

# Fully Closed: Individual Responses to Realized Gains and Losses

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- ▶ Main results:
  - ▶ individuals reinvest 70% on average, 80% in response to a gain and 40% in response to a loss
  - ▶ individuals often do not reinvest at all after losses and are more likely to exit stock markets

# Interpretation and relation to the literature

- ▶ Individuals are inattentive and inert:
  - ▶ Karlsson et al. (2009), Olafsson and Pagel (2017), Piliav et al. (2010), Alvarez et al. (2012), Bonaparte and Cooper (2011), Calvet et al. (2009a,b), Brunnermeier and Nagel (2008), Agnew et al. (2003), and Mitchell et al. (2006)





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- ▶ Individuals treat realized losses differently from realized gains (and paper losses):
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- ▶ Individuals learn irrationally from personal experiences
  - ▶ Malmendier and Nagel (2011), Ansgol et al. (2015), Andersen et al. (2014), and Kaustia and Knüpfner (2008)



## Data and summary statistics

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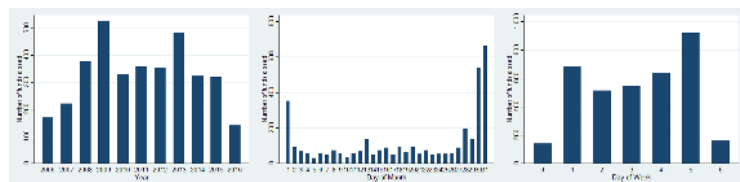
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  - ▶ 3,102 (voluntary) trades post announcement, 2,548 individuals

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  - ▶ 32,811 voluntary trades pre announcement, 16,237 individuals

# Summary statistics: closed funds

- ▶ Number of mutual funds closures, as identified by the International Securities Identification Number (ISIN)





## Background: fund liquidations

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- ▶ Could not find significant underperformance in our sample (relative to style class)
- ▶ For identification: unlikely investors (can) choose to-be-closed funds

# Summary statistics: all funds

	mean	median	standard deviation	25th percentile	75th percentile
fund characteristics					
retaining	62%				
domicile Luxembourg	62%				
domicile Germany	14%				
target fund	1%				
currency Euro	72%				
fund age (in months)	14	13	7	10	17
costs and fees					
total expense ratio	1.62%	1.72%	0.76%	1.10%	2.03%
initial charge	2.95%	3.50%	2.09%	0.00%	5.00%
annual charge	1.19%	1.25%	0.50%	0.80%	1.50%
asset classes					
alternatives	0%				
bonds	17%				
commodity	0%				
equity	61%				
balanced	20%				
money market	1%				
other	1%				
fund size before deletion dates (mio Euro)					
1 month	871	41	21,000	12	152
6 months	860	41	19,800	12	153
12 months	838	41	17,400	11	152
24 months	807	40	15,400	11	150
48 months	803	42	14,100	11	154
fund returns before deletion dates					
6 months	1.60%	4.78%	32.26%	-6.02%	16.91%
12 months	2.82%	4.93%	21.96%	-2.91%	13.97%
24 months	4.11%	4.81%	14.56%	-0.61%	12.07%

# Summary statistics: affected funds

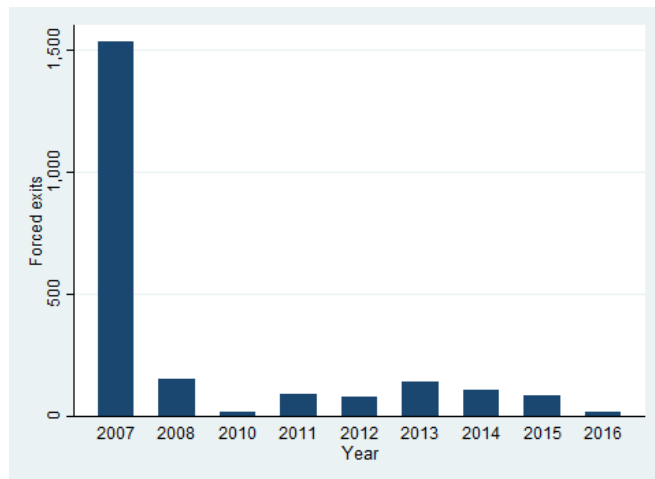
	mean	median	standard deviation	25th percentile	75th percentile
<b>fund characteristics</b>					
retaining	60%				
domicile Luxembourg	58%				
domicile Germany	34%				
target fund	8%				
currency Euro	87%				
fund age (in months)	15.40	14.61	6.64	10.50	18.41
<b>costs and fees</b>					
total expense ratio	1.50%	1.40%	0.84%	0.89%	1.92%
initial charge	3.27%	4.00%	1.81%	2.00%	5.00%
annual charge	1.11%	1.10%	0.48%	0.75%	1.50%
<b>asset classes</b>					
alternatives	1%				
bonds	19%				
commodity	1%				
equity	43%				
balanced	20%				
money market	4%				
other	11%				
<b>fund size before deletion dates (mio Euro)</b>					
1 month	92	18	633	05	57
6 months	113	22	805	07	65
12 months	123	26	845	08	73
24 months	134	31	788	10	84
48 months	169	36	1,130	12	106
<b>fund returns before deletion dates</b>					
6 months	-1.23%	1.73%	30.75%	-6.57%	10.86%
12 months	-0.13%	1.97%	20.11%	-3.95%	8.89%
24 months	1.58%	2.29%	13.55%	-2.05%	7.37%

# Summary statistics: all and affected individuals

	mean	standard deviation	10th percentile	25th percentile	50th percentile	75th percentile	90th percentile
<b>all individuals</b>							
male	.84	.37	0	1	1	1	1
age	54	13	40	45	52	61	72
PhD educated	.078	.27	0	0	0	0	0
account age (yrs)	13	3.3	11	11	11	14	19
risk class of trades	4.4	1.5	3.6	3.9	4.2	4.6	5
portfolio value	55,836	129,607	7,425	16,577	33,586	62,808	111,841
number of secs	46	30	8.6	20	41	68	92
HH index	.14	.15	.0083	.037	.095	.2	.35
<b>affected individuals</b>							
male	.86	.35	0	1	1	1	1
age	54	13	39	45	52	61	72
PhD educated	.088	.28	0	0	0	0	0
account age (yrs)	13	3.5	11	11	11	18	19
risk class of trades	4.3	1.5	3.6	3.9	4.1	4.5	4.9
portfolio value	65,827	118,273	8,195	18,801	38,086	74,595	131,792
number of secs	52	28	15	29	51	74	94
HH index	.12	.13	.0062	.027	.075	.16	.29
<b>affected individuals forced to sell</b>							
male	.84	.37	0	1	1	1	1
age	53	12	40	45	51	59	68
PhD educated	.098	.3	0	0	0	0	0
account age (yrs)	13	3.3	11	11	11	13	19
risk class of trades	4.3	1.7	3.4	3.7	4	4.4	5
portfolio value	60,590	123,922	9,128	19,710	36,732	63,517	110,742
number of secs	51	29	15	27	48	74	96
HH index	.099	.11	.0053	.024	.065	.14	.24

## Summary statistics: forced sales

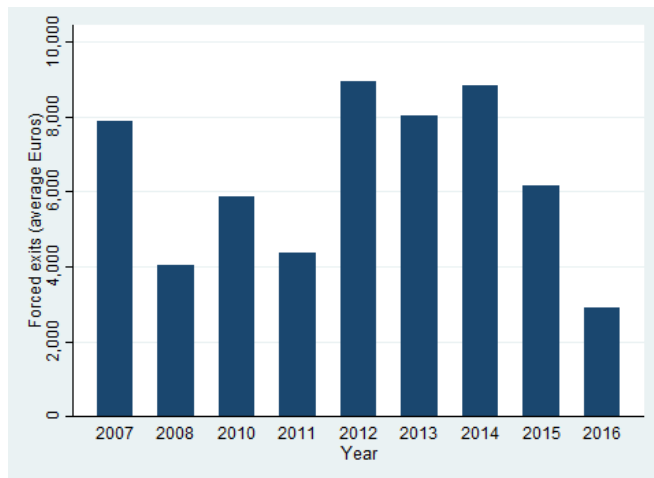
- ▶ Number of forced sales, i.e., number of individuals affected by fund closures per year





# Summary statistics: forced sales

- ▶ Forced sales: average amounts liquidated



# Summary statistics: forced sales

	mean	standard deviation	10th percentile	25th percentile	50th percentile	75th percentile	90th percentile
holding period before closure (in days)	869	619	100	361	687	1,324	1,764
purchase share price	57	245	25	36	46	56	80
forced selling share price	62	224	27	50	50	61	76
value of forced sell	7,452	11,574	468	1,456	4,027	8,691	17,681
return of fund investment	.21	.35	-.12	.0077	.13	.38	.64
observations	2,228						

# Do individuals notice?

- ▶ Individuals are inattentive and inert



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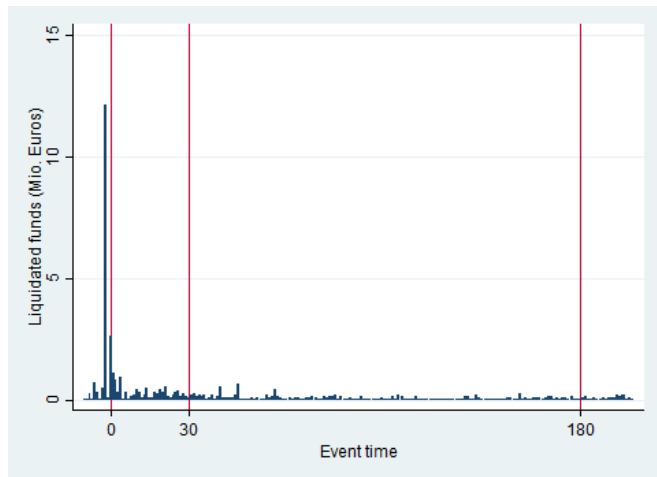
- ▶ Individuals are inattentive and inert
- ▶ They likely miss the announcement of the fund closure six months in advance (reinvestment behavior similar to deliberate sales)





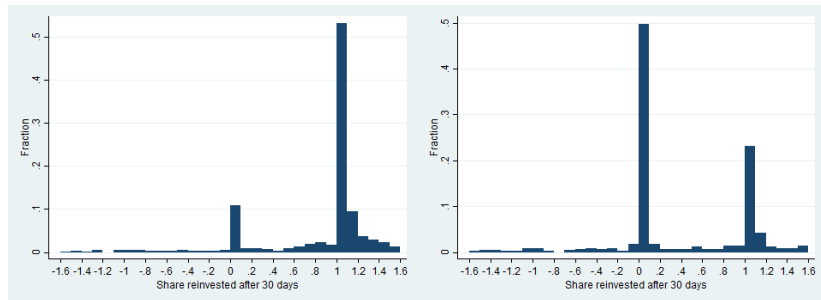
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- ▶ Affected funds: announcement effects and sales activity before closures



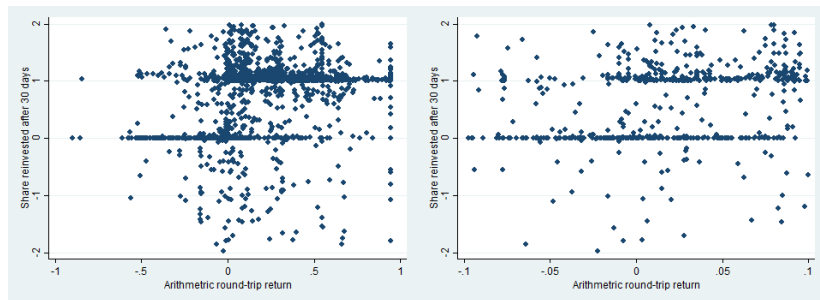
# Raw data: reinvestment after 30 days

- ▶ Forced sales: average percentage reinvested in response to a gain or loss



# Raw data: reinvestment after 30 days

- ▶ Forced sales: average percentage reinvested relative to the arithmetic return of the individual fund investments





# Empirical specification

$$Y_{t,t+\tau}^i = \alpha + \beta F_{tj}^i \times (f, post, pre) + \eta S_j + \gamma m_t + \theta y_t + \vartheta wm_t + \varepsilon_{tj}^i$$

- ▶ Regressors:  $F_{tj}^i$  liquidation at  $t$  of  $j$  investor  $i$ , month, year, week-of-month, and fund fixed effects

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- ▶ Outcome variable:  $\log Y_{t,t+\tau}^i$  flows into portfolio, savings, and checking accounts (or nirwana)
- ▶ Bandwidths  $\tau$ : thirty days since the day that the money arrives in individual's accounts

# Simple cross-sectional results for forced sales

	staying in settlement	outflows into portfolio	outflows into savings	all other outflows	outflows out of bank
<b>liquidation</b>	<b>0.1437***</b> (0.0540)	<b>0.6824***</b> (0.0837)	<b>0.1565***</b> (0.0583)	<b>0.0174</b> (0.0297)	<b>-0.0156</b> (0.0318)
year fes	✓	✓	✓	✓	✓
month fes	✓	✓	✓	✓	✓
week-of-month fes	✓	✓	✓	✓	✓
ISIN chars and fund age	✓	✓	✓	✓	✓
observations	2,228	2,228	2,228	2,228	2,228
R-squared	0.0471	0.2535	0.0390	0.0107	0.0260

	staying in settlement	outflows into portfolio	outflows into savings	all other outflows	outflows out of bank
<b>liquidation</b>	<b>0.0766*</b> (0.0463)	<b>0.7869***</b> (0.0628)	<b>0.1272***</b> (0.0456)	<b>0.0093</b> (0.0265)	<b>-0.0421</b> (0.0338)
<b>liquidation*loss</b>	<b>0.2393</b> (0.1483)	<b>-0.3725*</b> (0.2150)	<b>0.1044</b> (0.1462)	<b>0.0288</b> (0.0717)	<b>0.0946</b> (0.0724)
year fes	✓	✓	✓	✓	✓
month fes	✓	✓	✓	✓	✓
week-of-month fes	✓	✓	✓	✓	✓
ISIN chars and fund age	✓	✓	✓	✓	✓
observations	2,228	2,228	2,228	2,228	2,228
R-squared	0.0616	0.2691	0.0409	0.0111	0.0281

Robust standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

# Cross-sectional regression results

	staying in settlement	outflows into portfolio	outflows into savings	all other outflows	outflows out of bank
liquidation*forced	0.1132 (0.0930)	0.7314*** (0.0953)	0.1299** (0.0577)	0.0254 (0.0445)	-0.0231 (0.0486)
liquidation*post	0.0971 (0.1160)	-0.2496** (0.1189)	0.0384 (0.0720)	0.1141** (0.0555)	0.1044* (0.0606)
liquidation*pre	0.1764* (0.0947)	-0.3532*** (0.0971)	0.0093 (0.0588)	0.1675*** (0.0453)	0.1676*** (0.0495)
ISIN fes	✓	✓	✓	✓	✓
year fes	✓	✓	✓	✓	✓
month fes	✓	✓	✓	✓	✓
week-of-month fes	✓	✓	✓	✓	✓
observations	38,141	38,141	38,141	38,141	38,141
R-squared	0.0506	0.0650	0.0578	0.0637	0.0888

Robust standard errors in parentheses \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

# Results with loss interactions

	staying in settlement	outflows into portfolio	outflows into savings	all other outflows	outflows out of bank
liquidation*forced	0.0608 (0.1047)	0.8543*** (0.1072)	0.0779 (0.0649)	0.0070 (0.0500)	-0.0610 (0.0546)
liquidation*post	0.0997 (0.1301)	-0.2947** (0.1333)	0.0938 (0.0807)	0.1012 (0.0621)	0.1012 (0.0679)
liquidation*pre	0.2621** (0.1067)	-0.4144*** (0.1092)	0.0227 (0.0662)	0.1297** (0.0509)	0.1458*** (0.0556)
liquidation*forced*loss	0.2015 (0.1887)	-0.4845** (0.1933)	0.2070* (0.1171)	0.0761 (0.0901)	0.1523 (0.0984)
liquidation*post*loss	0.1976 (0.1430)	-0.3375** (0.1465)	-0.0038 (0.0887)	0.1437** (0.0683)	0.1846** (0.0746)
liquidation*pre*loss	-0.1591*** (0.0428)	-0.2994*** (0.0438)	0.1867*** (0.0266)	0.2718*** (0.0204)	0.2884*** (0.0223)
ISIN fes	✓	✓	✓	✓	✓
year fes	✓	✓	✓	✓	✓
month fes	✓	✓	✓	✓	✓
week-of-month fes	✓	✓	✓	✓	✓
observations	38,141	38,141	38,141	38,141	38,141
R-squared	0.0511	0.0664	0.0591	0.0682	0.0930

Robust standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

# Additional results on risk taking and participation

	outflows*riskclass	reinvestment into funds	no reinvestment	participation
liquidation*riskclass*forced	1.1469*** (0.0662)			
liquidation*riskclass*post	-0.2105*** (0.0752)			
liquidation*riskclass*pre	-0.5144*** (0.0675)			
liquidation*riskclass*forced*loss	-0.4723*** (0.1046)			
liquidation*riskclass*post*loss	-0.4037*** (0.0617)			
liquidation*riskclass*pre*loss	-0.0671*** (0.0209)			
liquidation*forced		0.6869*** (0.0213)	0.1029*** (0.0192)	0.7758*** (0.0499)
liquidation*post		-0.0277 (0.0187)	-0.0149 (0.0169)	-0.2023*** (0.0575)
liquidation*pre		0.0092 (0.0161)	-0.0522*** (0.0145)	-0.0690 (0.0505)
liquidation*forced*loss		-0.2342*** (0.0263)	0.2246*** (0.0238)	-0.0356** (0.0144)
liquidation*post*loss		-0.0839*** (0.0184)	0.0682*** (0.0166)	0.0207** (0.0101)
liquidation*pre*loss		-0.0513*** (0.0060)	0.0299*** (0.0054)	-0.0085*** (0.0033)
ISIN fes	✓	✓	✓	✓
year fes	✓	✓	✓	✓
month fes	✓	✓	✓	✓
week-of-month fes	✓	✓	✓	✓
observations	36,271	38,135	38,135	38,135
R-squared	0.3119	0.1115	0.1091	0.2486

Robust standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

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- ▶ The liquidation event is exogenous but the investment return may be endogenous:
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  - ▶ Individuals may select into holding on to investment after closure announcement
    - ▶ Use amount at announcement and loss at announcement as instruments
  - ▶ Individuals may select into holding on to a losing investment
    - ▶ Use dummy for holding a loser

# Robustness results

	outflows portfolio	outflows portfolio	outflows portfolio	outflows portfolio	outflows portfolio	outflows portfolio
liquidation	0.8439*** (0.0618)	0.8222*** (0.0654)	0.8196*** (0.0627)	0.8195*** (0.0627)	0.8197*** (0.0627)	
liquidation*loss	-0.5095** (0.2286)	-0.4230** (0.2043)	-0.4187** (0.1993)	-0.4187** (0.1994)	-0.4184** (0.1993)	
announcement						0.8304*** (0.0285)
announcement*loss						-0.3869*** (0.0576)
dummy for investment loss	✓					
fund return over investment portfolio return		✓				
over fund investment three months portfolio return			✓			
twelve months portfolio return				✓		
year fes	✓	✓	✓	✓	✓	✓
month fes	✓	✓	✓	✓	✓	✓
week-of-month fes	✓	✓	✓	✓	✓	✓
ISIN chars and fund age	✓	✓	✓	✓	✓	✓
observations	2,228	2,228	2,222	2,227	2,227	2,227
R-squared	0.4597	0.4532	0.4529	0.4531	0.4532	0.4215

Robust standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

# Individuals forced to sell at a gain versus loss

	mean	standard deviation	25th percentile	50th percentile	75th percentile
<b>individuals forced to sell at a gain</b>					
risk class of portfolio	3.41	1.40	3.00	4.00	5.00
risk class of trades	4.29	1.71	3.67	3.98	4.36
average holding period (in days)	790.73	585.82	296.15	686.15	1290.00
sum of paper and realized winners at all sale dates	2266.82	13316.89	139.50	416.50	1154.00
sum of paper and realized losers at all sale dates	1915.89	8019.62	93.00	315.50	1067.00
average of paper and realized winning funds at all sale dates	24.09	37.51	5.00	12.00	27.00
average of paper and realized losing funds at all sale dates	12.00	16.50	3.00	6.00	14.00
propensity to realize gains	40.40%	28.01%	16.18%	33.82%	61.54%
propensity to realize losses	28.83%	25.93%	8.84%	19.33%	42.72%
<b>individuals forced to sell at a loss</b>					
risk class of portfolio	3.22	1.58	1.00	4.00	5.00
risk class of trades	4.33	1.65	3.69	4.01	4.42
average holding period (in days)	1129.26	653.10	618.50	1173.50	1764.00
sum of paper and realized winners at all sale dates	1932.08	5829.46	93.00	370.00	1254.00
sum of paper and realized losers at all sale dates	1953.12	6245.63	108.00	355.50	1228.50
average of paper and realized winning funds at all sale dates	14.49	19.52	3.00	8.00	19.00
average of paper and realized losing funds at all sale dates	11.86	15.85	3.00	7.00	14.00
propensity to realize gains	22.17%	20.97%	7.53%	14.29%	30.30%
propensity to realize losses	20.63%	21.12%	7.33%	13.34%	25.00%

# Mechanisms and implications

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- ▶ Behavioral explanations? Preferences versus beliefs?
  - ▶ Prospect theory: realization utility matters (Barberis and Xiong, 2012)
  - ▶ Mental accounting: differential response to realized rather than paper gains and losses (Imas, 2016)
  - ▶ Delegation and reverse disposition effects (Koestner et al., 2017; Chang et al., 2016)
  - ▶ Selective attention: individuals know they lost and choose to not act (Olafsson and Pagel, 2017; Karlsson et al., 2009; Hirshleifer and Welch, 2002)
  - ▶ Irrational experiential learning (Malmendier and Nagel, 2011; Anagol et al., 2015)



# How much do individuals consume?

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  - ▶ Baker et al. (2007) and Maggio et al. (2017)
- ▶ Individuals propensity to consume out of cash inflows:
  - ▶ Johnson et al. (2006), Agarwal and Qian (2014), Olafsson and Pagel (2016), Jappelli and Pistaferri (2014), and Jappelli and Pistaferri (2000)



# Marginal propensity to consume after 30 days: baseline result

	consumption	outflows into portfolio	outflows into savings	staying in settlement	outflows out of bank
liquidation	0.1059*** (0.0295)	0.5408*** (0.0776)	0.2788** (0.1184)	0.0745 (0.1261)	0.0050 (0.0300)
year fes	✓	✓	✓	✓	✓
month fes	✓	✓	✓	✓	✓
observations	10,742	10,742	10,742	10,742	10,742
R-squared	0.0185	0.0659	0.0133	0.0086	0.0067

Robust standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

# MPC: recession versus boom

	consumption	outflows into portfolio	outflows into savings	staying in settlement	outflows out of bank
liquidation × ECB recession	0.0147 (0.0212)	0.8939*** (0.0341)	0.0816*** (0.0298)	0.0098 (0.0171)	-0.0086 (0.0207)
liquidation × boom	0.1136*** (0.0386)	0.4369*** (0.1364)	0.5460** (0.2587)	-0.0965 (0.2742)	0.0072 (0.0584)
year fes	✓	✓	✓	✓	✓
month fes	✓	✓	✓	✓	✓
observations	9,777	9,777	9,777	9,777	9,777
R-squared	0.0176	0.1248	0.0142	0.0026	0.0064

	consumption	outflows into portfolio	outflows into savings	staying in settlement	outflows out of bank
liquidation × NBER recession	0.0153 (0.0213)	0.8948*** (0.0342)	0.0794*** (0.0298)	0.0105 (0.0172)	-0.0098 (0.0208)
liquidation × boom	0.1128*** (0.0385)	0.4367*** (0.1364)	0.5475** (0.2589)	-0.0970 (0.2744)	0.0083 (0.0583)
year fes	✓	✓	✓	✓	✓
month fes	✓	✓	✓	✓	✓
observations	9,777	9,777	9,777	9,777	9,777
R-squared	0.0175	0.1248	0.0143	0.0026	0.0064

Robust standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

# Conclusion and open questions

- \* What's new here?
  - ▶ Evidence for utility flows in response to realized gains and losses important for understanding investor preferences influenced by experiences
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  - ▶ Evidence for utility flows in response to realized gains and losses important for understanding investor preferences influenced by experiences
  - ▶ Evidence for the “realization effect” using observational data
- \* We are writing another \*macro\* paper: just estimating the marginal propensity to consume (MPC) out of realized capital gains
  - ▶ Young versus old investors
  - ▶ High income versus low income investors
  - ▶ Across the business cycle
  - ▶ Across interest rate regimes

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