Consumption and the Housing Market: An Irish Perspective

Yvonne McCarthy
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BUDGET PERSPECTIVES 2015
PAPER 1

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Acknowledgements

The authors would like to thank Frances Ruane, John FitzGerald and Tim Callan (all ESRI) and the comments of two anonymous referees for comments on an earlier draft. Any errors are the responsibility of the authors.

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Abstract

The recent financial crisis highlighted the strong linkages between the Irish housing market, real economic activity and key fiscal considerations. Over the period 1995 to 2007, while house prices were increasing rapidly on a persistent basis, key economic aggregates such as consumption and income registered strong growth. In the period since then, the decline in the fortunes of the housing sector have also been mirrored in economy-wide developments. Across countries, empirical estimates testify to the importance of the housing market to wider economic activity; however, this relationship is likely to be particularly strong in an Irish context. In this paper, drawing on recent research conducted at a micro-economic level, we highlight the importance of the housing market for key economic decisions such as consumption and deleveraging. Our results suggest that mortgaged Irish households exhibit a relatively large wealth effect out of housing when compared with other countries. Furthermore, in examining the implications of the significant increase in Irish household debt levels, our analysis also suggests that those households which can deleverage do so, and that the decision to reduce debt levels has negative implications for household consumption.

1. INTRODUCTION

From an Irish perspective, if the financial crisis experienced in 2007/08 served to highlight any particular point it was the integral nature of the housing market to general economic fortunes. The significant increases in disposable income and dramatic falls in unemployment experienced during the so-called *Celtic Tiger* era between 1995 to 2007 went hand-in-hand with persistent increases in house prices and substantial levels of housing activity. The particularly strong impact of the subsequent financial crisis on the Irish economy can be traced directly to vulnerabilities brought about by the disproportionate influence of the residential and commercial property sectors. The dramatic correction both in house prices and activity levels in these sectors resulted in a sharp downturn in economic activity with a concomitant increase in unemployment. This had significant implications for the fiscal accounts with the budgetary position being somewhat distorted by the transactions based tax revenues accruing to State coffers from the increased levels of housing supply.

Furthermore, the relationship between the housing market and general economy was intensified by developments in the domestic and international credit markets. From the late 1990s, the ability of Irish financial institutions to access international wholesale money markets greatly increased the supply of credit and, in particular, mortgage finance in the Irish economy. As a result, by 2007, after a period of significant house price increases, many households, by international standards, had become increasingly indebted.

In this paper we summarise the results of two recent contributions examining the relevance of the housing market to economic behaviour amongst mortgaged Irish households. In assessing the relationship between consumption, deleveraging and housing wealth, McCarthy and McQuinn (2013) and (2014a) both use two unique micro-data sources. The first is mortgage loan-level data gathered on a regular basis for the three main Irish financial institutions containing information on individual mortgage amounts, house prices at point of loan origination and mortgage repayment history.[1] This is supplemented by information from a representative household survey conducted in 2012/2013 on the mortgage books of the same institutions.[2] In particular, details such as the actual consumption, deleveraging decisions, income, expenditure, savings and employment status of these households are recorded.

[1] These are Allied Irish Bank (AIB), Bank of Ireland (BoI) and Irish Life and Permanent (ILP). In mid-2012 these institutions accounted for approximately 75 per cent of mortgage credit in the Irish market.

[2] This survey was conducted between May 2012 and February 2013, and was designed to be representative of the mortgage book of the three institutions AIB, BOI and ILP.

We first summarise estimates of the housing wealth effect for a representative sample of mortgaged Irish households. This establishes the importance of developments in the housing market for key economic decisions of households. Accurate estimates of the wealth effect are especially important in addressing present difficulties in the mortgage market. Given the substantial fall in Irish house prices, estimates suggest that almost 400,000 Irish properties are now in negative equity. The prevalence and scale of negative equity provides an additional, compelling reason for seeking to identify property-related wealth effects; certain proposals to alleviate the Irish mortgage crisis have included the prospect of debt relief for distressed borrowers. Clearly, the economy-wide benefit of such a move requires an accurate evaluation of the wealth impact on consumption.

We also summarise the findings in McCarthy and McQuinn (2014a) who examine the decision to deleverage or reduce personal debt levels of Irish mortgage holders. Given the post-2007 downturn in economic activity, aggregate statistics suggest that many households are currently engaged in deleveraging. Such a course of action can, potentially, have serious implications for key economic variables; when households seek to pay down their debts, a reduction in consumption and/or an increase in savings levels is very often observed. At a time when economic growth rates across countries are still struggling to recover from the financial crisis, this deleveraging, understandable from a household perspective, could act as a further drag on economic activity. In this context, the availability of micro data allows one to examine the nature of the relationship between household debt levels and consumption.

McCarthy and McQuinn (2013) suggest that Irish mortgaged households exhibit a relatively large wealth effect out of housing when compared with other countries and, in accordance with the life-cycle theory of consumption, households' price expectations appear to be influential in determining the consumption response to shocks. This result particularly holds in the case of those mortgaged households experiencing negative equity.

In terms of deleveraging, McCarthy and McQuinn (2014a) suggest that it is older, more affluent Irish households, who are presently reducing their debt levels. In particular, the probability of deleveraging is highest among those households with higher levels of income, with older or retired/inactive heads of household, and among those households where the head is relatively well educated. Furthermore, in a result that reinforces the importance of affordability in any deleveraging decision, McCarthy and McQuinn (2014a) find that households are

likely to reduce their deleveraging if they expect a deterioration in future financial conditions. Finally, McCarthy and McQuinn (2014a) find that the decision to deleverage has negative implications for consumption patterns.

The rest of this paper is structured as follows: In the next section we examine developments in the Irish housing market. We then present an overview of the micro-level data before examining what previous research says about the magnitude of the housing wealth effect in cross-country studies. The following section presents estimates of the wealth effect, while subsequent empirical sections examine who deleverages in an Irish context and what the relationship between consumption and deleveraging is for mortgaged households. A final section offers some concluding comments.

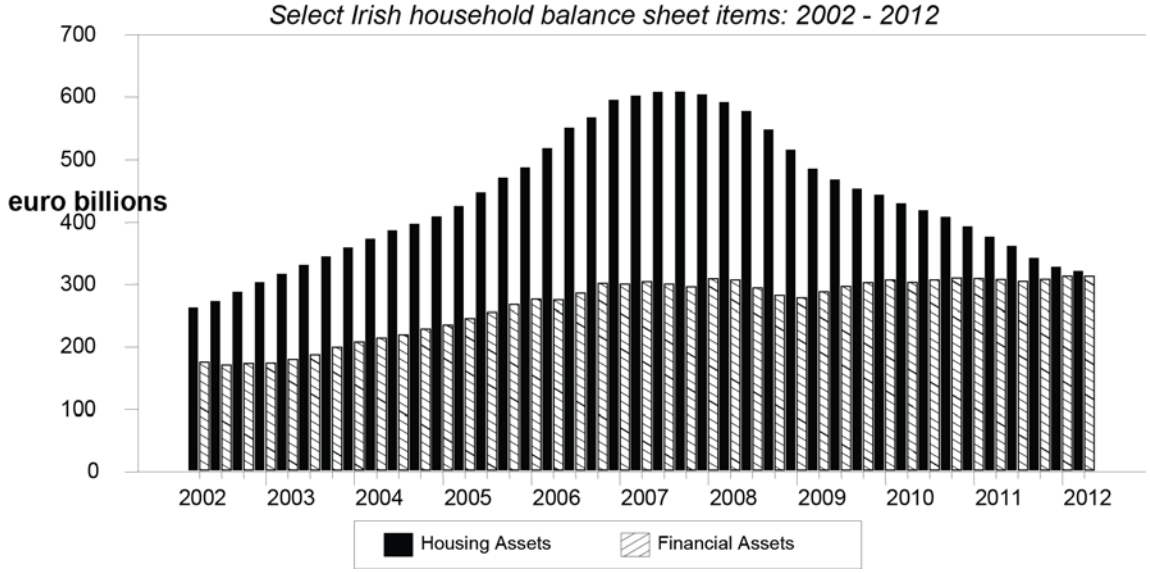
2. THE IRISH HOUSING AND MORTGAGE MARKET

Housing has traditionally constituted a significant portion of Irish households' asset holdings. This is potentially due to many different reasons. Up to the financial crisis of 2007, the capital return on housing in Ireland was sustained and dependable over a long period of time (since the 1950s), thus identifying property as a stable and reliable source of investment. This was accentuated during the *Celtic Tiger* years by the preferable manner in which property investment was treated from a taxation perspective. Also, given the rather conservative nature of the Irish financial system, for many households, until recently, the only realistic alternative investment asset to housing was a domestic bank deposit and/or life insurance. In Figure 1, the total stock of Irish housing and financial assets is plotted for the period 2002 - 2012. Over the period, both the significant increase and subsequent decline in the value of housing is readily apparent.

The 1990s heralded profound changes in both the Irish economy and housing market. The emergence of the so-called *Celtic Tiger* in the mid-1990s occurred after a decade of negligible economic growth and high average unemployment rates. The change in Irish economic fortunes thereafter was truly substantial. Sustained economic growth saw the total number of people employed in the country surge by almost 50 per cent, while the accompanying increase in income

Figure 1

Select Irish household balance sheet items: 2002 - 2012



levels was coupled with a stable, low interest rate environment. Figure 2 presents key Irish macroeconomic variables, including changes in aggregate consumption, over the period 1990 to 2011, while Table 1 traces changes in the main indicators of Irish housing activity over the same period.

Figure 2

Select Irish macroeconomic variables: 1990 - 2011

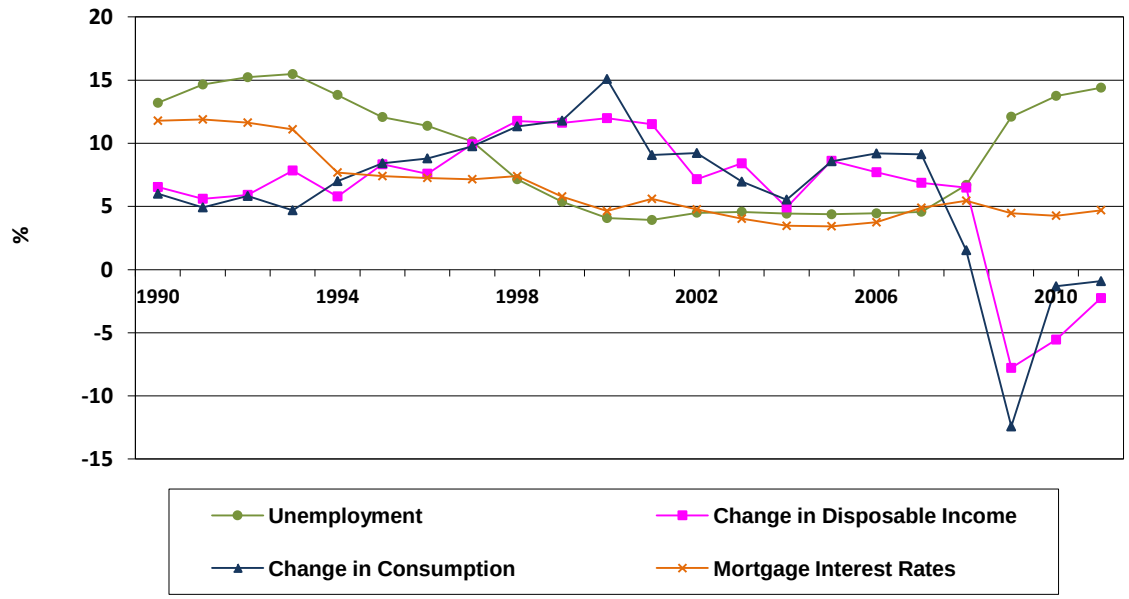


TABLE 1 SUMMARY OF IRISH RESIDENTIAL MORTGAGE MARKET STATISTICS: 1990-2012

Variable	Unit	1990	1995	2000	2005	2007	2012
Outstanding level of residential lending	€ million	6,563	11,938	32,546	94,259	123,002	84,973
Total value of mortgages issued	€ million	1,492	2,666	9,004	27,753	24,064	3,412
Average mortgage issued	€	42,856	54,094	111,355	231,206	271,154	184,113
Total number of mortgages issued		34,812	49,288	80,856	120,037	88,747	18,532
House prices	€	65,541	77,994	169,191	276,221	322,634	227,376
Housing supply		19,539	30,575	49,812	80,957	78,027	8,428

Note: For all data except the outstanding level of residential lending, the observation for 2012 is Quarter 2.

The combination of continuing income growth and benign monetary conditions (formalised by Ireland's entry into the single European currency in 1999), contributed to a major house price boom, which, in later years, prompted a significant increase in housing supply. In an international context, the performance of the Irish housing market between 1995 and 2007 was exceptional; real Irish house prices grew by nearly 9 per cent per annum – the next highest country growth rate in the OECD was 7.6 per cent. Housing supply, which escalated markedly post-2000, averaged 84,000 units between 2004 and 2006 comparing with just over 225,000 units built for the same period in the UK despite a fourteen-fold population differential. [3]

The scale of difficulties in the Irish mortgage market is now quite sizeable. Central Bank of Ireland estimates, based on earlier work by Duffy (2010), suggest that between 40 to 50 per cent of the total stock of Irish mortgages was, at end-2012, in negative equity. At end-March 2013, 12.3 per cent of private residential mortgage accounts were in arrears over 90 days with a further 6 per cent of mortgage accounts in arrears of less than 90 days. The equivalent 90+ days past due figures in March 2012 and 2010 were 9.9 and 4.1 per cent respectively. Given the number of households in less than 90 days arrears and those already

[3] Furthermore, due to more stringent planning requirements, the supply of housing in the UK tends to match supply to a greater degree than in Ireland.

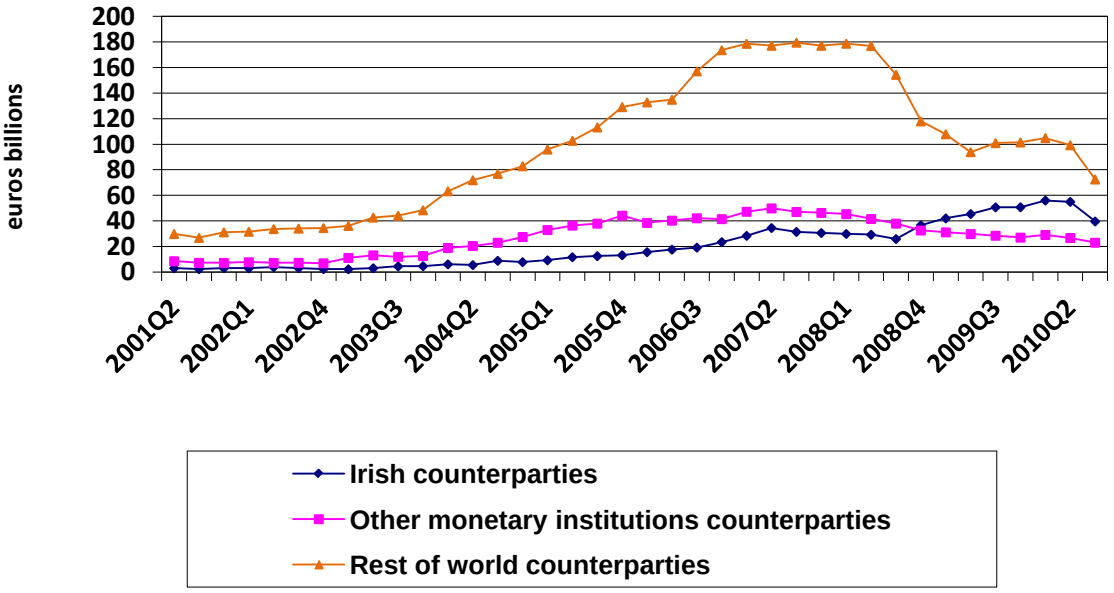
restructured, about one-fifth of Irish mortgages are presently in some form of distress.[4]

2.1 Indebtedness Amongst Irish Households

An additional cause of increased housing market activity was the greater provision of mortgage credit in the Irish economy. Starting in the mid-1980s, the domestic credit market underwent a sustained period of financial liberalisation involving the removal of both credit and interest-rate controls.[5] While all of these changes culminated in significant credit expansion by Irish financial institutions, the most profound development in the provision of credit was the increased ability of Irish banks, from the early-2000s, to attract deposits from non-residents. Figure 3 details the source of funding for Irish resident credit institutions from 2001. The rapid increase in debt securities issued by Irish credit institutions post-2003 resulted in a marked expansion in total lending to the economy.

Figure 3

Funding of Irish Financial Institutions: 2001 - 2010



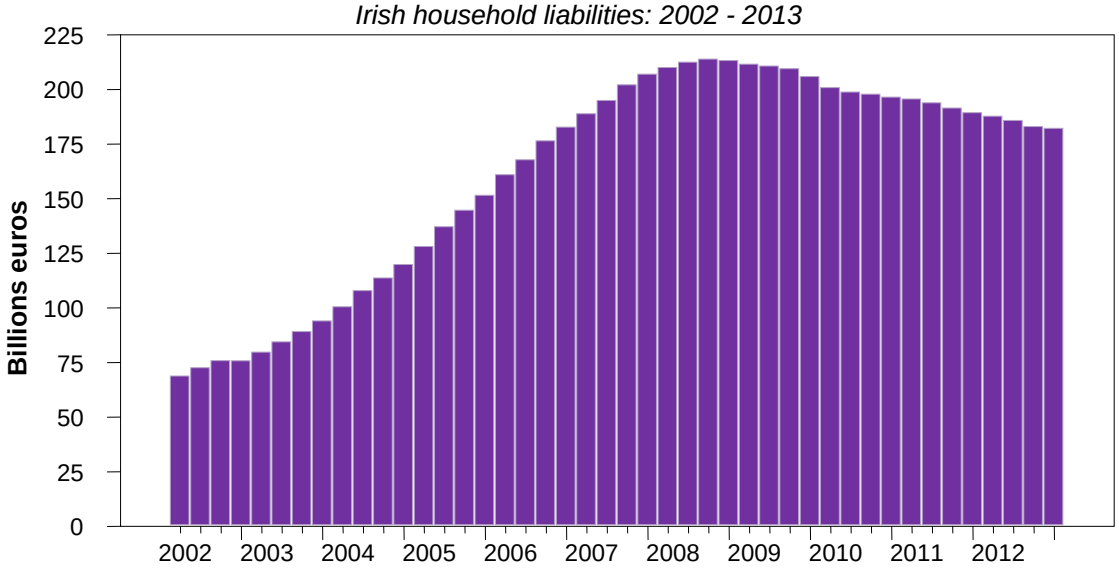
[4] Over 10 per cent of mortgage accounts have been classified as restructured by Irish financial institutions. Forbearance techniques include a switch to an interest only mortgage; a reduction in the payment amount; a temporary deferral of payment; extending the term of the mortgage; and capitalising arrears amounts and related interest. It should be noted that the arrears figure includes all accumulated arrears, including arrears carried into a restructuring arrangement.

[5] See McCarthy and McQuinn (2013) for a detailed discussion of this.

The combined effect of financial liberalisation, in an Irish context, was to increase the elasticity of the supply of credit to the household sector. The resulting overall trend in Irish households' liabilities can be observed from Figure 4. Debt levels continued to rise, albeit at a slower pace, after the peak had been reached in the property market in 2007 and from the end of 2008, liabilities started to decline. Cussen and Phelan (2010) highlight the corresponding increase in household leverage which they measure using (i) a ratio of total liabilities to disposable income and (ii) a ratio of total liabilities to total assets (financial and nonfinancial). These measures are replicated in Figure 5 and clearly illustrate the increasing financial pressure experienced by Irish households. The increase in the ratio of liabilities to income is arguably a more accurate measure as the alternative (liabilities to assets) can be ameliorated by the increasing house and equity prices experienced prior to 2007.

Figure 4

Irish household liabilities: 2002 - 2013



In principle, the decision to deleverage is achieved by paying off debts and/or writing down existing loans. In Figure 6 the quarter-on-quarter change in Irish household liabilities is presented. In the aftermath of the financial crisis, the rate of increase in liabilities slowed significantly, while the increase in deleveraging is apparent from early 2009. As can be seen, in an aggregate sense, this has occurred through a combination of paying off debts (transactions) and writing-down of loans (revaluations).

Figure 5

Irish household leverage ratios: 2002 - 2013

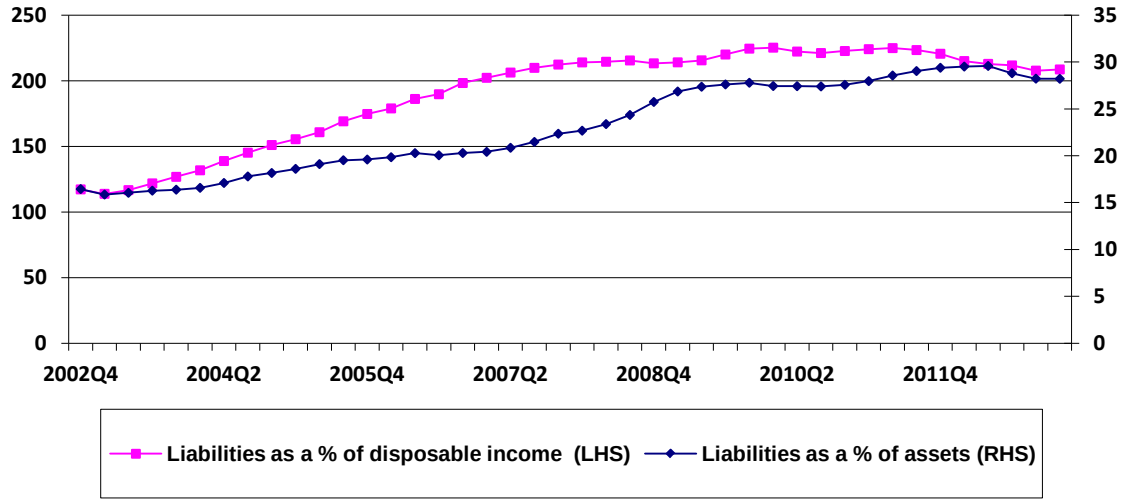
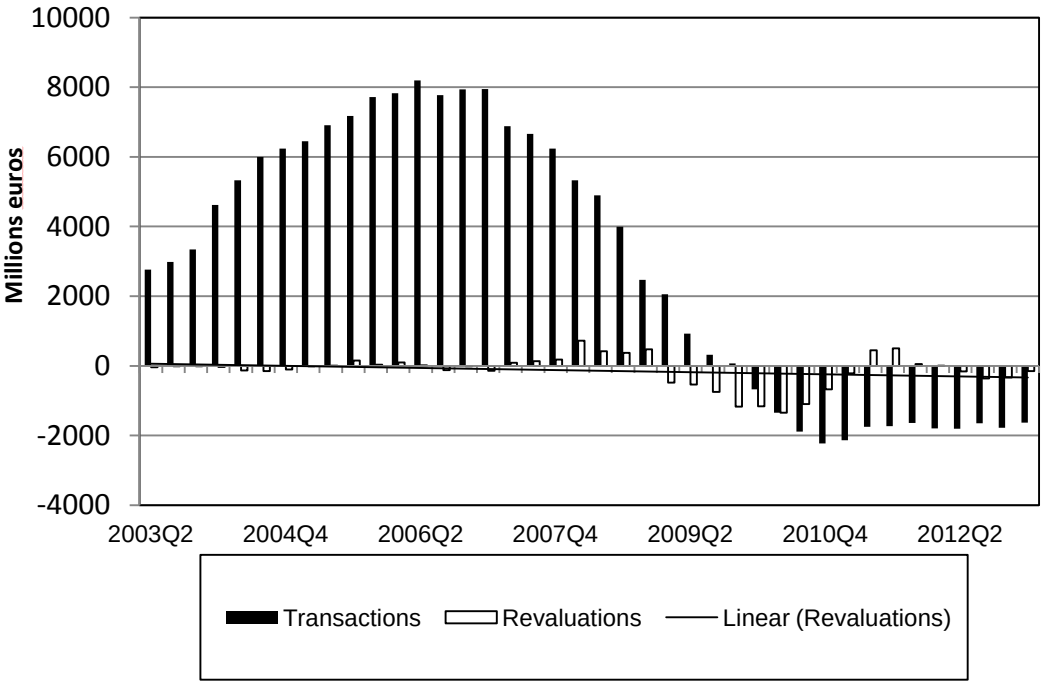


Figure 6

Quarter on quarter change in Irish household liabilities: 2003 - 2013



3. Overview of Data

Two sources of micro-level data are used in this paper. The first is a loan-level dataset collected by the Central Bank of Ireland as part of a Prudential Capital Assessment Review exercise, which assesses the potential capital requirements of the Irish banks under various stress scenarios. The dataset includes a snapshot of the entire residential mortgage books of three Irish banks at June 2012. At 75 per

cent, these banks account for the majority of the Irish mortgage market.[6] The loan level dataset incorporates a broad array of information for each loan, including borrower and mortgage details from the point of loan origination as well as information on the value of the property on which the mortgage is secured. Table A.1 in the Appendix provides an overview of the contents of the dataset.[7]

However, as with most loan-level datasets, credit institutions rarely update this type of data with current economic information on individual borrowers. Consequently, given the extent of economic change experienced in Ireland in recent years, this information may have changed substantially since loan origination. Therefore, to complement the loan level data, the Central Bank of Ireland commissioned a custom designed household survey to capture the current economic circumstances of mortgagees in Ireland. This survey is the second source of information used in the current study.

The mortgage holders' survey was conducted by ipsos MRBI on behalf of the Central Bank of Ireland. The survey, which is representative of the entire mortgage books of the three banks in the loan-level dataset, was administered to over 2,000 households all of whom are included in the loan-level dataset. Crucially, each individual's survey responses can be linked back to their corresponding mortgage information in the loan-level dataset, where the respondent gave permission for this linking to take place.[8] This is important as it ensures that the values, for example, for house prices and mortgage loan amounts included in the data are the actual levels reported by the financial institution as opposed to those "recalled" by the survey participant. The survey itself was conducted over the period May 2012 to February 2013 with 97 questions, in total, being asked of participating households. There were four broad categories of questions related to:

1. Mortgage background, including questions on the contributors to the mortgage repayment, the current educational and employment characteristics of such contributors and unemployment details where relevant.
2. Income and finance, including detailed questions on household income, its composition and recent changes, details on expenditure and questions on household financial distress.

6 The three banks are: Allied Irish Bank, Bank of Ireland, and Permanent TSB.

7 Further information on the loan level dataset is available in Kennedy and McIndoe-Calder (2011).

8 The majority of the sample (88 per cent) gave permission for this linking to take place.

3. Residential investment properties and other financial holdings, details of institutions where borrowings and savings are held, on credit applications and outcomes, and future expectations.

4. Questions on the mortgage arrears resolution process (MARP) and the degree and nature of contact with the mortgage lender.[9]

To capture household consumption, respondents were presented with the following question:

> *Thinking of total household spending on all goods and services, but excluding mortgage and other debt repayments, how much would you say that your household spends in an average month? Please include spending on groceries, household utilities, clothing and footwear, travel expenses, childcare expenses, socialising, etc.*

Table 2 provides an overview of the characteristics of the sample. We focus on a cleaned sub-sample of the portion of respondents that allowed their survey responses to be linked to their loan-level data. This amounts to a sample size at this stage is 1,400.[10] Among the sample, the largest portion of respondents are in the 35 to 44 year age group. The majority of respondents are married (83 per cent), employed (85 per cent) and are relatively well educated, with almost 45 per cent of respondents having a third level degree or higher. In terms of household composition, the average household in the sample comprises three persons (usually two adults and one child).

Table 2 also shows average values of key financial variables used in the current study. The median annual gross income among the sample is €55,000 while the median annual level of spending on goods and services is €15,300. The average house price at June 2012 among the sample was just over €184,000 while the average mortgage outstanding was approximately €151,000. The final panel in Table 2 shows that 39 per cent of the sample was in a position of negative equity in mid-2012 while 19.8 per cent of the sample had outstanding arrears on their property. Finally, in 56.7 per cent of cases, respondents reported having some level of savings or investments available to them.[11]

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9 The Central Bank of Ireland introduced the MARP in February 2009 and updated it in February 2010. The purpose of this process is to provide a framework that lenders must use when dealing with borrowers in arrears or facing arrears with their mortgage.

10 Full details of the cleaning exercise are available in McCarthy and McQuinn (2013).

11 See the Appendix for further details on the calculations of these variables.

TABLE 2 DEMOGRAPHIC AND ECONOMIC CHARACTERISTICS OF THE SAMPLE, PERCENTAGE OF RESPONDENTS UNLESS OTHERWISE STATED

Variable		%
Age group years	18-34	14.6
	35-44	39.9
	45-54	29.8
	55-64	12.6
	65+	2.7
Marital status	Married / Couple	83.3
	Widowed / Separated	6.1
	Single	10.5
Work status	Employed	84.5
	Unemployed	6.1
	Inactive	9.2
Education status	Low	13.1
	Medium	43.6
	High	42.5
Household composition	1 Adults, 0 Kids	9.4
	2 Adults, 0 Kids	16.0
	3+ Adults, 0 Kids	7.4
	1+ Adults with Kids	60.0
	Undefined	7.2
Median Financial Data (€)	Income	55,000
	Consumption	15,300
	Current House Price	181,428
	Mortgage Outstanding	144,554
Negative Equity	% of Group	39.0
Any Arrears	% of Group	19.8
Has Savings/ Investments	% of Group	56.7

Note: Where group totals do not equal 100 per cent, the residual is accounted for by "don't know" or "refused" responses. Sample size is 1,827 except in the case of the current house price and negative equity; the sample sizes here are 1,808 and 1,795 respectively.

4. THE HOUSING WEALTH EFFECT: WHAT PREVIOUS RESEARCH SUGGESTS

While there have been many aggregate level studies of consumption and wealth effects, the greater availability of survey data has resulted in a small but increasing number of micro-level applications in the area.[12] For example, Englehardt (1996), Flavin and Yamashita (2002) and Sheiner (1995) consider the impact of housing shocks on savings and asset allocation, while Attanasio and Weber (1994) examine whether greater financial liberalisation and the house price boom experienced in the UK throughout the 1980s explained the increase in consumption. Bostic *et al.* (2009) estimate, in the case of US households, that consumption spending is more sensitive to changes in housing rather than financial wealth. Campbell and Cocco (2007) assess the response of UK household consumption to house price changes and find the house price effect to be most significant for older homeowners, whereas for young renters the house price effect on consumption is negligible.

In a European context, Paiella (2007) finds a relatively large wealth effect for Italian households with respect to financial wealth, while Guiso *et al.* (2005) find that the wealth effect for Italian homeowners due to increases in house prices is comparable to that in other countries. In looking at consumption and wealth effects for Spanish households, Bover (2005) observes a significant and strong housing effect for prime-age adults with an insignificant financial wealth effect. Bover (2005) also notes that many household estimates of the wealth effect may be downward biased due to measurement error associated with household wealth. Using micro-data from the Luxembourg Wealth Study (LWS), Sierminska and Takhtamanova (2007) find significant differences in the wealth effect across age groups within different countries. In particular, they find a strong wealth effect for older households in Canada and middle-aged groups in Finland and Italy. [13]

Addressing the aftermath of the financial crisis, Christelis *et al.* (2011) use US survey data to examine the impact of the associated wealth and unemployment shocks. They distinguish between temporary and permanent wealth effects by splitting the sample between those who think that the market will recover in a year's time and those who do not. They find the financial wealth effect is greater than the housing effect. Other studies which also look at wealth effects of the recent crisis include both Hurd and Rowhedder (2010a) and Hurd and Rowhedder

[12] For a comprehensive literature review see Muellbauer (2007).

[13] For more information on the LWS, see http://www.lisproject.org/lws.htm.

(2010b). These studies respectively find that between 2008 and 2010, up to 40 per cent of American households were affected by issues such as unemployment, negative equity, mortgage arrears or foreclosure. They also find that older households have experienced substantial losses in wealth levels.

Other recent studies focussing on post crisis wealth losses include Bricker *et al.* (2011) and Petev *et al.* (2011). In the former, significant disparities are noted across household wealth levels between 2007 and 2009, with changes in asset values rather than changes in the ownership of the assets being the contributing factor to the observed differences. Petev *et al.* (2011) find that the consumption patterns of the relatively wealthier US households fell more than those of the less wealthy over the 2007 - 2009 period. Again using micro data, Arrondel *et al.* (2011) document the degree to which French households adjusted their consumption during the 2008/09 crisis. They also emphasise the role of expectations and a related confidence channel on consumption plans.

Finally, a related strand of the literature distinguishes between the effects of predictable versus unpredictable house prices on consumption. Campbell and Cocco (2007) note that house prices may be positively related to consumption for a number of reasons; including wealth and substitution effects, borrowing constraints, precautionary savings or myopic behaviour by households. As noted by Disney *et al.* (2010) contemporaneous changes in housing values may have no impact on household consumption growth if they were anticipated by consumption-smoothing households.

5. ESTIMATES OF THE HOUSING WEALTH EFFECT

5.1 Baseline Model

Our baseline model, typical in the literature, is a reduced-form specification relating household consumption to the household's current house price, income levels and a series of household demographic, labour market and educational attainment controls. The model, which is estimated cross-sectionally, can be summarised as follows, where lower case denotes logs:

$$c_i = \beta_0 + \beta_1 h_i + \beta_2 y_i + \sum_{j=3}^{n} \beta_j \emptyset_{i,j} + \epsilon_i \quad (1)$$

c_i is household *i's* annual consumption on all goods and services (excluding mortgage and other debt repayments), h_i is the current house price for

household *i*, y_i is annual household income and $\emptyset_{i,j}$ are household specific socio-economic and demographic controls. Table 3 provides a full overview of the independent variables used in the model.

TABLE 3 INDEPENDENT VARIABLES FOR CONSUMPTION REGRESSION

Variable	Description
h_i	Logged house price (at June 2012) for household *i*
y_i	Logged gross annual income for household *i*
Male	Dummy variable indicating that the survey respondent is male
Married	Dummy variable indicating that the survey respondent is married
HHsize	Continuous variable indicating the number of people in the household
Age – 18-34	Omitted category – captures survey respondents who are aged between 18 and 34 years
Age – 35-44	Omitted category – captures survey respondents who are aged between 35 and 44 years
Age – 45-54	Omitted category – captures survey respondents who are aged between 45 and 54 years
Age – 55-64	Omitted category – captures survey respondents who are aged between 55 and 64 years
Age – 65+	Omitted category – captures survey respondents who are aged 65 years and more
Edu – low	Omitted category – captures survey respondents with a low level of education (lower second level and non-degree)
Edu – med	Dummy variable indicating that the survey respondent has a medium level of education (upper second level and non-degree)
Edu – high	Dummy variable indicating that the survey respondent has a high level of education (third level degree or above)
Unemployed	Omitted category – captures respondents who are unemployed
Employed	Dummy variable indicating that the survey respondent is unemployed
Retired/inactive	Dummy variable indicating that the survey respondent is retired or inactive (student, stay at home parent etc.)
Mrti	Log of the mortgage-repayment-to-income ratio for household *i*
Other	Dummy variable indicating that the household has a second mortgage
Unsecure	Dummy variable indicating that the household has unsecured debt.

The house price level for each household is calculated by taking the reported house purchase price in the loan level data (at the point of loan origination) and then "forecasting" the data forward to the present using official regional house price data.

To control for the effect of debt burdens on consumption, we include two dummy variables indicating if the household has a second mortgage or unsecured

lending. We also include a mortgage repayment-to-income ratio (*MRTI*) for each household. This variable, which was originally presented in McCarthy and McQuinn (2011), can be regarded as a household liquidity indicator, particularly at a time when many Irish households are experiencing mortgage repayment difficulties. For example, an increase in mortgage interest rates would result in an increase in the ratio, thereby reducing household consumption.

Finally, much of the recent literature on consumption and wealth effects (cited earlier) assesses the importance of both housing and financial wealth in household consumption. In the Irish case, it is important to note that housing wealth has tended to assume a majority share of households' wealth portfolios, thereby making it an important consideration in consumption and wealth assessments. In Figure 1 (shown earlier) we saw that housing wealth accounted for over two-thirds of total household wealth in 2007. Despite the sharp reduction in house prices in recent years, housing wealth still accounts for 50 per cent of total household wealth. [14]

In terms of financial wealth, while we do not have information on these holdings for Irish mortgaged households, we can control for this effect by combining a number of questions in the survey to determine whether a household regularly saves and/or invests in financial products. Specifically, we generate a dummy variable (*save-invest*) that captures people who save regularly, receive any income from savings or investments, or who report that they have savings or investments that they can use in financial difficulties, and we include this as an additional control in the model. [15]

Table 4 presents the results of the initial estimation. While it is common in the literature to use the marginal propensity to consume (MPC) as the standard indicator of the wealth effect, we take, as our point of comparison, the estimated elasticity of consumption with respect to wealth i.e. the coefficient from the log-log regression. Evaluating the relative impact of wealth effects via the MPC, particularly across countries, is complicated by the size of the accompanying consumption-to-wealth ratio. For example, in an Irish context, this ratio is quite low owing to the relatively high level of Irish house prices.[16] Thus, the MPC can be relatively low in a country if housing is quite expensive.

[14] As we do not have all relevant wealth data in the survey, we are unable to check this ratio at the household level.

[15] By not including the actual amount of savings and investments, there is still the possibility that the coefficients on the housing wealth variable may be overstated.

[16] Gan (2010) makes a similar point in the case of Hong Kong.

TABLE 4 BASELINE CONSUMPTION REGRESSION

Variable	Coefficient	Standard Error
Constant	3.829***	0.446
h_i	0.113***	0.036
y_i	0.319***	0.031
Controls:		
Male	-0.017	0.029
Mmarried	0.068	0.045
HHsize	0.122***	0.013
Age – 3544	0.076*	0.041
Age – 4554	0.099**	0.044
Age – 5564	0.095*	0.055
Age – 65+	0.127	0.102
Edu – med	0.079*	0.045
Edu – high	0.040	0.049
Employed	0.163***	0.060
Retired/inactive	0.060	0.075
Mrti	0.027	0.021
Other	0.024**	0.010
Unsecure	0.055**	0.028
N	1,405	
F-stat	38.93	
Prob>F	0.0000	
Adj. R^2	0.3018	

At 0.11, the estimated elasticity[17] for the Irish market is quite high by international standards – see, for example, the summary of cross-country micro-based estimates presented in Table 7 of McCarthy and McQuinn (2014b). Sierminska and Takhtamanova (2007) comment on the relatively high estimates of 0.123 and 0.135 for Canada and Italy respectively, so the Irish result would appear to be at the high end of the international spectrum. This is not altogether surprising given the traditional role played by housing amongst Irish householders' balance sheets. Furthermore, it is not uncommon for financial innovation in countries which have experienced substantial housing booms to increasingly facilitate collateral based lending. Lydon and O'Hanlon (2012)

[17] This implies that a 10 per cent increase in house prices results in a 1.1 per cent increase in consumption.

present some evidence which suggests that the significant increase in equity release borrowing in the Irish market since 2000 may have fed into greater consumption of durable goods.

The remaining results in Table 4 conform with a priori expectations; the consumption effect is larger amongst the older cohorts of the sample, for those households where the head of household is employed and among relatively larger households. Similarly, higher income leads to higher consumption.[18] Interestingly, having unsecured lending or a second mortgage[19] appears to exert a positive and significant effect on consumption, while having additional wealth in the form of savings or investments does not have a statistically important effect. The coefficient on the MRTI variable is positive, suggesting that higher debt burdens have a positive impact on consumption. This result, however, is not significant. In the next section, we examine the effect of the current state of the Irish mortgage market on the housing wealth effect in some detail.

5.2 Negative Equity

As a next step, we examine the implications of house price expectations for the housing wealth effect for those households experiencing negative equity. As many households secured their mortgage in the Irish market at a time when house prices were substantially overvalued, the subsequent correction in prices has led to a sizeable cohort of mortgaged households experiencing this phenomenon.[20] Central Bank of Ireland estimates, based on earlier work by Duffy (2010), suggest that between 40 to 50 per cent of the total stock of Irish mortgages was, at end-2012, in negative equity. Clearly, house price expectations are likely to be especially important in this case. To assess this, we focus only on the sub-group of households experiencing negative equity and examine the implications for the housing wealth effect. The results are shown in Table 5.

[18] We also try replacing the log income variable with the log of income after the mortgage repayment. The results are essentially unchanged from those presented here.

[19] It is not clear from the data what the second mortgage is for i.e., a new property or on the existing one.

[20] Honohan (2010) summarises many of these studies.

TABLE 5 CONSUMPTION REGRESSION, SUB-GROUP IN NEGATIVE EQUITY

Variable	Coefficient	Standard Error
Constant	4.7222***	0.634
h_i	0.047	0.051
y_i	0.319***	0.035
Permanent hp	-1.570	0.820
h_i * permanent hp	0.125*	0.067
Controls:		
Male	-0.018	0.030
Married	0.069	0.046
HHsize	0.120***	0.014
Age - 3544	0.065*	0.043
Age – 4554	0.086**	0.045
Age – 5564	0.103*	0.057
Age – 65+	0.125	0.108
Edu – med	0.068*	0.047
Edu – high	0.038	0.051
Employed	0.144**	0.064
Retired/inactive	0.056	0.079
Mrti	0.020	0.025
Other	0.025**	0.010
Unsecure	0.043	0.030
Saves - invests	0.005	0.031
N	1,321	
F-stat	29.83	
Prob>F	0.0000	
Adj. R^2	0.2933	

In line with our previous finding for the whole sample, we find that house price expectations have an important impact on housing wealth effects among the sub-group of households experiencing negative equity. Specifically, the coefficient on the house price variable is not significant, while the coefficient on the interaction term (between house prices "*h*" and when the change is considered to be permanent "*permanent hp*") is positive and significant (albeit only at the 10 per cent level). This result suggests that the consumption level of households in negative equity only responds to an increase in housing wealth if the change in housing wealth is perceived to be permanent. The remaining results in the table are similar to those for the whole sample; household income, household size and additional borrowings have a positive and significant impact on household consumption.

From a policy perspective the results are quite informative. While a relatively large and significant wealth effect suggests that developments in the housing market can have an influential role in overall Irish economic activity, it is clear, particularly, for those households in negative equity, that house price increases have to be perceived as being permanent in nature for the wealth effect to be realised. Given the recent turbulent nature of house price movements over the past 10 years, this may take some time to occur.

6. DELEVERAGING

We now turn to the issue of household deleveraging. To capture household deleveraging, respondents to the income survey were first asked if they were concerned about their current level of debt; over 55 per cent of respondents reported that they were either very concerned or fairly concerned about their debt levels.[21] These respondents were then presented with the following question:

> *What actions, if any, are you taking to deal with your concerns about your current level of debt?*

Respondents could answer from a list of options (e.g., taking no action, cutting back expenditure, etc.), or they could provide an answer in a free text field. We create a dummy variable to capture deleveraging, which equals one if a respondent reported, first, that they were worried about their debt and, second, that they were making overpayments to clear their debt more quickly or they were using savings to supplement their payments. We compare these individuals to those who reported that they were worried about their debt but who were not engaged in these deleveraging activities as a means of dealing with their debt concerns.[22] Of the sample who were concerned with their debt, about 12 per cent were involved in deleveraging activities.

Table 6 provides an overview of the characteristics of the sample used in this study, according to deleveraging status.[23] In both the deleveraging and non-deleveraging groups, the largest portion of respondents is in the 35 to 44 year age group. The majority of respondents are married, employed and are relatively

[21] Of course households who are not concerned with their debt levels may also decide to deleverage.

[22] Our definition of deleveraging can be regarded as "explicit" deleveraging where households pay down debts in excess of required repayments. Deleveraging also occurs "implicitly" through the servicing of debt repayments in the absence of any additional debt being incurred.

[23] The sample at this stage is restricted to those individuals who reported that they were worried about their debt.

well educated, with about 40 per cent of respondents having a third level degree or higher. In terms of household composition, the average household in the sample comprises three persons (usually two adults and one child).

TABLE 6 DEMOGRAPHIC AND ECONOMIC CHARACTERISTICS OF THE SAMPLE BY DELEVERAGING DECISION, PERCENTAGE OF RESPONDENTS UNLESS OTHERWISE STATED

Variable		% of Deleveraging Sample	% of Non-Deleveraging Sample
Age group years	18-34	12.6	15.1
	35-44	41.2	40.3
	45-54	27.7	30.4
	55-64	16.0	11.7
	65+	1.7	2.2
Marital status	Married / Couple	83.2	81.8
	Widowed / Separated	11.8	6.7
	Single	5.0	11.5
Work status	Employed	84.0	81.5
	Unemployed	5.0	9.4
	Inactive	10.9	8.9
Education status	Low	9.2	14.7
	Medium	44.5	45.0
	High	45.4	39.5
Household composition	1 Adults, 0 Kids	6.7	9.4
	2 Adults, 0 Kids	13.5	14.6
	3+ Adults, 0 Kids	5.9	6.9
	1+ Adults with Kids	65.6	62.5
	Undefined	8.4	6.2
Median Financial Data (€)	Income	65,000	55,000
	Consumption	21,000	15,300
	Current House Price	191,717	180,381
	Mortgage Outstanding	185,918	170,394
Negative Equity	% of Group	44.0	46.8
Any Arrears	% of Group	20.2	28.2
Has Savings/ Investments	% of Group	44.5	31.7

Note: Where group totals do not equal 100 %, the residual is accounted for by "don't know" or "refused" responses.

Comparing the deleveraging and non-deleveraging groups, the differences in demographic and labour market status do not appear stark. There are slightly more older cohorts, more employed or inactive people, more highly educated people and slightly more widowed, divorced or separated people among the deleveraging group, but these differences are minor.[24] The differences between the groups are more pronounced, however, in relation to financial variables.

Average income appears higher among the deleveraging sample; median income in this case is €65,000 relative to €55,000 in the case of the non-deleveraging group. Average consumption is also higher for those who deleverage, their current house value is greater and, notably, a higher proportion of the deleveraging group report saving on a regular basis. Specifically, approximately 45 per cent of the deleveraging group saves regularly compared to 32 per cent of the non-deleveraging group. These results suggest that income and wealth may play a role in the deleveraging story. In the next section, we assess the importance of such factors in a multivariate setting.

6.1 Empirical Approach - Who Deleverages?

To explore the deleveraging decision empirically, we specify the following cross-sectional, probit model, where the probability of deleveraging is a function of income and a series of household-specific controls:

$$\text{Prob}\,(\text{y}_\text{i} = 1) = F(\beta(x_i) + \epsilon_i); \text{i} = 1,2, \ldots\text{n} \qquad (2)$$

Where y_i is the dependent variable "Deleverage", *x* comprises controls for the *ith* household's characteristics and financial information, β is a set of parameters to be estimated and ϵ_i is the error term.

Table 7 provides a full overview of the independent variables used in the model. To control for household characteristics, we include variables denoting the gender, age, marital status, educational attainment and employment status of the main mortgage contributor. We also control for the number of people in the household, the household's mortgage leverage (captured by the current loan-to-value ratio) and the *MRTI* or mortgage repayment-to-income ratio of the household. Given its use as a household liquidity indicator, the *MRTI* is particularly pertinent at a time when many Irish households are experiencing mortgage repayment difficulties.

[24] The inactive group includes people who are retired, on home duties or students.

TABLE 7 INDEPENDENT VARIABLES FOR DELEVERAGING REGRESSION

Variable	Description
y_i	Logged gross annual income for household *i*
Male	Dummy variable indicating that the survey respondent is male
Married	Dummy variable indicating that the survey respondent is married
HHsize	Continuous variable indicating the number of people in the household
Age – 18-34	Omitted category – captures survey respondents who are aged between 18 and 34 years
Age – 35-44	Omitted category – captures survey respondents who are aged between 35 and 44 years
Age – 45-54	Omitted category – captures survey respondents who are aged between 45 and 54 years
Age – 55-64	Omitted category – captures survey respondents who are aged between 55 and 64 years
Age – 65+	Omitted category – captures survey respondents who are aged 65 years and more
Edu - low	Omitted category – captures survey respondents with a low level of education (lower second level and non-degree)
Edu – med	Dummy variable indicating that the survey respondent has a medium level of education (upper second level and non-degree)
Edu – high	Dummy variable indicating that the survey respondent has a high level of education (third level degree or above)
Unemployed	Omitted category – captures respondents who are unemployed
Employed	Dummy variable indicating that the survey respondent is unemployed
Retired/inactive	Dummy variable indicating that the survey respondent is retired or inactive (student, stay at home parent etc.)
Mrti	Log of the mortgage-repayment-to-income ratio for household *i*
Other	Dummy variable indicating that the household has a second mortgage
Unsecure	Dummy variable indicating that the household has unsecured debt.
Savings	Dummy variable capturing households that save on a regular basis.
Current LTV	Loan-to-value ratio for household *i* (at June 2012)
Fixed rate mortgage	Dummy variable indicating that the mortgage is a fixed rate mortgage
Income Quartile 1	Omitted category – captures respondents in the bottom 25 per cent of the income distribution
Income Quartile 2	Dummy variable capturing respondents in the 2nd income quartile
Income Quartile 3	Dummy variable capturing respondents in the 3rd income quartile
Income Quartile 4	Dummy variable capturing respondents in the 4th income quartile

6.2 Baseline Results

Table 8 presents the results of the initial estimation. A clear picture emerges as to the profile of Irish households that are deleveraging; those with higher levels of income, with a head of household who is retired or inactive and those households with a relatively well educated head, are the most likely to deleverage.

TABLE 8 PROBIT MODEL: DEPENDENT VARIABLE = DELEVERAGES

Variable	Marginal Effect	Standard Error
Male	-0.013	0.023
Married	-0.007	0.037
HHsize	0.012	0.011
Age – 35-44	0.000	0.034
Age – 45-54	-0.010	0.036
Age – 55-64	0.078	0.062
Age – 65+	-0.052	0.069
Edu – med	0.068	0.043
Edu – high	0.082*	0.048
Employed	0.071	0.036
Retired/inactive	0.167**	0.104
y_i	0.053**	0.025
Mrti	0.033	0.021
Current LTV	-0.013	0.016
Fixed rate mortgage	-0.011	0.035
N	835	
F-stat	24.26	
Prob>F	0.0609	
Adj. R^2	0.0397	

Note: *** significant at 1 per cent level; ** significant at 5 per cent level; * significant at the 10 per cent level. Omitted categories for dummy variables are; age 18-34; low education and unemployed.

In Table 9 we repeat the previous regression, this time replacing the income variable with dummy variables capturing income quartiles. The omitted category "Income Quartile 1" captures the 25 per cent of the sample with the lowest income levels. The results suggest that it is those households with the highest income level that are most likely to deleverage with the coefficient on "Income

Quartile 5" suggesting that those households at the upper end of the income distribution have an 8.5 per cent higher probability of deleveraging relative to those households at the lower end of the distribution.

TABLE 9 PROBIT MODEL: DEPENDENT VARIABLE = DELEVERAGES, INCLUDING INCOME QUARTILES

Variable	Marginal Effect	Standard Error
Male	-0.011	0.023
Married	0.001	0.036
HHsize	0.012	0.011
Age – 35-44	-0.001	0.034
Age – 45-54	-0.010	0.036
Age – 55-64	0.080	0.063
Age – 65+	-0.055	0.066
Edu – med	0.077*	0.043
Edu – high	0.088*	0.048
Employed	0.081*	0.034
Retired/inactive	0.176**	0.105
Income Quartile 2	0.010	0.034
Income Quartile 3	0.012	0.041
Income Quartile 4	0.085*	0.048
Mrti	0.025	0.020
Current LTV	-0.010	0.016
Fixed rate mortgage	-0.010	0.035
N	835	
F-stat	24.26	
Prob>F	0.0609	
Adj. R^2	0.0397	

Note: *** significant at 1 per cent level; ** significant at 5 per cent level; * significant at the 10 per cent level. Omitted categories for dummy variables are; age 18-34; low education, unemployed and income quartile 1 (lowest income group).

6.3 Future Income Uncertainty

A key finding to emerge, therefore, is that it is those households with the means to deleverage that do so. In this context, and given the significant changes experienced in key economic variables such as incomes and unemployment rates in Ireland in recent years, it is interesting to consider the effect of increased

future income uncertainty on the deleveraging decision. To address this question, we follow Manski (2004), Christelis *et al*. (2011) and McCarthy and McQuinn (2013b) who use households' subjective expectations as a means of characterising their attitudes to the distribution of future shocks. In particular, we use the following specific question to gauge households' subjective expectations for future income developments:

> *Thinking about your financial circumstances, over the next year or so, do you expect to be: Better off, worse off or about the same as you are now*

Households are asked whether they expect to be 'better off', 'worse off' or 'the same' in terms of their financial circumstances over the next year. We generate a dummy variable that captures those individuals who expect to be 'worse off' in a year, relative to those who expect their position 'to improve' or 'stay the same', and include this as an additional control in the regression. The results, reported in Table 10, suggest that an expected deterioration in future financial circumstances leads to a *reduction* in deleveraging. In particular, individuals who expect to be 'worse off' in the future have a 4 per cent lower probability of deleveraging, relative to people who either expect no change in their circumstances or to be 'better off' in the future. This result is compatible with our earlier finding that affordability is a key factor in the deleveraging decision.

7. DELEVERAGING AND HOUSEHOLD CONSUMPTION

As noted by Cooper and Dynan (2013), the theoretical case for a specific role for household debt in determining consumption is not readily apparent. In many standard models of consumption, debt does not exert an independent influence on consumption. In such cases, where households, say, experience a negative house price shock, debt levels contract, exclusively, in an endogenous fashion; in response to the ensuing negative wealth effect, households reduce their consumption and borrow less accordingly. Therefore, debt levels decline.

However, there are several reasons to believe that households may respond to or target the level of debt itself, independent of the wealth effect and this, in turn, could affect consumption. Households, may, for example, have a target level of debt relative to either household income or assets. In the latter case, with a significant fall in house prices, they may wish to redress the ratio by reducing debt levels. Similarly, debt levels play an important role in accessing credit. Financial institutions are, typically, reticent to lend to significantly indebted households. In terms of the life cycle hypothesis, this may be particularly relevant where households perceive their current income to be below the permanent

level and thus, may wish to borrow to smooth consumption levels. Heightened levels of debt would clearly impede access to finance.

TABLE 10 PROBIT MODEL: DEPENDENT VARIABLE = DELEVERAGES, INCORPORATING FINANCIAL EXPECTATIONS

Variable	Marginal Effect	Standard Error
Male	-0.011	0.024
Married	-0.014	0.039
HHsize	0.014	0.011
Age - 3544	0.001	0.035
Age – 4554	-0.003	0.039
Age – 5564	0.100*	0.068
Age – 65+	-0.055	0.071
Edu – med	0.062	0.044
Edu – high	0.071	0.049
Employed	0.065	0.040
Retired/inactive	0.157**	0.103
y_i	0.048*	0.026
Mrti	0.035	0.022
Current LTV	-0.011	0.017
Fixed rate mortgage	-0.019	0.034
Savings	0.043*	0.026
Expect deterioration	-0.039*	0.023
N	797	
F-stat	28.64	
Prob>F	0.0380	
Adj. R^2	0.0476	

Note: *** significant at 1 per cent level; ** significant at 5 per cent level; * significant at the 10 per cent level. Omitted categories for dummy variables are; age 18-34; low education and unemployed.

To date, micro level analysis of the relationship between debt and consumption at a household level is at a relatively nascent stage. Indeed, Cooper and Dynan (2013) describe household level empirical research in this area as being "limited". A number of US based studies such as Dynan (2012) and Cooper (2012) find that high levels of debt have a negative impact on consumption after controlling for income and net worth, while Dynan and Edelberg (2013) demonstrate that high debt households were more likely to reduce their consumption in 2009 after controlling for other determinants of spending.

To assess the impact of deleveraging on consumption, we use a survey question that asks respondents how their consumption changed relative to a year earlier (increased/decreased/no change) and by how much it changed. A continuous variable is created capturing such information and this is used as the dependent variable.[25] As controls, we employ the same binary independent variables as before. In addition, to control for changes in housing wealth, we include a continuous variable capturing the change in housing equity for each household between June-2011 and June-2012.[26] In terms of income, our survey does not capture numerical changes. Rather respondents are asked only about how their income has changed in a qualitative sense (increased/decreased/no change) over the previous year. We generate a dummy variable capturing cases where households registered a fall in their income over the past year, and include this as an additional control in the regression. The results are shown in Table 11.[27]

Turning first to household characteristics, the education level of the head of the household has an important impact on consumption changes. More highly educated heads tended to register an increase in consumption levels over the year; heads with a medium education level saw their consumption rise by €91 relative to households where the head has a low level of education, while those with a high level of education increased their consumption by €87. Income developments also have an important impact on consumption developments among the sample. Relative to households that registered an increase or no change in their income over the year, households that saw a reduction in income tended to record lower consumption levels. Finally, larger households (as captured by "HH size") tended to increase their consumption levels over the year.

8. CONCLUDING COMMENTS

At present many economies are still struggling to emerge from the aftermath of the 2007/08 financial crisis. For some of these countries, the origin of much of the difficulty lay in the interaction between the housing market and the real economy. After a prolonged period of growth, house price levels began to deviate significantly from what fundamental values based on economic variables suggested. In certain distressed markets, such as the Irish case, the subsequent decline in prices has given rise to substantial levels of negative equity and a downturn in overall economic activity has contributed to a growing mortgage arrears problem.

[25] Full details of the questions employed and the distribution of changes are available in the Appendix. Note the change is in nominal terms.

[26] See the Appendix for further details.

[27] We also tried including the level of income, however, this was not significant in the regression.

TABLE 11 IMPLICATIONS FOR CONSUMPTION: DEPENDENT VARIABLE = € CHANGE IN CONSUMPTION

Variable	Marginal Effect	Standard Error
Constant	-101.757	80.903
Male	1.986	28.527
Married	22.721	42.536
HHsize	25.003*	13.335
Age – 35-44	-5.097	41.499
Age – 45-54	-11.472	43.664
Age – 55-64	63.591	54.026
Age – 65+	-80.761	102.213
Edu – med	90.871**	41.861
Edu – high	86.806**	43.339
Employed	57.550	48.351
Retired/inactive	55.668	65.481
Fixed rate mortgage	36.652	44.195
Change in equity	0.001***	0.000
Income fall	-78.363**	34.234
Deleverage	-67.864*	40.573
N	888	
F-stat	2.31	
Prob>F	0.0031	
Adj. R^2	0.0383	

Note: *** significant at 1 per cent level; ** significant at 5 per cent level; * significant at the 10 per cent level.

In that context, as countries seek to emerge from these difficulties, understanding the link between variables such as consumption and house prices has, arguably, never been more important. Accurately assessing these relationships is essential in the design of efficient and effective policy responses. This paper uses two unique data sources to address these issues for the Irish mortgage market, which is presently experiencing considerable distress. The presence of questions eliciting subjective expectations amongst households is a particular advantage of micro-level survey data as it provides an additional means of distinguishing between movements in key variables perceived to be of a permanent or temporary nature.

Our results indicate a significant consumption response amongst Irish households to house prices, particularly when compared with comparable type estimates from other jurisdictions. Our data also allows us to observe directly deleveraging

amongst a representative sample of mortgaged Irish households. Consequently, we are in a position to both observe the characteristics of those households which are deleveraging and to examine the implications for household consumption. The key finding that household consumption is affected by changing debt levels is quite significant at a time when a debate exists as to whether debt levels should even be considered in standard consumption frameworks. This result is achieved given a relatively precise definition of deleveraging, while controlling for household-specific wealth effects.

Our result that a relatively affluent cohort of the mortgaged population are more likely to engage in deleveraging suggests that certain less well-off sections of the mortgaged population are likely to remain significantly indebted while they are unable to address their leveraged position. This result finds a certain resonance with the results of recent research by Maître, Russell and Whelan (2014), who, in examining trends in economic stress over the period 2007-2011, conclude that a precarious and lower middle-class[28] are those who register a greater deterioration of their situation vis-à-vis classes both above and below them.

The results also suggest that as household income levels begin to recover, consumer demand may be somewhat constrained going forward. More generally, the importance of debt levels themselves for consumption behaviour, as indicated by the results presented here, illustrate an important linkage between financial sector developments and the real economy. Understanding these linkages is highly important when framing budgetary considerations.

[28] Precarious and lower-middle income class are defined respectively as 60 – 74 and 75 – 124 per cent of equivalised household income. For more details on this see p. 21 of Maître, Russell and Whelan (2014).

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APPENDIX TABLE A.1

Unit Identifier	Borrower	Property	Loan	Interest Rate	Performance
Bank	Borrower type	Geographic location	Origination date	Current interest rate	Arrears balance (Dec 2010)
Borrower	Income	Property type	Original loan balance	Interest rate type	Arrears balance (last 12 mths)
Property	Income verified	New or existing original valuation (& date)	Loan term	Interest rate margin	Collection status modification / forbearance flag
Loan	Credit quality	Original LTV	Loan purpose	Rate revision date	
		Construction year	Current Repayment		
			Repayment type		
			Interest rate info.		

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