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Review: “Do Individuals Make Sensible Health Insurance Decisions? Evidence From a Menu With Dominated Options”

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A growing body of economic research is focused on understanding how consumers choose and utilize their health benefits. This is one of a series of article reviews prepared by the Behavioral Finance Subgroup of the Health Section that will highlight substantive articles of interest to health actuaries. It focuses on a report by Saurabh Bhargava and George Loewenstein of Carnegie Mellon University and Justin Sydnor of the Wisconsin School of Business.¹

For many Americans, health care spending represents a meaningful portion of their annual household expenditure. At its core, health insurance protects individuals from catastrophic financial risk when falling ill or suffering injury in exchange for fixed periodic payments. When choosing a health care plan, consumers aim to select the most favorable options that provide benefit coverage to meet their anticipated health care needs. However, new research shows that individuals, when making health plan choices through an employer-sponsored plan, often make suboptimal or even contradictory choices that lead to unnecessary out-of-pocket expenditures. To better understand why these suboptimal choices are made, Bhargava et al. performed a series of experiments designed to elicit key factors that influence health insurance decisions.

These experiments, and the authors’ subsequent analyses, provide useful insights for health actuaries consulting with large employers as well as product actuaries working in both the group and individual markets.

EMPIRICAL EVIDENCE OF POOR HEALTH PLAN CHOICES

The authors begin with an empirical assessment of the health plan choices made by more than 50,000 employees at an undisclosed Fortune 100 firm. Beginning in 2010, these employees were required to assemble their own health plan by selecting four in-network, cost-sharing features from a menu of options. Choices available included four annual deductible levels (\$1,000; \$750; \$500; \$350), three out-of-pocket maximum levels (\$3,000;

\$2,500; \$1,500), two office visit copayment levels (\$15 for primary care physician (PCP)/\$40 for specialist; \$25 for PCP/\$35 for specialist), and two coinsurance rates (90 percent; 80 percent) for a total of 48 distinct plans. All plans were administered by the same insurance company and featured the same provider network; therefore the only variations between plans were the four cost-sharing features and the corresponding premiums.

What makes this menu of health plan options notable is the presence of “financially dominated” options. A particular plan is considered financially dominated if there is an alternative plan that results in lower overall out-of-pocket costs across the entire range of potential medical spends. For example, consider two hypothetical plans—Plan A and Plan B—that are identical except for the in-network deductible level.

Plan A	Plan B
Deductible: \$500	Deductible: \$1,000
Out-of-pocket max: \$1,500	Out-of-pocket max: \$1,500
Office visit copay: \$15 PCP \$40 specialist	Office visit copay: \$15 PCP \$40 specialist
Coinsurance: 90%	Coinsurance: 90%
Annual premium: \$1,568	Annual premium: \$930

By selecting Plan A over Plan B, an individual would pay an additional \$638 in annual premium in exchange for a maximum potential savings of \$500 in deductible expenditure. Even after considering the tax implications associated with these different premiums (assuming the deductible would be spent using after-tax dollars and the premium would be paid using before-tax dollars), the expected tax-adjusted cost differential still exceeds the potential savings in deductible expenditure.

This example may seem trivial, but in reality all but one of the 36 low-deductible plans offered by the employer were financially dominated by the corresponding \$1,000 deductible plan on a pretax basis (30 of the 36 were dominated after tax





considerations). The authors found that a majority, nearly 63 percent, of plan enrollees selected plans that were financially dominated on a pretax basis.² Even after tax adjustment using the inferred marginal tax rate for each employee based on reported salary, 46 percent of employees chose financially dominated plans, nearly half of whom were paying more than 50 percent more in annual premium than the difference in deductibles. To make things worse, the evidence further suggests that the most financially vulnerable enrollees (e.g., lower-income employees, older employees, and those with chronic conditions) were significantly more likely to select the financially dominated plans. Employees in the lowest band of reported income could have saved more than 4 percent of annual income, on average, with the actuarially best plan. The disproportionate impact on the most financially vulnerable individuals due to the burden of complex insurance decisions highlights the fact that these poor plan choices critically undermine the propositions of choice expansion. The authors conclude that individuals who selected a plan with a deductible lower than \$1,000 could have saved on average \$353 per year by switching to the corresponding \$1,000 deductible plan. Given average employee salary below \$30,000 for individuals in this sample, this represents a significant savings of nearly 2 percent of total after-tax salary.

UNDERSTANDING POOR HEALTH PLAN CHOICES

The underlying question as to why individuals, with their own financial best interest in mind, would choose dominated plans was tested in a series of experiments focused on different perceived behavioral biases in plan selection. The fact that each of the 48 plans offered by the firm had a nontrivial percentage of enrollees suggests that there are a wide variety of search strategies, motivations and preferences at play. The experiments were presented through an online module that allowed test subjects to make plan choices in a manner similar to that of the firm's employees, but with various interventions imposed to elicit the key drivers underlying the decisions made. The test groups for each of the experiments described were drawn from

a homogeneous population and were demographically diverse in gender, age, education level, race and income. In addition, the test groups consisted of individuals with and without health insurance.

Experiment 1: Search Complexity

The first experiment was designed to test the hypothesis that poor plan choices made by plan enrollees could be attributed to "search complexity," a catch-all term to refer not only to the large size of the plan menu and the plethora of individual choices to be made, but also the difficulty in comparing distinct plans. The test group was exposed to a plan menu that, although differing in number of customizable attributes and total options from the firm's plan, included the same degree of price domination. Subjects were each exposed to a plan interface that varied across the following three attributes, for a total of eight "interventions":

- **Premium mode.** Premiums were either presented annually or monthly in order to assess whether displaying premiums annually, and thus on the same basis as the deductible, improved plan choice.
- **Number of plan attributes to be selected by the test subject.** Options varied between four deductibles and three maximum out-of-pocket (MOOP) (12 options) and four deductibles with MOOP held constant (four options).
- **Ease of comparison.** Some test subjects were required to build plans sequentially (similar to the firm's plan) with the option to price different plans separately, while others were shown a single table containing all potential plan options with corresponding premiums.

Figure 1 illustrates the options used in this experiment.

The authors found that the elections of financially dominated plans under the experiment were in line with the empirical data collected from the firm. In the experiment, only 32 percent of subjects elected a plan with the maximum deductible of \$1,000 (compared to 37 percent of the firm's enrollees), meaning that more than two-thirds of the sample group selected financially dominated plans. Modest improvements were noted for subgroups whose interventions included the side-by-side comparison of all available plans; however, the researchers note no noticeable improvement in plan selection due to limiting the number of selectable attributes or through displaying monthly versus annual premiums.

Experiment 2: Insurance Literacy and Search Motivation

While the results of the first experiment provide modest evidence that complexities with the plan selection interface may contribute to the selection of dominated plans, the second experiment focused on the complexity of fundamental insurance

Figure 1
Experiment 1—Search Complexity

Select plan menus faced by subjects in comparison choice conditions

(menus vary by number of attribute combinations and time-horizon of premium display)

The following table tells you how much you would pay in premium for the deductible you select.

TABLE OF MONTHLY PREMIUMS FOR HEALTH PLAN OPTIONS			
DEDUCTIBLE			
\$350	\$500	\$750	\$1,000
\$163/month	\$118/month	\$110/month	\$68/month

- Comparison Choice
- Single Attribute
- Monthly Premiums

The following table tells you how much you would pay in premium for the deductible and out-of-pocket maximum you select.

TABLE OF MONTHLY PREMIUMS FOR HEALTH PLAN OPTIONS			
DEDUCTIBLE	OUT-OF-POCKET MAXIMUMS		
	\$1,500	\$2,500	\$3,000
\$350	\$163/month	\$151/month	\$134/month
\$500	\$118/month	\$104/month	\$93/month
\$750	\$110/month	\$97/month	\$86/month
\$1,000	\$68/month	\$55/month	\$53/month

- Comparison Choice
- Two Attributes
- Monthly Premiums

The following table tells you how much you would pay in premium for the deductible and out-of-pocket maximum you select.

TABLE OF YEARLY PREMIUMS FOR HEALTH PLAN OPTIONS			
DEDUCTIBLE	OUT-OF-POCKET MAXIMUMS		
	\$1,500	\$2,500	\$3,000
\$350	\$1,957/year	\$1,808/year	\$1,605/year
\$500	\$1,419/year	\$1,252/year	\$1,114/year
\$750	\$1,321/year	\$1,168/year	\$1,038/year
\$1,000	\$817/year	\$662/year	\$634/year

- Comparison Choice
- Two Attributes
- Annual Premiums

Source: Reproduced from “Do Individuals Make Sensible Health Insurance Decisions? Evidence From a Menu With Dominated Options” by Saurabh Bhargava, George Loewenstein and Justin Sydnor, May 2015.

concepts as the key driver to suboptimal plan selection. In the second experiment, subjects were presented a short narrative of a recent health care enrollee and subsequently asked to define key cost-sharing attributes of a typical insurance plan (copayment, deductible, out-of-pocket maximum and coinsurance) prior to plan selections from a simplified menu. The subjects’ insurance “literacy” was determined based on the responses given. Results of the “literacy” analysis found that 71 percent of respondents were unable to identify and explain the four cost-sharing attributes correctly. The researchers found that high insurance literacy corresponded to better plan selection with approximately 65 percent of “literate” subjects selecting

non-dominated plans versus approximately 50 percent for their “illiterate” counterparts.

In further iterations of the experiment, subjects were coached on how to identify dominated plans (i.e., comparing difference in premium to difference in deductible). An example of this coaching is shown in Figure 2.

Introducing coaching saw increases in selection of non-dominated plans versus a control group for both “literate” and “illiterate” subjects. In total, education and coaching interventions improved the quality of plan choices; however, 30 to 40 percent of the subjects persisted in making suboptimal choices.

Figure 2
Experiment 2—Health Literacy

In the final part of the survey, we will ask you to choose a health plan from a menu of possible plans.

However, before you choose, we’d like to spend a few minutes and walk you through a couple illustrative scenarios. For these scenarios imagine that you are only responsible for your own health care, and not that of a spouse or dependents.

First, it is helpful to define two terms:

A **plan premium** is the amount that must be paid for a health plan (usually monthly, quarterly or annually).

A **plan deductible** is the annual amount that must be paid out-of-pocket for medical care before a health plan begins to pay. For example, if a plan deductible is \$1,000, the plan won’t pay anything until a customer has exceeded \$1,000 in medical expenses.

Imagine that Bill is presented with the following health plan for the next year (“Plan Green”):

Plan Green has a \$1,200 annual premium and a \$800 deductible. The plan covers all expenses after the deductible is met.

What is the *minimum* and *maximum* amount Bill might have to spend next year on health care (including both his premium and possible out-of-pocket costs)?

	0	400	800	1200	1600	2000	2400	2800	3200
Minimum Bill Might Spend	0	400	800	1200	1600	2000	2400	2800	3200
Maximum Bill Might Spend	0	400	800	1200	1600	2000	2400	2800	3200

Yes, you are correct!

No matter what, Bill would end up paying *less* with **Plan Green**.

Why? Note that plans with a lower deductibles (here, **Plan Blue**) cost more in annual premium.

If Bill does not use any medical care, he will definitely pay more with the low deductible plan.

If Bill does use care, the low deductible plan may save him money by reducing his out-of-pocket spending but will only be cheaper overall if these savings are larger than the additional plan premium.

In this example, if Bill chooses **Plan Blue**, he has to pay an *additional \$800 in premium* (\$2,000–\$1,200). However, even if Bill uses a lot of medical care, **Plan Blue** can only *save him a maximum of \$400* in out-of-pocket spending (\$800–\$400).

Now imagine that Bill has the option of choosing between the same **Plan Green** or a new **Plan Blue**

The plans provide access to the same doctors and quality of service, but the plans have the following features:

Plan Green has a \$1,200 annual premium and a \$800 deductible. The plan covers all expenses after the deductible is met.

Plan Blue has a \$2,000 annual premium and a \$400 deductible. The plan covers all expenses after the deductible is met.

For each of the following scenarios, which plan will be cheaper for Bill?

	Plan Green	Cheaper Plan for Bill	
		Plan Blue	Plans are Equal
Bill does not visit the doctor all year	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bill visits the doctor at a total expense of \$500	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bill visits the doctor and hospital at a total expense of \$3000	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Source: Reproduced from “Do Individuals Make Sensible Health Insurance Decisions? Evidence From a Menu With Dominated Options” by Saurabh Bhargava, George Loewenstein and Justin Sydnor, May 2015.

In addition to testing whether basic *knowledge* of key insurance principles could result in better plan selection, the authors also tested whether an individual’s preconceived *beliefs* that some insurance plans are simply bad deals correlated to improved selections. Subjects were presented with the following question:

When enrolling in health insurance, typically you would be asked to choose from a set of health plans with very different prices (premiums). What would you expect to be true about these plan options?

Subjects who responded that price differences usually reflect difference in quality or coverage were classified as “trusting,” while

those responding that price differences do not necessarily reflect these differences were classified as “suspicious.”

Although a majority of the test group was identified as “suspicious,” the researchers only found marginal improvements in plan choice for this cohort. For those given a simplified plan menu (four plans varying only by deductible), 56 percent of suspicious individuals selected non-dominated plans compared to 55 percent of trusting individuals. When the plan menu became more complicated (12 plans varying by deductible and MOOP), however, the gap widened to 57 percent of suspicious individuals selecting non-dominated plans compared to 48 percent of their trusting counterparts. These minimal discrepancies between the

Consumers are valuing the deductible level using some convoluted heuristic, when a simple comparison of the differences in deductibles to the premium differential should suffice.

suspicious and trusting groups may suggest that suspicious individuals, although correct in their belief that some plans were simply a bad deal, lacked the ability to identify which plans were, in fact, the bad deals.

Experiment 3: Plan Price and Perceived Health Status

The final experiment performed in this study focused on the sensitivity of plan choice to two additional attributes: plan price and perceived health status. To measure consumer sensitivity to plan price, a test environment was designed with four plan options differing only by deductible. In the baseline case, all low-deductible plans were financially dominated by the \$1,000 deductible plan. A second case (“more expensive”) was designed so that the premium gaps between the \$1,000 deductible plan and the low-deductible plans were increased by a factor of 1.25, with the \$1,000 deductible plan premium unchanged. The third case (“less expensive”) was designed in a similar manner to the “more expensive” case, but with premium gaps scaled by a factor of 0.75. The researchers found a marginal increase in optimal plan selection as price differentials rose, with 44 percent selecting the \$1,000 deductible plan in the “more expensive” case compared to 36 percent in the baseline case and 32 percent in the “less expensive” case. This apparent sensitivity to the magnitude of price differentials is not particularly surprising, however, as nearly all low-deductible plans were dominated in each of the three scenarios. This strongly suggests that consumers are valuing the deductible level using some convoluted heuristic, when a simple comparison of the differences in deductibles to the premium differential should suffice.

The latter portion of the third experiment focused on perceived health status as a primary motivator for plan choices. Prior to having subjects select from a menu of four plans varying only by deductible level (and with all low-deductible plans dominated by the \$1,000 deductible option), individuals self-reported their health status as either “extremely healthy,” “fairly healthy,” “somewhat healthy,” or “unhealthy.” Of those self-reporting as “extremely healthy,” a majority, 51 percent, selected the \$1,000 deductible option. In comparison, only 33 percent of their less healthy counterparts made the same election. Despite a similar rate of election of dominated plans in the “fairly healthy,”

“somewhat healthy” and “unhealthy” groups, those self-reporting in the lowest two groups were significantly more likely to select the plan with the absolute lowest deductible. The authors conclude that the results of this experiment show that subjects “. . . do not appear to make choices randomly, but instead appear to recognize the existence of tradeoffs involving plan prices and health risks.”

UNDERSTANDING THE PRICING OF PLAN OPTIONS

The results of the aforementioned experiments, as well as the empirical data, strongly suggest that a substantial proportion of consumers may make poor insurance decisions when offered a menu that includes financially dominated plan options. The natural follow-up to this conclusion is to question the rationale behind offering financially dominated plans to the employees in the first place. The authors noted that the firm studied partnered with an actuarial/health insurance consulting firm to price the plan options. The authors propose that the existence of financially dominated options was a consequence of adverse selection and the use of an “average-cost-pricing” approach that set prices for each plan based on the cost of those individuals selecting the plan. Furthermore, the dominated options were made apparent because of the “build-your-own” menu of cost-sharing options presented to employees instead of offering fewer, more widely varied “bundled” options that would make the dominated options less transparent.

To determine whether or not the observed plan menu is consistent with an average-cost-pricing strategy, the authors employed a series of regression analyses using premiums, plan features and health care spending. Based on these techniques, they were able to determine the marginal difference in employee plan price associated with each cost-sharing feature and the “average incremental cost” to the employer associated with each cost-sharing feature (both relative to the option with highest cost-sharing). These regression models showed that the average incremental cost to the employer (or benefit to the employee) was much less than the price charged for the benefit. This result further validates the empirical assertion that there is substantial cost savings to the consumer associated with non-dominated plans. For example, the analysis shows that the marginal cost of choosing a plan with a \$500 deductible instead of an equivalent plan with a \$1,000 deductible would be approximately \$625. Compare this to the average incremental cost to the insurer of only \$230 (equivalent to out-of-pocket savings for the consumer of the same amount); it becomes apparent that the consumer would be better off choosing the option with greater cost-sharing.

Additional regression analysis found that the premium patterns observed seem much more reasonable when viewing them through the lens of total cost borne to the insurer. By regressing the average total expenditure on medical spending with features

of the chosen plan (the “average-cost-pricing” approach), both the incremental cost to the insurer for covered health spending and differences in total health spending between employees by plan choice could be accounted for. Consistent with the assertion that employees are self-selecting based on their own perceived health status, the researchers find that individuals opting for lower cost-sharing, and hence dominated plans, are also spending more on health care. Back to the \$500 deductible versus \$1,000 deductible example, this analysis shows that individuals choosing the \$500 deductible spend, on average, more than \$1,200 than those selecting higher-deductible plans—all else equal. It is clear from these results that anti-selection of plan participants can—at least partially—account for the presence of financially dominated plan options when an average-cost-pricing methodology is used.

The authors suggest that using the average incremental cost approach rather than an average-cost-pricing approach would diminish the consequences of poor choices, as premiums would never be financially dominated. Furthermore, the authors note that healthier employees (who are the most disadvantaged by dominated options) would tend to migrate to higher cost-sharing plans, which would result in increasingly dominated pricing under the average-cost-pricing approach. This suggested pricing under the average-cost-pricing approach. This suggested pricing approach is essentially encompassed in the “single risk pool” requirements of the Affordable Care Act, since plan options cannot be priced as separate risk pools.

IMPLICATION FOR ANALYSIS OF INSURANCE MARKETS

In the final section of the paper, the authors offer a modification to the standard model of insurance markets. In the standard model, consumers are rational and would not purchase a financially dominated option. The authors suggest that some consumers may naively assume that the price presented is an “actuarially fair” price and will purchase coverage based only on their perceived risk, ignoring the price. By weighting the standard model with this modification, the authors demonstrate how the choice of financially dominated options could occur.

CONCLUSION

In conclusion, the authors note that the empirical results do not follow the standard economic model of insurance demand, which

posits that individuals select the available plan that maximizes utility given accurate beliefs about the financial consequences of coverage choices based on expectations of benefit utilization and level of financial risk aversion. However, we live in a world where many of our everyday decisions may not be considered “rational” in a purely economic sense. An overabundance of options, as seen in the study, can cause individuals to make financially nonsensical decisions with no one the wiser. Health insurers, as well as employers sponsoring group health plans, should focus on providing their members with the tools and assistance needed to support educated plan enrollment rather than focusing solely on expanding plan menus. Individuals are ultimately responsible for the choices made, but empowering them with appropriate knowledge could go a long way in improving the consumer decision process. ■



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ENDNOTES

- ¹ The original report can be found at <https://www.cmu.edu/dietrich/sds/docs/bhargava/w21160.pdf>.
- ² It is worth noting that the plan with the highest degree of cost-sharing, and therefore lowest annual premium, was the default plan for those with existing coverage and electing not to make a choice using the new plan selection interface. The authors were unable to make a distinction between those who had actively versus passively selected this plan.