Repaying Consumer Debt and Increasing Savings After Retirement

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Motivation

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- Voluntary retirement savings schemes have been becoming more and more important
- The question whether or not individuals plan properly and save enough for retirement is still debated

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2. Love et al. (2009); Poterba et al. (2011a,b) document that wealth is stationary or increases after retirement
   - ★ DeNardi et al. (2010); Jones et al. (2018); Ameriks et al. (2016); Laitner et al. (2018) explain this with longevity and medical expense risk

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- We estimate the changes in consumer debt and liquid savings from individuals transitioning to retirement (individual fixed effects regressions)
- ★ Look at intersection of the two puzzles
- ★ Other papers on changes in households' balance sheets around retirement: Addoum (2016) analyses portfolio choice around retirement and Agarwal et al. (2009) look at financial mistakes over the life-cycle

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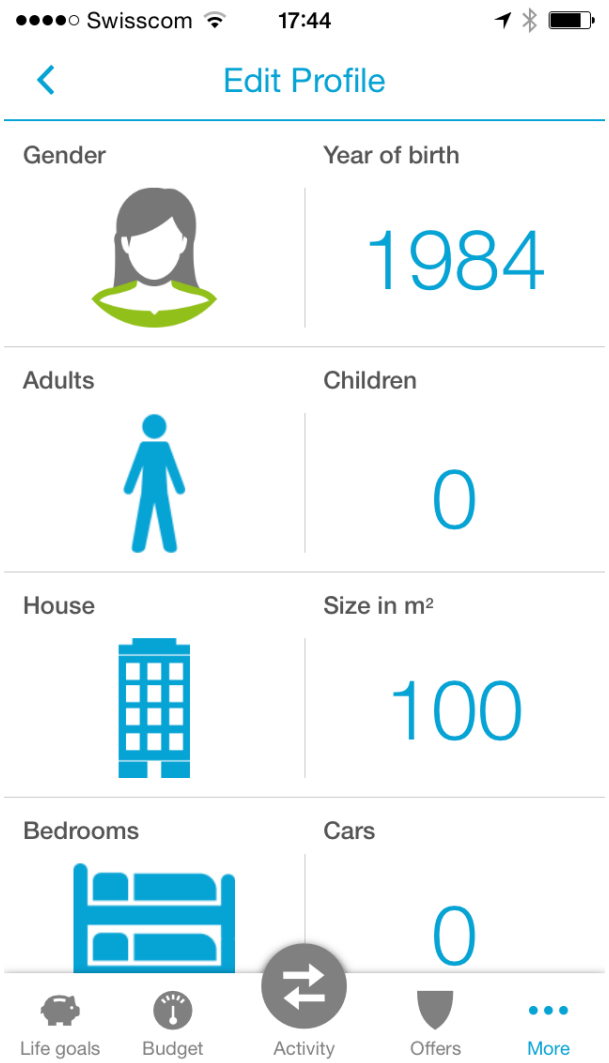
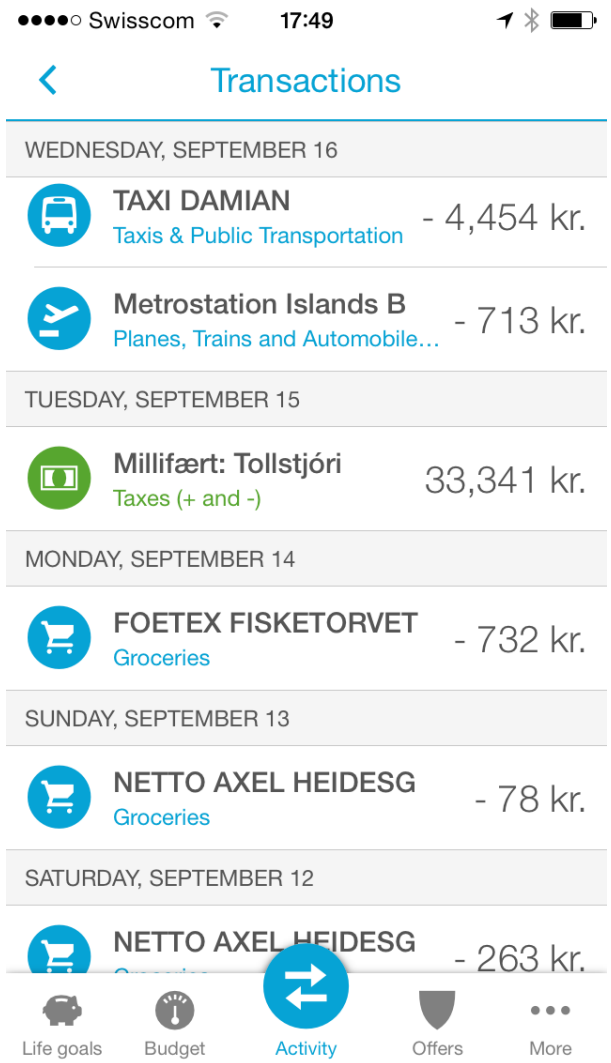
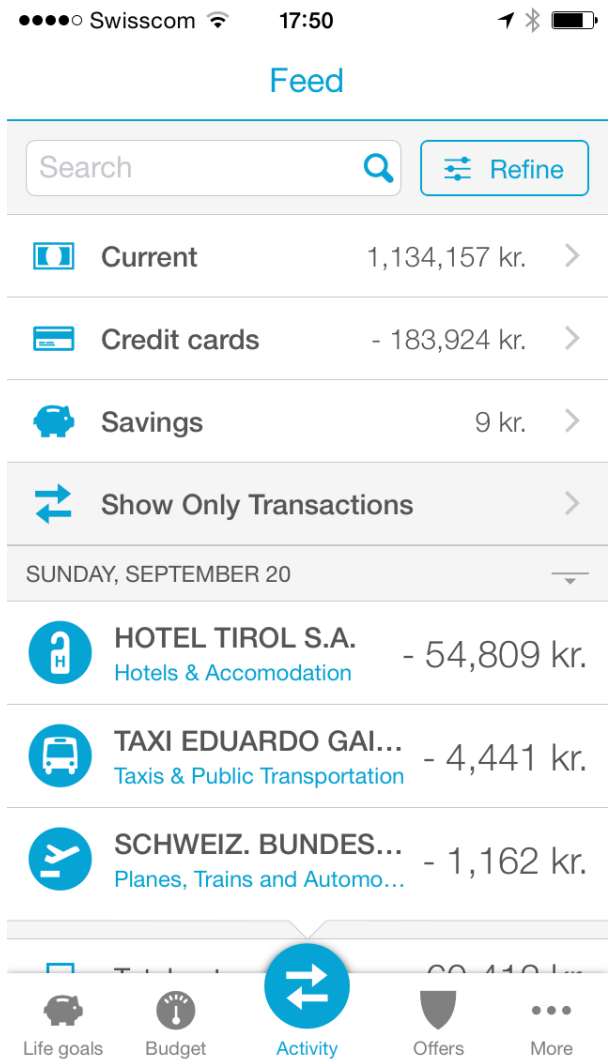
    - Income and spending are pre-categorized
    - All accounts are personal but individuals can link household members
- We observe the years 2011 to 2017 with $\sim$12K of individuals transitioning into retirement

The financial aggregation app: screenshots







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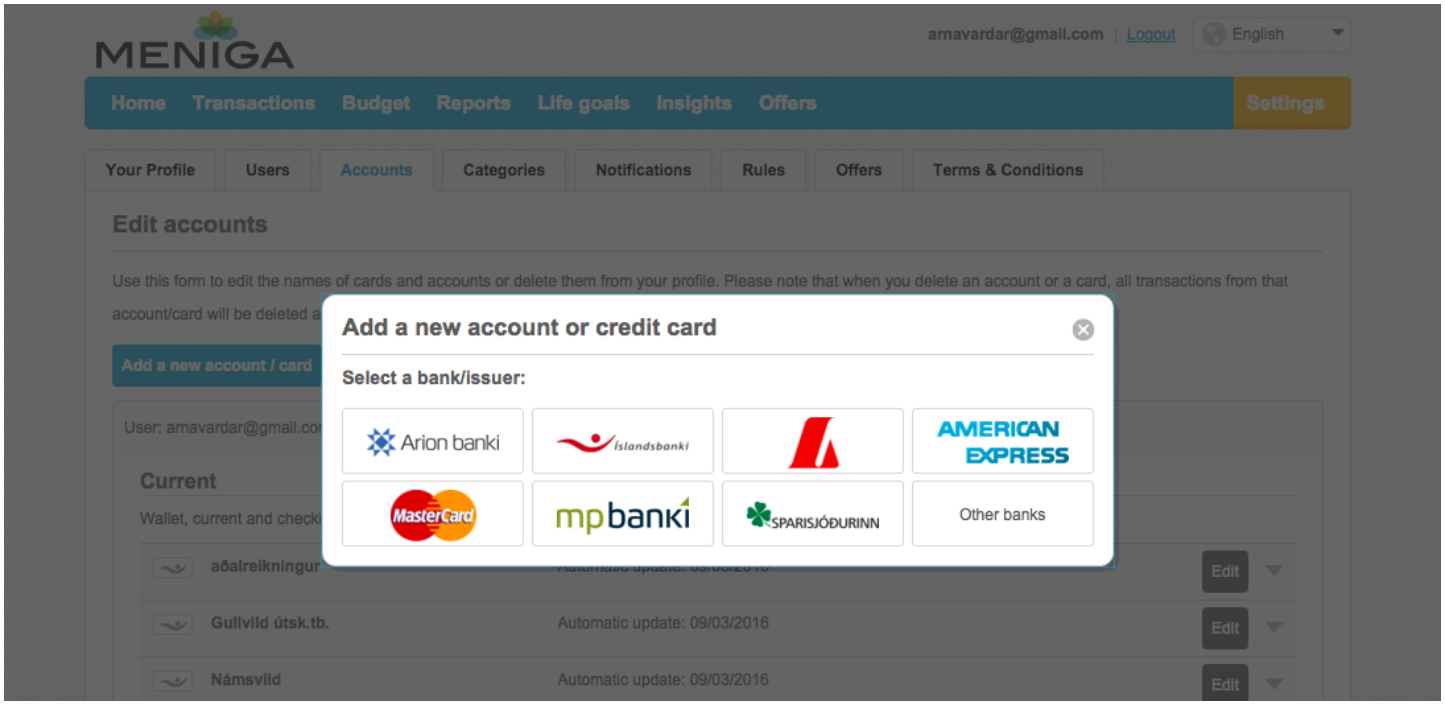

Icelandic pension system

- Public pension: means-tested minimum income
- Defined benefit/contribution: fully annuitized pension income (cutoff ages are 60, 65, and 67)
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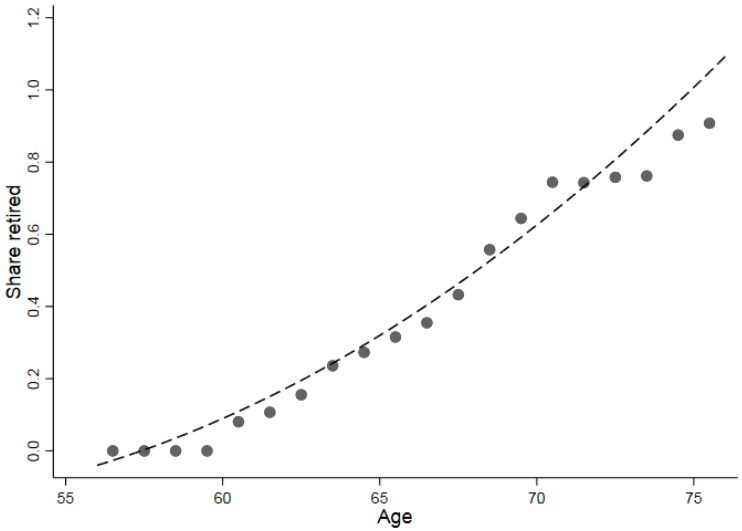
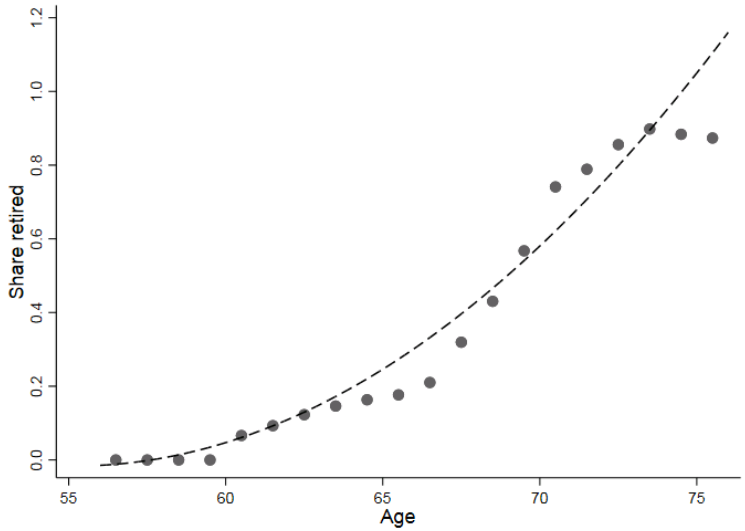
Share of individuals retired by age



Men



Women

Monthly income and personal finances

	Eligible but not retired		Retired	
	Mean	St.dev.	Mean	St.dev.
Age:	64.2	3.6	71.2	5.8
Income:				
Pensions	74	1,063	1,899	1,869
Personal finances:				
Overdraft indicator	0.46	0.50	0.38	0.49
# Overdrafts	0.52	0.65	0.46	0.67
Overdraft interest	24	66	17	56
Late fees	6	36	5	31
Interest income indicator	0.32	0.47	0.53	0.50
Interest income	45	724	79	609
Liquidity (in days of average spending)	180	152	201	330

The effect of retirement on household behavior

We run the following regression:

$$Y_{it} = \beta\, Retired_{it} + \gamma_{mby} + \eta_i + \mu\, HHInc_{it} + \varepsilon_{it}$$

- γ_{mby} is a month-by-year fixed effect and η_i is an individual fixed effect
- $Retired_{it}$ is an indicator equal to 1 if the individual is retired in month t
- $HHInc_{it}$ is the total income of the individual i or household that individual belongs to
- β measures the effect of the onset of retirement on consumer debt and liquid savings

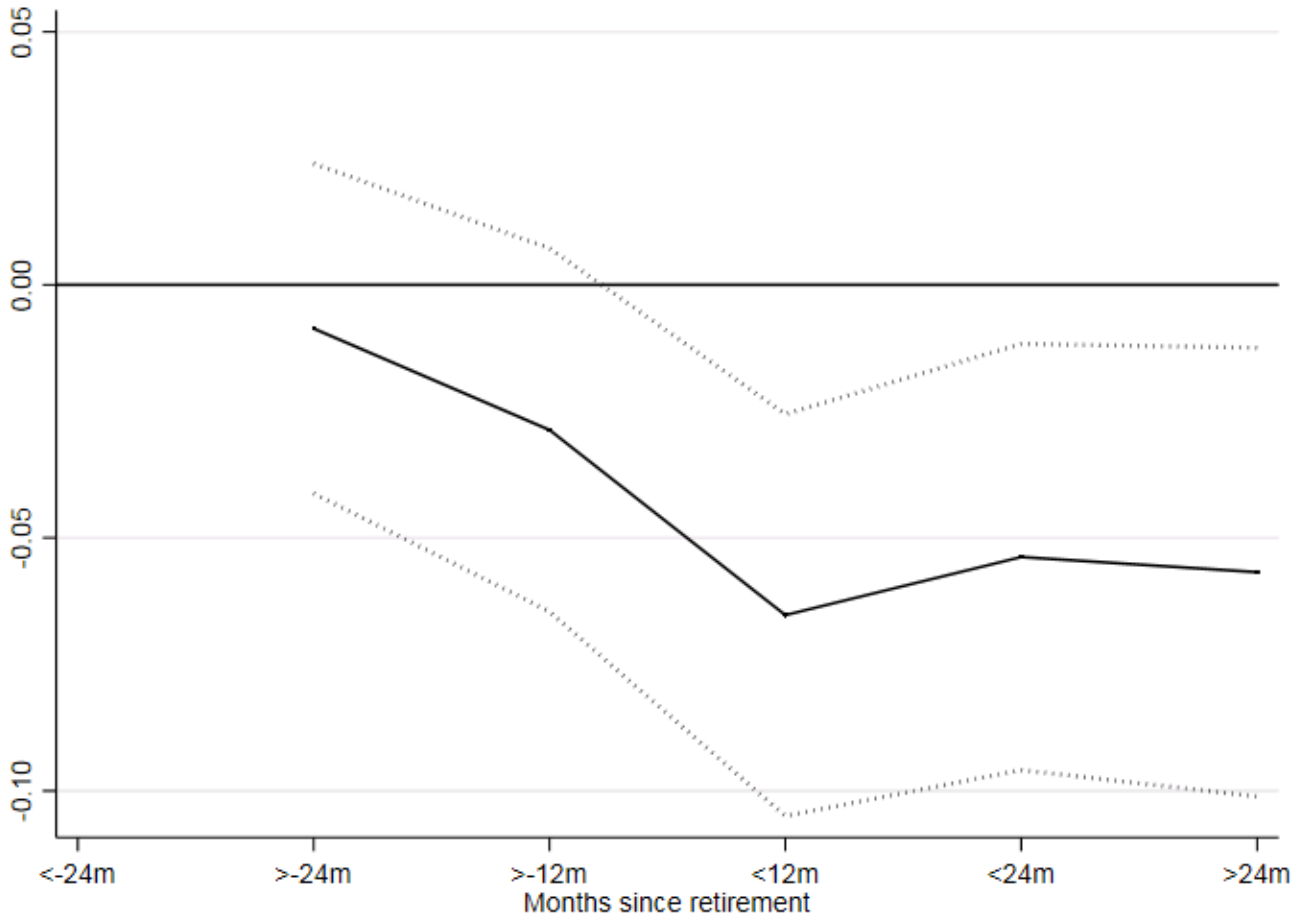
Empirical findings: personal finances

	Overdraft indicator	# overdrafts	Overdraft interest	Late fees	Interest income indicator	Interest income	Credit lines
Without controlling for income:							
Retired	-0.044***	-0.043**	-0.549***	-0.249***	0.036**	0.281***	-0.060
	(0.016)	(0.021)	(0.133)	(0.081)	(0.016)	(0.098)	(0.080)
Controlling for income:							
Retired	-0.045***	-0.045**	-0.561***	-0.284***	0.021	0.281***	-0.058
	(0.016)	(0.021)	(0.133)	(0.081)	(0.016)	(0.098)	(0.080)
Individual FE	✓	✓	✓	✓	✓	✓	✓
Month-by-year FE	✓	✓	✓	✓	✓	✓	✓

Empirical findings: personal finances dynamics

	Overdraft indicator	# overdrafts	Overdraft interest	Late fees	Interest income indicator	Interest income	Credit lines
Retired for (months):							
Without controlling for income:							
< 12	-0.050***	-0.049**	-0.577***	-0.263***	0.042***	0.487***	-0.048
	(0.016)	(0.020)	(0.134)	(0.084)	(0.015)	(0.098)	(0.081)
$12 > < 24$	-0.037**	-0.031	-0.468***	-0.149	0.029	0.296***	-0.134
	(0.018)	(0.024)	(0.155)	(0.099)	(0.019)	(0.108)	(0.108)
> 24	-0.039**	-0.043	-0.574***	-0.319***	0.033	-0.047	-0.020
	(0.020)	(0.028)	(0.166)	(0.104)	(0.023)	(0.115)	(0.152)
Controlling for income:							
< 12	-0.051***	-0.051**	-0.590***	-0.300***	0.020	0.487***	-0.047
	(0.016)	(0.020)	(0.134)	(0.084)	(0.015)	(0.098)	(0.081)
$12 > < 24$	-0.038**	-0.032	-0.480***	-0.182*	0.013	0.296***	-0.133
	(0.018)	(0.024)	(0.155)	(0.099)	(0.018)	(0.108)	(0.109)
> 24	-0.041**	-0.044	-0.587***	-0.355***	0.029	-0.047	-0.018
	(0.020)	(0.028)	(0.166)	(0.104)	(0.022)	(0.115)	(0.152)

Empirical findings: overdraft interest indicator event study



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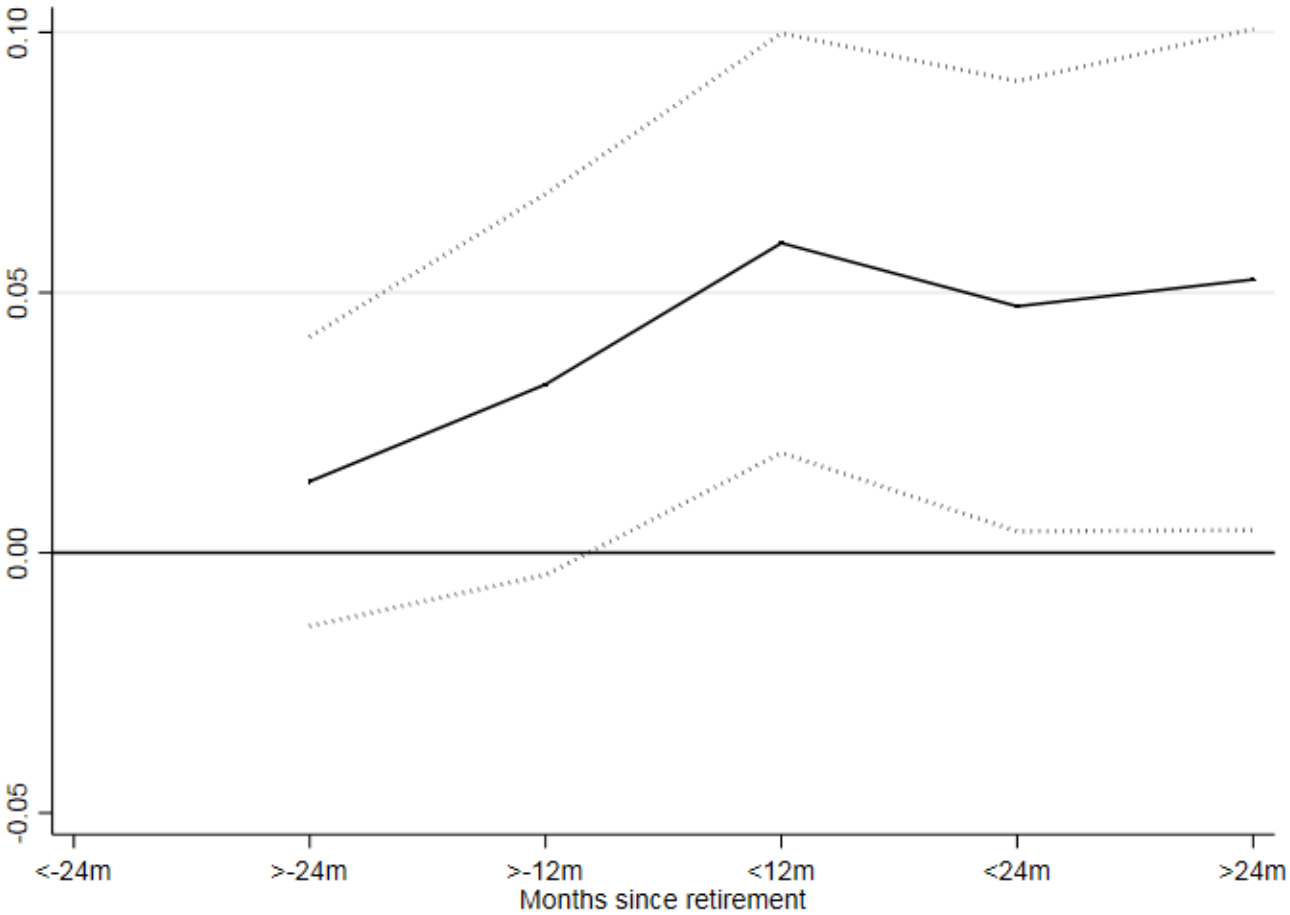

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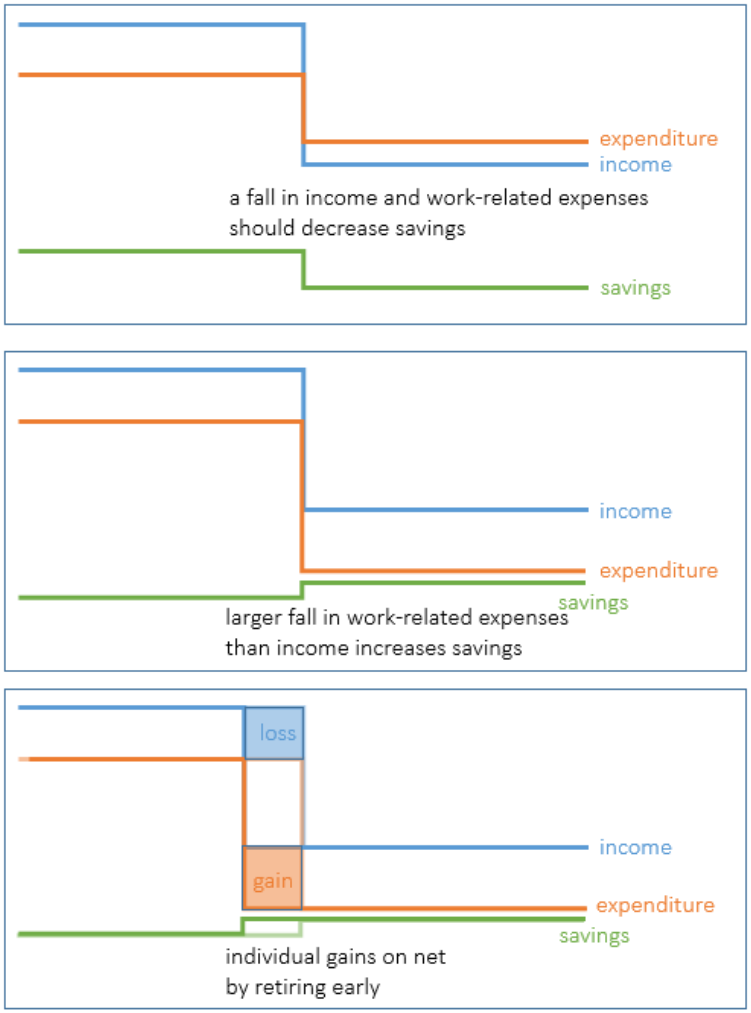
- We did a number of robustness checks with different specifications and controls
- We find the same patterns in CEX and SCF data
- We find the same patterns in individual-level data from the PSID and HRS
- Using spending data alone, even for very fine categories (bakeries, fine dining, restaurant visits, ...) we cannot conclusively tell whether expenses are work-related or not

Personal finances: theoretical explanations



Either the agent experiences systematic surprises that increase savings (while consumption drops for other reasons), or any explanation has to:

1. increase the drop in consumption beyond the drop in income
2. explain why the agent would not have retired early

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- Credit constraints? No decrease in limits at retirement

Potential behavioral explanations

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- Maybe individuals correct their overconsumption and debt problems once they find themselves retired?
- To explain this behavior the degree of present bias has to change at retirement (may capture entire classes of models generating a change of preferences or planning around retirement)

Behavioral theoretical explanations

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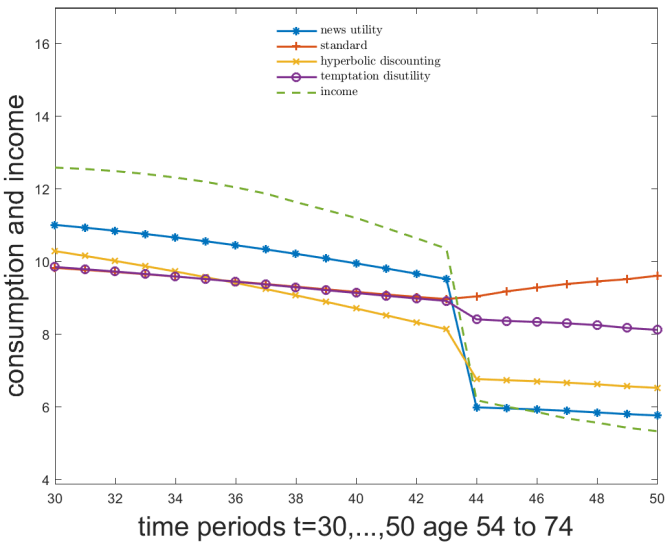
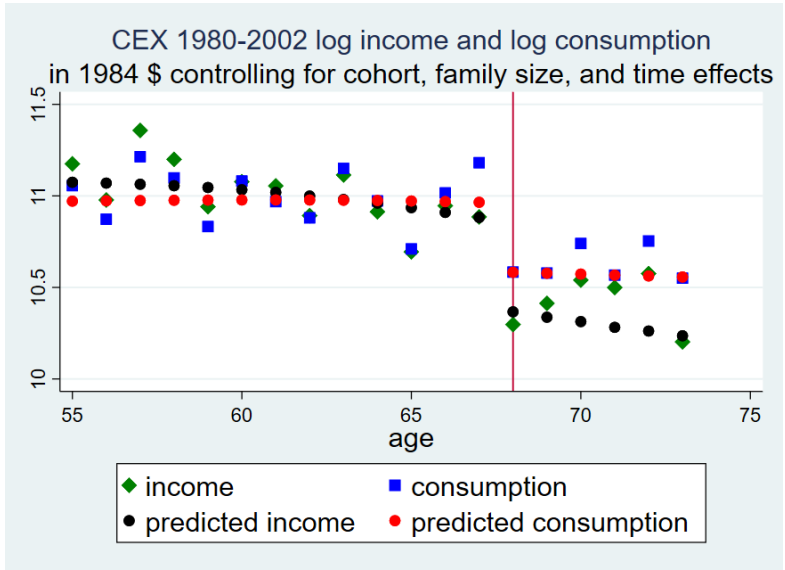
- Expectations-based reference-dependent preferences predict that individuals have more problems with overconsumption before retirement than after retirement
- Intuition:
  - When income is uncertain, individuals overconsume because they like to surprise themselves with additional present consumption
  - When income is certain, as it is after retirement, overspending results in a sure loss in future spending

Behavioral theoretical explanations

Life-cycle profiles of consumption for different preference specifications (with the degree of patience changing at retirement) and CEX data





Behavioral theoretical explanations

	Standard agent	News-utility agent	Hyperbolic agent	Tempted agent
Consumption regressions:				
Retired	0.06***	-0.38***	-0.14***	-0.004***
	(22.67)	(-94.40)	(-44.76)	(-1.42)
Savings regressions:				
Retired	-0.006***	0.052***	0.016***	-0.0004***
	(-21.93)	(86.56)	(44.61)	(-1.37)
Total HH income	✓	✓	✓	✓

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  - This response is very difficult to explain in a model of rational planning
- We can look at the leading explanations of the retirement puzzles but they do not necessarily explain our findings
- We cannot "retire the consumption puzzles" just yet

Addoum, J. M. (2016). Household portfolio choice and retirement. *Review of Economics and Statistics* (0).

Agarwal, S., J. C. Driscoll, X. Gabaix, and D. Laibson (2009). The age of reason: Financial decisions over the life cycle and implications for regulation. *Brookings Papers on Economic Activity 2009*(2), 51–117.

Agarwal, S., J. Pan, and W. Qian (2015). The composition effect of consumption around retirement: Evidence from singapore. *American Economic Review Papers & Proceedings 105*(5), 426–431.

Aguiar, M. and E. Hurst (2005, October). Consumption vs expenditure. *Journal of Political Economy 113*(5), 919–948.

Aguiar, M. and E. Hurst (2013). Deconstructing life cycle expenditure. *Journal of Political Economy 121*(3), 437–492.

Ameriks, J., J. Briggs, A. Caplin, M. D. Shapiro, and

C. Tonetti (2016). Late-in-life risks and the under-insurance puzzle.

Banks, J., R. Blundell, and S. Tanner (1998). Is there a retirement-savings puzzle? *The American Economic Review 88*(4), 769–788.

Bernheim, B. D., J. Skinner, and S. Weinberg (2001, September). What accounts for the variation in retirement wealth among u.s. households? *American Economic Review 91*(4), 832–857.

Caliendo, F. and D. Aadland (2007). Short-term planning and the life-cycle consumption puzzle. *Journal of Economic Dynamics and Control 31*(4), 1392–1415.

DeNardi, M., E. French, and J. B. Jones (2010). Why do the elderly save? the role of medical expenses. *Journal of Political Economy 118*, 39–75.

Gabaix, X. (2016). Behavioral macroeconomics via sparse dynamic programming. Technical report, National Bureau of Economic Research.

Haider, S. J. and M. Stephens (2007, May). Is there a retirement-consumption puzzle? evidence using subjective retirement expectations. *The Review of Economics and Statistics 89*(2), 247–264.

Huang, K. X. and F. Caliendo (2011). Rationalizing multiple consumption-saving puzzles in a unified framework. *Frontiers of Economics in China 6*(3), 359.

Hurst, E. (2008, September). Understanding consumption in retirement: Recent developments. In J. Ameriks and O. Mitchell (Eds.), *Recalibrating Retirement Spending and Saving*, Chapter Understanding Consumption in Retirement: Recent Developments. Oxford University Press.

Jones, J. B., M. De Nardi, E. French, R. McGee, and J. Kirschner (2018). The lifetime medical spending of retirees. Technical report, National Bureau of Economic Research.

Laitner, J., D. Silverman, and D. Stolyarov (2018). The role of annuitized wealth in post-retirement behavior. *American Economic Journal: Macroeconomics 10*(3), 71–117.

Love, D. A., M. G. Palumbo, and P. A. Smith (2009). The trajectory of wealth in retirement. *Journal of Public Economics 93*(1), 191 – 208.

Poterba, J., S. Venti, and D. Wise (2011a). The composition and draw-down of wealth in retirement. *Journal of Economic Perspectives 25*, 95–117.

Poterba, J., S. Venti, and D. Wise (2011b). Family status transitions, latent health, and the post-retirement evolution of assets. *In David A. Wise (ed.), Explorations in the*

Economics of Aging. Chicago: The University of Chicago Press.

Schwerdt, G. (2005). Why does consumption fall at retirement? evidence from germany. *Economics Letters 89*(3), 300 – 305.