WEALTH EFFECTS ON CONSUMPTION:

MICROECONOMETRIC ESTIMATES FROM A NEW SURVEY OF HOUSEHOLD FINANCES

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1. Introduction

- Estimating wealth effects at the micro level is important because of heterogeneity; they are expected to vary with age, composition of household wealth...

- But it is difficult because of lack of household survey data containing at the same time measures of assets and consumption

- Even more difficult is disentangling importance of different factors behind estimated wealth effects: precautionary savings, reverse morgages, improved credit conditions…

This paper:

- New dataset, the Spanish Survey of Household Finances (EFF 2002), whose distinguishing feature is the availability of info on consumption and wealth from a representative sample of households subject to oversampling by wealth

- Period where a priori reasons to believe that the estimated housing wealth effects are essentially due to precautionary savings motives alone (reverse mortgages or opportunities for borrowing on increased housing equity were virtually non-existent financial products in 2002)

- Focus on the effects of housing wealth (also distinguishing main and secondary) which we believe give a measure of precautionary saving motives

- Aim to estimate a (reduced form) causal effect that is a useful input for policy

  → Exogenous variation in wealth data comes from house price (HP) variation by locality and inheritance indicators; also include a rich set of controls

Outline

2.- Theoretical considerations
Existing empirical results

3.- Data
Descriptive statistics

4.- Discussion of instruments: Identification strategy

5.- Wald estimates of total housing wealth effects
(for selected cells)

6.- Linear IV estimates distinguishing between owner occupied housing and other real estate properties

7.- Two-stage least squares matching estimates that allow for heterogeneity in wealth effects in a flexible way

2. Theoretical considerations and existing empirical results

- Consumption theory does not produce unambiguous predictions on the relative magnitudes of effects when considering separate effects of different types of wealth (e.g. stocks and real estate)

- Δ stock prices due to expected Δ in productivity and expected profits would lead to higher wealth and increases in spending power of this highly liquid wealth (however, perceptions about how permanent changes in equity are may have an effect)

- Δ house prices may have no effects on consumption if moving costs are large and the borrowing possibilities for the liquidity constrained are limited (even in model without bequests) [Skinner (1996)]

    . user cost of owner occupied housing rises with HP

    . increase in spending may occur if (i) downsizing (ii) reverse mortgages

    . actual downsizing or reverse mortgages in Spain are uncommon

- However, *possibility* of downsizing in the future if needed may be sufficient for middle-aged homeowners to reduce the need for other precautionary savings

- Precautionary savings model has specific predictions about mpc
  - mpc out of housing wealth varies by age
  - mpc lower for high levels of wealth

→→ Relevance of wealth effects is largely considered an empirical matter.

Time series and country-level studies

- Aggregate time series data [review in Poterba (2000) and Carroll (2004)]
- Panel of countries [Case, Quigley, and Shiller (2003)]
- Separate estimates for OECD countries [Catte et al. (2004)]
- Education and income cohorts [Maki and Palumbo (2001)]

→→ . instability over long periods due to changes in credit market

. potential endogeneity

Household level studies

Literature reflects lack of datasets with info on both wealth and consumption

- using parameters of a consumption predictive equation in one dataset to construct a measure of consumption in another dataset that contains wealth [Skinner (1989), Parker (1999)]

- using measure of 'active' savings [Skinner (1996), Engelhardt (1996), Juster et al. (2004)]

- using changes in non-durable consumption and components of wealth in Italian SHIW [Grant and Peltonen (2005)]

→→ . estimated effects often small and insignificant due to the presence of measurement errors in wealth and the use of Δ

. these datasets do not include very wealthy households whose response to capital gains is a fundamental piece of the wealth effect

3. Consumption and Wealth in the EFF

The data

- . 5143 sample of households from EFF 2002
  . oversampling of wealthy households (around 40% of the sample corresponds to households liable to wealth tax – 5% of the population)
  . rich information on assets, debts, incomes, spending, and socioeconomic variables

- All results in the paper make use of the 5 multiply imputed data sets

- Wealth variables: (i) value of main residence, other real estate properties, financial wealth (various components)
  (ii) mostly gross values

- Consumption variables from: (i) food expenditure, (ii) total non-durable expenditure, (iii) value of equipment (x 0.15), (iv) vehicles (x 0.165)

- Descriptive statistics of the association between wealth and consumption

Table 1. Consumption and wealth: descriptive statistics[1]

	Food and non durable consumption		Food, non durable and durable consumption		Food, non durable, durable and vehicles consumption	
Owner occupied housing	Mean	Wealth effect[2]	Mean	Wealth Effect	Mean	Wealth effect
Percentile of value • Less than 25 (mean 6.4)	8.7		9.9		10.5	
• Between 25 and 50 (mean 60.1)	8.7	0	10.3	0.01	11.2	0.01
• Between 50 and 75 (mean 106.4)	10.2	0.03	12.3	0.04	13.3	0.04
• Between 75 and 90 (mean 161.7)	12.4	0.04	14.9	0.05	16.2	0.05
• Between 90 and 100 (mean 300.1)	15.4	0.02	19.2	0.03	21.2	0.04

[1] Mean values are in thousand euros
[2] Change in average consumption relative to change in average wealth

The wealth and credit position of Spanish households (TABLE 2)

- in 2002 still very limited use of re-mortgaging following housing equity windfalls

  only 20.5% have consumption debts vs. 62% of US households

  mortgage equity withdrawal (secured borrowing not invested in real estate)

- low propensity to move

→→ would predict no wealth effect on consumption in a perfect certainty model

→→ ideal ground for measuring importance of precautionary savings behind

- relevance of disentangling various factors behind wealth effects:

  . understand differences between countries

  . if precautionary motives strong, not only drop in consumption but also not enough precautionary savings in the future

Table 2. Distribution of Spanish households' assets.
By income and wealth

	Distribution of the value of households' assets (%)					Percentage of households owning asset (%)				Net worth (€)	
	Main residence	Other real estate	Business[1] and other real assets	Bank accounts	Other financial [2] assets	Main residence	Other real estate	Bank accounts	Other financial assets	Median	Mean
All households	58.3	21.0	8.2	5.0	7.6	81.9	30.1	98.2	35.2	96.3	153.4
Income percentile											
Less than 20	73.3	16.0	2.6	5.5	2.6	73.7	18.5	95.5	13.0	52.7	75.0
Between 20 and 40	71.7	15.4	3.9	5.7	3.2	79.0	22.9	97.8	24.0	77.9	99.5
Between 40 and 60	65.1	19.5	6.3	5.2	3.9	80.0	27.4	98.7	33.4	88.1	120.0
Between 60 and 80	58.9	22.4	7.9	5.2	5.7	85.1	33.5	99.3	43.4	115.7	165.8
Between 80 and 90	55.4	21.9	10.2	5.0	7.5	89.6	42.7	99.4	53.5	152.0	209.6
Between 90 and 100	42.8	24.9	12.7	4.3	15.3	92.3	53.7	99.8	70.7	247.0	402.9

Source: Survey of Household Finances (EFF) 2002.
[1] Business related to self employment.
[2] Includes: listed and unlisted shares and other equity, mutual funds, fixed income securities, pension schemes and unit-linked life insurance, and other financial assets.

4. Discussion of instruments: Identification strategy

(i) Local HP (lagged one year) as instruments for housing wealth

Identifying assumption: local HP differences as a source of predetermined variation in cross-sectional household real estate wealth

- HP may not be totally free from endogeneity but concern of a lesser order of magnitude relative to the one created by household wealth

  In this respect:

  . HP changes have been very different across the population (one year variation 15.7% with a standard deviation of 3.8%)

  . the fact that Spanish households do not very often change residential area is a relevant consideration for the predeterminedness of HP (less than 1.5% of homeowners acquired their main residence in the last 12 months, 2.5% in the last 24 months…)

- Another potential concern: possibility that HP reflect general local demand conditions but for most of province capitals HP at the municipality district level

(ii) Inheritance indicators

Five dummies indicating whether the following have been inherited: main residence, each of the three most valuable other real estate properties, and the rest of real estate properties. (Table 3)

(iii) First step regressions

- HP and inheritance instruments relevant despite large number of controls
- for the case where separately main residence and other real estate properties we calculate Shea (1997) partial R^2 which takes into account inter-correlations among the instruments to check for some of the instruments being irrelevant
- also considered but rejected possibility of weak instruments (comparison with inverse 2SLS and LIML)

Table 3. Housing wealth and inheritance

	Main Residence	Other real estate properties			
		One	Two	Three	Four or more
% of households owning the asset	82.0	29.9	8.4	4.5	2.6
% of households having inherited the asset among owners of the asset	12.5	28.5	38.7	42.4	66.4

5. Cell-by-cell Wald estimates of housing wealth effects

- Transparent calculations for a simple table

$$\beta(x) = \frac{E(C|X = x,\ p=1) - E(C|X = x,\ p=0)}{E(W|X = x,\ p=1) - E(W|X = x,\ p=0)}$$

- Intuitively, we measure the effect of wealth on consumption through the effect of HP on consumption, relative to the effect of HP on wealth
- Within-cell IV estimand when the instrument is a dummy variable

$$C=\beta(X)W+\alpha(X)+U$$

reduced form causal or policy effect capturing steady state or medium run responses

Results

Table 5. Non-parametric IV estimates of housing wealth effects

	Age 35-44[1]		Age 45-54		Age 55-64	
	Large towns	Small towns	Large towns	Small towns	Large towns	Small towns
High fitted permanent income						
$\overline{C}_H$ [2]	23,7	19,4	30,9	27,9	30,7	25,7
$\overline{C}_L$ [3]	20,8	17,1	27,8	19,3	35,5	19,8
$\overline{HW}_H$ [4]	373,3	213,9	463,8	469,1	645,1	422,9
$\overline{HW}_L$ [5]	186,0	182,9	336,4	220,0	718,1	368,1
$\left(\overline{C}_H - \overline{C}_L\right) \Big/ \left(\overline{HW}_H - \overline{HW}_L\right)$	0.02*[6]	0.07	0.02**	0.04**	0.07	0.11
Low fitted permanent income						
$\overline{C}_H$	12,9	14,7	16,0	13,3	13,7	14,3
$\overline{C}_L$	13,1	12,6	14,9	13,7	16,5	11,8
$\overline{HW}_H$	111,3	126,1	185,8	138,8	184,8	164,3
$\overline{HW}_L$	135,0	84,4	148,1	134,8	170,4	129,0
$\left(\overline{C}_H - \overline{C}_L\right) \Big/ \left(\overline{HW}_H - \overline{HW}_L\right)$	-	0.05*	0.03	-	-	0.07*

[1] Age of household head. All households considered in this table have more than one member.

[2] $\overline{C}_H$ average consumption of the group considered that lives in areas with house prices higher than the sample median.

[3] $\overline{C}_L$ average consumption of the group considered that lives in areas with house prices lower or equal than the sample median.

[4] $\overline{HW}_H$ average housing wealth (includes main residence and other real estate properties) of the group considered that lives in areas with house prices higher than the sample median.

[5] $\overline{HW}_L$ average housing wealth (includes main residence and other real estate properties) of the group considered that lives in areas with house prices lower or equal than the sample median.

[6] * $1 <$ t-ratio ≤ 2

** t-ratio > 2

estimates not reported when t-ratio ≤ 0.5

- Advantage of cell-by-cell analysis:

  . directness, avoids parametric restrictions and extrapolation across cells

  Disadvantage:

  . due to small sample size, limited to a small number of controls

→→ complementary to conventional IV consumption equations in section 6

→→ in section 7 2SLS matching estimates which combine the flexibility of Wald estimates with the ability to use a larger variation in controls and instruments

6. Linear IV Estimates of Wealth Effects

- IV estimates of the effect on consumption (using our most comprehensive measure) of:
  - total real estate wealth
  - separate effects of main residence and other real estate
  - effects for different age groups
  - OLS effect of financial assets for which we lack a plausible instrument

- Large number of socio-demographic characteristics

→→ control for permanent income, human wealth, outstanding debt, and other types of wealth not explicitly considered.

Table 6. IV and OLS regression results

Total real estate wealth

Dependent variable: total consumption

	IV			OLS	
	1	2	3	4	5
Total real estate wealth	0.013 (4.93)	-	-	0.013 (9.67)	-
Total real estate wealth * Dummy household head age < 35	-	-0.040 (1.57)	-	-	0.012 (3.51)
Total real estate wealth * Dummy household head age 35-44	-	0.037 (1.79)	-	-	0.014 (6.24)
Total real estate wealth * Dummy household head age 45-54	-	0.015 (2.14)	-	-	0.019 (7.09)
Total real estate wealth * Dummy household head age 55-64	-	0.014 (2.18)	-	-	0.011 (4.53)
Total real estate wealth * Dummy household head age 65-74	-	0.013 (1.96)	-	-	0.008 (4.85)
Total real estate wealth * Dummy household head age > 74	-	0.005 (0.57)	-	-	0.010 (4.62)
Net total real estate wealth	-	-	0.013 (4.86)	-	-
R^2	-	-	-	0.48	0.48

Table 7. IV and OLS regression results

Different wealth components: main residence, other real estate, financial assets

Dependent variable: total consumption

	IV		OLS		
	1	2	3	4	5
Main residence	0.018 (3.09)	-	0.019 (9.26)	-	0.018 (9.28)
Other real estate properties	0.011 (2.86)	0.010 (2.67)	0.008 (5.93)	0.008 (5.99)	0.008 (5.33)
Financial assets	-	-	-	-	0.003 (1.71)
Main residence * Dummy household head age < 35		-0.037 (1.51)	-	0.014 (2.65)	-
Main residence * Dummy household head age 35-44		0.063 (2.13)	-	0.021 (5.25)	-
Main residence * Dummy household head age 45-54		0.020 (2.10)	-	0.024 (5.43)	-
Main residence * Dummy household head age 55-64		0.024 (2.86)	-	0.021 (4.19)	-
Main residence * Dummy household head age 65-74		0.020 (2.08)	-	0.013 (4.12)	-
Main residence * Dummy household head age > 74		0.009 (0.44)	-	0.013 (4.05)	-
R^2		-	0.48	0.48	0.49

- precautionary model (Skinner 1996) explains the pattern observed in our data:

. Δ in value of homes ∇ need for other savings at the age when many of those savings would otherwise occur (≈ 35-44). The possibility of downsizing in future gives housing equity an insurance element preventing the need for other precautionary savings

. effect still present until retirement age but to a lesser extent

. at retirement most households do not need to tap into their housing equity

. lower coefficient of secondary housing

→→ confirm our a priori considerations on the precautionary savings nature of the factors at work behind the wealth effect we estimate

7. A Robustness Check: Two-stage Least Squares Matching Estimates

- Evidence obtained suggests different wealth effects for different groups

→→ overall wealth effect may be biased if not properly aggregated

→→ here we pursue this issue further

$$C = \beta(X)W + \alpha(X) + U$$

$$E(U \mid X, Z) = 0$$

The interest is in the estimation of the aggregate effect $\beta^* = E[\beta(X)]$

where $\alpha(X)$ and $\beta(X)$ are general functions of X

- $\beta(X)$ coincides with the two-stage least squares estimand

$$\beta(X)=\frac{Cov\left(Y,\hat{W}|X\right)}{Var\left(\hat{W}|X\right)}=E\left(\frac{Y\left(\hat{W}-\mu(X)\right)}{\omega(X)}|X\right) \qquad (1)$$

where $\hat{W}=E(W\mid X,Z)$, $\mu(X)=E\left(\hat{W}\mid X\right)$, and $\omega(X)=Var\left(\hat{W}\mid X\right)$. And $\beta^{*}=E\left(\frac{Y\left(\hat{W}-\mu(X)\right)}{\omega(X)}\right)$

- β^{*} is estimated as

$$\tilde{\beta}^{*}=\frac{1}{N}\sum_{i=1}^{N}\left(\frac{Y_i\left(\hat{\hat{W}}_i-\hat{\mu}(X_i)\right)}{\hat{\omega}(X_i)}\right)$$

where $\hat{\mu}(X_i)$ and $\hat{\omega}(X_i)$ are flexible parametric estimates of $\mu(X)$ and $\omega(X)$.

(It can be generalized to more than one endogenous explanatory variable)

8. Conclusion

- Evidence presented
  - mpc out of housing wealth 0.015
  - decomposed: main residence 0.02, other real estate 0.01

→→ confirmed by 2SLS matching results robust to observed heterogeneity in wealth effects in a flexible way

- Partial equilibrium effects: insofar as changes in house prices were associated with changes in employment or interest rates, the general equilibrium effect could be more pronounced

- These figures mask important differences across groups of households (between 0.04 and 0.06 for prime age households)

- Given high % of home-owners and owners of other real estate, HP fluctuations may very significantly affect aggregate expenditure even with relatively low average mpc

- When these effects reflect changes in precautionary savings, severe busts may seriously affect retirement plans and expectations of middle age households in so far as they are counting on housing equity gains in the face of personal negative shocks when old.