Consumption and initial mortgage conditions: evidence from survey data*

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Abstract

Economic theory predicts that the consumption path of unconstrained homeowners responds to the interest rate, while the consumption path of credit constrained homeowners is determined by the size and timing of payments (mortgage maturity). We exploit the rapid expansion of mortgage markets during the last decade in Spain and a very detailed survey on household finances to estimate group-specific consumption responses to changes in the credit conditions. Our estimates suggest that the consumption of households headed by an individual with high school responds more to mortgage maturity than to the interest rate spread. The consumption of the rest of indebted households is insensitive to loan maturity. Those results are confirmed when we instrument loan maturity exploiting the fact that banks are reluctant to offer contracts with age at maturity above 65. An interpretation of those results is that households headed by middle education individuals, 8% of our sample, behave as credit constrained.

JEL Codes: D91, E91

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NON-TECHNICAL SUMMARY

Basic economic theory predicts that changes in the mortgage market conditions, like longer periods to repay and lower borrowing costs have a heterogeneous impact on the consumption of home owners. The consumption of households who pay higher borrowing rates and who expect higher income growth late in life should be especially responsive to the size and timing of mortgage installments, which in turn is determined by the initial length of a mortgage. Alternatively, the consumption of credit unconstrained groups is unrelated to the size of periodic mortgage installments but reacts instead to changes in interest rates. We use the retrospective information on house purchases in the 2002 and 2005 waves of the *Spanish Survey on Household Finances* to estimate the response of household consumption to cross-sectional changes in mortgage maturity and in financing rates for various groups of the population.

We first examine income growth for different groups of households, based on the education of the head. Consistently with other evidence on the Spanish labor market, we find that households where the head has a high school degree have the highest average earnings growth late in life among the groups we consider. We also find that that group pays higher than average mortgage interest rates. Guided by that evidence, we use education as an indicator of credit constraints. An alternative sample split uses household income.

We document that the consumption response to interest rates and maturities is rather heterogeneous across groups of house owners. When we split the sample by the educational level of the head of the household, we find that the level of consumption is related negatively to interest rates only among the college educated. Increases in mortgage maturity of 5 years increase consumption by about 5%, but only among households headed by a person with high school. That estimate does not vary much when we account for the possibility that borrowers have special preferences for consumption, but becomes about three times higher when we control for unobserved variables that affect consumption and mortgage conditions. Alternative sample splits based on household income also suggest that the negative relationship between consumption and mortgage

interest rate exists only among house owners in the top income quartile, while we find a positive response of consumption to mortgage maturity only among house owners in the central quartiles of the income distribution.

Overall, the sizable response of consumption to mortgage maturity among households whose head has a high school degree together with evidence about that group having higher income growth late in life compared to the rest of the population lead us to characterize the mid-education group as credit constrained. The evidence from the alternative sample split using current income suggests that households in the second and third quartiles of the income distribution behave like credit constrained. According to our interpretation, the share of constrained households in Spain would be around 32% of home owners or 8% of the total population.

1 Introduction

Do the initial mortgage conditions when a house is purchased have a lasting impact on the consumption path of home-owners? If so, which particular components of credit developments matter? The answer to those questions is crucial to understand the consequences of likely future changes in the access to mortgage loans and to assess to what extent credit constraints affect consumption. Our study uses a very complete data set of household finances and the episode of the development of mortgage markets during the last decade in Spain to estimate the long-term consequences of relaxation of mortgage conditions on household consumption. Using a simple model of consumption, we argue that the response of household consumption to initial loan maturity and to interest rates is informative about the prevalence of credit constraints in the economy.

An interesting literature has examined the contemporaneous impact of particular aspects of credit market developments on household consumption. Leth Petersen (2006) analyzed the heterogeneity in the consumption responses to the possibility of borrowing against home equity. In particular, he studied a reform of the market of credit in Denmark that enabled house owners to use housing equity as a collateral in consumption loans, finding that younger households react much more to access to credit than other (presumably, not liquidity constrained) households. Other studies focus on the marginal propensity of consumption out of housing wealth. Campbell and Cocco (2006) estimate that increases in the value of the house increase the consumption of older homeowners, possibly through the channel of an increased perceived wealth and a higher collateralization possibility.[1] Besley et al (2008) estimate the response of aggregate and cohort-specific consumption to changes in interest rates charged to new mortgages.

[1] Disney et al. (2010) stress the importance of unobserved expectations about future income. Using the fact that only unanticipated changes in the house value have an impact on consumption, they estimate that young households do not react differently than older households. Bover (2008), using the same dataset as we do, found that the marginal propensity to consume out of changes in the house value was heterogeneous across households, in particular were greater for prime age households, consistent with a precautionary saving motive.

Our study uses the theoretical insights from Attanasio et al. (2008) to argue that, in the presence of credit constraints, different dimensions of the development of credit markets can have a lasting impact on the consumption of different groups of home owners over the life of a mortgage. In particular, the consumption of households with unrestricted access to credit is determined by the discounted stream of payments, and reacts mostly to changes in the borrowing rate. Conversely, the consumption path of credit constrained households reacts mostly to the size and timing of the debt repayment payments during the first years of the life of a mortgage (determined by loan maturity) and less to interest rates. Hence, examining only a particular dimension of credit market development (say, drops in interest rates) on contemporaneous expenditure may lead to an underestimation of the consumption response to changes in the access to credit. We examine if there is heterogeneity of the consumption response to mortgage conditions by households that are likely to differ in their access to credit.

Spain is an interesting case to examine for various reasons. First, between 1996 and 2005 access to mortgage credit became much easier. Average maturity increased from 18 to 25 years, the average interest rate spread fell by 110 bp, reducing the amount of the down payment of the households. Parallel to such changes in credit markets, there was a drop in the aggregate household saving rate that fell from 16% in 1995 to 11% in 2005.

The second reason is the possibility of using joint information on consumption and credit conditions in the 2002 and 2005 waves of the *Spanish Survey of Household Finances* (EFF, by its Spanish initals). The survey contains information on actual consumption and a rich set of retrospective information on mortgage conditions. Hence, the EFF provides an unique setup to understand the impact on household consumption to changes in loan maturity and interest rates.

Finally, the home ownership ratio exceeds 80% in Spain. Within the subset of households who became owners after 1992, 80% financed the transaction using a mortgage. Therefore, changes in the credit conditions can be an impact on

aggregate consumption.

Linked to these advantages, there are several challenges. First, observed maturity and interest rates are the result of a matching between the demand for mortgages of the families and the supply of loans from the banks' side. Therefore both maturity and interest rate variables are likely to be correlated with unobserved characteristics of the household. We argue that increases in loan maturity do not affect all potential purchasers equally because banks are reluctant to offer mortgages expiring when the loan applicant is older than 65. Hence, younger home owners in periods of higher competition for mortgages are likely to obtain longer maturities than other households. Following Besley et al. (2008) we instrument interest rates using averages within cells defined by education, age and year of purchase. A second challenge is selection; theory has predictions on the impact of credit conditions on the households that have a mortgage. We use survey information about credit rejections to identify a selection model and correct our estimates for selection bias.

Our results suggest that there is heterogeneity in the consumption responses to interest rates and mortgage maturity. An increase of one year in maturity increase the total consumption of house owners with a high school degree by 3-5% while a decrease of interest rates of 100 bp is not associated to significant consumption responses. Nevertheless, the consumption of house owners with a college degree is insensitive to the size of mortgage installments. We find some evidence suggesting that the consumption of those households responds to changes in interest rates, but the estimates are imprecise. Overall, those results together with differences in the income growth late in life and in the cost of borrowing across education groups suggest that households headed by an individual with high school are credit constrained, while households headed by an individual with either college or basic schooling are not. Further sample splits by household income suggest that consumption correlates negatively with interest rates only among households in the top income quartile, while it correlates positively with maturities for households in the mid quartiles of the income distribution.

The paper is organized as follows. Section 2 provides a description of the evolution of the market of mortgages in Spain in the last two decades, and summarizes a model that motivates our strategy. Section 3 presents the data and the empirical strategy. Sections 4 and 5 discuss the results and Section 6 concludes.

2 The evolution of credit market conditions in Spain

Access to credit and, specially, access to mortgage debt became easier in many countries between 1995 and 2007. Table 1 in the Appendix shows the evolution of mortgage conditions at purchase in Spain -as recollected by the reference person in the household. The percentage of fixed rate mortgages decreased between 1995 and 2007 by almost a half. The average loan to value ratio increased from 75% - for mortgages signed between 1991 and 1995- to 91% – mortgages signed after 2003. Loan maturity increased on average from 18 to 23 years and the interest rate spread from Spanish government bonds fell from 2% to 1.5%. Together with those changes, the saving ratio fell to historical lows.

To give a sense of the magnitudes involved, assume a 90,000 euro loan signed in 1995 at 4% interest rate, to be repaid in 15 years. Assuming constant installments, the yearly installment would be 7,772 euro. The same loan at a loan maturity of 25 years would involve paying 5,631 euro per month. Using the median level of gross household income of 31,000 euro and an income tax of 25%, the reduction in the yearly installment would be about (7,772-5,631)/(.75*31,000)=9% of yearly net earnings.

2.1 Theoretical considerations

We use a simple model of durable purchases to illustrate how variation in access to credit among households results in different responses of consumption to changes in the cost of borrowing (interest rates) and in installment size (mort-

gage maturities). We build on Attanasio et al. (2008).[2]

Preferences. Agents live for three periods: the initial period when purchases take place and two additional periods when the loan can be repaid. Agents derive utility from the flow of non-durable consumption in each of the three periods (c_1, c_2, c_3) and from the stock of housing purchased h. The utility function is time separable and isoelastic with $\rho < 1$.The stock of housing cannot be resold or augmented and does not depreciate over time.

Endowments: Individuals receive an exogenous stream of earnings (y_1, y_2, y_3) . There is a set of agents who receive most of their lifetime earnings in the third period of life -ie. for whom income growth is high relative to their intertemporal discount rate.[3]

Timing of purchases: The agents choose the amount of housing consumed in the first period, as well as non-durable consumption in the rest of the periods. The price of housing is assumed to be 1.

Credit markets: There is a single asset and a single liability. The interest rate on the asset r_a is smaller or equal than the cost of borrowing r_b. We assume that, for a set of agents - credit constrained households- interest rates on saving are strictly smaller than the cost of borrowing r_b. The only way to obtain credit in this economy for credit constrained households is by getting a mortgage during the first period. In particular, agents choose to borrow the amount ϕh, where $0 \leq \phi \leq 1$. $\phi = 1$ implies that the agent does not make a downpayment at the time of the purchase. Finally, loan maturities M are exogenously set by banks as either 1 (the full amount is repaid in the second period) or 2 (the amount borrowed is repaid in the second and third periods

[2] That model was originally intended to understand the loans in the market of cars. See Alessie et al. (1997) for a similar set up. We extend some the insights in that work to the housing market.

[3] The exact condition is

$$\frac{\beta^{\frac{2}{\rho}}(1+r_b)^{\frac{2}{\rho}-2}}{1+\eta^{\frac{1}{\rho}}+\beta^{\frac{1}{\rho}}(1+r_b)^{\frac{1}{\rho}-1}} < \frac{\frac{y_3}{(1+r_b)^2}}{y_1+\frac{y_2}{1+r_b}+\frac{y_3}{(1+r_b)^2}}$$

where β is the intertemporal discount rate, r_b is the cost of borrowing, η the weight of housing in the utility function, ρ the risk aversion parameter and y_1, y_2, y_3 the stream of earnings.

The problem of the household is the following:

$$\max_{\{c_1,c_2,c_3,h,\phi,P\}} \frac{(c_1)^{1-\rho}}{1-\rho} + \beta\frac{(c_2)^{1-\rho}}{1-\rho} + \beta^2\frac{(c_3)^{1-\rho}}{1-\rho} + \eta\frac{h^{1-\rho}}{1-\rho}$$

s.t.

$$c_1 + h(1-\phi) \leq y_1 \tag{1}$$

$$c_2 + P - (1+r_a)[y_1 - c_1 - h(1-\phi)] \leq y_2 \tag{2}$$

$$c_3+[\phi h(1+r_b)-P](1+r_b)-(1+r_a)[y_2-c_2-P+(1+r_b)(y_1-c_1-h(1-\phi)] \leq y_3 \tag{3}$$

$$0 \leq \phi \leq 1$$

$$0 \leq P \leq h(1+r_b)$$

where c_i is the consumption of non housing goods for each period i=1,2,3 and h is the value of the amount of housing purchased. β is the intertemporal discount rate and η is the weight of housing in the utility of the agent. y_i is the amount of disposable income for each period, P is the amount of the repayment on the mortgage. ϕ is the loan to value ratio, that is the proportion of the house value that is financed with a mortgage and r_b and r_a are the interest rates on loans and lending respectively.

The first constraint implies that the first period income must be at least as large as the sum of non-housing consumption and the amount of the downpayment for the purchase of a house. The second constraint implies that income in the second period plus any savings from the first period $(1+r_a)[y_1-c_1-h(1-\phi)]$ must finance consumption in the second period and the corresponding part of the mortgage installment. Finally, the third period restriction states that the final period income plus any remaining savings must be at least as large as the

sum of final period consumption c_3 and the final installment of the mortgage $[\phi h(1+r_b) - P](1+r_b)$.

A short (one period) mortgage maturity implies a contract in which $P = h(1+r_b)$. A two-period maturity implies a contract where the agent can choose the amount P in the second period and the remained of the debt in the third one. in what follows, we discuss the implications of changes in mortgage length and interest rates. The analytical results are presented in Appendix 1.

The allocation of consumption and housing depends on the level of maturity set by the bank. We use the shorthand notation $c_1(m), c_2(m), h(m)$ and $\phi(m)$ when m=1,2 for the optimal consumption and borrowing stream with maturity equals 1 and 2, respectively. Result 1 compares both allocations.

Result 1: Under the previous assumptions, a consumer who is allowed to repay in mortgage during the second and third periods chooses a level of c_1, c_2, *and* h *that is not lower than the optimal one if required to repay during one period.*

When consumers can only obtain one-period mortgages and the income in the third period is high enough with respect to lifetime incomes (see Footnote 3), consumption in the first period $c_1(1)$ equals.[4]

$$c_1(1) = \frac{1}{1+\eta^{\frac{1}{\rho}} + \beta^{\frac{1}{\rho}}(1+r_b)^{\frac{1}{\rho}-1}}[y_1 + \frac{y_2}{1+r_b}]$$

The corresponding expression for $c_1(2)$, or the level of first-period consumption when maturity equals two periods is:

$$c_1(2) = \frac{1}{1+\eta^{\frac{1}{\rho}} + \beta^{\frac{1}{\rho}}(1+r_b)^{\frac{1}{\rho}-1} + \beta^{\frac{2}{\rho}}(1+r_b)^{\frac{2}{\rho}-2}}[y_1 + \frac{y_2}{1+r_b} + \frac{y_3}{(1+r_b)^2}]$$

When maturity equals 2, the level of consumption in the first period is proportional to the value of the stream of income in periods 1, 2 and 3, discounted at the interest rate r_b. When maturity equals 1, and the consumer has preferences for consumption that result in zero wealth holdings at the end of the

[4] The result arises if consumers end up period 2 with no assets. Given the assumption of $r_a < r_b$, there will be a positive mass of those consumers.

second period, first period non-housing consumption is a function of the discounted stream of earnings during the first two periods only. Hence, if income in the third period y_3 is large enough relative to income in the first two periods of life y_1 and y_2, allowing the consumer to repay in two rather than in one period only results in a higher level of consumption: $c_1(2)$ is not lower than $c_1(1)$. An additional repayment period allows a credit constrained consumer to increase first period consumption by borrowing against the whole future earnings stream rather than against the earnings during the first two periods. Clearly, the result hinges on two assumptions: income during the third period is relatively large and interest rates of borrowing exceed those of saving -that guarantees that some consumers end up with zero wealth in the second period of life.[5]

Result 2: Credit constrained agents who are allowed to repay over two periods choose a higher level of ϕ than if required to pay during 1 period: $\phi(2) \geq \phi(1)$

Using the first-period budget constraint, one notices that, holding interest rates and the discounted earnings stream constant the increase in the level of non-housing consumption during period 1 must be financed by a higher level of borrowing during the first period of life of the mortgage. When allowed to repay the mortgage in two periods the credit-constrained consumer increases both h and c_1, but the total outlay in housing expenses during the first period falls because $\phi(2) \geq \phi(1)$.

2.1.1 A benchmark: perfect access to credit markets

A natural benchmark to understand the impact of mortgage maturities on the allocation of consumption is to assume that agents can access credit markets perfectly, or $r_a = r_b$ Under the assumption of perfect access to credit markets at an interest rate that is the same for saving and borrowing, the main determinant of consumption is the sum of lifetime earnings discounted by the interest rate -for example, the unconstrained consumer could always borrow in period 2 against

[5] Similarly, one can show that an expansion in maturity allows credit constrained consumers to expand the consumption of housing h - $h(2) > h(1)$ and of second period non-housing expenditure $c_2(2) > c_2(1)$

income in period 3. In that case, $\phi(2) = \phi(1)$ and $c_1^u = c_1^u(2) = c_1^u(1)$

$$c_1^u = \frac{1}{1 + \eta^{\frac{1}{\rho}} + \beta^{\frac{1}{\rho}}(1+r_b)^{\frac{1}{\rho}-1} + \beta^{\frac{2}{\rho}}(1+r_b)^{\frac{2}{\rho}-2}}[y_1 + \frac{y_2}{1+r_b} + \frac{y_3}{(1+r_b)^2}]$$

Finally, after comparing c_1^u, $c_1(1)$ and $c_1(2)$ we obtain an additional testable result

Result 3: A drop in the interest rate increases relatively more the first-period non-housing consumption of non-credit constrained consumers than that of credit constrained consumers.

The result is proven in Appendix 1 and is driven by the larger wealth effect of an increase in interest rates when the whole lifetime earnings stream is discounted than when discounting applies only to the first two periods.

2.1.2 Testable implications

The discussion above highlights two testable implications. In the presence of credit constraints (i.e., $r_b > r_a$), the effects of changes in mortgage maturity and mortgage interest rates on consumption differ among consumers.

- For unconstrained households, increases in mortgage maturity have no impact on either the level of consumption of homeowners or the loan-to-value ratio. $\frac{\partial c_1}{\partial r} < 0$, $\frac{\partial c_1}{\partial M} = 0$

- Within the set of credit constrained home owners, those who have high income growth late in life react to increases in maturity by expanding the level of consumption. The consumption response of such subset of households to the interest rates is negative, but weaker in absolute value than that of unconstrained households: $|\frac{\partial c_1^c}{\partial r}| < |\frac{\partial c_1^u}{\partial r}|$, $\frac{\partial c_1}{\partial M} > 0$.[6]

[6] Two notes are in order. We are not allowing for re-sale and we do not model the timing of the purchase decision. Nevertheless, credit conditions could potentially affect the timing of the purchase. In the empirical part, we discuss how we can control for selection into house purchase using a mortgage and thus obtain consumption responses conditional on purchase.

Second, we characterize credit-constrained consumers as those for whom r_b is greater than r_a.(the rate at which one can save). But one may think of alternative definitions, like a constrain that imposes a maximum ratio of the debt service to current household earnings. While we have not proved the result analytically, we strongly suspect that such alternative

3 Data and empirical strategy

This section describes the data used for the analysis and the empirical strategy.

3.1 Data

We use data of the 2002 and 2005 waves of the *Spanish Survey of Household Finances* (EFF, by its Spanish initials). The EFF is a tri-yearly survey of 5,143 households (in 2002) and 5,962 households (in 2005). 2,580 of these are panel households, interviewed in both surveys. We use information about the real assets held by the households and, in particular, the information about the mortgages that financed the purchase of real estate (either the main residence or a secondary one). The EFF collects information about up to 13 mortgages for four real estate properties of each household. For the first property the respondents are asked about the details of at most four mortgages. If they purchased additional real estate properties using an outstanding loan, the EFF collects information on up to three mortgages per property.

Consumption measures: The EFF contains broad questions about food expenditures, non-durable consumption and about purchases (and holdings) of vehicles and housing equipment. Much of our study is devoted to analyzing how consumption responds to higher current "cash-on-hand" income associated to smaller mortgage installments. Given that items like durable purchases are more likely to be income-sensitive than other expenses, we follow Bover (2006) and experiment with three consumption measures that incorporate durable goods expenditure in different forms. The first measure is non-durable expenditure. The second is non-durables plus an imputation of durables consumption based on depreciation rates for the US.[7] The third measure adds non-durable plus

modellign device would deliver the same testable predictions. The reason is that an increase in mortgage maturity would result in a reduction of the amount that must be paid during the early years of a loan, possibly leading those consumers who are close to the credit limit to expand consumption and to increase their leverage. Hence, the consumption of credit constrained households should still react more to changes in mortgage maturity than to changes in the interest rate.

[7] We measure the flow of durable consumption as 0.15 times the value of household equipment expenditure and 0.165 times the value of the stock of vechicles.

actual purchases of vehicles and housing equipment over the last two years.

Credit conditions at purchase: The EFF collects information about the year and purchase price of up to 4 real estate properties. For each mortgage, households are asked to report the initial value of the mortgage, its initial duration (or maturity), whether the interest rate is fixed or variable and its current level. We impute the initial value of interest rates at the moment of purchase. When interest rates are fixed, we use the current rate as the initial one. For variable interest rate mortgages -around 90% of loans during the latter part of the sample- we subtract from the current interest rate the average Euribor in the period of the interview and add the average one during the year of the purchase

Permanent income: We proxy permanent income with an average of the income observations normalized to the age of 45 of the household head. Respondents report at least two measures of income: the sum of income components of all members during the year prior to the interview (2001 for the 2002 wave, 2004 for the 2005 wave) and a measure of annual current income obtained by multiplying by 12 the current monthly income of all household members. For panel households we have up to four income observations. Appendix A.2. gives the details of how we standardize by age and household size.

Sample selection: We use a sample of owners who purchased any of their real estate properties before the age of 65 and have at least one mortgage outstanding - we do not know the credit conditions if the loan is already repaid. We consider house purchases after 1991. The average maturity in the beginning of the nineties was about 15 years, so the restriction eliminates unusually long mortgages signed during periods when the typical maturity was short. We also exclude owners who have very short mortgages (below 10 years). For panel households, we keep only one observation: the earliest observation of consumption after having signed the mortgage with the longest maturity.[8] Finally, we consider only households whose consumption-income ratio is above the 3rd or below the 97th centiles.[9]

[8] We assume that the longest maturity mortgage has the largest impact on consumption.

[9] In the TSLS specification we show, we included more observations to maximize the number of cases in the first stage equation for interest rate and maturities. There, we only screen

The average final sample size is 1,517 households in the OLS specification.[10] The total number of buyers, including those without a mortgage, after 1991 is 3,356. Table 1 provides a description of the variables considered, separated by education group. As we discuss in the next section, education is the main sample split. The average age at purchase of the group with the lowest educational level is 46, while groups with high school or college purchased on average at 40. The interest rate charged also falls with the education of the household head (5.27% for basic schooling, 4.89 for college heads). In addition, indebted households have a very low non-durable consumption to (pre-tax) earnings ratio: the mean is about 47 percent for households headed by an individual with either low or medium education, and it is even lower among college head households (36 percent).

3.1.1 Characterizing credit constrained households

The model sketched in Section 2 gives indications about what groups of the population are most likely to be affected by changes in the maturity of a mortgage. Consumption responses to maturity should be larger among groups of the population with higher-than average income growth late in life (because it is accessing to the earnings of those ages that allows extended mortgage maturities to have an impact on consumption) and pay higher interest rates on their loans than the rest of the population (because a differential in interest rates leads households to end up without assets at the end of the second period). This section provides evidence that income growth and interest rates differ across education groups, providing the basis for our main sample split. In Section 5 we provide an alternative sample split based on household income.[11]

observations above the 99th percentile or below the 1st centile. The results were not affected much.

[10] The EFF imputes the variables that households do not answer by multiple imputation, so there are five datasets for each wave. All the estimates shown below are the average of the estimates in each of the five different samples, with standard errors corrected for the uncertainty across replicates. As the imputed information varies across samples, some of the restrictions we apply to the data vary across samples. Thus, we document average sample sizes that may contain decimals. See http://www.bde.es/webbde/es/estadis/eff/userguide.pdf

[11] The literature has used partitions to examine the prevalence of credit constraints different from education, like current income or assets at the time of the purchase. We mainly have

Income growth The first column of Table 2 shows the results of an OLS regression of household-specific income growth between 2002 and 2005 on age of the household head (minus 45), two dummies of educational attainment of the head (basic schooling and high school, college being the omitted group), the number of adults in the households in 2002, an indicator of female head and interactions between education and age. We use a subsample of 1,013 households who did not experience any change in the number of adults during the three year period. Table 2 suggests that income growth is higher among households with a head with college degree than among households headed by an individual with primary school (15 percent lower). Households headed by an individual with high school have also lower income growth than college head households (8 percent) but the difference is not statistically significant. Importantly for our purposes, the interaction between age of the head and high school is .0117 (standard error: .006), positive and statistically significant at the 6% confidence level. In other words, at later ages -or for earlier cohorts- income growth is higher among high school graduates than among college graduates.

Table 2 Panel B column 1 shows the predicted income growth at age 55 for a household headed by a male and 2 adults. The estimated income growth between 2002 and 2005 for a household headed by a male individual aged 55 with low education was minus 15 percent (standard error: .067). Predicted income growth is also negative for households with a head with college (minus 9 percent, with an standard error of 5.2 percent). Nevertheless, households headed by an individual with high school experienced an income drop of 6 percent, statistically not different from zero. That evidence suggests that mature individuals with mid education levels were the only whose income did not fall between 2002 and 2005.[12]

Interest rates Table 2, column 3 correlates interest rates charged on mort-

retrospective information and the EFF does not report what household income or assets were at the time when the mortgage was signed.

[12] There is other evidence from the EFF pointing at overall negative household income growth in a sample of "homogeneous" households -see Bover, 2008. There is also evidence suggesting declining returns to college in Spain after 1995 -see Izquierdo and Lacuesta, 2006.

gages and education and demographics. The dependent variable is the household-specific average mortgage interest rate paid for all mortgages, weighted by loan size. We regress that household-specific rate on the age of the head, his or her education level, the level of current household income and household composition dummies (not shown). The results suggest that households headed by individuals with mid education levels pay 21 bp more than the rest of the educational groups.

Summarizing, the group of households headed by an individual with high school is the most likely to react to changes in mortgage maturity.

3.2 The empirical strategy

We estimate the following equation for households with an outstanding mortgage:

$$\ln C_h = \alpha_0 + \sum_{g=1}^{g=3} M_{h,g}\beta_g + \sum_{g=1}^{g=3} R_{h,g}\gamma_g + D_t + \delta X_h + f(age_{purchase}) + \varepsilon_h \quad (4)$$

where M_g is the maturity of the mortgage, R_g is the interest rate at the moment of purchase, D_t are 3 dummies indicating the year of the interview (2003, 2005 or 2006), and X_h is a set of covariates described below. Maturity and interest rates are interacted with education dummies – our proxy for credit constraints. From the reference model, we expect β_g to be positive for credit-constrained households only (the middle-education group). Conversely, γ_g ought to be negative for the rest of the households. In the empirical specification, we include maturity and interest rates as the main effects, and interact those variables with basic school and college indicators. Hence, the main effects of $M_{h,g}$ and $R_{h,g}$ capture the impact for households headed by an individual with a high school degree.

X_h includes a set of controls. The first is a set of variables aimed to pick up the life-cycle pattern of consumption. It contains the gender of the reference person, its marital status, 5 dummies indicating the size of the household and the number of adults. The second set contains indicators for current resources: the

current job situation of the reference household and of the spouse and current income. Finally, we condition on other credit conditions at purchase, like the year of purchase of the house (3 dummies for each year of purchase, the reference group being purchases between 1991 and 1993) and whether or not the loan was fixed-rate. Year of house purchase and year of interview are included to capture the aggregate interest rate, thus guaranteeing that $R_{h,g}$ picks up cross-sectional variation in spreads. We also include the age of the head at the time of purchase of the house. Now, controlling for year of purchase, age at purchase and current year precludes us from estimating life-cycle effects on consumption associated to the age of the household head. To capture such life-cycle effects, we construct a variable that takes the age of the spouse for married households and age of the head for other households.

Two main problems that arise when estimating equation (1): the endogeneity of mortgage maturity and interest rates, and sample selection into the sample of indebted buyers. We discuss those issues now.

3.2.1 Selection and two step strategy

Equation (1) is computed on the selected sample of house buyers with an outstanding mortgage. Within the 80% of households who own their house of residence, a significant fraction of home owners purchased their home of residence without borrowing in the credit market (20%). The share of households who did not borrow to purchase their secondary real estate property is even higher: 46%. To estimate consumption responses that control for selection into borrowing, we need to hold tastes constant and identify variation in mortgage access that comes from bank lending practices. We use information about credit rejections to identify households who wanted to have credit but could not have credit because of bank decisions (see Jappelli, 1990 for a similar reasoning). The EFF asks individuals whether or not they had applied for a loan during the last two years, the reason not to apply and if some of the loan applications were totally or only partially rejected, the latter being the case if banks gave a lower amount than that requested by the household.

We estimate first a selection model using a sample of house owners, distinguishing whether or not they have a mortgage on their house. We impute the interest rate and maturities at the time of the purchase using mean interest rates at the time of purchase among broad education and age groups. The rest of the regressors is the set of covariates X_h, as well as three variables to control for selection. The first identifies potential demand for credit and is an indicator of whether the individual applied for a loan during the last two years or did not because of fear of being rejected. This variable is also included in the consumption equation. The second is an indicator of either actual rejections (some of the loans requested were rejected) or anticipated rejections (did not ask for a loan because felt that would be rejected). The third is an indicator of partial rejections (the applicant was given less credit than asked for). Using the results from that Probit, we construct a Mills ratio that is subsequently included in (4) as a selectivity correction term. Our identifying assumption is that, conditional of loan application and the covariates we use, the consumption of owners with and without mortgages would have been the same if all their loan applications had been accepted.

3.3 Endogeneity and instrument choice

An additional problem is that both mortgage maturity and the interest rate are likely to be correlated with unobservable factors that also affect consumption.[13] To solve the problem of endogenous maturity, we exploit the fact that banks are reluctant to award a maturity level that involves paying once the household head is above 65. After age 65 income is expected to fall (due to retirement) and mortality (and the bank expected loss) increases. Furthermore, banks tend to offer mortgage maturities that are often rounded to a 0-5 multiple. We argue that those two rules create arguably exogenous variation in maturity.

We start by documenting the first fact. Graphs 1 and 2 show the histogram

[13] Credit conditions are the result of a match between banks and customers. Households that are better at financial planning could spend more time looking for better deals and sustain a higher level of consumption. On the other hand, banks screen customers using characteristics that we do not observe in the data, but that positively correlate with consumption, such as the assets held by the household at the moment of the signing the mortgage.

of the expected age at mortgage maturity -that is, the sum of age at purchase and the initial maturity of the mortgage. Splitting the sample by the year at which the mortgage was signed, one notices that after 1998 there was an increase in the average age at which the mortgage expire. Yet, banks seemed to be reluctant to award maturities that imply that the household keeps on paying after the head is 65 years of age.[14] Moreover, using the administrative data from the *Instituto Nacional de Estadistica* (INE) for year 2003, we plot the number of all the mortgages signed in Spain in that year, and their maturities. Graph 3 shows that there is considerable accumulation at durations like 5, 10, 15, 20 years.

The instrument for maturity we use is a variable that rounds to the closest 5-multiple of the distance from 65 years the age at which the household purchased the house. The idea is that if a buyer obtains a mortgage when he or she is 30, he/she will receive a mortgage with a maturity of 35 at most, while if s/he asks a mortgage at 33, s/he will receive a 30 year mortgage. Hence, we use as an additional identifying source of variation the age at purchase plus variation that is due to the fact that if a household who purchases a house at an age that is a multiple of 5 is likely to obtain in a maturity longer than another household whose age at purchase is slightly higher. The "rounded" variable has an advantage over an alternative instrument that equals "65-age at purchase": the latter is very similar to year-specific linear age effect. To clarify, identification is obtained through changes in the age profile of maturities according to the year of purchase. Thus, in the second stage, we can control for age and year of purchase separately, as the parameters are identified by the interaction between both variables. The model we estimate is

[14] There seems to be a peak in the age at the maturity of loan at age 55, even higher than that at 65. Unlike the peak at 65, the accumulation at 55 is substantially reduced when we use sampling weights to compute the histogram (not shown). This lead us to suspect that the fact that the EFF oversamples the wealthy includes a few observations on individuals with low maturities that create bunching at 55. Given the size of the sample, and the selection process, we preferred to show unweighted estimates.

$$\ln C_h = \alpha_0 + \sum_{g=1}^{g=3} M_{h,g}\beta_g + \sum_{g=1}^{g=3} R_{h,g}\gamma_g + D_t + f(age_{purchase}) + X_h\delta + \varepsilon_h \quad (5)$$

$$M_h = \theta_0 + \theta_1|65 - age\_p| * POST98_h + \theta_2 POST98_h + \theta_3|65 - age\_p| + \delta X_h + D_t + X_h\delta_1 + u_h \quad (6)$$

$|65 - age\_p|$ is a variable that rounds the distance to 65 to the smallest multiple of 5. $POST98$ is a dummy that takes value 1 if the house was purchased after 1998. The use of 1998 as the dividing year is based on the observation that mortgage maturities increased after that year. D_t is the year of purchase and X_h contains the rest of covariates detailed above.

Instrumenting interest rates. Interest rates are also potentially affected by endogeneity biases. We use as an instrument the average interest rate spread by year of purchase (4-year periods) age of purchase (below or above 45) and education category (3 education groups). For each cell identified with these variables, we imputed the average spread computed in the same way as described in Section 3.1, assuming therefore that the spread was exogenously determined from the market and not driven by the household choices.

A related issue is that in order to check for the heterogeneity in the responses of credit constraints household in equation (1) we have to interact maturity and interest rates with education dummies. Therefore, these interactions are also endogenous variables, and instruments for these variables can be found in the interaction of the proposed instrument, distance from 65 and the interaction with purchase years, with education dummies. The system of equations (5) and (6) is estimated using TSLS

4 Results

This section provides the results for different estimation strategies. First, we assume that interest rates and loan maturity are exogenous and that the sample of house owners with a mortgage is random. We relax each of those assumptions

by controlling for selection first and instrumenting maturities and interest rates secondly. The final specification controls both for endogeneity of interest rates, mortgage maturity and sample selection using TSLS. Finally, we examine different specifications in order to understand who the credit constrained households are, and also focus on the loan to value channel that is an important aspect of consumption. In all cases, the estimates shown are the average of the 5 different imputations that the EFF staff does to address the problem of item and unit non response. The standard errors shown are also corrected for the fact that we are using five implicates.[15]

4.1 The impact of maturity and interest rates on consumption assuming exogeneity

Table 3, column 1, rows 1-6 presents the impact of maturity and interest rates on the log of non-durable expenditure for households with different education levels. The estimation method is OLS and there is no control for sample selection into borrowing. Standard errors are corrected for heteroscedasticity. In column 4 we add consumption components that may be specially sensitive to "cash-in-hand" like the imputed consumption of vehicles and housing equipment and in column 5, actual expenditure on vehicles and housing equipment over the last two years. As the expenditures in housing equipment and vehicles of constrained households are likely to be specially sensitive to "cash in hand", comparing responses across consumption items gives insights about the role of access to credit markets.

The impact of interest rates for the college education group is shown in Table 3, column 1, row 4 and amounts to -0.047 (standard error of 0.0126), statistically significant from zero at the 1 percent confidence level. Conversely, maturity has a negative effect on the consumption of that group: the coefficient in Table 3, row 1 column 1 suggests that an additional year of mortgage maturity diminishes the log of non-durable consumption by .0096 (standard error of 0.003). The

[15] Namely, the standard errors are the average of the 5 standard errors computed in each replication plus a term that reflects the variability of estimates across implicates.

negative impact on non-durable expenditure of maturity could be due to the fact that college grads are younger than the average (and thus consume less) and have accessed the mortgage market when longer maturities were available.[16] We revisit the issue when we control for endogeneity.

Turning to the set of households with a high school head, we find that mortgage maturity level affects the non-durable expenditure of this group positively, and that this differential response with respect to households with a college degree is statistically different from zero: .0118 (standard error: .005). An increase in mortgage maturity of one year increases expenditure by .012-.0096=.0024 log points (Table 3, column 3, rows 1 and 3). The magnitude is relatively small, as an increase in maturity of 10 years increases non-durable consumption by 2.4%. Interestingly, the non-durable expenditure of households headed by an individual with high school is unaffected by interest rates. Adding up the estimate in Table 3, column1, rows 4 and 6 one obtains basically zero (.0469 -.050=0.003).

Rows 2 and 5 of Table 3, column 1 show the differential consumption response of households headed by a person with low education to interest rates and maturity (relative to heads with college degree). The consumption of this group reacts neither to mortgage length (-.0096 + .002= -.0076) or to interest rates.(-.0469 + .0450=-.0019).

Columns 3 and 5 of Table 3 present the response to initial mortgage conditions of total consumption (i.e, non-durables plus the imputed consumption of housing equipment and vehicles) and total expenditure (i,e, non durables plus expenditure over the last two years in vehicles and housing). The pattern of results confirms that the impact of interest rates on consumption is negative only among households whose heads have a college degree. Conversely, the expenditure of households whose head has a high school degree reacts to mortgage length: Table 3, row 6, column 3 shows that an extra year of maturity increases total expenditure by .005 log points (.013 - .008). The consumption of households headed by a person with basic schooling is insensitive to either maturity

[16] Ejarque and Leth-Petersen (2009) document that recent young home buyers in Denmark have little savings to cushion against income shocks, possibly leading to a low consumption level.

or interest rates.

Overall, the evidence in Table 3 suggests that the responses of consumption to mortgage maturities and interest rates differ among groups of the population. The size of the mortgage installments increases expenditure among households headed by a person with high school and that group does not consume more in response of better financing rates. That behavior is consistent with the idea that credit constraints bind for that group. The determinants of consumption within the group with college degree are those of unconstrained households: consumption is lower among households with higher interest rates, but it is insensitive to drops in the size of the yearly installment captured by longer maturities.

4.2 Controlling for selection

The estimates in Table 3 do not account for the fact that the consumption preferences of owners who borrowed to finance their home purchase may differ from the rest of the population. We control for selection into borrowing using information about the credit rejections of households who wanted to borrow but could not because banks rejected their applications.[17] Table A.2. in the Appendix shows the results of a Probit that identifies mortgage borrowing among a sample of 3,356 house owners using the covariates in Table 3. Table A.2. confirms that conditional on having applying for a loan, households who were rejected have a lower chance of having purchased their house of residence with a mortgage.

Columns 2 and 3 of Table 4 report the OLS estimates of the impact on consumption of maturity and interest rates on consumption, controlling for selection. Table 4 adds two additional variables to the specification in Table 3: a measure of "demand for loans" and the Mills ratio from the Probit in Table A.2.. The results in Table 4 confirm the results in Table 3. We document a negative correlation between interest rates and consumption only among households

[17] The survey asks about credit rejections during the last two years only, not about rejections at the time of purchase. We assume that the reasons that lead a bank to reject a credit application are likely to stay over time

whose head has a college degree. Conversely, the only group whose consumption responds to mortgage maturity is that headed by a person with a high school degree.

4.3 TSLS estimates.

The following step is to control for the endogeneity of maturity and interest rates. We instrument maturity using changes over time in the age at mortgage maturity, and interest rates using averages within broad age-education-year of purchase cells. We start by verifying that those instruments have predictive power.

4.3.1 The first stages: relevance of the instruments

Table 5 illustrates the results for the first stage regression of maturity (columns 1 and 3) and interest rates (columns 5 and 7) on the exogenous variables and the instruments. Column 1 shows the determinants of mortgage maturity. The first row of Table 5 shows the OLS coefficient of the interaction of "rounded distance to 65 at purchase" and "purchase after 1998" in a regression with maturity in the left-hand-side. The magnitude of the interaction is 0.1007 (with a s.e. of 0.0348), suggesting that an extra year of purchase reduces the maturity by around one month. Interestingly, "rounded distance to 65" does not correlate with maturity for purchases prior to 1998: the coefficient is -.0428, with standard error of .0515. Adding a selection term does not change the first stage: the coefficient in Table 5, row 1 is virtually identical. Finally, the average interest rate seems not to be related with higher maturity, reassuring us that what identifies variation in maturity is the age at purchase and not other credit market conditions. The F-test of "rounded age to 65" times "post 98" is 9.49, in the border of a weak instrument.

Table 5, column 5 row 2 shows the regression of the interest rate variable on the instruments. The coefficient of the average interest rate spread by education, age and year of purchase groups is .75 (standard error: .396). The estimate is not statistically different from 1, but it is not particularly precise. This creates

a problem, as one of the instruments is weak. To check for the validity of the TSLS inferences, we present robustness checks instrumenting maturity only and replacing the individual interest rate with the average of the (spread of the) interest rate in the year of purchase, schooling and age.

4.3.2 The causal impact of interest rates and maturities on consumption

The impact of interest rates on non-durable consumption of high educated households is shown in row 1 of Table 6 and are large, negative and imprecise. Households headed by an individual with a college degree reduce the log of non-durable expenditure by -.2024 (standard error: .1546) when interest rates increase by 100 basis points. On the other hand, one year longer mortgage maturities has a negligible impact on the consumption of the college head households; the estimated coefficients are shown in row 4 of Table 5 and equal to -.01 (a .1 percent response of non-durable consumption to 1 more year of maturity) and -0.012 for total expenditure. Neither estimate is significantly different from zero at conventional significance levels.

The differential response of non durable consumption to mortgage maturity for the group of households headed by a *mid-education* household (relative to college) is shown in row 3 of Table 5 and is 0.0425 (with a standard error of 0.019), suggesting that an increase in maturity of 1 year increases consumption by 3.2% =(4.25-1) . The coefficient is significant at a 5% confidence level. The response of non-durable expenditures of the high school group to an increase of 100 bp is -.10 obtained by taking the difference between the estimates in rows 4 and 6 of Table 5 (column 1). The corresponding estimate for the group with college was -.20. While not statistically different the pattern of results is in line with the theory. The fact that the timing of mortgage payments has a positive effect on all the consumption measures of the "high school degree" group, but interest rates have a smaller impact than for other groups is again consistent with binding credit constraints for that group.

In rows 2 and 5 of Table 6 we show the impact of interest rates and maturity

on the consumption of the *low educated*. In column 2 the estimated nondurable consumption response to the interest rate for the low education group is -0.15 for non durables and -0.13 for total expenditure, much larger in absolute value than the zero responses in Tables 3 and 4. Turning to mortgage maturity, the non-durable consumption response can be obtained by adding up coefficients in column 1, rows 1 and 2 of Table 6 : the impact is 0.0048 (=.0148-.01), small and not significantly different from zero. The selectivity-corrected estimates in Table 7 confirm the results in Table 6.

Summarizing, once we instrument interest rates and maturities, the consumption response to one-year maturity changes by the "high school group" increase dramatically, the interaction of maturity and high school increases from the values around .01 in Tables 3 and 4 to values in the realm of .045 in Table 6 row 3 (all columns). The reactions of consumption to interest rates are much larger in absolute value than those in Table 3 and lower among "high school group" than among the rest of households. Nevertheless, those results must be taken with care because TSLS estimates of the response of consumption to interest rates are rather imprecise. Again "college" households resemble the credit unconstrained group that reacts more to interest rates than to the size of mortgage installments, while the "high school group" reacts mainly to mortgage maturities.

Magnitude of the estimates We next assess how large the response of consumption to maturity is among households headed by an individual with high school. In Section 2, we provide a rough computation suggesting that an increase in mortgage maturity of 10 years diminishes yearly payments by about 10% of the earnings of the average household. We reran the model in Table 6 column 1 but using the logarithm of the ratio of nondurable goods over earnings. The coefficient of that regression indicates the impact of mortgage credit conditions on consumption as a fraction of current income. The coefficient of maturity interacted with high school head is .025 (standard error: .024). We then predicted for each household the (log of the) consumption income ratio with a maturity of 15 years and with a maturity of 25 years. The exponential of the

average difference is 10%, slightly above the 9% reduction in payments. Hence, the magnitude suggests that the whole reduction in installments is consumed by house owners.

4.4 Robustness checks

Instrumenting maturity only: In Table 8 we perform two robustness checks. The first is to examine the robustness of the results when we instrument less variables. The first stage for the interest rate suggests a limited explanatory power for the instrument of the interest rate. The average interest rate within the same education-year of purchase and time of purchase group is indeed related to actual interest rates paid, but the F-test for than instrument was lower than 4. As a robustness check, we try an additional model where we regress consumption on maturity, the instrument for interest rate, and the rest of exogenous regressors. We still instrument maturity using the variable "rounded distance to 65" interacted with "post 98" dummy. The results are shown in the first Panel of Table 8 and are qualitatively similar to those in Table 7.

The loan to value channel: The model we sketched suggests that credit constrained households use higher loan-to-value ratios to finance consumption during the early period of house ownership. Hence, we expect loan to values to respond more to mortgage maturity among credit constrained households than among the rest. Table 6 presents Tobit estimates of the impact of mortgage maturity and interest rates on the loan-to-value ratios across education groups. While the results may be affected by endogeneity biases - for example, interest rates seem to be orthogonal to loan-to value ratios- the response of loan-to-values is higher among households headed by a high school individual than among the rest of households. That result is broadly consistent with the idea that the "high school group" of house-owners finance their consumption by borrowing a higher share of the purchased house value against a longer period of remaining earnings.

5 Alternative sample splits and the role of financial literacy

Splitting the sample by income Banks examine variables like income of the household when deciding to give a loan to a household. Hence, household income looks like a natural sample split to identify differential access to credit. Unfortunately, we do not observe household income at the time of requesting a mortgage, but income in the year prior to the interview. Still, we split the sample of owners by income during the year prior to the survey to examine income-specific consumption responses to interest rates and maturities. Namely, we split the sample of home owners by income quartile and run group-specific OLS regressions of non-durable consumption on maturity, interest rate and the rest of the covariates. Instead of controlling for income quartile, we include (log) permanent and current income as linear terms to control for variation in income within each group. We expect negative responses of consumption to interest rates in the upper part of the income distribution, while consumption responses to maturity in the lower part of the income distribution.

The results are shown in Table 9, rows 1 and 2. Log consumption is unresponsive to mortgage maturity either in the very bottom of the income distribution (the lowest quartile) or in the top quartile. We find a response for the central two quartiles of the income distribution, where an extra year of maturity increases log consumption by .8 percentage points (standard error: .53 pp). The estimate is somewhat imprecise but very similar in magnitude to those in Tables 3 and 4 for the "high school group". Row 2 of Table 9 suggests that the only group whose consumption correlates negatively with interest rates is that with income in the top quartile. The magnitude of the interest rate response is -.07, larger in absolute value than the .04 estimate for the "college group" in Tables 3 and 4. For the rest of the groups, consumption and initial interest rates are unrelated.

Overall, Table 9 offers additional evidence of the existence of credit constraints among households with income in the second and third quartiles of the

income distribution, whose consumption responds to mortgage maturity, but not to interest rates. Households in the top quartile of the income distribution show behavior similar to that of unconstrained households.

Credit constraints vs financial literacy An alternative explanation of our results is that households with a high school degree have limited financial education and thus are unlikely to understand what an interest rate is (see Lusardi and Tufano, 2009) Hence, their consumption would not respond to interest rates, as that concept is not part of their information set. While of course problems with financial literacy are widespread and the issue merits further investigation we have strong doubts that a lack of financial literacy explains our findings. First, were financial literacy driving our results, the changes in the size and timing of installments would affect the consumption level of the least financially able: households with a basic schooling head. Nevertheless, the consumption of the least educated is insensitive to mortgage maturity in any of the specifications in the paper. Second, Lusardi and Tufano show that financial literacy is correlated with overindebtedness. In our sample, the loan-to-value ratio among the group with the lowest education level is as sensitive to the size of mortgage installments as that of the *most* educated (college heads, see Table 8 Panel B). Third, the TSLS specification does not rule out large consumption responses to interest rates among the least likely to be financially able: the low educated. Again, consumption responses to interest rates are admittedly imprecise, but rather large among the least educated. Fourth, the evidence from income growth in the later part of life fits more naturally with a credit constraint story than with a lack of financial sophistication.

6 Concluding remarks

Simple economic theory predicts that changes in mortgage market conditions, like longer periods to repay or lower interest rates have a heterogeneous impact on the consumption of home owners, and that such heterogeneity in the responses is informative about the share of liquidity constrained households

among house owners. In particular, the consumption of groups of the population who are exposed to higher borrowing rates and who expect higher income growth late in life should be specially responsive to mortgage maturity. Alternatively, the consumption of other, unconstrained, groups should react mainly to changes in interest rates and is unrelated to the size of mortgage installments. In this study, we use the 2002 and 2005 waves of the EFF, a Spanish Survey with retrospective information about mortgage conditions, to estimate the response of household consumption to cross-sectional changes in maturity and in the spread of the interest rate over the Euribor.

We document that the consumption response to interest rates and maturities is rather heterogeneous across groups of house owners defined by their income and education. The level of consumption seems to be related negatively to interest rates only among the college educated. The consumption of groups with high school attainment responds mainly to mortgage maturity. The evidence is robust to the endogeneity of interest rates and maturity and for controls for selection into borrowing. One interpretation of those findings is that households whose head has a high school degree are credit constrained. Alternative sample splits using household income suggest that consumption responses to changes in the interest rate are confined among home owners in the top income quartile. We find some evidence of a response of consumption to mortgage maturity only among house owners in the central quartiles of the income distribution.

One way to assess the magnitude of our estimates is to compute a share of credit constrained households in Spain. The share of households headed by a person with a high school degree as a fraction of the set households that bought the house with a mortgage in the period 1992-2006 is 32%. Hence, credit constrained households would be about 32% of relatively recent house owners or 8% of the total population. Both estimates are above what one would get using credit rejection questions - around 3% of indebted households in our sample.

Do the patterns of consumption response to mortgage conditions hold in thinner mortgage markets, like the Italian one? Take the alternative case of the US, where loan refinancing is much more prevalent than in Spain. Do initial

mortgage conditions determine there the level of household consumption? We plan to address those issues by estimating the link between consumption and credit market conditions using datasets from other economies.

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7 Appendix 1

This appendix gives details about the results in Section 2.

7.1 Consumption when mortgage maturity equals 1.

We focus on the case that the consumer ends the second period with no saving. In that case,

$$c_1(1) = \frac{1}{1+\eta^{\frac{1}{\rho}}+\beta^{\frac{1}{\rho}}(1+r_b)^{\frac{1}{\rho}-1}}[y_1+\frac{y_2}{1+r_b}]$$

$$h(1) = \frac{\eta^{\frac{1}{\rho}}}{1+\eta^{\frac{1}{\rho}}+\beta^{\frac{1}{\rho}}(1+r_b)^{\frac{1}{\rho}-1}}[y_1+\frac{y_2}{1+r_b}]$$

and

$$c_2(1) = \frac{\beta^{\frac{1}{\rho}}(1+r_b)^{\frac{1}{\rho}}}{1+\eta^{\frac{1}{\rho}}+\beta^{\frac{1}{\rho}}(1+r_b)^{\frac{1}{\rho}-1}}[y_1+\frac{y_2}{1+r_b}]$$

while $c_3(1) = y_3$. In such allocation, one can show the following results:

Lemma 1 $\frac{\partial c_1}{\partial(1+r_b)} < 0$ *if* $\rho < 1$ *and* $\frac{y_2-y_1}{y_1}$ *is sufficiently large*

Taking derivatives with respect to $1+r_b$, one can obtain

$$\frac{\partial c_1}{\partial(1+r_b)} = -\frac{1}{\Omega(r_b)}[\frac{y_2}{(1+r_b)^2}] - \frac{\Omega^{'}(r_b)}{[\Omega(r_b)]^2}[y_1+\frac{y_2}{1+r_b}]$$

Where $\Omega(r_b) = 1 + \eta^{\frac{1}{\rho}} + \beta^{\frac{1}{\rho}}(1+r_b)^{\frac{1}{\rho}-1}$. Operating, we get

$$\begin{aligned} \frac{\partial c_1}{\partial(1+r_b)} &< 0 \qquad if \\ \frac{1}{\Omega(r_b)}[\frac{y_2}{(1+r_b)^2}] &> \frac{[-\Omega^{'}(r_b)]}{[\Omega(r_b)]^2}[y_1 + \frac{y_2}{1+r_b}] \end{aligned}$$

Dividing both sides of the inequality by $[y_1 + \frac{y_2}{1+r_b}]$ and rearranging, one obtains that $\frac{\partial c_1}{\partial(1+r_b)} < 0$ whenever parameters satisfy (C1)

$$\frac{1+\Delta y}{2+\Delta y+r_b} > \frac{1}{\rho}[\frac{\beta^{\frac{1}{\rho}}(1+r_b)^{\frac{1}{\rho}-1}(\rho-1)}{1+\eta^{\frac{1}{\rho}}+\beta^{\frac{1}{\rho}}(1+r_b)^{\frac{1}{\rho}-1}}] \tag{7}$$

Where $\Delta y = \frac{y_2 - y_1}{y_1}$. The left hand side of (7) is 1 at most, increases with second period income and falls with the borrowing rate r_b The RHS of (7) is the product of two terms.$\frac{1}{\rho}$ and a second term that increases with ρ. Thus, an increase in r_b diminishes consumption in the first period if Δy is sufficiently large

Lemma 2 *An increase in interest rates makes* $\phi(1)$ *fall*

Using the first period budget constraint, one can recover the expression for the optimal loan-to-value ϕ_1

$$\frac{[\eta^{\frac{1}{\rho}}+1]y_2 - \beta^{\frac{1}{\rho}}(1+r_b)^{\frac{1}{\rho}}y_1}{\eta^{\frac{1}{\rho}}[y_1(1+r_b)+y_2]} = \phi(1)$$

Taking differences with respect to $(1+r_b)$ one obtains

$$\frac{-\frac{1}{\rho}\beta^{\frac{1}{\rho}}(1+r_b)^{\frac{1}{\rho}-1}y_1}{\eta^{\frac{1}{\rho}}[y_1(1+r_b)+y_2]} - \phi_1\frac{\eta^{\frac{1}{\rho}}y_1}{\eta^{\frac{1}{\rho}}[y_1(1+r_b)+y_2]} = \frac{\partial\phi(1)}{\partial(1+r_b)}$$

Both terms are negative. Hence, an increase in $1+r_b$ leads to a drop in both housing and non-housing consumption among buyers both through income and substitution effects if $\rho < 1$ and the income profile sufficiently steep. Still, as the fraction of housing financed through a mortgage drops unambiguously with the interest rate a home buyer still needs to spend more on housing upfront (1-ϕ)h, thus consuming less on the rest of (non-housing) goods.

7.2 Case 2: Consumption when mortgage maturity equals 2.

With two periods to repay the loan, the allocations of non-housing consumption -$c_1(2), c_2(2)$ and $c_3(2)$- and housing -$h(2)-$ can be written as follows

$$c_1(2) = \frac{1}{1+\eta^{\frac{1}{\rho}} + \beta^{\frac{1}{\rho}}(1+r_b)^{\frac{1}{\rho}-1} + \beta^{\frac{2}{\rho}}(1+r_b)^{\frac{2}{\rho}-2}}[y_1 + \frac{y_2}{1+r_b} + \frac{y_3}{(1+r_b)^2}]$$

$$c_2(2) = \frac{\beta^{\frac{1}{\rho}}(1+r_b)^{\frac{1}{\rho}}}{1+\eta^{\frac{1}{\rho}} + \beta^{\frac{1}{\rho}}(1+r_b)^{\frac{1}{\rho}-1} + \beta^{\frac{2}{\rho}}(1+r_b)^{\frac{2}{\rho}-2}}[y_1 + \frac{y_2}{1+r_b} + \frac{y_3}{(1+r_b)^2}]$$

$$c_3(2) = \frac{\beta^{\frac{2}{\rho}}(1+r_b)^{\frac{2}{\rho}}}{1+\eta^{\frac{1}{\rho}} + \beta^{\frac{1}{\rho}}(1+r_b)^{\frac{1}{\rho}-1} + \beta^{\frac{2}{\rho}}(1+r_b)^{\frac{2}{\rho}-2}}[y_1 + \frac{y_2}{1+r_b} + \frac{y_3}{(1+r_b)^2}]$$

$$h(2) = \frac{\eta^{\frac{1}{\rho}}}{1+\eta^{\frac{1}{\rho}} + \beta^{\frac{1}{\rho}}(1+r_b)^{\frac{1}{\rho}-1} + \beta^{\frac{2}{\rho}}(1+r_b)^{\frac{2}{\rho}-2}}[y_1 + \frac{y_2}{1+r_b} + \frac{y_3}{(1+r_b)^2}]$$

Lemma 3 *Maturity extensions increase $c_1(2)$ relative to $c_1(1)$ and $c_2(2)$ relative to $c_2(1)$ when y_3 sufficiently large relative to the borrowing rate r_b*

$$c_1(2) = \frac{1}{1+\eta^{\frac{1}{\rho}} + \beta^{\frac{1}{\rho}}(1+r_b)^{\frac{1}{\rho}-1} + \beta^{\frac{2}{\rho}}(1+r_b)^{\frac{2}{\rho}-2}}[y_1 + \frac{y_2}{1+r_b} + \frac{y_3}{(1+r_b)^2}] = \Omega_2(r_b)E_3(r_b)$$

Where we have used the notation $\Omega_2(r_b) = \frac{1}{1+\eta^{\frac{1}{\rho}} + \beta^{\frac{1}{\rho}}(1+r_b)^{\frac{1}{\rho}-1} + \beta^{\frac{2}{\rho}}(1+r_b)^{\frac{2}{\rho}-2}}$ and $E_3(r_b) = [y_1 + \frac{y_2}{1+r_b} + \frac{y_3}{(1+r_b)^2}]$

$$c_1(1) = \frac{1}{1+\eta^{\frac{1}{\rho}} + \beta^{\frac{1}{\rho}}(1+r_b)^{\frac{1}{\rho}-1}}[y_1 + \frac{y_2}{1+r_b}] = \Omega_1(r_b)E_2(r_b)$$

To establish the result, one needs to prove that $\frac{c_1(1)}{c_1(2)} < 1$, or $\frac{\Omega_1(r_b)y_2(r_b)}{\Omega_2(r_b)y_3(r_b)} < 1$. A similar condition is that

$$\frac{\Omega_2(r_b)}{\Omega_1(r_b)} < \frac{y_2(r_b)}{y_3(r_b)} \tag{8}$$

Expression C2 can be expressed in terms of parameters as follows:

$$\frac{\Omega_2(r_b)}{\Omega_1(r_b)} = 1 + \frac{\beta^{\frac{2}{\rho}}(1+r_b)^{\frac{2}{\rho}-2}}{1+\eta^{\frac{1}{\rho}}+\beta^{\frac{1}{\rho}}(1+r_b)^{\frac{1}{\rho}-1}}$$

$$\frac{y_2(r_b)}{y_3(r_b)} = \frac{1}{1+\frac{\frac{y_3}{(1+r_b)^2}}{y_1+\frac{y_2}{1+r_b}+\frac{y_3}{(1+r_b)^2}}}$$

Hence, $\frac{c_1(1)}{c_1(2)} < 1$ if

$$\frac{\beta^{\frac{2}{\rho}}(1+r_b)^{\frac{2}{\rho}-2}}{1+\eta^{\frac{1}{\rho}}+\beta^{\frac{1}{\rho}}(1+r_b)^{\frac{1}{\rho}-1}} < \frac{\frac{y_3}{(1+r_b)^2}}{y_1+\frac{y_2}{1+r_b}+\frac{y_3}{(1+r_b)^2}}$$

This condition is more likely to hold when y_3 sufficiently large relative to the interest rate r_b. The condition also guarantees that $\frac{c_2(1)}{c_2(2)} < 1$

Lemma 4 *An extension in maturity increases the loan-to-value ratio of homeowners.*

The loan-to-value ratio can be obtained from the first-period budget constraint:

$$(1-\phi(2))h = y_1 - c_1(2)$$

Evaluating the expression at $h(2)$ and $h(1)$, one gets the result.

$$1-\phi(2) = \frac{y_1}{h(2)} - \frac{(1+r_b)^{\frac{1}{\rho}}}{\eta^{\frac{1}{\rho}}}$$

$$1-\phi(1) = \frac{y_1}{h(1)} - \frac{(1+r_b)^{\frac{1}{\rho}}}{\eta^{\frac{1}{\rho}}}$$

The fact that an increase in mortgage maturity leads to an increase of both the expenditure in housing and non-housing goods together with the fact that the budget constrained must be satisfied implies that implies that $1-\phi_2 < 1-\phi_1$, or $\phi_1 < \phi_2$: The higher level of non-housing consumption is financed with a higher loan-to-value ratio

Lemma 5 *The response of consumption to the interest rate is higher among non-constrained households holds* $|\frac{\partial c_1(1)}{\partial(1+r_b)}| < |\frac{\partial c_1(2)}{\partial(1+r_b)}|$

$$c_1(1) = \frac{1}{1+\eta^{\frac{1}{\rho}}+\beta^{\frac{1}{\rho}}(1+r_b)^{\frac{1}{\rho}-1}}[y_1+\frac{y_2}{1+r_b}]$$

$$c_1(2) = \frac{1}{1+\eta^{\frac{1}{\rho}}+\beta^{\frac{1}{\rho}}(1+r_b)^{\frac{1}{\rho}-1}+\beta^{\frac{2}{\rho}}(1+r_b)^{\frac{2}{\rho}-2}}[y_1+\frac{y_2}{1+r_b}+\frac{y_3}{(1+r_b)^2}]$$

The responses are:

$$\frac{\partial c_1(1)}{\partial(1+r_b)} = -\frac{(\frac{1}{\rho}-1)\beta^{\frac{1}{\rho}}(1+r_b)^{\frac{1}{\rho}-2}}{[1+\eta^{\frac{1}{\rho}}+\beta^{\frac{1}{\rho}}(1+r_b)^{\frac{1}{\rho}-1}]^2}[y_1+\frac{y_2}{1+r_b}]-\frac{1}{1+\eta^{\frac{1}{\rho}}+\beta^{\frac{1}{\rho}}(1+r_b)^{\frac{1}{\rho}-1}}[\frac{y_2}{(1+r_b)^2}]$$

a negative number. $\frac{\partial c_1(2)}{\partial(1+r_b)}$ equals

$$\begin{aligned}\frac{\partial c_1(2)}{\partial(1+r_b)} &= -\frac{(\frac{1}{\rho}-1)\beta^{\frac{1}{\rho}}(1+r_b)^{\frac{1}{\rho}-2}[1+2\beta^{\frac{1}{\rho}}(1+r_b)^{\frac{1}{\rho}-2}]}{[1+\eta^{\frac{1}{\rho}}+\beta^{\frac{1}{\rho}}(1+r_b)^{\frac{1}{\rho}-1}+\beta^{\frac{2}{\rho}}(1+r_b)^{\frac{2}{\rho}-2}]^2}[y_1+\frac{y_2}{1+r_b}+\frac{y_3}{(1+r_b)^2}] \\ &\quad -\frac{1}{1+\eta^{\frac{1}{\rho}}+\beta^{\frac{1}{\rho}}(1+r_b)^{\frac{1}{\rho}-1}+\beta^{\frac{2}{\rho}}(1+r_b)^{\frac{2}{\rho}-2}}[\frac{y_2}{(1+r_b)^2}+\frac{y_3}{(1+r_b)^3}]\end{aligned}$$

If $\rho < 1$ and condition C1 holds, $|\frac{\partial c_1(1)}{\partial(1+r_b)}| < |\frac{\partial c_1(2)}{\partial(1+r_b)}|$

8 Appendix 2: The construction of permanent income

The measure of permanent income we use is an average of total income during the years we observe the household, normalized for a household composed by 3 adult members whose head is 45 years of age as of 2002. For 55% of households we have two consecutive yearly observations The first is the report during the fiscal year of 2001 for the EFF2002 and that for 2007 for EFF2008. The second is an imputation of monthly household income during the period of the interview, based on direct questions on current income to all household members. We multiply by 12 that report. For panel households, we have two extra data points -two similar measures for the 2002 or 2005 wave. We use the sample of households whose head is at most 70.

To normalize permanent income, we regress current earnings on a 4th order polynomial of age of the household head , education, and indicators of marital status, the number of adults in the household and the number of children. The point of including schooling is that there is substantial cross-cohort variation in earnings. We make the hypothesis that education captures part of the variation in the intercepts of those cohort profiles, so including them as regressors permits us to identify the coefficients of the age polynomial as measuring an average life-cycle income profile.

$$\log y_{ht} = \delta_0 + f(age - 45) + \sum_{i=1}^{i=3} \delta_{1+i} School_{head} + \delta_4 X + \sum_{t=2003}^{t=2006} Year + u_h + \varepsilon_{ht}$$

where the error component has two elements: one that does not vary over time and a second one that we assume to be iid. The measure of permanent income is the following:

$$Y_h = \exp(\delta_0 + \delta_1 School_{head} + u_h)$$

Table 1: Descriptive statistics, sample of owners with at least one mortgage

	Basic school		High school			College		
	Mean (1)	St. Deviation	Mean (2)	St. Deviation	T-Test (1)=(2)	Mean (3)	Stand. Deviation	T-Test (3)=(2)
Interest rate	5,427	2,289	4,890	2,088		4.8007	1.9405	
Age of purchase	37,075	11,281	32,437	8,987		32.1323	8.5415	
Maturity (years)	20,333	6,574	21,392	6,637		20.8917	6.2028	
Mortgage	64.743	48.397	75.747	16.7397	**	91.631	113.102	**
Original loan-to-value	.89	.486	.826	.52		.70	.30	**
Fixed	0.135	0.342	0.169	0.375		0.1578	0.3648	
Household income	32.642	21.348	36.079	40.898	**	54.831	48.501	**
Non-durable/Income	0.467	0.242	0.453	0.251		0.3610	0.2472	**
Current age	46,620	12,075	39,844	9,219		40.1408	8.6547	
Applied for a loan, last 2 years	0.467	0.500	0.498	0.501		0.4380	0.4965	**
Rejected partially/totally	0.031	0.172	0.050	0.218		0.0293	0.1683	*
Average sample size	245.4		483.6			789		

Monetary magnitudes in 000s euro of 2006, all statistics are weighted using population weights and averaged across 5 replications

1. Source: EFF2002 and 2005 waves. Sample of 1517 house owners (on average) with at least one mortgage on one of their properties and who purchased their house before age 65 and between 1993 and 2006.Initial maturities are at least ten years long

2. Sample excludes cases when the imputed total yearly consumption over household income is above the 97th or below the 3rd centiles

3. An *,** in the T-test columns indicates whether the difference of means is significantly different from zero at the 10 (5) percent confidence level

Table 2: Who is likely to be affected by increases in mortgage maturity?

Panel A: Household income growth and interest rates on mortgage, by education group

Dependent variable:	Income growth 2002-2005				Interest rate on mortgages	
Estimation method:	OLS		WLS		OLS	
	Coeff.	St. Error	Coeff.	St. Error	Coeff.	St. Error
	(1)	(2)	(3)	(4)	(5)	(6)
Age of head minus 45	-.0079	.0048*	-.0085	.0058	-.937	.585
Age head minus 45 * Primary	.0091	.0064	.0082	.009	--	
Age head minus 45 * High school	.0117	.0061*	.0133	.0086	--	
Primary school	-.149	.0069*	-.047	.090	23.531	7.83**
High school	-.0880	.061	-.088	.0725	19.11	4.84
Constant	-.017	.041	-.063	.097	347.158	18.10

Panel B: Predicted household income growth and interest rates

	Predicted income growth				Interest rate	
	Unweighted		Weighted		Unweighted	
Low educated	-.150	.067*	-.126	.071*	385.31	21.58
High school	-.064	.063	-.0987	.0776	388.97	19.22
College	-.0922	.053*	-.147	.079*	367.91	19.37
Sample size:		1013			761	

1. EFF 2002 and 2005 waves

2. The sample used in columns 1 and 2 is a panel of 1,013 households where the number of adults stayed constant between 2002 and 2005 and where the head is between 18 and 65 years of age. Standard errors are corrected for heteroscedasticity

3. The sample used in Column 3 contains households with a mortgage and a head between 18 and 65 years of age. The estimates are not corrected for selection. Standard errors in parentheses are corrected for heteroscedasticity

Table 3: The OLS response of household consumption to initial mortgage conditions, by education

	Log of yearly expenditure on non durable goods		Log of non-durables + imputed vehicles + furniture		Log of non-durables + expenditure on vehicles and furniture	
	Coeff.	St. Error	Coeff.	St. Error	Coeff.	St. Error
	(1)	(2)	(3)	(4)	(5)	(6)
1. Maturity	-0.0096	0.0035**	-0.0110	0.003**	-0.008	0.003**
2. Maturity*Basic school	0.0020	0.0054	0.0054	0.005	0.000	0.005
3. Maturity*High school	0.0118	0.0050**	0.0115	0.004**	0.013	0.005**
4. Interest rate	-0.0469	0.0126**	-0.0451	0.010**	-0.045	0.012**
5. Interest rate* Basic school	0.0450	0.0167**	0.0373	0.014**	0.039	0.016**
6. Interest rate*High school	0.0501	0.0154**	0.0388	0.013**	0.049	0.015**
Rest of covariates						
Age at purchase -65, rounded	-0.0011	0.0033	-0.0013	0.003	-0.001	0.003
Basic school	-0.3837	0.1630	-0.4399	0.135	-0.310	0.157
High school	-0.5544	0.1456	-0.5116	0.119	-0.568	0.141
Female ref. person	-0.1869	0.0666	-0.1946	0.057	-0.182	0.066
Household size 1	-0.4394	0.0823	-0.4051	0.069	-0.441	0.082
Household size 2	-0.2572	0.0403	-0.2195	0.035	-0.237	0.039
Household size 4	0.0763	0.0359	0.0670	0.030	0.066	0.035
Household size 5 or more	0.2347	0.0528	0.2010	0.045	0.223	0.052
Age below 35	-0.0922	0.0435	-0.0855	0.036	-0.078	0.042
Age between 46 and 55	0.1648	0.0498	0.1440	0.042	0.156	0.049
Age between 56 and 65	0.1213	0.0793	0.1249	0.067	0.096	0.078
Age above 66	0.0048	0.1595	-0.0099	0.134	-0.026	0.158
single	0.0195	0.0742	-0.0516	0.067	-0.016	0.075
divorced	-0.0461	0.0817	-0.0272	0.068	-0.055	0.081
widow	-0.0850	0.1344	-0.0954	0.111	-0.108	0.134
Year 2003	0.1972	0.0428	0.1403	0.036	0.180	0.042
Year2005	0.0672	0.0537	0.1012	0.046	0.077	0.053
Year 2006	0.1221	0.0397	0.1267	0.034	0.135	0.039
Bottom quartile current inc	-0.1934	0.0634	-0.1784	0.052	-0.182	0.060
Third quartile current inc.	0.0150	0.0448	0.0217	0.035	0.021	0.043
Top quartile perm. Inc.	0.1000	0.0591	0.1315	0.047	0.105	0.057

Table 3 (cont.): The OLS response of household consumption to initial mortgage conditions

	Log of yearly expenditure on non durable goods		Log of non-durables + imputed vehicles + furniture		Log of non-durables + expenditure on vehicles and furniture	
	Coeff.	St. Error	Coeff.	St. Error	Coeff.	St. Error
	(1)	(2)	(3)	(4)	(5)	(6)
Bottom quartile perm inc	-0.1273	0.0489	-0.1229	0.040	-0.138	0.047
Third quartile perm inc.	0.0372	0.0466	0.0687	0.037	0.058	0.045
Top quartile perm. Inc.	0.3784	0.0553	0.4163	0.046	0.392	0.054
Year of purchase 94-96	0.0440	0.0623	0.0334	0.052	0.031	0.058
Year of purchase 97-02	-0.0082	0.0524	-0.0073	0.044	-0.008	0.048
Year of purchase 03-06	-0.0133	0.0425	-0.0120	0.037	-0.011	0.038
Spouse has no job	-0.0019	0.0424	0.0095	0.036	0.012	0.041
Fixed interest rate	-0.0340	0.0394	-0.0423	0.032	-0.028	0.038
Constant	9.8000	0.1466	10.1422	0.126	9.8012	0.143

1. Source: EFF2002 and 2005 waves. Sample of 1517 house owners (on average) with at least one mortgage on one of their properties and who purchased their house before age 65 and between 1993 and 2006.Initial maturities are at least ten years long

3. Observations censored when the imputed total yearly consumption over household income is above the 97th or below the 3rd centiles

4. Each coefficient is the OLS impact of the variable in each row on the consumption measure in the column. Standard errors are corrected for arbitrary heteroscedasticity. The constant is the average log-consumption of a three person household where the head has a college degree and the spouse is between 36 and 45 years of age and who purchased their house before 1994

6. *(**): the coefficients in rows 1-6 are statistically different from zero at the 10(5) confidence level

Table 4: OLS responses to mortgage conditions, by education and controlling for selection

Estimation method: OLS plus a term accounting for selection				
Dependent variable	Non-durables		Non-durables + exp. vehicles and equipment	
	Coeff.	Standard error	Coeff.	Standard error
	(1)	(2)	(3)	(4)
1. Maturity	-0.0097	0.0035**	-0.0090	0.0035**
2. Maturity*Basic school	0.0022	0.0054	0.0007	0.0053
3. Maturity*High school	0.0115	0.0050**	0.0127	0.0048**
4. Interest rate	-0.0401	0.0120**	-0.0376	0.0118**
5. Interest rate* Basic school	0.0447	0.0170**	0.0397	0.0163**
6. Interest rate*High school	0.0496	0.0156**	0.0493	0.0150**
Rest of covariates				
Age at purchase -65, rounded	-0.0031	0.0042	-0.0018	0.0041
Basic school	-0.3834	0.1657	-0.3208	0.1590
High school	-0.5352	0.1464	-0.5551	0.1416
Female ref. person	-0.1787	0.0671	-0.1716	0.0664
Household size 1	-0.4229	0.0839	-0.4279	0.0835
Household size 2	-0.2560	0.0405	-0.2394	0.0392
Household size 4	0.0780	0.0358	0.0660	0.0354
Household size 5 or more	0.2361	0.0529	0.2198	0.0518
Age below 35	-0.0708	0.0546	-0.0745	0.0526
Age between 46 and 55	0.1400	0.0617	0.1490	0.0604
Age between 56 and 65	0.0689	0.1132	0.0823	0.1105
Age above 66	-0.0897	0.1516	-0.0594	0.1481
single	-0.0005	0.0808	-0.0363	0.0811
divorced	-0.0544	0.0811	-0.0689	0.0798
widow	-0.1061	0.1340	-0.1231	0.1334
Year 2003	0.1917	0.0427	0.1765	0.0421
Year2005	0.0690	0.0539	0.0697	0.0528
Year 2006	0.1253	0.0405	0.1294	0.0401
Bottom quartile current inc	-0.2068	0.0673	-0.1873	0.0640
Third quartile current inc.	0.0248	0.0448	0.0299	0.0430
Top quartile perm. Inc.	0.1059	0.0593	0.1117	0.0576
Bottom quartile perm inc	-0.1285	0.0492	-0.1392	0.0476
Third quartile perm inc.	0.0336	0.0469	0.0564	0.0447
Top quartile perm. Inc.	0.3696	0.0554	0.3867	0.0547
Spouse has no job	-0.0014	0.0428	0.0147	0.0417
Fixed interest rate	-0.0202	0.0392	-0.0161	0.0378
Applied for a loan	-0.0091	0.0390	0.0241	0.0382
Mills ratio	0.0702	0.1227	0.0351	0.1210
Constant	9.7968	0.1501	9.7602	0.1476

1. Source: EFF2002 and 2005 waves. Sample of 1517 house owners (on average) with at least one mortgage on one of their properties and who purchased their house before age 65 and between 1993 and 2006.Initial maturities are at least ten years long

3. Observations censored when the imputed total yearly consumption over household income is above the 97th or below the 3rd centiles

4. Each coefficient is the OLS impact of the variable in each row on the consumption measure in the column. Standard errors are corrected for arbitrary heteroscedasticity.

The constant is the average log-consumption of a three person household where the head has a college

degree and the spouse is between 36 and 45 years of age and who purchased their house before 1994
6. *(**): the coefficients in rows 1-6 are statistically different from zero at the 10(5) confidence level
7. The Mills ratio is based on the Probit model shown in Table A.2 accounting for whether an owner financed the purchase of a house with or without a mortgage. The regressors in that Probit are the same as shown in Table 2 plus three additional variables: whether or not the individual asked for a loan during the last two years or refrained to do so because s/he would be rejected, an indicator of whether the individual was either rejected or did not ask for a loan because he or she would be rejected an indicator of whether or not the individual was given less than asked

Table 5: The first stage: the relationship between the instruments and maturity and Interest rates

Dependent variable:	Loan maturity				Initial interest rate			
	Coef.	Std. Err.	Coef.	Std. Error	Coef.	Std. Error	Coef.	Std. Error
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1. 65 - Age purchase. rounded * (House purchased after 1998)	0.1007	0.0348**	.1038	0.0359**	0.0057	0.0117	0.0028	0.0118
2. Average interest rate (*)	-1.5347	1.1113	-1.615	1.2644	0.7573	0.3962*	0.7852	0.3962*
Rest of covariates (included in all specifications, but only shown for specifications without the selectivity correction)								
65 - Age purchase. rounded	-0.0428	0.0515			0.0148	0.0168		
65 - Age purchase. rounded * primary	0.0158	0.0434			0.0019	0.0120		
66 - Age purchase. rounded * high school	0.0393	0.0434			0.0007	0.0114		
Primary	1.8817	1.3514			-0.0904	0.3549		
High School	1.0329	1.0883			-0.1635	0.2464		
Female	-0.2617	0.6381			-0.1908	0.1626		
Household size 1	0.8922	0.7275			0.0383	0.1779		
Household size 2	-0.0291	0.4193			0.0177	0.1055		
Household size 4	0.4058	0.3692			-0.0226	0.1043		
Household size 5 or more	0.4210	0.4967			-0.0254	0.1443		
Current age below 35	1.9232	0.4224			-0.2197	0.1122		
Current age 46-55	-1.4482	0.4574			0.2578	0.1347		
Current age 56-65	-1.4209	0.7265			0.2794	0.1959		
Current age above 65	-0.7193	1.1939			0.0839	0.3367		
single	-0.6173	0.7029			0.2056	0.1781		
divorced	2.2020	0.7859			0.4463	0.2064		
widow	2.1141	1.2668			0.2344	0.2327		
Self employed	-1.1896	0.3800			0.2574	0.1124		
Unemployed	-0.6093	0.6180			0.2542	0.1429		
Retired	0.0476	0.7792			0.4279	0.2498		
Other labor status	0.6683	0.8858			-0.2220	0.2257		
Year 2003	0.6140	0.3861			0.7164	0.1389		
Year 2005	2.1140	0.6027			0.0482	0.1537		
Year 2006	0.8240	0.4058			-0.5182	0.1155		
Bottom quartile -perm. income	0.2455	0.4905			0.3414	0.1597		

Table 5 (cont.): The first stage: the relationship between the instruments and maturity and Interest rates

Dependent variable:	Loan maturity				Initial interest rate			
	Coef.	Std. Err.	Coef.	Std. Error	Coef.	Std. Error	Coef.	Std. Error
Third quartile -perm. Income	-0.1560	0.4740			-0.0888	0.1255		
Top quartile -perm. Income	-0.3198	0.4255			-0.3136	0.1215		
Year of purchase 94-96	-0.5771	0.7381			-3.5909	0.5415		
Year of purchase 97-02	-6.8523	4.2644			-3.0575	1.5586		
Year of purchase 03-06	-5.5587	6.5506			-3.0331	2.3609		
nojobspouse	0.5209	0.4520			-0.1840	0.1102		
Fixed interest rate	-2.1027	0.4022			-0.9336	0.1652		
Mills ratio	--	--	.795	1.307			.594	.3873
Applied for loan, last two years	--	--	1.223	.422			.1733	.1280
Constant	30.6501	9.586			3.8806	3.4608		
Average number of cases:				1626.8				
F- test (Age round-65)* Post98=0		9.49		8.94				
F test AvR=0						3.10		3.9
F- test (Age round-65)* Post98=AvR=0		5.73		5.32		1.76		2.00

1. Source: EFF2002 and 2005 waves

2. Sample of 1626.8 house owners (on average) with at least one mortgage on one of their properties and who purchased their house before age 65 and between 1991 and 2006. Maturities at least 10 years long

4. Each coefficient is the OLS impact of the variable in each row on the consumption measure in the column. Standard errors are corrected for arbitrary heteroscedasticity. The reference group is a three-person household where the reference person has an university degree, the spouse is between 36 and 45 years of age and who purchased their house between 1992 and 1993

6. *,** imply that the coefficient of interest (shown in rows 1-2) are statistically different from zero at the 10 and 5 confidence level

7. The Mills ratio is based on the Probit model shown in Table A.2 accounting for whether an owner financed the purchase of a house with or without a mortgage. The regressors in that Probit are those in the first stage of Table 5 plus three additional variables: whether or not the individual asked for a loan during the last two years or refrained to do so because s/he would be rejected, an indicator of whether the individual was either rejected or did not ask for a loan because he or she would be rejected an indicator of whether or not the individual was given less than asked

Table 6: TSLS responses of various consumption measures to initial mortgage conditions, by education

	Log of expenditure on non durable goods		Log of non-durables + imputed vehicles + furniture		Log of non-durables + + expenses on vehicles and furniture	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
	(1)	(2)	(3)	(4)	(5)	(6)
1. Maturity	-0.0101	0.0251	-0.0283	0.0218	-0.0120	0.0243
2. Maturity*Basic school	0.0148	0.0311	0.0211	0.0278	0.0174	0.0297
3. Maturity*High school	0.0425	0.0190 **	0.0496	0.0166**	0.0483	0.0184**
4. Interest rate	-0.2024	0.1546	-0.2052	0.1362 +	-0.1781	0.1481
5. Interest rate* Basic school	0.0463	0.0420	0.0453	0.0389	0.0438	0.0408
6. Interest rate*High school	0.0930	0.0446 **	0.0923	0.0394 **	0.1047	0.0433 **
Rest of covariates						
Age at purchase -65, rounded	-0.0006	0.0047	-0.0002	0.0041	-0.0012	0.0045
Basic school	-0.6349	0.8187	-0.7719	0.7421	-0.6691	0.7859
High school	-1.4082	0.5786	-1.5696	0.5079	-1.5766	0.5628
Female ref. person	-0.2492	0.0839	-0.2647	0.0756	-0.2385	0.0824
Household size 1	-0.4574	0.0862	-0.4312	0.0760	-0.4533	0.0846
Household size 2	-0.2482	0.0429	-0.2234	0.0380	-0.2307	0.0409
Household size 4	0.0840	0.0392	0.0841	0.0344	0.0762	0.0380
Household size 5 or more	0.2330	0.0573	0.2129	0.0506	0.2224	0.0550
Age below 35	-0.1541	0.0725	-0.1192	0.0628	-0.1324	0.0698
Age between 46 and 55	0.2178	0.0737	0.1757	0.0650	0.1978	0.0712
Age between 56 and 65	0.1544	0.0974	0.1382	0.0852	0.1123	0.0944
Age above 66	0.0362	0.1650	0.0083	0.1393	-0.0078	0.1616
Single	0.0483	0.0870	-0.0171	0.0818	0.0070	0.0867
Divorced	-0.0402	0.1268	0.0106	0.1110	-0.0633	0.1232
Widow	-0.0404	0.1596	-0.0287	0.1378	-0.0662	0.1570
Year 2003	0.3068	0.1241	0.2667	0.1078	0.2748	0.1191
Year2005	0.0778	0.0791	0.1392	0.0691	0.0869	0.0763
Year 2006	0.0423	0.0926	0.0608	0.0829	0.0717	0.0892

Table 6: TSLS responses of various consumption measures to initial mortgage conditions (cont.)

	Non-durables (log)		Log of non-durables + imputed vehicles + furniture		Log of non-durables + expenses on vehicles and furniture	
	(1) Coefficient	(2) Standard error	(3) Coefficient	(4) Standard error	(5) Coefficient	(6) Standard error
Bottom quartile perm inc	-0.1379	0.0797	-0.1432	0.0701	-0.1596	0.0750
Third quartile perm inc.	0.0611	0.0547	0.0985	0.0447	0.0842	0.0511
Top quartile perm. Inc.	0.3838	0.0674	0.4377	0.0591	0.4068	0.0656
Year of purchase 94-96	-0.5531	0.5814	-0.5696	0.5121	-0.4628	0.5548
Year of purchase 97-02	-0.9538	0.9150	-0.9325	0.8056	-0.7927	0.8762
Year of purchase 03-06	-1.2313	1.1610	-1.1459	1.0256	-1.0140	1.1143
Spouse has no job	-0.0375	0.0548	-0.0260	0.0478	-0.0158	0.0527
Fixed interest rate	-0.1409	0.1777	-0.1889	0.1534	-0.1126	0.1697
Constant	11.570	2.9617	12.2336	1.5008	11.3735	1.6420
Average number of cases				1626.8		

1. Source: EFF2002 and 2005 waves

2. Sample of 1626.8 house owners (on average) with at least one mortgage on one of their properties and who purchased their house before age 65 and between 1991 and 2006.Initial maturities are at least ten years long

3. Observations where the imputed total yearly consumption is above 2.33 times the household income (top percent of the consumption to income ratio) or below 7% of household income (bottom percentile among home owners in the sample)

4. Each coefficient is the TSLS impact of the variable in each row on the consumption measure in the column. Standard errors are corrected for arbitrary heteroscedasticity. The constant is the average log-consumption of a three person household where the head has an university degree and the spouse is between 36 and 45 years of age and who purchased their house between 1992 and 1993

5. Instruments for mortgage maturity and its interactions with education group: Interaction of the variable "Age at purchase minus 65 rounded to the nearest multiple of 5" and an indicator for purchase after 1998 and its interaction with primary education and with high school education
The instruments for interest rate and its interaction with primary schooling or secondary education group
is the average interest rate within schooling group, age at purchase (above or below 45) and year of purchase (see text)

6. +,*,** imply that the coefficient of interest (shown in rows 1-6) are statistically different from zero at the 15, 10 and 5 confidence level

Table 7: Selectivity-corrected TSLS responses of consumption to initial mortgage conditions, by education group

Dependent variable:	Log of yearly expenditure on non durable goods		Log of non-durables + imputed vehicles + furniture		Log of non-durables + expenditure on vehicles and furniture	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
	(1)	(2)	(3)	(4)	(5)	(6)
1. Maturity	-0.0184	0.0257	-0.0365	0.0219	-0.0170	0.0247
2. Maturity*Basic school	0.0142	0.0315	0.0264	0.0272	0.0187	0.0300
3. Maturity*High school	0.0462	0.0192**	0.0541	0.0166**	0.0512	0.0186**
4. Interest rate	-0.2182	0.1641	-0.1929	0.1420	-0.1858	0.1562
5. Interest rate* Basic school	0.0505	0.0415	0.0563	0.0366	0.0486	0.0398
6. Interest rate*High school	0.0992	0.0428**	0.1026	0.0365**	0.1099	0.0415**
Rest of covariates						
Age at purchase -65, rounded	-0.0069	0.0052	-0.0092	0.0045	-0.0065	0.0050
Basic school	-0.6399	0.8230	-0.9397	0.7178	-0.7196	0.7858
High school	-15,074	0.5731	-17,032	0.4913	-16,588	0.5567
Female ref. person	-0.2391	0.0819	-0.2372	0.0725	-0.2241	0.0796
Household size 1	-0.4382	0.0911	-0.4019	0.0779	-0.4336	0.0883
Household size 2	-0.2491	0.0431	-0.2254	0.0374	-0.2323	0.0409
Household size 4	0.0903	0.0390	0.0916	0.0335	0.0803	0.0376
Household size 5 or more	0.2369	0.0573	0.2154	0.0489	0.2225	0.0547
Age below 35	-0.0778	0.0854	-0.0221	0.0718	-0.0755	0.0813
Age between 46 and 55	0.1275	0.0849	0.0557	0.0720	0.1273	0.0807
Age between 56 and 65	-0.0183	0.1515	-0.0914	0.1298	-0.0255	0.1444
Age above 66	-0.2275	0.2172	-0.3386	0.1852	-0.2180	0.2077
Single	0.0126	0.0889	-0.0786	0.0788	-0.0300	0.0878
Divorced	-0.0238	0.1292	0.0036	0.1121	-0.0621	0.1249
Widow	-0.0818	0.1562	-0.1008	0.1328	-0.1111	0.1524
Year 2003	0.3303	0.1384	0.2772	0.1177	0.2945	0.1323
Year2005	0.1120	0.0855	0.1774	0.0717	0.1116	0.0819
Year 2006	0.0634	0.0827	0.1074	0.0725	0.0937	0.0791

Table 7 (cted.): Selectivity-corrected TSLS responses of various consumption measures to initial mortgage conditions

	Log of yearly expenditure on non durable goods		Log of non-durables + imputed vehicles + furniture		Log of non-durables + expenditure on vehicles and furniture	
	(1)	(2)	(3)	(4)	(5)	(6)
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
Bottom quartile perm inc	-0.1545	0.0710	-0.1783	0.0596	-0.1762	0.0669
Third quartile perm inc.	0.0539	0.0563	0.0922	0.0447	0.0783	0.0524
Top quartile perm. Inc.	0.3569	0.0825	0.4117	0.0715	0.3854	0.0791
Year of purchase 94-96	-0.5885	0.5992	-0.4897	0.5132	-0.4708	0.5700
Year of purchase 97-02	-0.9857	0.9349	-0.7839	0.8045	-0.7935	0.8915
Year of purchase 03-06	-1.2749	1.2002	-0.9926	1.0371	-10,423	11,456
Spouse has no job	-0.0449	0.0583	-0.0316	0.0501	-0.0229	0.0558
Fixed interest rate	-0.1551	0.1820	-0.1662	0.1552	-0.1142	0.1727
Applied for a loan, last 2 years	0.0466	0.0689	0.2594	0.1549	0.1628	0.1742
Mills ratio	0.1982	0.1822	0.1066	0.0577	0.0803	0.0656
Constant	11.926	1.914	12.2926	1.649	115,699	18,187
Average number of cases				1626.8		

1. Source: EFF2002 and 2005 waves

2. Sample of 1626.8 house owners (on average) with at least one mortgage on one of their properties who purchased their house before age 65 and after 1991. Initial maturities are at least 10 years long

3. Observations with imputed total yearly consumption is above 2.33 below 7% of household income are excluded

4. Each coefficient is the TSLS impact of the variable in each row on the consumption measure in the column. Standard errors are corrected for arbitrary heteroscedasticity. The constant is the average log-consumption of a three-person household where the head has an university degree and the spouse is between 36 and 45 years of age and who purchased their house between 1992 and 1993

5. Instruments for mortgage maturity and its interactions with education: Interaction of the variable "Age at purchase minus 65 rounded to the nearest multiple of 5" and an indicator for purchase after 1998 and its interaction with primary education and with high school education The instruments for interest rate and its interaction with primary schooling or secondary education group is the average interest rate within schooling group, age at purchase (above or below 45) and year of purchase (see text)

6. +,*,** imply that the coefficient of interest (shown in rows 1-6) are statistically different from zero at the 15, 10 and 5 confidence level

7. The Mills ratio is based on the Probit model shown in Table A.2 accounting for whether an owner financed the purchase of a house with or without a mortgage. The regressors in that Probit are those in the first stage of Table 5 plus three additional variables: whether the individual asked for a loan during the last two years or did not because s/he would be rejected, an indicator of whether the individual was either rejected or did not ask for a loan because he or she would be rejected an indicator of whether or not the individual was given less than asked

Table 8: Robustness checks

Sample:	Basic schooling		High school		College	
Panel A: TSLS responses of non-durable consumption to mortgage maturity, control for average interest rate						
Average interest rate	-.091	.13	-.063	.14	-.129	.147
Maturity	.013	.028	.0319	.0192*	-.0112	.0290
Average sample size:			1626.8			
Panel B: The response of the loan-to-value to interest rates and mortgage maturity (Tobit estimates)						
Interest rate	.0033	.0115	.101	.008	-.0041	.005
Maturity	.0122	.0035**	.0178	.0025	.101	0.002
Sample size	282		527		879	

Panel A: see notes to Table 7

Panel B:

1. Source: EFF2002 and 2005 waves
2. Sample of 1688 house owners with at least one mortgage on one of their properties who purchased their house before age 65 and after 1991. Initial maturities are at least 10 years long but the sample is not screened for extreme consumption values
4. Each coefficient is the Tobit impact of the variable in each row on the loan to value. We run three separate Tobit models for each education group and the set of regressors is the same as in Table 3.
5. +,*,** imply that the coefficient of interest (shown in rows 1-6) are statistically different from zero at the 15, 10 and 5 confidence level

Table 9: The response of non-durable consumption to maturities and interest rates, by income

Estimation method: OLS						
Dependent variable	Log non-durable consumption					
	Bottom income quartile		Two central quartiles		Top income quartile	
	Coeff.	St. Error	Coeff.	St. Error	Coeff.	St. Error
	(1)	(2)	(3)	(4)	(5)	(6)
1. Maturity	-0.0105	0.0216	0.0080	0.0053+	0.0012	0.0068
2. Interest rate	0.0291	0.0689	-0.0087	0.0235	-0.0723	0.0369**
Rest of covariates						
Age at purchase -65, rounded	-0.0127	0.0111	-0.0109	0.0054	0.0011	0.0073
Female	-0.0381	0.4038	-0.1779	0.1829	-0.4382	0.2390
Household size 1	0.1757	0.4184	-0.1586	0.2329	0.0712	0.2444
Household size 2	0.4315	0.2865	-0.1358	0.0937	-0.1670	0.1123
Household size 4	0.1048	0.2877	0.0372	0.0817	0.1139	0.1051
Household size 5 or more	0.7871	0.4422	0.1175	0.1614	-0.0026	0.1528
Numb adults	0.1349	0.1867	0.0183	0.0566	0.0730	0.0597
Single	-1.1155	0.5991	-0.0609	0.2115	0.0107	0.2374
Divorced	-0.4372	0.4168	-0.1414	0.2161	0.3154	0.2505
Widow	-0.7885	0.7715	-0.1589	0.3615	-0.0995	0.4355
Primary school	-0.2491	0.3172	-0.1806	0.1005	-0.3223	0.1513
High school	-0.0726	0.2880	-0.0684	0.0760	-0.1437	0.1005
Age below 35	-1.0752	0.3385	-0.3118	0.1934	-0.3989	0.4392
Age between 46 and 55	-0.3714	0.2421	-0.0228	0.0917	-0.1003	0.1271
Age between 56 and 65	-0.5006	0.3195	-0.1245	0.1571	0.0032	0.1574
Age above 66	-0.5035	0.6025	-0.4443	0.2550	-0.4207	0.3530
Self-employed	-0.4547	0.3410	-0.0410	0.1109	-0.0136	0.0974
Unemployed	0.0723	0.3070	-0.0254	0.1466	-0.0323	0.2628
Retired	-0.4636	0.4771	0.0901	0.1638	0.2886	0.2117
Student	0.0360	0.6333	0.1446	0.2102	0.4138	0.2270
Other labor status	-0.4355	0.2809	0.0606	0.1042	-0.0571	0.1651
Spouse works	-0.7207	0.3629	0.0873	0.0782	-0.1349	0.0962
Log current income	-0.4267	0.1272	0.1675	0.1782	0.2277	0.1331
Log permanent income	0.7818	0.2816	0.3285	0.1607	0.3233	0.1307
Year 2003	-0.0442	0.5223	0.2389	0.1065	0.2398	0.1252
Year 2005	0.1668	0.3099	-0.1044	0.1157	0.0308	0.1344
Year 2006	-0.1536	0.2803	0.0684	0.0923	0.1456	0.1083
Fixed interest rate	0.4349	0.2494	0.0935	0.1628	0.2426	0.2244
Constant	8.7447	0.7775	8.5786	0.2287	8.6318	0.3260
Average sample size:	119.8		840		627.5	

1. Source: EFF2002 and 2005 waves

2. Sample of 1587,3 house owners (on average) with at least one mortgage on one of their properties who purchased their house before age 65 and after 1991. Initial maturities are at least 10 years long

4. Each column reflects a group-specific OLS regression of non durable consumption. Standard errors corrected for arbitrary heteroscedasticity. The constant is the average log-consumption of a three-person household where the head has an university degree and the spouse is between 36 and 45 years of age

6. +,*,** imply that the coefficient of interest (shown in rows 1-6) are statistically different from zero at the 15, 10 and 5 confidence level

Table A1: Evolution of credit conditions in Spain (EFF)

	Before 1997	1998-2002	After 2003
1. Interest rate paid currently	4.658	3.920	3.512
	(1.55)	(1.01)	(1.96)
2. Mortgage maturity	18.037	22.40	25.186
	(5.088)	(6.32)	(6.450)
3. Loan to value ratios	.7518	.879	.9169
	(.44)	(.43)	(.38)
4. Fixed-rate mortgages	.245	.122	.097
Sample size:	376	473	275

Source: Pooled 2002-2005 waves of the EFF. Only one implicate is used. Statistics weighted
Standard deviations in parentheses.

Table A.2. The probability of being home owner with a mortgage

Estimation method: Probit

Dependent variable takes value 1 if the home owner bought the house with a mortgage, 0 otherwise

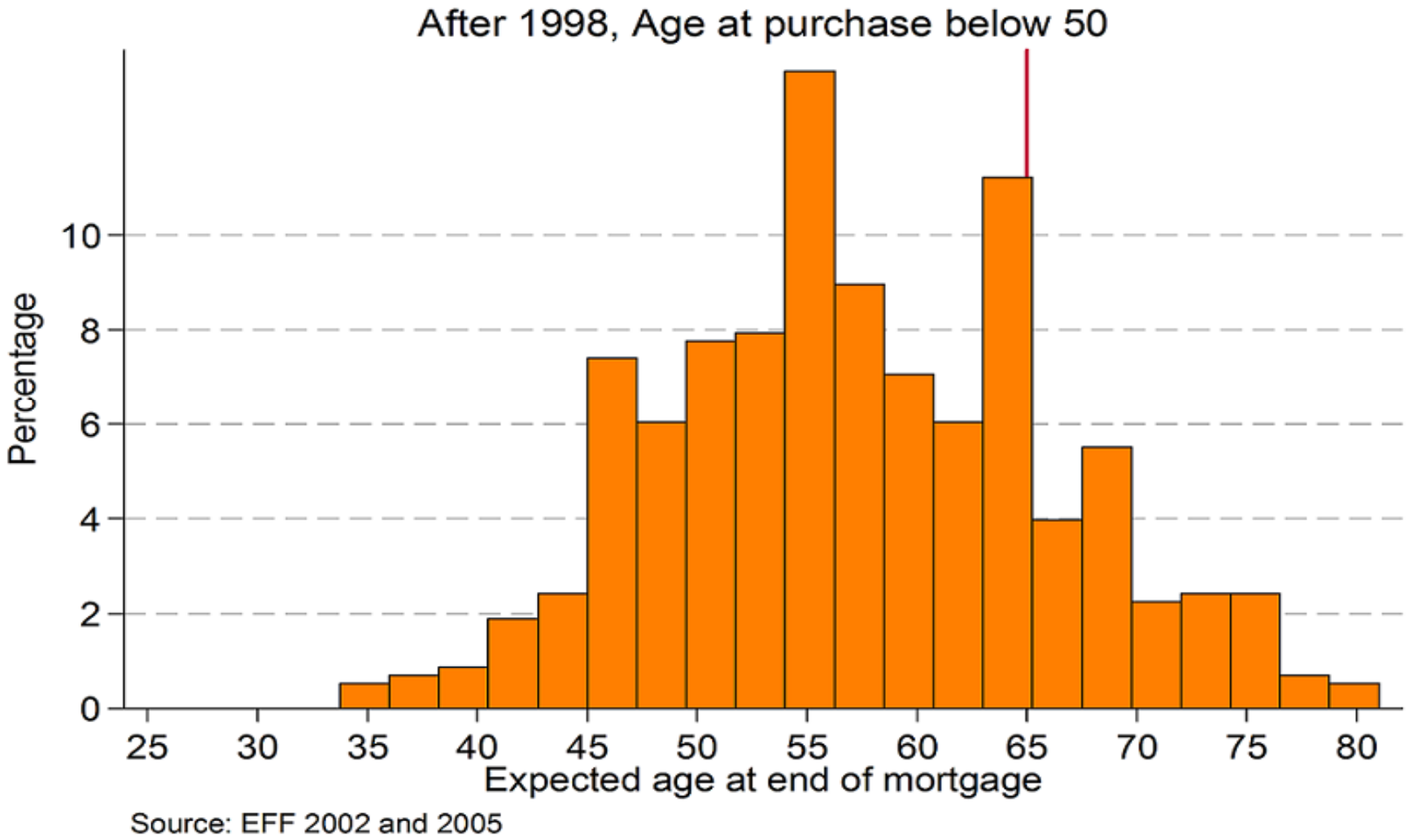
	Coeff.	St. error
Variables excluded from the consumption equations		
1. Rejected or applied not for fear of being rejected	-0.5938	0.2473**
2. Given less credit than asked for	0.6757	0.3750*
Variables included in the first stage of Table 7		
Either applied for a loan, last two years or did not for fear of being rejected)	0.5765	0.0655
Age at purchase -65, rounded	-0.0806	0.0097
Age at purchase -65, rounded * high school	-0.0004	0.0103
Age at purchase -65, rounded * primary schooling	-0.0023	0.0097
Age at purchase -65, rounded * House purchased after 1998	-0.0062	0.0091
Age at purchase -65, rounded * House purchased after 1999 * primary	-0.0041	0.0109
Age at purchase -65, rounded * House purchased after 1999 * high school	-0.0090	0.0098
Average Interest rate	0.1500	0.0826
Average Interest rate * Primary	-0.0240	0.0670
Average Interest rate *High school	-0.0462	0.0651
Primary schooling	0.0814	0.4361
High School	0.4465	0.3989
female	0.2245	0.1215
Household size equals 1	0.1178	0.1300
Household size equals 2	0.0287	0.0773
Household size equals 4	0.0382	0.0748
Household size equals 5	0.0803	0.1059
Age below 35	0.8160	0.0910
Age between 46 and 55	-0.9711	0.0819
Age between 56 and 65	-17,706	0.1154
Age above 66	-22,068	0.1950
single	-0.4062	0.1308
divorced	-0.1864	0.1452
widow	-0.4725	0.1900
Self employed	-0.2162	0.0675
Unemployed	-0.1802	0.1176
Retired	-0.9970	0.1242
Other labor status	-0.6054	0.1396
Year 2002	-0.0656	0.0749
Year 2005	0.1588	0.1167
Year 2006	0.1620	0.0748
Bottom quartile perm. Inc.	-0.1915	0.0947
Third quartile perm. Inc	-0.0761	0.0817
Top income quartile	-0.2793	0.0823
House purchased 1994-1996	0.0830	0.1044
House purchased 1997-2002	0.9537	0.3006
House purchased after 2003	0.9423	0.4109
Spouse has no Job	-0.1243	0.0961
Constant	17,044	0.6910
Average number of cases:	3356	

1. Source: EFF2002 and 2005 waves

2. Sample of 3356 house owners (on average) who purchased their house before age 65 and between

1991 and 2006
The dependent variable takes value 1 if the home owner acquired the house with a mortgage, 0 otherwise
3. Each coefficient is the coefficient of the latent index. Standard errors are corrected for arbitrary heteroscedasticity. The omitted group is a married couple with one child where the head has a college degree, the spouse is between 36 and 45 years of age and who purchased their house between 1992 and 1993
4. +,*,** imply that the coefficients of interest (shown in rows 1-2) are statistically different from zero at the 15, 10 and 5 confidence level

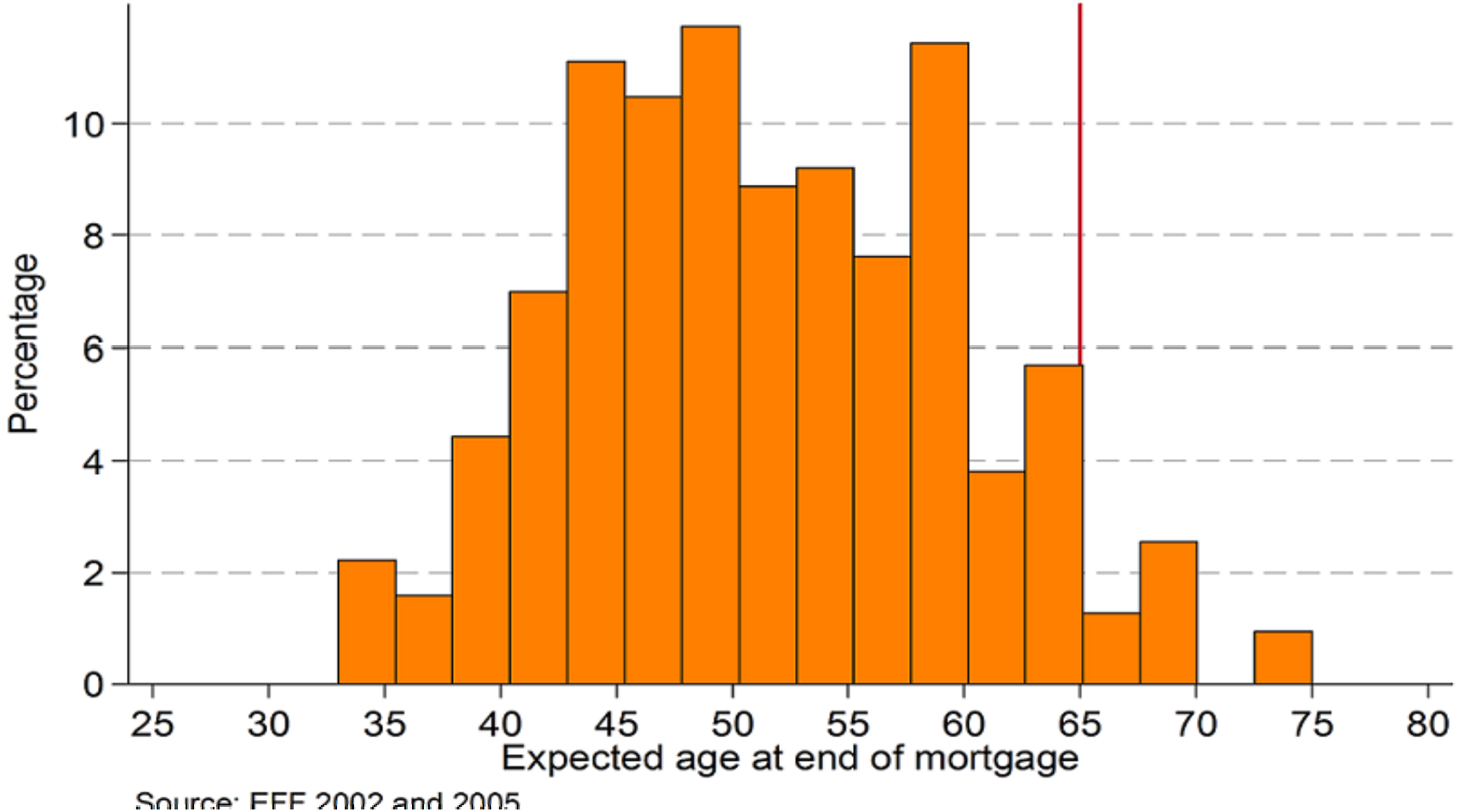
Graph 1: Expected age when the mortgage expires



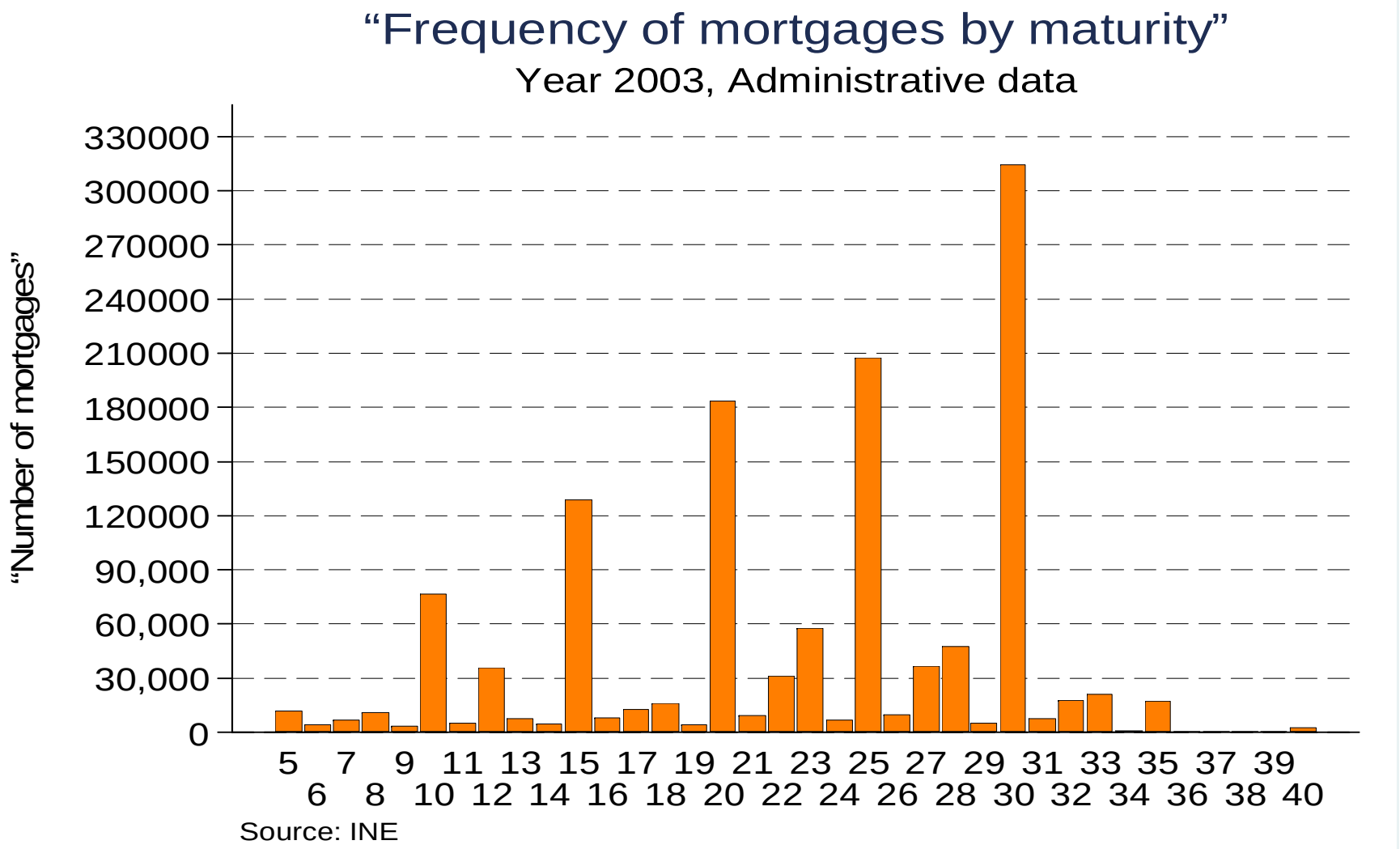
Source: EFF 2002 and 2005

Graph 2: Expected age when the mortgage expires

Before 1998, Age at purchase below 50



Source: EFF 2002 and 2005


"Frequency of mortgages by maturity"
Year 2003, Administrative data
"Number of mortgages"
330000
300000
270000
240000
210000
180000
150000
120000
90,000
60,000
30,000
0
5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40
Source: INE