Insurance Choice with Non-Monetary Plan Attributes: Limited Consideration in Medicare Part D

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Motivation

- Health insurance markets in the US are moving towards greater consumer choice.
  - Medicare, Medicaid, Affordable Care Act.
  - Employers offer employees choice among sponsored plans.
- Consumer choices over health insurance plans are notoriously difficult to rationalize with economic models.
  - Dominated choices, inconsistent preferences.
  - Standard insurance models often match choice patterns poorly.
  - Reduced form models abstract away from structural role of risk preferences and underlying source of demand.

Motivation

- In certain markets demand is presumed to be induced by a fundamental primitive (well-defined source of structural utility).
  - Risk aversion and expected utility is a standard example in insurance applications and adopted in this paper.
- Such a model can fail to rationalize choices for reasons other than misspecification of utility, including (among others):
  - Individuals may be fully rational but face unobserved constraints.
  - Impact of marketing or perceived quality of products.
  - Behavioral forces and use of heuristics to narrow choice set.
- In Medicare Part D, specifically, there is concern that the large number of plans is a particularly challenging choice environment to fully evaluate.

This Paper:

- Proposes a model of demand for insurance in which:
  - The traditional specification of utility over financial outcomes is maintained.
  - Plan attributes stochastically determine the composition of the set of plans an individual evaluates.
  - The methodology is applicable to other specifications of underlying demand structure.
- Estimates the model using data on Medicare Part D choices.
  - Offers insight into how plan attributes impact insurance plan choices and how beneficiaries navigate a large choice set.
  - Resolves certain documented inconsistencies between economic theory and empirical choice patterns.
- Assesses the potential welfare loss of limited consideration.

Preview of Results

- Allowing for limited consideration, risk preferences are comparable to other insurance settings.
- Heterogeneity in consideration is crucial to understanding plan choice.
- Consideration largely driven by firm effects and visible plan attributes.
  - All else equal, highest premium considered 10% as much as lowest premium.
  - Maximum deductible considered 18% as much as zero deductible.
- Limited consideration results in individuals frequently not considering their "utility-optimal" plan.

Choice Model

- Beneficiary i has utility over final wealth experienced under plan j, characterized by coefficient of risk aversion ν.

$$U_{ij}(C_{ij}) = -\frac{1}{\nu_i}\exp(-\nu_i(W_i - C_{ij})),$$

- $\mathcal{M} \equiv \{1, 2, ..., J\}$ denotes the feasible choice set.
- Each beneficiary draws an unobserved consideration set $M_i \subseteq \mathcal{M}$.
- Probability i chooses j is comprised of the probability $j \in M_i$ and among the products in M_i, that j is most preferred according to expected utility.

$$Pr(y_{ij} = 1) = \sum_{M \subseteq \mathcal{M}: j \in M} Pr(M_i = M) Pr(EU_{ij} \geq EU_{ik} \ \forall \ k \in M)$$

Choice Model

- Probability plan j appears in consideration set $\equiv$ $\varphi_j(Z_j)$.
- Assume consideration probabilities are:
  - Homogeneous across agents.
  - Independent conditional on observables.
  - Subject to a simple completion rule in case empty is drawn (omitted for notational simplicity).

$$\Rightarrow Pr(y_{ij} = 1) = \sum_{M \subseteq \mathcal{M}: j \in M} \prod_{k \in M} \varphi_k(Z_k) \prod_{k' \notin M} (1 - \varphi_{k'}(Z_{k'})) \, Pr\left(EU_{ij} \geq EU_{ik} \; \forall \; k \in M\right)$$

- Not computationally feasible to enumerate all consideration sets M.

Choice Model

- For any given value of ν, can rank plans according to expected utility:

  $$EU_{i1}(\theta_{C_{i1}}; \nu|\nu = \hat{\nu}) \geq EU_{i2}(\theta_{C_{i2}}; \nu|\nu = \hat{\nu}) \geq ... \geq EU_{iJ}(\theta_{C_{iJ}}; \nu|\nu = \hat{\nu}).$$

- $Pr\left(EU_{ij}(\theta_{C_{ij}}; \nu|\nu = \hat{\nu}) \geq EU_{ik}(\theta_{C_{ik}}; \nu|\nu = \hat{\nu})\right) \ \forall \ k \in M$:
  - $= 1$ when M does not contain any plans better than j.
  - $= 0$ when M does contain a plan better than j.
- Denote such dominating plans by $k_i \succ_{\hat{\nu}} j$.
- Can write the probability a given plan j is selected as:

$$Pr(y_{ij} = 1|\nu = \hat{\nu}) = \varphi_j(Z_j) \prod_{k_i \succ_{\hat{\nu}} j} (1 - \varphi_k(Z_k))$$

Data

- CMS administrative data: 5% sample of 2010 Medicare beneficiaries.
- Public data on plan formulary/drug pricing.
- Analysis sample: active choosers in California.
  - Sample of 4,400 individuals.
  - Select zero deductible plans more often than national average.
- Choice menu: 46 plans offered by 19 firms.
  - Substantial variation in plan attributes: premium, deductible, cost-sharing, drug coverage.

Summary Stats

Reduced Form Description of Plan Choice

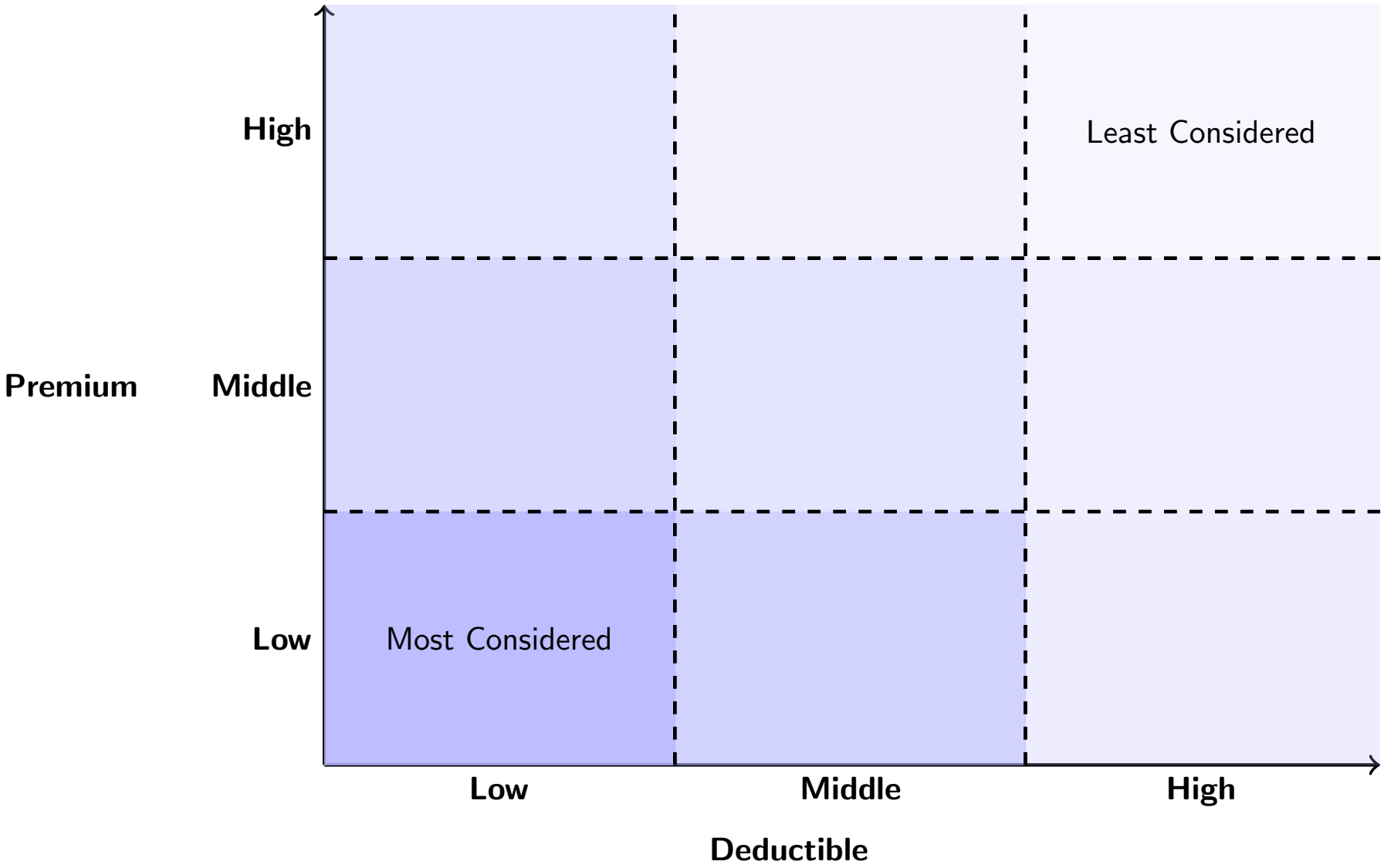
- 17% of beneficiaries in analysis sample select their lowest cost plan.
  - Average overspending of approximately a quarter of total expenditure.
  - 43% choose plans on the cost-variance frontier.
- Even within preferred (chosen) firm, 11% choose a plan dominated in cost and variance.
- Plan attributes are strongly associated with choices (utility coefficients from logit regression):
  - Premium: -.536
  - Mean out-of-pocket costs: -.350
  - Deductible: -.674

Logit Distributions

Estimation

- Consideration probabilities parameterized to be functions of:
  - Firm identity,
  - Monthly premium,
  - Deductible,
  - Gap coverage,
  - Count of top 100 drugs covered, and
  - Average cost share during initial coverage phase.
- No moral hazard.
- $\nu \in [0, .01] \sim Beta(\beta_1, \beta_2)$; $C_{ij} \sim N(\mu_{ij}, \sigma_{ij}^2)$.
- Perfect foresight of mean OOP costs $\mu_{ij} = \bar{\mu}_{ij} + p_j$.
- Estimate σ_{ij}^2 through binning by average monthly gross drug costs and number of effective claims.

Consideration Intuition

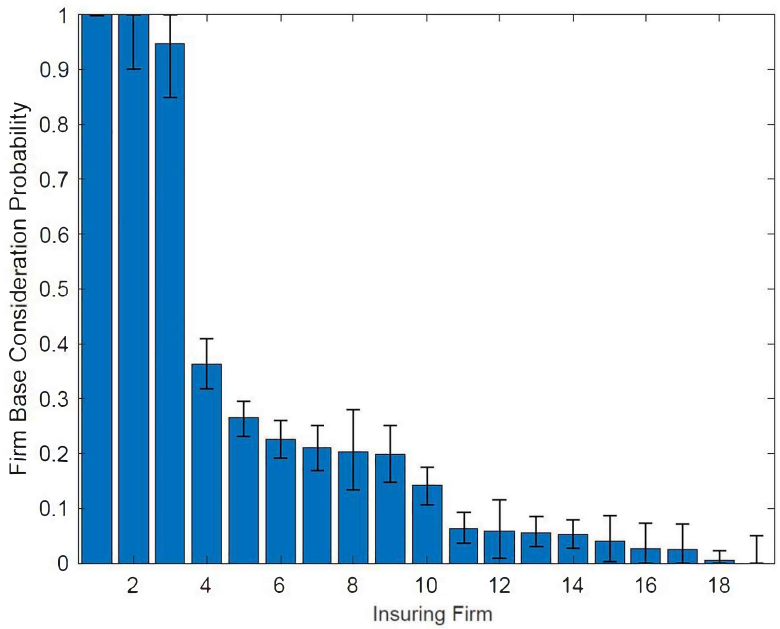


Main Results - Preferences & Plan Attributes

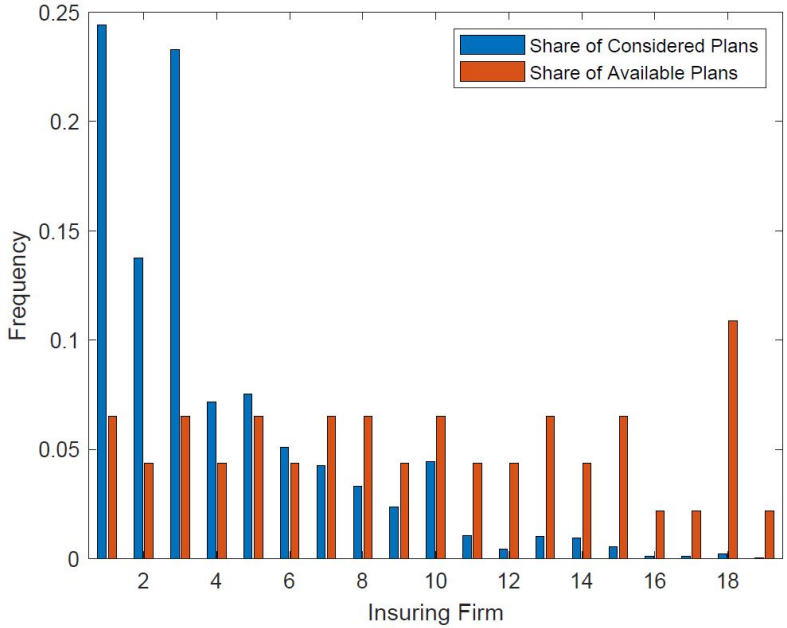
	Estimate	95% Confidence Interval
$\mathbb{E}$(Risk Aversion)	$9.52 \cdot 10^{-4}$	$[5.59 \cdot 10^{-4}, 1.40 \cdot 10^{-3}]$
Var(Risk Aversion)	$3.14 \cdot 10^{-6}$	$[9.75 \cdot 10^{-7}, 6.31 \cdot 10^{-6}]$
Premium	0.100	[0.074, 0.140]
Deductible	0.182	[0.163, 0.206]
Gap Coverage	0.859	[0.782, 0.953]
Top 100 Drugs	1.000	[0.999, 1.000]
Average Cost-Share	1.000	[1.000, 1.000]

Notes: CI based on 1,000 bootstrap reps with sub-sampling to correct for estimates on the boundary.

Main Results- Firm Effects



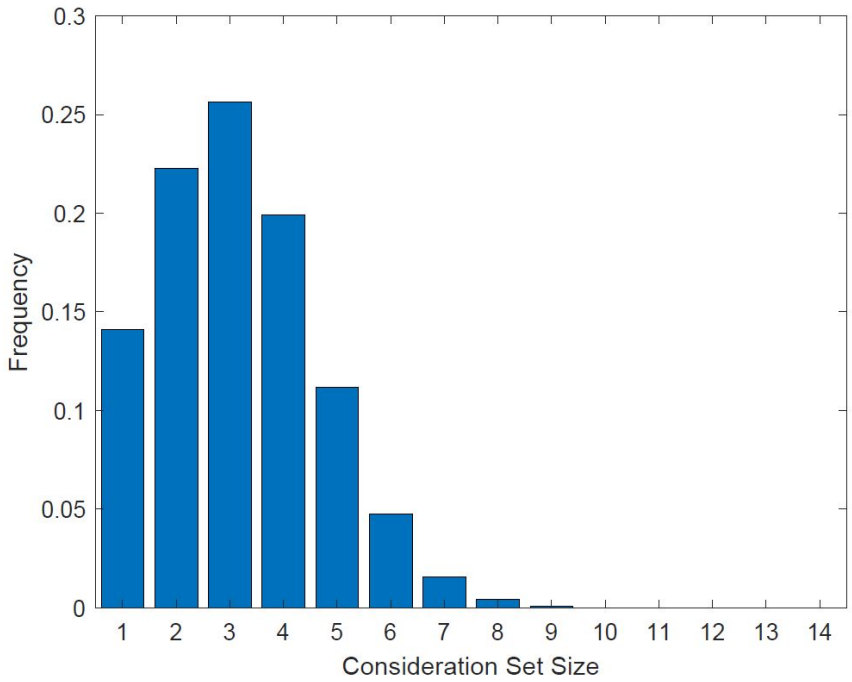
(a) Firm Consideration Probabilities



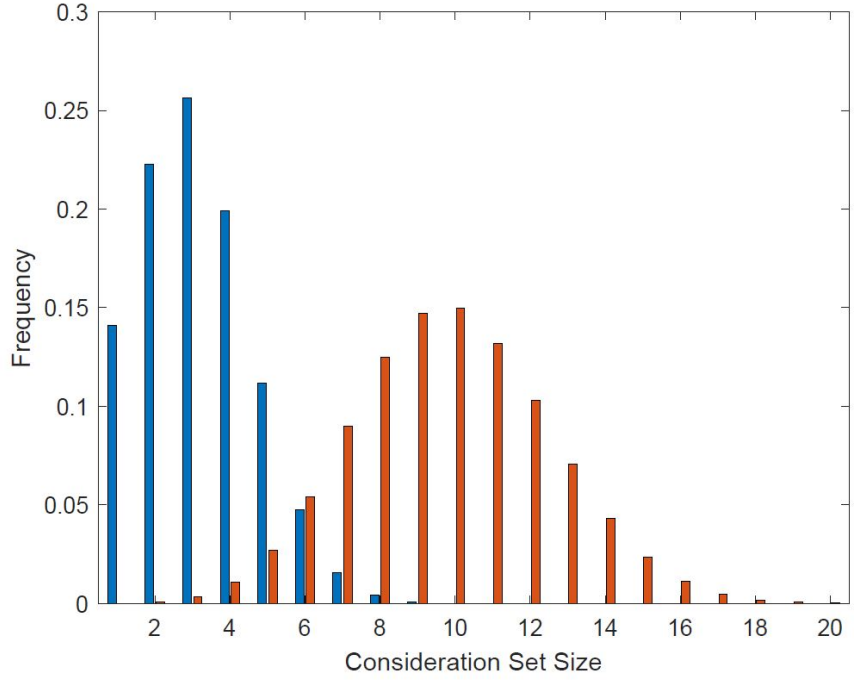
(b) Firm Plan Shares

Notes: Firms are ordered based on estimated base consideration probabilities. Error bars present 95% confidence intervals based on 1,000 bootstrap repetitions with sub-sampling to adjust for estimates on the boundary.

Main Results - Predicted Consideration Sets Sizes



(a) Implied Consideration Set Size



(b) Removing Firm Effect

Notes: Implied consideration sets are estimated as the average over 1,000 simulations.

Counterfactual - Cost of Limited Consideration

	Average CE Difference
Baseline Model	\$226
Removing Firm Effect	\$88
Only Firm Effect	\$84
Removing Deductible Effect	\$141
Removing Premium Effect	\$147
Removing Gap Effect	\$201

Notes: CE differenced averaged across individuals over 1,000 simulations of risk preferences and consideration sets as select consideration effects removed. CE difference computed as the difference in the certainty equivalent of the chosen plan and optimal plan.

Conclusion

- Provide a tractable and theoretically appealing framework to study risk preferences and the role of plan attributes in insurance choices.
  - Disentangles the roles that risk aversion and attributes play in choices.
  - Accommodates empirical patterns in which non-monetary features influence plan choice in manner consistent with standard theory.
  - Results are intuitive and informative for understanding how plan design and attributes impact choices.
- Empirical results reveal details of *how* beneficiaries select plans.
  - Distribution of risk preferences and the forming of consideration sets.
  - Accounting for consideration, choice behavior in this market aligns with typical preferences of expected utility maximizers in insurance settings.

Thank you!

Comments welcome:

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