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

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Abstract

Many people struggle to make financial decisions. Extensive research documents behavior inconsistent with well-informed consumers maximizing their expected utility of consumption. It remains unknown, however, whether such choices are linked across financial domains. Using a combination of administrative and survey data, we find that the quality of health insurance and retirement saving decisions are positively correlated. 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, simultaneously choosing a dominated plan and not contributing to supplemental retirement accounts results in giving up over $7,000 in savings over four years. Using a survey that includes a novel experiment, we find evidence that choices are partly explained by processing frictions and cognition, which include knowledge of benefits, complexity, inattention, and financial literacy. Other choices are instead explained by liquidity constraints or an aversion to out-of-pocket payments.

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1 Introduction

People face an increasingly complex set of financial decisions in daily life (Gomes, Haliassos and Ramadorai 2021). They must determine the best way to save, invest, borrow, insure, and pay for goods and services. The growth and complexity of decisions in today's economy are due to factors that include technology (e.g., E-trade and Robinhood), more frequent job changes (Copeland 2023), and public policy designed to provide consumers with a menu of options (e.g., health insurance and retirement saving) rather than a single one.

This proliferation of choices can pose challenges to the quality of consumer decision-making. Across a variety of domains, behavior often deviates from the standard economic model of informed consumers making choices that maximize their expected utility of consumption (Agarwal, Chomsisengphet and Lim 2017, Beshears et al. 2019). Much of this research suggests that many people make low-quality choices. Such behavior can inhibit the efficiency of markets and affect the distribution of surplus (DellaVigna 2009, Akerlof and Shiller 2015, Campbell 2016, Bubb and Warren 2020).

Less is known, however, about how the quality of consumer choices correlates across financial domains. It is critical to assess whether the same people make low-quality choices in multiple domains, or whether people "get it right" in some decisions but not in others. The correlation between choice quality might be positive if a common factor explains behavior in both domains. It might be negative if people concentrate effort on one domain, leaving them less time or attention to make choices in another. Understanding this correlation—along with the mechanisms that drive behavior—can help inform how to target assistance to particular individuals and across multiple decisions, a difficult problem given the risk of information overload (Chernev, Bockenholt and Goodman 2015). This issue is particularly relevant in light of reduced economic mobility and increased inequality. Lusardi, Michaud and Mitchell (2017) estimate that differences in financial sophistication account for 30–40 percent of U.S. wealth inequality. Determining whether people exhibit low choice quality across multiple domains—and, if so, why—may help improve the economic security of households.

In this paper, we analyze the correlation of choice quality in two domains with large financial consequences: health insurance and retirement saving. We consider two puzzles in decision-making that have been separately documented in household finance. In the case of health insurance, many people choose dominated plans, leading them to overpay for coverage (Handel 2013, Bhargava, Loewenstein and Sydnor 2017, Ericson and Sydnor 2017). In the case of retirement saving, many people forego employer matching contributions (Madrian and Shea 2001, Benartzi and Thaler 2007, Choi, Laibson and Madrian 2011), leaving money on the table. Using administrative panel data from 2014 to 2017 from a large public university

and an extensive survey of its employees, we investigate how and why these puzzling choices in health insurance and retirement saving are linked.

The menu of health insurance and retirement benefits offered in our setting provide advantages to study this question. The high-deductible health plan (HDHP) with a Health Savings Account (HSA) stochastically dominates the other two plans for almost all employees, which is common among many employers (Liu and Sydnor 2022). In our setting, we find most people choose dominated plans even though the financial stakes are particularly high; on average, employees who do not select the HDHP pay an extra $1,700 for health insurance each year.[1] As for retirement saving, alongside the mandatory plan are two supplemental voluntary saving plans: a 403(b) and a 457. Employees receive a 50% match on 403(b) contributions, with the employer annually matching up to 4% salary for some employees and up to $960 for others. Employees are immediately vested in all funds and can take in-service loans on their contributions. Over one-third of employees, however, do not contribute to the 403(b) and so forego employer matching funds.[2] For brevity, we refer to the behavior of simultaneously choosing a dominated health plan while not contributing to either supplemental account and therefore foregoing the employer match as making "puzzling choices in both domains."

We detect a large and statistically significant positive correlation between puzzling choices in insurance and saving. People who choose a dominated health plan are less likely to contribute to voluntary retirement plans. In terms of magnitudes, the likelihood of foregoing employer matching is 29% higher among those who choose a dominated plan. Over the four years of our sample, those who make puzzling choices in both domains lose over $7,000 in retirement savings, on average, were the money saved from avoiding dominated health plans reallocated to retirement accounts and matched (to the extent available) by the employer. These employees are more likely to have lower salaries, lower household income, and lower educational attainment, and to be women or non-white, than employees who avoid at least one puzzling choice. This correlation in puzzling choices generalizes outside of our setting based on survey data of employees at ten other universities from Davis, Leive and Gellert (2023) linked to administrative records managed by the Teachers Insurance and Annuity Association of America (TIAA).

[1] By comparison, the overpayments were below $400 in Bhargava, Loewenstein and Sydnor (2017). Many other studies have assessed choices when plans are not dominated, in which the difference in costs is often lower (Abaluck and Gruber 2011, Ketcham et al. 2012, Heiss et al. 2013, Ketcham, Kuminoff and Powers 2019, Keane et al. 2021, Gruber et al. 2020, Handel et al. 2022).

[2] The 457 plan is also tax-advantaged, but does not have a match. It offers complementary liquidity provisions to the 403(b) because 457 funds are illiquid while working but can be withdrawn penalty-free after separation, regardless of age. In our sample, 457 plan participation is very low: 5.2% of employees make any contributions and 0.7% contribute to the 457 but not the 403(b).

After establishing this positive correlation in puzzling choices, we investigate underlying mechanisms. We first note that several mechanisms commonly studied in health insurance and retirement saving decisions cannot, on their own, explain why people make puzzling choices in both domains. In particular, time preferences, inertia, and a desire to maximize take-home pay would predict puzzling choices in a single domain but not in both domains.[3] We designed a novel survey of employees at the university to directly test other mechanisms that may explain behavior in both domains.[4] Our primary focus is on measuring mechanisms related to how consumers acquire and process information when making financial decisions. To this end, we examined knowledge about benefits, complexity, and inattention and collectively refer to these factors as *processing frictions*.[5] As a related measure of cognitive skills, we also measure financial literacy (Hastings, Madrian and Skimmyhorn 2013, Lusardi and Mitchell 2014, 2023). Second, we measure and analyze *liquidity constraints*. Third, we consider *non-standard preferences* by measuring employee aversion to particular characteristics of health insurance plans.

Our analysis of processing frictions begins by showing that employee knowledge about benefits plays an important role in explaining puzzling choices in both domains. People who understand key features of HSAs are much more likely to avoid dominated plans. People who know that the employer matches 403(b) contributions are more likely to make supplemental retirement contributions. Knowledge is also positively correlated across domains: people who correctly answer questions about HSAs are more likely to know about the 403(b) match. This result is consistent with prior research that has examined each domain separately, showing that information affects choices in health insurance (Loewenstein et al. 2013, Handel and Kolstad 2015) and retirement saving (Duflo and Saez 2003, Bernheim and Garrett 2003, Chan and Stevens 2008). Financial literacy is positively correlated with benefits knowledge.

[3]Not saving in supplemental retirement accounts could reflect low discount rates or models of "present focus" (Ericson and Laibson 2019), but a strong preference for money today would imply choosing the HDHP because it minimizes payroll deductions. Choosing benefits that maximize take-home pay is also consistent with concerns about borrowing to finance consumption commitments or expenses besides health care. Less than 2% of employees make this set of choices during the first four years of the HDHP. Inertia predicts the opposite set of choices. We find evidence of inertia in employee health insurance choices, consistent with prior research (Handel 2013), although over 90% of new employees still choose a dominated plan. Inertia operates in reverse with retirement saving: new employees are less likely to contribute to retirement accounts—an empirical regularity dating back at least to Madrian and Shea (2001).

[4]We fielded the survey in August 2023, which was six years after the last year of our administrative records. Survey answers were anonymous and not linked to administrative records. Over this time, the share of dominated choices had fallen from nearly 90% to just below 50% at the university, as premium differentials continued to widen and the employer introduced additional decision supports. We show in Appendix F that the positive correlation between dominated choices and not saving in supplemental retirement accounts is stronger in the 2023 survey data.

[5]Stango and Zinman (2023) interpret two of the four behavioral types as representing processing-based models of decision-making, and we adapt that term here.

While both have independent explanatory power, financial literacy is less important than domain-specific knowledge of benefits in explaining choices.

Next, we find that the complexity of health insurance explains why some people choose dominated health plans, consistent with prior experimental studies (Bhargava, Loewenstein and Sydnor 2017, Samek and Sydnor 2023). We asked participants to choose a health plan under two different decision frames: a complex menu that presented each plan's premiums, deductibles, and other financial characteristics; and a simplified menu that presented the financial costs of the same plans in a bar graph. We randomized the order of which menu participants saw first. Our experimental results show that clarifying the financial consequences of insurance plan choices lowers the probability of choosing a dominated plan in hypothetical choices by 17%. We also designed a second version of the simplified menu that added the amount of retirement savings possible after 20 years if the difference in costs relative to the high premium plan were allocated to retirement accounts. This treatment was intended to encourage people to evaluate their health insurance and retirement saving choices together rather than in isolation, motivated by the possibility of narrow bracketing (Tversky and Kahneman 1981, Rabin and Weizsäcker 2009) and mental accounting (Thaler 1985, 1999). Contrary to our hypothesis, presenting future retirement savings alongside health costs did not affect hypothetical choices relative to the complex frame.

We further evaluate complexity by leveraging the survey's within-subjects design, comparing changes in hypothetical plan choices under different decision frames to the respondent's actual plan choices. People who reverse their choice by initially choosing a hypothetical dominated plan in the survey's complex frame and then not in the simplified frame are more likely to be enrolled in a dominated health plan in real life. This pattern is consistent with the idea that complexity partly explains dominated choices.

A related factor is attention, which is required to both understand benefits and make complex choices. Our survey measured attention in multiple ways. We asked questions developed by Stango and Zinman (2023) about whether people believed their benefit choices would improve if they paid more attention to them, with responses to distinguish rational inattention (Mackowiak, Matějka and Wiederholt 2023) from other forms of inattention (Gabaix 2019). People who report being inattentive are more likely to choose a dominated plan and forego supplemental retirement saving compared to those who report being very attentive. Splitting choices by the reason for inattention reveals limited evidence of rational inattention, as measured by the response that improving choices would require too much time or effort. Instead, people who regret not paying more attention in each domain or who say that choices are too difficult no matter how much attention they devote to them are more likely to make puzzling choices in each domain. We do not observe that people

conserve their attention by focusing on one domain at the expense of the other: attention to both domains is positively correlated. We document that knowledge about benefits is highly correlated with attention.

We also designed an incentivized task intended to simulate the real-life decision of whether to attend to the complex task of choosing benefits. At the end of the survey, we offered participants the chance to win extra money if they correctly answered additional vignette-style questions about health insurance and retirement saving. The monetary reward for correct answers varied randomly between participants[6] Before seeing the five additional questions, participants had to choose whether to attempt them or conclude the survey. As hypothesized, those who skipped these questions were more likely to report choosing health plans that were dominated in real life. This finding is consistent with an aversion to complexity documented in lab studies, in which subjects are willing to pay to avoid performing cognitively-demanding rules (Oprea 2020).

This task yielded two other important results regarding attention. First, financial stakes matter: the higher payment increased the probability of attempting the questions by 30%, pointing to potential interventions that emphasize the financial implications of benefits decisions. Second, attention varied by income; lower-income participants were more likely to attempt the questions but less likely to answer them correctly conditional on trying. On net, lower-income respondents earned smaller incentive payments despite devoting more attention to the task. This result suggests the greater frequency of puzzling choices among lower-income employees is not due to a lack of effort. Collectively, these findings provide new evidence on the importance of attention, and are consistent with recent research that propose attention-based models to explain why some Medicare beneficiaries do not choose the lowest cost prescription drug plan (Abaluck and Adams-Prassl 2021, Heiss et al. 2021, Brown and Jeon 2023, Brot-Goldberg et al. 2023).

Turning to the second category of mechanisms, we find that concerns about liquidity matter in both domains. We asked the question developed by Lusardi, Schneider and Tufano (2011) about people's confidence in financing a $2,000 emergency expense within the next month. Those who are uncertain about their ability to pay for the expense are more than twice as likely to simultaneously choose a dominated plan and forego employer retirement matching. It is possible, however, that employees might perceive liquidity differently if they fully understood their benefits, given employer funding in both the 403(b) and HSA and because loans or withdrawals are available. The magnitude of this correlation remains

[6]To encourage survey participation, 100 participants were randomly chosen to receive $150. Participants were then randomly assigned to receive an additional $40 per correct answer or $10 per correct answer if they were among the 100 participants randomly chosen for payment.

statistically significant but is cut in half after controlling for benefits knowledge and financial literacy—consistent with the idea that a complete understanding of plan details should reduce concerns about liquidity. On the health insurance side, supporting evidence arises from implementing a simulation in the spirit of Ericson and Sydnor (2022) to assess whether the timing of expenses within the year can explain avoidance of HDHP/HSA plans for people who must borrow at high interest rates to finance out-of-pocket costs. We find that this framework may explain 5 to 10% of dominated health plan choices in our context. A second survey question corroborates this explanation; people who choose dominated health plans are more likely to report preferring higher premiums and lower deductibles to lower premiums and higher deductibles because higher premiums help them plan a budget.

Finally, some dominated health plan choices likely reflect (non-standard) preferences rather than processing frictions or liquidity constraints. Here we draw on recent approaches in behavioral public economics that elicit choices under complex and simplified decision frames to assess "mistakes" (Bernheim and Taubinsky 2018, Ambuehl, Bernheim and Lusardi 2022). In the survey's hypothetical choices, many survey respondents do not reverse their choice of dominated plan even after financial costs are clarified. We also find that an aversion to out-of-pocket payments partly accounts for both actual and hypothetical choices of dominated plans among this set of people. These employees report a greater willingness to pay higher premiums to avoid thinking about whether they should pay out-of-pocket each time they use care. This preference is consistent with psychological models of a "pain of paying", as in Prelec and Loewenstein (1998).

Our paper makes three main contributions. First, we link the two large literatures that separately document puzzling choices in health insurance and retirement saving (Chandra, Handel and Schwartzstein 2019, Beshears et al. 2019). We find that it is often the same people who make choices inconsistent with standard economic models in each domain. This result has implications not just about important decisions in household finance but also for modeling behavior more generally. While economic models seeking to characterize welfare often invoke the Envelope theorem, our findings call this assumption into question by showing that some people simultaneously make sub-optimal decisions across multiple contexts.

Second, we provide novel evidence on mechanisms that drive decisions in health insurance and retirement saving. While prior research typically focuses on one mechanism in isolation, our survey enables us to directly test multiple mechanisms. Our evidence points to the importance of *processing frictions* in explaining puzzling choices in both domains. But we also find heterogeneity across people, with other choices instead explained by liquidity constraints or by non-standard preferences. Information about such mechanisms is relevant to assess which choices reflect mistakes and to consider the trade-offs between different types

of policies (Handel and Schwartzstein 2018). By examining specific mechanisms in multiple real-world benefit choices, our findings are complementary to and consistent with the findings of Stango and Zinman (2023), who begin to develop a taxonomy of consumer behavior by correlating lab-style elicitations of common biases and preferences.[7]

Third, we build upon recent work that documents income and education gradients in the quality of health insurance choices (Handel et al. 2022). By studying choices across domains, our results suggest that high health insurance expenses combined with low choice quality may pose an unrecognized barrier to retirement preparedness for many workers.[8] These results provide new evidence on sources of significant inequalities in lifetime financial outcomes by income, education, gender, and race (Lusardi and Mitchell 2008, Goldin 2014, Tamborini, Kim and Sakamoto 2015, Bosworth, Burtless and Zhang 2016, Bhutta et al. 2019) and highlight equity considerations in broader debates about the value of offering consumers a choice of health insurance plans (Ericson and Sydnor 2017, Ketcham, Kuminoff and Powers 2019, Ho and Lee 2023, Marone and Sabety 2022, Brown and Jeon 2023).

While the focus differs, our paper complements other research examining household financial decisions across different domains. Jørring (forthcoming) finds that people who incur late fees in consumer banking are more likely to lose money by misallocating credit card debt or failing to refinance their mortgage when it is optimal to do so. 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. Other research uses various benefit choices to test whether risk preferences are consistent across domains. Einav et al. (2012) use data on employee benefit choices from a large manufacturing firm and find that only about 30% of employees make consistently risk-averse choices across their health insurance and 401(k) plans. Using a survey of military members, Bell et al. (2018) find that risk preferences are positively correlated across multiple domains.

2 Setting 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 describe the university administrative data on employees, and we discuss the main features of their health insurance and retirement plan options. Appendix A provides additional details about the setting.

[7]Other studies examine within-person correlations of different preferences, cognitive abilities, and demographics (Dean and Ortoleva 2019, Chapman et al. 2023, Falk et al. 2018), but focus less on factors related to decision quality.

[8]For the debate about whether Americans are saving enough for retirement, see Scholz, Seshadri and Khitatrakun (2006), Skinner (2007), and Munnell, Rutledge and Webb (2014).

The administrative data from the university report annual earnings, semiannual demographics, monthly retirement plan contributions as a percent of earnings, annual health insurance choices, and annual health care spending data of each employee and dependent. Our data on earnings are collapsed into bins (of \$10,000–\$20,000 intervals) in order to eliminate the possibility that an individual could be identified.[9] Demographic information consists of employee gender, age collapsed into bins (generally of five-year intervals) and marital status (which is incompletely collected). We further observe category of employment (faculty versus staff), 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, rather than providing granular line-item claims. We focus on choices over the years 2014–2017, following the introduction of a third health insurance plan that stochastically dominated the two existing plans.

2.1 Health insurance choices

2.1.1 Plan descriptions

Prior to 2014, employees had a choice between two conventional plans that differed in their premiums and the share of medical costs they covered. In 2014, the university introduced a high-deductible plan (HDHP) with a health savings account (HSA).[10] The HDHP/HSA has substantially lower premiums and, with the high deductible, offers lower coverage than the other two plans. We therefore characterize the three plans offered as the high, medium, and low-coverage plans and abbreviate them as *H, M*, and *L*, respectively.

In spite of these terms, all the plans are relatively generous. Based on claims across the sample period, the actuarial value of the plans, defined as employer payments as a share of employer plus employee out-of-pocket (OOP) payments, is about 88% in expectation for the high-coverage plan, with employees paying 12% out-of-pocket; about 85% for the medium-coverage plan; and about 77% for the low-coverage plan.[11] Similar to other

[9] Employee salaries are freely available online because the university is public.

[10] An 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 services other than vision and dental are only available for the medium and high coverage plans.

[11] The definition of actuarial value does not include employee premiums. In 2014, the percentage of

employers, the university contributes the same amount in premiums for each plan and plans with more generous coverage have higher employee premiums.

Each plan has the same provider network, so differences between plans are only based on premiums and other plan parameters determining financial risk: deductibles, co-pays, co-insurance rates, and annual out-of-pocket limits. The major differences across plans are in premiums and, for the low-coverage plan, the high deductible together with the employer contribution to the HSA. For example, annual premiums were $2,904, $1,092, and $360 for the high, medium, and low coverage plans in 2015, for employee plus spouse coverage. While the deductible was $500, $1,000, and $4,000, respectively, the employer made an unconditional HSA contribution of $1,500 that year for the low-coverage plan.[12] All plans cover preventive care for free.

The structure of the 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. As shown in Appendix Table A.2, fourteen out of nineteen offer an HDHP/HSA plan, and among those, nine make substantial contributions to the HSA (for example, between $600 and $2,000 for family plans). The premium differences between the low and high-coverage plans are often large too. As we discuss later, the universities included in the survey by Davis, Leive and Gellert (2023) offer similar menus to the employer studied here. Finally, many employers outside of the education sector offer an HDHP/HSA alongside traditional plans, as reported in Liu and Sydnor (2022), confirming that the plan offerings in our setting are fairly typical.

2.1.2 Dominated health plans

Consumers should not choose a dominated plan if they seek to maximize the expected utility of consumption.[13] We focus on second-order stochastic dominance (SOSD) of the cost distribution for each plan. 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. A consumer with a utility function that is non-decreasing and concave prefers a gamble that second-order stochastically dominates an alternative gamble. As a more stringent definition, we also consider first-order stochastic

spending covered by the high and medium plans were 90% and 87%, respectively, because the deductibles were lower for these plans.

[12]Other plan parameters were more similar; the co-insurance rate was 10% in the high coverage plan, compared to 20% in the medium and low coverage plans. The annual out-of-pocket maximum was also similar across plans, at $10,000, $11,000, and $12,000 in 2015 for the high, medium, and low coverage plans. Appendix Table A.1 presents parameters for 2015 and 2017 for all coverage levels, and Appendix Figure A.1 graphically shows the differences for family coverage.

[13]We consider the possibility of liquidity constraints explaining dominated plan choices as in Ericson and Sydnor (2022) in Section 4.

dominance (FOSD), meaning that one gamble yields a higher value in each state of the world (i.e. for each possible realization of costs). Our main results focus on SOSD since only a minority of the sample faces a choice with FOSD. 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 and dividing all employees (and dependents) into cells based on age, gender, and total health spending in the prior year.

We define costs for each insurance plan as the sum of premiums and OOP costs, less any employer HSA contributions. We scale premiums by $1 - \tau$, where τ is the employee's marginal tax rate, to account for the tax preference for premiums. Appendix C describes our procedure for imputing marginal tax rates for each employee. We treat the employer's HSA contribution as a premium reduction in calculating the costs of the low coverage plan. Given that the HSA has superior tax preferences to all other savings products as analyzed in Leive (2022), HSA contributions are worth at least this amount.

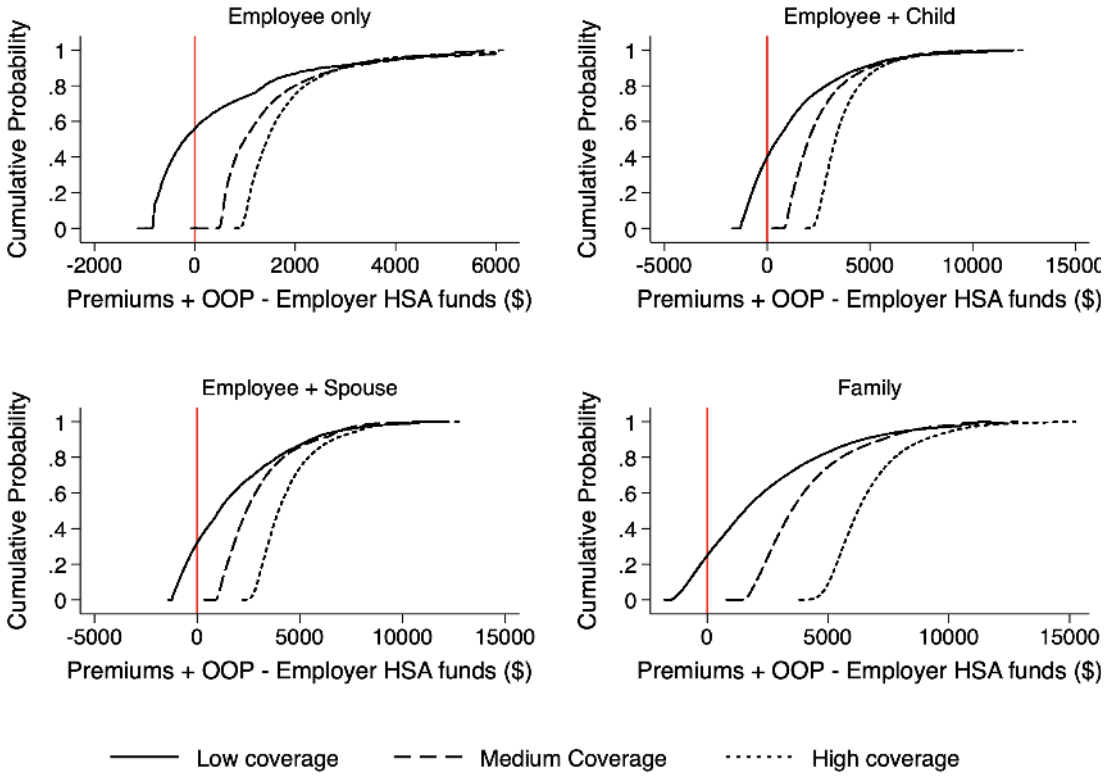
During our sample period, over 93.8% of employees in our sample face a menu with a stochastically dominated health insurance plan. The employer's large HSA contribution, along with the much lower premiums and only slightly higher risk-sharing compared to the other two plans, lead to stochastic dominance. We exclude the minority of observations from our analysis for whom we cannot determine whether a plan is stochastically dominated. For the same reason, 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. This restriction reduces the remaining sample by 4.2%, and we note over 82% of employees have zero out-of-network spending.

Figure 1 presents cumulative distribution functions (CDFs) of health care costs for the three plans in 2017, separately by the four different types of family coverage. These graphs pool all employees and the total costs they would face in each plan (inclusive of premiums, out-of-pocket costs, and employer HSA contributions). Each employee faces a particular distribution of costs under each plan according to their marginal tax rate and their age, gender, and lagged health spending, along with that of any dependents.[14] In both Figure 1 and Appendix Figure D.1, the differences in possible spending outcomes between the three plans is stark. The low coverage plan almost always has the lowest costs, followed by the medium coverage plan, and the high coverage plan has the highest costs. Due to the employer's HSA contribution to the low coverage plan, much of the CDF lies below zero: the plan is heavily subsidized. Over time, the differences in costs between plans grew as

[14] As an illustration for one employee, Appendix Figure D.1 presents the CDFs for 40-year old male and female employees with employee-only coverage in the median tercile of lagged health spending.

premiums and deductibles rose in the medium coverage and in the high coverage plan.[15]

Figure 1: Cumulative distribution functions of health care costs in 2017



Notes: Figure plots empirical cumulative distribution functions (CDFs) of health care costs across all employees under each available health insurance plan in 2017. Plan L second-order stochastically dominates the other plans. The distribution of L located to the left of the vertical red line at zero denotes the fraction of cost realizations that would result in negative costs due to the employer HSA contribution.

In keeping with the literature, Appendix Figure D.3 plots costs versus total health spending for the three plans. The density of spending is also overlaid to aid visualization of the second-order stochastic dominance seen in Figure 1. While L does not always have the lowest costs for *every* level of spending, those spending draws are quite rare, and in some cases, the costs are only moderately higher in L versus H or M.

2.2 Retirement saving choices

The university has both mandatory and supplemental (voluntary) savings plans. Employees differ in their eligibility for a university-sponsored defined contribution (DC) plan with required contributions and a state-sponsored hybrid plan with a defined-benefit component. Faculty have a choice for their mandatory plan while the majority of staff are enrolled in

[15] Appendix Figure D.2 plots the CDFs for 2014, which show similar patterns.

the hybrid plan.[16] All employees can choose additional voluntary contributions regardless of their mandatory retirement plan. These voluntary contributions can be directed to a 403(b) plan and also to a state-run 457 plan, with Roth versions of both available.[17]

The employer matches 403(b) contributions at a 50% rate, with limits that differ across academic and medical divisions. The match is substantial for most employees in the medical division: employees hired after 2002 receive the match for contributions up to 4% of their salary. The match limit is smaller ($960 per year) for medical division employees hired before this date and for all employees in the academic division.[18] Employees are immediately vested for their own contributions and matching contributions from the employer.

Employees may borrow against their 403(b) contributions, providing considerable liquidity. Loans can be taken for up to 5 years, with an interest rate that is closely tied to the prime rate. The principal and interest on loans is repaid periodically with after-tax dollars. In the case of default, the loan amount is considered a withdrawal and subject to income taxes and, if younger than than $59\frac{1}{2}$, a penalty tax of 10%. These terms are similar to features of retirement plan loans in other settings (Lu et al. 2017).

The main retirement outcome we examine is not receiving any employer matching funds. We consider not contributing to the 403(b) as a puzzle from the perspective of maximizing expected lifetime consumption given the combination of tax-preferences, liquidity, and matching; a 50% risk-free return from the employer 403(b) match is high compared to other investment opportunities, and 403(b) contributions are not completely illiquid because employees are immediately vested and can take loans while working. The dependent variable in our empirical analysis is whether the employee did not contribute to either the 403(b) or 457. To be conservative, we do not consider the decision to contribute to the 457 but not the 403(b) as necessarily departing from expected utility maximization. 457 contributions are illiquid prior to separation, but then become completely liquid regardless of age. Less than 1% of the sample contributes to the 457 but not the 403(b), and our results do not depend on how we consider 457 decisions. 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.

Nevertheless, we acknowledge that unlike the case with choosing a dominated health

[16] As explained in Appendix A, the mandatory contribution rates varied between 10.4% salary and 13.9% salary depending on the employee's date of hire.

[17] The 403(b) and 457 options are subject to separate, identical IRS contribution limits, each equal to the 401(k) limit, meaning that public-sector university employees are able to contribute twice as much to retirement plans as can most other employees. The tax-deferred and Roth options of each are jointly subject to the contribution limit.

[18] The more generous match rate for employees in the medical division hired after 2002 coincided with a reduction in the employer's contribution to the mandatory account from 8% salary to 4% salary.

plan, it is less definitive that foregoing matching funds necessarily deviates from expected utility maximization. Data on insurance claims for the entire employee population helps pin down health spending expectations, whereas several factors like family structure, past financial circumstances, and expectations of life expectancy and future spending needs are both heterogeneous and unobservable in administrative data, but may change the marginal utility of saving versus consuming in a particular year.

2.3 Sample selection and descriptive statistics

We select our sample to focus on employees with the opportunity to make choices in both domains. Starting with records for 24,939 employees during the 2014-2017 period, we restrict the sample to those who are: (i) staff or faculty; (ii) full-time employees; (iii) under age 65; (iv) annual salaries over $20,000; (v) enrolled in the employer's health insurance plan; (vi) not in their first year of tenure; (vii) have 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 about 17% of employees from the initial sample). In focusing on staff and faculty, we exclude students, post-doctoral scholars, house-staff, and a small number of employees with other non-standard employment designations. We drop employees over age 65 since Medicare coverage becomes available and that itself represents a separate choice which excludes the HDHP/HSA (dropping about 4% of the initial sample's employees). We exclude employees with very low salaries since they may face different choice sets via Medicaid or highly subsidized Affordable Care Act coverage, or they may be employed full-time but for only part of the year (dropping 7% of the initial sample's employees). We exclude employees who opt out of the health insurance plan (dropping 6% of the initial sample's employees). Finally, we drop the employee's initial year of employment for two reasons. First, the initial year is generally a partial year (e.g. September-December) and so features a different calculation of health insurance costs. Second, our prior study of retirement plan contributions in this setting found that most employees ramp up their voluntary contributions within the first year (Friedberg, Leive and Cai 2023). This restriction drops about 9% of the initial sample's employees. Finally, we drop employee-year observations in which the choice set did not include a dominated plan, as discussed above. This selection process yields an analytic sample of 16,096 employees spanning 43,360 employee-years.

Table 1 presents descriptive statistics for the sample. 56% work in the academic division and 44% in the medical division. The mean salary is $73,770 and there is large variation across employees (SD = $44,311). The average age is 45 years. Tenure with the employer—over 10 years, on average—is long in comparison to other U.S. settings. Most employees in our sample choose a stochastically dominated health plan. Fifty-nine percent

of the sample choose H (the high coverage plan), about one-third choose M (the middle coverage plan), and 6% choose L (the low coverage plan). Average total health spending per employee, including any dependents, is \$8,248 (SD = \$28,030). In terms of retirement saving, employees contribute 4.3% of salary to supplemental retirement plans and 64% participate in either the 403(b) or 457. Most of this saving occurs in the 403(b); among the set of employees contributing to either account, 91% contribute only to the 403(b), 1% contribute only to the 457, and 8% contribute to both accounts.

Table 1: Summary Statistics

	Mean	SD
Annual salary (\$)	73,770	44,311
Age (years)	45.07	11.20
Faculty (%)	0.19	0.39
Academic division (%)	0.56	0.50
Tenure with employer (years)	10.26	9.26
Female (%)	0.62	0.48
Household size	2.05	1.26
Low coverage plan (%)	0.06	0.24
Middle coverage plan (%)	0.34	0.47
High coverage plan (%)	0.59	0.49
Total health spending (\$)	8,248	28,030
Voluntary retirement contribution rate (% salary)	4.28	7.09
Voluntary retirement participation (%)	0.64	0.48
N	16,096	
NT	43,360	

Note: Table presents means and standard deviations of demographic and outcome variables in sample. Administrative data on employees at a large public university during 2014-2017. N denotes the number of unique employees and NT the number of employee-years. Salaries and total health spending are not adjusted for inflation.

3 Choice Patterns Across Domains

In this section, we first classify employees into four groups based on their choice patterns across both domains and describe the composition of each group. We then run linear probability models to quantify the relationship between choosing a dominated health plan and not receiving any employer matching contributions for retirement saving. Finally, we discuss the magnitudes of how much money is "left on the table", both in dollar terms and relative to annual salary, from these decisions.

3.1 Demographics and Descriptive Regressions of Choice Patterns

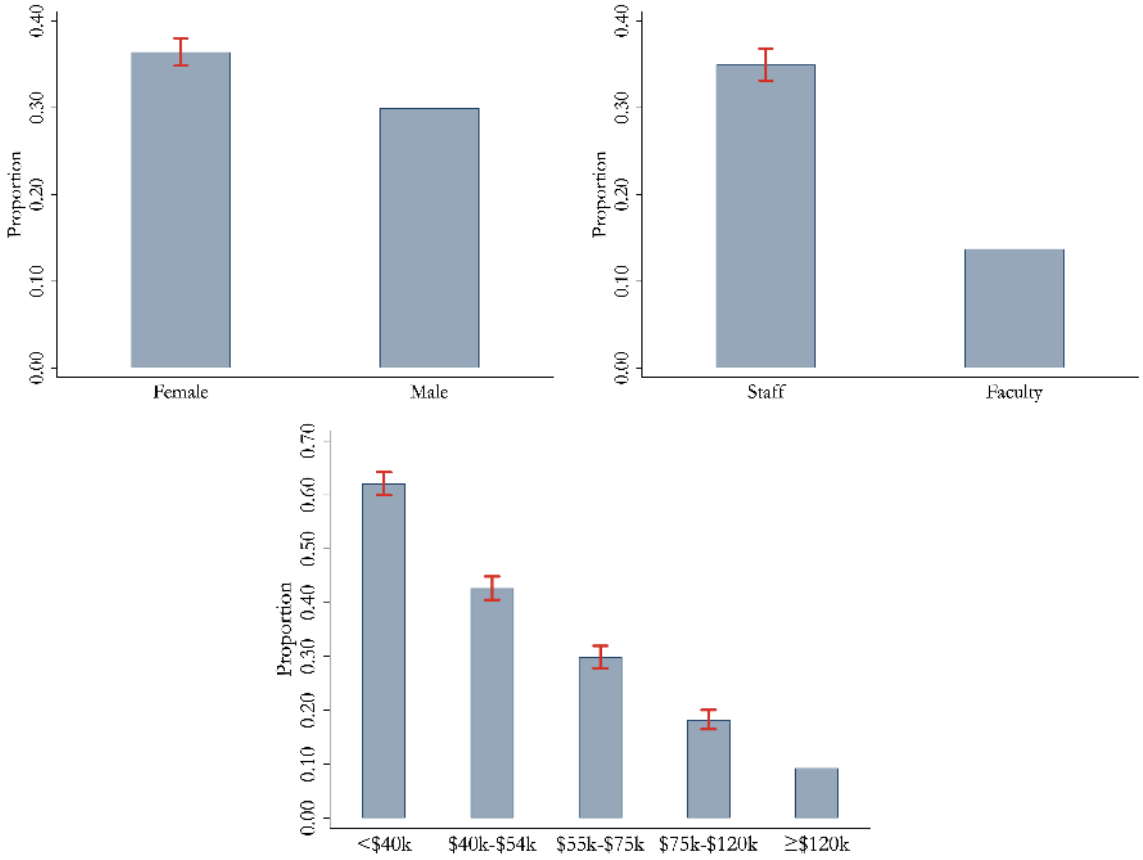
During the first four years of the HDHP, fewer than 5% of employees avoid a dominated plan and simultaneously receive employer matching funds. This small group of employees tend to have higher salaries, are more likely to be men, and are more likely to be faculty (Appendix Table D.5). They also have the lowest levels of health spending, on average. The least common pair of choices is choosing a dominated plan and foregoing the match (1.8%). That group is the youngest and has the lowest incomes, on average (Appendix Table D.5). The most common set of choices is choosing a dominated health plan while receiving matching funds (59.6%). Those employees are older, earn higher salaries, and have the longest tenure with the employer (Appendix Table D.5). Finally, just over one-third of employees make puzzling choices in both domains, choosing a dominated health plan while foregoing the retirement match.

We are particularly interested in this last group as they leave money on the table in both domains. Their composition raises potential concerns about the equity implications of offering choice in this context. Employees who make puzzling choices in both domains are more likely to be women, more likely to be staff (as opposed to faculty), have lower salaries, and have high levels of health spending. Figure 2 shows that these differences are large in magnitude and statistically significant. For example, over 36% of women fall into this group versus 30% of men. Only 13% of faculty make this set of choices compared to about 35% of staff. This result is consistent with recent evidence from the Netherlands that education is positively associated with the quality of health insurance deductible choices (Handel et al. 2022). Finally, the lower the employee's salary, the greater likelihood that they simultaneously choose a dominated health plan and forego matching funds. Comparing the top and bottom quintiles of salary, just 9% of employees earning over $120,000 make this pair of choices versus over 60% of employees earning below $40,000. Appendix Figure D.4 shows this income gradients persists when splitting by faculty versus staff.

To quantify the correlation in choices across domains, we run linear probability models. The dependent variable in these regressions is an indicator for not receiving any matching funds and the independent variable is an indicator for choosing a dominated health plan. Table 2 shows that choosing a dominated plan is associated with an 8.2 percentage point higher probability of not receiving matching funds (column 1). This magnitude equates to a 29.2% increase from the baseline rate. 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 from 8.2 percentage points to 7.8 percentage points (column 2).

The positive correlation is robust to considering alternative definitions of dominance

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 demographics. 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 model controls for fixed effects for calendar year and coverage type. The comparison between staff and faculty is restricted to the academic division, where this distinction is observed in the data.

in health plan choices. When we consider first-order (state-by-state) dominance, choosing a dominated health plan is associated with a 13.5 percentage point increase in the probability of not obtaining matching funds (Table 2, column 3). Relative to the baseline rate of 24.5 percent, this estimate translates into a 55.1% increase. As further evidence that this correlation is not sensitive to how we classify dominated choices in health insurance, we obtain qualitatively similar results if we exclude employees with either observed or predicted spending that falls in the range where costs are lower in H than in L (Appendix Table D.4).

Table 2: Linear Probability Model: Choices Across Domains

	Dep var: Forego retirement match			
	(1)	(2)	(3)	(4)
Choose dominated health plan	0.082	0.078	0.135	0.152
	(0.013)	(0.011)	(0.030)	(0.043)
Constant	0.281	0.285	0.245	0.178
	(0.012)	(0.011)	(0.029)	(0.042)
Definition of dominance	SOSD	SOSD	FOSD	SOSD
Controls	No	Yes	No	No
Exclude if age $< 59\frac{1}{2}$	No	No	No	Yes
N	43,360	43,354	5,174	4,584

Note: Table presents regression results of linear probability models correlating 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. The fourth column presents results using SOSD without controls and is restricted to employees older than $59\frac{1}{2}$, who do not face withdrawal penalties on 403(b) assets.

Finally, we find an even stronger positive correlation when we consider the sub-sample of employees who are older than $59\frac{1}{2}$ and younger than 65 (Table 2, column 4). These employees do not face an early withdrawal penalty from the 403(b). Given this provision, not obtaining the employer match is a more definitive departure from neoclassical theory for such employees, as studied in Choi, Laibson and Madrian (2011). Among this group of older employees, choosing a dominated plan is associated with a 15.2 percentage point higher probability of not receiving matching funds. This increase amounts to 85% of the baseline mean (17.8 percent), which is quite large.

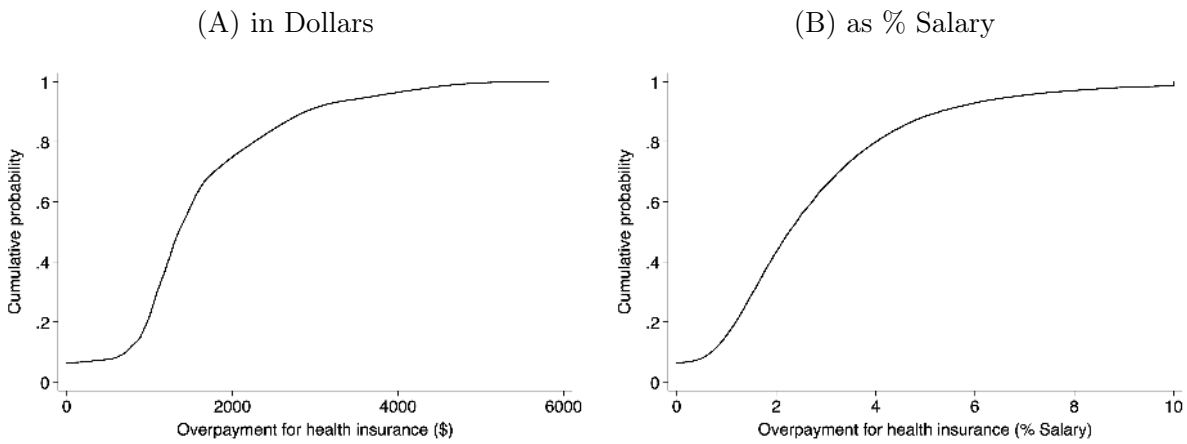
Appendix E examines whether these results generalize to other contexts using survey data from 10 other universities merged to administrative records from the Teachers Insurance and Annuity Association of America (TIAA). The positive correlation between puzzling

choices is also found in this broader set of employers, and it is larger in magnitude: those who choose a dominated plan are 44% more likely to forego the retirement match. This supplementary analysis assuages concerns that some idiosyncratic factor in our setting leads to the positive correlation in Table 2.

3.2 Quantifying counterfactual savings and changes in retirement wealth

We next calculate the amount of money left on the table by choosing a dominated health plan. We define an "overpayment" as the sum of premiums and expected out-of-pocket payments net of employer HSA contributions in the chosen plan relative to L.[19] This difference represents a measure of counterfactual savings. Figure 3 shows the distribution of overpayments, which are large in magnitude. Overpayments for half of employees exceed $1,350 a year (in expectation), and for one-quarter of employees they exceed $2,000 (Figure 3A). Figure 3B presents the distribution of overpayments in relation to salary. These amounts exceed 2% of pre-tax salary for over half of the sample, 3% of pre-tax salary for a third, and 4% for a fifth. The overpayments as a share of salary are particularly large for lower-income employees, as shown in Appendix Figure D.5.

Figure 3: CDF of overpayments for health insurance



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

By switching out of a dominated plan, this money could be consumed, saved, or used to

[19] We 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 as a savings vehicle. Incorporating these opposing forces would require making additional assumptions that we believe would complicate the comparisons without changing the conclusions.

repay debt. If it were saved in the 403(b), many employees would receive employer matching contributions. Appendix Figure D.6 presents binned scatterplots of overpayments for health insurance against voluntary retirement contributions, both expressed as a fraction of salary. The negative relationship between them is clear, regardless of whether overpayments are measured in dollars or a fraction of salary or whether using SOSD or FOSD to classify dominated plans. The upshot of this relationship is that it creates scope for savings on both dimensions, particularly concentrated at the lower end of the salary distribution. Consider the finding that employees who do not make any voluntary retirement contributions overpay for health insurance by about 3.5% of their salary, on average. They could make substantial retirement plan contributions and, in the medical division, get a 50% match, if they used their savings from choosing the low-coverage plan to finance their retirement accounts.

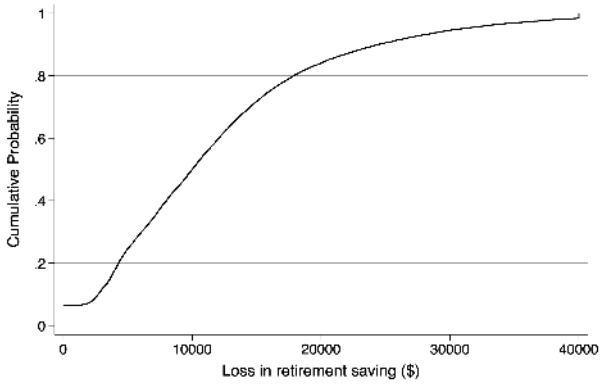
These choices have long-term implications for retirement wealth. A person who chooses a dominated health plan year after year and simultaneously foregoes employer matching for retirement saving will have substantially lower wealth over a long time horizon. The negative spillovers across domains add up due to employer matching, tax preferences for retirement saving, and compounding of investment returns. As an illustrative exercise, we calculate the losses in retirement wealth generated by observed choices in health insurance and retirement saving during our sample period. We use each person's salary, estimated health insurance overpayment(s) in each year, 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 retirement losses from health insurance overpayments across the sample. Among those who choose a dominated plan at least once (94% of the sample), the mean loss in retirement saving exceeds $12,700 and the median exceeds $10,600. Twenty-five percent of the sample incur losses over $16,000. The present value of the average loss exceeds $7,000.

One way to benchmark these magnitudes is relative to net worth at retirement. Based on estimates of net worth by age reported in Bhutta et al. (2020), the median loss in savings after 30 years equates to over 4% of net worth at retirement.[20] Expressed as a percentage of annual salary, the losses are greatest for those with lower incomes as shown in Panel B. The losses amount to 30% of one year's salary for employees earning less than $50,000 compared to 15% of salary for those earning $100,000. Not only are these magnitudes large, but they understate the lifetime costs because many people continued to choose dominated plans in subsequent years.

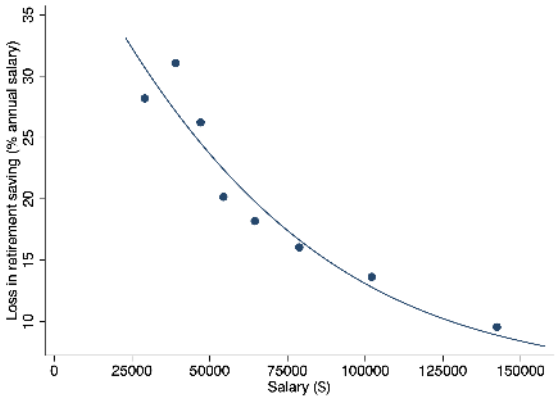
[20]Using the Survey of Consumer Finances, Bhutta et al. (2020) report the median net worth of families with a reference person aged 55–64 was $199,200 and for those aged 65–74 was $237,600 in 2016.

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

(A) CDF of Observed Savings Losses



(B) Savings Losses (% Salary) versus Salary



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 salary versus salary in dollars.

4 Evidence about Mechanisms

In seeking to understand puzzling choices across domains, a key question is whether a single mechanism explains choices in both domains. If so, then a single policy might be effective at influencing multiple choices. Alternatively, different explanations might arise in each domain, but be correlated within individuals.[21] Moreover, different mechanisms may be relevant for different people, which could further complicate efforts to address underlying causes. In this section, we use a survey to test which among several mechanisms can explain why many people both choose a dominated health plan and forego the employer retirement match.

4.1 Evidence about mechanisms from the administrative data

Before delving into the survey data, we note that the choice patterns in Section 3 provide evidence against some candidate mechanisms as a single explanation. First, present focus or impatience would predict not making supplemental retirement contributions and choosing the lowest premium health plan. This set of choices would minimize payroll deductions and maximize current consumption. Concerns about liquidity for expenses besides health care (e.g. car or home repairs, child expenses, etc.) likely predict the same pair of choices. Yet, less than 2% of employees choose to minimize payroll deductions. Those who do are indeed younger, earn lower salaries, and have low health spending, consistent with liquidity

[21] Recent laboratory and survey research find that several forms of nonstandard behavior are positively correlated within individuals, for example (Dean and Ortoleva 2019, Chapman et al. 2023, Stango and Zinman 2023).

constraints for non-health expenses. The upshot is, however, that present focus and liquidity for non-health care expenses explain relatively few choices across *both* financial domains during the initial years after the HDHP's introduction.

We also use the administrative data to consider inertia by comparing choices of new employees to those of existing employees. New employees must actively choose a health plan upon starting employment, while existing employees are defaulted into their previous choice.[22] After conditioning on other employee characteristics, differences in outcomes between these groups can be interpreted as capturing the role of inertia. The probability of choosing the HDHP is about 4 percentage points higher among new employees compared to existing employees, which is a 71% increase from the very small control mean of 5.5% (Appendix Table G.6). Over 90% of new employees still choose a dominated plan. Inertia therefore plays a statistically significant but minor role in accounting for dominated choices in health insurance, unlike in some other contexts (Handel 2013). On the retirement side, new employees are *less* likely to make voluntary contributions than existing employees. There is instead a gradual increase in voluntary contributions, which we have documented in other work in this context (Friedberg, Leive and Cai 2023) and is also observed in other settings dating back at least to Madrian and Shea (2001). So inertia may partly explain the largest group of employees who choose a dominated health plan while making supplemental retirement contributions, but not why people leave money on the table in both domains. To test whether other mechanisms can explain that puzzle, we turn to our survey.

4.2 Survey overview and changes in health plan enrollment

In August 2023, we implemented an incentivized survey of employees at the university studied in Section 3. We asked four types of questions to study mechanisms. First, we asked questions related to how consumers acquire and process information when making financial decisions. In particular, we measured knowledge about benefits, complexity, and attention, which we refer to processing frictions. Second, we asked about the individual's ability to finance a large emergency expense to measure liquidity constraints. Third, we included questions to elicit aversion to certain characteristics of insurance plans to measure non-standard preferences that might explain dominated health plans. Beyond these questions, we also asked about the demographics of the individual, their salary and job type, and the financial assets of their household. Appendix F presents the survey questionnaire and other details, including balance tables for the experimental treatments.[23] As shown in Appendix Table F.1, survey

[22] Since we exclude the first partial-year of employment, we consider the choice in open enrollment corresponding to the first full calendar year of employment for "new" employees.

[23] The pre-registeration for the survey can be found on AsPredicted: https://aspredicted.org/TSQ_CH8.

respondents have fairly similar characteristics to non-respondents, and predicted insurance and saving choices based on observables does not differ systematically between respondents and non-respondents.

Before presenting the survey results, it is important to note how health plan enrollment changed between 2017 (the last year of our administrative data) and 2023 (the year that the survey was conducted).[24] Enrollment in the HDHP/HSA (plan L) increased modestly from 5.0% in 2014 to 8.4% in 2017 and substantially by 2023; just over half of employees now choose it, according to discussions with the university's Human Resources department. By contrast, enrollment in the high-coverage plan H fell substantially and is now the least popular choice. Since 2018, premiums in all plans increased but did so the most in H, consistent with adverse selection in this context (Geruso, Layton and Leive 2023). Beyond these premium changes, the university invested resources in helping employees consider different options, including adding a second decision support tool and providing graphics that illustrated the premiums and out-of-pocket payments in each plan if spending surpassed the out-of-pocket maximum, as shown in Appendix Figure A.5.

Given these shifts in health plan enrollment, we re-estimate linear probability models shown in Table 2 using survey data, to test whether the positive correlation between dominated plan choices and zero supplemental retirement saving persists. As shown in Appendix Table F.2, we continue to find a strong positive correlation between these behaviors. Choosing a dominated health plan is associated with a 6.7 percentage point higher probability of not making supplemental retirement contributions (SE = 1.8 percentage points). This increase is nearly half of the baseline rate of 12.1%, and is again only slightly reduced when flexibly controlling for job characteristics and demographics. Having established that this correlation persists a decade after the HDHP/HSA's introduction, we proceed to test several candidate mechanisms.

4.3 Processing frictions

4.3.1 Benefits knowledge and financial literacy

We begin by considering what people know about their options for health insurance and retirement saving. Research in other settings finds that many employees are poorly informed about several features of HDHP/HSAs (Handel and Kolstad 2015, Brot-Goldberg et al. 2017) and other aspects of health insurance more generally (Loewenstein et al. 2013, Bhargava,

[24] We currently do not have access to administrative data from recent years. A change in the software used to manage HR records would also make merging such data at the individual level infeasible. In addition, the survey data collected in 2023 cannot be linked to our administrative data from 2014–2017 due to concerns about maintaining confidentiality for survey respondents.

Loewenstein and Sydnor 2017). Then, we seek to relate measures of benefits knowledge to measures of financial literacy.

We measured employee understanding of key features of benefits by asking:

1. Whether HSA funds roll over to the next year (61.0% correctly answered yes)
2. How much the employer contributes to the HSA (32.4% correctly chose from 4 options)
3. Whether the employer matches 403(b) contributions (81.7% correctly answered yes)

Each of these items is critical to making an informed decision about the financial outcomes of different benefits choices. Moreover, each piece of this information is readily available on the university's website and in other employer-provided materials. Knowledge about benefits is positively correlated across domains. Employees who know 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.

Our survey included the "Big Three" financial literacy questions about compound interest, inflation, and diversification (Lusardi and Mitchell 2014). A large body of research shows that financial literacy—defined as financial knowledge and the numeracy required to perform calculations—impacts retirement planning and a range of other financial behaviors (Hastings, Madrian and Skimmyhorn 2013, Lusardi and Mitchell 2014, 2023, Kaiser et al. 2022). It is conceivable that people with lower financial literacy may struggle to compare the cost sharing and premiums of health insurance plans to determine which options are dominated. To our knowledge, no existing evidence indicates whether financial literacy predicts choosing dominated health plans. 58% of survey respondents correctly answered all 3 financial literacy questions, which is higher than for the U.S. population (Lusardi and Mitchell 2023, Lusardi and Streeter 2023).

To estimate the association between choices, knowledge about benefits, and financial literacy, we run the following regressions:

$$y_i = \alpha_0 + \sum_{j=1}^{3} \beta_j \cdot Know_i^j + \beta_4 \cdot FinLit_i + e_i \tag{1}$$

where y_i is an indicator for whether employee i makes a specific benefits 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 $FinLit_i$ is an indicator for answering all three financial literacy questions correctly.

Table 3 presents the regression results. To examine the role of knowledge about benefits separately from financial literacy, columns 1–3 exclude financial literacy, columns 4–6 exclude

benefits knowledge, and columns 7–8 include both benefits knowledge and financial literacy as in Equation 2. Knowledge about benefits is an extremely strong predictor of choices. Those who know the HSA rolls over are 46.8 percentage points (SE = 2.4 pp) less likely to choose a dominated plan and those who correctly answer the amount of the employer's HSA deposit are 31.1 percentage points (SE = 2.5 pp) less likely to do so (column 1). Knowing the retirement match does little to predict choosing a dominated health plan after conditioning on knowledge about the HSA. These variables explain 43.6 percent of the variation in dominated plan choices. Those who know the employer matches some 403(b) contributions are 33.3 percentage points (SE = 3 pp) less likely to have zero supplemental contributions (column 2), while HSA knowledge is less predictive, consistent with the importance of domain-specific knowledge. The dependent variable in column 3 is an indicator for simultaneously choosing a dominated health plan and foregoing the retirement match. The coefficients on each variable for benefits knowledge are negative and highly significant.

Financial literacy also helps explain choices, but to a lesser degree. Employees with high financial literacy are 16.9 percentage points less likely to choose a dominated health plan (column 4), 12.5 percentage points less likely to forego the match (column 5), and 9.1 percentages points less likely to make both choices simultaneously (column 6). The R^2 from these regressions are substantially below those in columns 1–3. Financial literacy still helps explain choices after conditioning on benefits knowledge. While these variables are correlated, they all enter significantly when included together (columns 7–8).

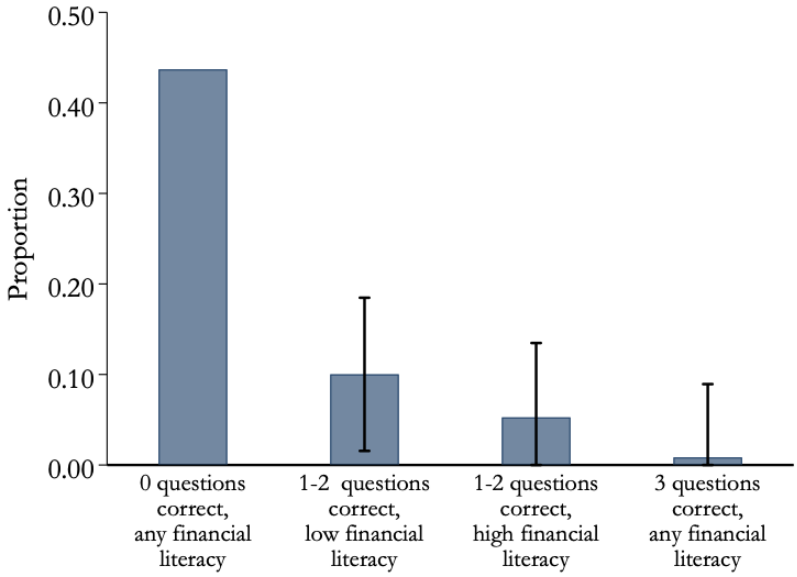
To visualize the importance of benefits knowledge in driving choices, Figure 5 shows the fraction of employees choosing a dominated plan and foregoing the match based on their benefits knowledge and financial literacy. Over 40% of employees who do not answer a single benefits question correctly make puzzling choices in both domains, regardless of their financial literacy. By contrast, less than 1% of employees who answer all three questions correctly choose a dominated plan and forego retirement saving, regardless of their financial literacy. Less than 10% of employees who answer 1 or 2 benefits questions correctly make this set of choices, with slightly fewer among those with high financial literacy. Appendix Figure G.1 shows similar results when including controls, weighting by the inverse probability of survey response, or restricting to those passing the attention check. Employees with lower household income are more likely to incorrectly answer all questions (Appendix Table G.1), but income does not explain these differences by knowledge: Panels (B) and (C) show the same general pattern for employees with household income below or above $125,000, respectively. The sharpest difference is that employees answering each question incorrectly are more likely to be non-White (42.1% vs. 23.4%). They are also likely to older, have shorter tenures, and have lower household retirement assets (Appendix Table G.1).

Table 3: Benefits Knowledge and Financial Literacy

	Dominated health plan (1)	Not saving in 403b or 457 (2)	Dominated plan AND not saving (3)	Dominated health plan (4)	Not saving in 403b or 457 (5)	Dominated plan AND not saving (6)	Dominated plan AND not saving (7)	Dominated plan AND not saving (8)
Know retirement match	0.006	-0.333	-0.194				-0.189	-0.179
	(0.024)	(0.030)	(0.025)				(0.025)	(0.025)
Know HSA rollover	-0.468	-0.056	-0.095				-0.087	-0.077
	(0.024)	(0.020)	(0.016)				(0.017)	(0.017)
Know employer HSA	-0.311	0.011	-0.054				-0.049	-0.048
funding amount	(0.025)	(0.019)	(0.012)				(0.012)	(0.012)
High financial literacy				-0.169	-0.125	-0.091	-0.048	-0.045
				(0.025)	(0.019)	(0.016)	(0.015)	(0.016)
Constant	0.861	0.454	0.324	0.585	0.227	0.145	0.341	0.324
	(0.023)	(0.030)	(0.027)	(0.019)	(0.016)	(0.014)	(0.028)	(0.028)
Controls	No	No	No	No	No	No	No	Yes
N	1643	1621	1621	1643	1621	1621	1621	1607
R^2	0.436	0.141	0.129	0.066	0.031	0.027	0.135	0.178

Note: Table presents regression results of linear probability models correlating health insurance and retirement saving choices with knowledge about benefits and financial literacy. Robust standard errors in parentheses. Controls (column 8) include indicators for household income, age, gender, marital status, non-white, academic division, faculty, and tenure with the employer.

Figure 5: Choose Dominated Plan and Forego Retirement Match by Benefits Knowledge and Financial Literacy



Notes: Figure presents proportion of survey respondents who choose a dominated plan and do not save in the 403b or 457, stratified by their knowledge of three questions about employee benefits and financial literacy. Whisker denote 95% confidence intervals of the difference relative to employees who incorrectly answer each question about employee benefits.

4.3.2 Complexity of health insurance choices

Even with knowledge about benefits, some people may have difficulty choosing a health plan. People may lack the ability to translate how premiums, deductibles, coinsurance, and HSA funds ultimately affect their total after-tax costs. This calculation is further complicated by the fact that spending is uncertain. Prior research finds that clarifying the financial consequences helps many consumers to avoid dominated plans (Bhargava, Loewenstein and Sydnor 2017). Recent experimental work by Samek and Sydnor (2023) shows that decision aids that provide people with quantiles of costs rather than the features of the contract reduces the likelihood of choosing a dominated plan. As an alternative approach, Gruber et al. (2020) and Bundorf, Polyakova and Tai-Seale (2024) find that decision aids based on artificial intelligence reduce expected spending of seniors choosing Medicare plans.

To study the role of complexity in health insurance choices, participants were asked to choose a health plan from a menu of three plans that differed in terms of premiums, deductibles, and other financial characteristics. We tested whether choices differed when the information was presented in a complex frame, which required calculations to determine the financial consequences, versus a simplified frame, which clarified the financial consequences of each choice. Participants were told that for the purposes of choosing a plan, there were

three possible scenarios for how much health care they could expect to use, and they were given the probabilities of each of the three scenarios. Plans were labeled Plan 1 (highest premium, lowest deductible), Plan 2 (intermediate premium and deductible), or Plan 3 (lowest premium, highest deductible). We designed the spending amounts and plan features so that the highest deductible stochastically dominated the other plans, but did not strictly dominate.

All respondents saw both menus, and we randomized the order of which one appeared first. The complex menu (Figure 6, Panel A) resembled how information is provided in real-world settings: a table listed the features of each contract (premium, deductible, coinsurance rate, out-of-pocket max, and employer HSA contribution). The plans were financially equivalent between the two frames. The costs shown in the simplified frame were calculated by applying the plan features in the complex frame to the three different spending scenarios. We cross-randomized respondents to see one of two possible graphs in the simplified frame. One graph showed the financial costs (premiums plus out-of-pocket payments, converted to after-tax dollars) from choosing each plan for each possible spending scenario (Figure 6, Panel B). The second graph included this information along with the amount of additional retirement savings possible after 20 years when choosing plan 2 or plan 3 if the difference in health care costs relative to plan 1 were contributed to the retirement account (Figure 6, Panel C). This section of the survey therefore had two within-subject conditions and two between-subject conditions.

Experimental effects of menu simplification: between-subjects design We tested the effect of simplification by comparing the first choices of people who first saw one of the graphs (the simplified frame) versus those who instead first saw the table with plan features (the complex frame). We include indicators for each treatment group and run the following specification:

$$y_i = \gamma_0 + \gamma_1 \cdot GRAPH_i^1 + \gamma_2 \cdot GRAPH_i^2 + u_i \tag{2}$$

where $GRAPH_i^1$ and $GRAPH_i^2$ indicate that respondent i was randomly assigned to first see either the graph with health care costs only or the graph with both health care costs and future retirement savings. The omitted group are those who first encountered the table with plan features.

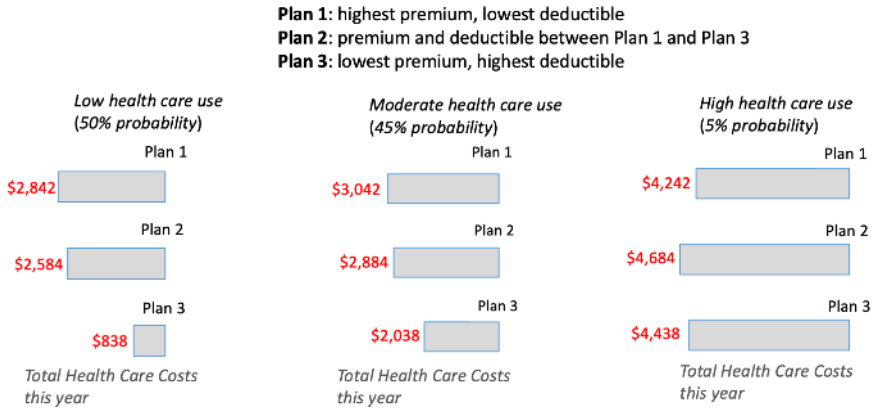
Figure 7 shows that the first graph that clarified the costs of each plan reduced the probability of making a dominated choice by 17%. While 55.2% of respondents who first select from the table menu choose a dominated plan, the rate is 45.7% among respondents

Figure 6: Experimental Treatment: Insurance Menu Simplification

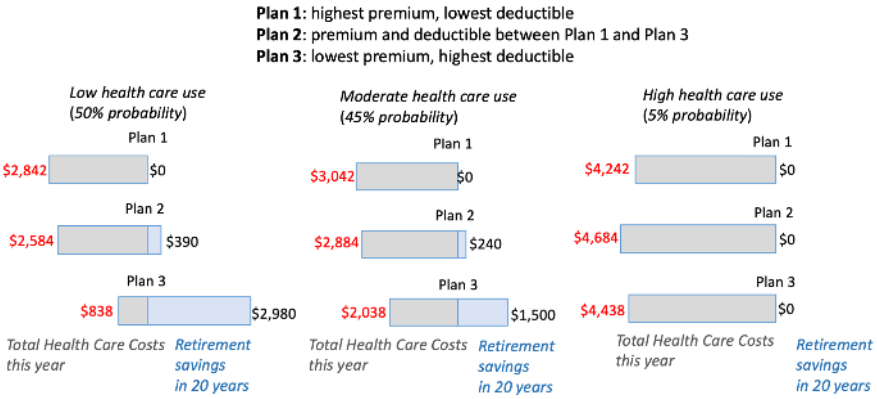
(A) Complex Frame: Table with Plan Features

	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: Graph 1



(C) Simplified Frame: Graph 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 Graph 1 (Panel B) or Graph 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.

who first select from the menu showing that year's health care costs.[25] The effect of menu simplification is driven by those with below-median household income (Appendix Figure G.6 Panel A). The probability of choosing a dominated plan falls from 60.9% with the complex menu to 45.5% when clarifying the health care costs for these employees. By contrast, the decline from 49.0% to 45.4% among higher-income households is smaller and not statistically distinguishable from zero (Appendix Figure G.6 Panel B).

In terms of magnitudes, these reductions in dominated plan choices from clarifying the health care costs alone are meaningful, though smaller than the 62% decline from menu clarification in Bhargava, Loewenstein and Sydnor (2017). One important difference is that the high deductible plan in that study strictly dominated the others. By contrast, we designed the high deductible plan to stochastically dominate other plans in our survey, with the low deductible plan having lower costs in the most expensive scenario that occurred with 5% probability.

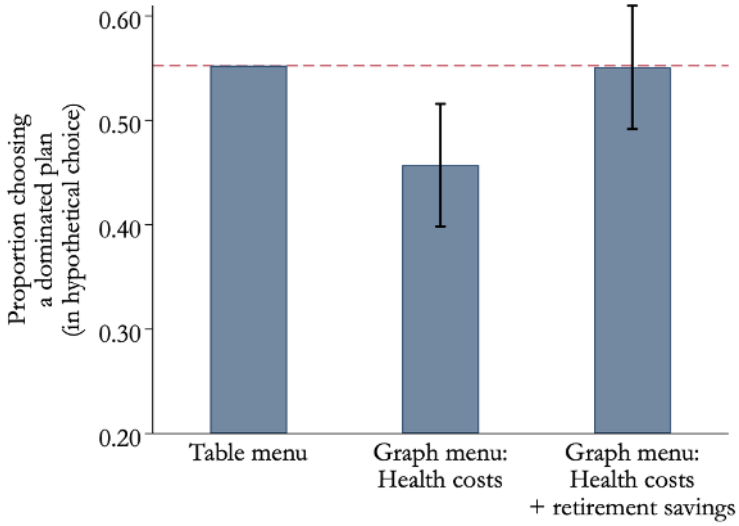
Contrary to our expectations, the second graph menu that presented the additional retirement savings in 20 years alongside current health care costs had little effect on choices. We had hypothesized that visualizing the benefits and costs in multiple domains would lead to larger effects by helping people frame decisions more broadly. However, we failed to detect any effect, on average, of clarifying the costs this way. While there was a 6 percentage point reduction among employees with below-median household income (who also have lower retirement assets), it is not statistically significant at conventional levels (Appendix Figure G.6 Panel A).

Choice reversals and dominated plan enrollment: within-subjects design We next use the sequential choices within subjects to study the frequency of first choosing a dominated plan under the complex decision frame but then not under the simplified decision frame. Analyzing these "choice reversals" when financial consequences are clarified serves two goals. First, we interpret the initial choice under the complex frame as representing a mistake. Second, we test whether people who exhibit choice reversals in their hypothetical choices are more likely to choose a dominated plan in their actual plan choice. About 22% of respondents chose a dominated plan when seeing the table first and then chose the high deductible when subsequently seeing the graph. These people are much more likely to choose a dominated plan in real life as shown in Panel B of Figure 7. While 47.0% of people not exhibiting choice reversals choose a dominated plan in real life, 64.9% of those exhibiting choice reversals do so. The estimates are larger in magnitude when restricting the sample to respondents who pass the attention check (Appendix Figure G.5).

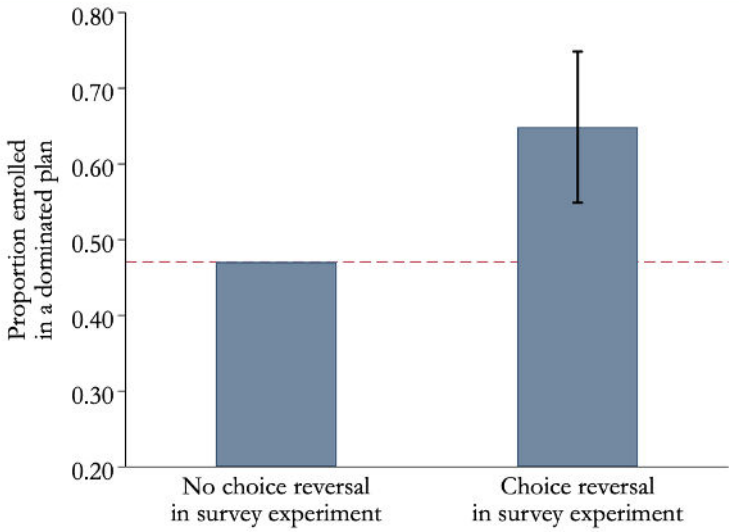
[25] We find similar results when weighting by survey response rates (Appendix Figure G.4).

Figure 7: Experimental Results: Menu Clarification and Choice Reversals

(A) Effect of Menu Clarification on Survey Choices



(B) Survey Choice Reversals and Dominated Choices



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).

4.3.3 Attention

Given the complexity of insurance and saving decisions, attention is likely required to both understand benefit options and make high-quality choices. Various behavioral models of inattention (Gabaix 2019) may underlie dominated plan choices and limited retirement saving. In addition, psychological models of limited "bandwidth" (Mullainathan and Shafir 2013, Schilbach, Schofield and Mullainathan 2016) may negatively impact decision-making: concerns about a scarcity of money, time, or other resources may induce people to focus on the most pressing problems at the expense of longer-term ones. We examine the role of attention through a combination of survey questions and an experimental treatment intended to mimic the decision of whether to attend to choices in these domains.

Experimental Results: Opt-out Task We offered participants a chance to win extra money if they correctly answered additional questions on health insurance and retirement saving. 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 to calculate the growth in savings. 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, there was still ambiguity about the size of the expected payout; while we announced we would select 100 winners, the number of respondents was unknown. This setup is preferred to specifying a deterministic or probabilistic payout because the financial stakes of real-life benefit decisions involve some ambiguity, particularly before a person devotes attention to them.

In designing the vignette, we specified the friend's objective is to minimize their expected health care costs, so that there is a single correct answer to each question. This setup purposefully contrasts with the prior questions about plan choices in Figure 6 that elicited choices based on the respondent's subjective preferences. Participants had to choose whether to attempt the questions or to skip to the end of the survey before they could see the questions. We refer to this section of the survey as the "Opt-out task."

We hypothesized that those who opted out would be more likely to choose a dominated health plan in real life. As predicted, Table 4 shows those who skipped the additional questions were over 20% more likely to choose a dominated plan in real life (60% vs. 47.5%). We detected no relationship between the survey opt out task and the decision to make supplemental retirement contributions (column 2) or choosing a dominated plan while not making supplemental contributions (column 3).

The remainder of Table 4 yields two important insights. First, attention responds to the size of the financial stakes. Compared to participants offered $10 per correct question,

those offered $40 were over 30% more likely to attempt the questions (column 4). Opt-out rates were fairly low in both groups, however. Only 12.3% of those offered the lower payment opted out versus 7.3% of those offered the higher payment. Second, the role of attention varies by income. Households with lower incomes were less likely to opt-out: 12.2% of households earning above $125,000 opted out versus 7.3% of those with lower incomes (column 5). But conditional on attempting the questions, higher-income households answered more of them correctly. On average, lower-income households answered 2.3 questions correctly, while higher-income households answered 2.7 correctly (column 7). The lower fraction of correct answers among lower-income employees offset their higher likelihood of attempting them, with lower-income households earning 14% less ($52.93 vs. $45.28). These results provide new evidence highlighting the role of attention in explaining why people with lower incomes are more likely to make insurance and saving decisions that are not in their financial interest.

Correlation Between Attention Check and Choices The 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. The attention check asked which month an employee attended an information session about employee benefits. One-third of respondents did not pass the attention check, and these people were 19% more likely to choose a dominated health plan in real life (Appendix G.7). There was no relationship between passing the attention check and making supplemental retirement contributions. This comparison provides additional evidence that attention plays a role in explaining health plan choices.

Table 4: Experimental Results: Opt-Out Task

	Dominated health plan	Forego retirement match	Dominated plan AND forego match	Opted out		# questions correct correct	Payment ($)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Opted out of incentivized task	0.125	0.012	0.010				
	(0.041)	(0.033)	(0.026)				
Higher incentive payment				-0.049			
				(0.015)			
Household income $<$ $125,000					-0.035	-0.438	-7.651
					(0.014)	(0.081)	(2.811)
Constant	0.475	0.153	0.090	0.122	0.103	2.307	52.933
	(0.013)	(0.009)	(0.007)	(0.011)	(0.010)	(0.059)	(2.078)
Observations	1643	1621	1621	1643	1622	1482	1622
R^2	0.006	0.000	0.000	0.007	0.004	0.019	0.005

Note: 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. Column (5) presents LPM of the opt-out decision by being above the median of household income. Columns (6)-(7) present results of the number of questions correctly answered (including zeros for those who opted out) and payments against household income. Robust standard errors in parentheses.

Correlation Between Other Survey Measures of Attention and Choices We further investigate the role of attention through a set of survey questions, following that designed by Stango and Zinman (2023). In particular, the first question asks: "Do you believe your household's long-run finances (dealing with kids' college, retirement planning, allocation of savings/investments, etc.) would improve if you paid more attention to them?" We also asked a similar question about health insurance. The responses are designed to distinguish different forms of inattention. For example, the response "*Yes, but paying more attention would require too much time/effort*" signifies rational inattention (Mackowiak, Matějka and Wiederholt 2023) while the response "*Yes, and I often regret not paying greater attention*" signifies a preference reversal.

Figure 8 shows the correlation between attention responses and the choice of a dominated health plan (Panel A) and zero voluntary retirement saving (Panel B). Compared to those who say they are already very attentive to these matters, those who regret not paying more attention in each domain are more likely to choose a dominated health plan and to not make supplemental retirement contributions. Those who say these choices are too difficult no matter how much attention they devote to them are the most likely to choose a dominated plan and not make supplemental retirement contributions.

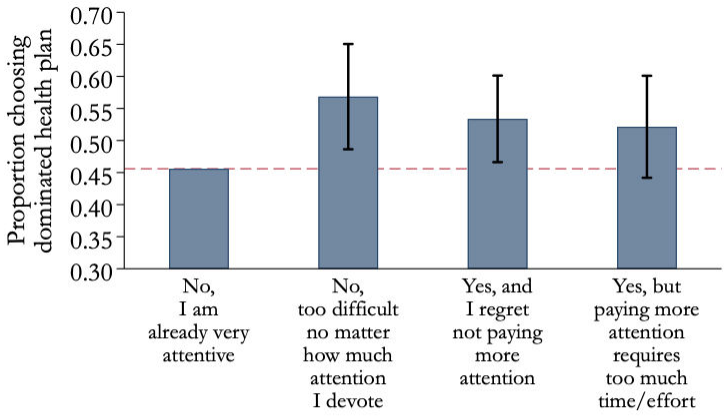
We find little evidence that rational inattention explains behavior. Compared to those who report already being attentive, respondents who say paying more attention would require too much time/effort are more likely to choose a dominated plan and not make supplemental retirement contributions, but the differences are not statistically significant. The lack of strong support for rational inattention may not be surprising, given that the stakes of these decisions are often very large, as shown in Section 3.

Nearly all people who say their finances are set up to note require attention make supplemental retirement contributions. The differences between these employees and other groups, which are all statistically significant, show the importance of financial planning for life-cycle decisions. We did not offer this response for our corresponding health insurance question since premiums and plan benefits change from one year to the next, so there is no analog.

Responses to these attention questions are highly correlated across domains (Appendix Table G.9). People who regret not paying more attention to their health insurance choices are more likely also to regret not paying more attention to their long-run finances. Those who find health insurance choices too hard no matter how much attention they devote are more likely to say the same about their long-run finances. And people who report they are already attentive in one domain are more likely to report they are attentive in the other one too. This positive correlation in attention is consistent with our earlier finding that

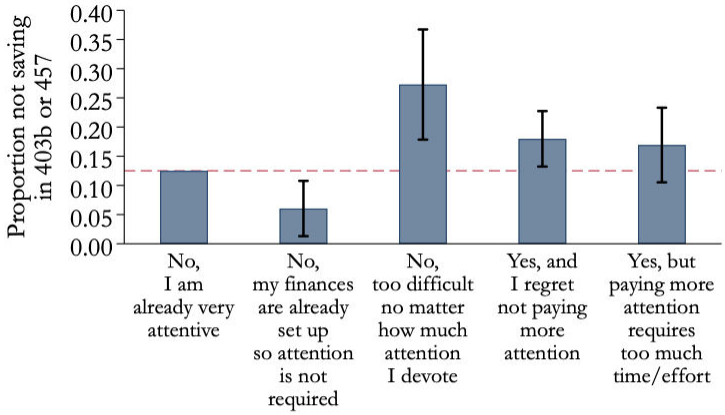
Figure 8: Insurance and Saving Choices by Attention

(A) Dominated Health Plan Choices



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

(B) Forego retirement match



Do you believe your household's long-run finances would improve if you paid more attention to them?

Notes: 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.

knowledge about benefits is positively correlated across domains.

Finally, we connect these results to our findings on benefits knowledge by documenting that knowledge is highly correlated with attention. Appendix Figure G.11 displays the fraction of people who correctly answer the three questions on benefits according to their responses on whether their choices would improve with more attention.

4.4 Liquidity constraints

Turning to the role of budget constraints, liquidity may also explain why some people choose a dominated health plan and do not make supplemental retirement contributions. Ericson and Sydnor (2022) show how borrowing costs and the timing of payments might lead people to choose a dominated health plan. Premium savings from the HDHP accrue gradually over the course of the year, but large out-of-pocket expenses can occur all at once. If there is a large unplanned shock early in the year, then a person who is cash-constrained may lack the ability to finance the out-of-pocket expense by borrowing against their future premium savings. The timing of spending shocks could explain a demand for a high premium, low deductible plan that is dominated (even strictly). The prevalence of "wealthy hand-to-mouth" consumers suggests liquidity is often important at higher income levels too (Kaplan, Violante and Wiedner 2014).

We examine the role of liquidity in two ways. First, we use survey responses to measure household perceptions of their liquidity. We ask households about their confidence of financing an unexpected $2,000 expense, following the question developed by Lusardi, Schneider and Tufano (2011).[26] A $2,000 expense is also about the difference between health insurance deductibles in our setting. We also ask questions about preferences for paying higher premiums in return for lower out-of-pocket payments to help plan a budget. Second, we simulate choices under a consumption-utility framework with borrowing constraints as in Ericson and Sydnor (2022) to assess whether dominated plan choices in our setting are consistent with an economic model in which households face shocks throughout the year, live hand-to-mouth, and cannot borrow against premium savings.

4.4.1 Survey responses of liquidity

Following Lusardi, Schneider and Tufano (2011), we ask "*How confident are you that you could come up with $2,000 if an unexpected need arose within the next month*?" We construct an indicator for being liquidity-constrained if the respondent reports they either certainly

[26]This question has been incorporated into some measures of financial well-being (see e.g., Yakoboski, Lusardi and Hasler (2023))

could not or probably could not come up with the money. Similar to our analyses in Table 3 and Table 4, we then regress insurance and saving choices (dominated health plan, not saving in the 403b/457, or both choosing a dominated plan and not saving) against this indicator for being liquidity-constrained. More respondents are confident they could come up with $2,000 to finance an emergency expense compared to other settings: 81% of our sample say they could certainly or probably come up with the money, which is similar to the U.S. average in recent years (Clark, Lusardi and Mitchell 2021).

Table 5 shows that liquidity is highly correlated with both insurance and saving choices. 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). In terms of retirement saving, those who are liquidity-constrained are over 2.5 times more likely not to save in the 403b or 457 compared to those who are not constrained (31.2% vs. 11.6%, column 2). When considering both choices together, those with liquidity constraints are more than three times as likely to simultaneously choose a dominated plan while not saving in the 403b or 457 (column 3).[27] The relationship between liquidity and choices remains strong and statistically significant after controlling for knowledge about benefits and financial literacy (column 4), as well as demographic controls (column 5).[28] While liquidity and knowledge are highly correlated, these regressions show that each plays an important role in explaining behavior.

Many people who choose dominated plans say they prefer higher premiums and lower deductibles for budget planning. We asked respondents the extent to which they agree with the following statement on a 5-point scale, from "strongly disagree" to "strongly agree:" *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 budget.* Appendix Figure G.9 shows there is a monotonic relationship between the extent to which people agree with this statement and choosing a dominated health plan: 27.5% among those who strongly disagreed with this statement chose a dominated plan versus 78.6% who strongly agreed, with less strong preferences or indifference in between these rates (Panel A). This gradient is large and statistically significant. The pattern is similar for the hypothetical plan choices in the survey, as shown in Panel B of Appendix Figure G.9 which compares choices among respondents who do not switch away from dominated plans when encountering the clarified frame after the complex frame.

The reasons people reported for not choosing the HDHP provide further corroboration

[27] Appendix Table G.5 shows these patterns hold both for households with incomes below $125,000 and those with incomes above this amount.

[28] The results are similar when restricting to those who pass the attention check (Appendix Table G.3) or weighting by the inverse probability of survey response (Appendix Table G.4).

for a concern about liquidity to finance health care. As shown in Appendix Table G.7, the most prevalent reason was that respondents worried about paying large out-of-pocket expenses all at once (43.0%). This was followed by the deductible was too high (26.6%), they expected to have high medical spending (22.8%), and they thought that managing the HSA would be a hassle or confusing (17.5%).[29]

Table 5: Liquidity

	Dominated health plan	Forego retirement or match	Dominated health plan AND forego retirement match		
	(1)	(2)	(3)	(4)	(5)
Liquidity constrained	0.177	0.196	0.142	0.080	0.073
	(0.031)	(0.028)	(0.024)	(0.023)	(0.025)
Know retirement match				-0.181	-0.175
				(0.024)	(0.024)
Know HSA rollover				-0.080	-0.073
				(0.017)	(0.017)
Know employer HSA funding amount				-0.047	-0.046
				(0.012)	(0.012)
High financial literacy				-0.027	-0.031
				(0.015)	(0.016)
Constant	0.453	0.116	0.063	0.302	0.296
	(0.014)	(0.009)	(0.007)	(0.029)	(0.028)
Demographic controls	No	No	No	No	Yes
Observations	1643	1621	1621	1621	1607
R^2	0.032	0.046	0.038	0.144	0.184

Note: Table presents regression results of linear probability models correlating health insurance and retirement saving choices with liquidity constraints, knowledge about benefits, and financial literacy. Liquidity constrained is an indicator equal to 1 if the respondent says they certainly could not or probably could not finance a $2,000 unexpected expense within 30 days. Robust standard errors in parentheses. Controls (column 5) include indicators for household income, age, gender, marital status, non-white, academic division, faculty, and tenure with the employer.

[29]We allowed people to select up to three reasons, so percentages exceed 100%.

4.4.2 Simulation of consumption-utility model with borrowing constraints

We simulate health plan choices assuming that employees must borrow the full amount of out-of-pocket costs. We make standard assumptions that employees have CRRA utility and have rational expectations over the distribution of health spending. Appendix G presents the details of the simulation's specification, which includes uncertainty both in the amount of costs and in their timing throughout the year. 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 3.

These calculations suggest liquidity may explain why between 5 and 10 percent of people avoided the HDHP in Section 3. Appendix Figure G.8 plots the percentage of the sample predicted to choose L for a range of interest rates on borrowing. At a 2% monthly interest rate (equal to a 26% annual interest rate), over 96% of the sample would choose the HDHP. This rate is what might be charged on credit card debt, for example. At a 100% annual interest rate, this model predicts over 90% of the sample would choose the HDHP. Most people are still predicted to choose the HDHP because the difference in out-of-pocket payments between plans is generally small, with large differences being relatively rare. High borrowing costs for low-probability events are not enough to outweigh the sizable difference in premiums and HSA funds, which are certain.[30]

Therefore, liquidity may explain a larger fraction of dominated choices in 2023—when one-third of survey respondents who choose a dominated plan are liquidity-constrained—compared to the earlier period.

4.5 Nonstandard preferences: payment aversion

In choosing their health insurance, 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. In addition, people may not like to trade off money and health at the margin, deciding whether each trip to the doctor is worth its cost. By contrast, more of the expense has already been pre-paid in a low-deductible,

[30] This framework assumes people can still borrow up to the out-of-pocket limit at a sufficiently high-interest rate. Instead, credit constraints might prevent people from borrowing above a certain limit at any interest rate. For that to explain choices, however, people would have to be constrained over the range between the out-of-pocket maxima for L and the other plans, since we still observe them choosing one of the employer's plans. In particular, someone with employee-only coverage would have to be able to borrow \$5,000 to finance the out-of-pocket max in H but unable to borrow \$5,500 to finance the out-of-pocket max in L. In the case of family coverage, a person would have to be able to borrow \$10,000 (the out-of-pocket max in H) but unable to borrow \$11,000 (the out-of-pocket max in L after subtracting the employer's HSA contribution). The possibility that borrowing limits fall between the out-of-pocket maxima of the plans seems unlikely.

high-premium plan. Moreover, premiums are automatically deducted from each paycheck and so may be less salient than the out-of-pocket costs of deductibles. Some people may therefore prefer to shield themselves from the psychic costs of paying at the point of service, even if they recognize that the HDHP delivers lower financial costs overall.[31]

Survey responses provide empirical support for payment aversion. We asked respondents the extent to which they agree with the following 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.* Appendix G.10 shows there is a monotonic relationship between the extent to which people agree with this statement and choosing a dominated health plan: 27.2% among those who strongly disagreed with this statement chose a dominated plan versus 68.1% who strongly agreed, with less strong preferences or indifference in between these rates (Panel A). This gradient is large and statistically significant. We also compare hypothetical choices among those respondents who do not exhibit choice reversals when the simplified frame is shown after the complex frame. Panel B of Appendix Figure G.10 shows a similar monotonic pattern between preferences for payment aversion and dominated choices.

5 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). Whether such behavior is correlated across domains has remained largely unexplored, however. We provide novel evidence on this question in the context of 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 and thereby forego employer matching funds. One-third of employees choose a dominated health insurance plan and make no voluntary retirement contributions. For these employees, overpayments for health insurance amount to 3.5% salary per year, which could be reallocated to retirement saving, current consumption, or reducing debt. The positive correlation between puzzling choices in health insurance and saving is not restricted to our particular setting. Using survey data linked to TIAA's administrative records on retirement accounts, we find the same pattern in ten other universities.

[31] Research on telephone contracts (Lambrecht and Skiera 2006) and gym memberships (DellaVigna and Malmendier 2006) also document preferences for higher payments upfront, even though costs are lower with pay-per-use contracts. Choices in those settings (which are not dominated) are consistent with other mechanisms in addition to a "pain of paying."

Using a comprehensive survey, we find evidence for different mechanisms. Many employees appear to make puzzling choices due to difficulty in acquiring and processing information. In particular, we find evidence that knowledge about benefits, complexity, attention, and financial literacy all help to explain choices across domains. These processing frictions and cognitive skills are also positively correlated within individuals, consistent with Stango and Zinman (2023). We interpret the survey's experimental results as evidence that some dominated plan choices are mistakes. Other choices, however, appear to reflect an aversion to out-of-pocket payments, due to the psychic costs of thinking about paying to access health care. Other choices can be explained by liquidity constraints, rather than low choice quality. While some employees continuing to choose dominated plans may not be making mistakes, it is important to recall that the share of dominated choices plummeted from over 90% in 2014–2017 to just below 50% in 2023. We view this decline as likely indication that many dominated choices in the early years were mistakes that people corrected over time.

Our results inform policy in two main ways. First, we show it is often the same people who could benefit from assistance across multiple financial decisions. Targeting a smaller set of people may be more efficient for employers and policymakers compared to a situation where different people leave money on the table in each domain. Moreover, the characteristics of employees who simultaneously choose a dominated plan and forego the retirement match raise equity concerns around the value of offering choice; these people are more likely to be women, non-white, less-educated, and have lower salaries and household wealth. Second, the heterogeneity in mechanisms we document suggests there are likely to be limits to the effect of any single policy. Interventions to reduce processing frictions may differ from those to reduce liquidity constraints, for example. Understanding how to best structure such efforts, and whether their benefits and costs justify offering choice at all in these domains, is an important question for future research.

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Online Appendices [Not for Publication]

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 for 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 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

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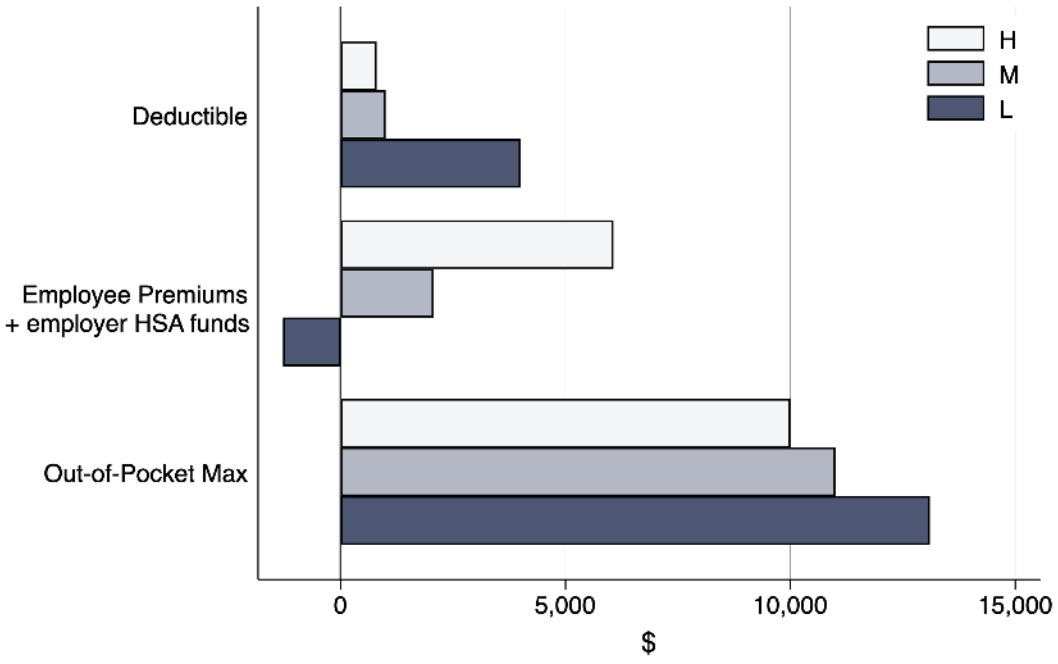
Table A.2: Summary of Main Plan Features at Peer Universities

		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: Deductibles, Premiums, and Out-of-Pocket Max in 2017, Family Coverage



Notes: Key parameters of health insurance plans in 2017 for family coverage. Plan names "L", "M", and "H" stand for low coverage (HDHP/HSA), medium coverage, and high coverage, respectively. The employer's $2,000 contribution to the employee's HSA is represented as a reduction in premiums for "L."

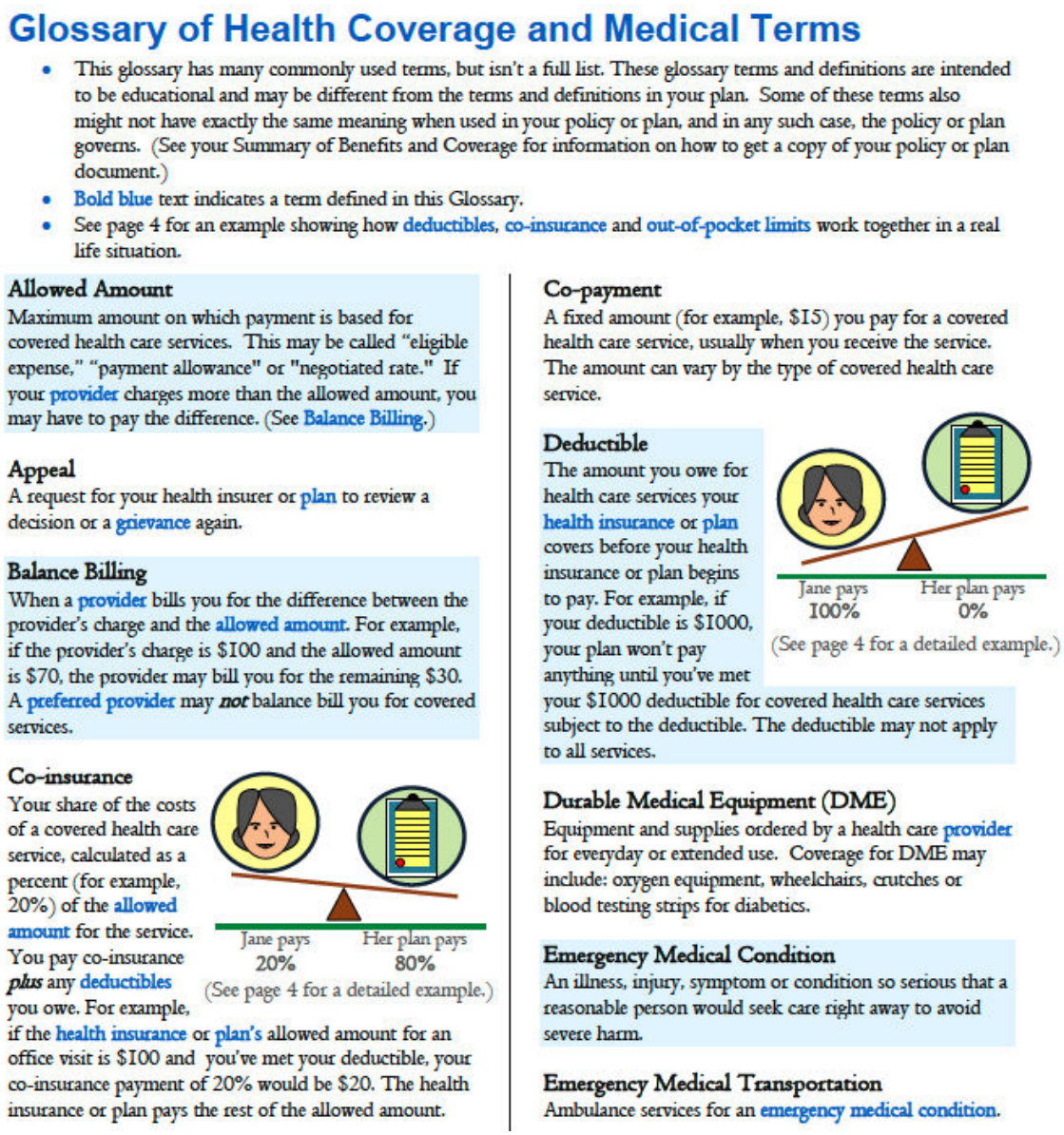
Figure A.2: Health Plan Comparison provided by University, 2015

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.)

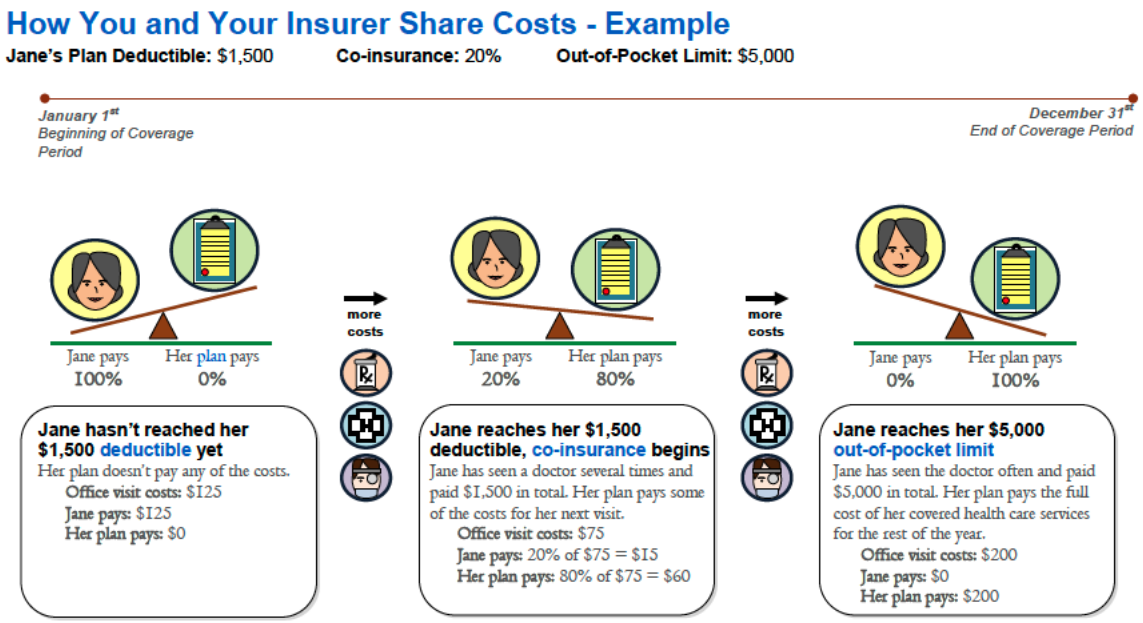
Durable Medical Equipment (DME)
Equipment and supplies ordered by a health care provider for everyday or extended use. Coverage for DME may include: oxygen equipment, wheelchairs, crutches or blood testing strips for diabetics.

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.

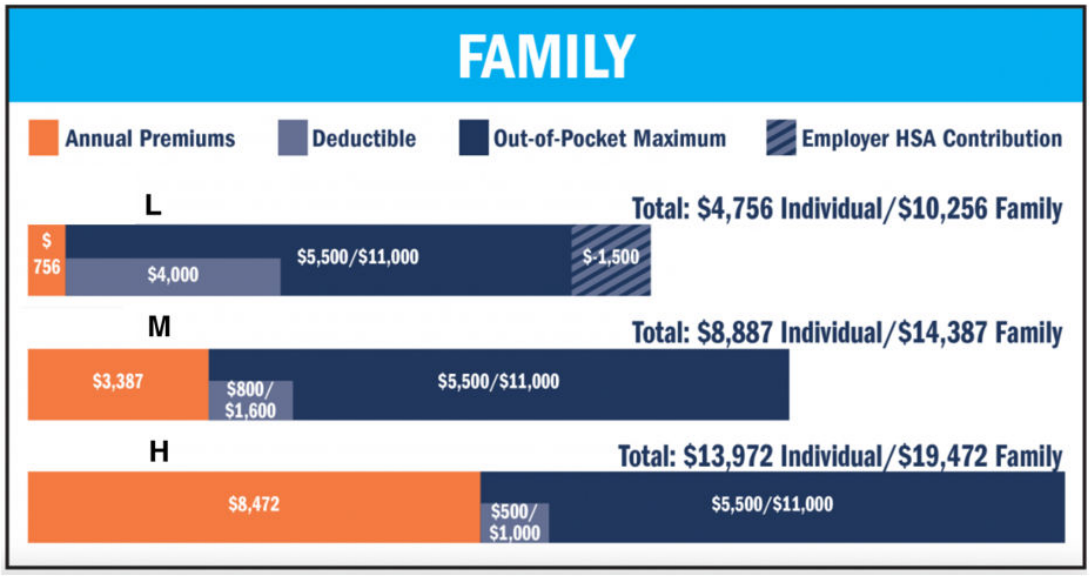
Notes: Screenshot of first page of glossary of health insurance terms provided to employees.

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 and older) and gender (male, female). Within these groups, we further split into terciles based on 1-year lags of total 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 total 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

Descriptive Statistics by Division and Health Plan Choice. Table D.1 presents sample means for employees in each plan, split by academic and medical division. Patterns are generally qualitatively similar across both divisions. In particular, mean income is highest among employees choosing high coverage, followed by those choosing low coverage (HDHP/HSA), and the lowest incomes among those choosing medium coverage. Employees who choose low coverage are younger, on average, than the other coverage types, and employees who choose high coverage are the oldest. Employees who choose the high coverage plan have the highest tenure with the employer. Household size does not differ substantially across coverage levels. Total health spending is highest among those choosing high coverage and lowest among employees choosing low coverage. The differences are quite large: over $10,000 in spending for high coverage, $6,000 in spending for medium coverage, and approximately $3,000 in spending for low coverage. In terms of retirement saving, voluntary contributions are meaningfully larger among those choosing low coverage compared to those choosing medium or high coverage, on average.

Table D.1: Sample Means by Health Insurance Coverage Level

	Academic Division			Medical division		
	Health insurance coverage			Health insurance coverage		
	High	Medium	Low	High	Medium	Low
Annual salary ($)	83,946	75,739	79,343	70,245	58,754	65,387
Age	49.85	43.05	41.52	46.19	38.78	38.41
Faculty (%)	0.36	0.32	0.38	0	0	0.01
Academic division (%)	1	1	1	-	-	-
Female (%)	0.50	0.47	0.46	0.76	0.73	0.73
Single (%)	0.34	0.21	0.2	0.57	0.46	0.5
Married (%)	0.35	0.29	0.27	0.17	0.16	0.15
Tenure with employer (years)	14.17	8.03	6.97	11	5.54	5.39
Household size	2.02	2.33	2.03	1.85	1.99	1.77
Family coverage (%)	0.50	0.59	0.45	0.46	0.51	0.35
Employee insurance premium, annual ($)	2,444	1,108	359	2,250	998	303
Employer insurance premium, annual ($)	7,876	8,694	8,010	7,473	7,916	7,021
Out-of-pocket spending ($)	1,249	1,354	1,485	1,237	1,352	1,643
Total health spending ($)	10,425	6,463	3,148	10,777	6,149	2,796
Voluntary retirement contribution (403b+457, %)	4.97	4.17	7.11	3.7	3.23	5.06
403b Participation (%)	0.66	0.63	0.65	0.57	0.51	0.62

Table D.2 replicates Table 1 in the main text, but does not restrict to the 93.8% of employees who face a stochastically dominated choice of health insurance plans. The means are extremely close to those from the analytic sample.

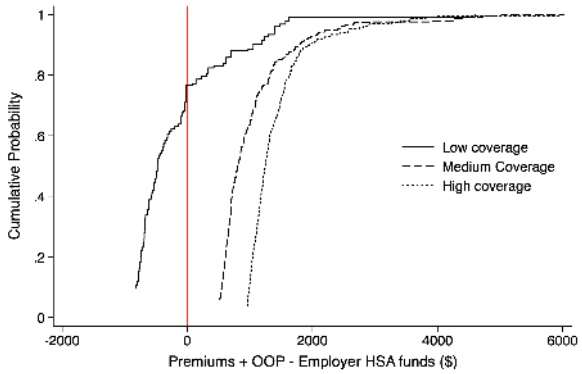
Table D.2: Summary Statistics, Not Restricted to Choice Sets with SOSD Plans

	Mean	SD
Annual salary ($)	74,530	45,445
Age (years)	45.35	11.41
Faculty (%)	0.20	0.40
Academic division (%)	0.57	0.49
Tenure with employer (years)	10.38	9.38
Female (%)	0.60	0.49
Household size	2.03	1.28
Low coverage plan, L (%)	0.07	0.25
Middle coverage plan, M (%)	0.34	0.47
High coverage plan, H (%)	0.59	0.49
Total health spending ($)	8,634	29,800
Voluntary retirement contribution rate (% salary)	4.32	7.17
Voluntary retirement participation (%)	0.64	0.48
N	17,145	
NT	49,233	

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 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. These costs are inclusive of premiums and HSA contributions from the employer in the low coverage plan. Based on second-order stochastic dominance, the low coverage plan dominates the other two plans for both men and women. For men, the CDF almost always lies above the other CDFs. The vertical red line at zero denotes the fraction of cost realizations that would result in negative costs due to the employer HSA contribution. Figure D.2 aggregates all the distributions across employees for 2014. The patterns are similar to those for 2017 that are presented in the main text.

Figure D.1: CDFs of health care costs for 40-year-old in 2017

(A) Male, middle cost tercile



(B) Female, middle cost tercile

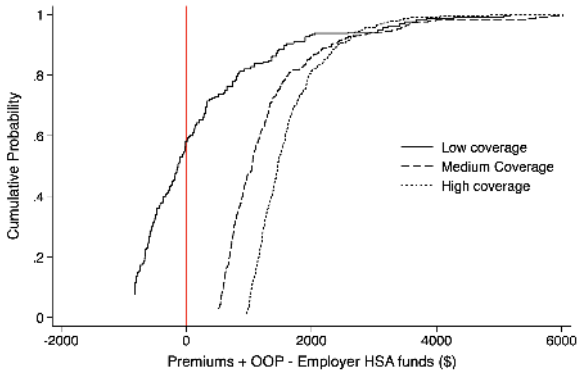
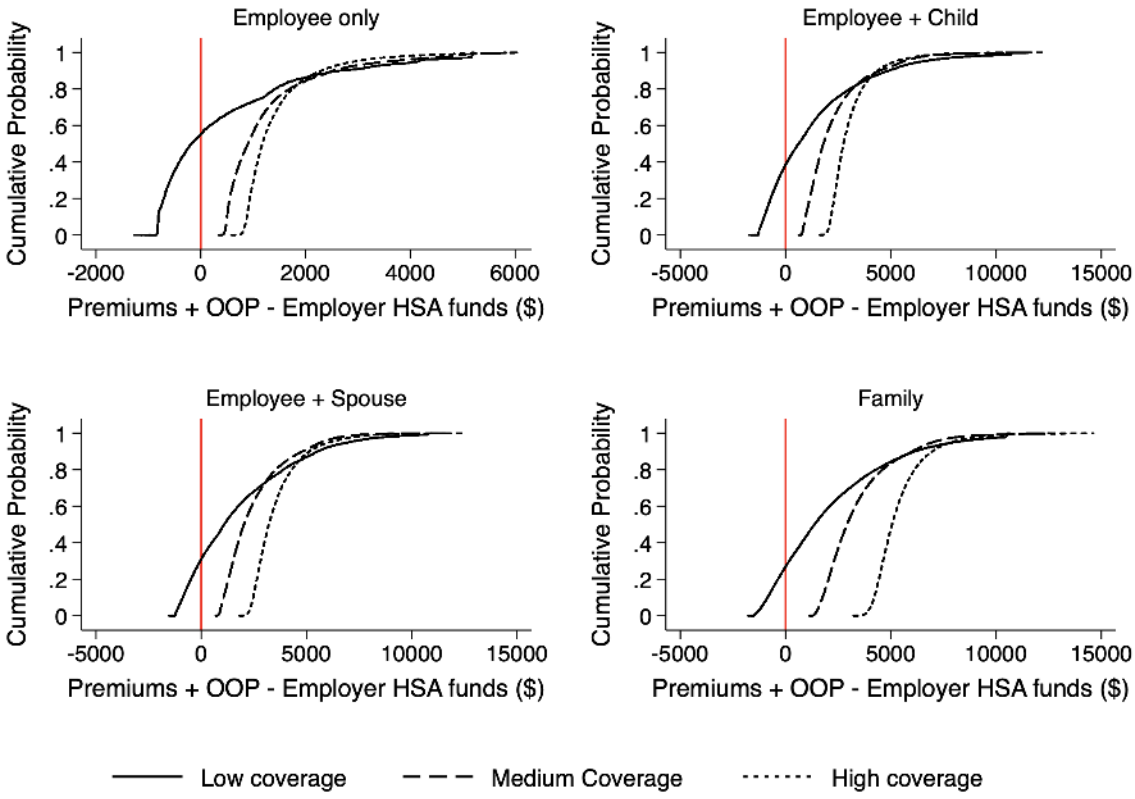


Figure D.2: CDFs of Health Care Costs in 2014

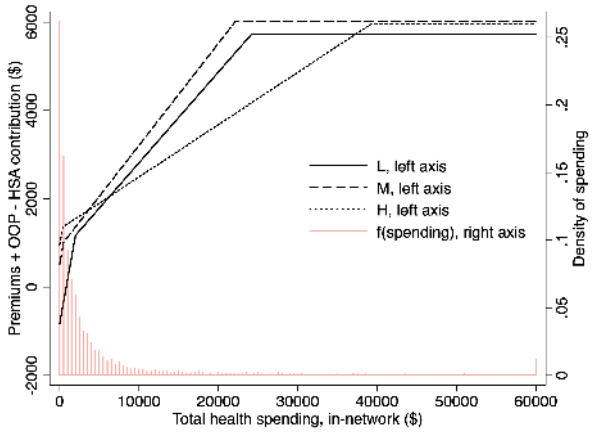


As another way of illustrating the cost differences between plans, Figure D.3 plots costs (on the left y-axis) as a function of total health spending for each plan, again stratified by coverage type and assuming a 25% marginal tax rate. We manually calculate the single coinsurance rate for all spending 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). 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. The calculations of the distributions of costs to calculate expected costs and assess stochastic dominance, such as in Figure D.1 or Figure D.2, use the observed patterns of costs. Each panel in Figure D.3 also overlays the density of total health spending (on the right y-axis). For each coverage type, the large majority of the distribution of spending falls in the range where costs are lowest under L. There are regions where H has lower costs, but the small density over this region shows these spending outcomes are quite rare. These graphs illustrate how L second-order stochastically dominates the other plans, but may not strictly dominate (first-order stochastic dominance).

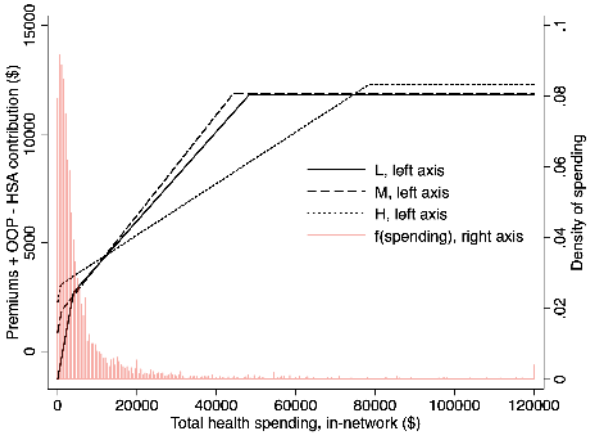
Notably, the greatest cost differences are not always at high levels of health care spending; this may be contrary to some people's intuition, as they may believe that, in case of catastrophic spending outcomes, they would pay much more under the low coverage plan. But because the high deductible would get exhausted in this eventuality and the OOP maximum is similar under all three plans, spending outcomes are quite similar under all three plans when high health care costs are incurred.

Figure D.3: Costs vs. Total Health Spending by Coverage Type

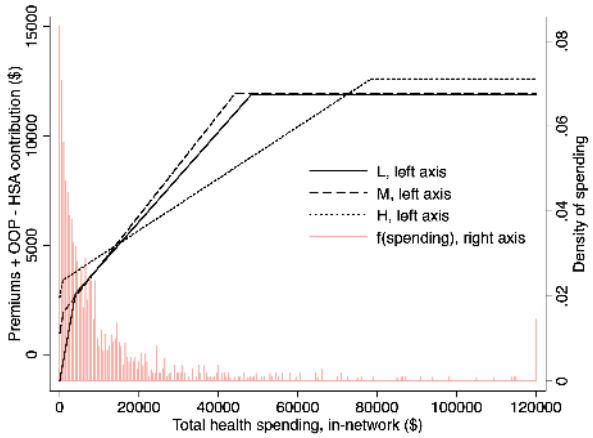
(A) Employee only



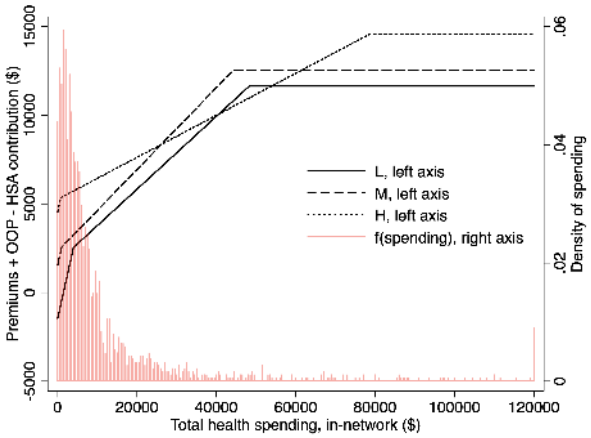
(B) Employee + Child



(C) Employee + Spouse



(D) Family



Robustness to Definition of Dominance. Table D.3 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.4 presents the linear probability models (LPMs) corresponding to sub-samples that exclude employees with either observed spending or predicted spending falling in the range where costs in H are lower than in L.

Table D.3: Distribution of Choice Patterns, Robustness

	Dominated plan and forego match	Dominated plan and obtain match	HDHP/HSA and forego match	HDHP/HSA and obtain match
Panel A. Choices based on empirical OOP distribution				
SOSD (Main analysis)	34.0	59.3	2.0	4.8
FOSD	35.5	59.2	1.2	4.1
Panel B. Excluding employees in range where H has lowest costs				
using observed spending	32.0	57.8	3.1	7.0
using LASSO-predicted spending	29.4	61.2	2.1	7.4
Panel C. By coverage type and division				
Family coverage	28.8	63.5	1.7	6.0
Employee-only coverage	35.2	57.4	4.9	2.4
Medical division with 4% 403(b) match	42.3	51.4	2.5	3.8

Table D.4: Robustness: Choices Across Domains, LPMs

	Dep var: Forego retirement match	
Choose dominated health plan	0.047	0.103
	(0.016)	(0.018)
Constant	0.309	0.221
	(0.015)	(0.017)
Definition of dominance	SOSD	SOSD
Exclude employees in range where H has lowest observed costs	Yes	No
Exclude employees in range where H has lowest LASSO-predicted costs	No	Yes
N		

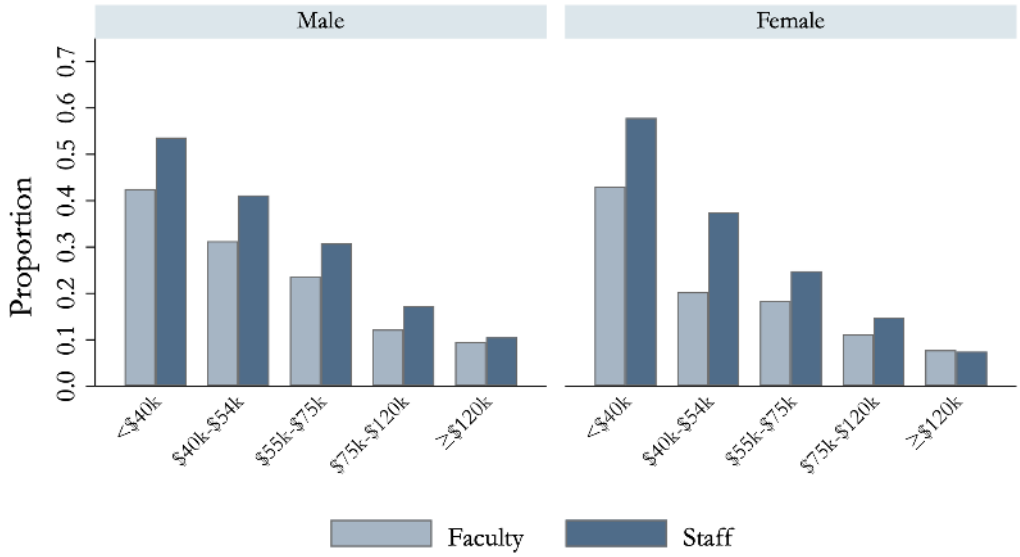
Characteristics Associated with Choice Patterns. Table D.5 tabulates sample means of income, demographics, job characteristics, and health spending split by the four pairs of choices. Those who obtain matching funds earn higher incomes than those who do not. Those who avoid choosing the dominated health plan but 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.5: Characteristics by Choice Patterns

	Dominated plan and forego match	Dominated plan and obtain match	HDHP/HSA and forego match	HDHP/HSA and obtain match
Percent of sample	34.0	59.6	1.8	4.6
Income ($)	54,742	84,436	49,933	85,432
Age (years)	43.9	46.2	36.4	42.4
Female (%)	67.2	59.9	67.4	55.2
Tenure (years)	10.2	10.7	4.1	7.5
Household size	2.0	2.1	1.8	2.1
Faculty (%)	7.7	25.1	11.0	30.1
Academic division (%)	45.9	61.4	49.6	67.4
Total health spending ($)	8,876	8,430	4,352	2,776

Figure D.4 plots the proportion of employees who simultaneously choose a dominated health plan and forego the match for different demographics. The comparison is restricted to the academic division because the staff/faculty designation is only observed for that division.

Figure D.4: Proportion who choose a dominated plan and forego the retirement match



Overpayments for Health Insurance and Retirement Saving. Figure D.5 presents binned scatterplots using the methods of Cattaneo et al. (2019) of overpayments in health insurance as a percent of salary (Panel A) and in dollars (Panel B) against employee pre-tax salary. Whiskers denote 95% confidence intervals.

Figure D.5: Overpayment for health insurance vs. salary

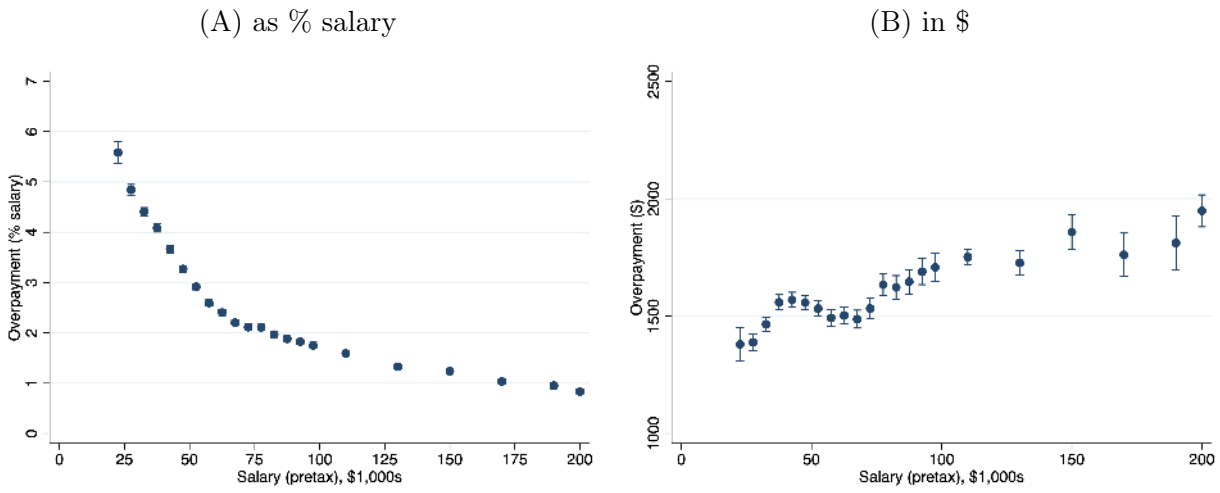


Figure D.6 present binned scatterplots of overpayments in health insurance against voluntary retirement contributions. There is a negative relationship between overpayments for health insurance and supplemental retirement contributions. Panels A and B use SOSD to classify dominated plans and Panels C and D use FOSD. Overpayments for health insurance are measured relative to employee salary in Panels A and C and in dollars in Panels B and D. The line plots a 4th-order global polynomial.

References

Cattaneo, Mattias, Richard Crump, Max Farrell, and Yingjie Feng. 2019. "On Binscatter."

Figure D.6: Binned Scatterplots of Overpayments vs. Retirement Saving

(A) SOSD, Overpayment as % Salary

(B) SOSD, Overpayment in $

(C) FOSD, Overpayment as % Salary

(D) FOSD, Overpayment in $

E External Validity: Analysis from Other Universities

We assess how the results in Section 3 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 11 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
Household salary ($)	92,759
Age (years)	53.71
Female (%)	60.1
Married (%)	14.5
White (%)	84.5
Faculty (%)	32.4
Defined benefit plan (%)	19.5
Total TIAA employee retirement saving ($)	8,284
Employee primary retirement saving ($)	2,852
Employee supplemental retirement saving ($)	5,432
Total TIAA balances ($)	380,690
Current retirement plan loan (%)	4.5
Chose HDHP/HSA (%)	40.8
Correctly answered 3 financial literacy questions (%)	63.0
Liquidity constraint (%)	11.6
N	1,211

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.[32] 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 total 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 D.3). Since we lack claims for each university, we instead use the provided distributions of spending under "Silver Combined" worksheet in CCIIO's calculator to evaluate SOSD by each university. 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 total health spending for each plan. In Universities 7-11, the HDHP/HSA also first order 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 foregoing the retirement match is also observed among this wider set of universities. Choosing a dominated plan is associated with a 13.9 percentage point increase in not obtaining any matching funds. This represents a 44.5% increase from the baseline mean, larger than the corresponding magnitude in Table 2. The pattern is also observed when we split the sample above and below $75,000 in annual salary, which is roughly equal to the median of survey respondents. In summary, the choice patterns in Table 2 extend to other contexts.

References

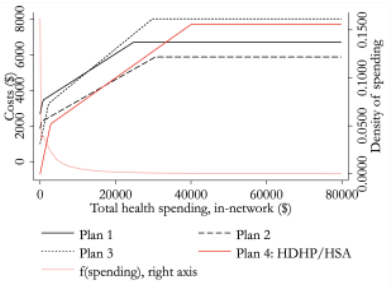
Davis, Brent, Adam Leive, and Andrew Gellert. 2023. "Fungibility in Workplace Benefits Choices: Evidence from Health Savings Accounts." *Working Paper*.

Liu, Chenyuan, and Justin Sydnor. 2022. "Dominated Options in Health Insurance Plans." *American Economic Journal: Economic Policy*, 14(1): 277–300.

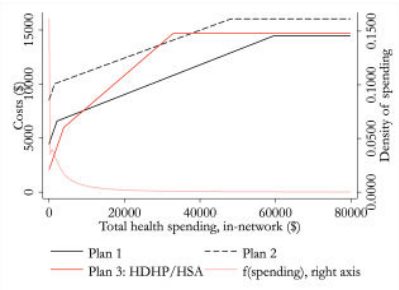
[32]The link is available here: https://www.cms.gov/CCIIO/Resources/Regulations-and-Guidance/Downloads/av-calculator-final.xlsm.(Accessed June 16, 2021)

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

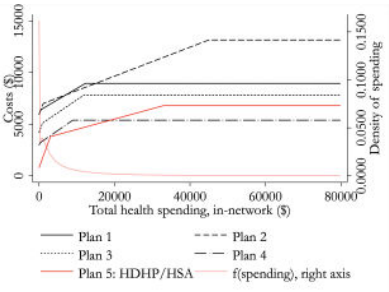
(A) University 1: All



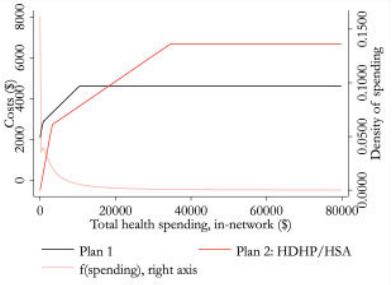
(B) University 2: All



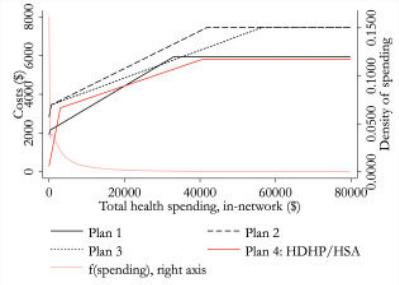
(C) University 3: All



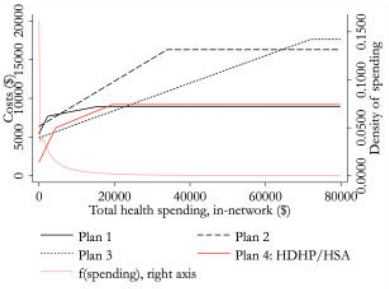
(D) University 4: \$60k-\$100k



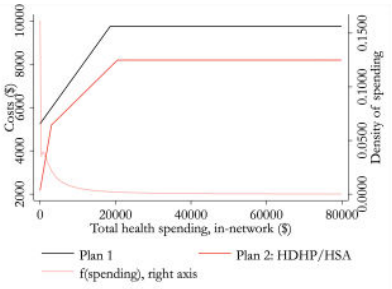
(E) University 5: All



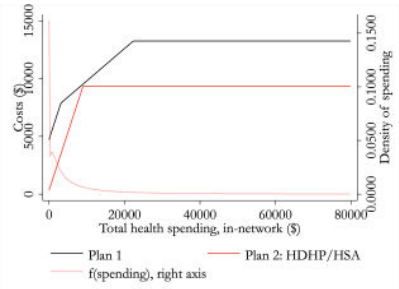
(F) University 6: All



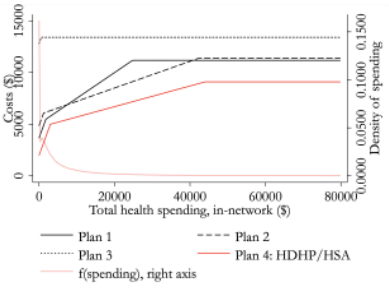
(G) University 7: All



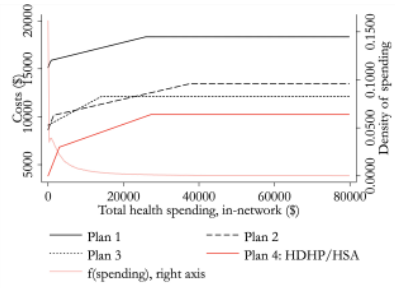
(H) University 8: \$62k-\$132k



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



(J) University 10: \$182k+



(K) University 11: All

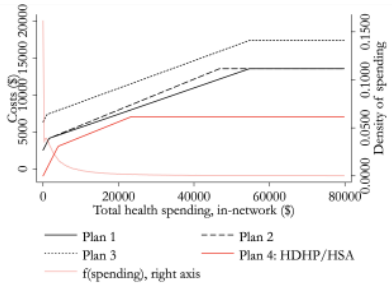


Table E.2: Choices Across Domains, TIAA Sample

	Dep var: Forego retirement match
Choose dominated health plan	0.139
	(0.029)
Constant	0.312
	(0.021)
N	1,153

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	28.6	30.6	13.6	27.2
Household salary ($)	80,705	89,379	94,366	109,384
Age (years)	54.9	54.5	52.3	52.3
Female (%)	56.8	63.1	53.0	63.9
Married (%)	16.8	14.0	13.9	12.8
White (%)	86.0	81.1	87.3	85.3
Faculty (%)	34.0	31.5	38.2	28.8
Defined benefit plan (%)	19.1	20.5	13.9	21.6
Total employee retirement saving ($)	3,773	10,324	4,742	12,503
Employee supplemental retirement saving ($)	0	8,274	0	10,664
Total TIAA balances ($)	334,328	387,452	310,973	456,790
Equity percentage of TIAA balances (%)	66.5	67.4	67.8	69.4
Current retirement plan loan (%)	8.7	1.3	7.3	2.1
Correctly answer 3 financial literacy Qs (%)	61.7	60.3	73.9	61.8
Cannot pay $2,000 emergency expense (%)	14.3	10.4	12.1	9.5

Lusardi, Annamaria, Daniel Schneider, and Peter Tufano. 2011. "Financially Fragile Households: Evidence and Implications." *Brookings Papers on Economic Activity*, Spring: 83–134.

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 2 and analyzed in Section 3. 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.

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 from Leora Friedberg and the address <leorafriedberg@surveys.UNIVERSITYNAME.edu>.

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 UVA 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: G30 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?

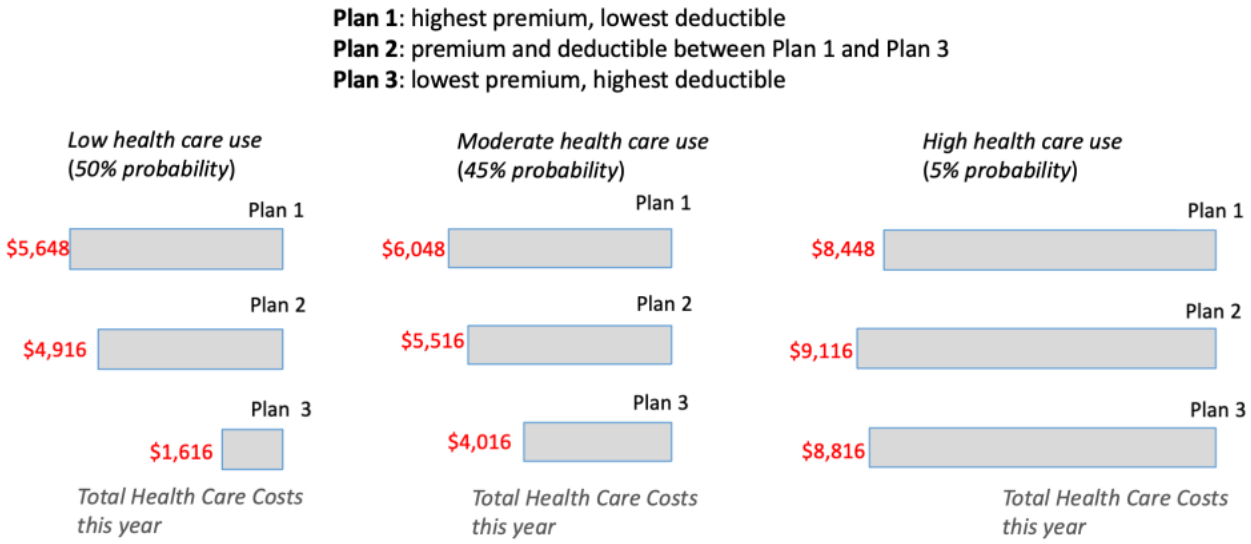
- Plan 1
- Plan 2
- Plan 3
- Not sure

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.]:



Which health plan would you choose?

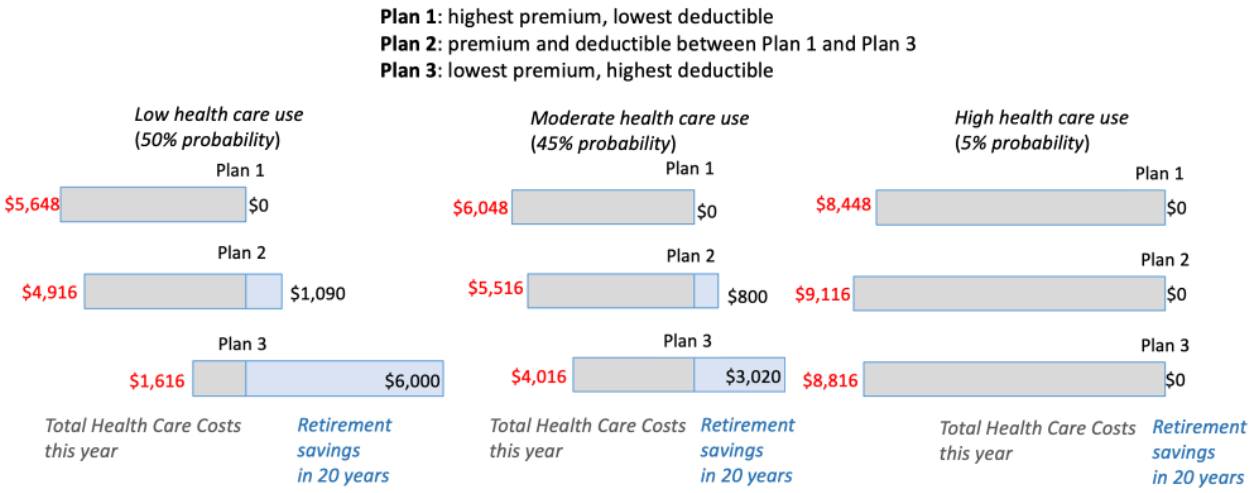
- Plan 1
- Plan 2
- Plan 3
- Not sure

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.]:



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. 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. We impute race and gender using validated algorithms based on first and last names. 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 clustered by employee 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 2014–2017 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. We collected data on salary, job titles, and departments matched to each email address. We also imputed race and gender based on the employee's first and last name. 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. In robustness analyses, we weight observations by the inverse probability of survey responses. We calculate these weights as the predicted probabilities from a logit regressions of responding to the survey against the employee characteristics shown in Table F.3 and a fourth-order polynomial for salary.

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 4.

Benefits Knowledge and Financial Literacy: Figure G.1 shows robustness of Figure 5 to alternative specifications. Panel A plots regression results that control for indicators for household income, age, gender, marital status, non-white, academic division, faculty, and tenure with the employer. Panel B restricts the sample to those passing the attention check. Panel C weights the regression based on the inverse probability of survey response rates. Each figure plots the predicted proportion of survey respondents who enroll in a dominated plan and do not save in the 403b or 457, stratified by their knowledge of three questions about employee benefits and financial literacy. Whisker denote 95% confidence intervals of the difference relative to employees who incorrectly answer each question about employee benefits. The patterns are very similar between each of these graphs and Figure 5.

Figure G.1: Robustness: Choose Dominated Plan and Forego Retirement Match by Benefits Knowledge and Financial Literacy

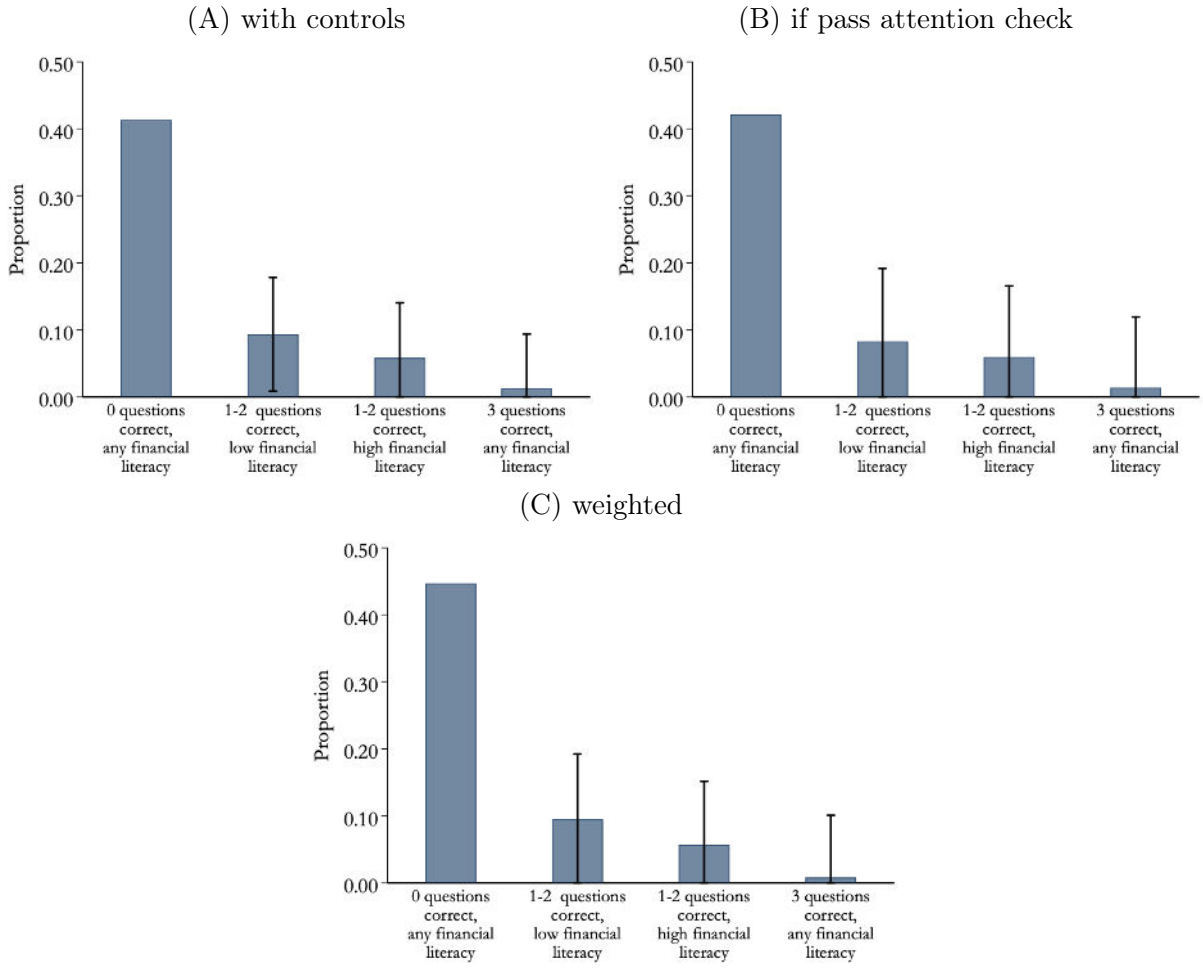


Table G.1 presents mean characteristics according to their responses to the knowledge questions and financial literacy. In terms of demographics, respondents who do not answer any

knowledge question correctly (column 1) are less likely to be married, more likely to be older, and more likely to be non-white. They have lower household incomes and retirement wealth, and shorter tenures with the employer.

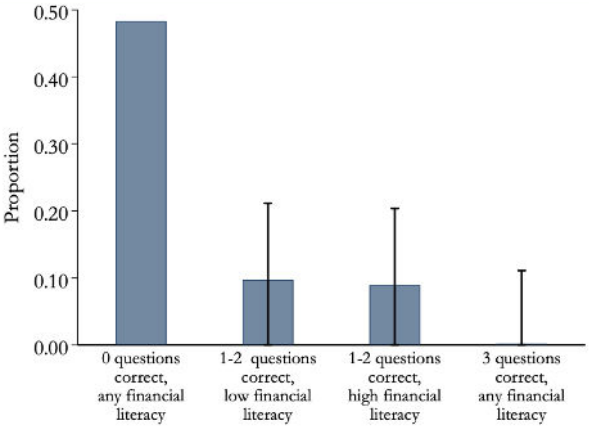
Table G.1: Characteristics by Benefits Knowledge and Financial Literacy

	0 questions correct, any financial literacy	1-2 questions correct, low financial literacy	1-2 questions correct, high financial literacy	3 questions correct, any financial literacy
Household (HH) income ($)	122,179	113,331	153,866	141,449
Household (HH) income: below $125k	55.0%	56.7%	40.0%	47.9%
HH retirement assets: below $25k	18.2%	27.9%	16.3%	11.4%
HH retirement assets: $25k - $100k	17.1%	24.0%	17.6%	24.6%
HH retirement assets: $100k - $250k	8.8%	11.7%	18.8%	20.6%
HH retirement assets: $250k - $750k	9.4%	7.8%	22.9%	22.6%
HH retirement assets: above $750k	5.3%	3.9%	14.8%	11.4%
Age (in years)	47.25	44.58	45.82	44.26
Men	24.1%	13.9%	36.2%	34.7%
Married	48.8%	51.7%	69.2%	62.3%
Non-white	42.9%	25.8%	20.6%	18.4%
Faculty	10.0%	8.2%	10.4%	7.7%
Tenure: $<$ 3 years	18.2%	8.2%	16.1%	12.7%
Tenure: 3 - 6 years	36.7%	29.9%	27.3%	22.4%
Tenure: 7 - 10 years	24.0%	20.8%	21.7%	25.9%
Tenure: 10 - 20 years	7.3%	14.9%	19.7%	18.7%
Tenure: 21+ years	15.3%	19.5%	16.9%	20.9%
Employee-only coverage	16.7%	14.9%	14.3%	12.2%

Figure G.2 splits the results in Figure 5 by household income. The patterns are qualitatively similar for both income groups, with the probability of enrolling in a dominated plan and not saving in the 403b or 457 being significantly higher among respondents who do not answer any of the three questions correctly. Among respondents who do not answer any question correctly, those with household income below $125,000 are more likely to exhibit this behavior.

Figure G.2: Choose Dominated Plan and Forego Retirement Match
by Benefits Knowledge, Financial Literacy, and Household Income

(A) Household income < $125,000



(B) Household income ≥ $125,000

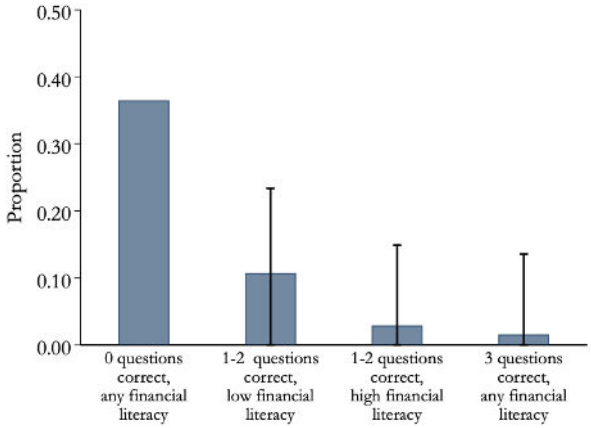


Table G.2: Benefits Knowledge and Financial Literacy, weighted and pass attention check

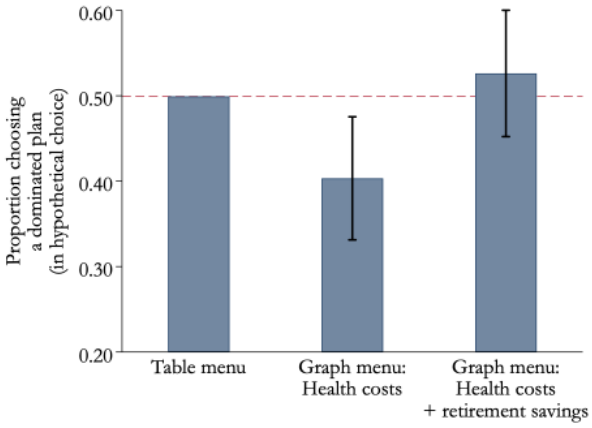
	Dominated health plan (1)	Not saving in 403b or 457 (2)	Dominated plan AND not saving (3)	Dominated health plan (4)	Not saving in 403b or 457 (5)	Dominated plan AND not saving (6)	Dominated plan AND not saving (7)	Dominated plan AND not saving (8)
Know retirement match	-0.003	-0.337	-0.211				-0.206	-0.193
	(0.029)	(0.035)	(0.030)				(0.030)	(0.030)
Know HSA rollover	-0.470	-0.053	-0.092				-0.085	-0.071
	(0.030)	(0.025)	(0.021)				(0.021)	(0.021)
Know employer HSA	-0.315	0.007	-0.059				-0.055	-0.053
	(0.029)	(0.024)	(0.015)				(0.015)	(0.015)
High financial literacy				-0.191	-0.135	-0.090	-0.041	-0.040
				(0.029)	(0.024)	(0.019)	(0.018)	(0.020)
Constant	0.867	0.464	0.338	0.596	0.245	0.150	0.352	0.332
	(0.026)	(0.035)	(0.033)	(0.022)	(0.020)	(0.017)	(0.034)	(0.033)
Controls	No	No	No	No	No	No	No	Yes
N	1254	1241	1241	1254	1241	1241	1241	1232
R^2	0.448	0.144	0.142	0.071	0.034	0.025	0.146	0.205

Note: Table presents regression results of linear probability models correlating health insurance and retirement saving choices with knowledge about benefits and financial literacy, weighted by the inverse probability of survey response. Regressions are restricted to those who pass attention check Robust standard errors in parentheses. Controls (column 8) include indicators for household income, age, gender, marital status, non-white, academic division, faculty, and tenure with the employer.

Complexity of Choices: We replicate the experimental results shown in Figure 7 in regressions that include controls (Figure G.3), weight by the inverse probability of survey responses (Figure G.4), and restrict to respondents passing the attention check (Figure G.5). Figure G.6 splits the results by household income and shows that the reduction in dominated choices from menu simplification are larger for respondents with household incomes below $125,000.

Figure G.3: Robustness: Menu Clarification and Choice Reversals, with Controls

(A) Effect of Menu Clarification on Survey Choices



(B) Survey Choice Reversals and Dominated Choices

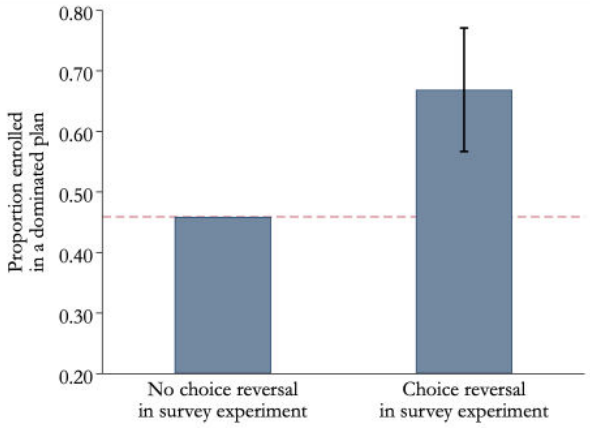
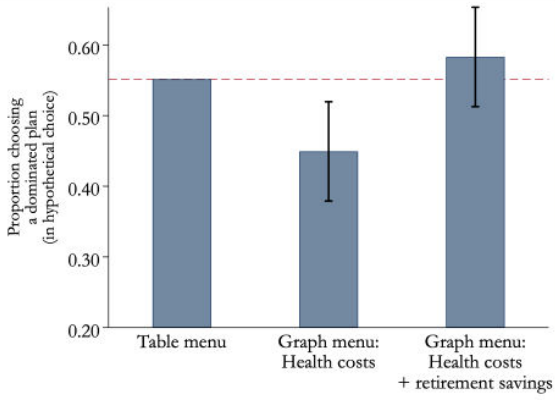


Figure G.4: Robustness: Menu Clarification and Choice Reversals, Weighted

(A) Effect of Menu Clarification on Survey Choices



(B) Survey Choice Reversals and Dominated Choices

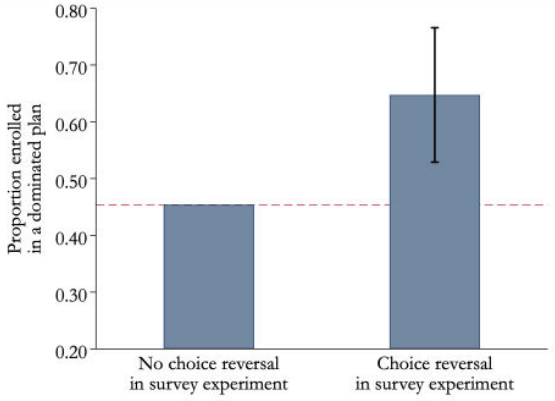
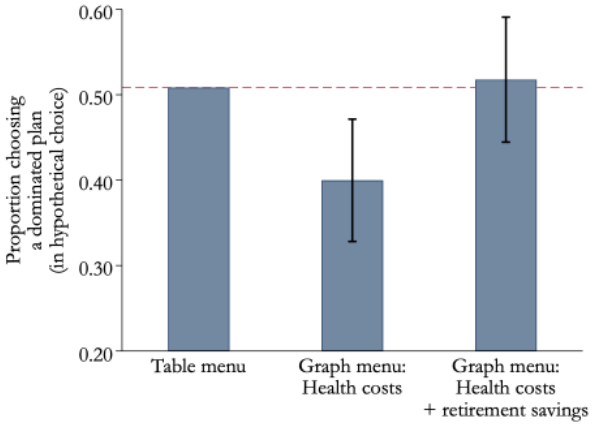


Figure G.5: Robustness: Menu Clarification and Choice Reversals, if Pass Attention Check

(A) Effect of Menu Clarification on Survey Choices



(B) Survey Choice Reversals and Dominated Choices

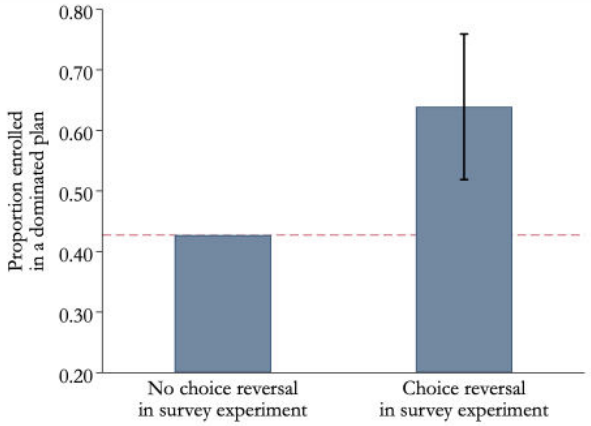
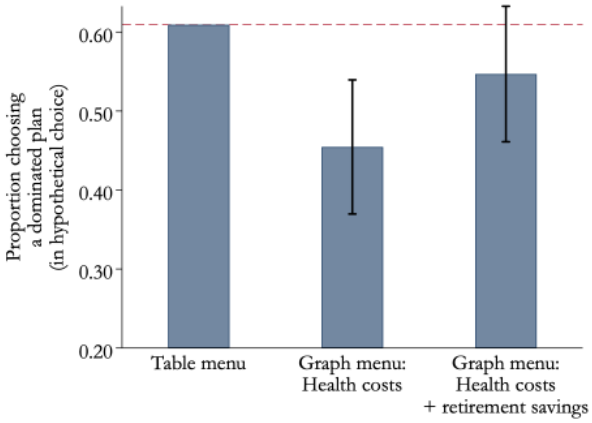
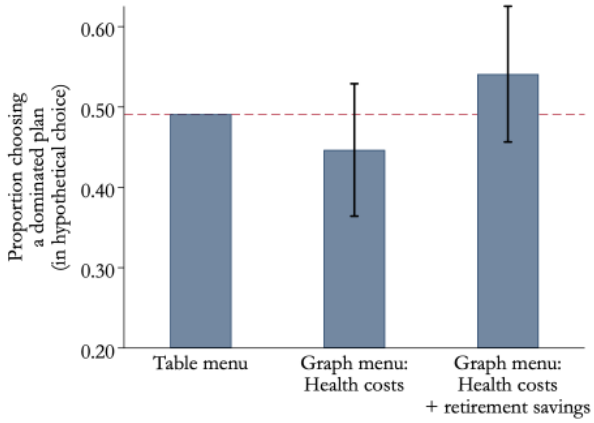


Figure G.6: Experimental Results: Menu Clarification by Income

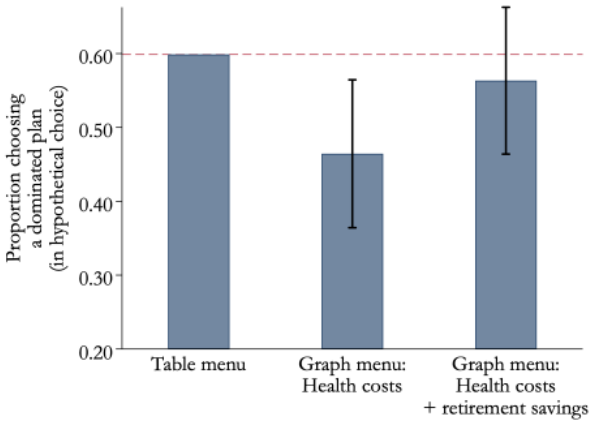
(A) Household income $<$ \$125,000



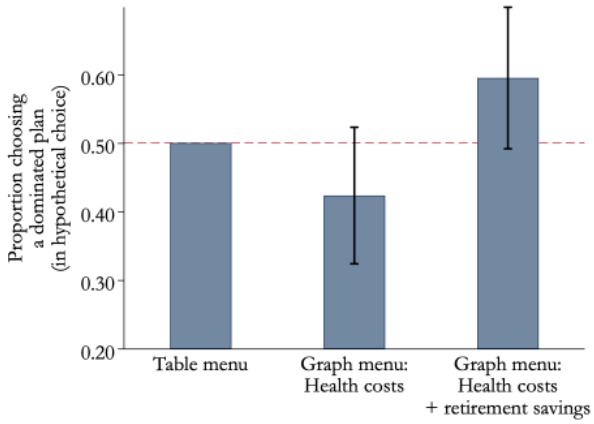
(B) Household income $\geq$ \$125,000



(C) Household income $<$ \$125,000, weighted

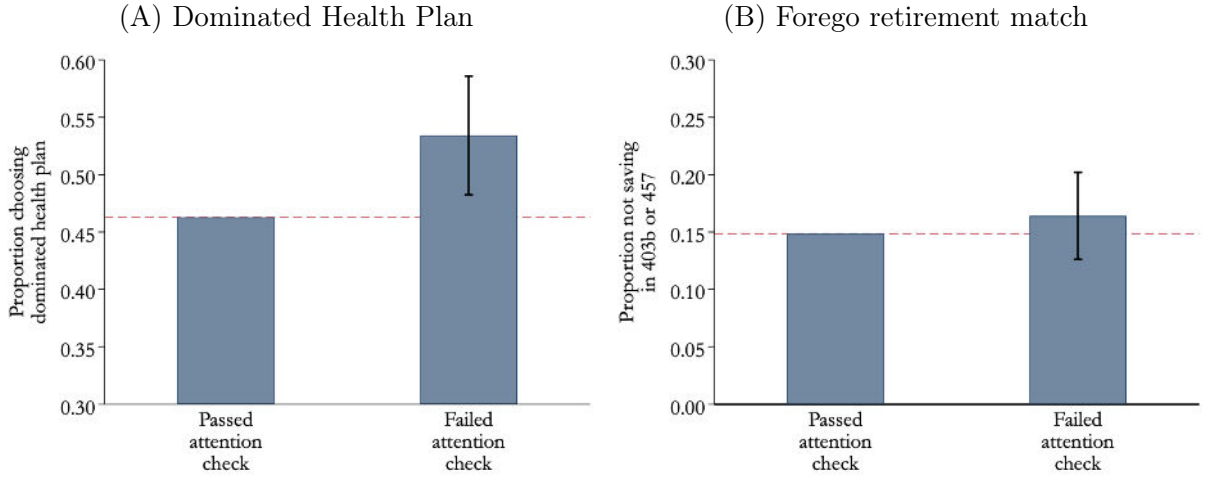


(D) Household income $\geq$ \$125,000, weighted



Attention: Figure G.7 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.7: Insurance and Saving Choices by Pass/Fail Attention Check



Liquidity: Simulation of Consumption-Utility Model. We simulate choices under a consumption-utility framework 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 choose health insurance plan j, they pay monthly premiums π_j, which are excluded from taxable income y. A dollar of health insurance premiums reduces their consumption by $\$(1-\tau)$ where τ is the marginal tax rate. If they incur health spending m while enrolled in plan j, their out-of-pocket costs are $OOP^j(m)$. We assume that the person is unable to finance *any* out-of-pocket payments 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. We assume spending occurs in only one month of the year, but with an equal probability of occurring in any month. If the shock occurs in month k, the person must borrow an amount $OOP^j(m)$ and must repay $OOP^j(m)(1+r^b)^{12-k}$ at the end of the year. If they enroll in the L, they must repay $(OOP^j(m) - HSA)(1+r^b)^{12-k}$. Their consumption if they enroll in plan j is defined as:

$$u(c^j) = \sum_{k=1}^{12} \frac{1}{12} \int_0^{\infty} u((y-\pi_j)(1-\tau) - (OOP^j(m) - \mathbf{1}(j=L)HSA)(1+r^b)^{12-k}) dF(OOP^j(m))$$

where $dF(OOP^j(m))$ is the density of out-of-pocket payments from enrolling in plan j, and $\mathbf{1}(j=L)$ denotes an indicator for choosing the HDHP, and HSA is the employer's unconditional HSA deposit.

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 $\gamma = 2$. We assume they are able to borrow up to the out-of-pocket maximum, but they may have to pay a high interest rate. Figure G.8 shows that over 96% of employees would still choose the HDHP if they can only borrow at annualized interest rates of 20 percent, such as credit card debt. A large majority continue to choose the HDHP if they face extremely high interest rates. Even at annualized interest rates of 500%, over 80% of the sample would still choose the HDHP under this model. While such borrowing costs are extreme, high out-of-pocket costs in the HDHP are sufficiently rare so that the premiums savings and HSA deposit from the employer—which occur with certainty—still drive decision-making.

Liquidity: Additional Survey Results. Table G.3 replicates Table 5, restricting to respondents who passed the survey's attention check. Liquidity constrained is an indicator equal to 1 if the respondent says they certainly could not or probably could not finance a $2,000 unexpected expense that occured within the next month. Robust standard errors are in parentheses. Controls (column 5) include indicators for household income, age, gender, marital status, non-white, academic division, faculty, and tenure with the employer. The results are quantitatively similar to Table 5, with the coefficients on liquidity and knowledge about benefits remaining large and statistically significant. Table G.4 replicates Table 5 weighting by survey response rates and also shows similar results.

Table G.5 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.

Table G.3: Robustness: Liquidity, if Passed Attention Check

	Dominated health plan	Not saving in 403b or 457	Dominated health plan AND not saving in 403b or 457		
	(1)	(2)	(3)	(4)	(5)
Liquidity constrained	0.207	0.182	0.145	0.093	0.086
	(0.040)	(0.036)	(0.031)	(0.030)	(0.032)
Know retirement match				-0.169	-0.168
				(0.029)	(0.028)
Know HSA rollover				-0.087	-0.079
				(0.021)	(0.020)
Know employer HSA funding amount				-0.030	-0.035
				(0.014)	(0.015)
High financial literacy				-0.024	-0.026
				(0.018)	(0.019)
Constant	0.424	0.119	0.059	0.287	0.284
	(0.016)	(0.011)	(0.008)	(0.035)	(0.035)
Demographic controls	No	No	No	No	Yes
Observations	1087	1086	1086	1086	1081
R^2	0.023	0.036	0.038	0.137	0.186

Table G.4: Robustness: Liquidity, Weighted

	Dominated health plan (1)	Not saving in 403b or 457 (2)	Dominated health plan AND forego retirement match (3)	(4)	(5)
Liquidity constrained	0.194	0.191	0.136	0.071	0.059
	(0.036)	(0.034)	(0.029)	(0.028)	(0.029)
Know retirement match				-0.199	-0.190
				(0.029)	(0.029)
Know HSA rollover				-0.078	-0.067
				(0.021)	(0.021)
Know employer HSA funding amount				-0.050	-0.049
				(0.015)	(0.015)
High financial literacy				-0.021	-0.027
				(0.018)	(0.020)
Constant	0.445	0.126	0.069	0.315	0.307
	(0.016)	(0.011)	(0.008)	(0.034)	(0.034)
Demographic controls	No	No	No	No	Yes
Observations	1254	1242	1242	1242	1233
R^2	0.034	0.044	0.035	0.153	0.208

Table G.5: Liquidity by Household Income

	Dominated health plan (1)	Forego retirement match (2)	Dominated plan AND no match (3)	Dominated health plan (4)	Forego retirement match (5)	Dominated plan AND no 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

Figure G.8: Simulated HDHP/HSA Choices vs. Borrowing Rates

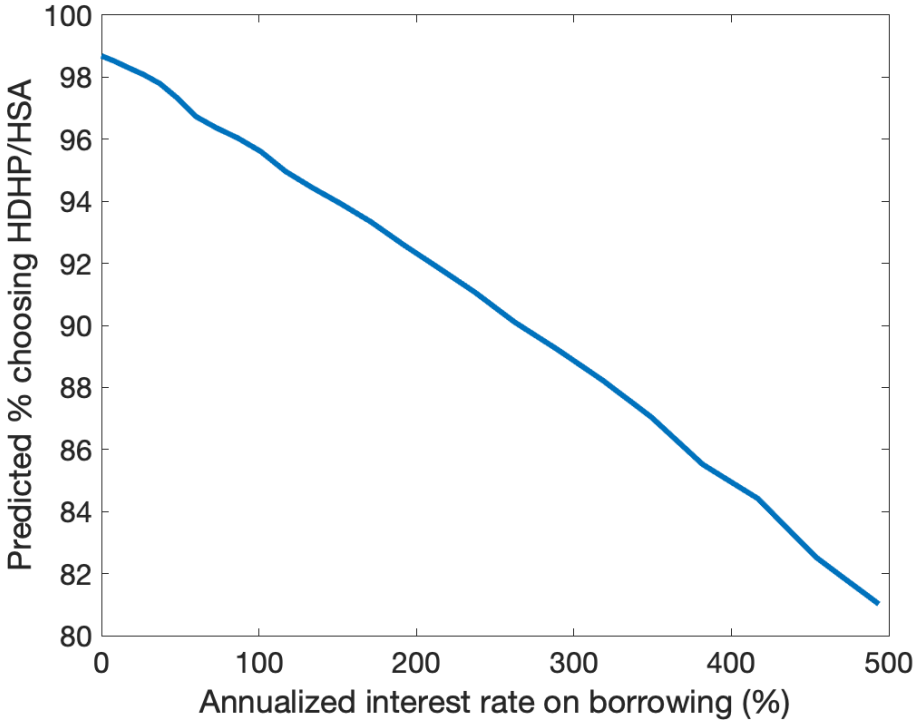
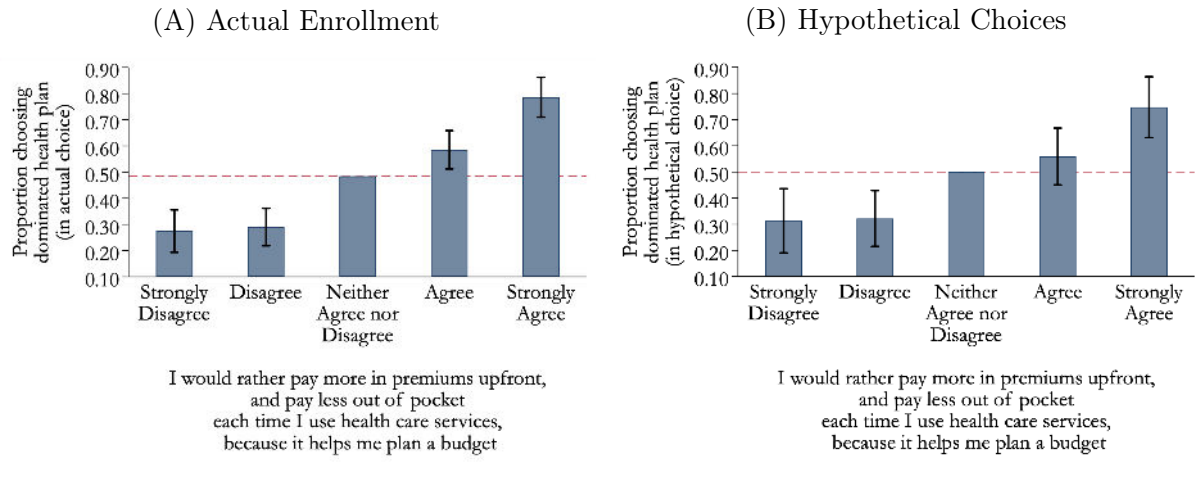


Figure G.9 plots the proportion of survey respondents choosing a dominated plan based on the extent to which they agree or disagree with the statement "*I would rather pay more in premiums upfront, and pay less out of pocket each time I use health care services, because it helps me plan a budget.*" Panel A plots the proportion of dominated choices based on the respondent's actual plan enrollment. Panel B presents the proportion of dominated choices based on the hypothetical choices from the survey's menu experiment, restricting responses to choices that do not change when the clarified menu is presented after the complex menu. Whiskers denote 95% confidence intervals using robust standard errors.

Figure G.9: Dominated Plan Choices by Budgeting Preferences



Inertia: Table G.6 presents regression results to test for the role of inertia in health insurance and retirement saving choices using our main sample. 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, but the magnitude is small in absolute terms: 94.5% of incumbent employees avoid the HDHP compared to 90% of new employees (column 1). On average, incumbent employees overpay by $1,615 per year compared to $1,508 for new employees (column 2). Requiring an active choice does 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 3).

Table G.6: Inertia

	Chose dominated health plan	Health insurance Overpayment ($)	Not saving in 403b or 457
	(1)	(2)	(3)
New employee	-0.039	-106.93	0.073
	(0.004)	(11.62)	(0.007)
Control mean	0.945	1615.47	0.341
	(0.002)	(6.86)	(0.004)
Demographic and job characteristics	Yes	Yes	Yes
N	43,355	43,355	43,355
R^2	0.023	0.375	0.166

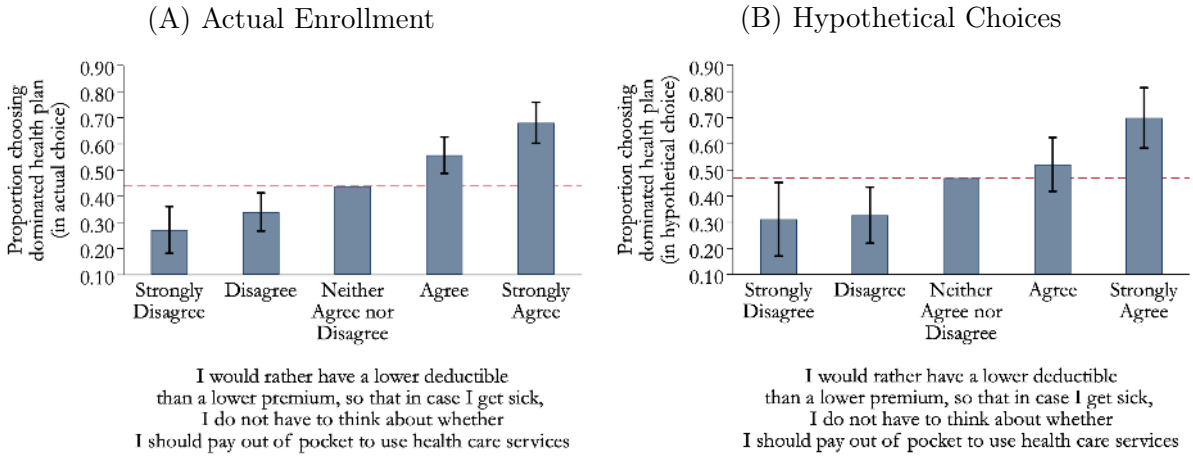
Reasons for Plan Choices: Table G.7 reports the reasons people report for not choosing the HDHP in the 2023 survey. The percentages sum to over 100% because respondents could select up to three reasons.

Table G.7: 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

Nonstandard preferences: Figure G.10 plots the proportion of survey respondents choosing a dominated plan based on the extent to which they agree or disagree 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.*" Panel A plots the proportion of dominated choices based on the respondent's actual plan enrollment. Panel B presents the proportion of dominated choices based on the hypothetical choices from the survey's menu experiment, restricting responses to choices that do not change when the clarified menu is presented after the complex menu. Whiskers denote 95% confidence intervals using robust standard errors.

Figure G.10: Dominated Plan Choices by Payment Aversion



Correlation between mechanisms:

Table G.8: 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

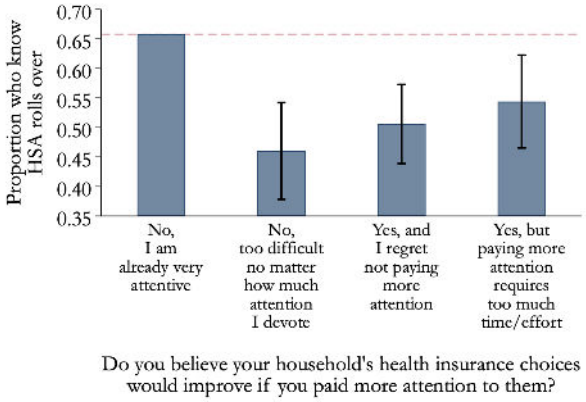
Table G.9 shows regression results of the correlations between responses to the question "*Do you believe your household's health insurance choices would improve if you paid more attention to them?*" and the question "*Do you believe your household's long-run finances would improve if you paid more attention 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.9: Correlation in Attention Responses across Domains

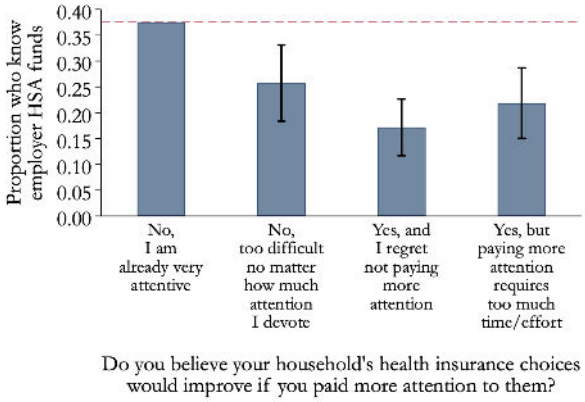
	Dependent var: Attention to long-run finances				
	"Already attentive" (1)	"Too hard" (2)	"Regret (3)	"Not worth time/effort" (4)	"Already set up" (5)
Attention to health insurance					
Too hard no matter how much attention I devote	-0.162 (0.032)	0.126 (0.037)	0.117 (0.050)	0.019 (0.033)	-0.099 (0.035)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

Figure G.11: Benefits Knowledge by Attention

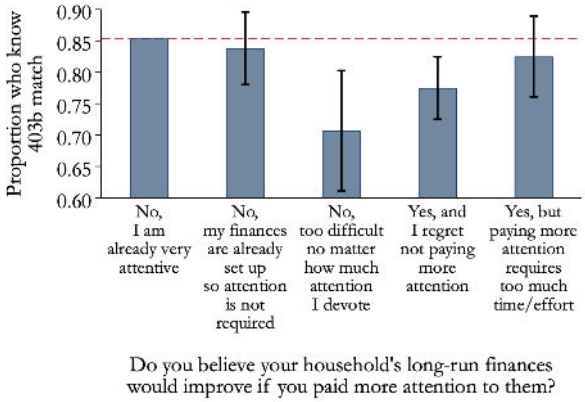
(A) Know HSA rolls over



(B) Know employer HSA funding



(C) Know 403(b) match



Attention and benefits knowledge are highly correlated.Figure G.11 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.