Online Appendix for "Dynamic Spending Responses to Wealth Shocks: Evidence from Quasi-lotteries on the Stock Market"

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Online Appendix A: Extra Results

Table A1: Distributional statistics. The table shows extended summary statistics for the estimation sample. End-of-year balance sheet measures are based on data from tax records: Total assets includes financial assets as well as housing. Financial assets includes securities and bank deposits. Risky share is the ratio of risky assets to total financial assets. Danske Bank stock market portfolio measures are based on data from Danske Bank: Portfolio size is the dollar value of the portfolio. Portfolio risk is the standard deviation of the current portfolio's monthly returns over the past 12 months. Expected return is the mean of the current portfolio's monthly returns over the past 12 months. Passive gains are the dollar gains earned on the portfolio held at the beginning of the month. All DKK amounts are converted to USD using the average exchange rate in 2009-16 of 5.85 DKK/USD.

	(1)	(2)	(3)
	Observations	Mean	Standard deviation
Demographics			
Age of oldest member (years)	13,451,485	59.4	17.1
Highest eduaction			
- High school	13,451,485	0.51	0.50
- College	13,451,485	0.29	0.45
- Graduate	13,451,485	0.18	0.38
Two-adult household	13,451,485	0.52	0.50
DB exclusive customer	13,451,139	0.57	0.50
End-of-year balance sheet (tax data)			
Total assets ($)	13,451,485	469,567	549,200
Financial assets ($)	13,451,485	174,118	276,513
Risky share	13,359,830	0.48	0.33
Total debt ($)	13,451,485	155,639	233,993
Income (tax data) and spending (DB data)			
Total income ($ per month)	13,451,485	7,042	5,403
Labor income ($ per month)	13,451,485	4,620	6,140
Spending ($ per month)	13,451,485	4,097	3,197
DB stock market portfolio (DB data)			
Portfolio size ($)	13,451,485	80,471	162,627
Portfolio risk	13,435,264	0.046	0.051
Expected monthly return	13,435,264	0.008	0.022
Number of securities	13,451,485	4.3	4.3
Actual gains ($ per month)	13,451,485	583	4,960
Passive gains($ per month)	13,451,485	591	4,968
Dividends ($ per month)	13,451,485	180	1,320
Portfolio links to labor market			
Share of portfolio in own industry	13,451,485	0.05	0.19
Any equity in own industry	13,451,485	0.10	0.30
Any unlisted assets in portfolio	13,403,778	0.11	0.32

Table A2: Heterogeneity in liquidity, age, returns and attention. The table shows the mean of liquidity, household age, absolute return and financial attention by tercile of each of these these variables. For each household-month observation, we measure liquidity as the sum of deposits, stocks and other securities held at the beginning of the month relative to average monthly income; household age as the age of the oldest household member at the beginning of the month; absolute return as the absolute size of the stock market portfolio return during the month; and financial attention as the number of days that a member of the household logged into their Danske Bank accounts in an average month. In each dimension, we rank the observations within each month and split them into three equally sized groups: the first, second and third terciles. The reported means are taken within these groups across all months in the sample.

	First Tercile	Second Tercile	Third Tercile
Liquidity	3,0	13,6	76,6
Age	39,7	61,8	77,8
Absolute return	0,6%	1,8%	7,7%
Attention	1,1	5,6	12,7

Figure A1: Validation of spending measure. The figure compares average household spending by age group based on our transaction data against results from Statistics Denmark's Household Budget Survey (Statistics Denmark, 2019). Age groups are defined by the oldest member of the household. Average spending levels are computed within each group for each year 2009-16 and then averaged across years. The transaction data measure is based on the full sample of Danske Bank customers with at least one spending transaction per month for each adult member and at least five when summing across all adult members. The Household Budget Survey measure is computed as total monthly spending minus the imputed value of owner-occupied housing.

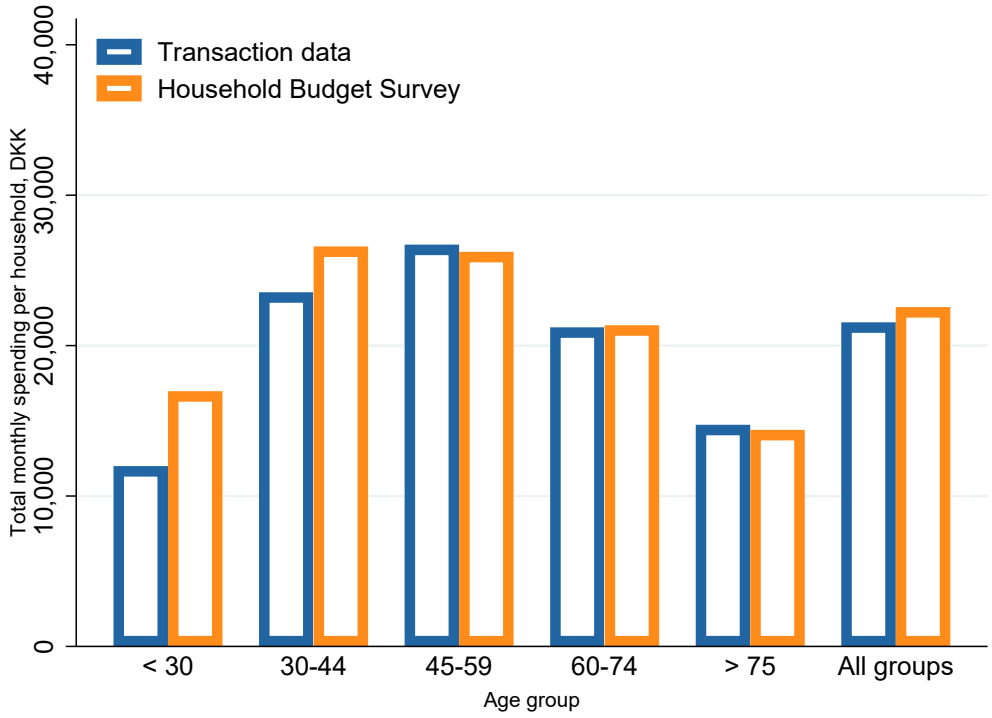


Figure A2: Completeness of portfolio data. The upper panel shows a bin scatter of the value of total portfolios as reported by financial institutions to the Danish tax authorities (x-axis) and the value of portfolios held at Danske Bank as observed in the customer dataset (y-axis). The lower panel shows a bin scatter of annual income as reported on the tax return (x-axis) and annual spending as measured in the customer dataset from Danske Bank (y-axis). Both figures use the estimation sample defined in Section 2.3.

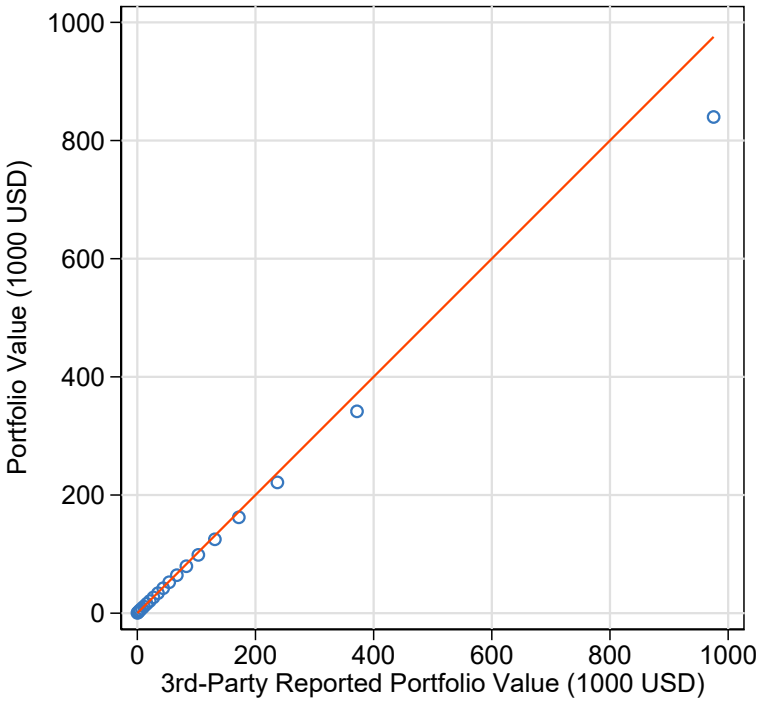


Figure A3: Variation in returns. The figure shows monthly returns for the leading Danish stock market index OMXC20 (black line, Nasdaq Nordic 2018), the average monthly portfolio return within our analysis sample (orange line) and the 5th and 95th percentile of monthly portfolio returns in our analysis sample (shaded area).

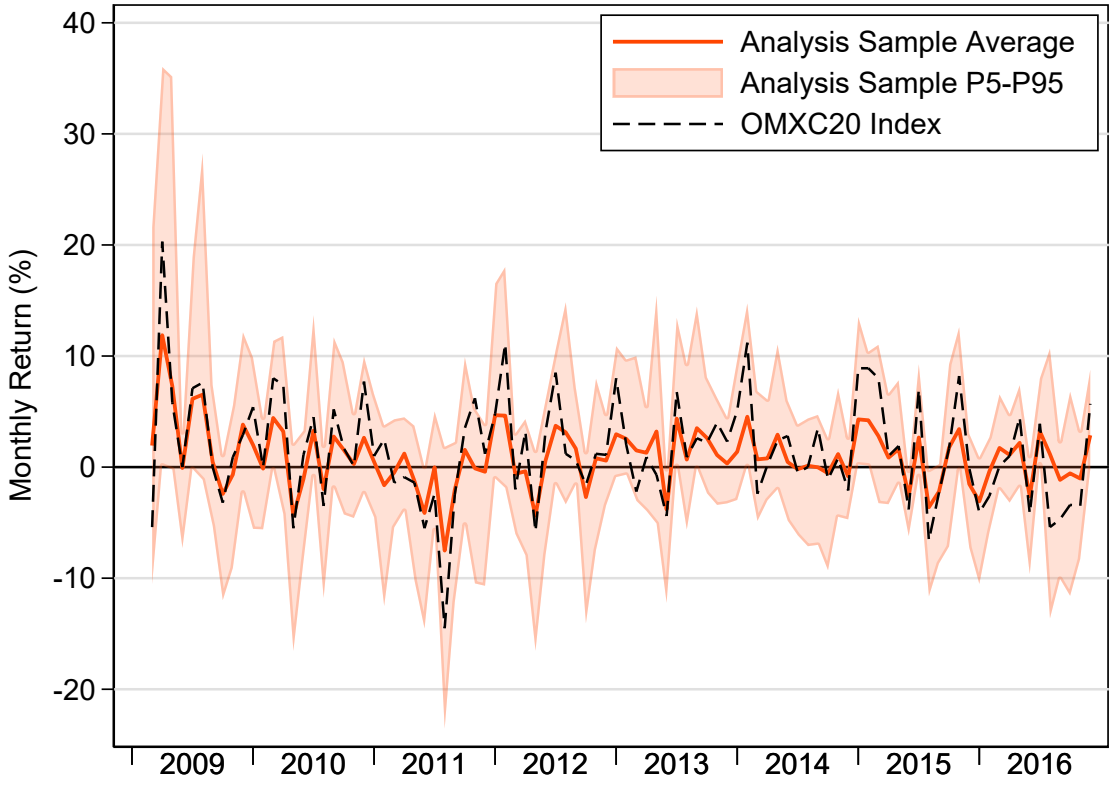


Figure A4: Passive and actual gains. The figure illustrates the conditional correlations between passive gains and past, present and future values of actual gains. We obtain each estimate by estimating equation (3) using the household's actual stock market gains in month $t + h$ as the dependent variable, where $h \in -24, -23, ..., 36$. The estimate for $h = 1$ corresponds to the first-stage coefficient on the passive gains instrument in our main specification. The confidence intervals are based on standard errors clustered at the household level.

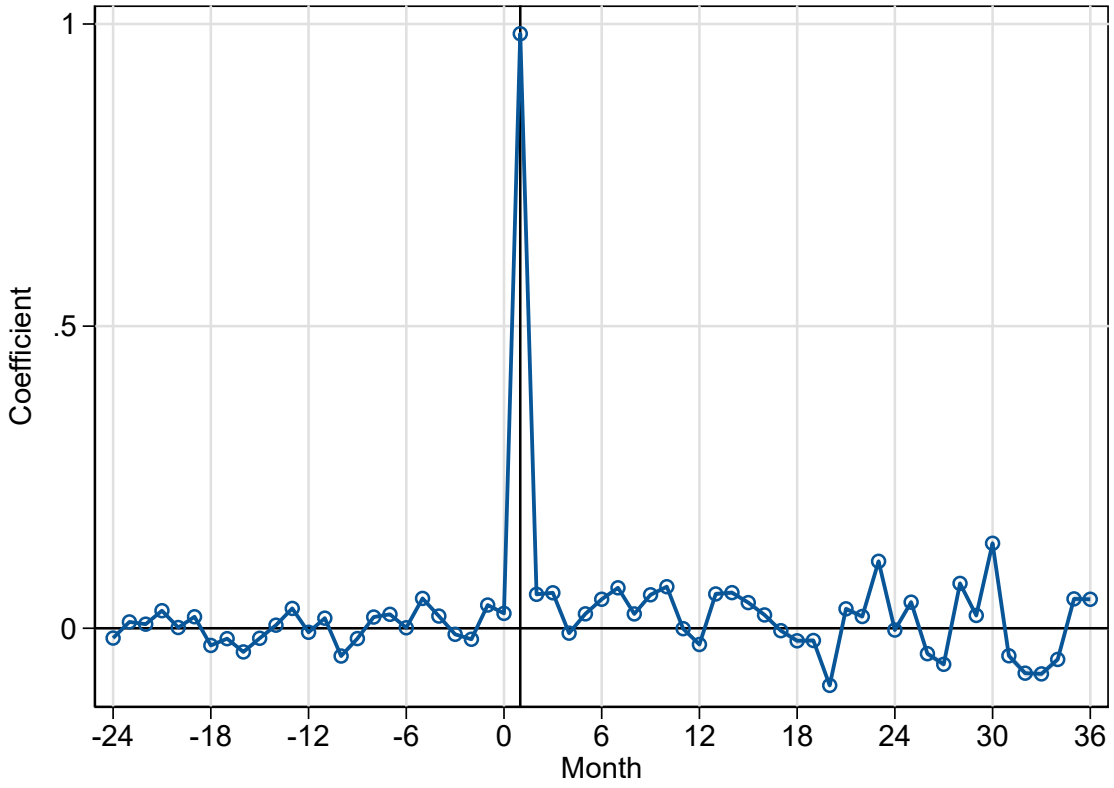


Figure A5: Robustness of baseline estimates The figure illustrates our dynamic estimates of the marginal propensity to consume for different variations of the sample and the specification. *Full sample* means that households with investments in a firm that is also the main employer of a household member are allowed to enter the estimation sample. *Exclusive* means that households with accounts in other banks than Danske Bank are excluded from the estimation sample. *Excl. own industry* means that we ignore investments in industries where household members are employed when we construct the stock market portfolio. *No controls* means that we estimate the model without household-level controls. *Excl. unlisted* means that we drop households with unlisted shares. *Future returns* means that we include interactions between the average passive portfolio return since month 2 (20 bins), portfolio size at the beginning of month 1 (100 bins), and calendar month. The interactions are included as extra controls for positive horizons only. Confidence intervals are shown only for the baseline specification and are based on standard errors clustered at the household level.

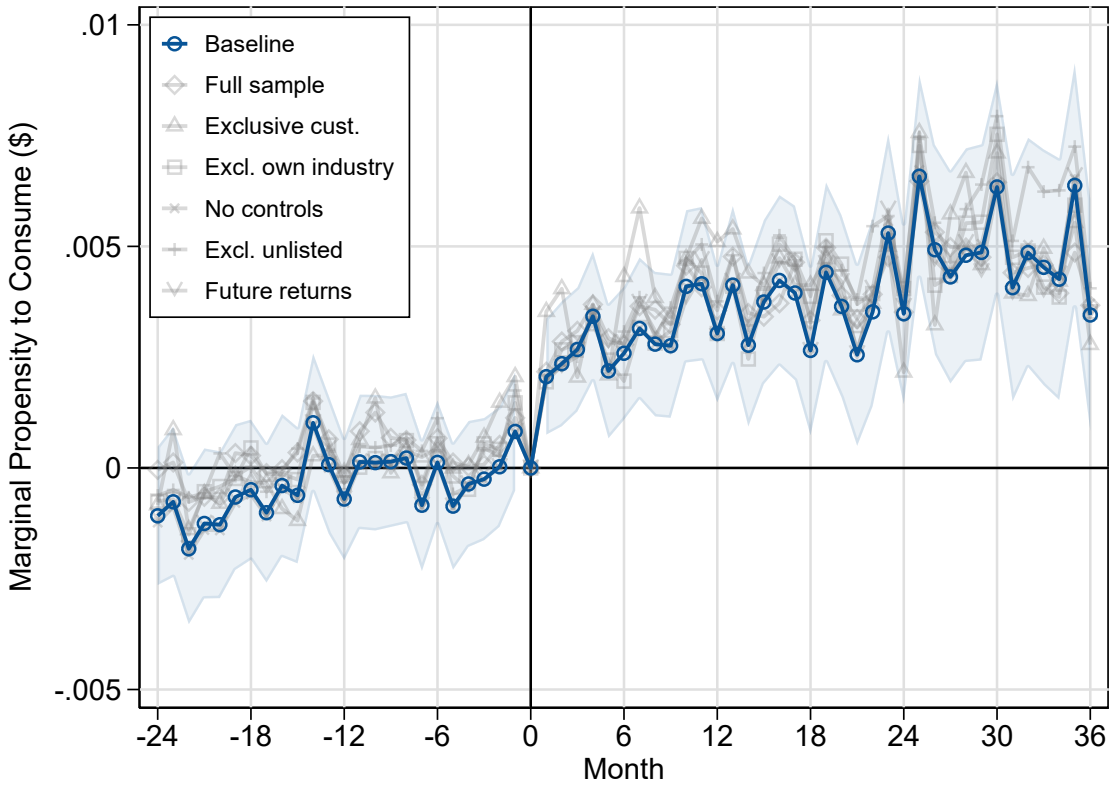
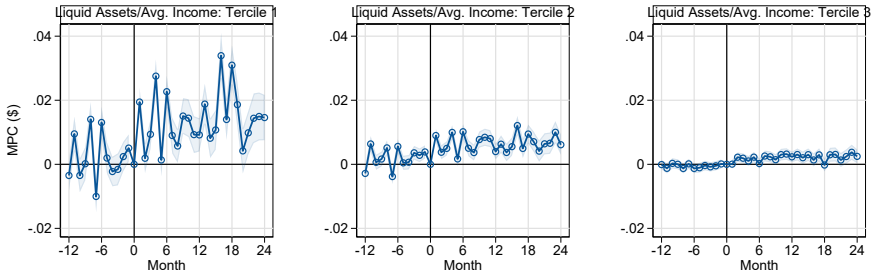
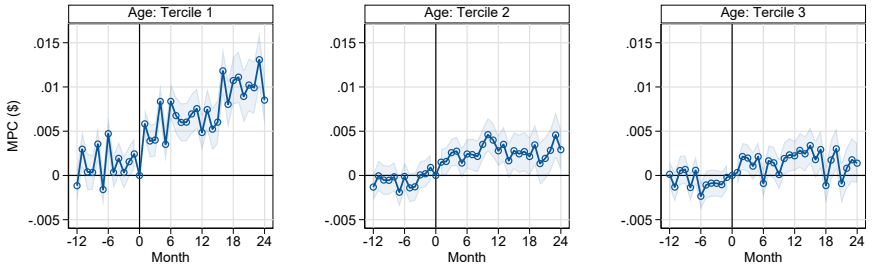


Figure A6: Heterogeneity in dynamic spending responses. The figure illustrates the heterogeneity in our dynamic estimates of the marginal propensity to consume: the increase in spending between month t and $t+h$ caused by a \$1 stock market gain in month $t+1$. Standard errors are clustered at the household level.

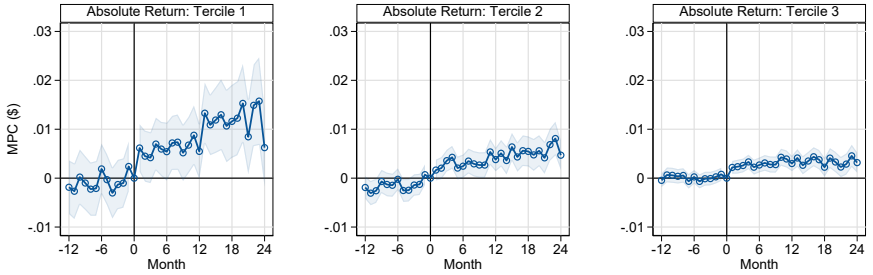
(a) Liquidity



(b) Age



(c) Absolute return



(d) Financial attention

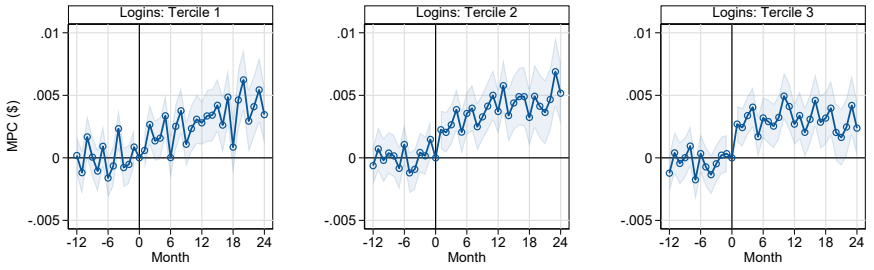
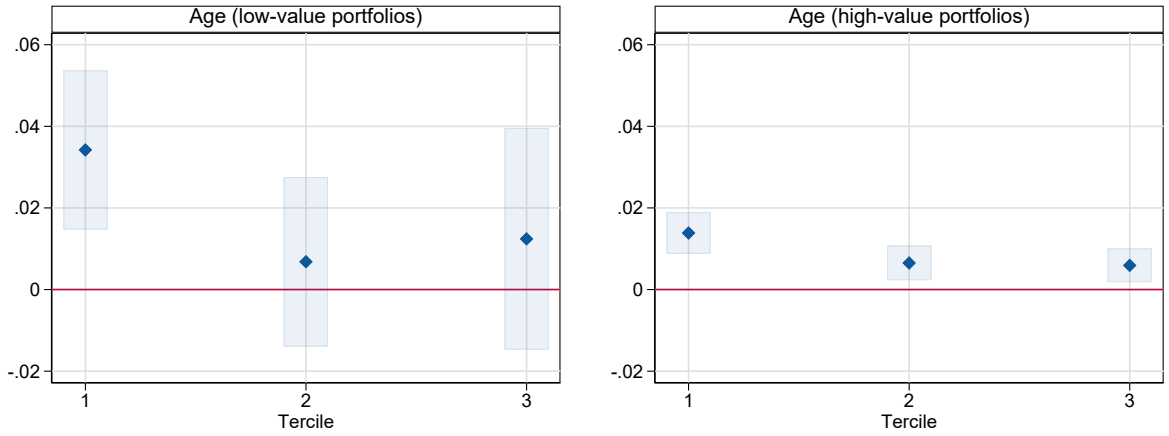
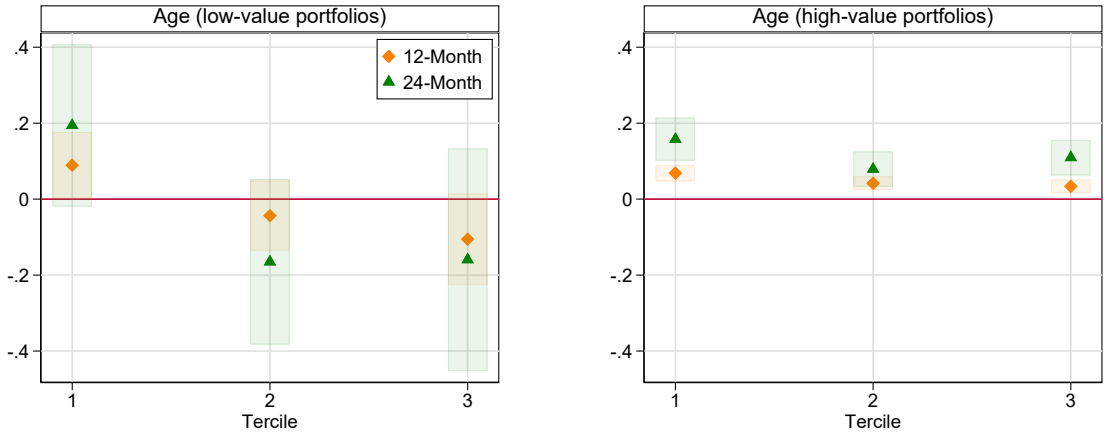


Figure A7: Heterogeneity in the marginal propensity to consume by age and portfolio values. The figure illustrates the heterogeneity in estimated marginal propensities to consume out of stock market gains cumulated over a three-month horizon (top panel) and one-year and two-year horizons (bottom panel) by age (three groups) and portfolio values (two groups). The results are obtained from a modified version of the baseline model where gains are interacted with all six combinations of the three age indicators and the two portfolio value indicators. The confidence intervals are based on standard errors clustered at the household level.

(a) Short-run responses



(b) Medium-run responses



Online Appendix B: Measuring spending

Danske Bank's customer records hold information about the time, type and amount of each customer's transactions. For card transactions and bill payments, we also have information about the type of recipient in the form of Merchant Category Codes (MCCs).

Our spending measure includes three types of outgoing transactions: Card payments (including payments initiated via mobile phone applications), bill payments and cash withdrawals. We exclude transactions that are unlikely to reflect consumption, for example fee payments to the bank and payments for financial securities purchases, as well as uncategorized bank transfers where the purpose is unobservable. Further, we use the MCC codes to exclude tax payments and debt repayments. We then sum all the remaining outgoing transactions to construct a monthly spending measure for each individual in the sample of Danske Bank customers, splitting outgoing transactions from joint accounts evenly between the account owners to avoid double-counting when aggregating to the household level.

Figure A1 shows average levels of annual household spending across age groups based on our transaction data measure and compares them to survey-based measures from the annual Household Budget Survey published by Statistics Denmark (Statistics Denmark 2019). We find very similar spending levels across the two data sources when averaging across all age groups, which suggests that our transaction based measure has a high level of completeness. There is generally also strong correspondence cross-sectionally across age groups. The largest discrepancy is for the youngest households where the survey-based average is somewhat higher. It is not clear whether this is due to undermeasurement in our transaction data or overreporting in the surveys.[1] In either case, mismeasurement of spending for households in the below-30 category is unlikely to substantially affect our results, since this group accounts for only 6% of the observations in our estimating sample.

[1] Koijen et al. (2015) compare a survey-base measure of consumption to a registry-based measure imputed from detailed administrative data on income and wealth. Like us, they find a higher average value in the survey data for the youngest households.

References

[1] Koijen, R., Van Nieuwerburgh, S., and Vestman, R., 2015. "Judging the Quality of Survey Data by Comparison with "Truth" as Measured By Administrative Records: Evidence from Sweden." Chapter 11 in "Improving the Measurement of Consumer Expenditures", by Caroll, C., Crossley, T. and Sabelhaus, J. (eds.). *NBER Book Series Studies in Income and Wealth*, University of Chicago Press, 2015

[2] Nasdaq Nordic, 2018. "OMXC20, OMX COPENHAGEN 20". Data available at `https://www.nasdaqomxnordic.com/index/index_info?Instrument=DK0016268840` (accessed April 18 2018).

[3] Statistics Denmark, 2019. "FU08: Consumption by group of consumption, age and price unit". Data available at `https://statistikbanken.dk/FU08` (accessed May 23 2019).