Supplemental Appendix

Links Between Puzzles in Household Finance: Evidence from Employee Benefit Choices

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A Institutional Details of Health Insurance and Retirement Plans

This Appendix presents more information on the rules and options for health insurance and retirement saving offered by the employer.

Health insurance: Table A1 presents key features of the health insurance plans—premiums, deductibles, out-of-pocket maxima, HSA availability and employer contributions—by type of coverage in 2015 and 2017. Copayments and coinsurance rates differed by plan. Coinsurance rates were lower in the high coverage plan compared to the other two options (10% vs 20%), and these rates applied to most service categories. Copayments applied to office or outpatient visits for the middle coverage and high coverage plans. Copayments were $25 for primary care in the high coverage plan and $30 in the medium coverage plan and not subject to the deductible. Copayments for specialty care visits were twice these amounts and also not subject to the deductible for these two plans. Physical therapy, occupational therapy, chiropractic care, and acupuncture each had $40 copayments for both the medium and high coverage plans. Inpatient care had a $500 deductible for the high coverage plan. For the low and medium coverage plans, inpatient care had 20% coinsurance after the deductible. Emergency room visits had a $200 copayment in the high coverage plan and a 25% coinsurance rate after the deductible in the low and medium coverage plans. All plans covered preventive care (including physical examinations with a primary care provider, well care child visits, non-urgent diagnostic tests, lab services, and x-rays, common communicable diseases like flu shots) without out-of-pocket payments. Maternity visits were also paid in full by each plan. Plans had slightly different prescription drug coverage. Nonetheless, we compared prices on the 30 most common prescriptions (nationwide) as classified in Fuentes, Pineda and Nagulapalli Venkata (2018) and found little difference across plans.

The university provided information to help employees make decisions between the three plans. Figure A.1 presents a summary comparison of the three health plans and Figure A.2 presents the first page of a four-page glossary of health insurance terms that describe plan features and other insurance terms in plain language. The university also offered examples of how cost sharing works for particular expenses, as shown in Figure A.3. During our sample period, employees also had access to Alex, an online decision support tool to aid in choosing between the three plans.

Retirement saving: The large public university that we study offers faculty a complicated set of retirement plan choices. Several distinctions are important, between the academic and medical divisions, between faculty and other employees in the academic division; and by hire date.

Academic division. Non-faculty academic-division employees are enrolled into the state DB plan, with 5% of their pay contributed to the help finance the system. This has become less generous over time, following two changes in the state system. The DB formula was changed to reduce generosity a little and delay retirement for employees hired after July 1, 2010. It was changed again, with a much more substantial reduction in generosity for employees hired after December 31, 2013; another change at that time was that 4% of pay continued to go to the state DB system, but 1% began to go to a DC plan with an employer match of 1%. Faculty face a one-time irrevocable choice at the outset of employment between the DB plan run by the state and the 401(a) DC plan with mandatory contributions. For faculty hired before July 1, 2010, the mandatory contribution rate to the 401(a) is 10.4% from the employer. For faculty hired after, it is 8.9% from the employer and 5% from the employee. A large majority of faculty chooses the DC plan instead of the DB plan.

For both faculty and staff in the academic division, the employer provides a match to the university 403(b) plan. This consists of a 50% match on employee contributions up to $80 per

month ($960 per year). There is a choice between two vendors for the 401(a) and each vendor also offers the 403(b). There is also a state 457 plan that is run by a different vendor. Both the 403(b) and 457 allow for tax-deferred and Roth contributions.

Medical division. Medical division employees do not have a choice of mandatory plan and are enrolled in a medical system DC plan. For employees hired before October 1, 2002, the employer contributes 8% of pay, and for employees hired after, the employer contributes 4%. The match ceiling for contributions to the 403(b) plan changed at the same time. For employees hired before October 1, 2002, the match parameters were the same as for academic-division employees, with a 50% match for contributions up to $960 per year. For employees hired after, it is a 50% match for employee contributions up to 4% of salary. Medical division employees also have access to the same state 457 plan.

Table A.1: Summary of Main Features of Health Insurance Plans, 2015 and 2017

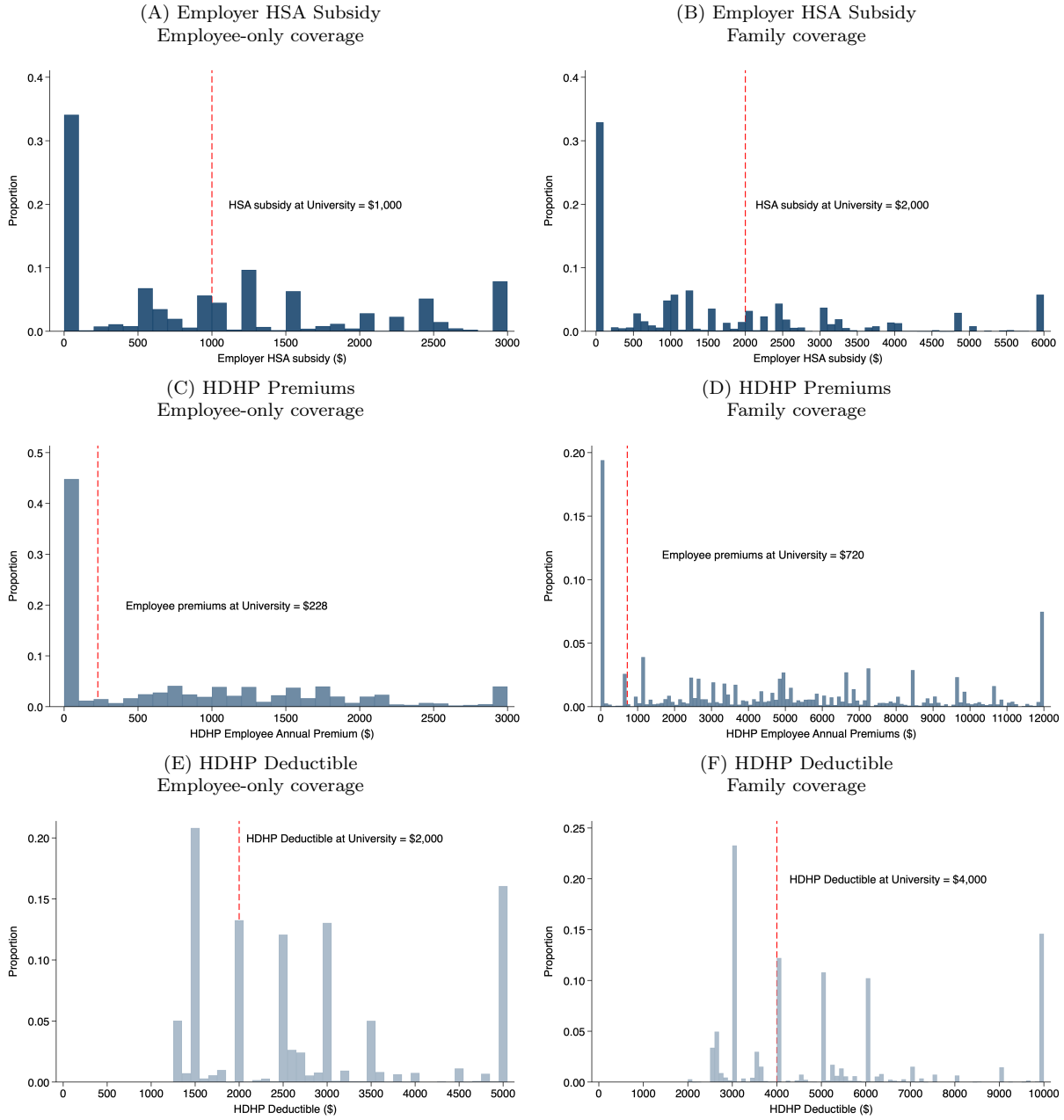
	2015			2017		
	Coverage level			Coverage level		
	High	Medium	Low	High	Medium	Low
Panel A. Employee-only						
Annual premium	1,080	612	228	1,275	687	228
Deductible	250	500	2,000	400	500	2,000
Out-of-pocket max	5,000	5,500	6,000	5,000	5,500	6,550
HSA available	No	No	Yes	No	No	Yes
Employer HSA contribution	No	No	1,000	No	No	1,000
Panel B. Employee + child						
Annual premium	2,580	1,020	288	3,039	1,164	288
Deductible	500	1,000	4,000	800	1,000	4,000
Out-of-pocket max	10,000	11,000	12,000	10,000	11,000	13,100
HSA available	No	No	Yes	No	No	Yes
Employer HSA contribution	No	No	1,500	No	No	1,500
Panel C. Employee + spouse						
Annual premium	2,904	1,092	360	3,471	1,284	381
Deductible	500	1,000	4,000	800	1,000	4,000
Out-of-pocket max	10,000	11,000	12,000	10,000	11,000	13,100
HSA available	No	No	Yes	No	No	Yes
Employer HSA contribution	No	No	1,500	No	No	1,500
Panel D. Family						
Annual premium	5,136	1,800	696	6,066	2,064	720
Deductible	500	1,000	4,000	800	1,000	4,000
Out-of-pocket max	10,000	11,000	12,000	10,000	11,000	13,100
HSA available	No	No	Yes	No	No	Yes
Employer HSA contribution	No	No	2,000	No	No	2,000

Table A.2: Summary of Main Plan Features at Peer Universities

		Low coverage plan				High coverage plan		#
		Premium	Deductible	HSA Available	Employer HSA Contribution	Premium	Deductible	plans
Panel A. Private Universities								
1	Individual	$324	$1,500	Yes	$1,000	$1,380	$300	3
	Family	$3,480	$3,000	Yes	$1,000	$7,620	$600	
2	Individual	$408	$600	No	N/A	$2,016	$0	4
	Family	$3,768	$1,800	No	N/A	$9,036	$0	
3	Individual	$348	$1,450	Yes	$300	$804	$850	2
	Family	$3,084	$2,900	Yes	$600	$6,024	$2,550	
4	Individual	$643	$2,500	Yes	$500	$1,452	$500	3
	Family	$4,209	$5,000	Yes	$1,000	$3,402	$1,000	
5	Individual	$1,092	$1,500	Yes	$1,000	$2,448	$150	4
	Family	$3,576	$3,000	Yes	$2,000	$7,596	$450	
6	Individual	$1,512	$0	N/A	N/A	$3,168	$100	4
	Family	$5,556	$0	N/A	N/A	$8,904	$300	
7	Individual	$355	$1,500	Yes	$400	$1,288	$500	5
	Family	$1,320	$3,000	Yes	$800	$6,869	$1,500	
Panel B. Public Universities								
1	Individual	$264	$1,400	Yes	$60	$1,387	$200	4
	Family	$1,465	$2,800	Yes	$120	$3,413	$400	
2	Individual	$276	$1,400	Yes	$500	$1,701	$500	5
	Family	$802	$2,800	Yes	$1,000	$5,660	$1,500	
3	Individual	$276	$1,400	Yes	$500	$1,701	$500	5
	Family	$802	$2,800	Yes	$1,000	$5,660	$1,500	
4	Individual	$0	$1,500	Yes	$0	$1,308	$0	4
	Family	$228	$3,000	Yes	$0	$4,542	$0	
5	Individual	$180	$1,350	Yes	$500	$1,680	$400	4
	Family	$772	$2,700	Yes	$1,000	$2,160	$800	
6	Individual	$0	$400	No	N/A	$408	$0	2
	Family	$3,492	$800	No	N/A	$4,188	$0	
7	Individual	$812	$0	No	N/A	$1,224	$0	5
	Family	$2,112	$0	No	N/A	$3,060	$0	
8	Individual	$0	$500	No	N/A	$1,788	$0	3
	Family	$2,820	$1,000	No	N/A	$7,896	$0	
9	Individual	$2,256	$2,800	Yes	$0	$3,948	$300	4
	Family	$5,469	$5,400	Yes	$0	$10,437	$600	
10	Individual	$0	$1,500	Yes	$0	$936	$0	4
	Family	$600	$3,000	Yes	$0	$4,548	$0	
11	Individual	$300	$1,400	Yes	$0	$2,112	$175	10
	Family	$948	$2,800	Yes	$0	$5,928	$525	
12	Individual	$372	$1,500	Yes	$750	$3,228	$250	4
	Family	$936	$3,000	Yes	$1,500	$8,040	$500	

Note: Table presents parameters of insurance plans for the set of peer institutions (as classified by the university). When there are more than two plans offered, we report only the most generous and least generous plans to show the range.

Figure A.1: Distribution of HDHP Characteristics, Kaiser Employee Health Benefits Survey



Notes: Figure plots distributions of annual the employer HSA subsidies, employee premiums, and deductibles in high-deductible health plans (HDHPs) reported in the Kaiser Employee Benefits Survey data. The sample is restricted to years 2014–2018 to match our empirical setting and the University's values of these variables are listed for comparison and denoted by vertical dashed lines.

Figure A.2: Health Plan Comparison provided by University, 2015

SERVICES PROVIDED	PLAN "L"	PLAN "M"*	PLAN "H"
1. PLAN COINSURANCE Applies to all expenses unless otherwise stated.			
	Deductible & 20% Coinsurance	Deductible & 20% Coinsurance	Deductible & 10% Coinsurance
2. PROFESSIONAL SERVICES IN OFFICE OR OUTPATIENT			
A. Primary Care Physician Visit	Deductible & 20% Coinsurance	$30 Copayment	$25 Copayment
B. Specialty Care Visit	Deductible & 20% Coinsurance	$60 Copayment	$50 Copayment
C. Maternity Visit	Paid in Full[1]	Paid in Full[1]	Paid in Full[1]
3. PREVENTIVE CARE AND IMMUNIZATIONS			
A. Preventive General Physical Examination (PCP Only)	Paid in Full	Paid in Full	Paid in Full
B. Preventive Well Child Care (Under Age 7) (PCP Only)	Paid in Full	Paid in Full	Paid in Full
C. Preventive Diagnostic Tests, Laboratory Services and XRay Procedures (Non-Urgent Only)	Paid in Full[1]	Paid in Full[1]	Paid in Full[1]
D. For Common Communicable Diseases as per CDC Guidelines excluding those used for Foreign Travel	Paid in Full	Paid in Full	Paid in Full
4. URGENT CARE CENTER *(Must be an unexpected illness or injury where services are needed sooner than a routine doctor's visit)*			
	Deductible & 20% Coinsurance	Deductible & 20% Coinsurance	Deductible & 10% Coinsurance

SERVICES PROVIDED	PLAN "L"	PLAN "M"*	PLAN "H"
5. EMERGENCY ROOM SERVICES Emergency Room Services will be processed under the Hospital Care Benefits if patient is admitted. *(Must be an emergency to receive benefits.)*			
Emergency Room Visit	Deductible & 25% Coinsurance	Deductible & 25% Coinsurance	$200 Copayment
Other Associated Charges	Deductible & 25% Coinsurance	Deductible & 25% Coinsurance	Deductible & 10% Coinsurance
6. INPATIENT HOSPITAL			
A. Inpatient Care (Semi-Private Accommodations Unless Private Accommodations are Approved for Medical Reasons)	Deductible & 20% Coinsurance	Deductible & 20% Coinsurance	$500 Copayment per confinement
B. Limitation on Inpatient Days	Unlimited	Unlimited	Unlimited
7. TRANSPLANT SERVICES Using Institutes of Excellence Network			
Inpatient Services	Deductible & 20% Coinsurance	Deductible & 20% Coinsurance	$500 Copayment per confinement
8. OUTPATIENT HOSPITAL			
Outpatient Procedures	Deductible & 20% Coinsurance	Deductible & 20% Coinsurance	$200 Copayment per visit
Other Associated Charges	Deductible & 20% Coinsurance	Deductible & 20% Coinsurance	Deductible & 10% Coinsurance
9. SKILLED NURSING FACILITY			
Skilled Nursing / Rehabilitation Facility (180 Days Per Year Combined Maximum)	Deductible & 20% Coinsurance	Deductible & 20% Coinsurance	$300 Copayment per confinement
10. HOME HEALTH SERVICES			
Medically Necessary Services Approved By Claims Administrator (90 Visits Per Year Maximum)	Deductible & 20% Coinsurance	Deductible & 20% Coinsurance	Deductible & 10% Coinsurance
11. AMBULANCE TRANSPORTATION			
Local Ground or Air Transportation When Medically Necessary To and/or From a Hospital	Deductible & 20% Coinsurance	Deductible & 20% Coinsurance	Paid in Full

Notes: Screenshot of the first two pages of the plan benefit comparison chart provided by University for 2015 health plans. Names of plans have been replaced with "L", "M", and "H" to preserve anonymity.

Figure A.3: Glossary of Health Insurance Terms Provided by Employer

Glossary of Health Coverage and Medical Terms

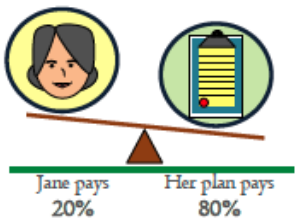
- This glossary has many commonly used terms, but isn't a full list. These glossary terms and definitions are intended to be educational and may be different from the terms and definitions in your plan. Some of these terms also might not have exactly the same meaning when used in your policy or plan, and in any such case, the policy or plan governs. (See your Summary of Benefits and Coverage for information on how to get a copy of your policy or plan document.)
- **Bold blue** text indicates a term defined in this Glossary.
- See page 4 for an example showing how **deductibles**, **co-insurance** and **out-of-pocket limits** work together in a real life situation.

Allowed Amount
Maximum amount on which payment is based for covered health care services. This may be called "eligible expense," "payment allowance" or "negotiated rate." If your **provider** charges more than the allowed amount, you may have to pay the difference. (See **Balance Billing**.)

Appeal
A request for your health insurer or **plan** to review a decision or a **grievance** again.

Balance Billing
When a **provider** bills you for the difference between the provider's charge and the **allowed amount**. For example, if the provider's charge is $100 and the allowed amount is $70, the provider may bill you for the remaining $30. A **preferred provider** may ***not*** balance bill you for covered services.

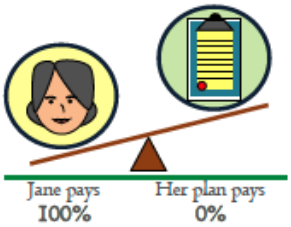
Co-insurance
Your share of the costs of a covered health care service, calculated as a percent (for example, 20%) of the **allowed amount** for the service. You pay co-insurance ***plus*** any **deductibles** you owe. For example, if the **health insurance** or **plan's** allowed amount for an office visit is $100 and you've met your deductible, your co-insurance payment of 20% would be $20. The health insurance or plan pays the rest of the allowed amount.



(See page 4 for a detailed example.)

Co-payment
A fixed amount (for example, $15) you pay for a covered health care service, usually when you receive the service. The amount can vary by the type of covered health care service.

Deductible
The amount you owe for health care services your **health insurance** or **plan** covers before your health insurance or plan begins to pay. For example, if your deductible is $1000, your plan won't pay anything until you've met your $1000 deductible for covered health care services subject to the deductible. The deductible may not apply to all services.



(See page 4 for a detailed example.)

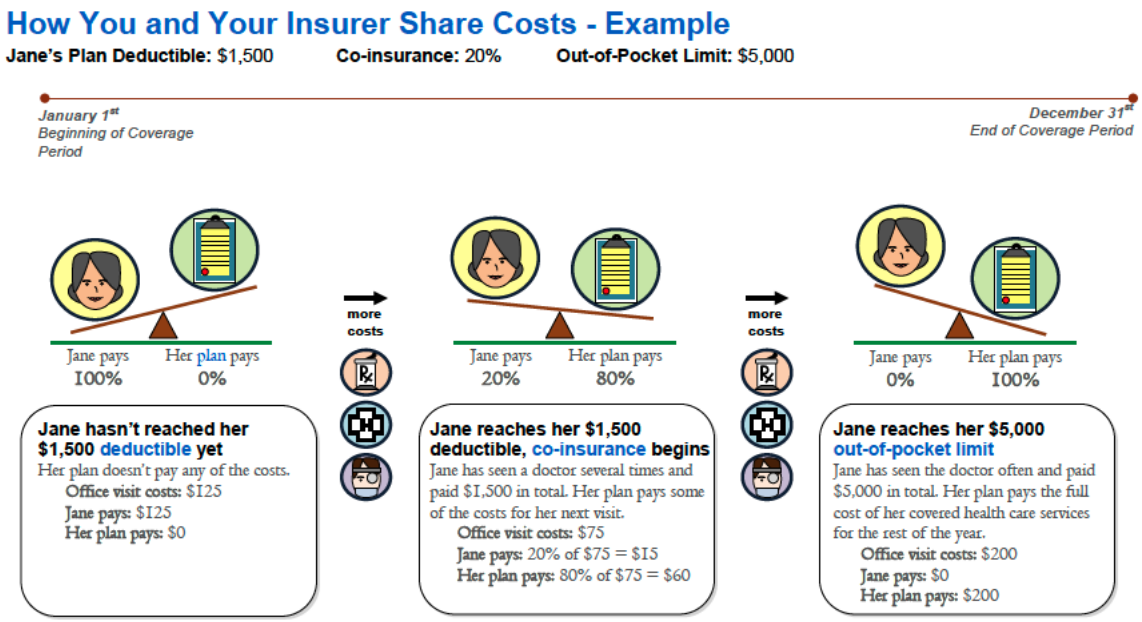
Durable Medical Equipment (DME)
Equipment and supplies ordered by a health care **provider** for everyday or extended use. Coverage for DME may include: oxygen equipment, wheelchairs, crutches or blood testing strips for diabetics.

Emergency Medical Condition
An illness, injury, symptom or condition so serious that a reasonable person would seek care right away to avoid severe harm.

Emergency Medical Transportation
Ambulance services for an **emergency medical condition**.

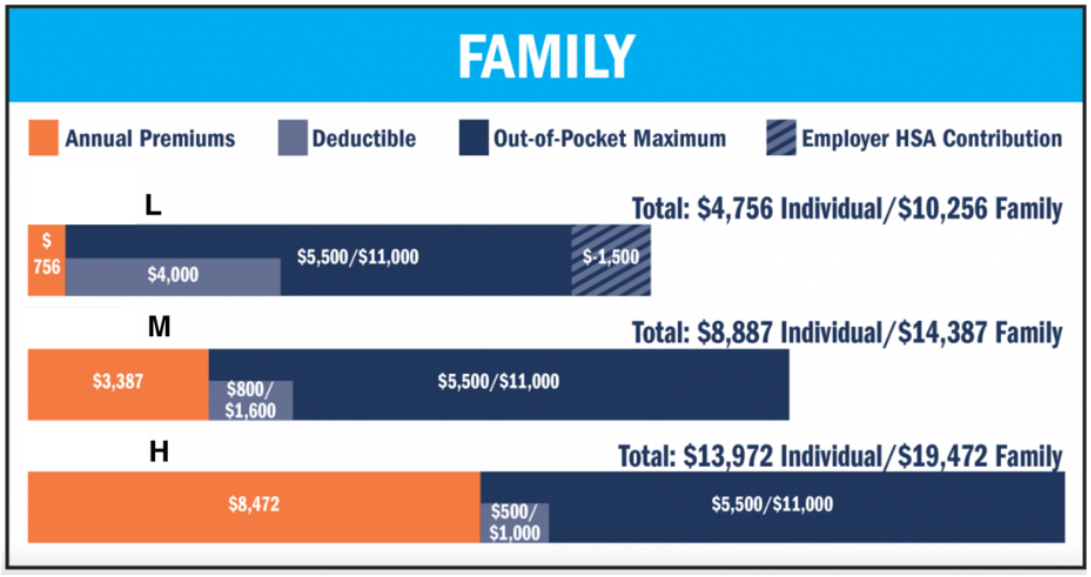
Notes: Screenshot of first page of glossary of health insurance terms provided to employees.

Figure A.4: Example of Cost Sharing Provided by Employer



Notes: Screenshot of an example of deductibles, coinsurance, and out-of-pocket limit provided to employees.

Figure A.5: Graphic of Costs if Spending Exceeds Out-of-Pocket Max, Family Coverage 2022



Notes: Graphic presented during 2022 Open Enrollment in written materials and online. Graphs corresponding to each coverage type were provided to employees.

B Construction of Health Expenditure Distributions

We construct distributions of out-of-pocket costs for each employee and dependents by grouping people into "risk groups" according to demographics and previous health spending, and then using the empirical distribution of out-of-pocket (OOP) payments among people in each risk group as a measure of beliefs. We first divide each insured individual according to discrete age bins (younger than 30, 30–39, 40–49, 50–59.5, 59.5–65, 65 and older) and gender (male, female). Within these groups, we further split into terciles based on 1-year lags of annual health spending, combining both plan paid spending and OOP spending. We classify people with the same grouping of age, gender, and cost tercile as being in the same risk group. To construct the distribution of out-of-pocket spending under plan j for people in risk group g, we take the distribution of observed spending of people within risk group g who chose plan j. We assign this distribution to people in risk group g who chose a different plan $k \neq j$.

To give an example, we group women aged 30–39 together, rank them by their annual health spending in year $t-1$, and divide them evenly into three sub-groups (terciles) based on year $t-1$ spending. Within each tercile, we further split them based on their observed plan choice (low coverage, medium coverage, or high coverage) in year t. The empirical distribution of OOP for each of the three coverage levels is taken as the OOP distribution for each woman in that sub-group if she had chosen that coverage level.

The final step is to combine OOP distributions of each member of the family. We implement this by taking 500 draws for each employee or dependent from their group-specific OOP distribution under each plan, and sum each of the 500 draws across all family members to arrive at a distribution of OOP costs for the family. If the sum of OOP within families for any draw exceeds the plan's OOP max, we replace the OOP for that draw as the OOP max. This distribution of 500 OOP draws represents the family's belief about OOP risk under each available plan.

In constructing each OOP distribution, we pool multiple years together. Doing so ensures that each risk group based on age, gender, lagged cost tercile, and plan choice has a sufficiently large number of individuals. The only plans and years for which we construct distributions from a single year of data are the high coverage and medium coverage plans in 2014. Starting in 2015, the deductibles increased for these plans, raising average OOP spending by about $100. We pool 2015–2017 for constructing distributions for the medium coverage and high coverage plans in these years. Since cost sharing in the low coverage plan remained roughly constant with the exception of a slight rise in the OOP max, we pool 2014–2017 in generating OOP distributions in the low coverage plan.

It is important to note several assumptions made in this approach to constructing OOP distributions. First, we assume draws are independent within families. Draws might be positively correlated if family members have similar tastes for health care consumption that we do not model. On the other hand, OOP draws (not necessarily spending draws) might be negatively correlated due to the non-linear nature of the insurance contract. We believe modeling these correlations would introduce unnecessary complexity into this calculation without providing meaningfully different results. We assume people have rational expectations regarding future spending risk based on their demographics and lagged spending, which is a standard assumption in modeling choices between health plans.

C Imputation of Marginal Tax Rates

This Appendix describes the procedure to impute marginal tax rates for each employee in our data. Our administrative records lack several pieces of information required for a direct calculation of the employee's marginal tax rate, including information about spousal earnings, children, other sources of income, home ownership, and relevant deductions. In addition, marital status is reported incompletely and salary is recorded in bands to protect data confidentiality. Our approach is therefore to calculate marginal tax rates for respondents of the American Community Survey (ACS) using the National Bureau of Economic Research's TAXSIM, and then to use hot-deck imputation to assign a marginal tax rate for the employees in our sample by matching on income, age, and gender.

Step 1: ACS data We use ACS surveys between 2011 and 2017, which record relatively comprehensive information that helps us calculate marginal tax rates. In particular, we use the following information from the survey: wage and salary income of respondent and spouse, interest received, retirement income and social security benefits, supplemental security income and public assistance income, state, marital status, age, number of dependents, and number of children under 13.

Step 2: Marginal tax rate calculation For each ACS observation, we use NBER TAXSIM to estimate the federal and state marginal tax rates based on the variables in the list above.

Step 3: Hot-deck imputation We match individuals between our administrative data and the ACS by year, age band, income band, and gender. We then use hot-deck imputation to assign a marginal tax rate to the matched employees in our sample. The imputation is repeated five times and we take the average to construct our estimate of the employee's marginal tax rate.

D Additional Descriptive Analyses of Choice Patterns

Health Care Cost Distributions. We provide additional examples of distributions of health care costs to illustrate the prevalence of dominated choices in health insurance. Figure D.1 replicates Figure 1 for employee-plus-spouse and employee-plus-children coverage, showing similar patterns. In Panels (A) and (B), we manually calculate the single coinsurance rate for all spending that would produce the same actuarial value for the plan as the set of its actual copayments and coinsurance rates using the Actuarial Value calculator by the Center for Medicare and Medicaid Services (CMS), following the procedure used in Ericson et al. (2020) and Liu and Sydnor (2022). This calculation uses the same deductible and out-of-pocket maximum as the plan, and does not incorporate employer HSA contributions in calculating the actuarial value. Panels (C) and (D) plot the cumulative distribution functions (CDFs) using the empirical distribution of costs to assess stochastic dominance. These costs are inclusive of premiums and HSA contributions from the employer in the low coverage plan. Figure D.2 plots the CDFs of health care costs for 40-year olds in the middle cost tercile in 2017 who face a 25% marginal tax rate under each of the three plans, using the empirical distribution of costs as described in Appendix B.

Figure D.1: Stochastic Dominance of Health Insurance Plans, Other Coverage Types

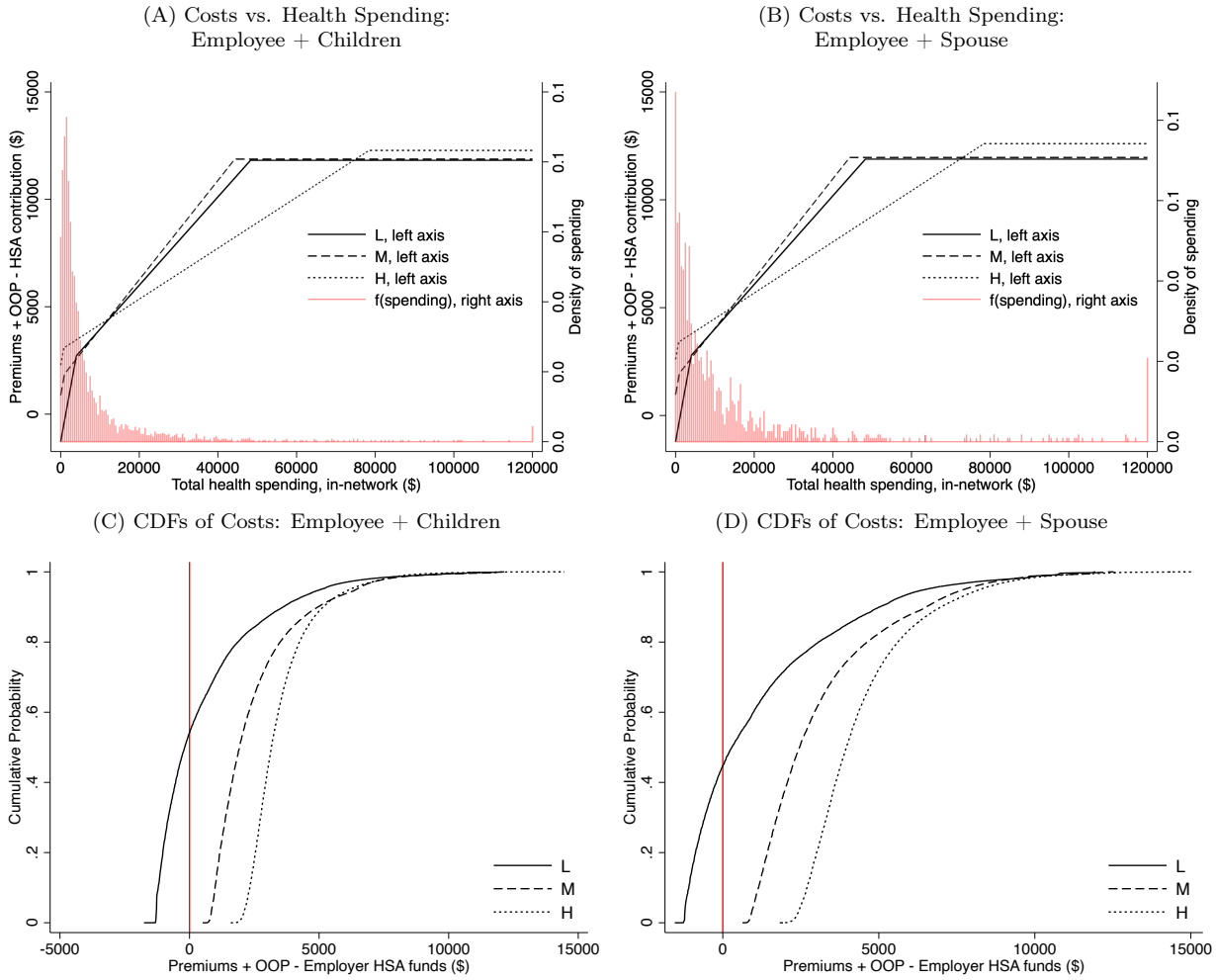
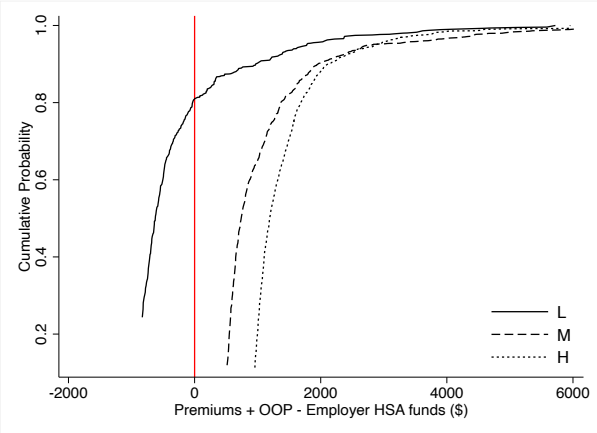
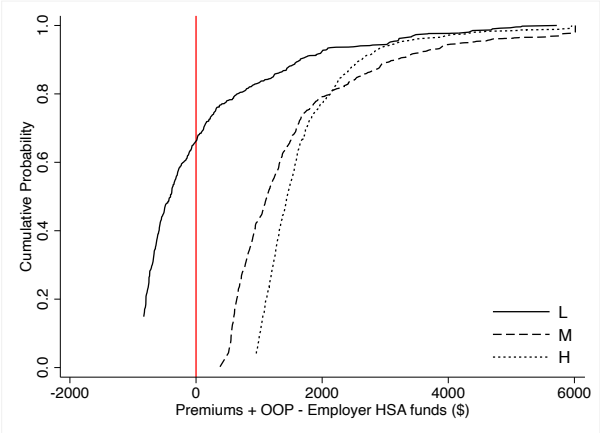


Figure D.2: CDFs of health care costs for 40-year-old in 2017

(A) Male, middle cost tercile



(B) Female, middle cost tercile



Robustness to Definition of Dominance and Sub-samples. Table D.1 shows the distribution of the four types under different criteria for classifying dominance, and restricted to different sub-samples. The patterns are similar if we exclude employees who have either observed spending or predicted spending (via LASSO) that falls in the range where costs in H are lower than in L. The general patterns are also similar when examining sub-samples, including by type of health insurance coverage and to employees who face a higher limit for matched retirement savings (Panel C).

Table D.1: Distribution of Choice Patterns, Robustness

	Dominated plan and forego match	Dominated plan and obtain match	Plan L and forego match	Plan L and obtain match	LPM coefficent (SE)
Panel A. Choices based on empirical OOP distribution					
SOSD (Main analysis)	33.9	57.5	2.5	6.1	0.080 (0.010)
FOSD	34.3	56.3	2.6	6.8	0.102 (0.016)
Panel B. Excluding employees in range where H has lowest costs					
using observed spending	32.5	56.8	3.5	7.2	0.034 (0.015)
using LASSO-predicted spending	29.7	59.9	2.6	7.7	0.079 (0.018)
Panel C. By coverage type, division, and age					
Family coverage	28.5	61.6	2.2	7.7	0.093 (0.022)
Employee-only coverage	35.6	54.4	3.5	6.5	0.047 (0.014)
Not Married	36.5	54.4	3.0	6.0	0.069 (0.011)
Medical division with 4% 403(b) match	41.9	49.8	3.2	5.1	0.074 (0.018)
Age $> 59\frac{1}{2}$	32.0	63.9	0.7	3.4	0.159 (0.032)

Characteristics Associated with Choice Patterns. Table D.2 tabulates sample means of income, demographics, job characteristics, and health spending split by the four pairs of choices. Those who obtain matching funds earn higher incomes than those who do not. Those who avoid choosing the dominated health plan but do not make supplemental retirement contributions have the lowest incomes, on average. Those who choose the dominated health plan have longer tenures and higher health spending.

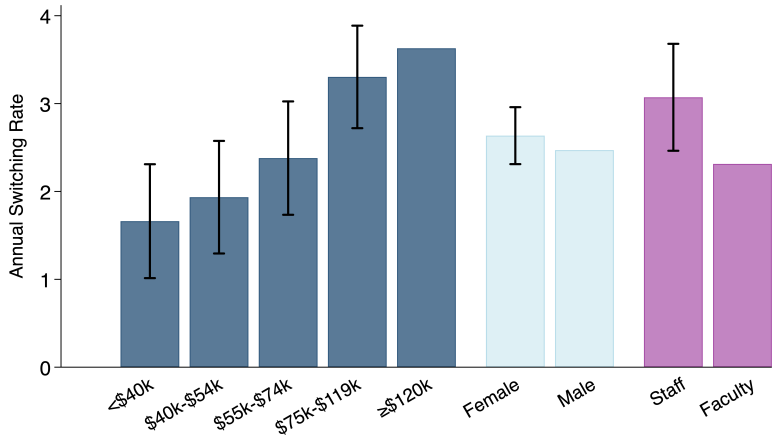
Table D.2: Characteristics by Choice Patterns

	Dominated plan and forego match	Dominated plan and obtain match	Plan L and forego match	Plan L and obtain match
Income ($)	54,805	84,976	50,377	85,743
Age (years)	43.8	46.4	36.3	42.5
Female (%)	64.6	58.1	62.3	54.4
Tenure (years)	10.0	10.9	4.4	7.9
Household size	1.9	2.1	1.7	2.0
Faculty (%)	8.2	25.2	11.0	28.0
Academic division (%)	47.0	61.2	54.7	66.1
Total health spending ($)	7,170	7,183	2,589	1,873

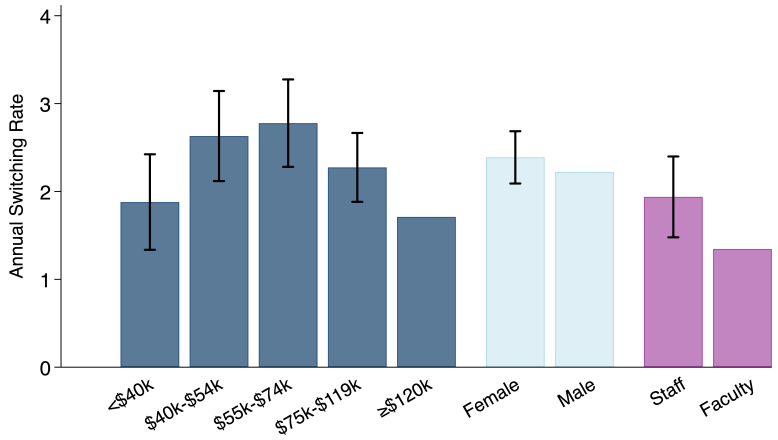
Figure D.3 shows that average annual rates of switching out of dominated plans (Panel A) and starting retirement contributions (Panel B), by employee characteristics. Whiskers denote 95% confidence interval on the difference relative to the omitted group, which is shown without a confidence interval, calculated from a linear probability model. The linear probability models control for fixed effects for calendar year and coverage type, income, gender, staff/faculty status, deciles of age, and marital status. The comparison between staff and faculty is restricted to the academic division, where this distinction is observed in the data.

Figure D.3: Switching Rates by Employee Characteristics

(A) Switching out of dominated plans



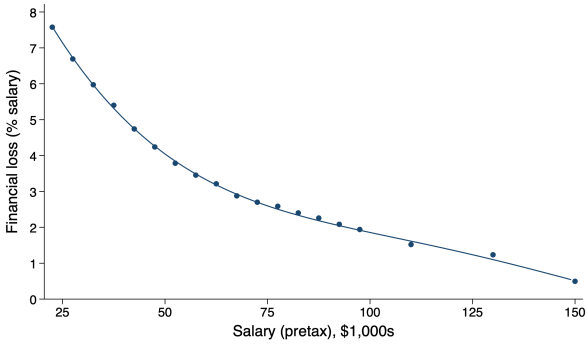
(B) Start obtaining retirement match



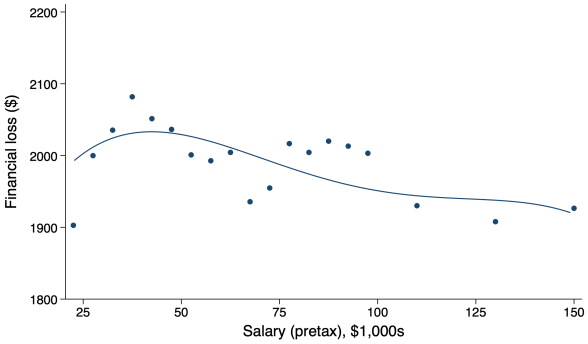
Financial Losses from Health Insurance, Salary, and Retirement Saving. Figure D.4 presents binned scatterplots using the methods of Cattaneo et al. (2024) of financial losses from health insurance against salary, with financial losses measured as a percent of salary in Panel A and in dollars in Panel B. Panel C plots financial losses against supplemental retirement contributions, both measured as a percent of salary. The line plots a 4th-order global polynomial.

Figure D.4: Financial Losses vs. Salary and Retirement Saving

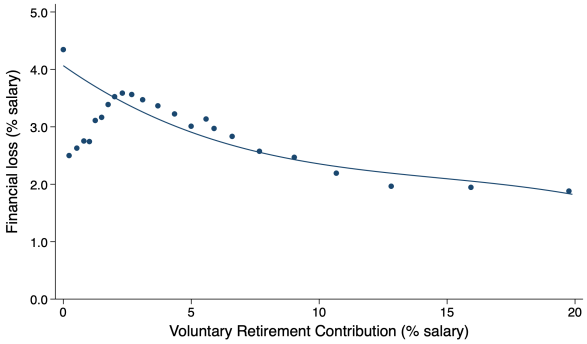
(A) Financial Losses (% Salary) vs. Salary



(B) Financial Losses ($) vs. Salary



(C) Financial Losses vs. Retirement Saving



E External Validity: Analysis from Other Universities

We assess how the results in Section II generalize to other settings by using survey data linked to administrative retirement accounts managed by the Teachers Insurance and Annuity Association of America (TIAA). The survey was designed to study fungibility of HSA assets, financial literacy, and liquidity as analyzed in Davis, Leive and Gellert (2023). The set of 15 universities differed by geography, university type, and level of employer HSA funding, and included the university in the main text of the paper. Universities were not selected based on whether they offered dominated health plans. We take advantage of the fact that the HDHP/HSA stochastically dominated the other health plans in 10 of the 15 universities to re-estimate the models from Table 2 in these other universities. We refer to this as the "TIAA sample." The survey was not incentivized and had a response rate of 3%. Table E.1 presents summary statistics of the TIAA sample. Compared to both our main sample and TIAA participants at these universities, survey respondents were older and earn higher salaries. Compared to the US average, they have higher levels of financial literacy and are less likely to be liquidity constrained, which we define as either having an outstanding 403(b) loan or reporting they are not confident they could finance an unexpected $2,000 emergency expense (Lusardi, Schneider and Tufano 2011).

Table E.1: Summary Statistics, TIAA Sample

	Mean
Salary ($)	94,345
Age (years)	53.63
Female (%)	60.5
Married (%)	14.6
White (%)	84.2
Faculty (%)	30.5
Defined benefit plan (%)	19.2
Total TIAA employee retirement saving ($)	8,279
Employee supplemental retirement saving ($)	5,154
Current retirement plan loan (%)	4.9
Chose HDHP/HSA (%)	44.3
Correctly answered 3 financial literacy questions (%)	62.8
Liquidity constraint (%)	11.9
N	1,105

Characterizing dominated health plans in TIAA sample: While we observe administrative data on retirement accounts, we lack administrative data on health spending or insurance choices. Nonetheless, we can still assess whether a person chose a dominated health plan using their self-reported responses and by classifying dominated plans using the methods of Liu and Sydnor (2022). We use the claims distribution from the Center for Consumer Information and Insurance Oversight's actuarial value calculator combined with each plan's cost sharing, premiums, and any employer HSA funding at each university. This information is publicly available online. We continue to use second-order stochastic dominance (SOSD) as our definition of dominated plans. For each plan at each university, we record the deductibles, co-pays, coinsurance rates, and other plan rules that are used to determine the plan's actuarial value according to the Center for Consumer Information and Insurance Oversight (CCIIO). The actuarial value is defined as the percentage of total spending for a population that is covered by the insurance plan. The remainder are paid in out-of-pocket payments by the insured. We input these parameters into the actuarial value calculator available

from CCIIO's website.[1] The calculations use the Gold metal tier assumption for each plan. After recording the actuarial value for each plan's actual cost sharing rules, we then calculate what single coinsurance rate for the same deductible and out-of-pocket maximum would yield the same actuarial value. This step is performed manually. For each plan, out-of-pocket payments can then be calculated as a function of annual health spending, by applying the plan's actual deductible, this calculated coinsurance rate, and the plan's actual out-of-pocket maximum (just as we did in Figure 1). Finally, we account for premiums and any employer HSA contributions to assess whether the HDHP/HSA plan stochastically dominated each of the other plans.

Our analysis includes the universities where the HDHP/HSA stochastically dominated all other plans offered. We do this because our survey did not ask the name of the chosen plan, only whether it was the HDHP/HSA. Among the 15 universities, we determine that the HDHP/HSA stochastically dominated the other plans in 11 cases. In three of the four remaining cases, the HDHP/HSA did not stochastically dominate. In the last case, we did not attempt to assess dominance due to substantial differences in provider networks across plans that indicated plans were not solely vertically differentiated based on costs. Two universities offered tiered coverage for each plan, and we assessed dominance within each tier of coverage in those cases.

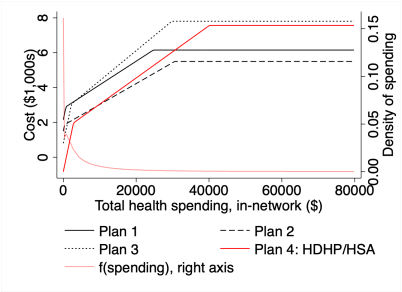
The universities where the HDHP/HSA stochastically dominated the other plans are presented in Figure E.1. Figures plot employee costs, defined as premiums plus out-of-pocket payments less employer HSA contributions, as a function of annual health spending for each plan. In Universities 7-10, the HDHP/HSA also strictly dominates all other plans as shown by costs being lower for each possible level of spending. For universities that adjust premiums by salary (panels D, H, I, J), we have presented examples for particular salary levels. The differences in costs are sometimes very large. For example, University 10 has differences exceeding $10,000 between the highest premium plan and the HDHP/HSA for employees earning over $182,000. The cost differences are still high but lower for employees at lower salary levels because premiums are a progressive function of income in that setting.

Linear Probability Models of Choices in TIAA sample: As shown in Table E.2, the positive correlation between choosing a dominated plan and not saving in supplemental retirement accounts is also observed among this wider set of universities. Choosing a dominated plan is associated with a 16.2 percentage point increase in not saving in supplemental accounts. This represents a 48.6% increase from the baseline mean, larger than the corresponding magnitude in Table 2. The magnitude declines only slightly we control flexibly for age, gender, and salary. In summary, the choice patterns in Table 2 extend to other contexts.

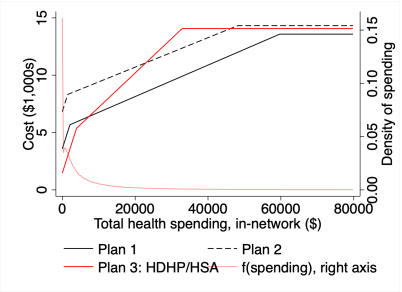
[1] The link is available here: https://www.cms.gov/CCIIO/Resources/Regulations-and-Guidance/Downloads/av-calculator-final.xlsm.(Accessed June 16, 2021)

Figure E.1: Costs vs. Total Health Spending, TIAA Sample

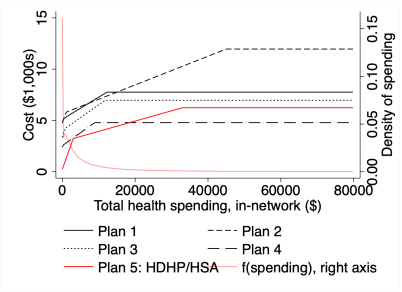
(A) University 1: All



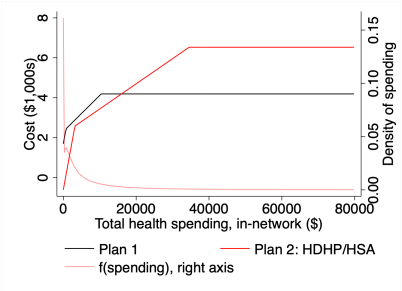
(B) University 2: All



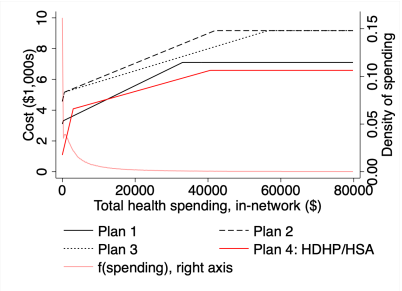
(C) University 3: All



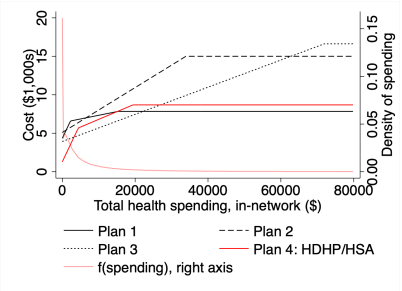
(D) University 4: $60k-$100k



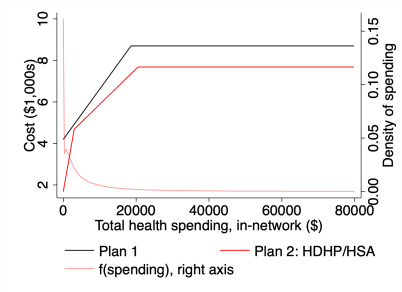
(E) University 5: All



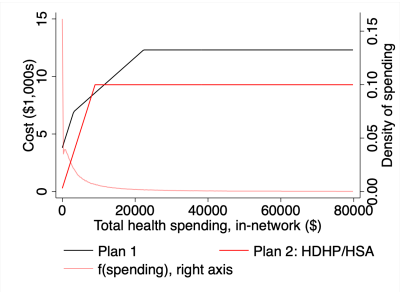
(F) University 6: All



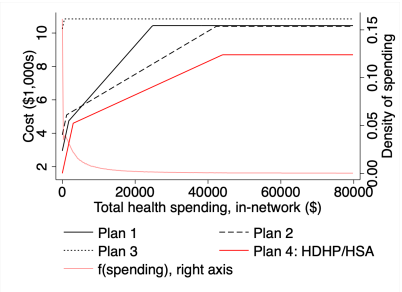
(G) University 7: All



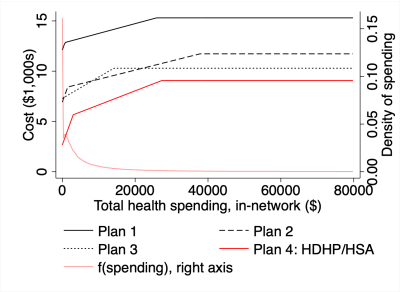
(H) University 8: $62k-$132k



(I) University 9: $80k-$135k



(J) University 10: $182k+



(K) University 11: All

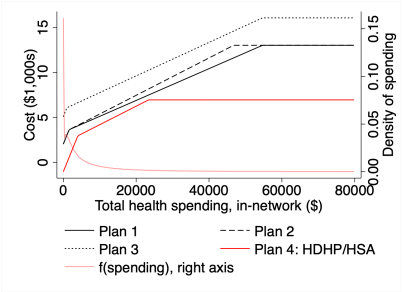


Table E.2: Choices Across Domains, TIAA Sample

	Dep var: Zero supplemental saving	
Choose dominated health plan	0.162	0.156
	(0.030)	(0.030)
Constant	0.333	0.336
	(0.022)	(0.021)
Controls	No	Yes
N	1,105	1,101

Table E.3: Sample Characteristics by Choices, TIAA sample

	Dominated plan & zero supplemental saving	Dominated plan & pos. supplemental saving	HDHP/HSA & zero supplemental saving	HDHP/HSA & pos. supplemental saving
Percent of sample	27.6	28.1	14.8	29.5
Household salary ($)	80,705	89,379	94,366	109,384
Age (years)	54.5	54.9	52.3	52.3
Female (%)	58.5	62.7	53.7	63.6
Married (%)	17.8	13.8	14.1	12.7
White (%)	85.4	80.3	87.1	85.4
Faculty (%)	31.3	27.6	38.0	28.8
Defined benefit plan (%)	18.8	20.6	13.5	21.2
Total employee retirement saving ($)	4,280	2,446	4,800	12,534
Employee supplemental retirement saving ($)	0	7,118	0	10,678
Current retirement plan loan (%)	9.8	1.6	7.4	2.1
Correctly answer 3 financial literacy Qs (%)	60.8	59.9	73.6	62.0
Cannot pay $2,000 emergency expense (%)	15.1	11.6	12.3	9.2

F Survey Instrument and Additional Details of Survey Design

On August 9th 2023, we fielded a Qualtrics survey among employees of the university described in Section I and analyzed in Section II. The survey was created with input from the University's Human Resources Department and was approved by the University of Virginia's IRB. The survey was open between August 9th and August 23rd 2023. The survey involved 40 questions and two experimental treatments. We describe the experimental design and present balance tests after showing the survey instrument below.

We collected email addresses, income, job type, and demographics from publicly available websites. 1,890 people completed the survey out of 18,364 invitations sent, for a response rate of 10.3%. Our approved IRB proposal specified that we planned to send two reminders after the initial email. However, after sending the initial survey invitation, we were contacted by the Provost's office requesting that we not send any reminders and so no reminders were sent.

The following text was included in the body of an email with a link to the survey. The subject line of the email was "Survey on health insurance and retirement decisions" and it was sent by Leora Friedberg.

Hello, we are conducting research (IRB-SBS #5331) that examines how people make choices about health insurance and retirement saving. As part of our research, we are conducting this survey among approximately half of UNIVERSITY NAME employees.

We request your participation in the survey. The survey is completely voluntary, as is answering each question. Your answers and identity as a participant will be kept confidential and will not be shared with anyone outside of this research project.

As a reward for participating in the survey, we are providing 50 randomly selected people the chance to receive up to $350[$200] each. Each of these winning participants will receive a payment of $150 for completing the survey and have the chance to earn up to $200[$50] more based on their answers to additional questions involving financial decisions.

Please click on the link below to complete our brief online survey. The estimated time to take this survey is 15 minutes and will be available to you for up to 14 days from today. Participants must be aged 18 or older. The survey is designed to work on either a computer or a mobile device.

If you would like to contact the research team, you may do so based on the information below.

Leora Friedberg, PhD
Department of Economics, University of Virginia
P.O. Box 400182
Charlottesville, VA 22903
Phone: ###-###-####
Email: lf6s@virginia.edu

Adam Leive, PhD
Goldman School of Public Policy, UC-Berkeley
2607 Hearst Avenue, Berkeley, CA 94720
Phone: ###-###-####

Email: leive@berkeley.edu

Follow this link to the Survey:
Take the Survey

Participants clicking the link are taken to the study consent page and the following survey:

Study Title: Understanding Health Insurance and Retirement Saving Choices
Protocol #: UVA IRB-SBS 5331
Please read this study information sheet carefully before you decide to participate in the study.

Purpose of the research study: The purpose of the study is to better understand the reasons behind employee decision-making in health insurance and retirement saving.

What you will do in the study: The survey asks about 30 questions regarding workplace benefits, household finances, and approaches to financial decision-making. You may skip any question that makes you uncomfortable and stop the survey at any time.

Time required: The study is estimated to take about 15 minutes of your time.

Risks: There are no anticipated risks in this study.

Benefits: There are no direct benefits to you for participating in this research study. The study may help you consider different aspects of health insurance and saving benefits you receive through UNIVERSITY NAME. The study may help researchers understand the factors related to choices in health insurance and retirement saving.

Payment: As a reward for participating in the survey, we are providing 50 randomly selected people the chance to receive up to $[350/200] each. Each of these winning 50 participants will receive a payment of $150 for completing the survey and have the chance to earn up to $[200/50] more based on their answers to additional questions involving financial decisions. A computer will be used to randomly select the 50 participants. The survey will be emailed to approximately 9,500 people, so, for example: if 2,500 people complete the survey, your chance of winning will be 1 in 50. The odds will be no worse than 1 in 190. If you are selected for payment, you will be contacted (separately from the survey) to provide your Social Security Number (SSN) for tax purposes.

Confidentiality: The information that you give in the study will be kept confidential. Your name will not be collected. Your email address is only collected in case you opt in to be randomly selected for payment. You must provide a valid UNIVERSITY NAME email address to be eligible for payment; that email address will be assigned a code number, and the list connecting your email address to this code will be kept in a locked file. When the study is completed and the data have been analyzed, this list will be destroyed. Your name and email address will not be used in any report. No identifying information will be included in the final dataset used by the research team to conduct analysis.

Voluntary participation: Your participation in the study is completely voluntary. Your decision to participate will have no effect on your employment.

Right to withdraw from the study: You have the right to withdraw from the study at any time without penalty. Withdrawing will not affect your experience as an employee.

How to withdraw from the study: If you want to withdraw from the study, you can exit the survey at any time. There is no penalty for withdrawing. Withdrawing will not affect your experience as an employee. If you choose to withdraw after completing the survey, you can email Leora Friedberg and Adam Leive at the email addresses provided below with the subject line "Request to withdraw from study."

Using data beyond this study: The data will not be used beyond the original study and will only be reported in the aggregate. The data you provide in this study will be retained in a secure manner by the researcher for 5 years and then destroyed.

If you have questions about the study, contact:
Leora Friedberg, PhD
Department of Economics, University of Virginia
P.O. Box 400182
Charlottesville, VA 22903
Phone: ###-###-####
Email: lf6s@virginia.edu

Adam Leive, PhD
Goldman School of Public Policy, UC-Berkeley
2607 Hearst Avenue, Berkeley, CA 94720
Phone: ###-###-####
Email: leive@berkeley.edu

To obtain more information about the study, ask questions about the research procedures, express concerns about your participation, or report illness, injury or other problems, please contact:

Tonya R. Moon, Ph.D. Chair, Institutional Review Board for the Social and Behavioral Sciences
One Morton Dr Suite 400
University of Virginia, P.O. Box 800392
Charlottesville, VA 22908-0392
Telephone: ###-###-####
Email: irbsbshelp@virginia.edu
Website: https://research.virginia.edu/irb-sbs
Website for Research Participants: https://research.virginia.edu/research-participants
UVA IRB-SBS # 5331

You may print a copy of this consent for your records.
Please check this box to indicate that you are 18 or older, that you have read the above information, and that you are willing to take part in the study:

☐

Q1: Which best describes your employment type?

- Faculty
- Staff or Administration

Q2a: [if Q1=Faculty] Which best describes your faculty employment?

- Full-time, tenured
- Full-time, tenure-track
- Full-time, non-tenure track
- Part-time with benefits
- Part-time without benefits [Go to Q38]

Q2b: [if Q1=Staff] Which best describes your staff or administration employment?

- Full-time with benefits
- Full-time without benefits [Go to Q38]
- Part-time with benefits
- Part-time without benefits [Go to Q38]

Q3: Which division best describes where you work?

- Academic division
- Medical division
- Both Academic and Medical division

Q4: What year did you first begin working at UNIVERSITY NAME?

- Prior to 2002
- 2002–2012
- 2013
- 2014
- 2015
- 2016
- 2017
- 2018
- 2019
- 2020
- 2021
- 2022
- 2023

Q5: What is your age?

- Younger than 30

- ○ 30–34
- ○ 35–39
- ○ 40–44
- ○ 45–49
- ○ 50–54
- ○ 55–59
- ○ 60–64
- ○ 65–69
- ○ 70–74
- ○ 75 or older

In this section we would like to ask you some questions about your income, retirement saving, and personal finances, since financial factors can play a critical role in benefits choices.

Q6: What is your approximate annual household income?

- ○ Less than $25,000
- ○ $25,000 to $49,999
- ○ $50,000 to $74,999
- ○ $75,000 to $99,999
- ○ $100,000 to $124,999
- ○ $125,000 to $149,999
- ○ $150,000 to $199,999
- ○ $200,000 to $299,999
- ○ $300,000 and higher
- ○ Not sure
- ○ Prefer not to answer

Q7: UNIVERSITY NAME offers additional retirement saving options that you can make contributions to via payroll deductions. UNIVERSITY NAME offers a 403(b) plan administered by either TIAA or Fidelity. There is also a 457 account, which is a state-run plan, that is administered by Mission Square. Have you previously contributed to any of the following supplemental retirement plans through UNIVERSITY NAME?

- ○ Yes, 403(b) savings plan only
- ○ Yes, 457 savings plan only
- ○ Yes, both 457 and 403(b) savings plans
- ○ Yes, but not sure in which plan
- ○ Not sure
- ○ No

Q8 [If Q7 $\neq$ No]: Approximately, how much money are you contributing to these supplemental accounts in total in 2023? Please consider combined contributions to the 403(b) and 457 plans over the entire year. Enter your contributions as either dollars or as a percentage of your salary (whichever you can report most accurately):

- _____ Enter dollar amount
- _____ Enter % amount
- Not sure

Q9: Which of the following do you believe is true about the supplemental 403(b) plan offered through UNIVERSITY NAME? [Random order until "Not sure"]

- UNIVERSITY NAME matches some of my contributions up to a limit
- UNIVERSITY NAME does not match any of my contributions
- Not sure

Q10: What is the approximate amount of your total household retirement assets? Include assets in all of your household's Individual Retirement Accounts (IRAs), 401(a)s, 401(k)s, 403(b)s, 457s from past and current jobs.

- Less than $25,000
- $25,000 to $99,999
- $100,000 to $249,999
- $250,000 to $749,999
- $750,000 or greater
- Not sure

Q11: How much time did you spend last year deciding how much to save for retirement?

- Less than 5 minutes
- 5–9 minutes
- 10–29 minutes
- 30–59 minutes
- 1 hour or longer

Q12: Do you believe your household's long-run finances (dealing with kids' college, retirement planning, allocation of savings/investments, etc.) would improve if your household paid more attention to them?

- Yes, and I often regret not paying greater attention
- Yes, but paying more attention would require too much time/effort
- No, my household long-run finances are set up so that they don't require much attention
- No, my household is already very attentive to these matters
- No, these choices are too difficult no matter how much attention I devote

Q13: How confident are you that you could come up with $2,000 if an unexpected need arose within the next month?

- I am certain I could come up with the full $2,000
- I could probably come up with $2,000
- I could probably not come up with $2,000

- ◦ I am certain I could not come up with $2,000
- ◦ Don't know

Health insurance is one of the most important benefits employees have access to through their employer. In this section we would like to ask you about your health insurance plan this year (in 2023).

Q14: Are you currently covered by UNIVERSITY NAME health insurance in 2023?

- ◦ Yes [go to Q15]
- ◦ No [go to end of survey]
- ◦ Not sure [go to Q15]

Q15: Who is covered through the UNIVERSITY NAME health insurance plan?

- ◦ Only myself
- ◦ Myself and my spouse/partner only
- ◦ Myself and my children only
- ◦ My whole family (i.e. myself, my spouse/partner, and children)

Q16 What is the name of the health insurance plan you chose?

(**Note:** IN THE DESCRIPTION AND RESPONSES BELOW, THE ORDER OF PLAN L AND PLAN H WAS RANDOMIZED. RESPONDENTS EITHER SAW (1) L, M, H OR (2) H, M, L FOR BOTH THE DESCRIPTION AND THE RESPONSES. THE SURVEY INCLUDED THE ACTUAL PLAN NAMES INSTEAD OF PLAN L, PLAN M, OR PLAN H.)

As a reminder:

- PLAN H has the lowest deductible and highest premium
- PLAN M has an intermediate deductible and intermediate premium
- PLAN L has the highest deductible and lowest premium, and provides access to a Health Savings Account (HSA)

Premiums are the amount the employee contributes from each paycheck to pay for health plan enrollment. The deductible is the amount you pay before your plan begins to pay for health care costs.

- ◦ PLAN H
- ◦ PLAN M
- ◦ PLAN L
- ◦ Not sure

Q17 How much would UNIVERSITY NAME contribute to your HSA if you chose PLAN L?

- ◦ Less than $500
- ◦ $500 to $999

- $1,000 to $1,499
- $1,500 to $1,999
- $2,000 or more
- Not sure

Q18 Please rank the extent to which you agree or disagree with the following statements [5 categories from Strongly Disagree to Strongly Agree]

- I would rather pay more in premiums up front, and pay less out of pocket, each time I use health care services, because it helps me plan a budget
- I would rather have a lower deductible than a lower premium, so that in case I get sick, I do not have to think about whether I should pay out of pocket to use health care services

Q19 Which of the following statements do you believe is true about the Health Savings Account (HSA)? [Random order until "Not sure"]

- Funds in the Health Savings Account roll over from year to year
- If I don't use funds in a given year, they will be lost
- Not sure

Q20a [If Q16 $\neq$ PLAN L]: PLAN L, with its higher deductible and Health Savings Account, is quite different than the other two plans. Why did you decide not to choose PLAN L in 2023? Choose all that apply. [Random order until "Not sure"]

- Deductible was too high
- Expected to have high medical spending in 2023
- Expected to have low medical spending in 2023
- Thought managing payments from the HSA would be a hassle or confusing
- Thought the funds in the HSA could not be carried over
- I do not have any experience with a high deductible plan or HSA
- I worried about paying large out-of-pocket expenses all at once
- I was recommended not to choose it
- Not sure
- Other [Please elaborate in the space provided] [free response]

Q20b [If Q16 $=$ PLAN L]: PLAN L, with its higher deductible and Health Savings Account, is quite different than the other two plans. Why did you decide to choose PLAN L in 2023? Choose all that apply. [Random order until "Not sure"]

- Premiums were low
- Expected to incur high medical spending in 2023
- Expected to incur low medical spending in 2023
- For the tax benefits of the Health Savings Account
- Unused HSA balances roll over each year
- It was recommended to me

- Not sure
- Other [Please elaborate in the space provided] [free response]

Q21 Approximately how much money did you and your family collectively incur on out-of-pocket payments for health care services in 2022? *Exclude* any money spent on health insurance premiums.

- $0 - $499
- $500 - $1,999
- $2,000 - $4,999
- $5,000 or higher

Q22 How much time did you spend last year choosing a health insurance plan?

- Less than 5 minutes
- 5–9 minutes
- 10–29 minutes
- 30–59 minutes
- 1 hour or longer

Q23 What sources of information did you use last year (in 2022) to make decisions about your health insurance plan? Select up to 3 that you used.

- Research I did myself
- Information distributed from Human Resources
- Recommendation from decision tool from Human Resources
- Recommendation from a coworker, friend, or family member
- Other source
- I just chose what I did the previous year

Q24 Do you believe your household's health insurance choices would improve if you paid more attention to them?

- Yes, and I often regret not paying greater attention
- Yes, but paying more attention would require too much time/effort
- No, my household is already very attentive to these matters
- No, these choices are too difficult no matter how much attention I devote

Q25 People are busy these days and do not always have time to research benefit options. While some have time to pay attention to their options, others may not even have time to read survey questions carefully. To show that you have read carefully, please select "December" as your choice option. That's right, there is no question here – just select " December" to show you were reading carefully.

During which month, if any, did you attend an information session by Human Resources about your 2023 benefits?

- ○ September
- ○ October
- ○ November
- ○ December
- ○ Cannot remember
- ○ Did not attend any session

Next, we would like to ask you a few questions on financial literacy. You may use whatever approaches you would like to answer these questions.

Q26: Suppose you had $100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow?

- ○ More than $102
- ○ Exactly $102
- ○ Less than $102
- ○ Not sure

Q27: Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account?

- ○ More than today
- ○ Exactly the same
- ○ Less than today
- ○ Not sure

Q28: Buying a single company's stock usually provides a safer return than a stock mutual fund.

- ○ True
- ○ False
- ○ Not sure

Note: ALL RESPONDENTS SEE THE FOLLOWING PROMPT FIRST

In this section, we ask you to consider hypothetical choices of health insurance plans. Suppose there are three health plans that differ in their premiums and deductibles, but are otherwise equivalent. For example, plans provide access to the same doctors and hospitals.

- Plan 1 has the highest premium and lowest deductible.
- Plan 2 has a lower premium than Plan 1 but a higher deductible.
- Plan 3 has the lowest premium and the highest deductible.

Note: RESPONDENTS THEN SEE TWO QUESTIONS. THE ORDER OF WHICH QUESTION COMES FIRST IS RANDOMIZED ACCORDING TO THE FOLLOWING GROUPS:

- MENU TREATMENT 1: Q29 THEN Q30
- MENU TREATMENT 2: Q30 THEN Q29
- MENU TREATMENT 3: Q29 THEN Q31
- MENU TREATMENT 4: Q31 THEN Q29

Q29: *The table below lists the premiums, deductibles, coinsurance, and out-of-pocket maximum for each plan. Assume that any taxes have already been paid on each of these amounts. Plans provide access to the same doctors and hospitals.*

As a reminder, premiums are the amount the employee contributes from each paycheck to pay for health plan enrollment. Premiums are not included as contributions toward the deductible or out-of-pocket maximum. Premiums are money the employee spends on health coverage, regardless of whether the employee uses health care. The deductible is the amount you pay before your plan begins to pay for health care costs; then, the employee and the health plan share the cost of services (coinsurance), up to the out-of-pocket maximum. A coinsurance rate of 20% means that the employee pays 20% of the costs and the plan pays 80%. Once the employee reaches their out-of-pocket maximum, the health plan pays for covered services at 100% for the rest of the year.

[**Note:** If Q15 $\neq$ "Only myself", the following table and spending distribution is shown. Otherwise, the graphic and distribution presented in the main text is shown.]:

	Plan 1	Plan 2	Plan 3
Monthly premium	\$379	\$243	\$93
Annual Deductible	\$1,000	\$2,000	\$4,000
Coinsurance Rate	10%	15%	20%
Annual out-of-pocket maximum	\$10,000	\$10,000	\$10,000
Employer HSA contribution	\$0	\$0	\$1,500

For the purpose of choosing a plan, suppose there are three possible scenarios of how much health care you use. Which scenario occurs is uncertain.

1. You are healthy next year and use \$1,000 of health care (50% probability)

2. You use $3,000 of health care (45% probability)
3. You end up using $15,000 of health care (5% probability)

Which health plan would you choose?

- ○ Plan 1
- ○ Plan 2
- ○ Plan 3
- ○ Not sure

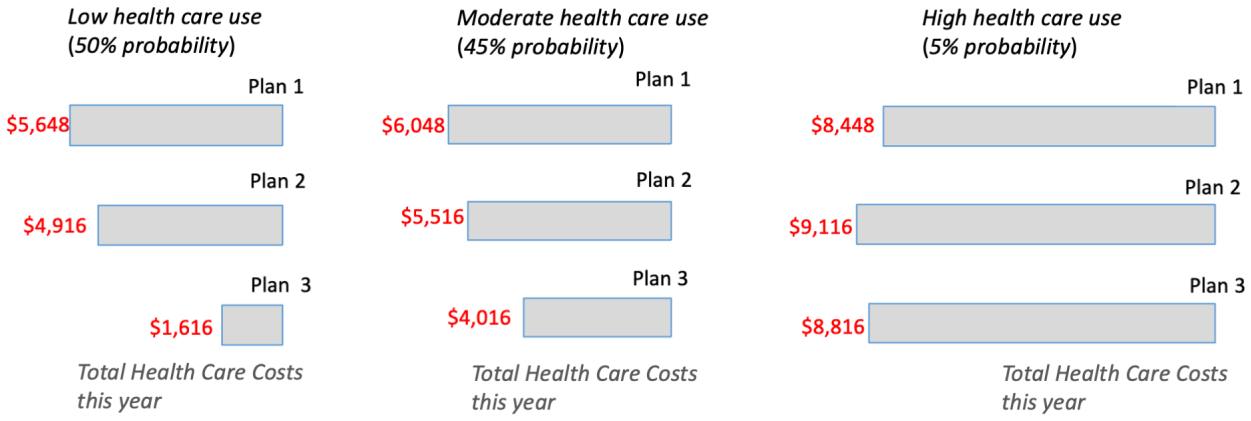
Q30: *The graphic below shows your health care costs (premiums and out-of-pocket payments) for each plan under three possible scenarios, which are uncertain:*

1. You are healthy next year and have low use of health care (50% probability)
2. or you use a moderate amount of health care (45% probability)
3. or you end up using a large amount of health care (5% probability)

Assume that any taxes have already been paid on each of these amounts. Plans provide access to the same doctors and hospitals.

[**Note:** If Q15 $\neq$ "Only myself", the following table and spending distribution is shown. Otherwise, the graphic and distribution presented in the main text is shown.]:

Plan 1: highest premium, lowest deductible
Plan 2: premium and deductible between Plan 1 and Plan 3
Plan 3: lowest premium, highest deductible



Which health plan would you choose?

- ○ Plan 1
- ○ Plan 2
- ○ Plan 3
- ○ Not sure

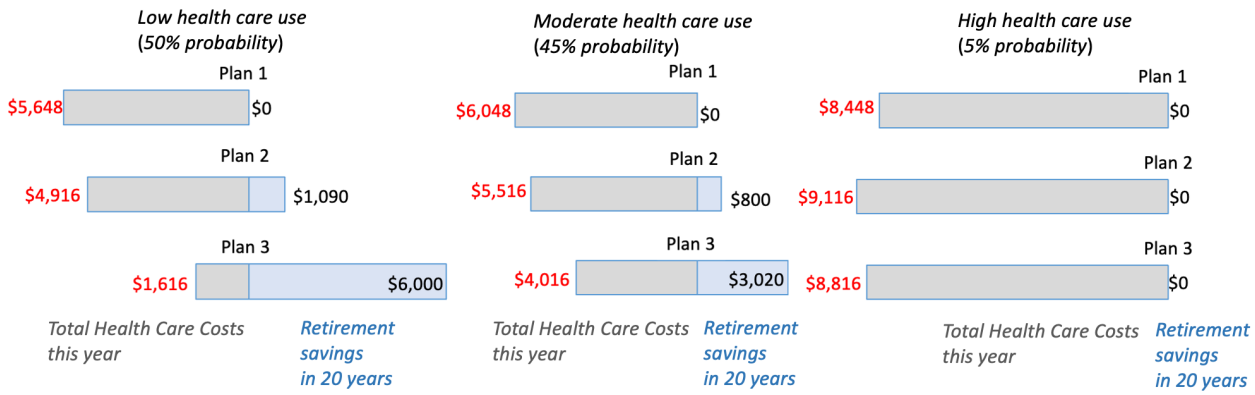
Q31: *The graphic below shows your health care costs (premiums and out-of-pocket payments) for each plan under three possible scenarios, which are uncertain:*

1. You are healthy next year and have low use of health care (50% probability)
2. or you use a moderate amount of health care (45% probability)
3. or you end up using a large amount of health care (5% probability)

The figure also displays the amount of additional retirement savings after 20 years when choosing plan 2 or plan 3 compared to plan 1 if the difference in health care costs were contributed to the retirement account. Assume that any taxes have already been paid on each of these amounts. Plans provide access to the same doctors and hospitals.

[**Note:** If Q15 $\neq$ "Only myself", the following table and spending distribution is shown. Otherwise, the graphic and distribution presented in the main text is shown.]:

Plan 1: highest premium, lowest deductible
Plan 2: premium and deductible between Plan 1 and Plan 3
Plan 3: lowest premium, highest deductible



Which health plan would you choose?

- ○ Plan 1
- ○ Plan 2
- ○ Plan 3
- ○ Not sure

Note: IN THE NEXT QUESTION, THE PAYMENTS ARE RANDOMIZED ACCORDING TO THE FOLLOWING GROUPS, WHERE "X", "Y", and "Z" CORRESPOND TO DOLLAR AMOUNTS IN THE QUESTION PROMPT:

OPT-OUT TREATMENT 1: X = $200, Y = $350, Z = $40
OPT-OUT TREATMENT 2: X = $50, Y = $200, Z = $10

This is the final set of questions on financial choices in the survey. It is an optional task that has 5 questions. If you are randomly selected to be one of the 50 participants to receive $150, you can earn up to an additional $X bonus (for a total of $Y) based on correctly answering the 5 questions in this task, with each question worth $Z. If you are randomly selected and choose to skip this set of questions, you will still receive $150 for completing the survey.

First, there are three questions that ask you to choose a health insurance plan for a hypothetical person who wants to minimize their spending on premiums and out-of-pocket payments. Next, there are two questions asking you about how much money will accumulate over time from monthly saving.

For all the questions, you can use a calculator, online tools, or any other approach you would like to answer the question.
Q32: Do you want to attempt the questions to have a chance to earn the bonus money, or skip to the final survey questions?

- ○ Yes, attempt questions [Go to Q33]
- ○ No, skip to end [Go to Q38]

Recommending a health plan

Q33: This question asks you to recommend a health plan to a friend.

- Your friend's employer offers three health plans, which differ based on the table below. All other features of the plans (e.g. which physicians are covered) are the same.
- Your friend tells you they want to minimize how much they spend on insurance premiums and out-of-pocket costs.
- Your friend has very predictable expenses – in fact, they know exactly how much care they will use. They will be billed for health care services amounting to $1,500.
- Insurance will cover some of this amount, and they will have to pay some of it out-of-pocket. The amount they pay out-of-pocket and the amount the insurance plan pays will depend on which plan they choose. Your friend is in the 25% tax bracket.

You may use whatever tools, calculators, or approaches you would like to answer the following questions. Here are some reminders:

- **Premiums** are the amount the employer deducts from each paycheck to pay for health plan enrollment. Premiums are not included as contributions toward the deductible or out-of-pocket maximum. Premiums are money the employee spends on health coverage,

regardless of whether the employee uses health care. The **deductible** is the amount you pay before your plan begins to pay for health care costs.; then the employee and the health plan share the cost of services (coinsurance), up to the out-of-pocket maximum. A **coinsurance rate** of 20% means that the employee pays 20% of the costs and the plan pays 80%. Once the employee reaches their **out-of-pocket maximum**, the health plan pays for covered services at 100% for the rest of the year.

	Plan 1	Plan 2	Plan 3
Monthly premium	$284	$168	$42
Annual Deductible	$500	$900	$2,000
Coinsurance Rate	10%	20%	20%
Annual out-of-pocket maximum	$5,000	$5,000	$5,000
Employer HSA contribution	$0	$0	$1,500

Which plan would you advise your friend to choose to minimize how much they will spend on insurance premiums and out-of-pocket costs?

- ○ Plan 1
- ○ Plan 2
- ○ Plan 3

Q34: Now suppose that your friend instead knows they will consume more health care than in the previous scenario. Suppose they know they will be billed for health care services amounting to $8,000.

Everything else about the insurance choices remain the same. The amount they pay out-of-pocket and the amount the plan pays will again depend on which plan they choose. Your friend is in the 25% tax bracket. The plan options and definitions are presented below for convenience.

Note: THE TABLE AND DEFINITIONS IN Q33 ARE OMITTED HERE FOR BREVITY BUT INCLUDED PRIOR TO THE FOLLOWING QUESTION

Which plan would you advise your friend to choose to minimize how much they will spend on insurance premiums and out-of-pocket costs?

- ○ Plan 1
- ○ Plan 2
- ○ Plan 3

Q35: Now suppose that your friend instead knows they will consume more health care than in the previous scenario. Suppose they know they will be billed for health care services amounting to $30,000.

Everything else about the insurance choices remain the same. The amount they pay out-of-pocket and the amount the plan pays will again depend on which plan they choose. Your friend is in the

25% tax bracket. The plan options and definitions are presented below for convenience.

Note: THE TABLE AND DEFINITIONS IN Q33 ARE OMITTED HERE FOR BREVITY BUT INCLUDED PRIOR TO THE FOLLOWING QUESTION

Which plan would you advise your friend to choose to minimize how much they will spend on insurance premiums and out-of-pocket costs?

- ○ Plan 1
- ○ Plan 2
- ○ Plan 3

Choosing how much to save

The final two questions in this section ask you to calculate the growth from monthly saving. You may again use whatever tools, calculators, or approaches you would like.

Q36: Suppose your friend's employer offers them a 401(k). Contributions are tax-deductible and interest earned on account assets are not taxable. Withdrawals are fully taxable. Your friend tells you they can save $100 per month for 20 years. If the account earns 3 percent interest per year and interest is compounded monthly, how much will they have at the end of 20 years before paying taxes? Enter the amount below, rounded to the nearest $1,000:
_____ Enter dollar amount

Q37: Now suppose your friend decides to save an extra $50 each month (for a total of $150 per month). Their account still earns 3 percent interest per year and interest is compounded monthly, and interest earned on account assets are not taxable. How much will they have at the end of 20 years before paying taxes? Enter the amount below, rounded to the nearest $1,000:
_____ Enter dollar amount

This final section asks you a few brief questions about your demographics.

Q38: What is your gender identity?

- ○ Woman
- ○ Man
- ○ Nonbinary or different identity
- ○ Prefer not to answer

Q39: What is your marital status?

- ○ Married
- ○ Not married
- ○ Prefer not to answer

Q40: What race/ethnicity do you identify with? Please select all that apply

- ○ American Indian or Alaska Native
- ○ Asian
- ○ Black or African American
- ○ Hispanic or Latino/a/x
- ○ Middle Eastern or North African
- ○ Native Hawaiian or Pacific Islander
- ○ White
- ○ Prefer not to answer

THANK YOU FOR COMPLETING THE SURVEY

Characteristics of Survey Respondents: Table F.1 reports salary, demographics, and job characteristics of survey respondents and non-respondents. We collected data on salary, job titles, and departments matched to each employee's email address. We impute race and gender using validated algorithms based on first and last names. The first three rows present the predicted probabilities of benefits choices from a linear regression of the choice against the characteristics in the table. These predictions are nearly equal across survey respondents and non-respondents, indicating that the influence of observable characteristics on choices is similar across groups. The differences in salary are small and not statistically significant. The differences in other characteristics are statistically significant, but are small in magnitude. Survey respondents are more likely to be women, White, staff, and work in the medical division. While we interpret respondents to be fairly similar to non-respondents in terms of characteristics that influence choices, we also perform analysis that weights respondents by their inverse probability of responding based on a logit regression of responses against these characteristics. Results are very similar whether or not we use these weights.

Table F.1: Characteristics of Survey Respondents

	Respondents	Non-Respondents
Predicted probability of dominated health plan (%)	56.4	56.4
Predicted probability of foregoing match (%)	15.8	16.0
Predicted probability of dominated plan & forego match (%)	10.1	10.3
Salary ($)	84,465	82,750
Faculty (%)	14.1%	18.8%
Staff (%)	88.8%	86.0%
Professor (%)	10.5%	13.5%
Medical division (%)	58.7%	54.3%
Asian (%)	4.5%	7.0%
Black (%)	13.1%	14.3%
Hispanic (%)	4.4%	5.0%
White (%)	75.5%	71.0%
2+ race/ethnicity (%)	1.7%	1.9%
Female (%)	68.6%	60.8%

Choice Patterns in 2023: Table F.2 presents regression results of linear probability models that correlate the choice of a dominated health plan with the choice of not contributing to supplemental retirement accounts using the 2023 survey. Standard errors are in parentheses. The first two columns include all survey respondents. The final two columns are restricted to those who pass the attention check. Columns 2 and 4 include indicators for age, income, tenure, gender, race, faculty, marital status, academic division, and insurance coverage type as controls. The positive correlation during 2014–2018 documented in the main text is also observed in 2023.

Table F.2: Linear Probability Model: Choices Across Domains, 2023 survey

	Dep var: Forego retirement match			
Choose dominated health plan	0.067	0.055	0.061	0.060
	(0.018)	(0.018)	(0.022)	(0.022)
Constant	0.121	0.127	0.121	0.120
	(0.011)	(0.012)	(0.013)	(0.013)
Controls	No	Yes	No	Yes
Restricted to passing attention check	No	No	Yes	Yes
N	1621	1601	1086	1077

Randomization and Balance: Participants were cross-randomized across the two treatments into eight possible conditions. At this university, employees are automatically assigned email addresses that include their initials followed by a portion with digits and letters that are randomly assigned. To assign each email address to one of the eight treatment groups, we made a crosswalk that randomly assigned each combination of these digits and letters to one of the eight groups. We tested for balance before running the survey by verifying that each group was similar in terms of demographics and job characteristics. Table F.3 shows that among the employees invited to participate in the survey, these characteristics are balanced across experimental conditions. Table F.4 shows the corresponding balance table among survey respondents. These characteristics are also balanced.

Table F.3: Balance Table: Survey Invitations

	Experimental groups								
Menu Treatment	1	2	3	4	1	2	3	4	p-value
Opt-Out Treatment	1	1	1	1	2	2	2	2	from F-test
Faculty (%)	0.192	0.176	0.191	0.176	0.183	0.177	0.181	0.175	0.625
Staff (%)	0.857	0.867	0.853	0.869	0.868	0.868	0.859	0.867	0.609
Professor (%)	0.129	0.129	0.142	0.130	0.135	0.130	0.130	0.123	0.717
Medical division (%)	0.549	0.545	0.541	0.547	0.560	0.563	0.539	0.544	0.692
Asian (%)	0.061	0.067	0.070	0.072	0.068	0.063	0.069	0.066	0.714
Black (%)	0.139	0.145	0.138	0.150	0.139	0.139	0.141	0.141	0.222
Hispanic (%)	0.050	0.051	0.045	0.048	0.051	0.047	0.045	0.056	0.404
White (%)	0.723	0.708	0.720	0.703	0.716	0.724	0.719	0.711	0.132
2+ race/ethnicity (%)	0.019	0.018	0.018	0.018	0.019	0.018	0.018	0.018	0.810
Female (%)	0.609	0.620	0.603	0.614	0.626	0.621	0.640	0.619	0.295
Salary ($)	84,064	82,248	84,561	83,973	82,828	82,928	80,830	81,691	0.393

Table F.4: Balance Table: Survey Responses

	Experimental groups								
Menu Treatment	1	2	3	4	1	2	3	4	p-value
Opt-Out Treatment	1	1	1	1	2	2	2	2	from F-test
Faculty (%)	0.152	0.136	0.167	0.124	0.170	0.121	0.130	0.124	0.455
Staff (%)	0.871	0.889	0.872	0.901	0.868	0.906	0.901	0.903	0.588
Professor (%)	0.121	0.104	0.139	0.099	0.115	0.075	0.092	0.094	0.269
Medical division (%)	0.583	0.599	0.563	0.558	0.604	0.632	0.573	0.584	0.665
Asian (%)	0.037	0.033	0.069	0.049	0.051	0.035	0.043	0.047	0.340
Black (%)	0.122	0.139	0.118	0.142	0.121	0.150	0.130	0.127	0.127
Hispanic (%)	0.055	0.042	0.036	0.060	0.038	0.042	0.034	0.042	0.303
White (%)	0.760	0.760	0.752	0.723	0.765	0.747	0.768	0.760	0.526
2+ race/ethnicity (%)	0.017	0.017	0.016	0.016	0.016	0.017	0.017	0.016	0.443
Female (%)	0.667	0.713	0.684	0.666	0.678	0.687	0.721	0.676	0.756
Salary ($)	88,753	85,856	86,711	83,188	84,510	82,190	76,506	86,820	0.124

G Additional Analyses of Mechanisms

This appendix presents additional analyses of mechanisms that are referenced in Section III and Section IV.

Reasons for Plan Choices: Table G.1 reports the reasons people report for not choosing the HDHP in the 2023 survey. The percentages sum to over 100% because respondents could select up to three reasons.

Table G.1: Reasons for Not Choosing HDHP/HSA

	All (%)	If pass attention check (%)
Worried about paying large out-of-pocket expenses all at once	43.0	47.3
Deductible was too high	26.6	30.0
Expected to have high medical spending	22.8	22.5
Thought managing the HSA would be a hassle or confusing	17.4	21.7
No experience with HDHP or HSA	17.5	19.9
Expected to have low medical spending	9.9	11.5
Not sure	6.5	5.2
Was recommended not to choose it	6.3	5.8
Thought HSA couldn't roll over	5.6	6.8
Other reason	14.4	17.9
	N= 800	N= 497

Benefits Knowledge and Financial Literacy: We estimate the association between benefits choices and our measures of benefits knowledge and financial literacy by running the following regressions (and repeat similar regressions below, as we test other mechanisms):

$$y_i = \alpha_0 + \sum_{j=1}^{3} \beta_j \cdot Know_i^j + \sum_{j=4}^{6} \beta_j \cdot FinLit_i^j + e_i \tag{G.1}$$

where y_i is an indicator for whether employee i makes a puzzling choice (choosing a dominated health plan, not making supplemental retirement contributions, or both), $Know_i^j$ is an indicator for whether employee i correctly answers the survey question about rule j, and $FinLit_i^j$ is an indicator for correctly financial literacy question j. Table G.2 presents the regression results. Columns 1–3 include benefits knowledge only and columns 4–7 add financial literacy as in Equation G.1. Domain-specific knowledge about benefits is an extremely strong predictor of choices in that domain. Those who know the HSA rolls over are 46.8 percentage points less likely to choose a dominated plan, and those who know the amount of the employer's HSA contribution are 31.1 percentage points less likely (column 1). Knowing the retirement match does little to predict choosing a dominated health plan after conditioning on knowledge about the HSA. Meanwhile, those who know the employer matches some 403(b) contributions are 33.3 percentage points less likely to have zero supplemental contributions (column 2). When considering both puzzling choices simultaneously, the coefficient on each type of benefits knowledge is negative and highly significant (column 3). Lastly, employees who correctly answer financial literacy questions are less likely to make both puzzling choices, and adding financial literacy only slightly reduces the coefficient estimates on benefits knowledge (column 4). The results are robust to adding controls (column 5), weighting by the inverse probability of survey responses (column 6), or restricting to those who pass the attention check (column 7).

Table G.2: Benefits Knowledge and Financial Literacy

	Dominated health plan	Forego retirement match	Dominated health plan AND forego retirement match				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Domain-specific knowledge							
Retirement match Q correct	0.006	-0.333	-0.194	-0.187	-0.178	-0.194	-0.167
	(0.024)	(0.030)	(0.025)	(0.025)	(0.025)	(0.030)	(0.029)
HSA rollover Q correct	-0.468	-0.056	-0.095	-0.087	-0.076	-0.071	-0.080
	(0.024)	(0.020)	(0.016)	(0.017)	(0.017)	(0.021)	(0.021)
Employer HSA funding Q correct	-0.311	0.011	-0.054	-0.048	-0.047	-0.053	-0.036
	(0.025)	(0.019)	(0.012)	(0.012)	(0.012)	(0.015)	(0.015)
Financial literacy							
Diversification Q correct				-0.034	-0.034	-0.017	-0.053
				(0.018)	(0.018)	(0.023)	(0.023)
Inflation Q correct				-0.035	-0.041	-0.049	-0.006
				(0.022)	(0.023)	(0.029)	(0.027)
Interest Q correct				-0.015	0.003	0.033	0.039
				(0.029)	(0.029)	(0.034)	(0.032)
Constant	0.861	0.454	0.324	0.376	0.350	0.332	0.290
	(0.023)	(0.030)	(0.027)	(0.037)	(0.038)	(0.043)	(0.046)
Controls	No	No	No	No	Yes	No	No
Survey response weights	No	No	No	No	Yes	Yes	No
Restrict to pass attention check	No	No	No	No	Yes	No	Yes
N	1643	1621	1621	1621	1607	1232	1080
R^2	0.436	0.141	0.129	0.136	0.180	0.206	0.182

Table G.3: Experimental Results: Opt-Out Task by Household Income

	Opted out	# of questions correct (if opted in)	Payment ($)
	(1)	(2)	(3)
Household inc. $<$ $125k	-0.035	-0.438	-7.651
	(0.014)	(0.081)	(2.811)
Constant	0.103	2.307	52.933
	(0.010)	(0.059)	(2.078)
Observations	1622	1482	1622
R^2	0.004	0.019	0.005

Notes: Column (1) presents a linear probability model (LPM) of the opt-out decision against an indicator for household income below $125,000. Column (2) presents results of the number of questions answered correctly among those who attempted them against household income. Column (3) presents payments (including zeros for those who opted out) against household income. Robust standard errors in parentheses.

Self-Assessed Attention and Choices: Figure G.1 correlates choices with responses to the questions about self-assessed attention and decision quality. Panel A presents the proportion of survey respondents who choose a dominated plan according to their response to the question: "*Do you believe your household's health insurance choices would improve if you paid more attention to them?*" Panel B presents the proportion who forego the retirement match according to their response to the question: "*Do you believe your household's long-run finances (dealing with kids' college, retirement planning, allocation of savings/investments, etc.) would improve if your household paid more attention to them?*" Whiskers denote 95% confidence intervals relative to the mean among respondents who say they are already very attentive to these matters.

Figure G.1: Insurance and Saving Choices by Attention

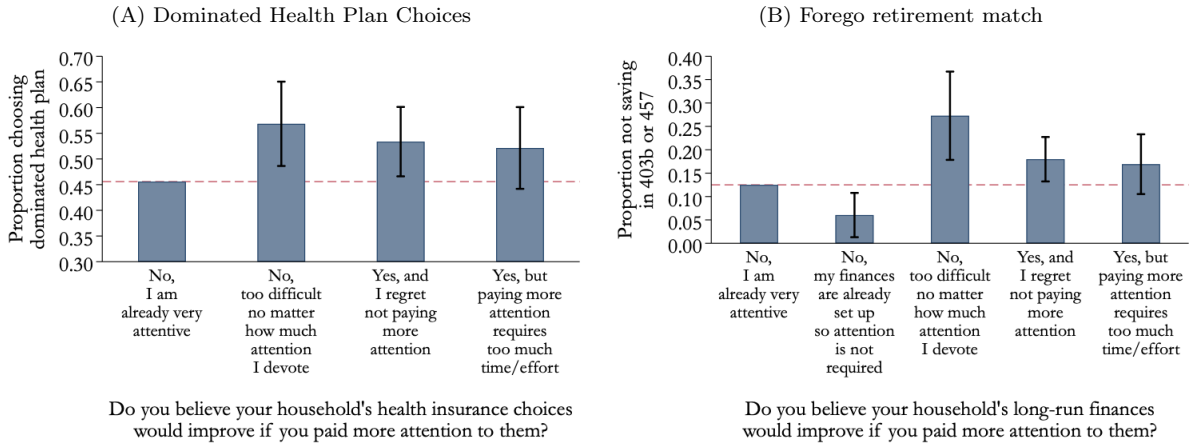


Figure G.2 shows how choices correlate with the time spent on each decision. There is little systemic relationship between time spent on health insurance choices and enrollment in dominated plans. By contrast, those who spent less than five minutes on their retirement saving decisions were substantially more likely to forego employer matching funds compared to those who spent more time on this choice.

Table G.4 reports the relationship between time spent on health insurance and retirement savings decisions. We pursue two approaches given that the responses include different lengths of time. The ordered probit specification (column 1) treats time as an ordinal variable, coding responses into five categories from least to most time spent without imposing assumptions about the spacing between time intervals. The OLS specification (column 2) treats the time responses as cardinal by assigning midpoint values to each bin (2.5, 7, 20, and 45 minutes) and assumes 75 minutes if the person reports spending an hour or longer. Across both specifications, respondents who report spending more time on one decision also report spending more time on the other. The OLS specification implies that an additional 10 minutes spent on health insurance is associated with approximately 4.7 additional minutes spent on retirement savings.

Figure G.2: Insurance and Saving Choices by Time Spent

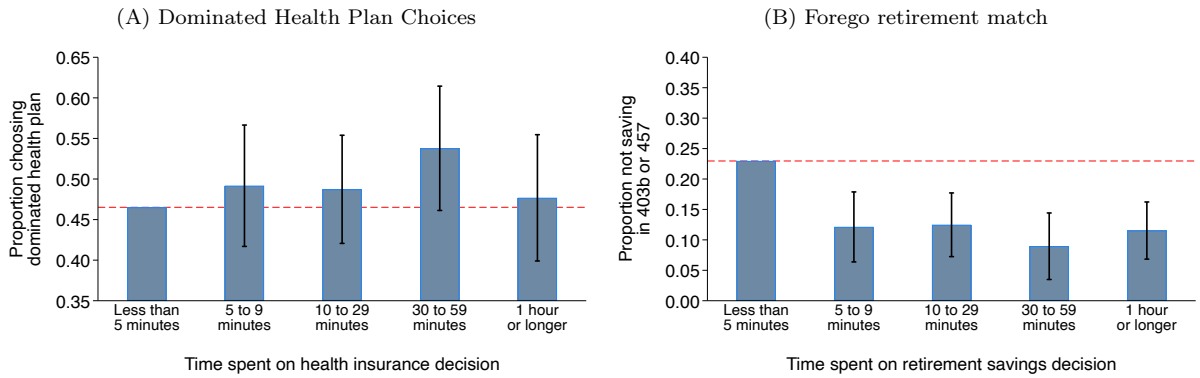
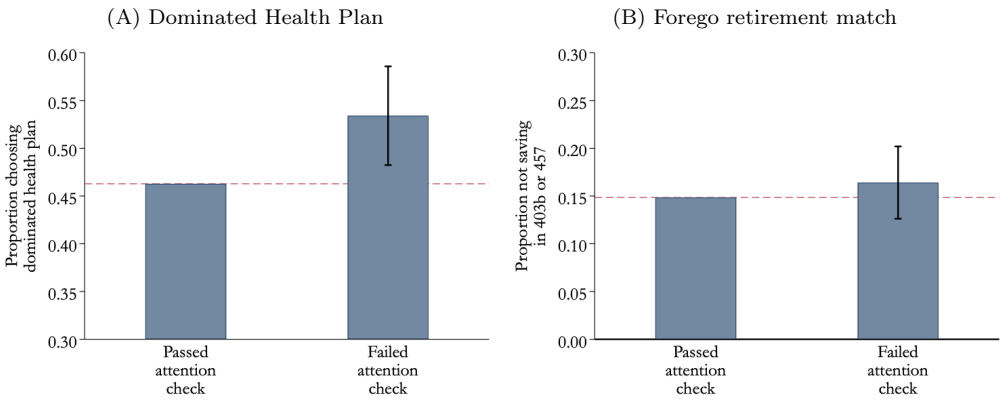


Table G.4: Correlation in Time Spent on Benefits Decisions

	Dep. Var: Time on Retirement Savings	
	(1) Ordered Probit	(2) OLS
Time on health decision (ordinal)	0.343	
	(0.023)	
Time on health decision (minutes)		0.472
		(0.029)
Constant		17.822
		(0.892)
cutpoint 1	0.438	
	(0.064)	
cutpoint 2	0.794	
	(0.067)	
cutpoint 3	1.295	
	(0.072)	
cutpoint 4	1.652	
	(0.077)	
Observations	1616	1616
Pseudo R^2	0.059	
R^2		0.161

Attention Check and Choices: Figure G.3 correlates benefits choices with whether the respondent passed the survey's attention check. Panel A presents the proportion of survey respondents who choose a dominated plan and Panel B presents the proportion who do not save in the 403b or 457. Whiskers denote 95% confidence intervals relative to the mean among respondents who pass the attention check. Respondents who fail the attention check are more likely to enroll in a dominated health plan. There is little change in retirement saving behavior according to whether the respondent failed the survey's attention check.

Figure G.3: Insurance and Saving Choices by Pass/Fail Attention Check



Complexity of Choices: We test the effect of simplification using between-subjects variation by running the OLS regression:

$$d_i = \gamma_0 + \gamma_1 \cdot FIGURE1_i + \gamma_2 \cdot FIGURE2_i + u_i \tag{G.2}$$

where $FIGURE1_i$ and $FIGURE2_i$ indicate that respondent i was assigned to first see either the figure with health care costs only or the figure that combined health care costs and future retirement savings. d_i is an indicator for choosing a dominated plan from the menu or being unsure of which plan to choose. As robustness, Table G.5 presents results for specifications that include controls, weight by survey response rates, and pass the attention check. Table G.6 replicates these specifications using both choices of each respondent.

Before estimating Equation G.2, we run a specification that includes indicators for each treatment arm to test whether the effect of menu simplification depends on the incentive in the opt-out task. We fail to reject the null that the coefficients on arms with the same menus but different opt-out incentives are equal, and so run Equation G.2 that pools treatment arms with different opt-out incentives.

Table G.5 presents the results of estimating Equation G.2 using the respondent's first choice of hypothetical health plan. Column 1 replicates Figure 6, Column 2 includes controls, Column 3 weights by the inverse probability of survey responses, and Column 4 restricts to respondents passing the attention check. The final two columns split the sample by household income and show that the reduction in dominated choices from menu simplification is larger for respondents with household incomes below $125,000. Table G.6 mirrors the same set of specifications using both choices of the respondent, clustering standard errors by respondent.

Table G.5: Effect of Menu Simplification, 1st choices

	Dependent variable: Choose dominated plan					
	(1)	(2)	(3)	(4)	(5)	(6)
Simplified frame: Figure 1	-0.096	-0.090	-0.103	-0.109	-0.045	-0.155
	(0.030)	(0.030)	(0.036)	(0.037)	(0.042)	(0.043)
Simplified frame: Figure 2	-0.002	0.014	0.032	0.009	0.050	-0.062
	(0.031)	(0.031)	(0.036)	(0.037)	(0.043)	(0.044)
Constant	0.545	0.539	0.546	0.507	0.489	0.609
	(0.017)	(0.017)	(0.020)	(0.022)	(0.024)	(0.025)
Controls	No	Yes	No	No	No	No
Survey response weights	No	No	Yes	No	No	No
Restricted to passing attention check	No	No	No	Yes	No	No
Household Income	All	All	All	All	≥$125k	<$125k
Observations	1618	1604	1240	1085	838	779

Table G.6: Effect of Menu Simplification, both choices

	Dependent variable: Choose dominated plan					
	(1)	(2)	(3)	(4)	(5)	(6)
Simplified frame: Figure 1	-0.064	-0.066	-0.066	-0.072	-0.063	-0.062
	(0.017)	(0.017)	(0.021)	(0.021)	(0.023)	(0.025)
Simplified frame: Figure 2	0.008	0.009	0.003	0.011	0.012	-0.001
	(0.018)	(0.018)	(0.021)	(0.022)	(0.026)	(0.026)
Constant	0.552	0.551	0.558	0.507	0.514	0.591
	(0.012)	(0.012)	(0.015)	(0.015)	(0.017)	(0.018)
Controls	No	Yes	No	No	No	No
Survey response weights	No	No	Yes	No	No	No
Restricted to passing attention check	No	No	No	Yes	No	No
Household Income	All	All	All	All	≥$125k	<$125k
Observations	3233	3205	2477	2168	1676	1555

Liquidity: Simulation of Consumption-Utility Model. We simulate choices under a model with liquidity constraints to assess the possibility that high borrowing costs might explain the choice of dominated health plans. Assume consumers have utility over consumption that satisfies constant relative risk aversion: $u(c) = \frac{c^{1-\gamma}}{1-\gamma}$ with γ denoting the coefficient of relative risk aversion. If they incur health spending m while enrolled in plan j, their out-of-pocket costs are $OOP^j(m)$. We assume spending occurs in only one month of the year, with an equal probability of occurring in any month. We consider two alternative scenarios regarding borrowing constraints.

Scenario 1: Borrowing at monthly rate r^b: First, we assume people are able to borrow up to the out-of-pocket maximum, but they may have to pay a high interest rate. In particular, we assume that the person is unable to finance any out-of-pocket payments (less any employer HSA contributions) without borrowing at the monthly interest rate r^b. If they borrow to finance out-of-pocket costs, they must repay the loan by the last month of the year. If the shock occurs in month k, the person borrows an amount $OOP^j(m)$ and repays $OOP^j(m)(1+r^b)^{12-k}$ at the end of the year. If they choose plan L, employer HSA contributions Z offset the amount that must be borrowed: they repay $(OOP^j(m) - H)(1+r^b)^{12-k}$ if $OOP^j(m) > Z$ and can pocket $Z - OOP^j(m)$ if $OOP^j(m) \leq Z$. Annual premiums π_j are excluded from taxable income y, so that a dollar of health insurance premiums reduces their consumption by $\$(1-\tau)$, where τ is the marginal tax rate. Their utility if they enroll in plan j is defined as:

$$u(c^j) = \frac{1}{12}\sum_{k=1}^{12}\int_0^\infty u((y-\pi_j)(1-\tau) - B^k(OOP^j(m)))dF(OOP^j(m))$$

where $dF(OOP^j(m))$ is the density of out-of-pocket payments from enrolling in plan j and

$$B^k(OOP^j(m)) = \begin{cases} (OOP^j(m))(1+r^b)^{12-k} & \text{if } j = H, M \\ (OOP^j(m) - Z)(1+r^b)^{12-k} & \text{if } j = L \text{ and } OOP^j(m) > Z \\ OOP^j(m) - Z & \text{if } j = L \text{ and } OOP^j(m) \leq Z \end{cases}$$

This formulation treats any HSA funds in excess of out-of-pocket costs as equivalent to a premium reduction. We use the empirical distribution of spending from the administrative data to predict plan choices for L, M, or H corresponding to the period analyzed in Section II. We calculate choices for each employee in the sample over a range of monthly borrowing constraints r^b from 0 to 16% (resulting in annualized interest rates up to 500%), using each employee's observed salary and assuming $\gamma = 2$ or $\gamma = 3$.

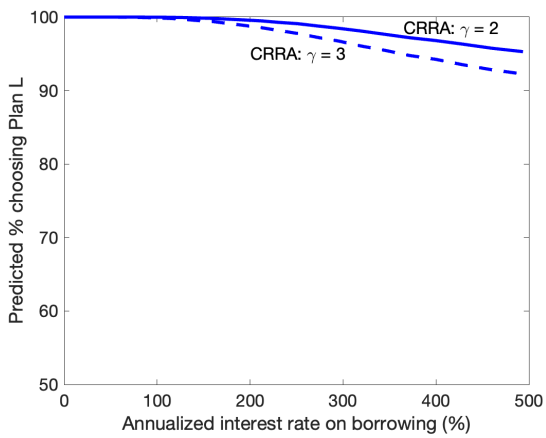
Scenario 2: No borrowing: The second scenario instead assumes that credit constraints prevent people from borrowing any money, no matter how high the interest rate. The out-of-pocket cost reduces consumption in that particular month and cannot be spread throughout the course of the year. To capture the effect of such uneven consumption throughout the year, utility over the course of the year is modeled as the sum of monthly utility, in which one month's utility is lower due to the out-of-pocket cost:

$$u(c^j) = 11 \cdot u((y-\pi_j)(1-\tau)) + \int_0^\infty u((y-\pi_j)(1-\tau) - OOP^j(m) + \mathbf{1}(j=L)Z)dF(OOP^j(m))$$

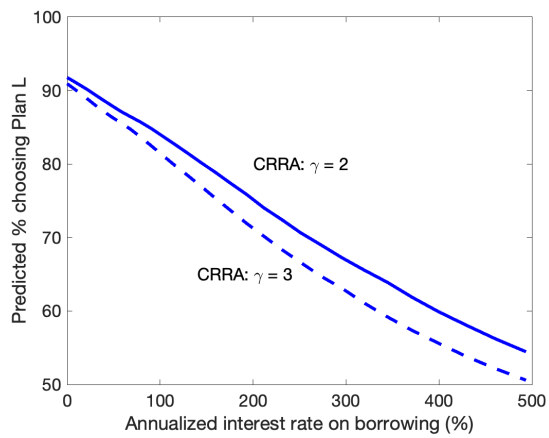
where $\mathbf{1}(j = L)$ is an indicator for choosing plan L. This specification ignores discounting within the year. We set a consumption floor of \$100 per month in case out-of-pocket payments and premiums exceed income.

Figure G.4: Simulated Choices of Plan L (2014–2018) vs. Borrowing Rates

(A) With employer HSA funding



(B) Without employer HSA funding



Notes: Figure plots predicted choices of plan L assuming that employees must borrow to finance out-of-pocket expenses. The calculations use each respondent's distribution of costs and salary, and predict choices as a function of annualized interest rate on borrowing. Appendix G provides details of the specification.

Table G.7 shows that far fewer people are predicted to choose Plan L when they are unable to borrow at all if risk aversion is high. The employer's HSA contribution is again central to offsetting the costs of high out-of-pocket payments, with 12% or less predicted to choose L if there were no HSA funding. This scenario suggests those who are unaware of the employer's HSA funding are unlikely to choose the HDHP if they face severe borrowing constraints.

Table G.7: Predicted % Choosing Plan L if Unable to Borrow

	CRRA Coefficient	
	$\gamma = 2$	$\gamma = 3$
With employer HSA funding	96.5	45.3
Without employer HSA funding	12.4	6.1

Liquidity: Survey Results. Table G.8 present regressions that show higher rates of puzzling choices among people who are liquidity constrained. We define an indicator equal to 1 if the person says they could probably not come up with \$2,000 for an emergency expense within 30 days, could certainly not come up with the money, or are unsure. Those who are unable to finance a \$2,000 emergency expense are 17.7 percentage points more likely to choose a dominated health plan, which is a 39% increase relative to the mean of 45.3% among those who are not constrained (column 1). They are also over 2.5 times less likely to save in the supplemental plan compared to those who are not constrained (31.2% vs. 11.6%, column 2), and they are more than 3 times as likely to make both puzzling choices (column 3). The relationship between liquidity and choices declines by almost half but remains strong and statistically significant after controlling for knowledge about benefits and financial literacy (column 4), as well as demographic controls (column 5), which include indicators

for household income, age, gender, marital status, non-white, academic division, faculty, and tenure with the employer. These results suggest that plan knowledge reduces, but does not eliminate, concerns among individuals who are liquidity constrained. The results are similar to weighting by the inverse probability of survey response rates (column 6) or restricting to those who pass the attention check (column 7).

Table G.8: Liquidity

	Dominated health plan	Forego retirement match	Dominated health plan AND forego retirement match				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Liquidity constrained	0.177	0.196	0.142	0.078	0.071	0.076	0.093
	(0.031)	(0.028)	(0.024)	(0.024)	(0.025)	(0.029)	(0.031)
Retirement match Q correct				-0.181	-0.175	-0.201	-0.168
				(0.024)	(0.024)	(0.029)	(0.029)
HSA rollover Q correct				-0.080	-0.072	-0.079	-0.085
				(0.017)	(0.017)	(0.021)	(0.021)
Employer HSA funding Q correct				-0.047	-0.046	-0.051	-0.032
				(0.012)	(0.012)	(0.015)	(0.014)
Diversification Q correct				-0.017	-0.022	0.008	-0.039
				(0.018)	(0.019)	(0.023)	(0.023)
Inflation Q correct				-0.025	-0.035	-0.039	0.009
				(0.022)	(0.022)	(0.028)	(0.027)
Interest Q correct				-0.004	0.012	0.022	0.029
				(0.028)	(0.028)	(0.034)	(0.033)
Constant	0.453	0.116	0.063	0.322	0.309	0.312	0.266
	(0.014)	(0.009)	(0.007)	(0.038)	(0.038)	(0.043)	(0.047)
Controls	No	No	No	No	Yes	No	No
Survey response weights	No	No	No	No	Yes	Yes	No
Restrict to pass attention check	No	No	No	No	Yes	No	Yes
Observations	1643	1621	1621	1621	1607	1242	1086
R^2	0.032	0.046	0.038	0.144	0.185	0.154	0.139

Table G.9 splits the sample by whether household income is below or above $125,000. For both income levels, liquidity is associated with dominated plan choices, foregoing retirement saving, and both behaviors simultaneously. The coefficient estimates are larger in relative terms for those with higher household income, indicating the importance of liquidity constraints in explaining choices are not only among those with lower incomes.

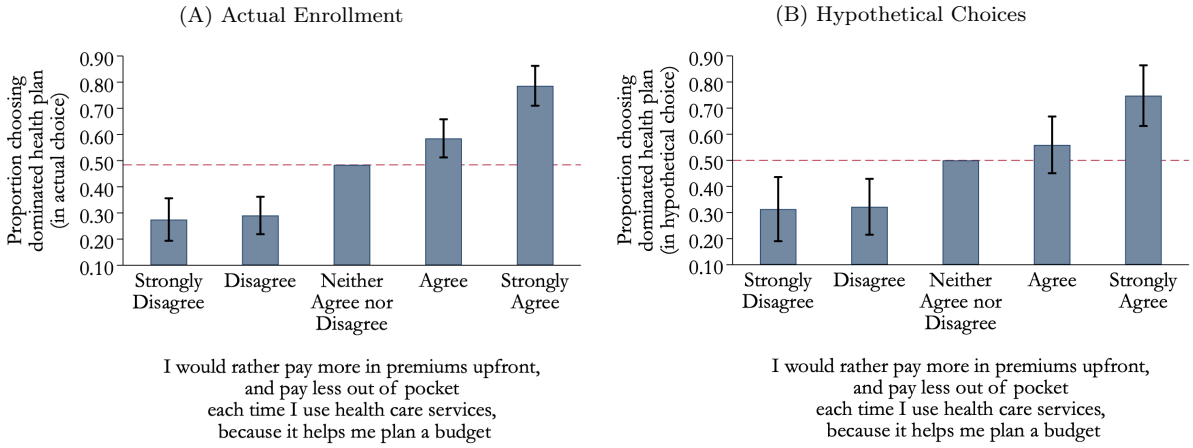
We asked a direct question about the trade-off between premiums and deductibles for planning purposes, which may matter to individuals who face liquidity constraints. The question asked to what extent the respondents agree with the statement, "*I would rather pay more in premiums upfront, and pay less out of pocket each time I use health care services, because it helps me plan a*

Table G.9: Liquidity by Household Income

	Dominated health plan (1)	Forego retirement match (2)	Dominated plan AND forego match (3)	Dominated health plan (4)	Forego retirement match (5)	Dominated plan AND forego match (6)
Liquidity constrained	0.151	0.156	0.143	0.210	0.231	0.126
	(0.041)	(0.037)	(0.032)	(0.047)	(0.043)	(0.035)
Constant	0.451	0.145	0.078	0.443	0.092	0.052
	(0.020)	(0.014)	(0.011)	(0.019)	(0.011)	(0.008)
Household income	<$125k	<$125k	<$125k	≥$125k	≥$125k	≥$125k
Observations	780	779	779	842	841	841
R^2	0.017	0.030	0.037	0.022	0.061	0.031

budget." There is a strong monotonic relationship between the extent to which people agree with this statement and their propensity to choose a dominated health plan: 27.5% among those who strongly disagreed with this statement chose a dominated plan versus 78.6% who strongly agreed (Figure G.5, Panel A). This gradient is large and statistically significant. We find a similar pattern when considering hypothetical choices from our experiment comparing decision frames. In Panel B of Figure G.5, we restrict the sample to those who do not change their choice even after complex information is simplified. The gradient suggests that many of those who prefer to smooth their expenses choose dominated plans while recognizing the financial costs of doing so.

Figure G.5: Dominated Plan Choices by Budgeting Preferences



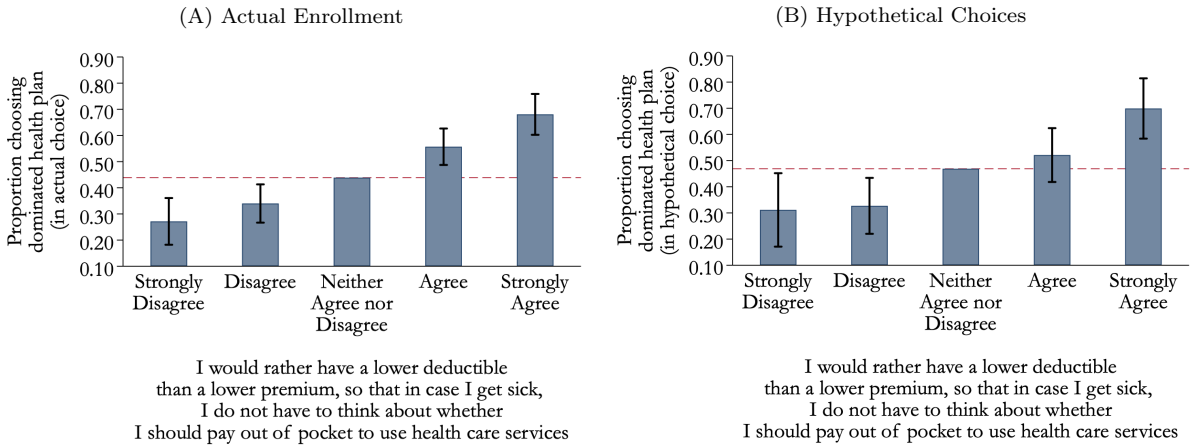
Inertia: Table G.10 presents regression results to test for the role of inertia in health insurance and retirement saving choices using administrative data from 2014–2018. The regressions compare outcomes for new employees to incumbent employees, controlling for age, salary, gender, faculty, health insurance coverage type, and year. Standard errors clustered by employees are in parentheses. New employees are more likely to choose the HDHP/HSA, consistent with work in other employer settings, though the magnitude is small in absolute terms: 92.0% of incumbent employees avoid the HDHP compared to 86.4% of new employees (column 1). Requiring an active choice does fairly little to reduce the probability of choosing a dominated health plan in this context. In terms of retirement, incumbent employees are more likely to contribute than new employees (column 2). Considering both choices together, new employees are 1.4 percentage points more likely to simultaneously choose a dominated plan and forego the match, which is 4% of the mean for incumbent employees.

Table G.10: Inertia

	Dominated health plan (1)	Forego retirement match (2)	Dominated plan AND forego retirement match (3)
New employee	-0.056	0.046	0.014
	(0.004)	(0.006)	(0.007)
Control mean	0.920	0.365	0.343
	(0.002)	(0.004)	(0.004)
Demographic and job characteristics	Yes	Yes	Yes
N	64,126	64,126	64,126
R^2	0.043	0.168	0.145

Nonstandard preferences: payment aversion: Figure G.6 shows a monotonic relationship between dominated plan choices and agreement with the statement: "*I would rather have a lower deductible than a lower premium, so that in case I get sick, I do not have to think about whether I should pay out of pocket to use health care services.*" 27.2% of those who strongly disagreed with this statement chose a dominated plan versus 68.1% of those who strongly agreed, with less strong preferences or indifference in between these rates (Panel A). We also compare hypothetical choices among respondents who do not exhibit choice reversals when the simplified frame is shown after the complex frame. Panel B of Figure G.6 shows a similar monotonic pattern between payment aversion and dominated choices, suggesting that many people who experience psychological costs from deductibles may choose dominated plans even if they recognize the financial costs.

Figure G.6: Dominated Plan Choices by Payment Aversion



Correlation between mechanisms: Below we present evidence showing the correlation between attention and benefits knowledge. Table G.11 shows regression results of the correlations between responses to the question "*Do you believe your household's health insurance choices would improve if you paid more attention to them?*" and the question "*Do you believe your household's long-run finances would improve if you paid more attention to them?*" Each column plots the results of a linear regression of an indicator for whether the respondent records that particular response to the question about long-run finances against indicators for their responses to the question about health insurance. The constant denotes the mean for participants who report they are already attentive to their household's health insurance choices. The regression excludes controls. Robust standard errors are in parentheses.

Table G.11: Correlation in Attention Responses across Domains

	Dependent var: Attention to long-run finances				
	"Already attentive"	"Too hard"	"Regret	"Not worth time/effort"	"Already set up to not require attention"
	(1)	(2)	(3)	(4)	(5)
Attention to health insurance					
Too hard no matter how much attention I devote	-0.162	0.126	0.117	0.019	-0.099
	(0.032)	(0.037)	(0.050)	(0.033)	(0.035)
Regret not paying more attention	-0.216	-0.014	0.488	-0.062	-0.196
	(0.024)	(0.018)	(0.035)	(0.020)	(0.022)
More attention not worth time/effort	-0.167	-0.003	0.074	0.199	-0.102
	(0.032)	(0.022)	(0.051)	(0.046)	(0.036)
Constant	0.257	0.050	0.354	0.104	0.233
	(0.016)	(0.008)	(0.018)	(0.011)	(0.016)
Observations	1087	1087	1087	1087	1087
R^2	0.050	0.028	0.111	0.042	0.040

Attention and benefits knowledge are highly correlated. Figure G.7 presents regression results of each indicator of benefits knowledge against responses to the questions about whether the respondent thinks their choices would improve if they devoted more attention to them.

Figure G.7: Benefits Knowledge by Attention

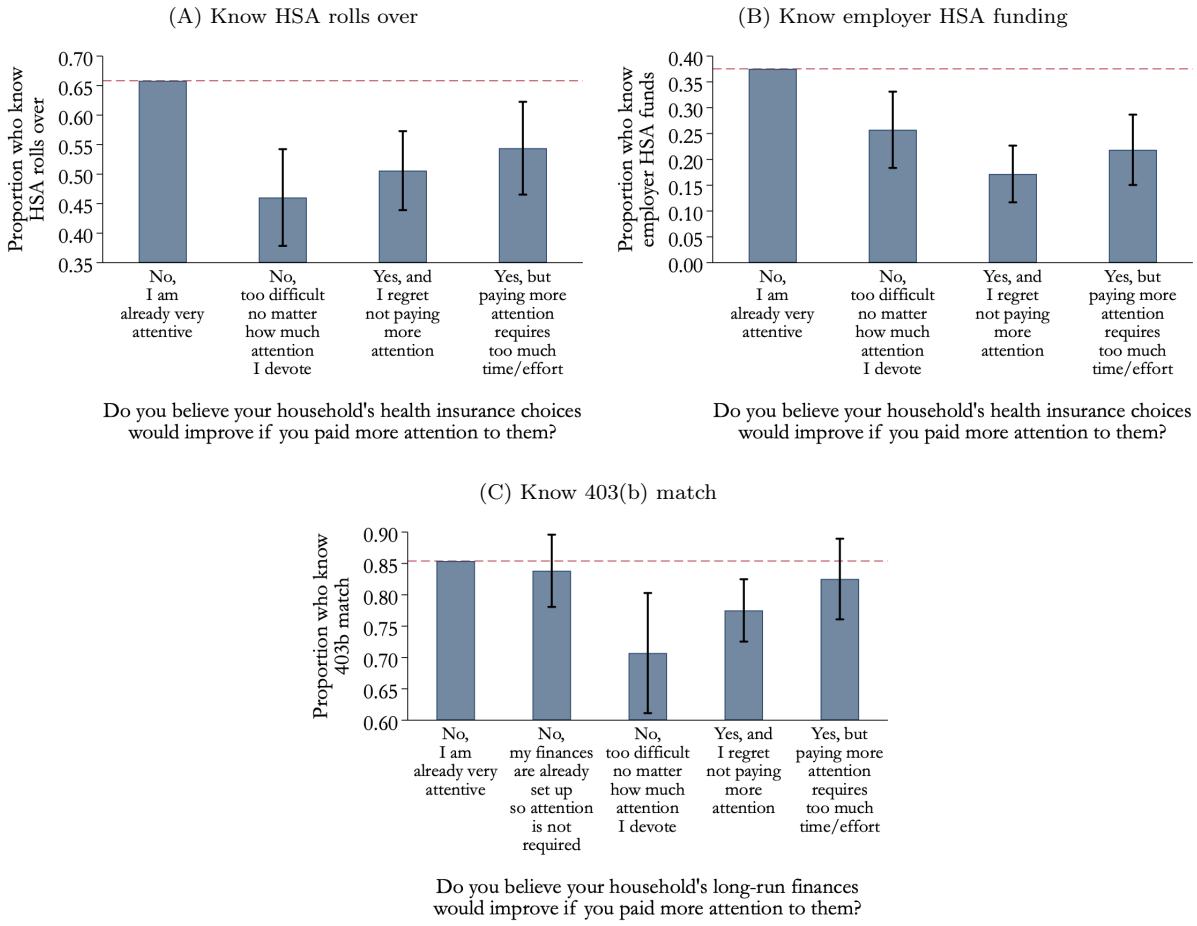


Table G.12 shows the correlation matrix for key measures of knowledge about benefits, financial literacy, the opt-out decision, and liquidity.

Table G.12: Correlation Matrix of Mechanisms

	Know employer match	Know employer HSA funding	Know HSA rolls over	Fin. lit: inflation Q correct	Fin. lit: interest rate Q correct	Fin. lit: diversification Q correct	Attempted optional task	Liquidity constrained
Know employer match	1							
Know employer HSA funding	0.068	1						
Know HSA rolls over	0.153	0.446	1					
Financial literacy: Inflation Q correct	0.128	0.137	0.172	1				
Financial literacy: Interest rate Q correct	0.139	0.111	0.134	0.371	1			
Financial literacy: Diversification Q correct	0.150	0.153	0.214	0.322	0.280	1		
Attempted optional task	0.126	0.076	0.081	0.149	0.177	0.070	1	
Liquidity constrained	-0.128	-0.112	-0.178	-0.248	-0.177	-0.326	0.020	1

Bivariate probit regressions in survey data: We estimate bivariate probit regressions (equations (2)–(4) in the main text) that include different covariates in each model to assess the relative importance of mechanisms. The focus of this exercise is on model fit based on a collection of variables rather than interpreting a particular variable in isolation. We therefore include indicators for each response to a particular survey question to flexibly model that variable. For example, when including variables for financial literacy, we do not code the variable as 1 if correct and zero otherwise (as in Table G.2), but we include separate indicators for each possible response, including if the respondent reports being unsure. We classify variables into the following categories:

- *Demographics, income, and job characteristics* (*Baseline*): Age bins; gender; married; tenure bins; household income bins; health insurance coverage type; non-white; faculty; academic division; health spending bins; experimental arms (48 variables).
- *Payment aversion*: Preference for paying higher premiums to avoid thinking about out-of-pocket costs (6 variables).
- *Liquidity*: Confidence in financing $2,000 expense; preferences for paying higher premiums to help plan a budget (12 variables).
- *Financial literacy*: Knowledge of interest rates; knowledge of inflation; knowledge of diversification (14 variables).
- *Information Frictions*: Knowledge of retirement match; knowledge of employer HSA funding; knowledge of HSA rollover; opt-out decision; attention check; whether health insurance choices would improve with more attention; whether long-run finances would improve with more attention; time spent on health insurance choices; time spent on retirement saving; source of information on health insurance (28 variables).

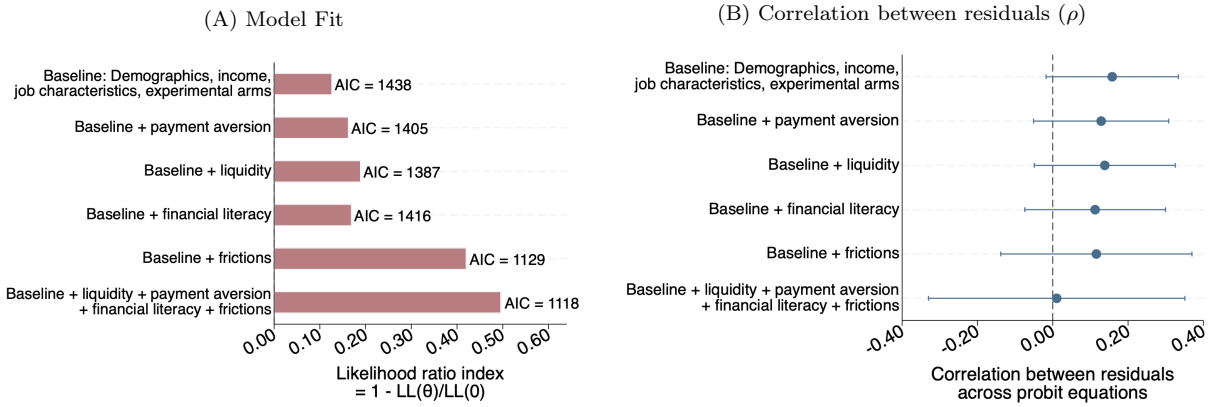
Table G.13 presents measures of model fit of bivariate probit regressions that include different combinations of mechanisms. The likelihood ratio index is defined as $1 - \frac{LL(\theta)}{LL(0)}$, where $LL(\theta)$ is the log likelihood from the model and $LL(0)$ is the log likelihood from the null model that restricts all coefficients to zero. This measure of model fit ranges from 0 to 1, where 1 corresponds to the model perfectly fitting the data, in which case $LL(\theta) = 0$. The Akaike information criterion (AIC) is calculated as $2k - LL(\theta)$, where k is the number of parameters. Lower AIC values indicate superior model fit and so this metric penalizes adding variables that do not improve the log likelihood.

Figure G.8 presents the results of bivariate probit models restricted to employees in the Medical Division whose default contribution to the 403(b) is zero. The patterns are qualitatively similar to the full sample results shown in Figure 7 and Table G.13.

Table G.13: Bivariate Probit Model Fit for All Combinations of Mechanisms

Model (# parameters)	$LL(\theta)$	Likelihood Ratio Index	AIC
1: Baseline: Demographics + income + job characteristics (99)	-1658	0.075	3486
2: Baseline + frictions (159)	-1164	0.350	2611
3: Baseline + liquidity (125)	-1543	0.139	3296
4: Baseline + financial literacy (127)	-1612	0.100	3438
5: Baseline + payment aversion (111)	-1605	0.104	3401
6: Baseline + frictions + financial literacy (187)	-1141	0.363	2609
7: Baseline + frictions + liquidity (185)	-1111	0.380	2544
8: Baseline + frictions + payment aversion (171)	-1131	0.369	2564
9: Baseline + liquidity + payment aversion (137)	-1519	0.152	3269
10: Baseline + liquidity + financial literacy (153)	-1513	0.155	3281
11: Baseline + payment aversion + financial literacy (139)	-1562	0.128	3359
12: Baseline + frictions + payment aversion + financial literacy (199)	-1562	0.128	2560
13: Baseline + frictions + liquidity + financial literacy (213)	-1090	0.391	2546
14: Baseline + frictions + liquidity + payment aversion (197)	-1088	0.392	2519
15: Baseline + liquidity + financial literacy + payment aversion (165)	-1489	0.169	3252
16: Baseline + frictions + financial literacy + liquidity + payment aversion (225)	-1067	0.404	2520
17: Frictions (63)	-1251	0.302	2628

Figure G.8: Bivariate Probit Regressions in Medical Division without 403(b) Default



Shapley-Owen decomposition of model fit: As a second way to measure the importance of each mechanism in explaining choices, we apply the concept of Shapley values to the bivariate probit models (Shapley 1953, Owen 1977). The contribution of each mechanism is calculated by measuring how its inclusion improves the model's fit to the data. We continue to assess model fit in two ways, based on an increase in the likelihood ratio index and a decrease in the AIC. This calculation is performed not just for the full model with all mechanisms, but for each combination of "sub-models" that exclude that particular mechanism (models 1–16 in Table G.13). The Shapley value for each mechanism is a weighted average of its marginal contribution when added to a sub-model, where the weights reflect the number of possible models with that permutation of mechanisms.

Define X as the full set of mechanisms mechanisms that could be included in a regression. In our case, $X = \{\text{frictions, liquidity, financial literacy, payment aversion}\}$. Define $v(S)$ as a metric of model fit when including the subset of mechanisms $S \subset X$. The change in model fit from adding mechanism m to the existing subset of mechanisms is $v(S \cup \{m\}) - v(S)$. There are $n = 4$ total mechanisms and $k < 4$ mechanisms in subset S. The Shapley value for mechanism m is a weighted average of the contributions over all possible permutations of subsets that exclude mechanism m:

$$V(m) = \sum_{S \subseteq X \setminus m} \frac{n!(n-k-1)!}{n!} (v(S \cup \{m\}) - v(S))$$

The weights $\frac{n!(n-k-1)!}{n!}$ are inversely proportional to the frequency of each sub-model that includes k mechanisms. This formulation assigns relatively more weight to the contribution when a mechanism is added to the baseline model or to a model with the three other mechanisms because there is only one possible sub-model for those cases. There are three possible sub-models for models that include either two mechanisms or three mechanisms as regressors, and so those models receive less weight in calculating mechanism m's contribution to model fit.

Table G.14 summarizes the results of this exercise. Consistent with Figure 7, frictions are the most important mechanism. Frictions explain 82% of choices when measuring fit based on the AIC and explain 76% when measuring fit based on the likelihood ratio index. Liquidity explains 10-12%, with financial literacy and payment aversion explaining 5% or less. Standard errors are shown in parentheses and are calculated by bootstrapping 200 samples with replacement.

Table G.14: Shapley-Owen Decomposition of Mechanisms (%)

	Decomposition of:	
	AIC	Likelihood ratio index
Information Frictions	82.1	76.6
	(2.4)	(2.0)
Liquidity	10.9	12.3
	(1.9)	(1.6)
Financial literacy	1.9	5.3
	(1.3)	(1.1)
Payment Aversion	5.1	5.8
	(1.4)	(1.1)

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