

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

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Many people have difficulty making financial decisions. We show that the quality of two important decisions—health insurance and retirement saving—are positively correlated using administrative and survey data. People who choose a dominated health plan are more likely to forego employer matching funds for retirement saving than those who do not. On average, choosing a dominated plan and not contributing to supplemental retirement accounts results in over \$10,000 in foregone savings over five years. Frictions in acquiring and processing information about benefits are the decisive factor in 50–75% of choices. Secondary mechanisms involve liquidity demand, financial literacy, and aversion to deductibles.

JEL: D14, D81, G5, I13

People face an increasingly complex set of financial decisions in daily life. They must determine the best ways to save, invest, borrow, insure, and pay for goods and services. In a variety of financial domains, behavior often departs from the standard economic model of informed consumers maximizing their expected util-

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ity of consumption (Agarwal, Chomsisengphet and Lim 2017, Ericson and Sydnor 2017, Beshears et al. 2019), and considerable research suggests that many people make low-quality choices. Such behavior undermines the efficiency of markets, alters the distribution of welfare, and may increase economic inequality (DellaVigna 2009, Akerlof and Shiller 2015, Campbell 2016, Campbell and Ramadorai 2025).

Little is known about how a person’s choice quality in one financial domain relates to their choice quality in another. Whether choices are correlated, and why, has implications for assessing the consequences of low choice quality and designing policy responses. In particular, a positive correlation implies that the costs of low choice quality are greater than recognized by studying one domain in isolation. Understanding the reasons behind a correlation can facilitate policies that target a mechanism, such as limited attention or liquidity constraints, that may span multiple domains.

We analyze the correlation of choice quality in two domains that have large financial consequences: health insurance and retirement saving. This focus allows us to revisit two puzzles in decision-making that have been documented separately in each domain and that have attracted policy attention. In the case of health insurance, many people choose dominated plans, leading them to overpay for coverage (Handel 2013, Bhargava, Loewenstein and Sydnor 2017). In the case of retirement saving, many people forego employer matching contributions, leaving money on the table (Madrian and Shea 2001, Choi, Laibson and Madrian 2011, Choukhmane, Goodman and O’Dea 2025). Using both administrative panel data from a large university and a detailed survey of its employees, we investigate how and why these puzzling choices in health insurance and retirement saving are linked.

The menu of health and retirement benefits in our setting presents employees with decisions that can lead to significant financial losses. One health insurance plan, the high-deductible health plan (HDHP) with a Health Savings Account

(HSA), stochastically dominates the other two plans for almost all employees. Stochastically dominated plans are common among many employers (Liu and Sydnor 2022), and the financial stakes are high in our setting; on average, employees who do not select the HDHP pay an extra \$2,100 each year.¹ We find that most people in our setting choose dominated plans. As for retirement saving, the supplemental voluntary savings plan offers an employer match. Employees receive a 50% match on 403(b) contributions, with the employer contributing up to 2% salary for some employees and up to \$480 per year for others. However, over one-third of employees do not contribute to the 403(b) and forego matching funds. We refer to the behavior of choosing a dominated health plan while not contributing to supplemental accounts as making “puzzling choices” in both domains because both choices leave substantial money on the table.

Different mechanisms yield distinct predictions about the correlation across domains. For example, people who wish to minimize payroll deductions and maximize current consumption would forego retirement savings contributions while choosing the low-premium health plan. Some forms of consumption commitments, liquidity constraints, or present-focus (Ericson and Laibson 2019) are consistent with this behavior, which generates a negative correlation in puzzling choices. The correlation would also be negative if people concentrate scarce effort in one domain at the expense of the other. By contrast, some mechanisms that operate similarly across health insurance and retirement saving predict a positive correlation. Such factors could include confusion about benefits, possibly due to low financial literacy, inattention to both choices, or concerns about liquidity to finance out-of-pocket medical costs. Alternatively, different explanations might arise in each domain, but be correlated within individuals. Recent laboratory and survey research finds that several forms of nonstandard behavior are positively correlated (Dean and Ortoleva 2019, Chapman et al. 2023, Stango and Zinman

¹By comparison, financial losses were below \$400 in Bhargava, Loewenstein and Sydnor (2017). Many other studies document evidence of low choice quality when health insurance plans are not dominated, and in those cases the difference in costs is smaller (Abaluck and Gruber 2011, Ketcham et al. 2012, Heiss et al. 2013, Ketcham, Kuminoff and Powers 2019, Gruber et al. 2020, Handel et al. 2024).

2023).

We detect a large and statistically significant positive correlation between puzzling choices in insurance and saving, and we show that the positive correlation generalizes beyond our setting.² The likelihood of foregoing employer matching in our data is 27% higher among those who choose a dominated plan. Over the five years of our sample, people leave over \$10,000 on the table by simultaneously choosing a dominated health plan and foregoing employer matching for retirement accounts. The employees who make puzzling choices in both domains have lower salaries compared to employees who avoid at least one puzzling choice.

After establishing this positive correlation in puzzling choices, we investigate underlying mechanisms. We designed a novel survey of employees at the university to directly test four possible explanations. First, we measure *frictions* related to how consumers acquire and process information when making financial decisions. To this end, we elicited knowledge about benefits and time spent on benefits decisions, responses to complexity in benefits, and the choice to devote attention when faced with complexity, including through two experimental treatments. Second, we measure *financial literacy* to capture general financial knowledge that might help individuals overcome information frictions. Third, we consider the demand for *liquidity*. Fourth, we consider aversion to deductibles as a form of *non-standard preferences*. We find that frictions in how consumers acquire and process information are of primary importance, and are the decisive factor in 50–75 percent of choices. Nevertheless, only a model with the additional set of mechanisms fully explains the positive correlation between puzzling choices for the same individuals, indicating some heterogeneity in mechanisms.

Our paper makes four contributions. First, we link the two large literatures that document puzzling choices separately in health insurance and retirement saving (Ericson and Sydnor 2017, Chandra, Handel and Schwartzstein 2019, Beshears

²Appendix E shows a higher correlation compared to our main setting using survey data of employees at ten other universities linked to administrative records managed by the Teachers Insurance and Annuity Association of America (TIAA).

et al. 2019). We find that it is often the same people who make choices that are inconsistent with standard economic models in each domain. This result is complementary to Choi et al. (2014), who argue that decision-making ability is likely general across domains by showing that consistency with utility maximization in experiments predicts wealth. Our finding that decision quality is positively correlated in repeated, high-stakes decisions in the field provides evidence for specific channels that may connect their experimental measures of decision-making ability to financial outcomes.

Second, we provide novel evidence on mechanisms that drive decisions in the domains we study. While prior studies typically focus on one mechanism in one domain, our survey reveals the importance of multiple mechanisms. Our analysis of links across domains extends prior research in these areas on the role of information (Duflo and Saez 2003, Bernheim and Garrett 2003, Chan and Stevens 2008, Loewenstein et al. 2013, Handel and Kolstad 2015*a*, Bhargava and Conell-Price 2022), attention (Brot-Goldberg et al. 2023, Brown and Jeon 2024), financial literacy (Hastings, Madrian and Skimmyhorn 2013, Lusardi and Mitchell 2014, 2023), complexity (Bhargava, Loewenstein and Sydnor 2017, Samek and Sydnor forthcoming), and liquidity (Ericson and Sydnor forthcoming). Our findings on relationships among mechanisms behind real-world decisions are complementary to Stango and Zinman (2023), who correlate elicitation of common biases and preferences. For example, we show the importance of attention in both domains, and its association with lack of benefit knowledge and complexity of benefit choices. Because this set of information frictions explains the majority of puzzling choices, our results point to the value of integrated policies focused on workplace benefit design and decision aids.

Third, we build on recent work that documents income gradients in the quality of health insurance choices (Handel et al. 2024) and the incidence of retirement matching incentives (Choukhmane et al. 2023). We show that the correlation of low choice quality is greater for low-salaried employees. In addition, we observed

differences by salary in survey responses to an incentivized task that mimicked attending to health and retirement choices. Lower-income respondents were more likely to attempt the questions but less likely to answer them correctly conditional on trying, and on net, lower-income respondents earned smaller incentive payments. Collectively, our findings provide new evidence on sources of significant inequalities in lifetime financial outcomes by income and financial sophistication (Lusardi and Mitchell 2008, Bosworth, Burtless and Zhang 2016, Lusardi, Michaud and Mitchell 2017).

Fourth, our paper complements research that examines other household financial decisions spanning multiple domains. Brown and Previtero (2020) document that employees who wait until the final day to choose a health insurance plan save less in retirement accounts and are less likely to annuitize, while Jørring (2024) finds a correlation between consumer banking puzzles. Other research compares choices of employee benefits to test whether risk preferences are consistent across domains (Einav et al. 2012, Bell et al. 2018).

Our findings point to levers for employers to consider in designing benefits. Because frictions in acquiring and processing information are the most important mechanism and are correlated within individuals, presenting health and retirement decisions through a unified framework—rather than as separate choices during the same enrollment window—could generate spillovers across domains. More proactive options include “smart defaults” that steer employees toward a health plan matching their spending risk, analogous to target-date funds in retirement accounts, and ensuring that no plan is dominated by auditing benefit menus. Our findings also point to considerations for federal tax policy, since both HSA-eligible plans and employer-sponsored retirement accounts offer substantial tax benefits. With incomplete take-up of these benefits correlated within workers, these tax expenditures merit joint consideration by policymakers.

The paper proceeds as follows. Section I describes the health insurance and retirement benefit options in our setting and the data we use. Section II documents

the correlation between choosing a dominated health plan and foregoing employer retirement matching funds. Section III examines the mechanisms behind these choices using survey evidence, and Section IV quantifies the relative importance of each mechanism. Section V discusses the implications of our findings for benefit design and policy.

I. Employee Benefit Options and Data

The large public university that we study offers employees a complicated set of retirement plan and health insurance choices. In this section, we summarize the options and discuss how we define puzzling choices in each domain.³ We then discuss our administrative data on employees and their benefit choices. As we explain below, our setting is fairly typical among large employers in terms of employee demographics and benefit options.

A. Health insurance options

Plan descriptions. — The university offers three health insurance plans, all with the same provider network. Two are conventional plans and one is a high-deductible plan (HDHP) with a health savings account (HSA), which was introduced in 2014.⁴ Plans with higher premiums have lower out-of-pocket (OOP) payments (deductibles, copayments, and coinsurance rates). Annual employee premiums for family coverage in 2017 were \$6,066, \$2,064, and \$720 across the plans, while the corresponding deductibles were \$800, \$1,000, and \$4,000, with the HDHP/HSA plan offering the lowest premium and the highest deductible. In addition, the employer made an HSA contribution of \$2,000, occurring in February.⁵

³Appendix A provides additional details about the setting.

⁴An HSA is a tax-preferred personal savings vehicle, in which contributions are tax-deductible (even from FICA taxes when contributions are made via payroll reduction, unlike retirement saving plans), investments grow tax-deferred, and withdrawals are tax-free if used to finance health care, including costs incurred in previous years. Income tax is owed on withdrawals for non-qualified expenses, as well as a penalty if funds are withdrawn prior to age 65. Funds in HSAs are not “use-it-or-lose-it,” as they are for Flexible Spending Accounts (FSAs). FSAs for medical services other than vision and dental are only available for the medium and high premium plans.

⁵Other plan parameters were more similar (Appendix Table A.1).

We characterize the three options as the high, medium, and low-premium plans (or H , M , and L , respectively). Based on claims during the sample period, the actuarial value of the plans (defined as employer payments as a share of annual health spending), is about 87% for H , 82% for M , and 79% for L , with employees paying the rest out-of-pocket.

Dominated health plans. — Insurance plans that differ in their premiums, deductibles, and other features yield different distributions of costs for individuals. Consumers should not choose a plan with a dominated distribution of costs if they seek to maximize the unconstrained expected utility of consumption, regardless of their level of risk aversion. Liu and Sydnor (2022) show that among employers offering plans with HSAs, higher-premium plans without HSAs are dominated in about half of cases. We consider whether liquidity constraints might explain dominated plan choices, as in Ericson and Sydnor (forthcoming), in Section III.

We focus primarily on second-order stochastic dominance (SOSD) of the cost distributions, which arises, for example, when two distributions have the same mean of costs, x , but one has a lower variance. Formally, this is a sufficient but not necessary condition for SOSD, which is defined as follows: for two distributions F and G , F SOSD G if and only if $\int_{-\infty}^x G(y)dy \geq \int_{-\infty}^x F(y)dy$ for all x . As a more stringent definition, we also consider first-order stochastic dominance (FOSD), in which $G(y) \geq F(y)$ for all y , so the preferred distribution always has a lower probability of exceeding any given level of costs, compared to the other. Focusing on dominated choices constitutes a stronger criterion for decision quality than the violations of the General Axiom of Revealed Preference (GARP) analyzed in Choi et al. (2014). Consistency with GARP ensures stable preferences, but does not preclude consistently choosing options that leave money on the table.

To ascertain stochastic dominance, we define costs for each insurance plan as the sum of premiums and OOP spending, less any employer HSA contributions. Appendix B describes our procedure for constructing distributions of out-of-pocket

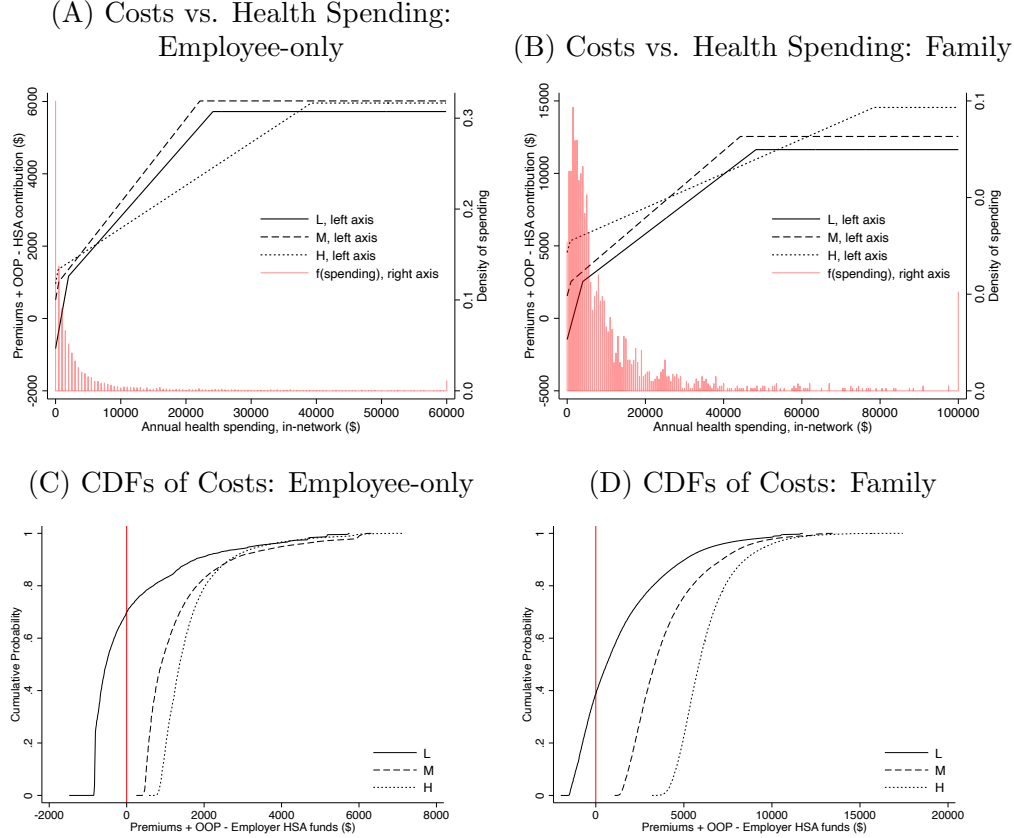
spending for each employee in each plan using the empirical distribution of claims by age, gender, dependents, and annual health spending in the prior year. We scale premiums by $1 - \tau$, where τ is the employee's marginal tax rate (as imputed in Appendix C), to account for the tax preference for premiums. The employer's HSA contribution, which we treat as equivalent to a premium reduction for plan L , is worth at least this amount, since HSAs have superior tax preferences to all other savings products (Leive 2022).

Given these costs, we find that over 99% of the employees in our sample face a menu with a second-order stochastically dominated health plan during our sample period. The employer's large HSA contribution to plan L , along with its lower premiums and only slightly higher risk sharing compared to the other two plans, leads to stochastic dominance. We exclude from our analysis the very small group of observations for whom no plan is stochastically dominated. To be conservative, we also exclude employees with over \$500 in out-of-network spending because the plans differ in out-of-network deductibles, and no longer exhibit stochastic dominance. A large majority of employees have zero out-of-network spending, and this restriction reduces the remaining sample by less than 1%.

Figure 1 displays stochastic dominance of health insurance plans in 2017, separately by employee-only and family coverage.⁶ These graphs pool employees to visualize the costs for those facing a dominated choice. Panels (A) and (B) plot annual health spending and resulting costs for the three plans. The graph overlays the density of spending, which shows that the range over which L does not have the lowest costs occurs quite infrequently. Panels (C) and (D) present cumulative distribution functions (CDFs) of costs. The differences in possible employee costs between the three plans are stark, with plan L almost always having the lowest costs, and its CDF lies well to the left in Panels (C) and (D) over most of the range of annual health spending.

⁶Corresponding graphs for employee-plus-children and employee-plus-spouse coverage are presented in Appendix Figure D.1. As an illustration for one employee, Appendix Figure D.2 presents the CDFs for 40-year old male and female employees with employee-only coverage in the median tercile of lagged

Figure 1. : Stochastic Dominance of Health Insurance Plans



Notes: Panels (A) and (B) plot costs against total health spending for each plan in 2017, stratified by coverage type. Costs equal premiums (net of taxes assuming a 25% marginal tax rate) plus out-of-pocket payments, less employer HSA contributions if enrolled in *L*. The coinsurance rates plotted in the graph are calculated as the rate which produces the equivalent actuarial value as full schedule of cost-sharing for the same deductible and out-of-pocket max, following the same procedure as Ericson et al. (2020) and Liu and Sydnor (2022). The density of total health spending is plotted on the right y-axis. Panels (C) and (D) plot the cumulative distribution functions (CDFs) of costs for each plan across all years using the empirical distribution.

B. Retirement saving options

The university has both mandatory and voluntary savings plans, and our analysis focuses on the voluntary plans. The employer matches contributions to the voluntary plan (a 403(b) account) at a rate of 50%, and all funds vest imme-

health spending with a 25% marginal tax rate.

diately. The match is substantial, at 2% of salary, for employees in the medical division hired after 2002. The match is smaller, limited to \$480 per year, for medical division employees hired before 2002 and for all academic-division employees. There is no default contribution in the medical division, while employees in the academic division are defaulted into contributing \$80 per month to receive the full employer match.

We follow previous research in classifying puzzles in retirement saving. As emphasized by Benartzi and Thaler (2007), Agarwal, Chomsisengphet and Lim (2017), Choi, Laibson and Madrian (2011), and others, many people make sub-optimal saving decisions by failing to obtain matching contributions. In our context, not taking advantage of the employer match leaves substantial money on the table given the match rate, loan terms, and tax preferences of the voluntary plan. For example, saving a pre-tax dollar with a 50% employer match yields \$2.01 in ten years, compared to \$1.16 in a non-tax preferred account, assuming a marginal income tax rate of 25%, long-term capital gains tax rate of 15%, and a nominal rate of return of 6%. While liquidity constraints could theoretically explain the decision not to save, employees can access their contributions via a loan from the plan on quite favorable terms, especially relative to credit card debt as an alternative; the loan duration is five years, the interest rate for repaying the loan is close to prime, and interest payments are deposited back into the account. In the extreme case of a default, the loan is simply treated as a withdrawal and is subject to income taxes and a 10% penalty (if the employee is younger than $59\frac{1}{2}$), still delivering a gain relative to not contributing. Because employees can access these funds if needed while still capturing the match, we treat the failure to contribute as a puzzle from the perspective of maximizing expected lifetime consumption.⁷

⁷There is, moreover, an additional supplemental plan offered by the state, which does not have a match but allows penalty-free withdrawals upon separation. To clarify the exposition and because nearly all supplemental saving is in the 403(b), we refer to not contributing to either account as foregoing the employer match when describing our empirical analysis.

C. Sample selection and puzzling choices

The administrative data from the university report annual earnings, semianual demographics, monthly retirement plan contributions as a percentage of earnings, annual health insurance choices, and annual health care spending data of each employee and dependent. Our earnings data are collapsed into bins (of \$10,000–\$20,000 intervals) to eliminate the possibility that an individual could be identified since salaries are public for this university. Demographic information consists of employee gender, age collapsed into bins (generally of 5-year intervals) and marital status (which is incompletely collected). We also observe the category of employment (faculty versus staff), the division of the university (academic or medical), and the hiring date for each employee. We observe annual health spending as reported on insurance claims, divided into dollars paid by insurance and dollars paid out-of-pocket by employees, and separately for in-network and out-of-network care. To protect confidentiality, the employer aggregated our claims data to the annual level for each employee and dependent. We focus on choices over the years 2014–2018, following the introduction of the HDHP/HSA that stochastically dominated the two existing plans.

We select our sample to focus on employees with the opportunity to make choices in both domains. Starting with records for 25,569 employees during the 2014–2018 period, we restrict the sample to those who are: (i) staff or faculty; (ii) full-time employees; (iii) under age 65; (iv) receiving annual salaries over \$20,000; (v) enrolled in the employer’s health insurance plan; (vi) not in their first year of tenure; (vii) facing a dominated health plan in their choice set. The first two restrictions exclude those whose benefit choices differ from the standard options studied in this paper (dropping 16.9% of employees from the initial sample). We drop employees over age 65 since Medicare coverage becomes available, which involves a separate set of choices that excludes the HDHP/HSA (dropping 3.8% of the initial sample’s employees). We exclude employees with very low salaries because they may face different choice sets through Medicaid or highly

subsidized Affordable Care Act coverage (dropping 6.7% of the initial sample's employees). We exclude employees who opt out of the health insurance plan (dropping 5.9% of the initial sample's employees). We drop the employee's initial year of employment (dropping 2.1% of the initial sample's employees) because many face partial-year health insurance premiums and some do not make their voluntary contribution decisions immediately.⁸ Finally, we drop employee-year observations in which the choice set did not include a dominated plan. The result is an analytic sample of 18,494 employees spanning 60,517 employee-years.

Table 1 presents descriptive statistics for the sample. The mean salary is \$73,929, with considerable heterogeneity (SD = \$44,787). The average age is 45 years. Tenure with the employer—over 10 years, on average—is long in comparison to non-academic U.S. settings. 57% of employees work in the academic division and 43% in the medical division. Average annual health spending per employee, including any dependents, is \$6,737 (SD = \$25,640).

Most employees in our sample choose a stochastically dominated health plan. In the first five years, 55% of the sample choose H , 36% choose M , and 9% choose L . Enrollment in L grew during this time, rising from under 5% in 2014 to over 15% by 2018. Panel B shows the rates of plan switching by year. Overall switching rates increased each year, as did the percentage who switched out of dominated plans (H and M) and into plan L .

In terms of retirement saving, 63% of employees participate in a supplemental saving plan, contributing 4.35% of salary, on average. Most of this saving occurs in the plan that matches contributions; among the set of employees contributing to either account, 91% contribute only to the plan with matching, 1% contribute only to the other plan, and 8% contribute to both accounts. As shown in Panel B, changes along the extensive margin of participation are relatively stable over time.

⁸We do, however, use the first year's choices to analyze inertia as a possible mechanism in Section III.

Table 1—: Summary Statistics and Choice Dynamics

	Full Sample (2014–2018)			
	Mean	SD		
<i>Panel A. Sample Characteristics and Choices</i>				
Annual salary (\$)	73,929	44,787		
Age (years)	45.04	11.48		
Household size	2.00	1.26		
Tenure with employer (years)	10.25	9.38		
Faculty (%)	19.2	-		
Academic division (%)	56.5	-		
Female (%)	60.2	-		
Annual health spending (\$)	6,737	25,640		
Plan <i>L</i> (%)	8.6	-		
Plan <i>M</i> (Dominated) (%)	36.0	-		
Plan <i>H</i> (Dominated) (%)	55.3	-		
Voluntary retirement participation (%)	63.4	-		
Voluntary retirement contribution rate (% salary)	4.35	7.20		
<i>Panel B. Annual Rates of Switching Choices, $t - 1$ to t (%)</i>				
	2015	2016	2017	2018
Any health plan switch	3.6	5.2	7.9	14.2
Plan <i>H</i> or <i>M</i> (Dominated) $\rightarrow$ Plan <i>L</i>	0.5	0.8	1.7	6.6
Plan <i>L</i> $\rightarrow$ Plan <i>H</i> or <i>M</i> (Dominated)	0.9	0.8	0.6	0.7
Voluntary retirement: stop contributing	0.5	0.3	0.6	0.8
Voluntary retirement: start contributing	2.7	3.8	2.2	0.8
<i>N</i>	18,494			
<i>NT</i>	60,517			

Notes: Table presents means and standard deviations of demographic and outcome variables in the sample. Administrative data on employees at a large public university during 2014–2018. *N* denotes the number of unique employees and *NT* the number of employee-years. Annual health spending is the sum of employee out-of-pocket costs and spending paid by the insurance plan. Salaries and annual health spending are not adjusted for inflation.

D. External Validity

The structure of health insurance plans in our setting is common in many institutions. We collected information on plan offerings for the public and private universities that the university we study designates as its peer group. Most offer an HDHP with low premiums and contribute to the HSA (Appendix Table A.2). Outside of the education sector, many employers offer an HDHP/HSA alongside traditional plans (Claxton et al. 2023). Using public use microdata from the 2014–2018 Kaiser Health Benefits surveys, Appendix Figure A.1 shows the University’s HSA subsidy, premiums, and deductibles are near the center of the distribution among firms that offer HDHPs. Finally, similar to most universities and large employers, an individual employee’s salary does not increase if they opt out of employer health insurance.

In terms of employee characteristics, the mean salary and age of our university’s employees are fairly similar to the national average of employees with workplace health insurance. Based on our calculations from the 2014–2018 American Community Surveys (Ruggles et al. 2024), the average full-time employee with employer-sponsored health insurance earns \$64,842 and is 42.9 years old. If we apply our sample’s age and salary restrictions to the ACS, the mean salary is \$69,365 and the mean age is 42.8 years, which are slightly below those reported in Table 1. Employees in our sample are more likely to be women and have longer tenures than the average in the private sector, which is common among academic employers. Overall, our setting appears representative along several important dimensions of health insurance menus and individual characteristics.

II. Choices Across Domains

In this section, we first run linear probability models to quantify the relationship between choosing a dominated health plan and not receiving any matching contributions for retirement saving. We then describe the demographic composi-

tion of employees who make these puzzling choices. We discuss the consequence of these choices by quantifying how much money is “left on the table,” in dollar terms and relative to annual salary. Finally, we discuss what we can learn from the administrative data about mechanisms explaining puzzling choices.

A. Descriptive regressions of puzzling choices

Just over one-third of employees make both puzzling choices by selecting a dominated health plan while foregoing the retirement match. About 6% of employees avoid both puzzling choices, by choosing plan L and receiving employer matching funds. The most common behavior is choosing a dominated health plan while receiving matching funds (57.5%) and the least common behavior is not choosing a dominated plan while foregoing the match (2.5%).

As a way to summarize these relationships, we run linear probability models in which the left-hand side variable is an indicator for employee i not receiving any matching funds ($no\ match_i$) and the right-hand side variable is an indicator for choosing a dominated health plan ($dominated\ plan_i$):

$$(1) \quad no\ match_i = \beta_0 + \beta_1 dominated\ plan_i + u_i$$

Table 2 shows that choosing a dominated plan is associated with an 8.0 percentage point higher probability of not receiving matching funds, which equates to a 27.5% increase from the baseline mean (column 1). Including controls does little to reduce the strength of this relationship; flexibly controlling for age, salary, gender, firm tenure, faculty status, payroll year, household size, and insurance coverage type reduces the coefficient estimate to 7.2 percentage points and it remains highly significant (column 2).

The positive correlation is also robust to considering alternative definitions of dominance in health plan choices. When we consider first-order stochastic dominance, choosing a dominated health plan is associated with a 10.2 percentage

Table 2—: Linear Probability Model: Choices Across Domains

	Dep var: Forego retirement match		
	(1)	(2)	(3)
Choose dominated health plan	0.080 (0.010)	0.072 (0.009)	0.102 (0.016)
Constant	0.291 (0.010)	0.298 (0.009)	0.277 (0.015)
Definition of dominance	SOSD	SOSD	FOSD
Controls	No	Yes	No
Dep. var mean	0.364	0.364	0.369
<i>NT</i>	60,148	60,148	13,879

Notes: Table presents regression results of estimating Equation 1 that correlate the choice of a dominated health plan with the choice to forego the retirement match. Standard errors clustered by employee in parentheses. The first column presents results using second-order stochastic dominance (SOSD) without controls. The second column adds indicators for age, income, tenure, gender, faculty, calendar year, household size, and insurance coverage type as controls. The third column presents results using first-order stochastic dominance (FOSD) without controls.

point increase in the probability of not obtaining matching funds (Table 2, column 3). Relative to the baseline rate of 27.7 percent, this represents an increase of 36.8%. We also obtain qualitatively similar results if we exclude employees with observed or predicted spending that falls in the range where costs are lower in H than in L (Appendix Table D.1).⁹

The results are also qualitatively similar across different sub-samples. We estimate a strong positive correlation whether or not we restrict to medical division employees with a zero default 403(b) contribution (Appendix Table D.1), suggesting that the correlation we document is not specific to one type of default regime. We also find a positive correlation when considering employees with employee-only coverage as well as those who do not report being married, suggesting that household unobservables are unlikely to drive the results (Appendix Table D.1).

Appendix E examines whether these results generalize to other contexts using

⁹As further robustness, we consider a sub-sample of employees for whom foregoing the employer match is even more of a puzzle. Employees who are older than $59\frac{1}{2}$ and younger than 65 do not face an early withdrawal penalty from the 403(b). For that sub-sample, we find an even stronger positive relationship between puzzling choices in both domains (Appendix Table D.1).

survey data from 10 other universities merged to administrative records from the Teachers Insurance and Annuity Association of America (TIAA). The positive relationship between puzzling choices is also found in this broader set of employers and is larger in magnitude: employees who choose a dominated plan are 48% more likely to not save in supplemental retirement accounts. This analysis allays concerns that some idiosyncratic factor in our setting leads to the positive correlation in Table 2.

As another, largely equivalent, way to measure the correlation between choices, we run bivariate regressions that jointly estimate equations for each outcome and allow for correlation between the errors:

$$\begin{aligned}
 (2) \quad & \text{dominated plan}_i = x_i\theta_1 + e_{1i} \\
 (3) \quad & \text{no match}_i = x_i\theta_2 + e_{2i} \\
 (4) \quad & \text{Cov}(e_1, e_2) = \rho
 \end{aligned}$$

This specification directly delivers the unit-free correlation of the choices through ρ , which is now the parameter of interest. We estimate versions of these models with a constant alone included in x (as in column 1 of Table 2), or with demographic controls and job characteristics included in x (as in column 2 of Table 2). We estimate a positive correlation and reject the null of zero, whether we specify the equations as a linear model via seemingly unrelated regression ($\rho = 0.043$, $p < 0.0001$) or as a bivariate probit ($\rho = 0.100$, $p < 0.0001$).

B. Demographics of choice patterns

Employees who make puzzling choices in both domains are more likely to be women, more likely to be staff (as opposed to faculty), and have lower average salaries. Panel (A) of Figure 2 shows that these differences are large in magnitude and statistically significant. Comparing the top and bottom quintiles of salary, just 9% of employees earning over \$120,000 make this pair of choices versus more

than 61% of employees earning below \$40,000. Less than 15% of faculty make this set of choices compared to more than 35% staff. As shown in Panel (B), the difference by staff is attenuated after controlling for income and gender, though it remains statistically significant. The difference by gender disappears because women earn lower salaries and are less likely to be faculty. The strong income gradient persists after adding controls, raising concerns that lower-salaried employees miss opportunities to improve their financial security. Appendix Table D.2 summarizes the characteristics of employees who make other sets of choices across domains.

C. Quantifying financial losses

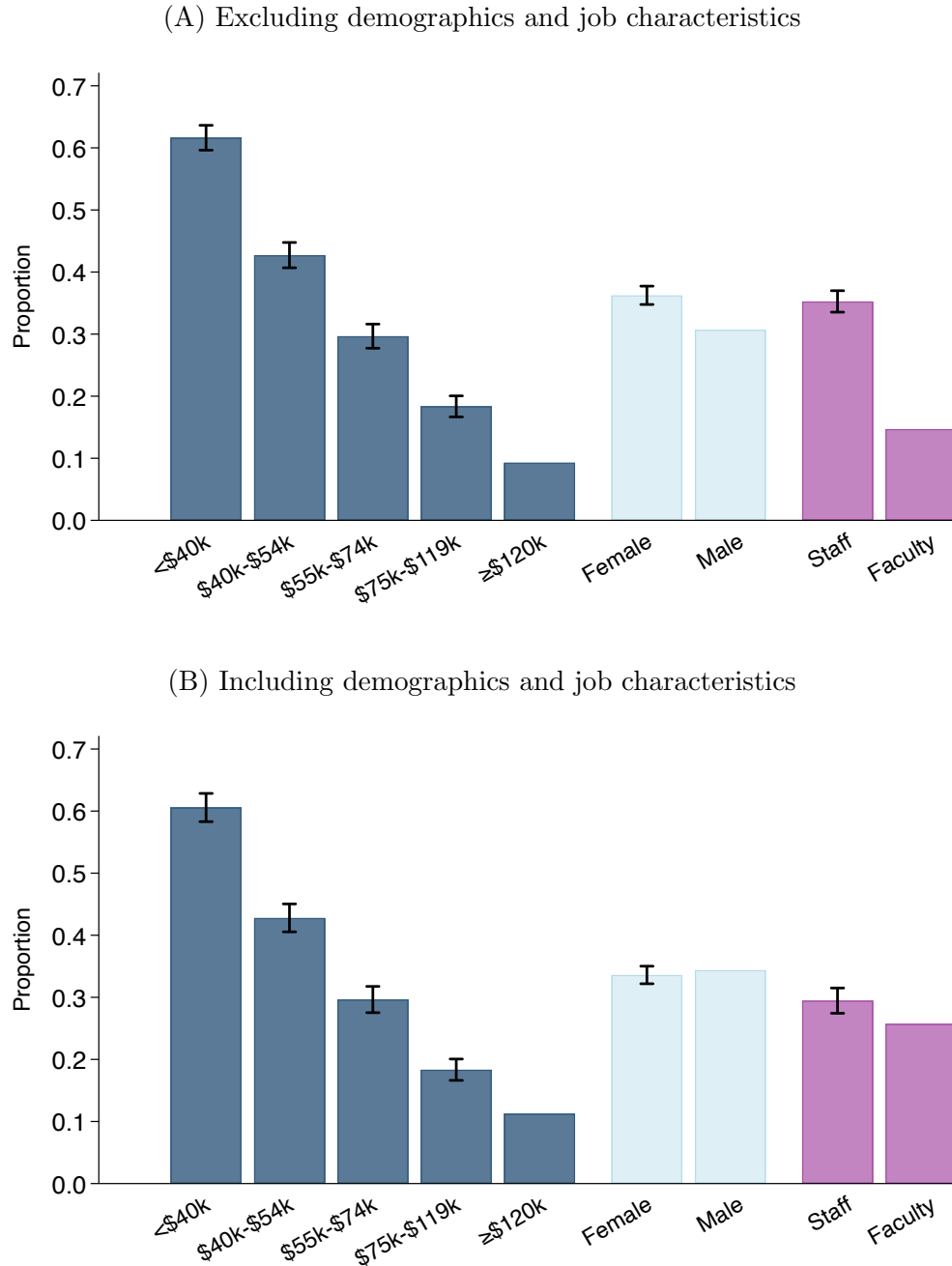
We calculate the amount of money left on the table by choosing a dominated health plan, and how much would be gained by using some of that money to get employer matching funds. We define financial losses as the sum of premiums and expected out-of-pocket payments net of employer HSA contributions in the chosen plan relative to L .¹⁰ Figure 3 shows the distribution of financial losses, which are large in magnitude. The median annual financial loss is \$1,735 and the 75th percentile is \$2,642 (Figure 3A). Put differently, financial losses exceed 2.9% of (pre-tax) salary for more than half of the sample, 3.8% for a third, and 5% for a fifth (Figure 3B), with losses reaching such a high share of salary because they predominate for lower-salary employees (Appendix Figure D.4).

By switching out of a dominated plan, this money could be consumed, saved, or used to pay down debt. If it were saved in the 403(b), many employees would receive employer matching contributions. For example, the financial losses from dominated health plans for employees who do not make voluntary retirement contributions are nearly 4.5% of their salary, on average.¹¹ In the long-term, a

¹⁰We note two factors that are not modeled in these calculations. Moral hazard would reduce the cost differences between L and either M or H . On the other hand, the HSA's tax preferences would increase the differences for employees using the account to accumulate funds over time. Incorporating these opposing forces would require making additional assumptions that we believe would complicate the comparisons without changing the conclusions.

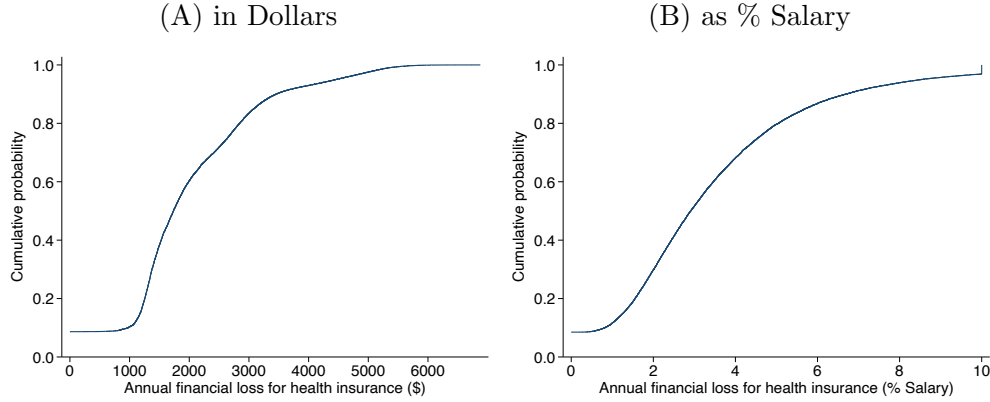
¹¹More generally, Appendix Figure D.4 presents binned scatterplots of financial losses for health

Figure 2. : Proportion who choose a dominated health plan and forego the retirement match



Notes: Figure plots the proportion of employees who simultaneously choose a dominated health plan and forego the retirement match by salary, gender, and faculty/staff status. 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. In Panel (A), the linear probability model controls for fixed effects for calendar year and coverage type. In Panel (B), the linear probability model adds controls for 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 3. : CDF of financial losses for health insurance



Notes: Panel A plots the distribution of financial losses for health insurance (in expectation) across all employees over all years in the sample in dollar terms. Panel B plots financial losses as a fraction of employee pretax salary. Financial losses are defined as the expected cost in the chosen plan relative to plan L , which stochastically dominated the other plans.

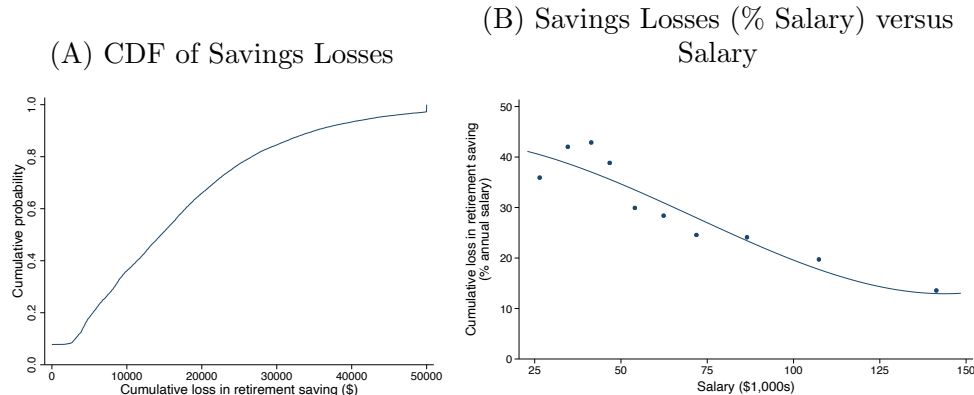
person who chooses a dominated health plan year after year and simultaneously foregoes employer matching for retirement saving will have substantially lower wealth. The negative spillovers across domains add up due to employer matching, tax preferences for retirement saving, and compounding of investment returns.

We calculate foregone retirement assets generated by observed choices in health insurance and retirement saving during our sample period, using each person's salary, estimated financial losses from health insurance choices, observed level of 403(b) contributions, and their matching schedule for 403(b) contributions. We assume a real interest rate of 2% and a future marginal tax rate of 25% (when assets are withdrawn). Figure 4 shows that the losses in retirement wealth are large for many employees. Panel A presents the distribution of foregone retirement assets from choosing a dominated health plan across the sample. Among those who make this choice at least once (over 92% of the sample), the mean of foregone retirement assets exceeds \$18,500 and the median exceeds \$15,900. Twenty-five percent of the sample incur losses over \$23,900. The present value of the average

insurance against voluntary retirement contributions.

loss exceeds \$10,000.

Figure 4. : Losses in Retirement Wealth from Choosing Dominated Health Insurance Plans



Notes: Panel A plots the cumulative distribution function (CDF) of the loss in retirement saving from the dominated health insurance choices observed during the study period. Panel B presents a binned scatterplot of the loss in retirement saving as a percentage of annual employee (pre-tax) salary versus salary in thousands of dollars. Calculations assume a 2% interest rate and 25% marginal tax rate in retirement.

One way to benchmark these magnitudes is relative to retirement assets. Based on estimates of net worth by age reported in Bhutta et al. (2020), the median loss after 30 years equates to about 7% of net worth at retirement.¹² As a percentage of salary, the losses are sizable for all employees but are extremely large for employees with lower earnings: Panel B shows the retirement losses amount to 40% of annual salary for those earning less than \$50,000. Not only are these magnitudes large, but they understate the lifetime costs because many people continued to choose dominated plans in subsequent years.

D. Evidence against stand-alone mechanisms from administrative data

The choice patterns in our administrative data provide evidence against some candidate mechanisms as a single explanation for both choices. First, we can rule

¹²Using the Survey of Consumer Finances, Bhutta et al. (2020) report the median net worth of families with a reference person aged 55–64 was \$199,200 and for those aged 65–74 was \$237,600 in 2016.

out a desire to minimize payroll deductions and maximize current consumption, which would generate a negative correlation in puzzling choices. Present-focused preferences, consumption commitments, or concerns about liquidity to finance non-health expenses could in some cases be consistent with such behavior. However, only 2% of employees choose to minimize payroll deductions by selecting the low-premium plan and foregoing retirement contributions.

Second, the puzzles that we observe are not limited to situations in which inertia may arise. While new employees (who make an active choice) are 5.6 percentage points less likely to pick a dominated health plan than are existing employees, it is still the case that more than 86% of new employees choose a dominated plan (Appendix Table G.10).¹³ On the retirement side, new employees are less likely to make voluntary contributions than existing employees, so inertia cannot explain why people leave money on the table in both domains.

Third, we consider whether liquidity constraints related to financing out-of-pocket health expenses can explain dominated plan choices. Ericson and Sydnor (forthcoming) show how borrowing costs and the timing of payments might lead people to choose a dominated health plan. The premium savings from plan *L* accrue gradually over the course of the year, but large out-of-pocket expenses can occur all at once, creating difficulty if such a shock occurs early in the year.

We simulate choices under a consumption-utility framework with borrowing constraints, as in Ericson and Sydnor (forthcoming), to assess whether dominated plan choices in our setting are consistent with an economic model in which risk-averse households face shocks throughout the year, live hand-to-mouth, and cannot borrow against premium savings. In one scenario of liquidity constraints, employees must borrow to finance out-of-pocket payments. In another scenario, employees are unable to borrow at all and forego other consumption that month to finance health care (Appendix G).

¹³Unlike in some other contexts where plans become dominated over time through premium increases (Handel 2013), plans *H* and *M* were immediately dominated when plan *L* was introduced in 2014. Not switching to the dominant plan among employees hired before 2014 may reflect a preference for the status quo or other sources of inertia.

Even if all out-of-pocket spending occurs in a single month, nearly all employees in our data are still predicted to choose the HDHP if they can borrow at annualized interest rates of 25%, which mimics credit card debt. Even at annualized interest rates of 200%, over 95% of the sample would choose the HDHP, as shown in Figure G.4 (Panel A). The reason is that the difference in out-of-pocket payments between plans is generally small and high borrowing costs for low-probability events are not enough to outweigh the large difference in premiums and HSA funds from the employer. However, fewer people are predicted to choose Plan L if they are unable to borrow at all, and at higher levels of risk aversion, less than half of the sample would choose Plan L .

In both scenarios, the employer’s HSA contribution is central. One feature of our setting that blunted the impact of liquidity constraints on employee choices is that the employer deposited the full HSA contribution in February, so employees did not need to wait for funds to accumulate. Without the employer contribution (Panel B), the share predicted to choose Plan L at annual borrowing costs of 100% decreases to 80%, and to less than 13% if they cannot borrow at all. As we show next in Section III, many people do not know the amount of the employer’s HSA contribution, so perceived liquidity constraints may induce some employees to avoid the high deductible plan even though they have more resources at their disposal. To measure employee knowledge and other mechanisms directly, we now turn to our survey.

III. Survey Evidence about Mechanisms

We use a survey of employees at the university that we study to help determine why many people both choose a dominated health plan and forego the retirement saving match. We show evidence of multiple mechanisms, and in Section IV we weigh their relative importance in explaining the correlated puzzles.

A. *Survey overview and recent health plan enrollment*

In August 2023, we implemented an incentivized survey to distinguish among four broad mechanisms. The first two mechanisms relate to the capacity to process and act on information, and the second two to budget constraints and preferences. The first mechanism involves frictions in acquiring and processing information about benefits. We asked questions eliciting what knowledge people have about benefits; time invested in benefit decisions; how people respond to complexity in their benefit choices; and how they choose to devote attention when faced with complexity. In two cases, one following the literature and one novel, we experimentally tested the importance of frictions. The second mechanism is financial literacy, which, as a reflection of general financial knowledge, may help reduce information frictions that are specific to benefits. The third mechanism involves concerns about liquidity. The fourth mechanism is an aversion to deductibles, which we interpret as a form of non-standard preferences, resulting from psychological costs of thinking about paying out-of-pocket for health care.¹⁴

We measure benefit choices using responses to survey questions because we do not have access to administrative data from recent years. Between 2018 (the last year of administrative data) and 2023, enrollment in plan *L* grew substantially. According to discussions with the university’s Human Resources department, just over half of employees chose plan *L* (which remains dominant) in 2023. This increase follows the same rate of growth as in the initial 5 years, when enrollment grew from 5% to 15% (Table 1). By contrast, enrollment in plan *H* fell substantially and became the least popular choice. Premiums in all plans increased during this time but did so the most in *H*. The university also invested resources in helping employees consider different options, including adding a second decision support tool and providing illustrations of premiums and out-of-pocket payments

¹⁴We also simply asked respondents who did not choose plan *L* why they did not. We listed several possible explanations, which we expressed in lay terms to facilitate responses, and we allowed respondents to select up to three reasons. The range of those responses, reported in Appendix Table G.1, provide support for all the mechanisms described here.

in each plan if the out-of-pocket maximum was reached (Appendix Figure A.5). We cannot attribute the decline in dominated plan choices over this period to a specific mechanism because of these multiple changes, which occurred simultaneously and are also confounded with learning that may have occurred through experience.

Among our survey’s respondents, 48.7% choose a dominated plan and 15.4% forego the match. Moreover, we now find a stronger positive correlation between choosing a dominated plan and foregoing the retirement savings match in our survey data than in the earlier period (Appendix Table F.2).

Beyond questions about mechanisms and benefit choices, we asked about demographics, household income, and financial assets. Appendix F presents the survey questionnaire and other details, including balance tables for experimental treatments.¹⁵ As measures of external validity, survey respondents have similar demographics, income, and job types as non-respondents based on publicly available information, and similar predicted insurance and saving choices based on observables (Appendix Table F.1).¹⁶

B. Descriptive Survey Responses

We begin by simply tabulating the percentage of employees making puzzling choices based on their responses to the survey’s key questions. Table 3 organizes questions according to the four mechanisms described above. We focus on summarizing the main patterns here, with Appendix G showing supplementary regressions.

Frictions in acquiring and processing information: The first three questions in Panel A consider what information people have acquired about their

¹⁵The pre-registration for the survey can be found on AsPredicted: https://aspredicted.org/TSQ_CH8. Table 3 reports means for a subset of variables used to measure frictions in acquiring and processing information and all variables for the three other mechanisms.

¹⁶All of our results are robust to weighting by the inverse probability of survey response, computed using demographic controls, or restricting to those who pass the survey’s attention check (Appendix G).

health insurance and retirement saving plans. Research in other settings finds that many employees are poorly informed about several features of HDHP/HSAs (Handel and Kolstad 2015a, Brot-Goldberg et al. 2017), more general aspects of health insurance (Loewenstein et al. 2013, Bhargava, Loewenstein and Sydnor 2017), and retirement benefits (Bernheim and Garrett 2003, Duflo and Saez 2003, Chan and Stevens 2008, Bhargava and Conell-Price 2022).

We find that employees who correctly answer factual questions about their plans are far less likely to make puzzling choices. Among those enrolled in dominated plans, 30.1% know that the HSA rolls over and 7.4% know the employer's HSA contribution, in contrast to 88.6% and 54.1% of those in the HDHP, respectively. Similarly, among those who did not receive the match, 47.8% know there was a match compared to 87.3% who received the match. Correct answers are also positively correlated across domains: employees who know that the employer matches 403(b) contributions are 32% more likely to know the employer's HSA contribution and 42% more likely to know that HSA funds roll over. While this information is readily available on the university's website and in other employer-provided materials, we cannot determine whether respondents knew this information before making their choices or only learned it afterward. Our quantification of mechanisms in Section IV therefore considers models with and without these three questions to bound their importance.

We also asked employees about their attention to benefits decisions. We asked how long respondents spent choosing their health plan and retirement savings, with options ranging from less than 5 minutes to an hour or more. In the case of health insurance, time spent on the decision is unrelated to choosing a dominated health plan. But time is predictive for the retirement saving puzzle, where those who spent less than five minutes were twice as likely to forego employer matching funds (Appendix Figure G.2). People who spend more time in one choice tend to spend more time in the other domain too (Appendix Table G.4), in contrast to the possibility that attention in one domain crowds out attention in the other.

Following Stango and Zinman (2023), we asked whether respondents believe their household’s long-run finances would improve with more attention, and asked a parallel question about health insurance. Respondents who report being already very attentive are least likely to make puzzling choices, while those who say choices are “too difficult” regardless of attention are most likely to do so. Those who say they regret not spending more attention also make puzzling choices more often than those who pay attention. We find limited evidence for rational inattention based on this question: differences in puzzling choices between those who say attention requires too much time or effort and those who are attentive are not statistically significant (Appendix Figure G.1). Responses to these attention questions are highly correlated across domains (Appendix Table G.11). Attention is also positively associated with benefits knowledge (Appendix Figure G.7), suggesting that these dimensions of information frictions are related.¹⁷

Financial literacy: To understand how generalized knowledge relates to the benefit-specific knowledge on which we focused above, our survey included the “Big Three” financial literacy questions about compound interest, inflation, and diversification (Lusardi and Mitchell 2014). Prior research shows that financial literacy impacts retirement planning and a range of other financial behaviors and that financial education improves financial literacy (Kaiser et al. 2022). Panel B shows that those who answer correctly are more likely to avoid dominated plans and obtain retirement matching funds.

Liquidity: Our survey included two questions to assess the role of liquidity. Following the question developed by Lusardi, Schneider and Tufano (2011), employees who are less confident about financing a \$2,000 emergency expense within 30 days are more likely to choose dominated plans and forego retirement saving.

¹⁷The survey included an attention check to assess whether people were reading carefully, and to test whether paying attention in the survey correlated with actual choices. Respondents who failed the attention check were 19% more likely to choose a dominated health plan in real life (Appendix Figure G.3).

We also asked a question about the trade-off between premiums and deductibles for planning purposes, which may matter to individuals who face liquidity constraints. We find a strong monotonic relationship between agreement with the statement that higher premiums help with budget planning and the rate of dominated plan choices.

Table 3—: Summary of Main Survey Questions and Benefit Choices

Survey Question	Dominated Health Plan (%)	Forego Retirement Match (%)
Panel A. Frictions in acquiring and processing information		
<u>Domain-Specific Knowledge</u>		
<i>Which statement is true about the Health Savings Account (HSA)?</i>		
HSA funds roll over from year to year (61.1%) [correct]	24.4	12.2
If I don't use funds in a given year, they will be lost (22.4%)	83.5	18.7
Not sure (16.5%)	86.5	22.5
<i>What is the University's contribution to your HSA if you choose</i>		
<i>PLAN L?</i>		
Less than \$500 (4.9%)	48.7	16.7
\$500 to \$999 (5.9%)	29.0	12.0
\$1,000 to \$1,499 (26.4%) [correct for employee-only coverage]	15.8	12.2
\$1,500 to \$1,999 (14.7%) [correct for all types of family coverage]	13.2	12.8
\$2,000 or more (5.3%)	36.5	1.2
Not sure (42.8%)	81.3	20.6
<i>Does the University match 403(b) contributions?</i>		
The University matches some of my contributions (81.6%) [correct]	46.3	9.0
The University does not match any of my contributions (4.9%)	44.3	16.5
Not sure (13.5%)	58.7	52.7
<u>Self-Assessed Attention</u>		
<i>Would your long-run finances (retirement planning, allocation of savings/investments, etc.) improve if you paid more attention to them?</i>		
Yes, and I often regret not paying greater attention (45.1%)	54.5	17.9
Yes, but paying more attention would require too much time/effort (12.9%)	36.5	16.9
No, my finances are set up so that they don't require much attention (17.7%)	38.8	5.9

(Continued on next page)

Table 3 – Summary of Main Survey Questions and Benefit Choices (continued)

Survey Question	Dominated Health Plan (%)	Forego Saving Retirement Match (%)
No, my household is always very attentive to these matters (17.4%)	46.8	12.4
No, these choices are too difficult no matter how much attention I devote (6.4%)	53.4	17.9
<i>Would your health insurance choices improve if you paid more attention to them?</i>		
Yes, and I often regret not paying greater attention (16.5%)	52.6	15.6
Yes, but paying more attention would require too much time/effort (11.1%)	51.4	15.6
No, my household is already very attentive to these matters (62.2%)	44.8	13.5
No, these choices are too difficult no matter how much attention I devote (10.2%)	56.1	17.8
Panel B. Financial Literacy		
<i>If \$100 earns 2% interest yearly, what is the balance after 5 years?</i>		
More than \$102 (89.4%) [correct]	46.0	14.2
Exactly \$102 (3.0%)	61.2	30.6
Less than \$102 (2.8%)	71.7	10.9
Not sure (4.8%)	63.6	29.9
<i>If savings grow at 1% and inflation is 2%, how much can you buy next year?</i>		
More than today (4.7%)	48.7	18.7
Exactly the same (3.9%)	49.2	31.7
Less than today (81.2%) [correct]	45.6	12.7
Not sure (10.2%)	66.1	29.1
<i>Buying a single company's stock usually offers a safer return than a stock mutual fund</i>		
True (28.0%)	58.5	19.5
False (69.0%) [correct]	42.4	11.3
Not sure (2.5%)	60.7	24.8
Panel C. Liquidity		
<i>Could you come up with \$2,000 for an emergency expense within 30 days?</i>		
I am certain I could come up with the full \$2,000 (63.9%)	43.0	10.9
I could probably come up with \$2,000 (16.9%)	50.9	14.2
I could probably not come up with \$2,000 (6.5%)	57.1	29.5
I am certain I could not come up with \$2,000 (9.7%)	65.2	29.1
Not sure (3.0%)	64.6	41.7
(Continued on next page)		

Table 3 – Summary of Main Survey Questions and Benefit Choices (continued)

Survey Question	Dominated Health Plan (%)	Forego Saving Retirement Match (%)
<i>I prefer higher premiums and lower out-of-pocket costs to a lower premium because it helps me plan a budget</i>		
Strongly Agree (15.1%)	78.6	19.3
Agree (26.7%)	58.5	14.7
Neither Agree nor Disagree (19.2%)	48.4	17.5
Disagree (25.1%)	29.0	12.7
Strongly Disagree (13.8%)	27.5	14.4
Panel D. Non-Standard Preferences: Payment Aversion		
<i>I prefer a lower deductible to a lower premium to avoid thinking about paying out-of-pocket costs in case I'm sick</i>		
Strongly Agree (16.6%)	68.1	19.0
Agree (31.0%)	55.7	17.9
Neither Agree nor Disagree (20.5%)	43.9	16.0
Disagree (22.4%)	34.0	10.7
Strongly Disagree (9.5%)	27.1	8.7

Notes: Table tabulates insurance and saving choices by survey responses, organized according to the four mechanisms. See Appendix F for the exact wording of each question, which have been condensed here for space. The percentage of respondents with each response is listed in parentheses after the response.

Payment Aversion: In choosing their health insurance plan, people may experience a “pain of paying” the deductible, as in Prelec and Loewenstein (1998): they may avoid the HDHP because they experience a psychological cost in paying out-of-pocket for each visit or service before reaching their deductible, rather than paying upfront as a premium. Panel D shows that employees who prefer lower deductibles to avoid thinking about out-of-pocket payments are more likely to choose dominated plans. Among those who strongly agree with this preference, 68.1% choose a dominated plan compared to 27.1% of those who strongly disagree. This pattern suggests that some employees may choose dominated plans even if they recognize the financial costs, because they wish to avoid psychological costs of paying at the point of service.

C. Experimental Results: Simplifying Health Insurance Menus

We showed above that people report a lack of knowledge of key benefit parameters. We now turn to our two experimental treatments, which causally test mechanisms related to information frictions. Choosing a health insurance plan is particularly complicated, requiring information across plans on multiple parameters (premiums, deductibles, coinsurance, out-of-pocket maximum, and, if it is an option, HSA funds). Processing this information is further complicated by uncertain spending, which requires that people calculate a distribution of costs. Prior research shows that clarifying financial consequences helps many consumers avoid dominated plans (Bhargava, Loewenstein and Sydnor 2017, Samek and Sydnor forthcoming). Given this possibility, our survey included an experimental treatment that varied how information was presented and, in one case, linked information across health insurance and retirement plan choices. We summarize the treatments and results here, with details of the regression specifications in Appendix G.

This experiment replicated the choice set that respondents face while controlling information about the distribution of health costs and randomly varying how the choices were presented. All participants were offered a hypothetical choice among three plans resembling their actual options, with Plan 3 (low premium, high deductible, HSA) stochastically dominating the others. Participants were told they could expect to spend one of three possible amounts on health care, with a probability attached to each. We presented two decision frames in random order, and participants were asked their preferred plan after seeing each frame. The complex frame (Figure 5, Panel A) resembled real-world settings: a table listed the features of each contract. The simplified frame visualized the annual financial consequences of each choice (premiums plus out-of-pocket payments) without including plan parameters (Figure 5, Panel B). A second simplified version added information about potential retirement savings after 20 years from avoiding the high premium plan, if the reduction in health care costs were contributed to the

retirement account (Figure 5, Panel C).

Using between-subjects variation, we compare the initial choice of those who first see the complex frame to the initial choice of those who first see one of the simplified frames. Figure 6 illustrates that being shown the simplified frame with financial consequences reduced the probability of making a hypothetical dominated choice by 17% relative to the 55% of respondents who first saw the table menu (Panel A). The effect is larger for those who pass the attention check and for those with below-median household income (Appendix Table G.5). These reductions are meaningful, though smaller than the 62% decline from menu clarification in Bhargava, Loewenstein and Sydnor (2017), which involved strict rather than stochastic dominance. Samek and Sydnor (forthcoming) similarly find that effects of simplification are about half as large when plans are stochastically dominated. Contrary to our expectations, the frame that included additional retirement savings had little effect on the insurance choice, undoing the gain from the simplest frame. We had hypothesized that visualizing consequences in multiple domains would lead to larger effects by helping people frame decisions more broadly.

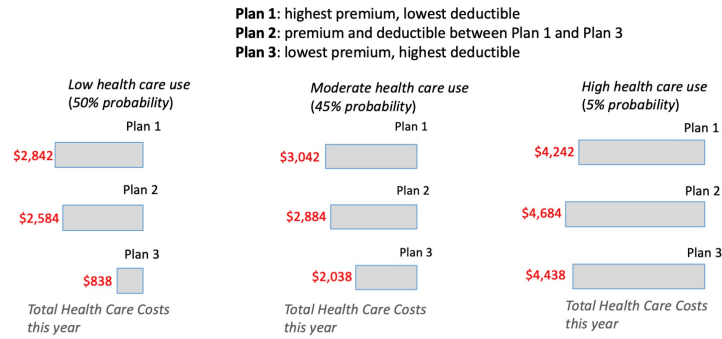
We next use the respondent's sequential choices to study choice reversals, which occur when people first choose a dominated plan under the complex frame but then not under the simplified frame. About 22% of respondents exhibited such reversals. This group is more likely to report choosing a dominated plan in real life, as shown in Panel B of Figure 6: 64.9% of those who exhibit choice reversals choose a dominated plan in real life versus 47.0% of those who do not. This pattern suggests that complexity contributes to dominated plan choices in the real world. Among respondents whose choice remained the same across frames, dominated choices are strongly associated with stated preferences for low deductibles due to payment aversion or budget planning (Appendix Figure G.5 and Appendix Figure G.6), pointing to reasons why some people may choose dominated plans even if they recognize the financial costs.

Figure 5. : Experimental Treatment: Insurance Menu Simplification

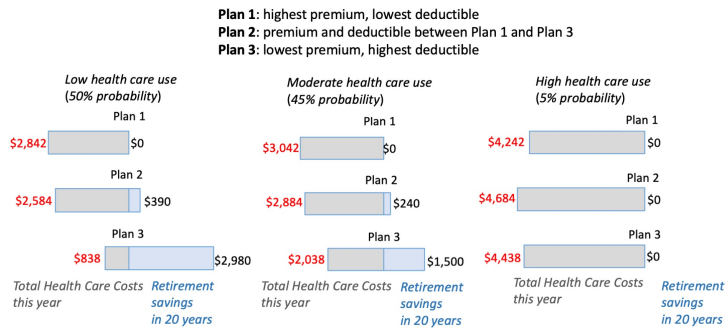
(A) Complex Frame: Table with Plan Features

	Plan 1	Plan 2	Plan 3
Monthly premium	\$191	\$132	\$49
Annual Deductible	\$500	\$1,000	\$2,000
Coinsurance Rate	10%	15%	20%
Annual out-of-pocket maximum	\$5,000	\$5,000	\$5,000
Employer HSA contribution	\$0	\$0	\$750

(B) Simplified Frame: Figure 1

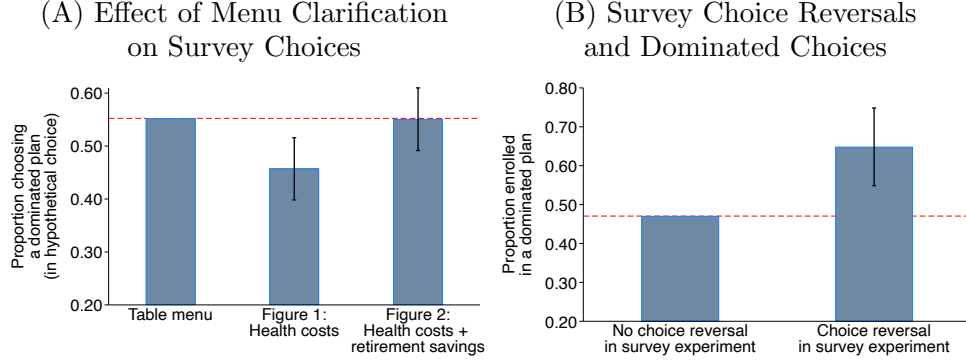


(C) Simplified Frame: Figure 2



Notes: Figure presents images shown in the complex and simplified menu. See Appendix F for a complete description of each decision frame and for images displayed for those with family coverage. Respondents were randomly assigned to see either Figure 1 (Panel B) or Figure 2 (Panel C) in the simplified menu, in addition to the Complex Menu (Panel A). The order of which menu came first in the survey was randomized.

Figure 6. : Experimental Results: Menu Clarification and Choice Reversals



Notes: Panel A presents proportion of survey respondents who choose a dominated plan according to the menu they are randomly assigned to see first, based on between-subject comparisons. Panel B presents results from a linear regression of choosing a dominated plan in the employee's actual choice and choice reversal in the survey experiment, which is an indicator variable corresponding to whether the employee initially chose a dominated plan under the complex menu and then did not choose a dominated plan under the simplified menu (within-subjects comparison).

D. Experimental Results: Opting Out of Benefit Choices

We examined the role of attention and complexity aversion through an experimental treatment that mimics the decision of whether to attend to choices about benefits. Motivated by lab studies finding that people are willing to pay to avoid complex tasks (Oprea 2020), we offered participants a chance to win extra money if they attempted and correctly answered additional optional questions about benefits. The five questions, which appeared at the end of the survey, were designed as vignettes asking the participant to advise a friend on health plan choices and as calculations of compounding in savings. The health insurance vignette specified that the friend's objective is to minimize their expected health care costs, to abstract from preferences and yield a single correct answer.

Participants were randomly assigned to earn either \$10 per correct question (up to \$50 total) or \$40 per correct question (up to \$200 total), if randomly selected for payment. Importantly, the expected payout was uncertain; while we announced we would select 100 winners, the number of respondents from which the 100 would

be drawn was unknown. This setup better captures the consequences of real-life benefit decisions, which involve financial ambiguity about how much might be gained from devoting attention, than does a deterministic or probabilistic payout. Participants had to choose whether to attempt the questions or skip to the end of the survey. We hypothesized that those who opted out would be more likely to choose a dominated health plan in real life because of inattention or complexity aversion.

Columns 1–3 of Table 4 present results that correlate the decision to opt-out with making one of the puzzling choices in real life. As predicted, those who skipped the questions were over 20% more likely to report choosing a dominated plan (60% vs. 47.5%). We did not detect a statistically significant relationship between opting out and foregoing retirement contributions, suggesting that attention and complexity aversion may be particularly relevant for health insurance.

The remaining columns of Table 4 test whether the size of the financial stakes affects the decision to skip the question and the number of questions answered correctly. 12.3% of participants offered \$10 per correct question opted out, compared to 7.3% offered \$40. The higher payment arm also increased the number of questions answered correctly. These results provide direct evidence that the decision to attend to complex tasks responds to financial stakes, and extends other attention-based explanations of insurance choices (Brot-Goldberg et al. 2023, Brown and Jeon 2024).

Finally, the decision to devote attention varies by income in a nuanced way, as shown in Appendix Table G.3. Lower-income households were less likely to skip the questions. But conditional on attempting, higher-income households answered more questions correctly. Fewer correct answers among lower-income employees offset their higher likelihood of attempting, and they earned 14% less in incentive payments. Handel et al. (2024) hypothesize that people with higher income either pay more attention or are more skilled when they do pay attention. Our results suggest the latter force is strong enough to outweigh a lower propensity

by higher-income individuals to devote attention.

Table 4—: Experimental Results: Opt-Out Task

	Dominated health plan	Forego retirement match	Dominated plan & forego match	Opted out	# of questions correct (if opted in)	(with 0s)
	(1)	(2)	(3)	(4)	(5)	(6)
Opted out of incentivized task	0.125 (0.041)	0.012 (0.033)	0.010 (0.026)			
Higher incentive payment				-0.049 (0.015)	0.137 (0.081)	0.228 (0.079)
Constant	0.475 (0.013)	0.153 (0.009)	0.090 (0.007)	0.122 (0.011)	2.02 (0.056)	1.77 (0.055)
Observations	1643	1621	1621	1643	1483	1643
R^2	0.006	0.000	0.000	0.007	0.002	0.005

Notes: Columns (1)–(3) present linear regressions of insurance and saving choices against the indicator for whether the participant opted out of the incentivized task at the end of the survey. Column (4) presents a linear probability model (LPM) of the decision to opt-out against an indicator for being randomly assigned to receive \$40 payment per correct question instead of \$10 per correct question. Columns (5)–(6) present results of the number of questions answered correctly against the higher incentive indicator: column (5) restricts to those who attempted the questions, while column (6) includes zeros for those who opted out. Robust standard errors in parentheses.

IV. Quantification of Mechanisms

We now assess the relative importance of each mechanism by re-estimating the bivariate regressions in Equations (2)–(4) using the survey data. These regressions jointly estimate one equation for choosing a dominated health plan and another for foregoing the retirement plan match, while allowing for correlated errors between the two equations. We assess the importance of each of the four mechanisms—information frictions, financial literacy, liquidity, and payment aversion—based on how they influence the model’s fit to the data and the correlation (ρ) between the errors.

Our main specification is a bivariate probit, and so we measure model fit using the likelihood ratio index, which 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 $LL(\theta) = 0$. Since the mechanisms include different numbers of survey questions, we also assess model fit using the Akaike information criterion (AIC), which 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. To fully capture each mechanism elicited in our survey, we include a full set of indicators for the responses to the relevant survey questions. For example, we include indicators for each possible response (including being unsure) to each of the three financial literacy questions. Appendix G lists the survey questions for each mechanism.

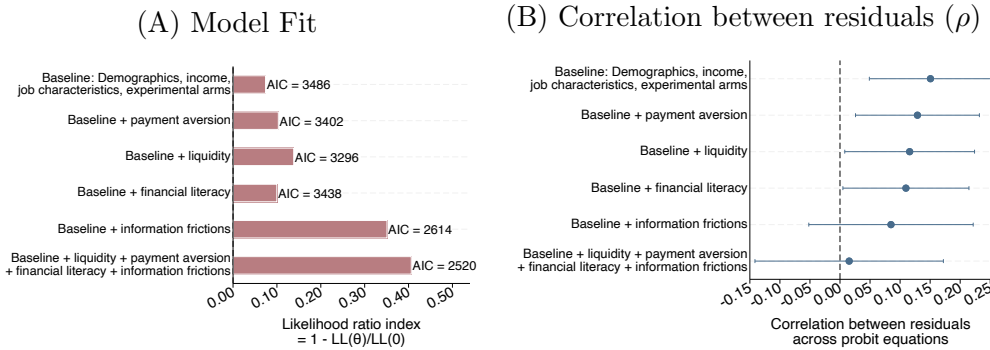
We begin with a baseline regression that controls for demographics, household income, job characteristics, expected health spending, and experimental arm. Compared to choices predicted by chance alone (i.e., no model), these baseline variables increase the log likelihood by 7.5%, as shown in the top row of Panel A of Figure 7. Adding the baseline variables leaves a correlation of 0.152 between the residuals of the regression equations, as shown in the top row of Panel B. We can strongly reject the null of no correlation ($p = 0.003$).

Subsequent rows of Figure 7 show the impact of adding mechanisms to the baseline model. Only slight improvements in model fit occur from controlling separately for liquidity, payment aversion, or financial literacy, though we can statistically reject that any of these models are equivalent to the baseline based on likelihood ratio tests. Adding them reduces the AIC, indicating improved model fit. The correlation between the residuals falls in each case, but the 95% confidence intervals still reject the null of zero correlation. Thus, these three mechanisms modestly help explain choices.

In contrast, controlling for frictions that reflect the difficulty of acquiring and processing information leads to substantial improvements in model fit. The increase in the likelihood ratio index from adding information frictions to the base-

line model is four times larger than the increase when adding liquidity, and over 10 times larger than when adding financial literacy or payment aversion.¹⁸ The same is true when considering reductions in the AIC. Information frictions also explain much of the positive correlation in choices; controlling for frictions reduces the correlation coefficient between residuals to 0.08 and eliminates its statistical significance.

Figure 7. : Bivariate Probit Regressions: Model Fit and Estimates of ρ



Notes: Figure presents results of bivariate probit regressions of choosing a dominated health plan and foregoing the retirement match. The baseline model includes indicators for age, gender, marital status, household income, academic or medical division, faculty, tenure, and expected health spending as measured in the survey. Each row adds different sets of mechanisms to the baseline model (see Appendix G for details), while keeping the same set of respondents across models ($N = 1,607$). As a measure of the goodness of fit, Panel A plots the likelihood ratio index, defined as 1 minus the ratio of the log likelihood of that model, $LL(\theta)$, to the log likelihood from the null model that restricts all coefficients to zero, $LL(0)$. Panel B plots the correlation coefficient (ρ) of the residuals from each outcome equation and its associated 95% confidence interval.

Finally, the bottom row shows that including all four mechanisms measured in the survey further improves model fit. It is also the only specification that effectively eliminates the positive correlation between residuals, reducing its magnitude to 0.01.¹⁹ We obtain qualitatively similar results here and elsewhere in our analysis when restricting to medical division employees whose default 403(b)

¹⁸The influence of information frictions on the log likelihood does not occur because it is represented by more variables than the other mechanisms. A model with information frictions alone improves log likelihood by almost twice as much as baseline characteristics and the other three mechanisms combined, even though the frictions-only model includes less than half as many parameters (Appendix Table G.13).

¹⁹Although the individual confidence intervals overlap, there are statistically significant differences in the ρ estimates across models: the p -value on the test of no difference in ρ between the full model with all mechanisms (bottom row) and the baseline model plus information frictions is 0.02.

contribution is zero (Appendix Figure G.8), which suggests our conclusions about mechanisms do not depend on the default regime (Goda et al. 2020).

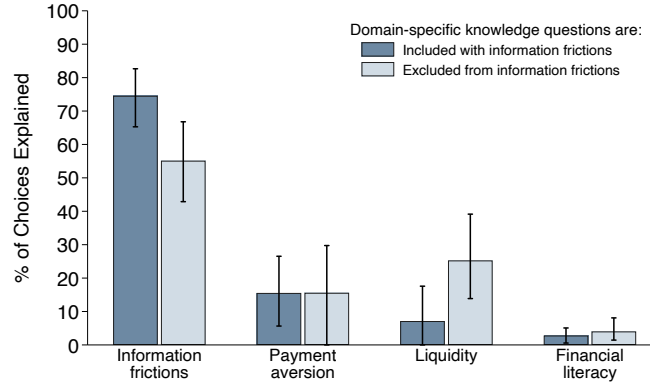
It is possible that the mechanism variables are measured with error in our survey. If this measurement error is uncorrelated with the benefit choices, then it attenuates the estimated probit coefficients, while biasing the residual correlation upward. Our estimates of the explanatory power of these factors should therefore be interpreted as a lower bound. However, the residual correlation falls close to zero when all mechanisms are included, suggesting that measurement error is not obscuring substantial unexplained correlation.

We use this final model with all mechanisms to assess descriptively each one’s importance in explaining choices. For each mechanism, we predict the reduction in puzzling choices if that mechanism were to be “turned off” by recoding the corresponding variables. We choose the strongest coding for each response to be able to differentiate as sharply as possible between mechanisms. For example, to remove the influence of liquidity, we predict choices if each person responded that they could “certainly finance a \$2,000 emergency expense” and that they “strongly disagree” with the statement that they prefer higher premiums to higher deductibles because it helps them plan a budget. We undertake these predictions for each mechanism one at a time, holding regressors for the other mechanisms at their observed values.

We first consider a model that includes the three domain-specific knowledge questions as part of information frictions and then consider a model that omits them. As a reminder, one potential concern with the domain-specific knowledge questions is that some people may only learn about these features after making their health and retirement decisions. Excluding the three variables assumes that people have learned about these features after making their choices, reflecting a lower bound on the importance of information frictions.

We start by describing results that consider domain-specific knowledge as part of information frictions (dark blue bars). Removing information frictions alone

Figure 8. : Quantification of Mechanisms: Predicted Choices from Bivariate Probit



Notes: Figure plots predicted changes in puzzling choices from each mechanism, standardized to sum to 100 across the four mechanisms, where information frictions exclude the three knowledge questions. Changes are calculated using the final model that includes all mechanisms, turning off each mechanism one at a time while holding other regressors at their observed values. Results are split by whether information frictions include the three questions about knowledge of employer HSA contributions, whether HSAs roll over, and whether employer matches 403(b) contributions (dark bars) or excluded (light bars). Whiskers denote 95% confidence intervals calculated by bootstrapping 200 samples.

is predicted to reduce the share of puzzling choices by more than 46 percentage points (from 55.5 to 8 percent). The predicted declines are much smaller for the other three mechanisms: removing payment aversion, liquidity constraints, or financial illiteracy would reduce the shares by 9.7, 4.5, and 1.8 percentage points, respectively. Figure 8 standardizes these predicted reductions to sum to 100% across the four mechanisms for ease of interpretation. Frictions in acquiring and processing information are the decisive factor in about three-quarters of choices. Payment aversion accounts for about 15%, followed by liquidity (7%) and financial literacy (3%).²⁰ As a lower bound, we find frictions remain the decisive factor in over 50% of choices if we exclude the three domain-specific knowledge questions (light blue bars). This exercise reinforces the conclusions from Figure 7 that information frictions are of primary importance, although the others still help to

²⁰As an additional technique to measure the importance of each mechanism and account for their correlation, Appendix G performs a Shapley-Owen decomposition (Shapley 1953, Owen 1977) based on improvements in AIC and likelihood ratio index using models with each possible combination of mechanisms reported in Appendix Table G.13. That decomposition yields a similar quantitative conclusion that information frictions are the decisive factor in about three-quarters of choices.

explain puzzling choices and their correlation. When removing the influence of all mechanisms simultaneously, the model predicts that over 98% would choose the HDHP and obtain the match.

V. Discussion

It is well-established that many people depart from standard economic models of behavior when it comes to choices about health insurance or retirement saving (Beshears et al. 2019, Chandra, Handel and Schwartzstein 2019). However, whether such behavior is correlated across domains has remained largely unexplored. We provide novel evidence about a positive correlation in puzzling choices in employee benefit decisions, which are made each year and carry sizable financial consequences. Using administrative data from a large university, we document that people who choose a dominated health plan are less likely to contribute to supplemental retirement accounts, sacrificing employer matching funds. One-third of employees do both. For those employees, financial losses from their health insurance choice, which average over 4% salary per year, could be reallocated to retirement saving (generating an employer match), current consumption, or debt reduction. The positive correlation between these puzzling choices is not restricted to our setting, arising in ten other universities that offer dominated health plans.

Using a survey of the employees at the university that we study, we find that frictions in acquiring and processing information are the decisive factor in 50–75% of choices. These frictions are multifaceted, as our results point to the importance of knowledge about benefits, responses to complexity in benefit options, and the choice of whether to devote attention when faced with complexity. Information frictions in each domain are positively correlated within individuals, consistent with Stango and Zinman (2023). A smaller share of choices can be explained by preferences about benefit features, including preferences for liquidity, consistent with Ericson and Sydnor (forthcoming), or an aversion to deductibles, reflecting

psychological costs of thinking about paying to access health care.

Our finding that the same employees make costly decisions across domains, and that these employees have lower average salaries, has direct implications for the design of employer-sponsored benefits. Because information frictions explain the majority of puzzling choices and are positively correlated within individuals, policies that reduce these frictions in one domain may yield spillovers to the other. Our survey, which revealed both descriptive findings about mechanisms and causal effects of interventions in hypothetical choices, points to several policy options ranging from light-touch information provision to more involved adjustments to choice architecture or restrictions on menu options.

Starting with information provision, the correlation we document suggests that employers could improve outcomes by presenting health and retirement choices through a unified framework. Although employees often receive information about both sets of benefits during the same enrollment period, the choices are presented separately, without guidance on how they might interact financially. Our analysis indicates that employees who lack knowledge about HSA features also tend to lack knowledge about retirement matching, suggesting that an integrated approach might highlight their complementarities (Friedberg et al. 2023). We found that clarifying the financial costs of health insurance choices yielded modest improvements in choice quality, although our effort to simultaneously highlight both domains failed. Therefore, further research is needed to identify tools that improve awareness without adding complexity, which can reduce active engagement. In other contexts, more comprehensive decision support tools have reduced dominated health insurance choices (Samek and Sydnor forthcoming) but have not been tested when encompassing multiple domains. A tool that directly alleviates liquidity concerns might be particularly fruitful, as they arise in both domains.

A more proactive approach that alters choice architecture is “smart defaults” into benefit choices based on prior choices and demographics. Such defaults have been proposed in the health insurance setting (Handel and Kolstad 2015*b*) and

could incorporate past spending data. Doing so might put decisions about health plans each year “on automatic”, in the same way that Target Date Funds (TDFs) do in retirement plans. TDFs automatically adjust portfolios towards less stock market exposure as individuals age, in line with standard models of optimal life-cycle savings, and are now the default investment across many employers following the 2006 Pension Protection Act. With health insurance, individuals could be defaulted to a plan that best matches their spending risk unless they opt out. Our survey showed that employees who do not actively engage with one set of choices tend to disengage from the other as well, suggesting that defaults in both domains may be especially valuable for these employees. This points to the possibility of using some of the premium savings that individuals would gain from being defaulted into the low premium health plan to make retirement plan contributions that deliver an employer match.

A more involved policy, which shifts the burden of action to the employer rather than the employee, would be to ensure that no health insurance plan is dominated by auditing plan offerings and altering premiums and deductibles as necessary. Such an obligation may be similar to the fiduciary and non-discrimination requirements that employers face in retirement plan administration. Menus can still include a choice of deductibles to satisfy those who are averse to paying out-of-pocket, either because of psychological costs of paying or a demand for liquidity, or to match heterogeneity in risk aversion. Employers could use average cost pricing to produce an initial premium for each plan and then adjust relative premiums if one plan dominates before finalizing their menu. Either the dominant plan’s premium could be raised or the dominated plan’s premium lowered. This approach has the advantage of preserving choice, in contrast to offering a “one-size fits all” plan. Evaluating its implications would require a structural model of plan choice that incorporates adverse selection across plans, which could build on our insights to determine equilibrium plan offerings that avoid dominated choices. While some empirical research concludes that a single health plan is

often optimal given limited heterogeneity in consumer risk preferences (Marone and Sabety 2022), additional heterogeneity arising from liquidity constraints or payment aversion, as we document, might justify maintaining multiple options.

The upshot of our analysis is that employers can focus on improving choice outcomes by taking a holistic view of benefit design and its cumulative impact on employee compensation. The correlation that we uncover reveals the scope for improvement from such coordination, as employees who choose dominated health plans substantially overlap with those who forego retirement matching. Because lower-earning employees are significantly more likely than their higher-earning colleagues to leave money on the table in both domains, the aggregate costs of these decisions contribute to significant wealth disparities over time. Consequently, complex benefit menus may increase inequality more than employers intend. Implications also arise for federal policy, which offers substantial tax incentives for HSA-eligible plans and employer-sponsored retirement accounts. Our finding that many employees simultaneously miss out on multiple tax breaks indicates that these tax incentives merit joint consideration.

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