS.

that credit constraints are also likely to be holding down consumption in the current Irish recession.

Fifth, in the 2004-05 HBS, the PIH is rejected for tenants with more than two loans. For those households that were multiple borrowers because of bad financial planning, it is possible that credit constraints were binding. For those households that had several loans because they were financially sophisticated, the SSIA scheme again may account for the observed savings.

VI CONCLUSIONS

This paper tests the permanent income hypothesis for Irish households before the collapse of the property bubble. It appears that most households consumed in line with their permanent income, which we proxy from actual disposable income using information on the social class and gender of the household head.

In six instances, the permanent income hypothesis does not seem to hold. First, in 1994-95 young households that owned their house apparently consumed less than their permanent income, perhaps to buy a larger one. Indirectly, this might suggest difficulties in obtaining a mortgage and thus credit constraints. Second, in 1994-95 mortgage households in arrears seem to have consumed less than their permanent income. This also points to the presence of credit constraints. Third, in the 1999-2000 survey, more highly educated mortgage and tenant households apparently saved some of their permanent income, potentially to move up the property ladder. Fourth, the PIH is rejected for farming mortgage households in 1999-2000. While income uncertainty may be particularly high for farming households, the fact that rejection is limited to mortgage households and the 1999-2000 HBS wave may also point to planned property purchases. Fifth, in the 2004-05 HBS, the PIH is rejected for tenants with more than two loans, who might have found it difficult to obtain further credit to smooth consumption. Finally, and this is an extremely robust finding, in 2004-05 most mortgage households saved out of permanent income. This may again be related to planned house upgrades. Alternatively, the Government's Special Savings Incentive Account scheme may explain this cut-back in consumption of the financially most literate group in society.

Generally, however, Irish households seem to have been able to consume according to their permanent income and thus to smooth consumption over temporary income fluctuations. Given the massive drop in consumption since 2008, it seems that many households have not been able to continue this practice. Future HBS releases will shed light on the question of which groups in society have been most affected.

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APPENDIX A: INSTRUMENT TESTS

For instruments to be valid, they need to be relevant, i.e., highly correlated with the variables they serve as instrument for, and exogenous. We test relevance by regressing all variables that are instrumented in the consumption equation on the instruments. Thus, we fit

$$\begin{aligned}
 y_j &= A_0 + A_{gender} gender_j + A_{class} class_j + w_j, \\
 y_j * age_j &= A_0^{age} + A_{gender}^{age} gender_j * age_j + A_{class}^{age} class_j * age_j + w_j^{age}, \\
 y_j * size_j &= A_0^{size} + A_{gender}^{size} gender_j * size_j + A_{class}^{size} class_j * size_j + w_j^{size},
 \end{aligned}$$

etc. and then test whether the hypothesis that the A_{gender} and A_{class} coefficients have a zero impact can be rejected. We reject strongly for all subsamples, tenure types and household characteristics, with no p-value exceeding 0.000.

To test for the exogeneity of the instruments, we assess whether the residuals of the consumption regression (1) are related to the instruments. If they are, the instruments are endogenous and should be used as explanatory variables in equation (1).¹⁰ We test for their information content using the Sargan-Hansen J-test, which relates the R^2 of the regression

$$\begin{aligned}
 e_j &= (\gamma_0 + \Sigma_{dem}\gamma_{dem} + \Sigma_{emp}\gamma_{emp} + \Sigma_{fin}\gamma_{fin}) gender_j \\
 &+ (\delta_0 + \Sigma_{dem}\delta_{dem} + \Sigma_{emp}\delta_{emp} + \Sigma_{fin}\delta_{fin}) class_j
 \end{aligned}$$

to the number of observations n and the number of overidentifying restrictions $(k - m)$ in equation (1). In particular,

$$nR^2 \sim \chi^2(k - m),$$

here $m = 8$ for the owner and tenant regressions (since we estimate eight β s and instrument each time disposable income with gender and class) and $k - m = 10$ for the mortgage regressions (where there are 10 β s). Table A1 reports the corresponding p-values. The hypothesis of no relation between the residual from the consumption equation and the instruments is not rejected in any of the regressions.

Table A1: *Exogeneity of Instruments (p-Value of Sargan-Hansen J-test)*

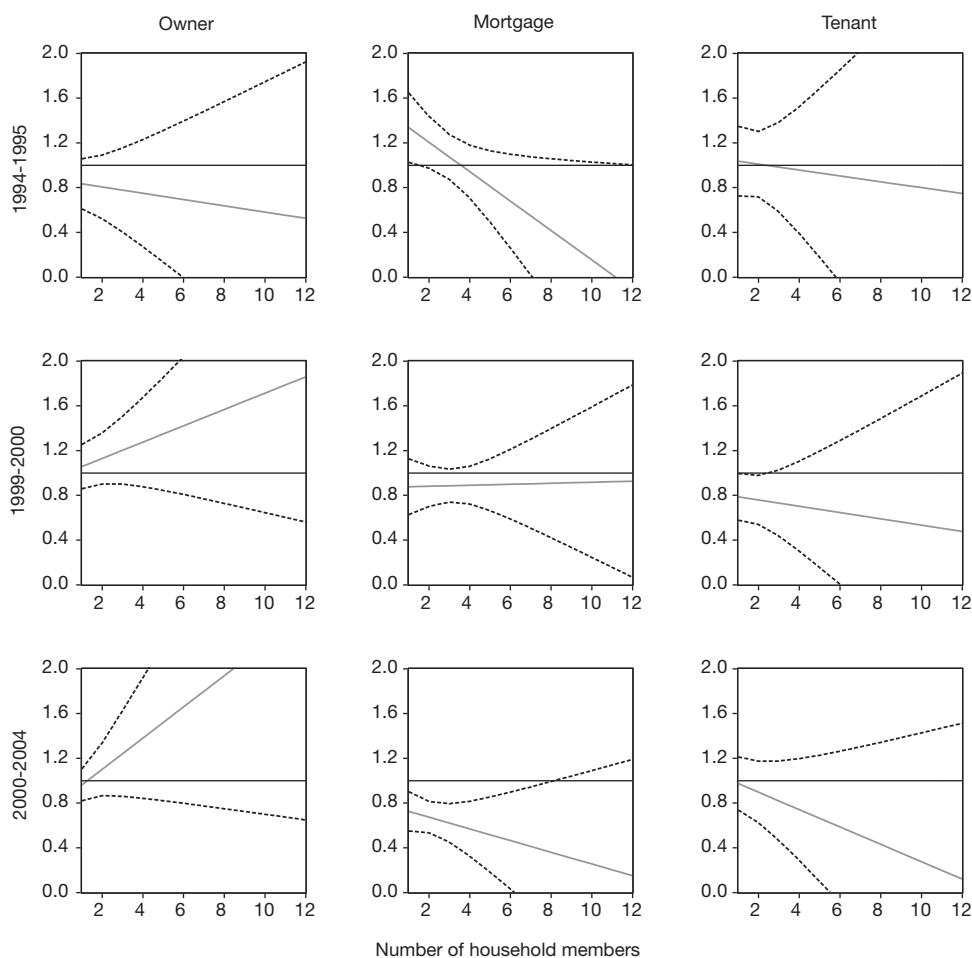
	Owner			Mortgage			Tenant		
	1994-1995	1999-2000	2004-2005	1994-1995	1999-2000	2004-2005	1994-1995	1999-2000	2004-2005
p-value	0.25	0.51	0.93	0.19	0.22	0.30	0.82	0.22	1.00

¹⁰ This test assumes that at least one of the instruments indeed is exogenous. Conditional on this, it informs us on whether additional instruments appear to be exogenous as well.

APPENDIX B: FURTHER PIH TESTS

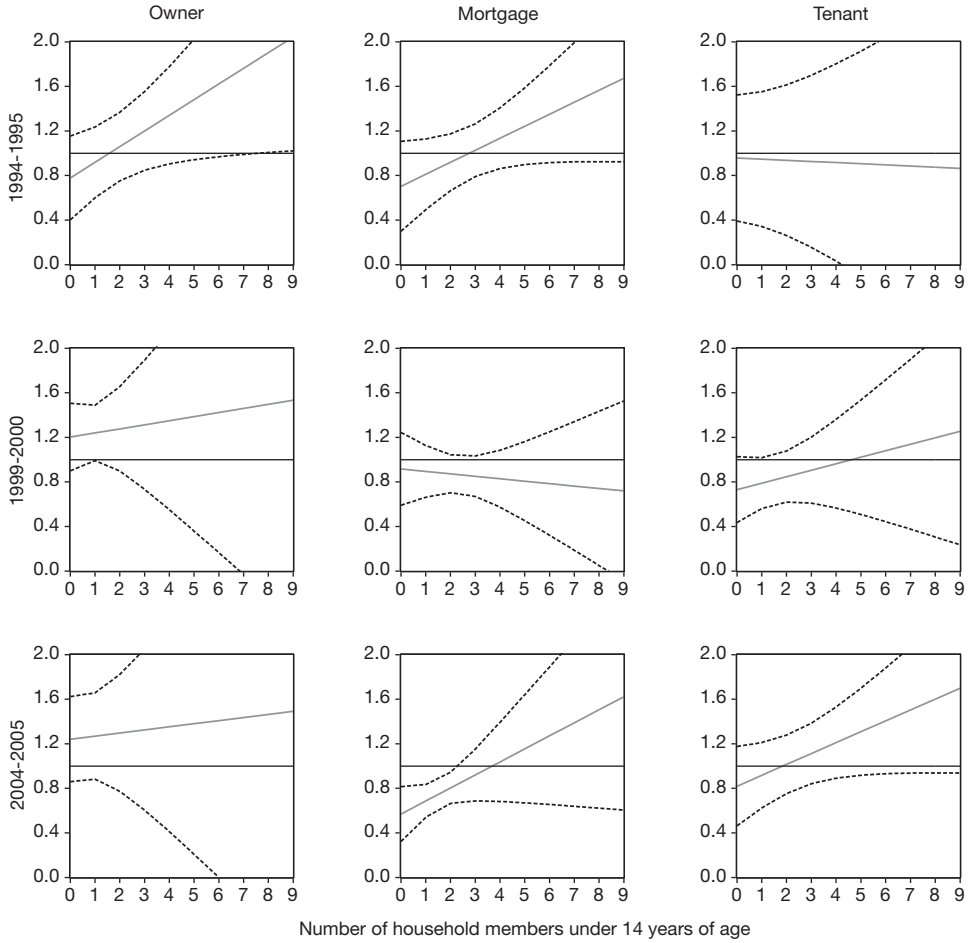
Here we report further PIH tests that do not reject the hypothesis (apart from for mortgage households in the 2004-05 wave). Figure A1 tests the PIH for different household sizes, Figure A2 for different numbers of children in the household, Figure A3 for an increasing size of government transfers, Figure A4 for the length of unemployment and Figure A5 – for mortgage households only – for different ratios of mortgage payments to income.

Figure A1: *Marginal Propensity to Consume for Increasing Household Sizes*



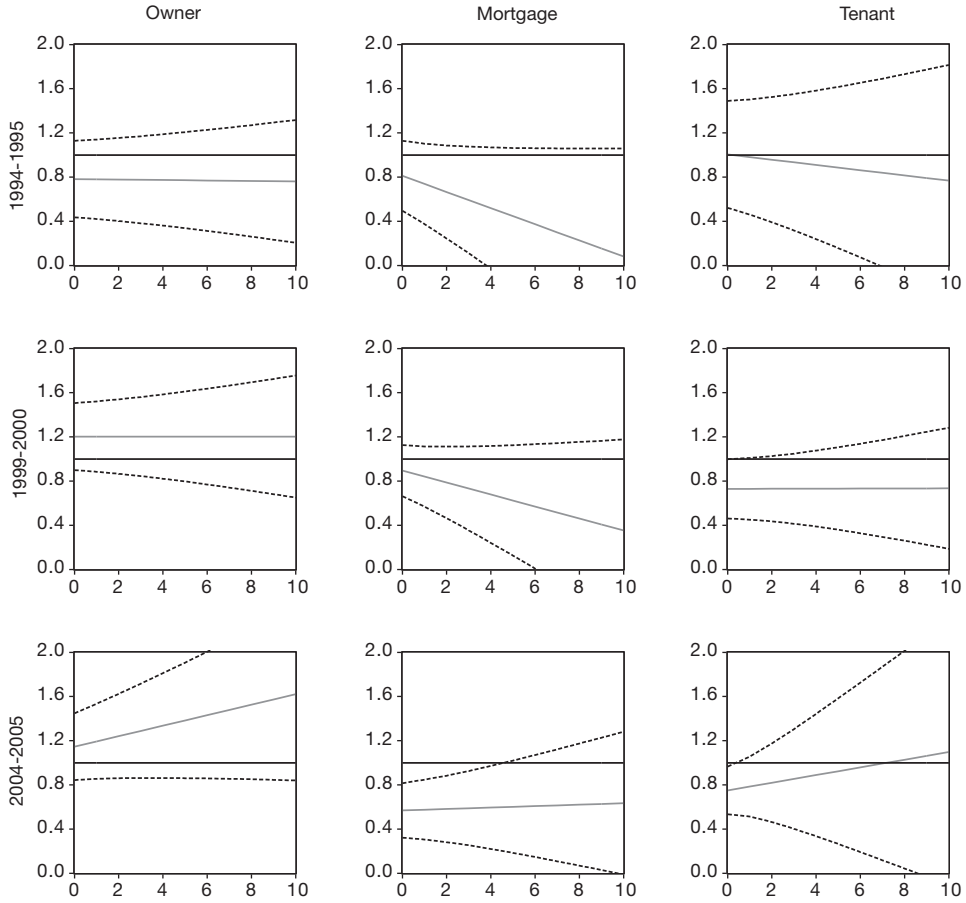
Note: All variables but “size” held at median for tenure type and HBS wave (values in Table 1). Dotted lines traced out the 95 per cent confidence band.

Figure A2: *Marginal Propensity to Consume for Increasing Number of Children*



Note: All variables but “under14” held at median for tenure type and HBS wave (values in Table 1). Dotted lines traced out the 95 per cent confidence band.

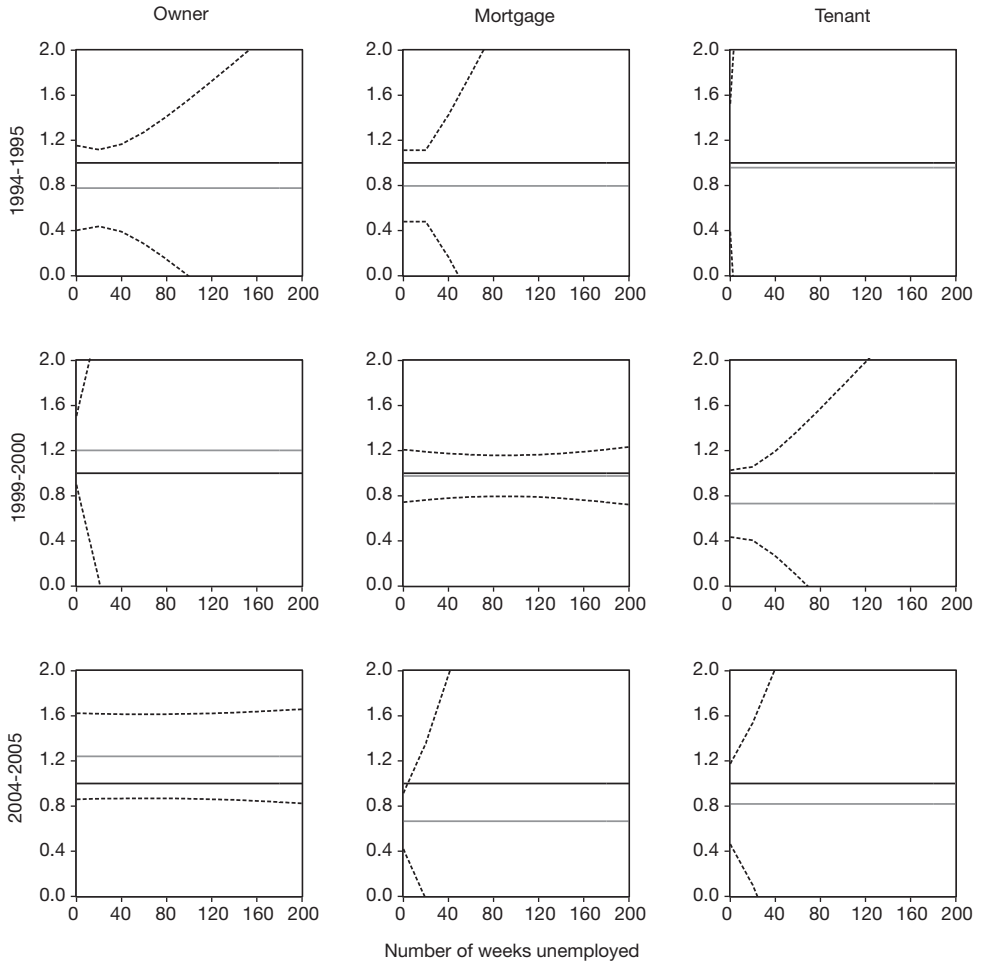
Figure A3: *Marginal Propensity to Consume for Increasing State Transfers*



0 – No state transfer income 2 – State transfer up to 20% of income 3 – 20-30% of income
 4 – 30-40% 5 – 40-50% 6 – 50-60% 7 – 60-70% 8 – 70-80% 9 – 80-90% 10 – 90-100%

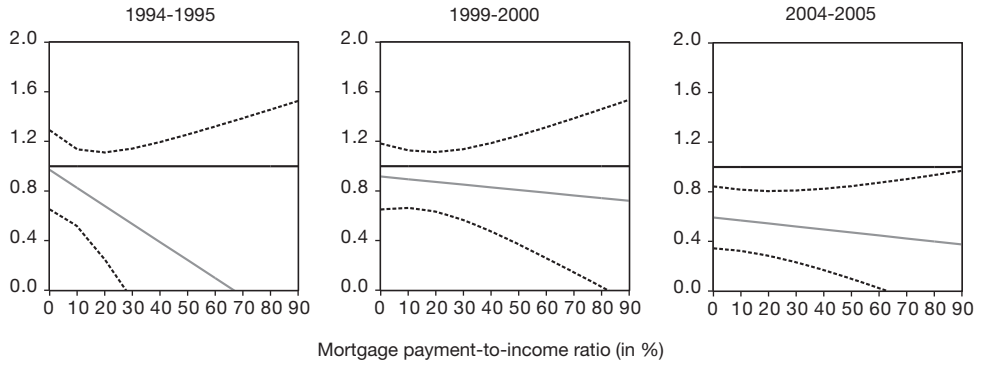
Note: All variables but “transfer” held at median for tenure type and HBS wave (values in Table 1). Dotted lines traced out the 95 per cent confidence band.

Figure A4: *Marginal Propensity to Consume for Increasing Number of Weeks in Unemployment*



Note: All variables but “unemployment length” held at median for tenure type and HBS wave (values in Table 1). Dotted lines traced out the 95 per cent confidence band.

Figure A5: *Marginal Propensity to Consume for Increasing Mortgage Payment-to-Income Ratios*



Note: All variables but “mortgage payment-to-income ratio” held at median for tenure type and HBS wave (values in Table 1). Dotted lines traced out the 95 per cent confidence band.

