The Effect of Housing Wealth Losses on Spending in the Great Recession

October 30, 2018

Appendix

(not for publication)

A   The CAMS Spending Questionnaire

Survey administration

CAMS is a mail survey of a random subsample of about 5,000 HRS households, that has been collected every two years since 2001. Questionnaires are sent out in late September or early October. For the most part, they are returned in October and November. Thus, CAMS 2001 measures total household spending approximately in the year 2001, CAMS 2003 measures total household spending approximately in 2003, and so on. The sample for the first wave of CAMS was drawn from the pool of HRS households that participated in the year 2000 core interview. About 3,800 HRS households responded to the first wave of CAMS. Since year 2001, the CAMS survey has been conducted every odd-numbered year. As refresher cohorts were inducted into the HRS (in 2004 and 2010), a random subsample was also inducted into CAMS so that CAMS continues to represent the population over 50. Unit response rates to CAMS average about 72%.

The CAMS is a paper-and-pencil survey that is sent to respondents in the mail. As such it is a self-administered survey where respondents can take the time they need and are willing to spend to fill out the questionnaire. They can consult records or other household members to help gather the information. This is important because producing informative reports about the amounts spent on certain categories usually requires some thought and respondents would not take this time if an interviewer was waiting for the answer in real time.

Spending categories

The level of aggregation should be chosen to balance respondent burden on the one hand and prompting respondents' memories sufficiently about different categories of spending on the

other hand so that they will not forget to report anything. For example, asking just one or just a hand-full of questions about spending would lead to substantial underreporting of spending. See for example Hurd et al. (1998) who document the extent of underreporting of a one-shot spending question, and Browning and Madsen (2005) who assess the degree of underreporting and data quality when asking four spending questions. The U.S. Consumer Expenditure Survey asks about spending in several hundred categories which would not be feasible in a general household survey and would also not necessarily produce more accurate data. CAMS queries households about their spending in a total of 39 categories. They are listed below.

"Adapting" reference period

The shorter the reference period the smaller the recall error. However, the objective in CAMS is to measure annual total household spending. If households spent the same amount every day on all categories then it would be sufficient to ask households for what they spent "yesterday" and to multiply that amount by 365. Instead there are some categories that tend to be recurring every month or every week, others are more irregular. This suggests that for obtaining annual spending the reference period should be "last 12 months" for irregular spending categories, like trips and vacations or home repairs, and "last month" or "monthly" for spending categories that are recurring every month, like utilities. This is the approach adopted in CAMS. For those categories where there is likely variation across households in the frequency of spending in some categories CAMS offers respondents the choice of reporting their spending "last month/monthly" or "last 12 months" whichever "best reflects the household's spending."

Imputation

The rate of item non-response in CAMS is low, averaging about 5%. Although we impute for missing values, just a small percentage of total spending is from imputation. We use two types of imputations for missing values on single spending categories. For those items for which there is additional information in the adjacent HRS core interviews, we use that to inform the imputations. For example, a missing rent number is imputed as zero if the household reported owning a home in the HRS core interviews. We also check for data patterns that are strongly suggestive of the respondent having entered an amount in the wrong column of the questionnaire (e.g., if the annualized utility amount is 12 times that in the previous or subsequent wave). These imputations are more detailed than those underlying the RAND-CAMS data, so our data and the RAND-CAMS data are not exactly the same.

A.1 List of CAMS spending categories

Purchases of big ticket items in the past twelve months:

- Automobile or truck

- Refrigerator

- Washing machine and/or dryer

- Dishwasher

- Television

- Computer

Amount spent in last 12 months:

- Homeowner's or renter's insurance

- Property taxes

- Vehicle insurance

- Vehicle maintenance: parts, repairs, and servicing

- Health insurance: out-of-pocket, including Medicare supplemental insurance

- Trips and vacations: including transportation, accommodations, and recreational expenses on trips

- Home repairs and maintenance: materials your household bought directly

- Home repairs and maintenance services: hiring costs including materials they provided

- Household furnishings and equipment: such as furniture, floor coverings, small appliances, miscellaneous household equipment

- Contributions to religious, educational, charitable, or political organizations

- Cash or gifts to family and friends outside your household: including alimony and child support payments

Amount spent "monthly" or in last 12 months:

- Mortgage[1]

- Rent

- Electricity

- Water

- Heating fuel for the home

- Telephone, cable, internet

- Car payments: interest and principal

Amount spent "monthly" or "in last 12 months" – please use the time period that best reflects your spending over the last 12 months:

- Housekeeping supplies: cleaning and laundry products

- Housekeeping, dry cleaning and laundry services: hiring costs for housekeeping or home cleaning, and amount spent at dry cleaners and laundries

- Gardening and yard supplies: yard, lawn and garden products

- Gardening and yard services: hiring costs including materials they provided

---

[1] The CAMS questionnaire elicits total mortgage payments, that is, the sum of mortgage interest and payments for mortgage principal. The latter is a form of saving and should not be included in household spending. We approximated households' interest payments as a certain fraction of the total mortgage payments reported in CAMS. We estimated this fraction for each survey year using data from the Consumer Expenditure Survey where the details of interest and payments for principal are split out; stratifying by age band of the respondent.

- Clothing and apparel: including footwear, outerwear, and products such as watches or jewelry

- Personal care products and services: including hair care, shaving and skin products, amount spent at hair dresser, manicure, etc.

- Prescription and nonprescription medications: out-of- pocket cost, not including what is covered by insurance

- Health care services: out-of-pocket cost of hospital care, doctor services, lab tests, eye, dental, and nursing home care

- Medical supplies: out-of-pocket cost, not including what is covered by insurance

- Tickets to movies, sporting events, and performing arts

- Sports: including gym, exercise equipment such as bicycles, skis, boats, etc.

- Hobbies and leisure equipment: such as photography, stamps, reading materials, camping, etc.

Amount spent "weekly," "monthly," or "last 12 months" – whichever is easiest to report:

- Food and beverages: food and drinks, including alcoholic, that you buy in grocery or other stores

- Dining and/or drinking out: items in restaurants, cafes, and diners, including take- out food

- Gasoline

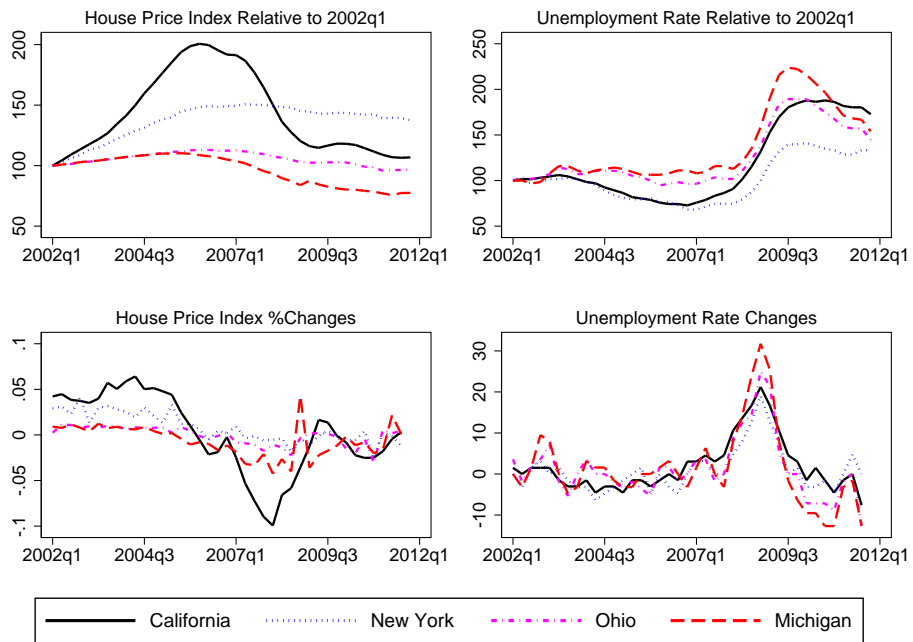# B Section 3 Additional Results

Figure B.1: Evolution of House Price and Unemployment Rate in Selected States
(Levels and Changes)

Table B.1: Regressions of Changes in Spending by Degree of House Price Decline
Dependent variable: change in log spending
(other regressors' coefficients for Table 2)

	HomeOwn (i)	Non-HomeOwn (ii)	HomeOwn Always HO (iii)	HomeOwn No Unemp (iv)	HomeOwn Same State (v)
Age	-0.002	-0.025*	-0.000	-0.002	0.000
	(0.006)	(0.014)	(0.006)	(0.006)	(0.006)
Age^2	0.000	0.000*	-0.000	0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
High School Graduate	0.016	-0.016	0.014	0.017	0.018*
	(0.011)	(0.021)	(0.010)	(0.011)	(0.011)
Some College	0.025*	-0.010	0.023**	0.024*	0.032**
	(0.012)	(0.028)	(0.011)	(0.012)	(0.012)
College or More	0.022	0.004	0.023*	0.022	0.032**
	(0.014)	(0.027)	(0.012)	(0.014)	(0.014)
Household Size	-0.003	-0.008	-0.005	-0.003	-0.004
	(0.005)	(0.009)	(0.006)	(0.005)	(0.006)
Whether a Couple	-0.015*	-0.032	-0.014	-0.014	-0.019*
	(0.008)	(0.021)	(0.010)	(0.008)	(0.010)
Very Good Health	-0.001	0.001	-0.004	0.000	-0.009
	(0.012)	(0.035)	(0.014)	(0.012)	(0.014)
Good Health	-0.005	0.033	-0.013	-0.004	-0.015
	(0.013)	(0.027)	(0.014)	(0.012)	(0.014)
Fair Health	0.001	-0.020	-0.011	0.000	-0.004
	(0.019)	(0.035)	(0.021)	(0.018)	(0.021)
Poor Health	-0.006	0.026	-0.010	-0.003	-0.011
	(0.024)	(0.043)	(0.031)	(0.023)	(0.028)
Income $2^n d$ Quartile	-0.008	-0.004	-0.009	-0.011	-0.009
	(0.014)	(0.018)	(0.014)	(0.014)	(0.013)
Income $3^r d$ Quartile	0.009	0.017	0.011	0.009	0.005
	(0.011)	(0.029)	(0.012)	(0.011)	(0.012)
Income $4^t h$ Quartile	0.024	-0.059*	0.021	0.024	0.022
	(0.015)	(0.035)	(0.016)	(0.015)	(0.016)
Wealth $2^n d$ Quartile	-0.036**	0.067**	-0.024*	-0.031**	-0.035**
	(0.015)	(0.024)	(0.014)	(0.015)	(0.014)
Wealth $3^r d$ Quartile	-0.042**	0.097**	-0.031*	-0.040**	-0.041**
	(0.017)	(0.042)	(0.016)	(0.017)	(0.019)
Wealth $4^t h$ Quartile	-0.024	0.046	-0.019	-0.022	-0.024
	(0.017)	(0.049)	(0.016)	(0.017)	(0.017)
Working Full Time	-0.010	0.032	-0.013	-0.006	-0.002
	(0.015)	(0.033)	(0.016)	(0.014)	(0.017)
Working Part Time	0.017	0.011	0.015	0.018	0.022
	(0.025)	(0.049)	(0.025)	(0.025)	(0.027)
Unemployed	-0.048	0.127	-0.028	-0.050	-0.052
	(0.054)	(0.077)	(0.054)	(0.061)	(0.057)
Partly Retired	-0.002	0.062	-0.010	0.001	-0.005
	(0.022)	(0.048)	(0.026)	(0.022)	(0.027)
Retired	0.001	0.036	-0.000	0.002	0.007
	(0.017)	(0.030)	(0.022)	(0.017)	(0.023)
Disabled	0.059	0.054	0.043	0.061	0.067
	(0.045)	(0.078)	(0.052)	(0.046)	(0.051)
Constant	-0.008	0.651	-0.061	-0.013	-0.077
	(0.199)	(0.480)	(0.205)	(0.204)	(0.209)
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes
Tercile-Specific Time Trend	Yes	Yes	Yes	Yes	Yes
N	9,122	2,036	7,980	8,994	7,997

States are grouped in terciles of the distribution of house price declines from 2007q4 to 2009q2 (1st tercile includes states with the smallest declines; 3rd tercile includes states with the largest declines). Standard errors clustered at the state level in parentheses. ***, ** and * indicate significance at the 1%, 5% and 10% level, respectively. In each survey wave we drop households with changes in log spending in the top 1% or bottom 1% of the sample.

Table B.2: Regressions of Changes in Spending by Degree of House Price Decline
Dependent variable: change in log spending
(including state-fixed-effects)

	HomeOwn (i)	Non-HomeOwn (ii)	HomeOwn Always HO (iii)	HomeOwn No Unemp (iv)	HomeOwn Same State (v)
$\mathbb{I}(Recession = 1)$	0.061**	-0.007	0.039	0.066**	0.059**
	(0.024)	(0.064)	(0.028)	(0.025)	(0.026)
$\mathbb{I}(Recession = 1) \times$	-0.052*	0.004	-0.040	-0.059**	-0.052*
$\mathbb{I}(Tercile = 2)$	(0.026)	(0.058)	(0.030)	(0.028)	(0.029)
$\mathbb{I}(Recession = 1) \times$	-0.104**	-0.032	-0.097**	-0.102**	-0.113**
$\mathbb{I}(Tercile = 3)$	(0.027)	(0.073)	(0.032)	(0.027)	(0.029)
Hypothesis Testing:					
$\mathbb{I}(Recession = 1) \times$					
$\mathbb{I}(Tercile = 2) =$	F=4.67	F=0.24	F=4.58	F=3.30	F=5.17
$\mathbb{I}(Recession = 1) \times$	p-val=0.04	p-val=0.62	p-val=0.04	p-val=0.07	p-val=0.03
$\mathbb{I}(Tercile = 3)$					
N	9,122	2,036	7,980	8,994	7,997

States are grouped in terciles of the distribution of house price declines from 2007q4 to 2009q2 (1st tercile includes states with the smallest declines; 3rd tercile includes states with the largest declines). Standard errors clustered at the state level in parentheses. ***, ** and * indicate significance at the 1%, 5% and 10% level, respectively. In each survey wave we drop households with changes in log spending in the top 1% or bottom 1% of the sample. Other regressors are those in Table B.1.

C   IV Regression Additional Results

Table C.1: IV Regressions of Change in Log Spending on Change in Housing Wealth
Complete Set of Estimated Coefficients

	(i)	(ii)	(iii)
$\Delta \ln(Housing\ Wealth)_{Non-Recession}$	-0.036	-0.037	-0.016
	(0.041)	(0.041)	(0.118)
$\Delta \ln(Housing\ Wealth)_{Recession}$	0.384**	0.379**	0.433**
	(0.157)	(0.157)	(0.209)
Recession Indicator	0.006	0.006	-0.002
	(0.017)	(0.017)	(0.028)
Age	-0.000	-0.000	0.001
	(0.000)	(0.000)	(0.001)
High School Graduate	0.008	0.008	0.054**
	(0.011)	(0.011)	(0.024)
Some College	0.026**	0.026**	0.087***
	(0.011)	(0.012)	(0.026)
College or More	0.019*	0.018*	0.065***
	(0.011)	(0.011)	(0.025)
$\Delta Household\ Size$	0.010	0.010	-0.002
	(0.009)	(0.009)	(0.014)
$Partnered \rightarrow Single$	-0.092***	-0.091***	-0.109*
	(0.034)	(0.034)	(0.058)
$Single \rightarrow Partnered$	0.094*	0.094*	0.046
	(0.050)	(0.050)	(0.083)
Health Worsening	-0.017	-0.017	-0.022
	(0.012)	(0.012)	(0.020)
Health Improvement	-0.002	-0.002	-0.026
	(0.013)	(0.013)	(0.021)
$\Delta(Household\ Income)$		0.002	-0.006
		(0.006)	(0.009)
$Working \rightarrow Working$		0.005	0.011
		(0.009)	(0.016)
$Not\ Working \rightarrow Working$		-0.004	0.037
		(0.029)	(0.051)
$Working \rightarrow Not\ Working$		-0.025	-0.076**
		(0.019)	(0.031)
$\Delta(Other\ Wealth)$		-0.000	-0.002
		(0.003)	(0.005)
$\Delta(Bequest\ Exp)$			0.010
			(0.025)
$\Delta(Stocks\ Exp)$			0.016
			(0.030)
$\Delta(Depression\ Exp)$			-0.038
			(0.029)
Constant	-0.048	-0.052	-0.153**
	(0.031)	(0.037)	(0.071)
N	8,790	8,790	3,238

Standard errors clustered at the state level in parentheses. ***, ** and * indicate significance at the 1%, 5% and 10% level, respectively. In each survey wave we drop households with changes in log spending in the top 1% or bottom 1% of the sample. Household income and other wealth are transformed using the inverse hyperbolic sine transformation.

C.1 First-Stage and Reduced-Form Regression Results

Table C.2 below shows the first-stage results and diagnostics for the IV regressions using housing wealth presented in Table 3. The first-stage consists of two regressions relating the variables $\Delta \ln(Housing\ Wealth)$ and $\mathbb{I}(Recession = 1) \times \Delta \ln(Housing\ Wealth)$ to the two instruments, namely changes in state-level house price indexes during non-recession and recession times — $\Delta \ln(HPI)$ and $\mathbb{I}(Recession = 1) \times \Delta \ln(HPI)$, respectively. In Table C.2, we only report the estimated coefficients on $\Delta \ln(HPI)$ and $\mathbb{I}(Recession = 1) \times \Delta \ln(HPI)$ and omit those associated with the other regressors. In column (i), the set of regressors includes age, indicators for education levels, change in marital status, change in household size and change in health status across two consecutive waves. In addition, the set in column (ii) includes change in total household income, work status and wealth other than housing; in column (iii) it also includes changes in bequest and economic outlook expectations. For the Underidentification and Weak Identification Tests we report the Kleibergen and Paap (2006) rank LM and Wald F statistics, respectively.

Table C.2: IV Regressions of Change in Log Spending on Change in Housing Wealth
(IV First-Stage Results)

	(i)	(ii)	(iii)
Regression for $\Delta \ln(Housing\ Wealth)$			
$\Delta \ln(HPI)_{Non-Recession}$	0.848***	0.845***	0.874***
	(0.037)	(0.037)	(0.113)
$\Delta \ln(HPI)_{Recession}$	-0.358***	-0.359***	-0.409***
	(0.091)	(0.091)	(0.141)
Regression for $\mathbb{I}(Recession = 1) \times \Delta \ln(Housing\ Wealth)$			
$\Delta \ln(HPI)_{Non-Recession}$	-0.001	-0.003	-0.009
	(0.001)	(0.002)	(0.010)
$\Delta \ln(HPI)_{Recession}$	0.485***	0.486***	0.451***
	(0.084)	(0.084)	(0.095)
First-Stage Diagnostic			
Underidentification Test	$\chi^2 = 31.62$	$\chi^2 = 31.24$	$\chi^2_1 = 21.92$
(p-val)	(0.000)	(0.000)	(0.000)
Weak Identification Test	$F = 16.46$	$F = 16.24$	$F = 11.19$
N	8,790	8,790	3,238

Standard errors clustered at the state level in parentheses. ***, ** and * indicate significance at the 1%, 5% and 10% level, respectively. The sets of regressors are as in Table C.1.

Table C.3: Reduced-Form Regressions of Change in Log Spending on Change in House Prices

	(i)	(ii)	(iii)
$\Delta\ln(HPI)_{Non-Recession}$	-0.031	-0.033	-0.010
	(0.035)	(0.034)	(0.112)
$\Delta\ln(HPI)_{Recession}$	0.199**	0.198**	0.202
	(0.068)	(0.068)	(0.138)
Recession Indicator	0.002	0.002	-0.007
	(0.017)	(0.017)	(0.027)
Age	-0.000	-0.000	0.001
	(0.000)	(0.000)	(0.001)
High School Graduate	0.009	0.009	0.045**
	(0.010)	(0.010)	(0.019)
Some College	0.019	0.019	0.064**
	(0.012)	(0.011)	(0.023)
College or More	0.019	0.018	0.056**
	(0.013)	(0.013)	(0.023)
$\Delta Household\ Size$	0.012	0.012	-0.003
	(0.010)	(0.009)	(0.014)
$Partnered \rightarrow Single$	-0.099**	-0.098**	-0.121**
	(0.030)	(0.031)	(0.042)
$Single \rightarrow Partnered$	0.092	0.092	0.046
	(0.060)	(0.059)	(0.067)
Health Worsening	-0.018*	-0.017	-0.027
	(0.010)	(0.010)	(0.019)
Health Improvement	-0.004	-0.004	-0.026
	(0.011)	(0.011)	(0.021)
$\Delta(Household\ Income)$		0.002	-0.003
		(0.004)	(0.005)
$Working \rightarrow Working$		0.005	0.007
		(0.009)	(0.015)
$Not\ Working \rightarrow Working$		-0.003	0.022
		(0.029)	(0.051)
$Working \rightarrow Not\ Working$		-0.027**	-0.082**
		(0.013)	(0.028)
$\Delta(Other\ Wealth)$		0.001	-0.001
		(0.003)	(0.004)
$\Delta(Bequest\ Exp)$			0.021
			(0.022)
$\Delta(Stocks\ Exp)$			0.018
			(0.031)
$\Delta(Depression\ Exp)$			-0.039
			(0.025)
Constant	-0.039*	-0.041	-0.120**
	(0.021)	(0.028)	(0.046)
N	8,790	8,790	3,238

Standard errors clustered at the household level in parentheses. ***, ** and * indicate significance at the 1%, 5% and 10% level, respectively. Household income and other wealth are transformed using the inverse hyperbolic sine transformation.