

Wealth Effects on Consumption across the Wealth Distribution: Empirical Evidence

L. Arrondel (CNRS-PSE, Banque de France)

P. Lamarche (European Central Bank)

F. Savignac (Banque de France)

Motivations

- ❑ **A policy issue for Central Banks:** monetary policy transmission to consumer spending (through changes in asset values).
- ❑ **Distributive effects of monetary policy** across the population: QE and asset prices.
- ❑ **And an old issue in the literature** (Brumberg and Modigliani, 1954; Ando and Modigliani, 1963)
- ❑ **Widely studied in the empirical literature (macro-based estimates)**
 - France : **0.8 to 1 cent on annual consumption for every 1 euro increase** (Slacalek 2009, Chauvin and Damette, 2010)
 - for the U.S or the U.K: MPC out of wealth between 3 cents and 5 cents

Motivations

□ Heterogeneity in households' consumption behaviours:

Total consumption may actually be made up of the aggregation of different consumption behaviors across population due to differences in wealth, age, portfolio composition, income expectations, etc.

□ Theoretical background :

- Carroll and Kimball (1996): decreasing MPC due to uncertainty over wealth and income;
- King (1994) - credit constraints induce a higher MPC

□ Growing empirical literature accounting for household level heterogeneity (e.g. Parker (1999), Attanasio et al. (2009), Bover (2005) Browning et al., (2013), Campbell and Cocco (2007), Christelis et al. (2015), Disney et al. (2010), Jappelli and Pistaferri))

What do we do?

□ Estimation of the **marginal propensity to consume out of wealth** (MPC) using the French Wealth survey (FWS 2010): cross-sectional differences in consumption behaviors and wealth

➡ First paper that estimates quantitative wealth effects on consumption for France using household level information (cross section)- Bover (2005): Spain , Paiella (2007): Italy

□ **Non durable consumption at the household level** : imputed using FWS and the Household Budget Survey (Browning et al., 2003)

□ **Main focus**

i) **MPC heterogeneity across the wealth distribution and depending on the wealth composition**

i) **Role of indebtedness**

Contribution to the related literature

❑ MPC heterogeneity across the whole wealth distribution

- Mian et al. (2013): geographical price variations across the U.S.
- Some previous evidences of decreasing MPC based on household survey. Parker (1999), Bover (2005), Arrondel et al. (2014)

❑ Accounting for heterogeneity in net wealth composition

- Most of micro-based studies are mainly about heterogeneity of **MPC out of housing wealth** across age or homeownership status [Attanasio et al. (2009), Browning et al., (2013), Campbell and Cocco (2007), Disney et al. (2010), Clancy et al. (2014)]
- Some estimates based on household wealth survey [Parker (1999), Bover (2005), Bostic et al.(2009), Grant and Peltonen (2008), Paiella (2007), Sierminska and Takhtamanova (2012), Christelis et al. (2015)]

❑ From micro heterogeneity to macro implications

- Micro based estimates of MPC out of wealth for various net wealth groups
- Consumption elasticities to wealth of each net wealth group: heterogeneous MPC + wealth and consumption distributions (mean values for each group) [Cf. Christelis et al. (2015)]

Main results

❑ Confirm the **limited wealth effects** on consumption in France (housing and financial wealth)

❑ **Decreasing MPC across the net wealth distribution**

Net wealth distribution	Housing wealth (MPC, cents €)	Financial wealth (MPC, cents €)
p1-p50	1.4	12.2
P90+	0.8	n.s.

❑.... **But increasing consumption elasticity** to housing wealth [wealth concentration]

❑ **Role of indebtedness**

- **Heterogeneity depending on the debt pressure**
- **Role of mortgages in France?** significant higher MPC out of housing wealth for households with mortgages: likely to reflect a selection effect in the bank lending policy.

Outline of the presentation

1. Introduction

2. Data

- Data sources
- Consumption measure
- Consumption and wealth distributions
- Econometric sample

3. Estimation results of the marginal propensity to consume out of wealth

- Baseline results
- Heterogeneity across the wealth distribution

4. Investigation of the collateral channel and other robustness tests

2. Data sources

❑ French Wealth Survey

- Part of the HFCS (first wave), conducted by INSEE
- 2009/2010 wave : october 2009-february 2010
- Cross-section of 15,006 households
- Oversampling of the wealthy
- National questionnaire (long experience: first French wealth survey: 1986, then conducted every 6 years, now every 3 years)
- **New questions about consumption in this wave [not available before]: food consumption at home, outside home and utilities + qualitative indicators about other expenditures (clothing, public transport, cultural and recreational goods and services, health, children education, etc.)**

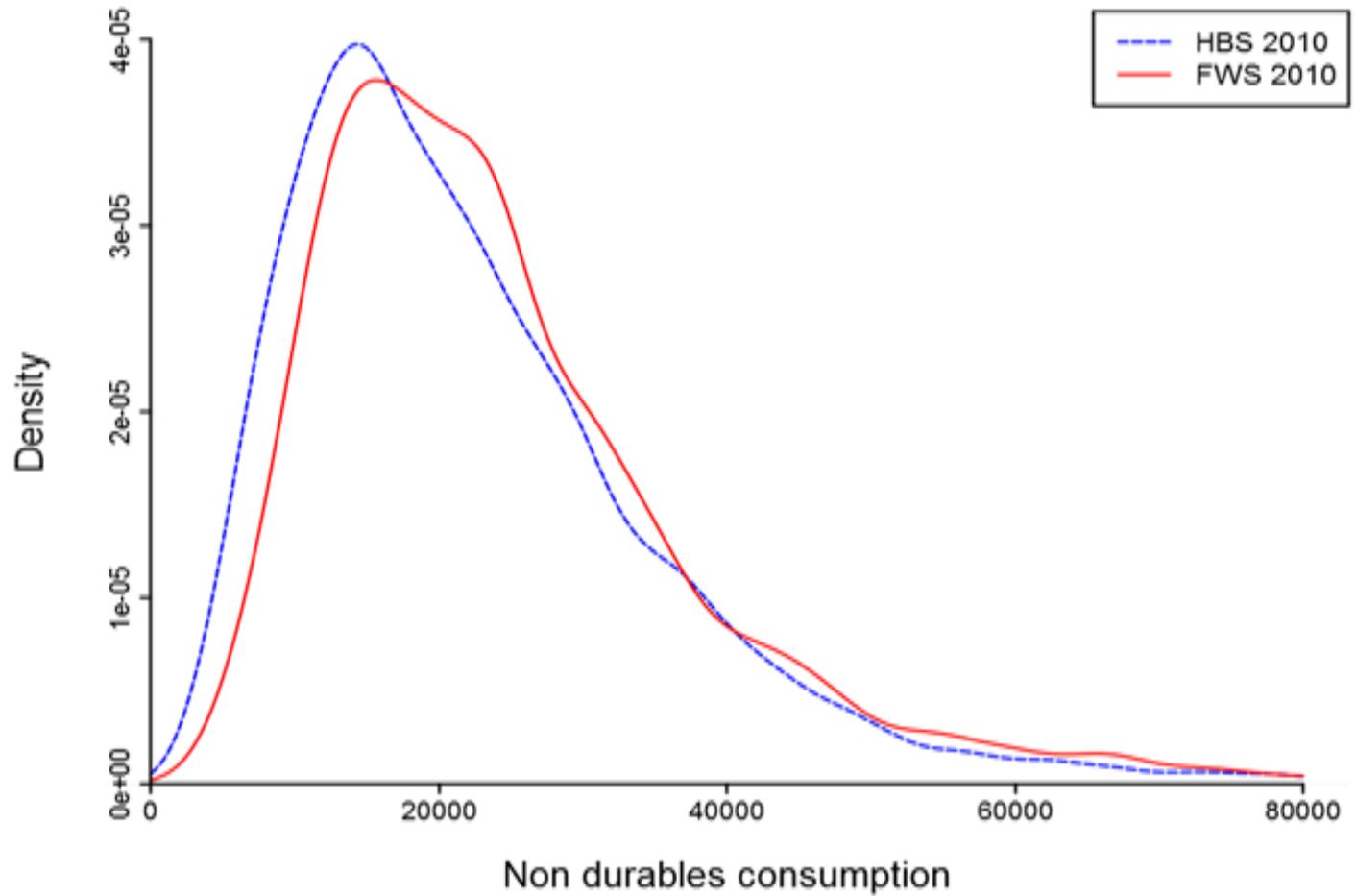
❑ Household budget survey

- 2010 wave – Fieldwork : oct2010-oct2011. About 15,000 households
- Used to impute consumption in the FWS

2. Measuring consumption at the household level

- Browning et al. (2003) approach to impute **non durable consumption**
- **Consumption module of the FWS and the Household Budget Survey** (Insee - Eurostat):
 1. In the HBS: **Non durable consumption is regressed on selected expenditure items (food consumption at home, outside home and utilities)** and on the qualitative indicators about other expenditures
 2. **Estimated coefficients are used to impute the non durable consumption** at the household level in the FWS
- **Results :**
 - Total non durable consumption measure covers 89 % of the national accounts aggregate (considering harmonized definitions)
 - distributions of the imputed consumption variable in the FWS and the original variable measured in the HBS are very close

Fig. Observed (HBS) and imputed distribution (FWS) of non-durable consumption

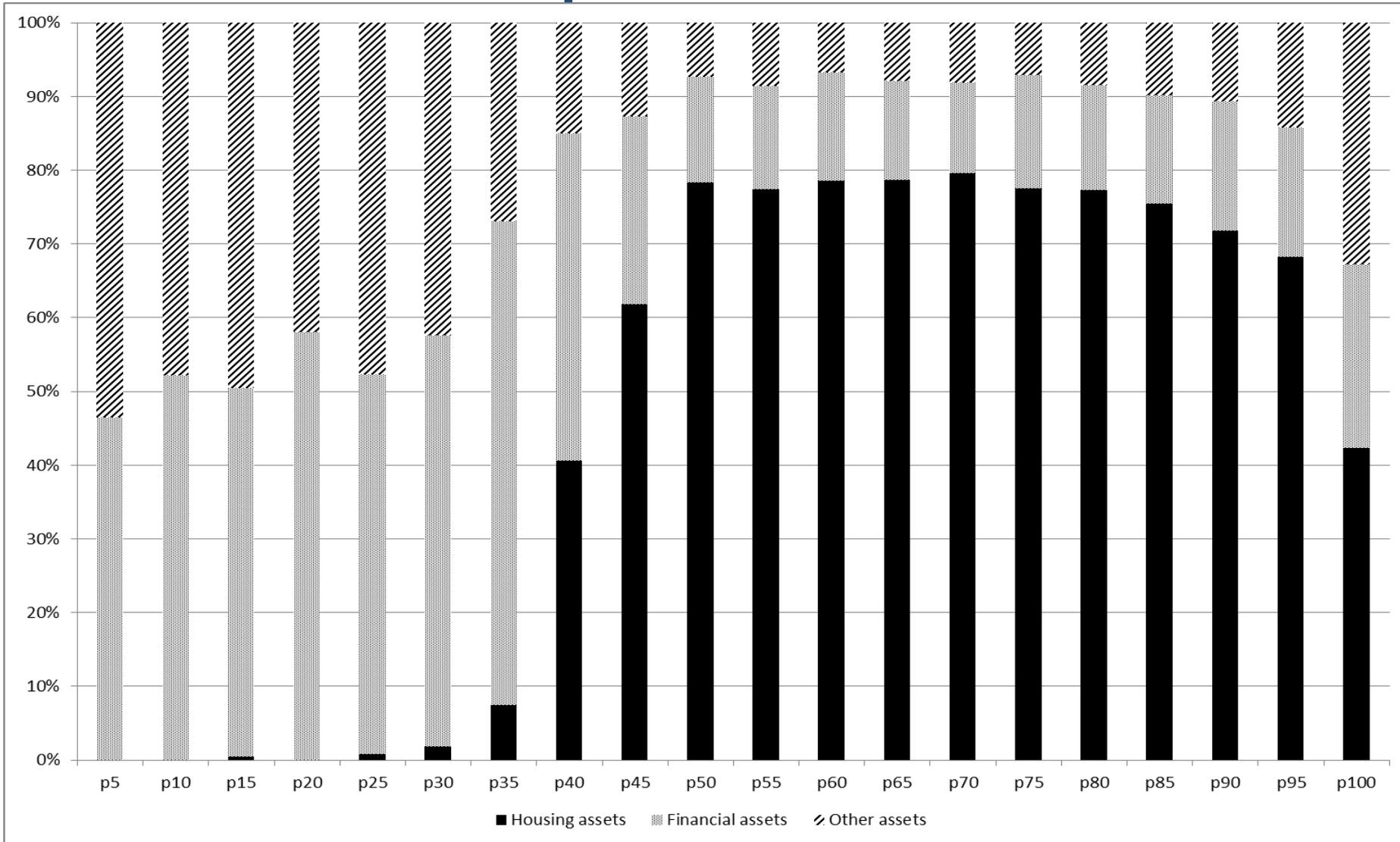


2. Consumption, wealth and income distributions in France

	Non durable consumption	Net wealth	Income	
			Total Income	Excl. Capital income
Mean (euros)	24,500	229,300	36,900	32,700
Median (euros)	22,300	114,500	29,200	26,900
P90/Median	1.99	4.42	2.20	2.16
Gini	0.33	0.65	0.38	0.36

Source: INSEE, Household Budget Survey, French Wealth Survey

2. Data : Assets composition by gross wealth percentile



2. Data : Econometric sample

- **Questions on consumption:** asked only to a (randomly selected and representative) sub-sample : **about 4,500 households** among the 15,006 in the full sample
 - Cleaning to exclude very specific behaviours : Extreme values of C/Y , W , Y
 - Restricted to RP aged 25-75
 - **Econometric sample: 3,454 households**
- Composition (demographic and wealth variables) very similar to the full sample

3. Empirical analysis

□ **Baseline model** : a simple consumption function , similar approach as Paiella (2007):

$$\frac{C_h}{Y_h} = \beta_0 + \beta_1 \frac{W_h}{Y_h} + \gamma Z_h + u_h$$

- **C_h**: non durable consumption of household h
- **Y**: current income (non property income)
- **W**: net wealth which **can be decomposed into** net values of **housing** (main residence and other real estate), **financial and others assets** (valuables and business assets)
- **Z**: **Controls for heterogeneity in life-cycle position, preferences, risks exposure and credit constraints**: age, work status, education of the reference person, household composition, credit constraint, past unemployment episodes, sick leaves, income expectations (dummy variable, expect positive average income growth five years hence).

□ Heterogeneous MPC across the net wealth distribution

$$\frac{C_h}{Y_h} = \beta_0 + \sum_{j=1}^J \beta_1^j \frac{W_h}{Y_h} * I_h^j + \gamma Z_h + u_h$$

j= net wealth category

$$I_h^j = \begin{cases} 1 & \text{If } h \text{ belongs to the } j \text{ NW category} \\ 0 & \text{Otherwise} \end{cases}$$

□ Macroeconomic implications

Consumption elasticities of a given NW group j

$$\varepsilon_{c/w}^j = \beta_1^j \frac{\overline{W^j}}{\overline{C^j}}$$

3. Baseline results

	(1)		(2)		(3)	
	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.
Wealth						
Gross wealth	0.005 ***	0.001	-	-	-	-
Net wealth	-	-	0.006 ***	0.001		
Financial wealth	-	-	-	-	0.002 ***	0.001
Main residence	-	-	-	-	0.007 ***	0.001
Other real estate	-	-	-	-	0.007 ***	0.001
Other assets	-	-	-	-	0.007 ***	0.001
Positive income expectations	0.002 **	0.001	0.002 **	0.001	0.002 **	0.001

OLS estimates- Econometric sample

Control variables: age, work status, education of the reference person, household composition, credit constraint, past unemployment episodes, sick leaves

4. Heterogeneity across the wealth distribution

Specification	Regression results			Computation of elasticities			
	(1)			(2)	(3)	(4)=(1)*(2)/(3)	
	Wealth percentile dummy	Marginal propensity to consume wealth		W	Consumption C elasticity to wealth		
		Coefficient	Std. Err.	(mean - euros)	(mean-euros)		
(B)	Financial assets						
	p1-p49	0.122	***	0.014	8,000	22,000	0.044
	p50-p69	0.020	***	0.008	26,400	23,700	0.022
	p70-p89	0.013	**	0.006	52,800	28,200	0.024
	p90-p99	0.002		0.001	178,100	35,800	0.009
	Housing wealth						
	p1-p49	0.014	**	0.006	14,650	22,000	0.009
	p50-p69	0.009	***	0.002	139,700	23,700	0.051
	p70-p89	0.008	***	0.002	269,800	28,200	0.080
	p90-p99	0.008	***	0.001	519,300	35,800	0.116
	Other assets						
	p1-p49	0.025	**	0.008	1,300	22,000	0.002
	p50-p69	0.035	***	0.008	14,000	23,700	0.020
	p70-p89	0.014	***	0.003	29,000	28,200	0.015
	p90-p99	0.006	***	0.001	261,800	35,800	0.044
	Control variables	yes					
R²	0.175						

4. Additional results and robustness

- **Disaggregating housing wealth into “main residence” and “other real estate”** (secondary residences and housing assets held for investment purposes)
 - MPC's decreasing pattern for both housing components
 - For a given net wealth group, **the MPC out of other real estate is significantly higher than the MPC out of the value of the main residence** (except in the p90-p99 wealth group where there are no significant difference between the two types of housing assets).

Specification	Regression results			Computation of elasticities			
	(1)			(2)	(3)	(4)=(1)*(2)/(3)	
	Wealth percentile dummy	Coefficient	Std. Err.	W (mean - euros)	C (mean-euros)	Consumption C elasticity to wealth	
Financial assets							
	p1-p49	0.122	**	0.014	8,000	22,000	0.044
	p50-p69	0.020	***	0.008	26,400	23,700	0.022
	p70-p89	0.013	***	0.006	52,800	28,200	0.024
	p90-p99	0.002		0.001	178,100	35,800	0.009
Main residence							
	p1-p49	0.012	***	0.006	14,650	22,000	0.008
	p50-p69	0.007	***	0.003	128,500	23,700	0.039
	p70-p89	0.009	***	0.002	233,200	28,200	0.073
	p90-p99	0.008	***	0.002	332,000	35,800	0.077
(C)	Other real estate						
	p1-p49	0.030	**	0.015	700	22,000	0.001
	p50-p69	0.023	***	0.008	16,400	23,700	0.016
	p70-p89	0.006	***	0.004	41,600	28,200	0.008
	p90-p99	0.008	***	0.001	233,600	35,800	0.051
	Other assets						
	p1-p49	0.026	***	0.008	1,300	22,000	0.002
	p50-p69	0.035	***	0.008	14,000	23,700	0.021
	p70-p89	0.014	***	0.003	29,000	28,200	0.015
	p90-p99	0.006	***	0.001	261,800	35,800	0.044
	Control variables	yes					
	R ²	0.184					

4. Additional results and robustness

❑ **Endogeneity issues : spurious correlation between consumption and wealth**, due to missing variable correlated with C and W

1) **Expectations about income and future activity**

- Already control for income expectations
- **We add control variables for the heterogeneity in local housing prices** (geographical control for the location of the HMR), see Cooper, 2013 or Bover, 2005.

Our results are not dramatically impacted.

2) Asset-holding decisions : Some factors not observed or not fully captured by the control variables (such as taste, time and risk preferences) might be expected to affect both consumption and asset allocations.

Estimation restricted to households holding similar types of assets: homeowners and stockholders . These estimates confirm the decreasing MPC pattern.

❑ **Considering 5 net wealth groups instead of 4** This does not affect our main conclusions.

4. The role of indebtedness

- ❑ **Collateral channel:** higher housing wealth may relax financial constraints when loans are guaranteed by housing assets (mortgages).

- ❑ **Credit markets: French institutional features**
 - 1) **Specificities of the mortgage market: very limited use for other purpose than real estate acquisition**
 - Using mortgages to finance other assets than the collateralized one was only permitted by law during a limited period of time (2007-2014)
 - value of the collateral is not re-evaluated over time + credit revolving cannot be guaranteed by housing property
 - 2) **Two types of loans to purchase a property:**
 - housing loan insured by an insurance scheme (70%)
 - Mortgage collateralized by housing assets (30%)

Wealth variables	Wealth percentile	Without loans guarantied by real estate collateral			Column 1 econometric sample restricted to households with at least one mortgage
		With loans guarantied by real estate collateral	All	Indebted households with a real estate property	
		(1)	(2)	(3)	Column 2: other households without mortgages
		Coeff. <i>Std. Err.</i>	Coeff. <i>Std. Err.</i>	Coeff. <i>Std. Err.</i>	
<hr/>					
Financial Wealth					
	p1-p49	0.045 <i>0.079</i>	0.117 *** <i>0.015</i>	0.204 *** <i>0.047</i>	Column 3: sub-population of column 2: households without mortgages that are nonetheless in debt and have at least one real estate property.
	p50-p69	0.060 * <i>0.036</i>	0.021 *** <i>0.008</i>	0.018 0.026	
	p70-p89	0.042 ** <i>0.019</i>	0.013 ** <i>0.006</i>	0.028 ** 0.011	
	p90-p99	0.005 <i>0.004</i>	0.001 <i>0.001</i>	0.004 ** <i>0.002</i>	
<hr/>					
Housing wealth					
	p1-p49	0.078 *** <i>0.019</i>	0.012 * <i>0.006</i>	0.048 *** <i>0.011</i>	
	p50-p69	0.034 *** <i>0.010</i>	0.010 *** <i>0.003</i>	0.032 *** <i>0.005</i>	
	p70-p89	0.020 *** <i>0.005</i>	0.008 *** <i>0.002</i>	0.021 *** <i>0.003</i>	
	p90-p99	0.012 *** <i>0.002</i>	0.008 *** <i>0.001</i>	0.011 *** <i>0.001</i>	
<hr/>					
Other wealth					
		0.008 *** <i>0.002</i>	0.007 *** <i>0.001</i>	0.009 *** <i>0.001</i>	
<hr/>					
Control variables		yes	yes	yes	
R ²		0.227	0.178	0.247	
#observations		437	3,017	1,166	

4. Collateral channel and indebtedness

- Everything else being equal, the consumption of households with mortgages is more sensitive to the value of the housing wealth.
- **Given the institutional features in France:** unlikely to reflect a collateral channel

□ **Possible explanation: a selection effect in the bank lending supply?**

i.e. banks only offer mortgages to highly specific households.

Significant differences between the average characteristics of indebted households depending on the type of loan they have.

“mortgage households”: higher income, housing wealth and total debt, more often self-employed and younger than the other indebted households.

Differences in unobservable characteristics? (more concerned with the value of their housing assets, more accurate evaluation of their wealth, etc...)

Means characteristics
Indebted households holding one property or more

	With at least one mortgage	With other loans (and no mortgage)
	(mean values)	(mean values)
Wealth and income		
Gross wealth	460,600	429,200
Net wealth	346,700	350,200
Financial assets	52,200	61,600
Main residence	229,600	212,700 **
Other real estate	84,800	61,800 **
Other assets	93,900	87,100
Income (excluding income from housing and financial assets)	46,000	44,200 **
Total debt	121,200	71,500 **
Debt Service	12,000	7,700 **
Asset holding (% of HH)		
household's main residence	0.950	0.924 **
Other real estate	0.316	0.322
Business	0.283	0.236 **

Means characteristics
Indebted households holding one property or more

With at least one
mortgage
(mean values)

With other loans
(and no mortgage)
(mean values)

Demographics

Age

25 to 29	0.049	0.046
30 to 39	0.289	0.213**
40 to 49	0.351	0.253**
50 to 59	0.211	0.257**
60 to 69	0.083	0.179**
70 to 75	0.011	0.044**
More than 75	0.006	0.008

Employment status

Self-employed	0.141	0.108**
Employee	0.735	0.635**
Retired	0.087	0.224**
Unemployed	0.022	0.019
Others	0.015	0.014

Education

No qualification	0.107	0.094
Primary or Secondary	0.377	0.436**
Baccalaureat	0.161	0.145
Post-secondary	0.174	0.137**
Tertiary	0.181	0.188

# observations	1,681	4,200
----------------	-------	-------

Conclusion

Limited housing and financial wealth effects on consumption in France

Decreasing MPC across the wealth distribution

Financial assets : From 12.2 cents to non significant MPC in the top of the NW distribution

Housing assets : from 1.4 cents to 0.8 cent

Is financial or housing wealth the main channel?

Our answer : it depends on the households' position in the NW distribution

Conclusion

- ❑ **Higher MPC out of housing wealth for households having mortgages** : selection effect of the bank lending supply?
- ❑ **Future research** : HFCS to study cross-country heterogeneity on these issues

ANNEXES

CONSUMPTION QUESTIONS IN THE FRENCH WEALTH SURVEY

[Q1.] Over the last 12 months, how much have you spend, on average per month, for food at home (excluding food consume in restaurants), considering every member of your household ?

[Q2.] And how much do you spend, for your household as a whole, for food taken outside (including school or at-work restaurant, fast-food, meal and sandwiches eat in the workplace) ?

[Q3.] Over the last 12 months, how much have you spend, for water, electicity and gas, heating and communication bills (telephone and web connexion)?

[Q4-Q11.] Over the last 12 months has any member of your household had regular expenses regarding:

- clothing
- public transport (train, bus, plane, subway and taxi)
- other transport with motorized vehicle or bicycle (gas expenses, insurance, etc. but not the vehicle acquisition expenses themselves)
- on cultural and recreational goods or services (books, movies, music, concert, museum and art exhibitions, etc.)
- other form of recreational goods or services
- health (expenses not covered by public or employer insurance scheme)
- children education or childcare
- personal services (housekeeping, gardenkeeping, other)

[Q12.] How much do you spend, on an average month, for your usual consumption only (food, clothes, heating, transports, leisure, various services,...), excluding rents, repayments, large expenditure on durables (e.g. buying a car, a refrigerator, a washing-machine, furnitures,...) ?

The reference person's expectations concerning future household income are elicited using the following question, put in questionnaire module (for another sub sample than the "consumption one)

How do you imagine your household's total income will change over the next five years?

You have 100 percentage points to allocate among the 7 choices below:

Your household's total income will:

increase by [more than 25%, 10% to 25%, less than 10%]

be the same as today,

decrease by [less than 10%, 10% to 25%, more than 25%]

We compute the mean expected changes for each respondent considering the mean value for each bracket and the percentage points given for each choice. We define "optimistic households" as those where the respondent expects a positive mean change in total income in the next five years.

- we estimate the linear probability of a household expecting a positive change in household income in the next five years
- Explanatory variables: detailed household composition, the reference person's demographic variables (age, age squared, detailed social status, education) and information on the reference person's *parents* (father's main occupation during the reference person's childhood).
- In sample imputation

Table B1. Indicators of income expectations: quality of fit

		Average expected changes in income (%)	% of "optimistic" households
Subsample "expectations and preferences"	Observed	3.25	56.3
	Estimated	3.13	56.5
Econometric subsample	Predicted	1.56	52.2

Wealth variables	Wealth percentile	Homeowners	Stockholders
		(1) Coeff. <i>Std. Err.</i>	(2) Coeff. <i>Std. Err.</i>
<hr/>			
Financial Wealth			
	p1-p49	0.086 *** <i>0.030</i>	0.170 *** <i>0.032</i>
	p50-p69	0.023 * <i>0.012</i>	0.018 <i>0.015</i>
	p70-p89	0.023 *** <i>0.006</i>	0.023 *** <i>0.009</i>
	p90-p99	0.004 *** <i>0.001</i>	0.004 *** <i>0.002</i>
<hr/>			
Housing wealth			
	p1-p49	0.062 *** <i>0.007</i>	0.055 * <i>0.034</i>
	p50-p69	0.031 *** <i>0.003</i>	0.032 *** <i>0.009</i>
	p70-p89	0.019 *** <i>0.002</i>	0.020 *** <i>0.004</i>
	p90-p99	0.012 *** <i>0.001</i>	0.012 *** <i>0.001</i>
<hr/>			
Other wealth			
	p1-p49	0.013 * <i>0.008</i>	0.023 <i>0.055</i>
	p50-p69	0.030 *** <i>0.010</i>	0.032 <i>0.039</i>
	p70-p89	0.013 *** <i>0.003</i>	0.031 *** <i>0.009</i>
	p90-p99	0.007 *** <i>0.001</i>	0.008 *** <i>0.002</i>
<hr/>			
Control variables		yes	yes
R ²		0.266	0.302
#observations		2,364	837

The role of indebtedness

☐ Debt pressure:

- The debt-to-assets ratio: household “under pressure” when this ratio is above 2;
- The debt-service-to-income ratio: “highly indebted” when above 25% (which corresponds to the 9th decile of these ratios in the population).

Wealth variables	Wealth percentile	Debt to asset ratio		Debt service to income ratio	
		ratio>2 Coeff. Std. Err.	ratio<2 Coeff. Std. Err.	ratio >0,25 Coeff. Std. Err.	ratio <0,25 Coeff. Std. Err.
Financial Wealth					
	p1-p49	0.017 0.044	0.117*** 0.015	0.041 0.062	0.124** 0.015
	p50-p69	0.068** 0.034	0.021*** 0.008	0.030 0.041	0.021*** 0.008
	p70-p89	0.042*** 0.016	0.013** 0.006	0.054 ** 0.022	0.013*** 0.006
	p90-p99	0.002 0.003	0.001 0.001	0.004 0.002	0.000 0.001
Housing wealth					
	p1-p49	0.032 ** 0.016	0.016 ** 0.007	0.041 *** 0.016	0.013 *** 0.007
	p50-p69	0.030 *** 0.007	0.009 *** 0.003	0.019 ** 0.007	0.010 *** 0.003
	p70-p89	0.018 *** 0.005	0.008 *** 0.002	0.010 ** 0.004	0.009 *** 0.002
	p90-p99	0.013 *** 0.002	0.007 *** 0.001	0.007 *** 0.002	0.009 *** 0.001
Other wealth					
		0.006 *** 0.002	0.007 0.002	0.006 *** 0.002	0.008 *** 0.001
Control variables					
		yes	yes	yes	yes
	R ²	0.258	0.177	0.227	0.184
	#observations	550	2904	527	2927