Adverse Selection in Health Insurance Markets

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January 8, 2023

Overview

- Health insurance pays for most health care expenses for consumers in the U.S. (~3 trillion per year)

- In U.S., often provided through regulated markets where private firms compete with one another (exchanges)

  -- What type of actual insurance do firms provide?

  -- How much can insurers price discriminate?

  -- How do regulators and insurers contend with adverse selection?

  -- Insurer fixed costs, markups, and profit caps

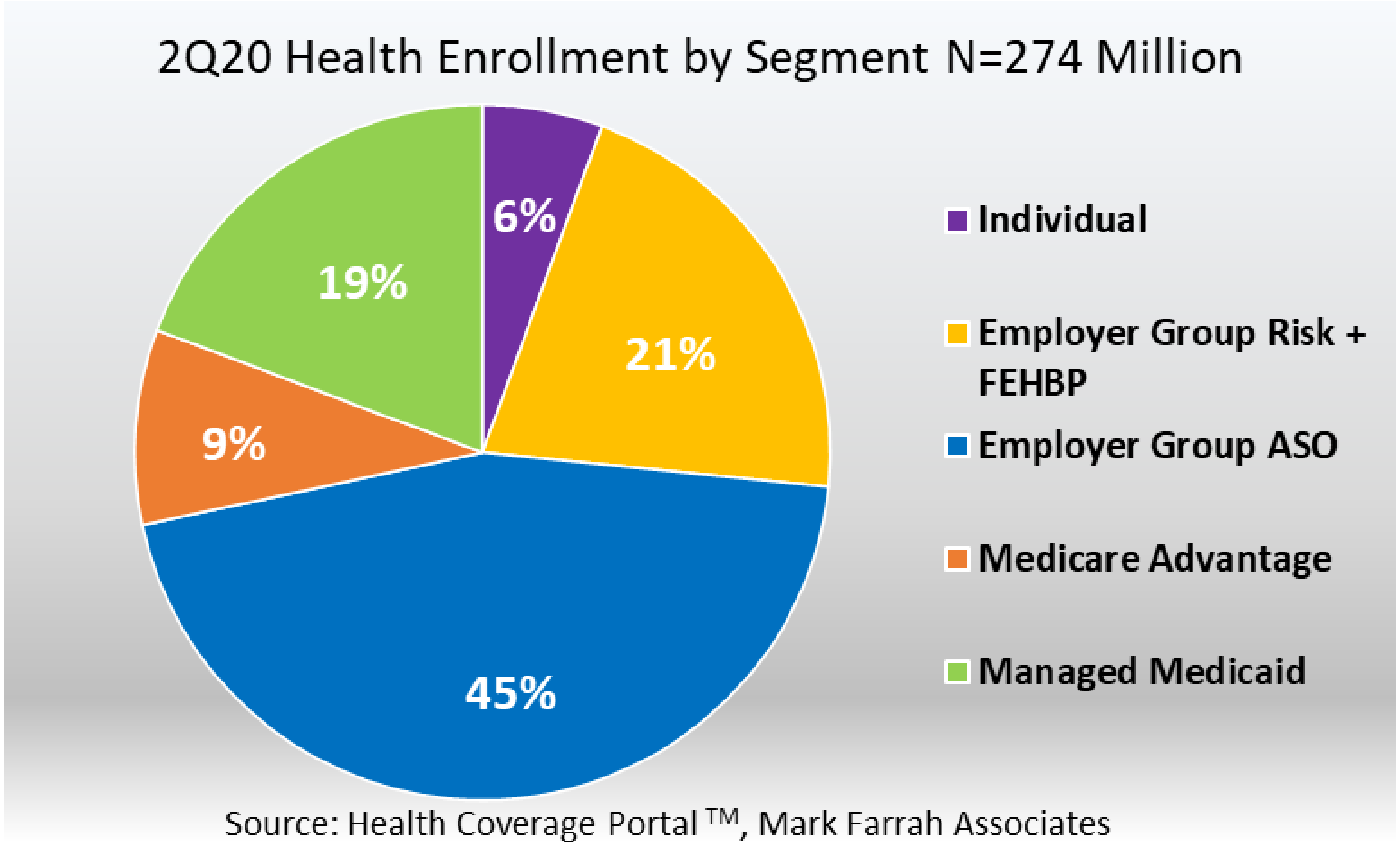
- Key U.S.-specific markets include:

  -- Medicare Part D prescription drug insurance

  -- Affordable Care Act state-by-state exchanges

  -- Employer provided markets

Overview

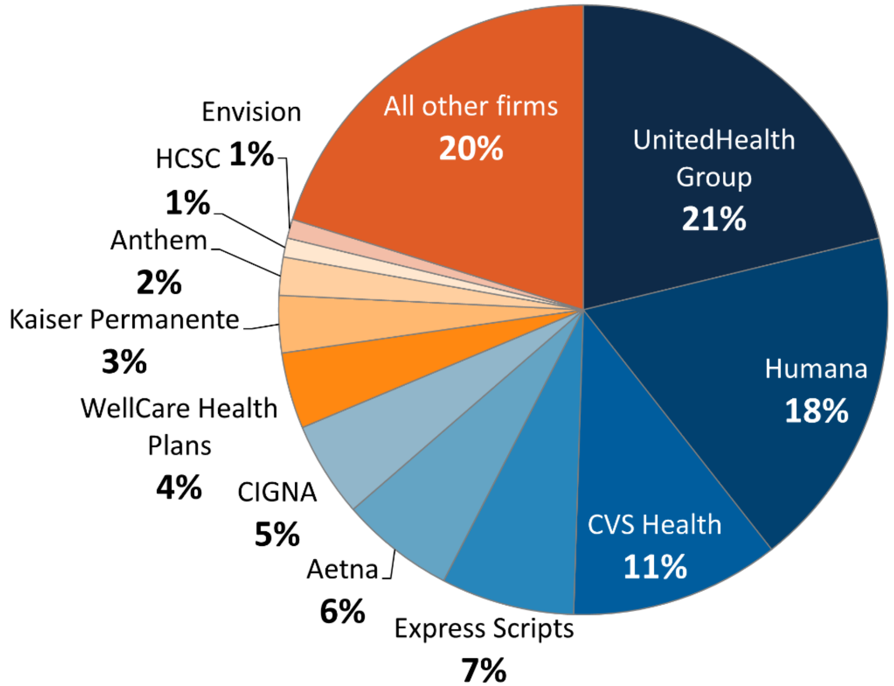


- Chart includes privately insured consumers
- Traditional Medicare enrollees include another 30M (10%) and also about another 10% on state-run Medicaid

Overview

Exhibit 1.5

Distribution of Medicare Part D Enrollment, by Firm, 2015



Total Medicare Part D Enrollment, 2015 = 39.2 million

NOTE: Includes plans in the territories and employer group plans.
SOURCE: Georgetown/Kaiser Family Foundation analysis of CMS 2015 Part D plan and enrollment files.

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Overview

- One key feature of health insurance markets is that they are a "selection market," where the cost of someone enrolling depends on *who is enrolling* (in this case, how sick they are)
  - This can be due to either pricing regulations <u>or</u> asymmetric information

- Today we will cover two key papers that conceptually and empirically study adverse selection in health insurance

- <u>Other examples of selection markets</u>: credit cards, loans, life/auto insurance, annuities….what other examples can you think of?

Einav et al., *QJE*, 2010

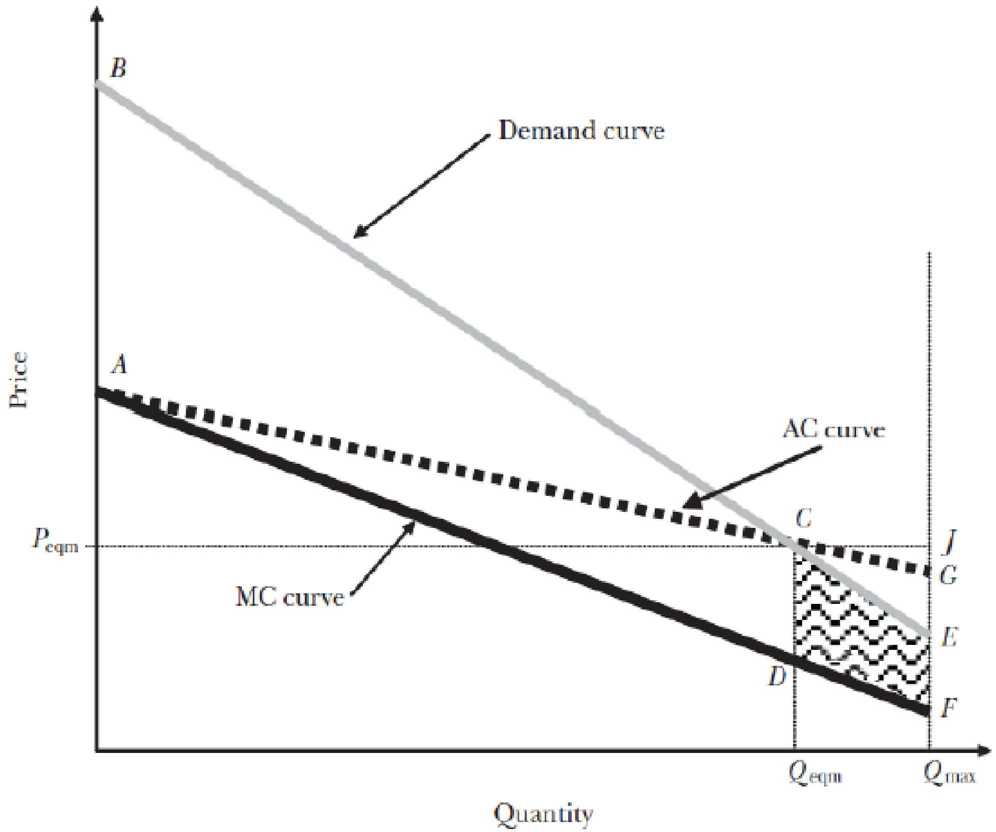
“Estimating Welfare in Insurance Markets Using Variation in Prices”

EFC (2010): Setup

- Simple model of selection markets, nice graphical framework
- Application to adverse selection in health insurance at large employer (Alcoa) where different regions / offices have different prices, ostensibly because of idiosyncratic management by site
- Model assumes that one plan is priced by competitive market and that other option is non-priced backstop option (e.g. basic government insurance).
- Main empirical result: some evidence of adverse selection, but very small welfare loss from that selection

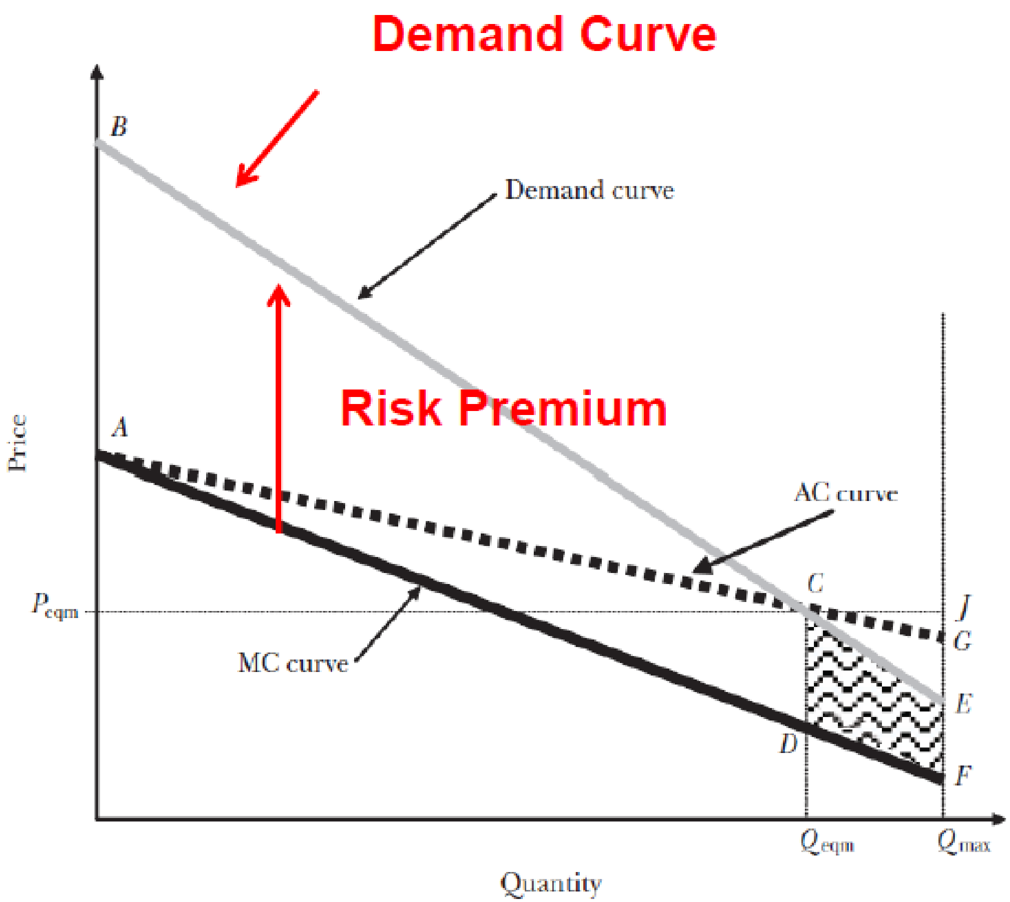
EFC (2010)

- **Y-Axis:** Price of insurance contract
- **X-Axis:** Quantity of people buying insurance contract
- Quantity of insurance contract here is just proportion of consumers buying that contract
  - 0 if no one buys
  - Q_{max} if everyone buys
- Quantity of buying insurance increases moving left to right



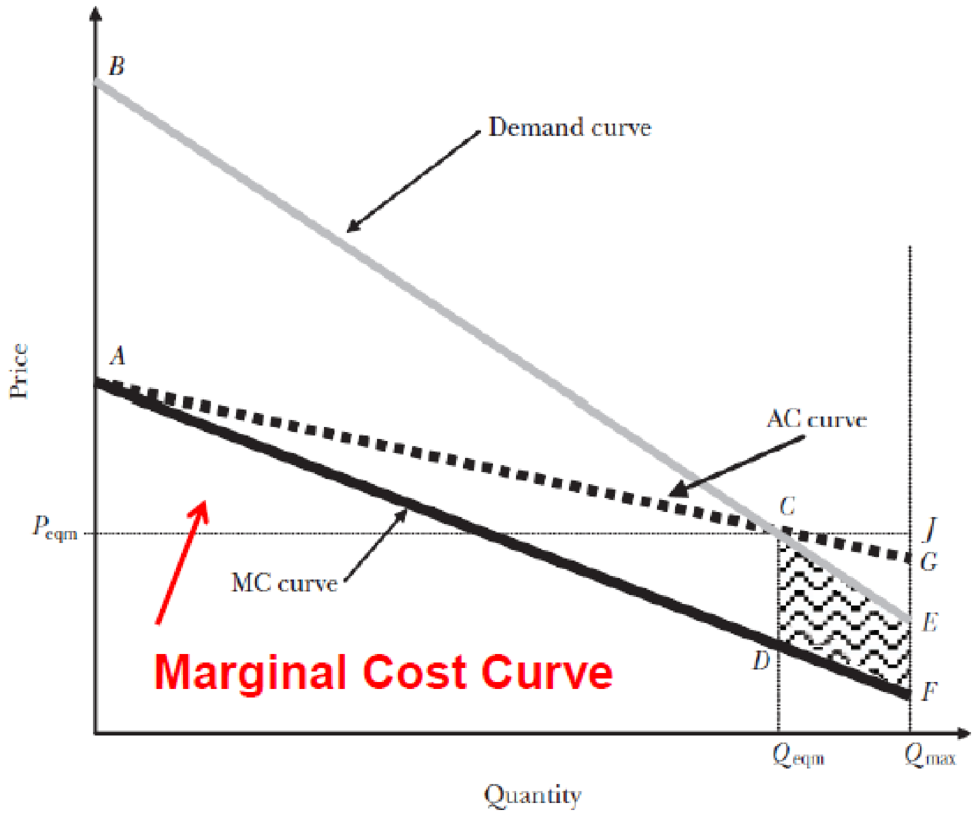
EFC (2010)

- **Demand:** The demand curve represents the *quantity (proportion)* of consumers willing to purchase the insurance contract at a given price P
- Simply proportion of consumers with willingness to pay greater than P.
- Demand from:
    - Risk aversion
    - Health risk



EFC (2010)

- **Marginal Cost (MC):** Expected cost to insurer for *marginal* consumers buying at price P
- Marginal cost would be the same as the demand curve in this simple setup if consumers were risk neutral
- Marginal cost is both:
  - Expected reduction in consumer spending from insurance
  - Expected increase in insurer costs if consumer buys

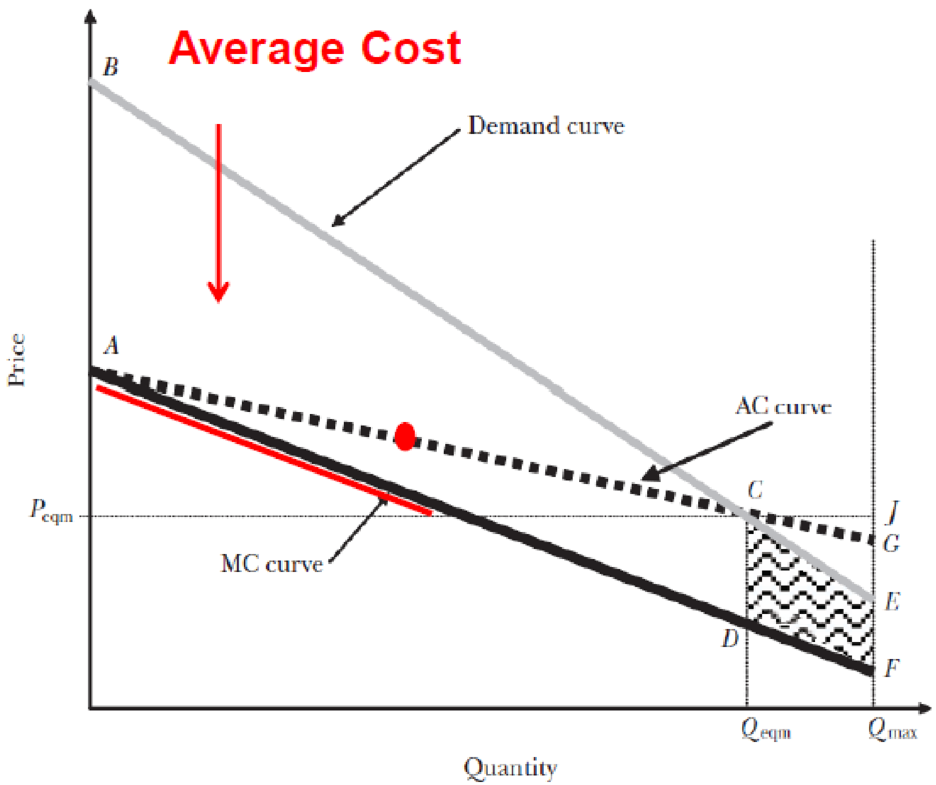


EFC (2010)

- **Average Cost (AC):** Expected *average cost* to insurer for *all* consumers purchasing insurance at price P

- Average cost for given price P in graph is simply average expected cost of those with willingness-to-pay larger than P

- Thus, the average cost curve for price P and implied quantity Q is just the *average* of the marginal cost curve to the left of quantity Q

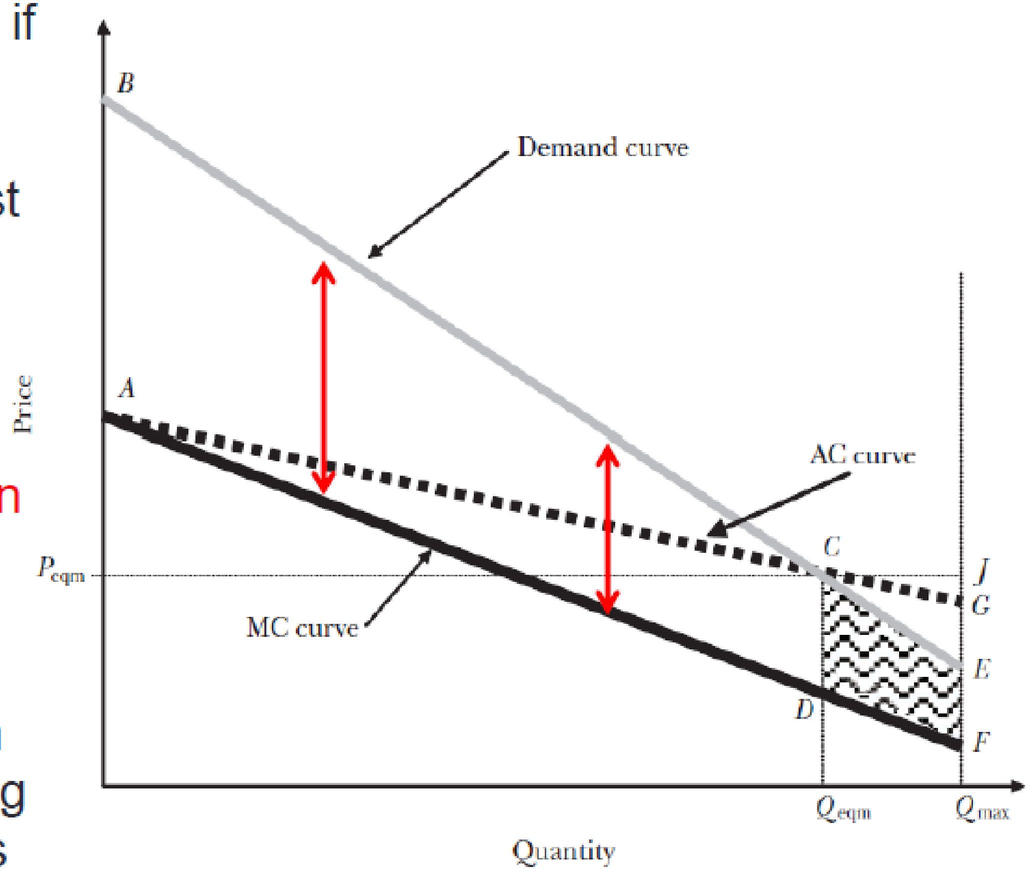


EFC (2010)

- Social welfare is increased if all consumers who have willingness-to-pay greater than the their expected cost of insurance to the insurer *actually buy insurance*

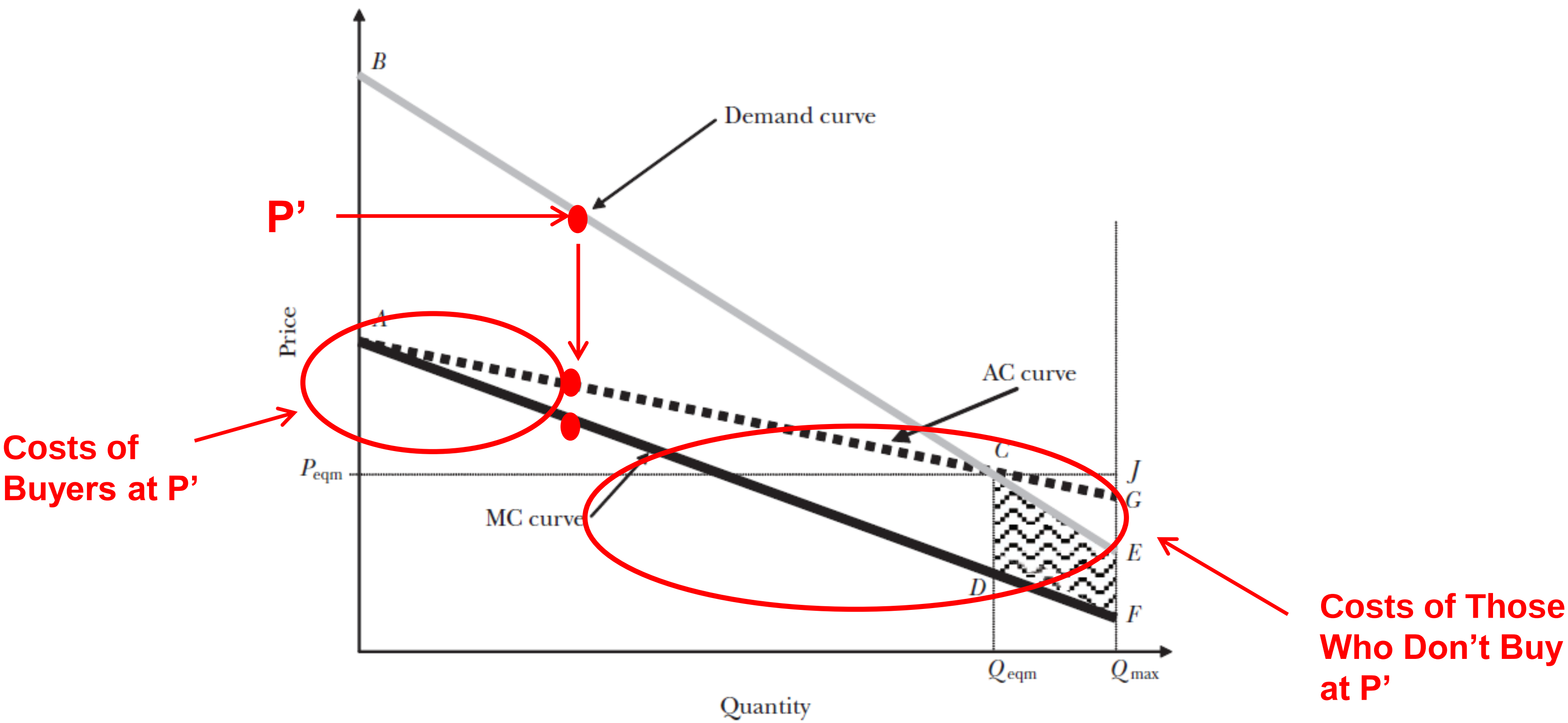
- How many consumers do we want to buy insurance in this basic setup?

- Demand (willingness-to-pay) is *always greater* than marginal cost here, implying that we want *all* consumers to buy insurance



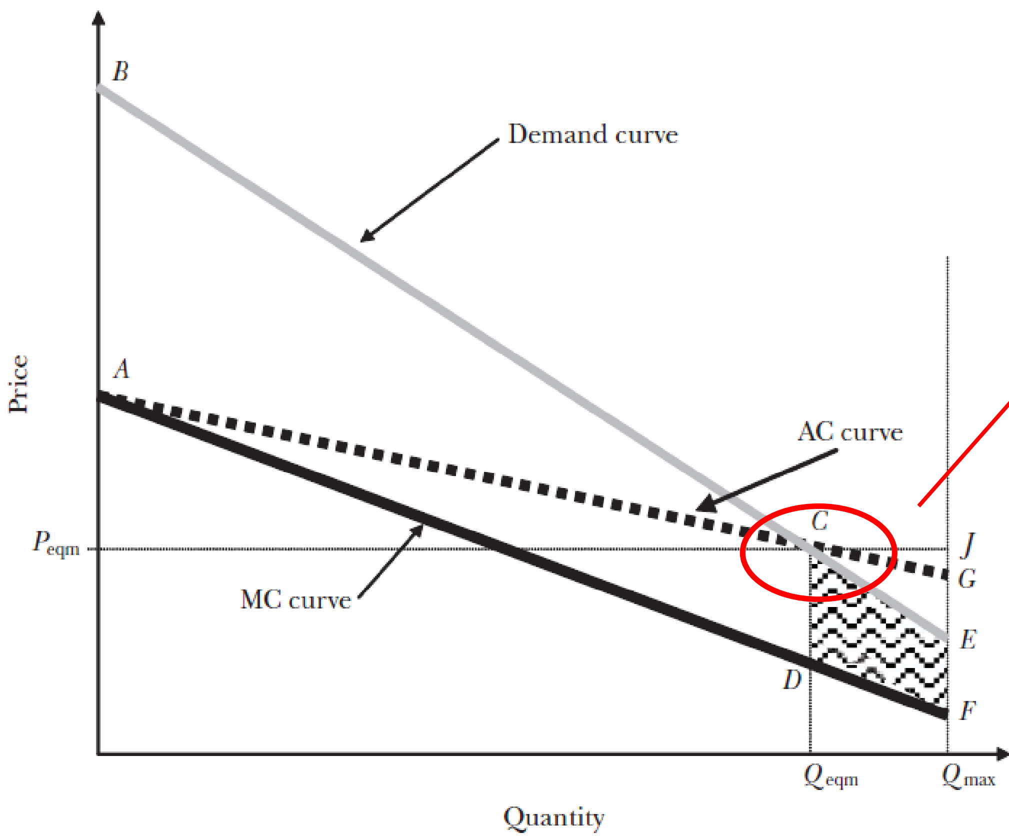
Adverse Selection

- At candidate price P' , given downward sloping MC (and hence AC) curves, sicker people buy health insurance, healthy people don't buy



Market Outcome: Adverse Selection

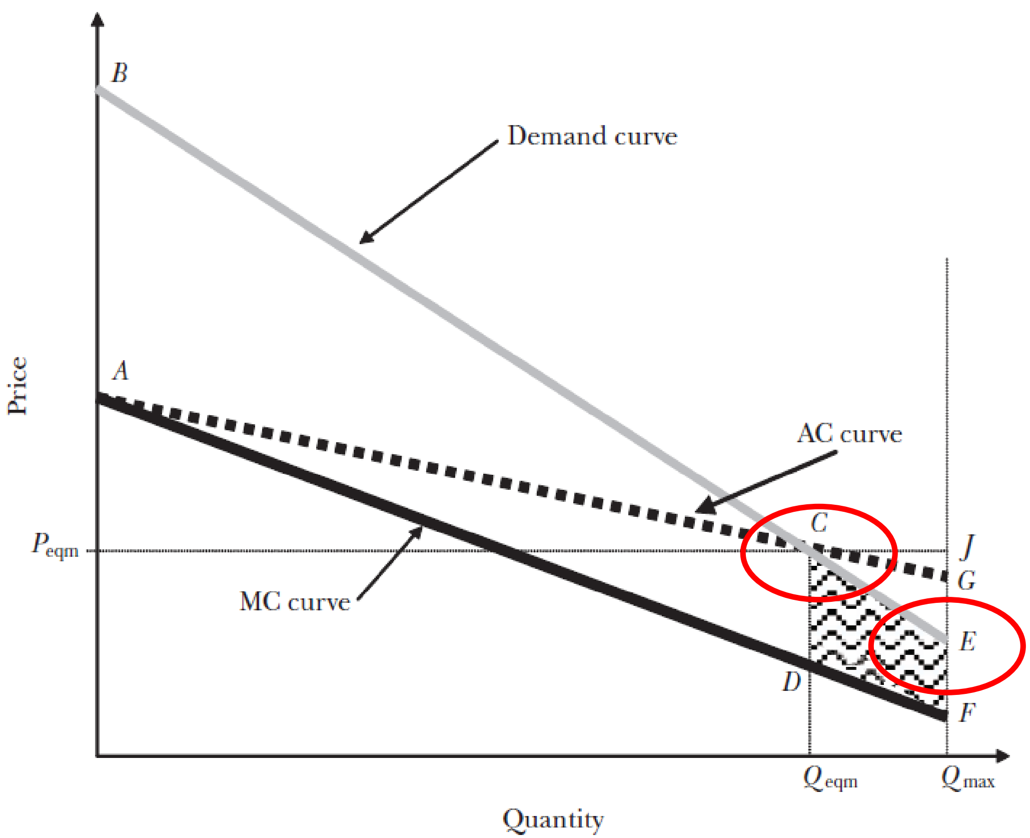
- Market Outcome = (P_{eqm} , Q_{eqm}), which occurs at point **C** in graph below
- Why? Competitive market implies zero profit conditoin



Marginal Willingness-To-Pay (Demand Curve) = AC which equals P by definition

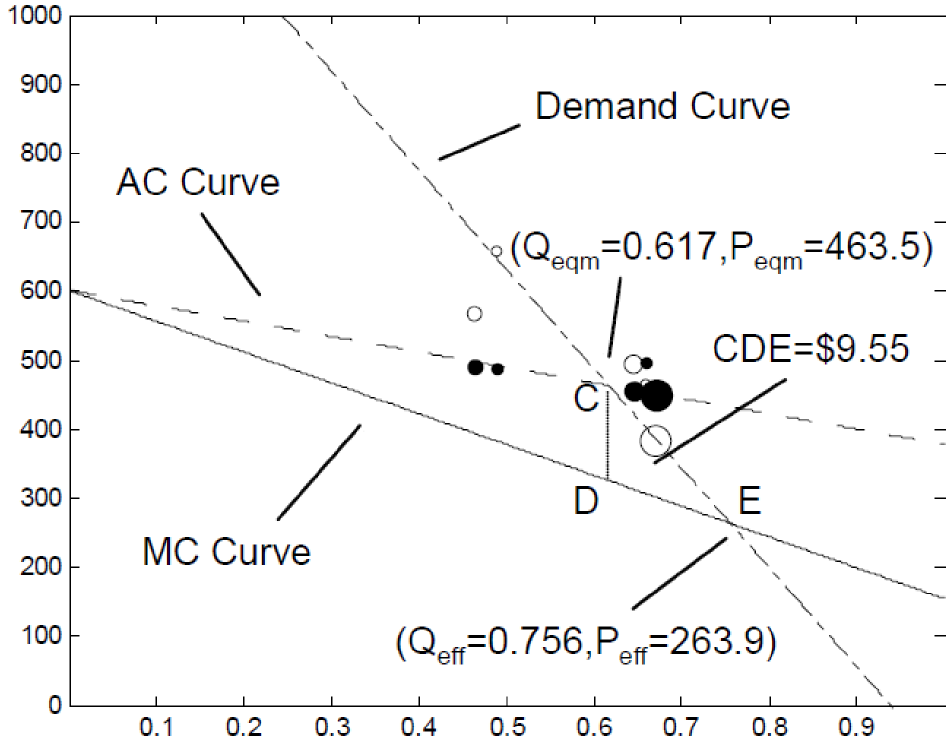
Market Outcome: Adverse Selection

- Why does the outcome (P_{eqm} , Q_{eqm}), point C, represent adverse selection?



- **Remember**: In this basic model, social planner wants *everybody* to have insurance.
- Everyone is risk averse, so efficient quantity is Q_{max}
- So, insurance is under-provided in market relative to social optimum.
- This is because sicker people enroll on average at P_{eqm} driving up price for healthy consumers.

Empirical Analog



- Uses detailed choice / claims data from Alcoa with variation across locations in plan pricing as instrument

Handel, Hendel and Whinston, *Econometrica*, 2015

"Equilibria in Health Exchanges: Adverse Selection vs. Reclassification Risk"

Motivation

- Great deal of interest has focused on the creation of health insurance exchanges. In ACA:
  - Annual policies
  - Four pre-specified plans with coverage 60%, 70%, 80%, 90%
  - Restrictions on pricing pre-existing conditions, demographics
- This type of heavily regulated insurance market, termed “managed competition” is used in a variety of settings:
  - Switzerland (1996), Netherlands (2006)
  - Private insurance exchanges (Pauly and Harrington (2013)
- Use equilibrium framework we develop to empirically study the interplay between two potential sources of inefficiency: **adverse selection** and **reclassification risk**.

Adverse Selection & Re-Classification Risk

- ACA aims to eliminate reclassification risk (RCR) through pricing regulation, but at possible cost of more adverse selection (within market / into market)

- **Our primary focus:** Study trade-off between these two inefficiencies within an equilibrium framework

  -**Ask:** How would alternative pricing regulations (e.g. age, health status) affect market outcomes and welfare?

  -**Impact:** As regulation allows more opportunities for insurers to price specific risks (i) reduced welfare loss from within-market adverse selection and (ii) increased welfare loss from RCR

  -**Additionally:** Insurer risk-adjustment transfers, market participation, different long-run welfare notions, non-price contract regulation, multi-year contracts

Methodology Overview

1. Use insurance choice and health outcomes data to estimate joint distribution of risk preferences and health risk for population of insured individuals [based on Handel(2013)]

2. Develop equilibrium model of an exchange that provides and algorithm for identifying equilibria

   -Multi-plan competition, free entry

3. Use estimated preferences, plus health / cost information to compute equilibria for this population of insured individuals (actually, a “pseudo-population”) under various pricing rules

4. Evaluate welfare for this population under various pricing rules

   -Short-run welfare and AS, long-run welfare and RCR

   -Tradeoff between adverse selection and reclassification risk

Empirical Characterization of Risk

R is ratio of variance of total expenditures to mean
φ captures how much health status info known at contracting

Final Sample Total Health Expenditure Statistics

Ages	Mean	S. D.	S. D. of mean	S. D. around mean	R	ϕ
All	6,099	13,859	6,798	9,228	31,369	0.24
25-30	3,112	9,069	4,918	5,017	26,429	0.29
30-35	3,766	10,186	5,473	5,806	27,550	0.29
35-40	4,219	10,753	5,304	6,751	27,407	0.24
40-45	5,076	12,008	5,942	7,789	28,407	0.25
45-50	6,370	14,095	6,874	9,670	31,149	0.24
50-55	7,394	15,315	7,116	11,092	31,722	0.22
55-60	9,175	17,165	7,414	13,393	32,113	0.19
60-65	10,236	18,057	7,619	14,366	31,854	0.18

Model

Model characterizes equilibria in exchanges (two classes of plans priced in competitive market at same time, potentially with same insurer offering both plans)

-- Enforced mandate

-- Provides conditions for existence, uniqueness

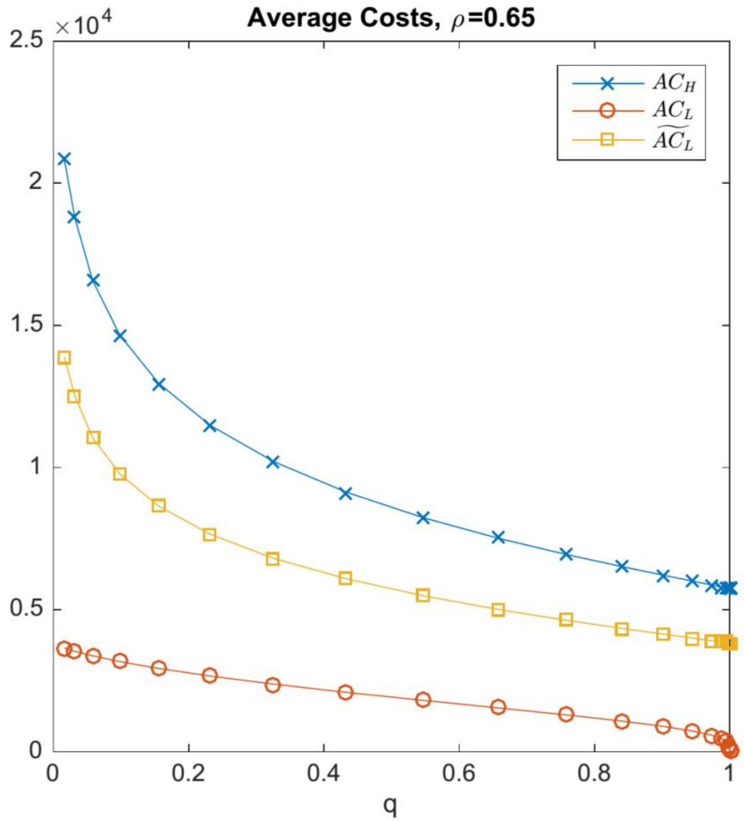
-- Nash equilibrium (SP and MP) and Riley equilibrium (harder to deviate, needed to ensure existence)

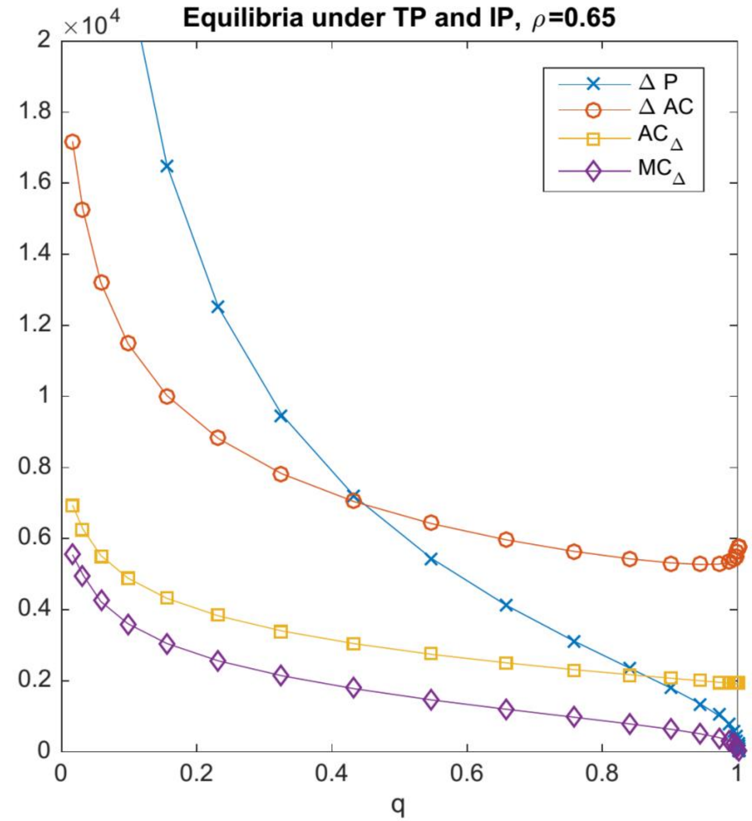
- EFC (2010)*:* pricing of one “add-on” policy given fixed price of base policy. Always get existence of NE. Never get full unraveling with strict risk aversion and Pr(loss)>0.

- Comparison to HHW setting:
  - Pricing of two policies allows cream skimming, which undermines existence
  - Can get complete unraveling with strict risk aversion and Pr(loss)>0 (Intuition: high WTP consumers now benefit from pooling with low WTP consumers at low coverage)

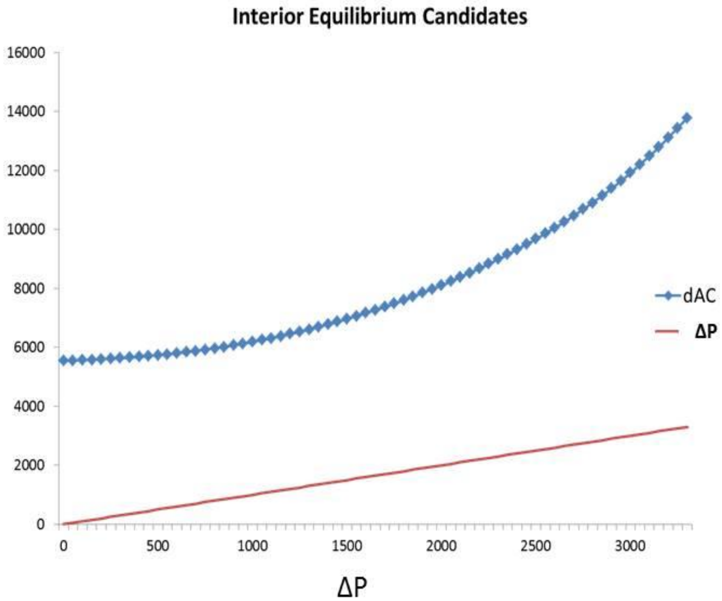
Model: EFC vs. HHW

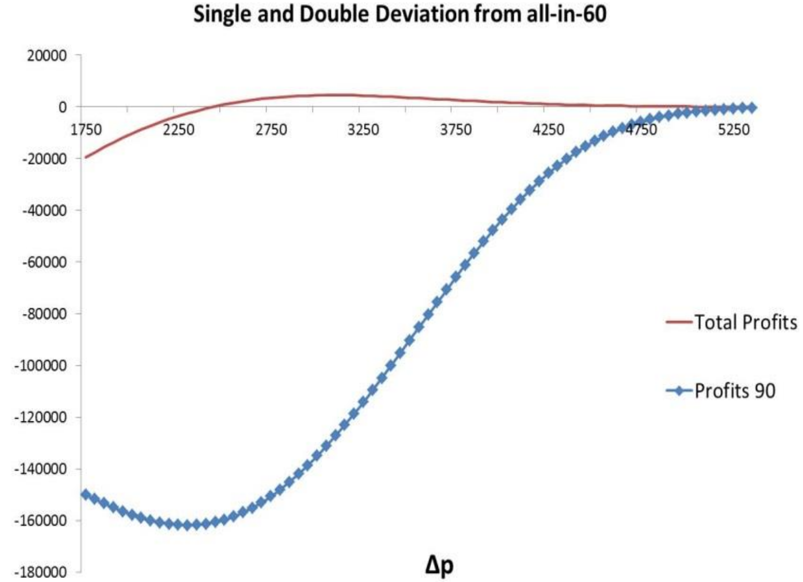
Comparison in Weyl and Veiga (Pricing Institutions, 2016) shows that market is much more likely to unravel in HHW market setup than in EFC market setup. Both setups are potentially “right” depending on market institutions





Empirical Results: Pure Community Rating





Equilibrium Concept	P_{60}	P_{90}	s_{60}	s_{90}	AC_{60}	AC_{90}
Single policy-NE	4051		100	0	4051	
Multi-policy NE	No equilibrium					
Riley	4051		100	0	4051	

Health-Status Pricing: ACG Quartiles

- Now, as example of limited health-status based pricing, suppose pricing can be based on ACG-quartiles.

  --Creates 4 separate sub-markets.

  --Follow the same steps for each sub-market

- Increases re-classification risk, decreases adverse selection

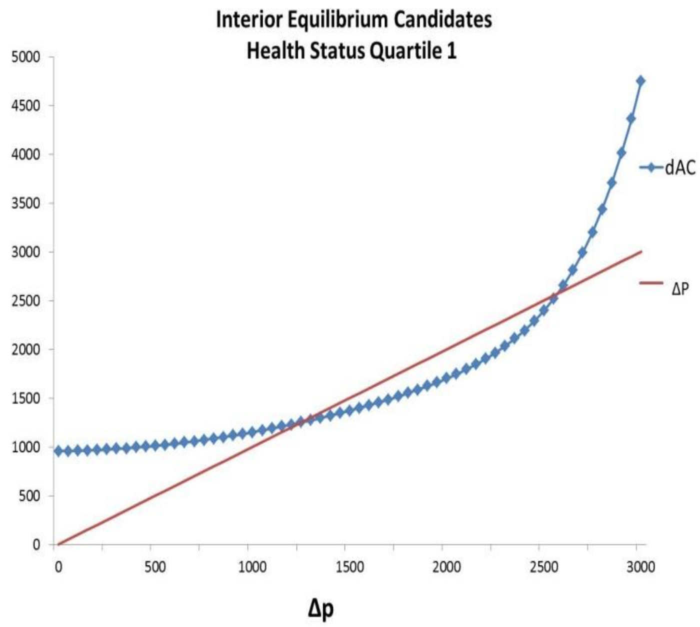
- Summary for pricing by health-status quartiles:

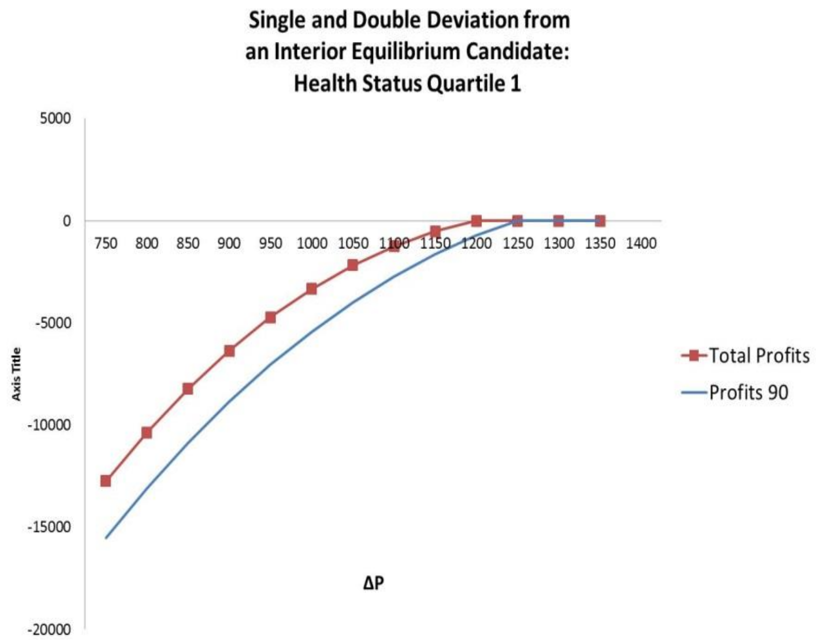
  --For every quartile, a 60 deviation is profitable against “all-in 90”

  --Reduced unraveling in healthiest quartile, still full unraveling in other 3

  --At risk of moving to one of four premiums next year (RCR)

Equilibria with Health Pricing: Health Status Quartiles





Market	Equilibrium Type	P_{60}	P_{90}	s_{60}	s_{90}	AC_{60}	AC_{90}
Quartile 1	RE/sp-NE/mp-NE	289	1550	64.8	35.2	289	1,550
Quartile 2	RE/sp-NE	1467	1467	100	0	1467	
Quartile 3	RE/sp-NE	4577	4577	100	0	4577	
Quartile 4	RE/sp-NE	9802	9802	100	0	9802	

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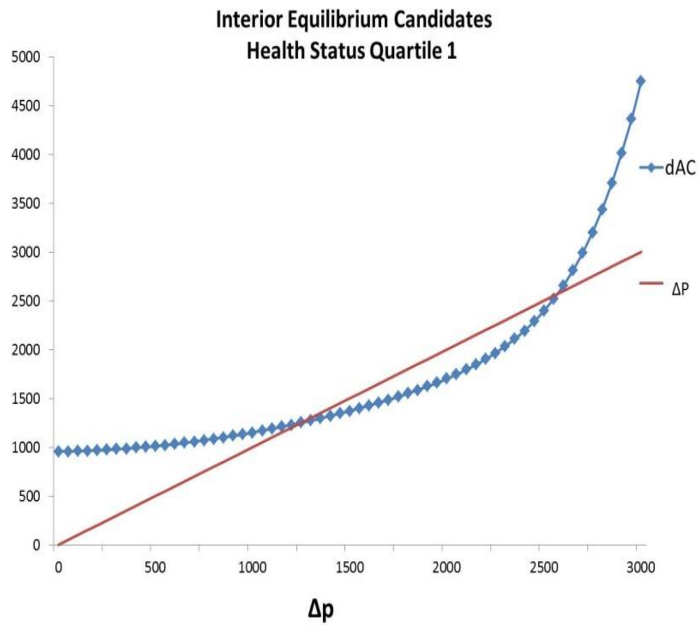

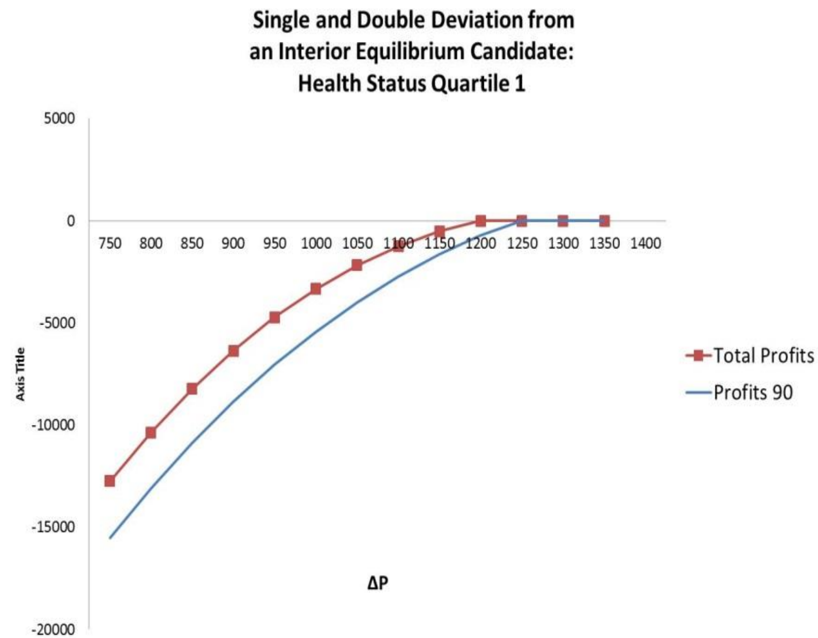

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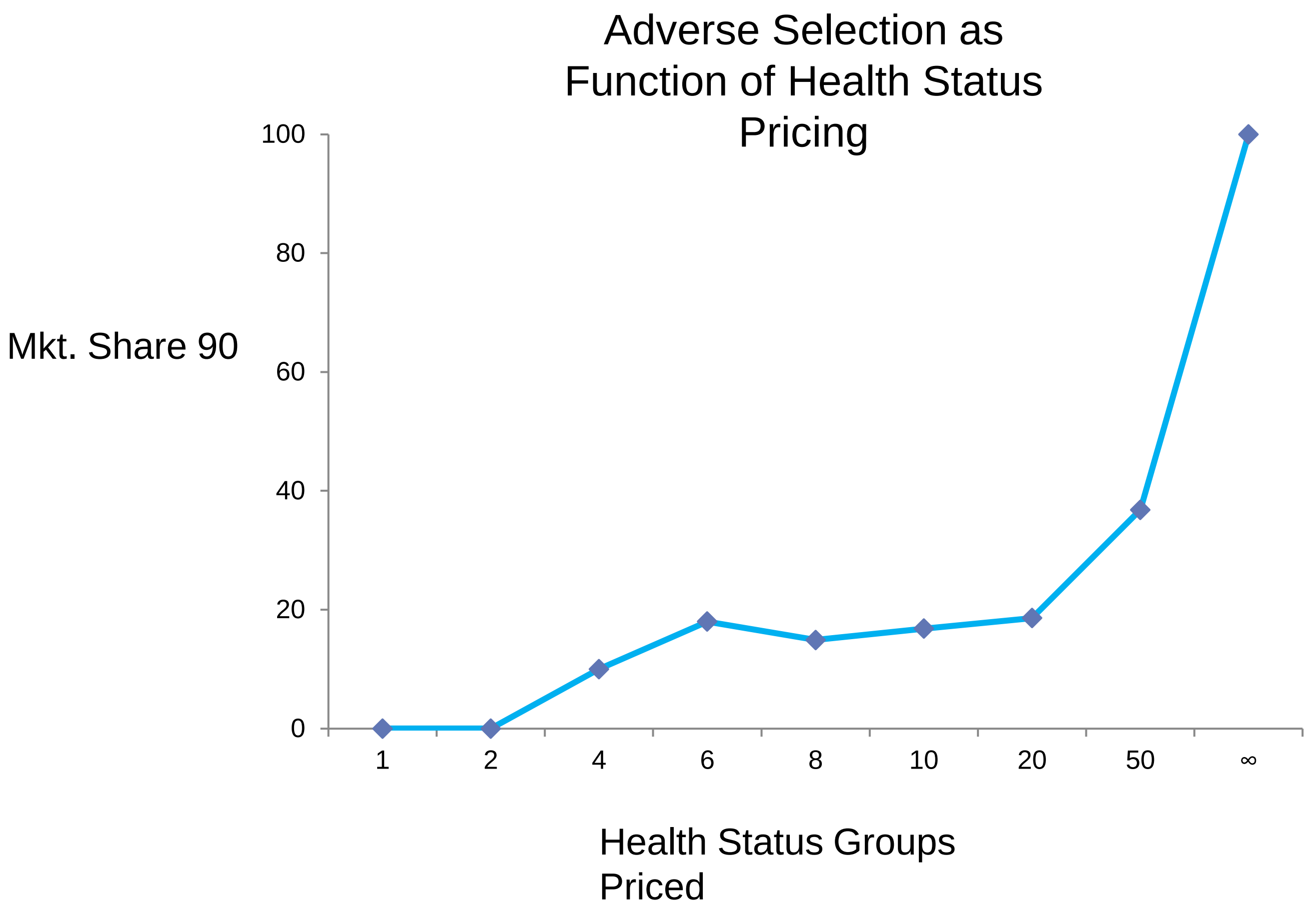
Reclassification risk

Equilibria with Health Pricing: Adverse Selection



Welfare Analysis: AS and RCR

- **Goal:** Evaluate the ex ante utility of an ***unborn individual***
  - Uncertainty about health status transitions in lifetime
  - Within-year uncertainty after purchasing insurance contract

- Lifetime welfare calculation depends on pricing regime *x* and equilibrium notion *e*

- **Step 1:** compute certainty equivalent of equilibrium choice in one-year market for each individual in data, characterized by (λ,γ):

$$CE_{e,x}(\lambda,\gamma)$$

- Also compute CE if all are in 90 policy at $P_{90}^{e,x} = \underline{AC}_{90}$:

$$CE_{all90}(\lambda_t,\gamma)$$

Welfare Analysis: AS and RCR

Integrate one-year at a time market outcomes into lifetime analysis

Step 2: Compute the **fixed annual payment $y_{x,x',e}(\gamma)$** that would make ex ante lifetime expected utility in pricing regime x equal to that in pricing regime x':

$$\sum_t \delta^t E_{x_t}[-e^{-\gamma\{I_t - CE_x(\lambda_t,\gamma) + y_{x,x'}(\gamma)\}} \mid \gamma] = \sum_t \delta^t E_{x_t}[-e^{-\gamma\{I_t - CE_{x'}(\lambda_t,\gamma)\}} \mid \gamma]$$

Key Assumptions for computing $\boldsymbol{y_{x,x',e}(\gamma)}$:

- Discount factor = 0.975
- Steady state population, represented by our sample
- γ is age 25 risk aversion (individual assumes no change in risk aversion, but true evolution of health conditional on γ)
- Get distribution of health at each age t conditional on γ by pulling all individuals of age t whose (acg, γ) lies in a band around the relation we estimated (Idea: γ at birth determines health process and also evolves with age).
- I_t either fixed or follows manager/non-manager age profile

Welfare Comparisons

Example: Compare relative long-run welfare under case of pure community rating to case of pricing on health status quartiles.

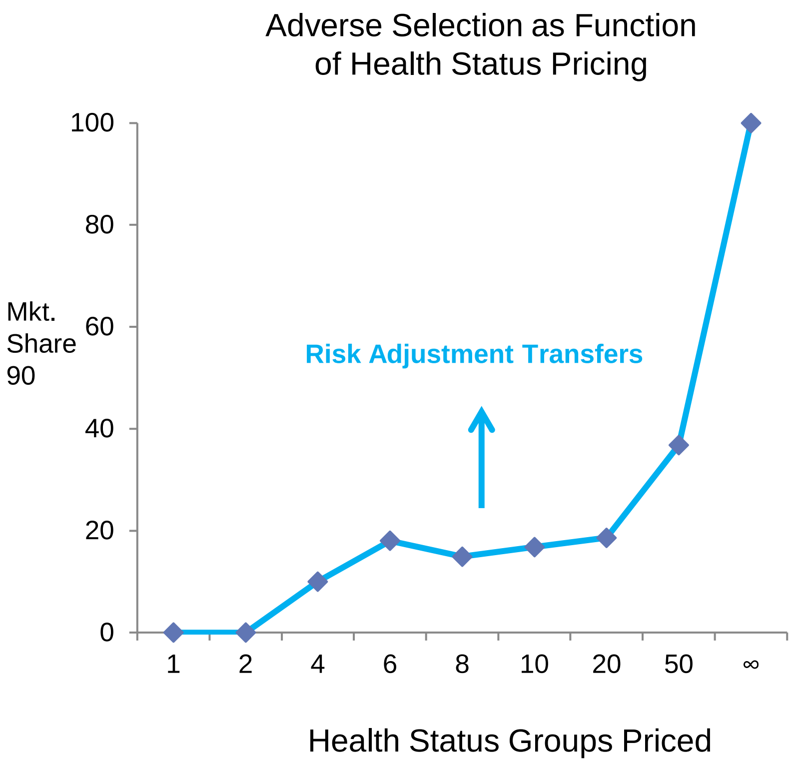
- Solution concept is Riley equilibrium

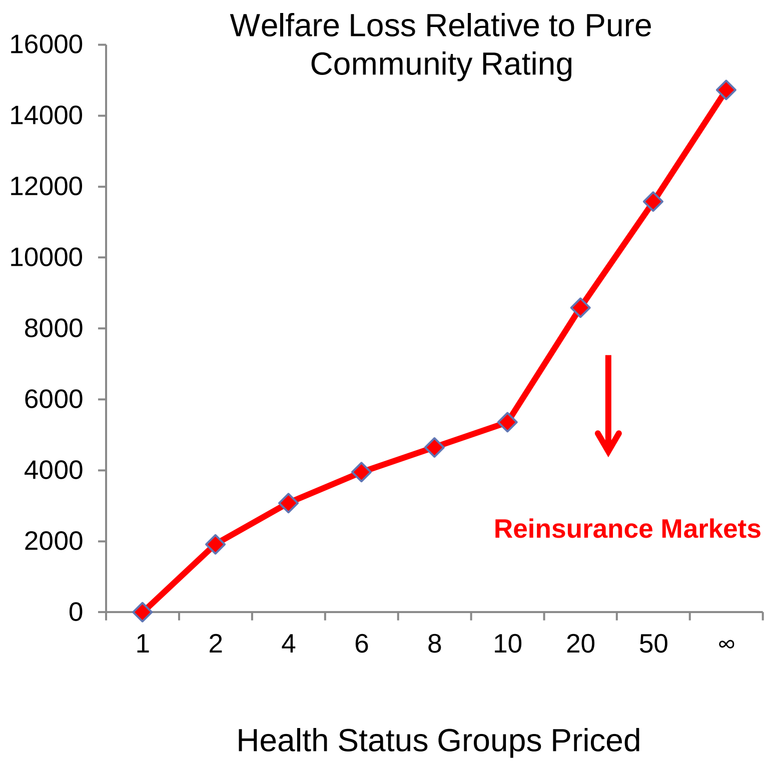
Compare to:

- $6559 average annual total expenses
- Fixed income, mean risk aversion, willing to pay **$619 for 90 at pop. AC**

Welfare Loss from ACG-quartile Pricing in Riley/sp-NE ($/year)			
Risk Parameter	Fixed income	Non-manager Income Path	Manager Income Path
0.0002	2200	1499	-384
0.0003	2693	1688	-613
0.0004	3082	1821	-886
0.0005	3399	1764	-973
0.0006	3626	2115	-891

Varying the Extent of Health-Based Pricing: Adverse Selection vs. RCR





Extensions

1. Consumers borrowing and saving reduces negative impact of reclassification risk, but welfare loss from quartile-based pricing still lower than that from community rating

2. Alternative contract actuarial value regulation

3. Insurer risk-adjustment reduces welfare loss of adverse selection by over 50%, holding all else equal.

4. What happens if mandate not fully enforced?

Lessons

1. Health insurance contracts typically community rated and one-year at a time. Relaxing community rating induces tradeoff between adverse selection and reclassification risk. Think about this as a tradeoff between short-run risk and long-run risk.

2. Moving away from community rating, holding other regulations constant, is clearly welfare reducing for the consumers we study.

3. Equilibria in health exchanges can be subtle to analyze: when there are two regulated types of competitive plans offered, as in HHW, you have to worry about existence / uniqueness, unlike in EFC framework

GHHW (2023): Long-Run Dynamic Contracts

Newer work by GHHW studies welfare implications of dynamic contracts that have:

-- One-sided commitment where firms commit but consumers don't

-- Full risk-rating starting at age 25

-- Firm commits to sequence of contingent premiums

-- Consumers can lapse (leave at any time)

Optimal contracts have frontloading: consumers pay higher than actuarially fair premiums up front so firm can break even on longer-run commitment.

Empirical implementation with Utah APCD and two other datasets

Potential benefits in certain situations, though less than we expected due to costs of frontloading

Risk-Adjustment and Adverse Selection

- Insurer risk-adjustment is key policy tool to combat adverse selection in markets with community rating
- Risk-adjustment transfers money from insurers who enroll healthy enrollees to insurers who enroll sick enrollees based on some function
- Potential elements of function:

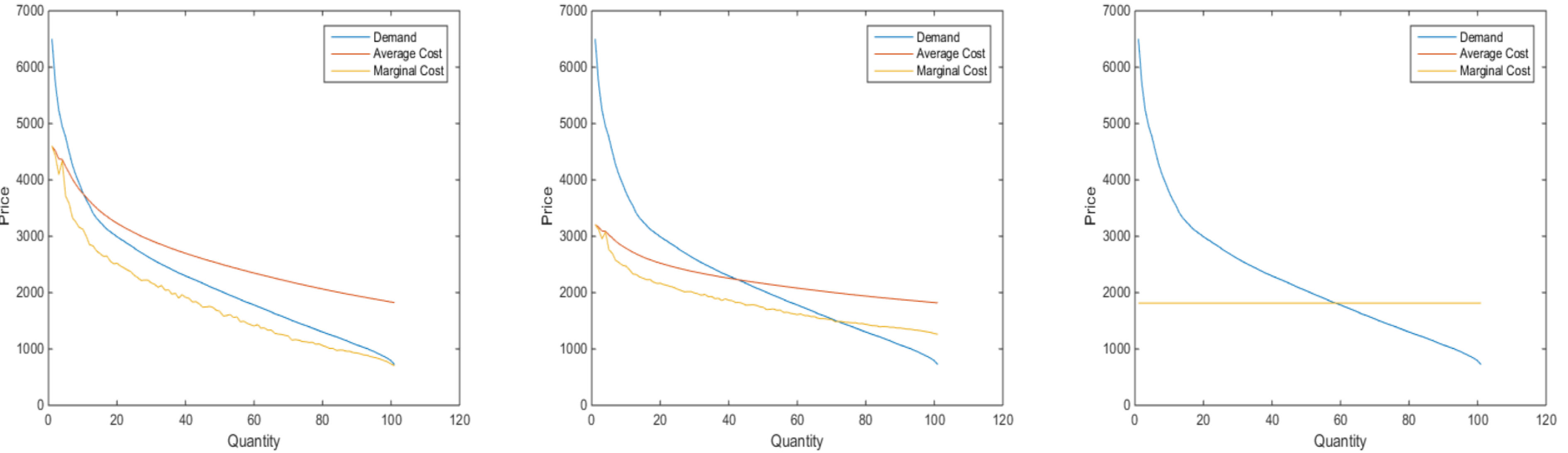
  -- Ex-post claims

  -- Ex-ante risk measures

  -- Demographics

Risk-Adjustment and Adverse Selection

- Insurer risk-adjustment flattens the average cost curve, so reduces degree of adverse selection



- Without choice frictions in this simulation, impact of market shares on equilibrium enrollment is substantial.

Risk-Adjustment and Insurer Responses

- Great in theory, some difficulties with implementing in practice, including endogenous insurer responses to RA scheme
- Lavetti and Simon (2018): formulary design in Medicare Part D responds to incentives to enroll profitable patients. Insurers integrated with medical insurance behave differently than drug plans alone.
- Geruso and Layton (2018): privatized Medicare patients have 6 to 16% higher diagnostic risk scores than FFS Medicare patients, holding all else equal, presumably due to upcoding in response to risk adjustment
- We include lever here to study market equilibrium as risk-adjustment effectiveness

Wrap Up: Empirical Evidence

Quite a few papers studying positive and normative impacts of adverse selection, not going to cover fully here but happy to provide many references if this is an area you are interested in

Insight 1: there is typically less adverse selection than one might think in many settings in practice (inside and outside of health)

---- multi-dimensional heterogeneity (annuities, health, car insurance)

---- behavioral factors / choice frictions

----policies / market responses to mitigate (risk-adjustment, existence of market to begin with suggests can't be too acute, i.e. tautologically limited)

Insight 2: some examples with substantial unraveling / adverse selection

----- Cutler and Reber (1998)

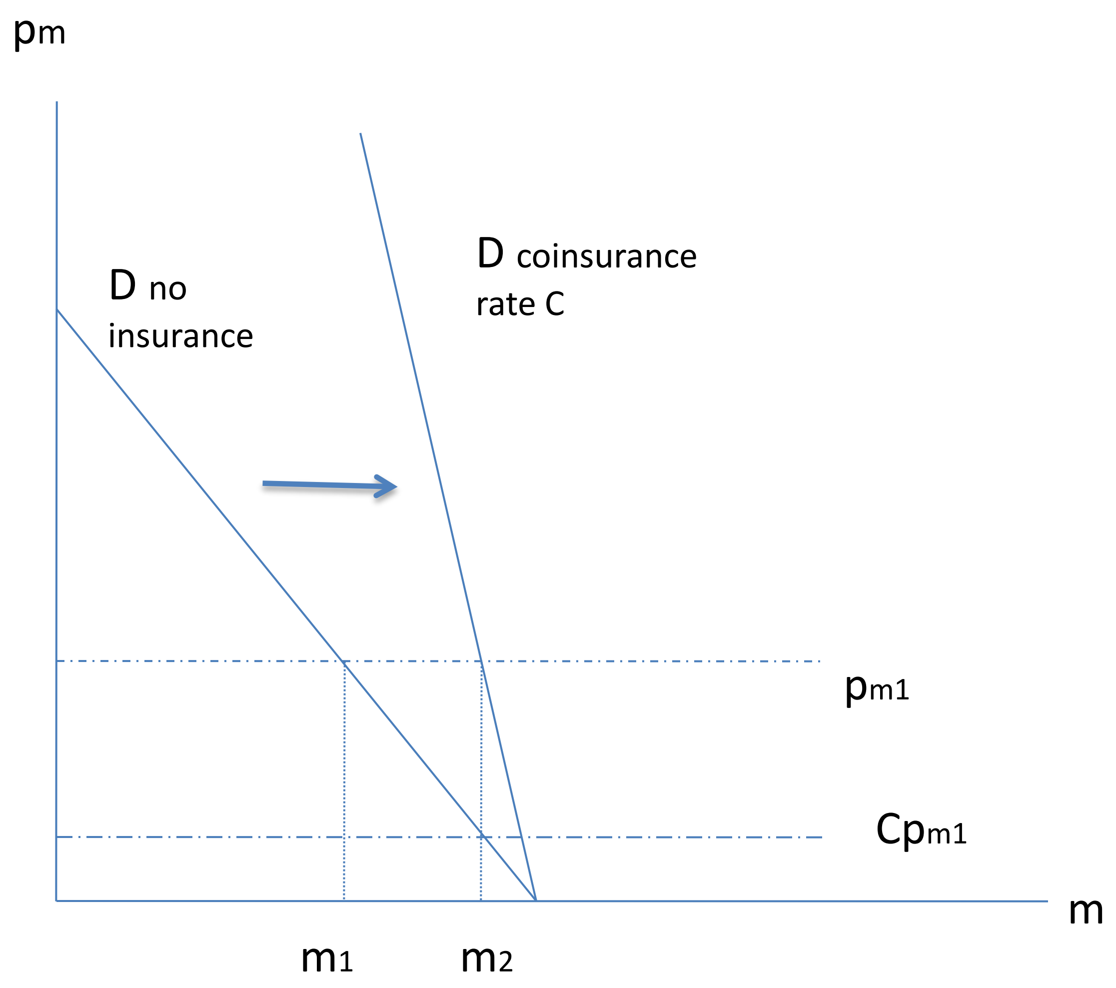
----- Long term care insurance markets

----- Car insurance markets and monitoring

Moral Hazard

- "…the problem of 'moral hazard' in insurance has, in fact, little to do with morality, but can be analyzed with orthodox economic tools"
- Two types of moral hazard:
  - *Ex ante*: Behave differently because you are insured against a bad outcome
  - *Ex post:* Behave differently because you face different prices at the margin

Coinsurance



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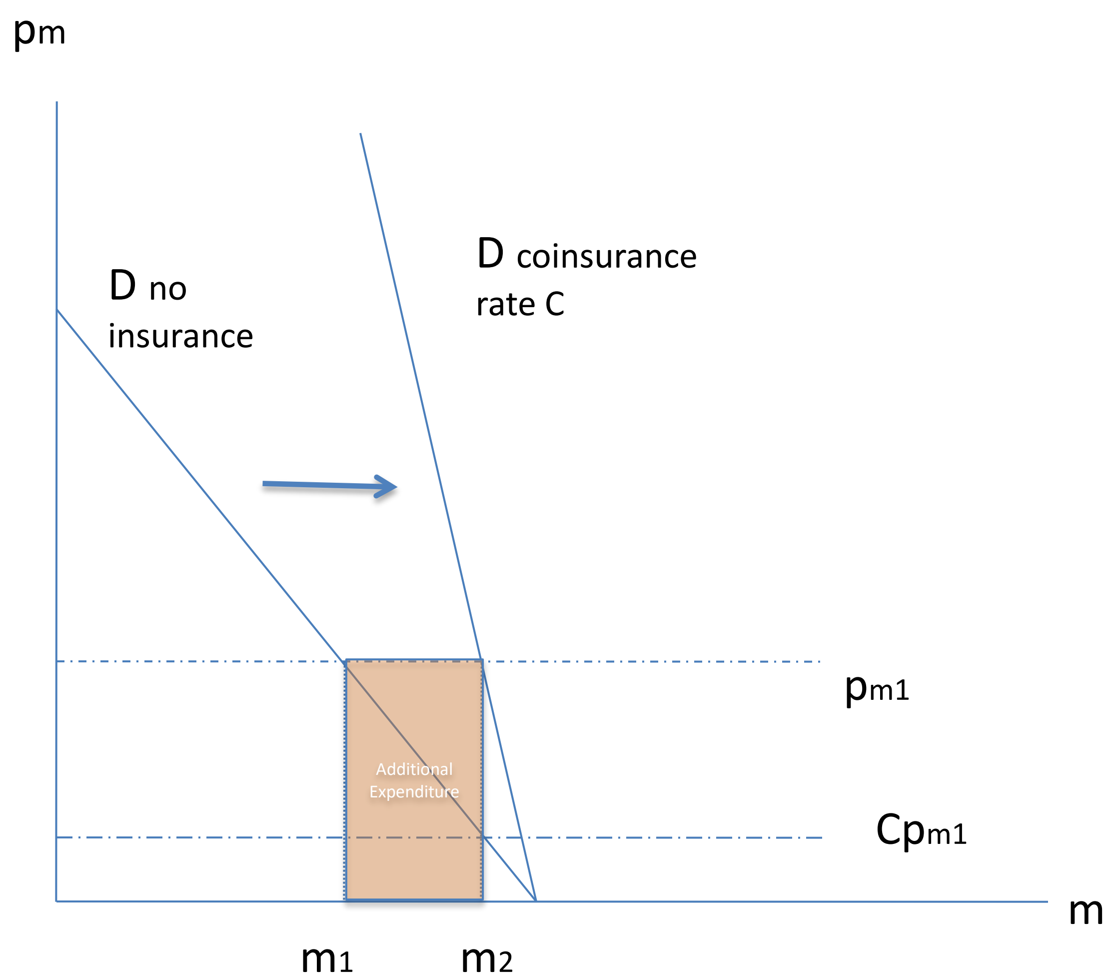

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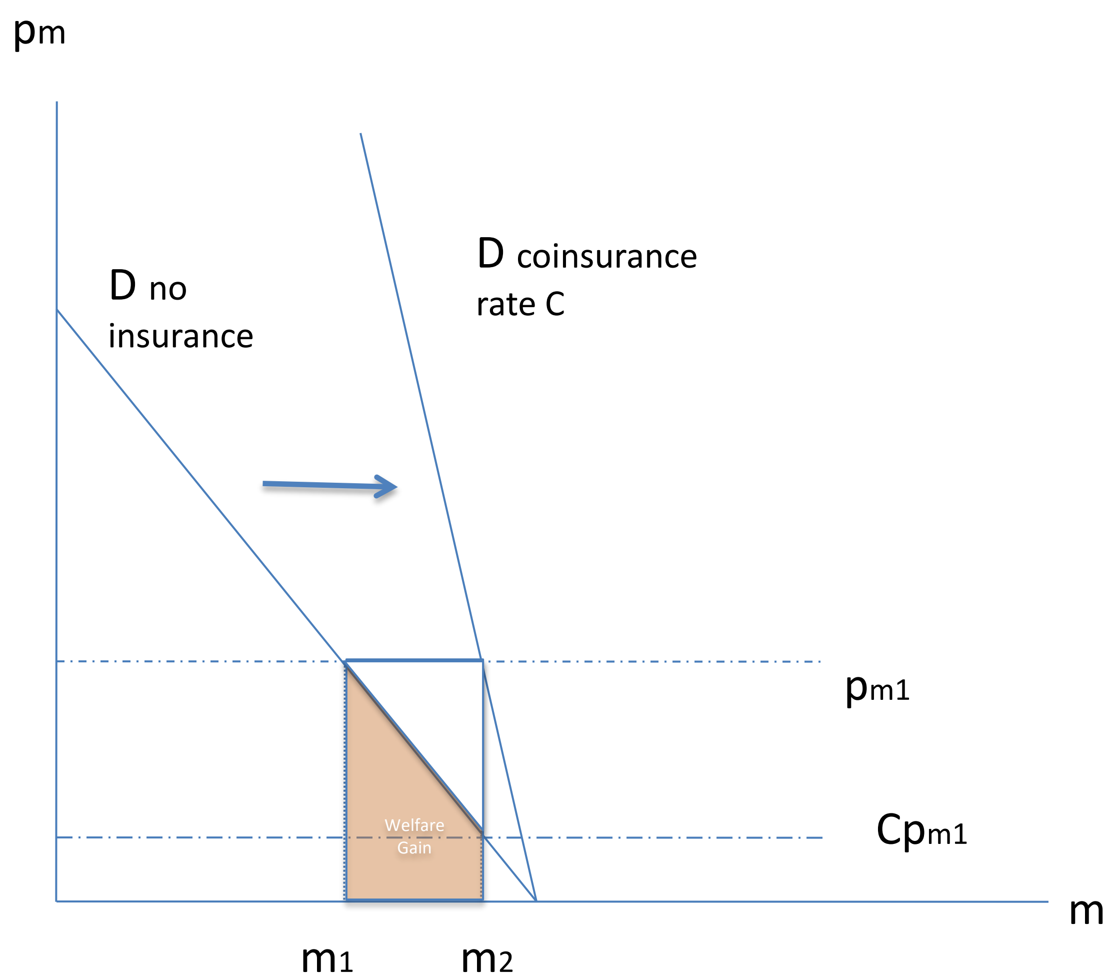

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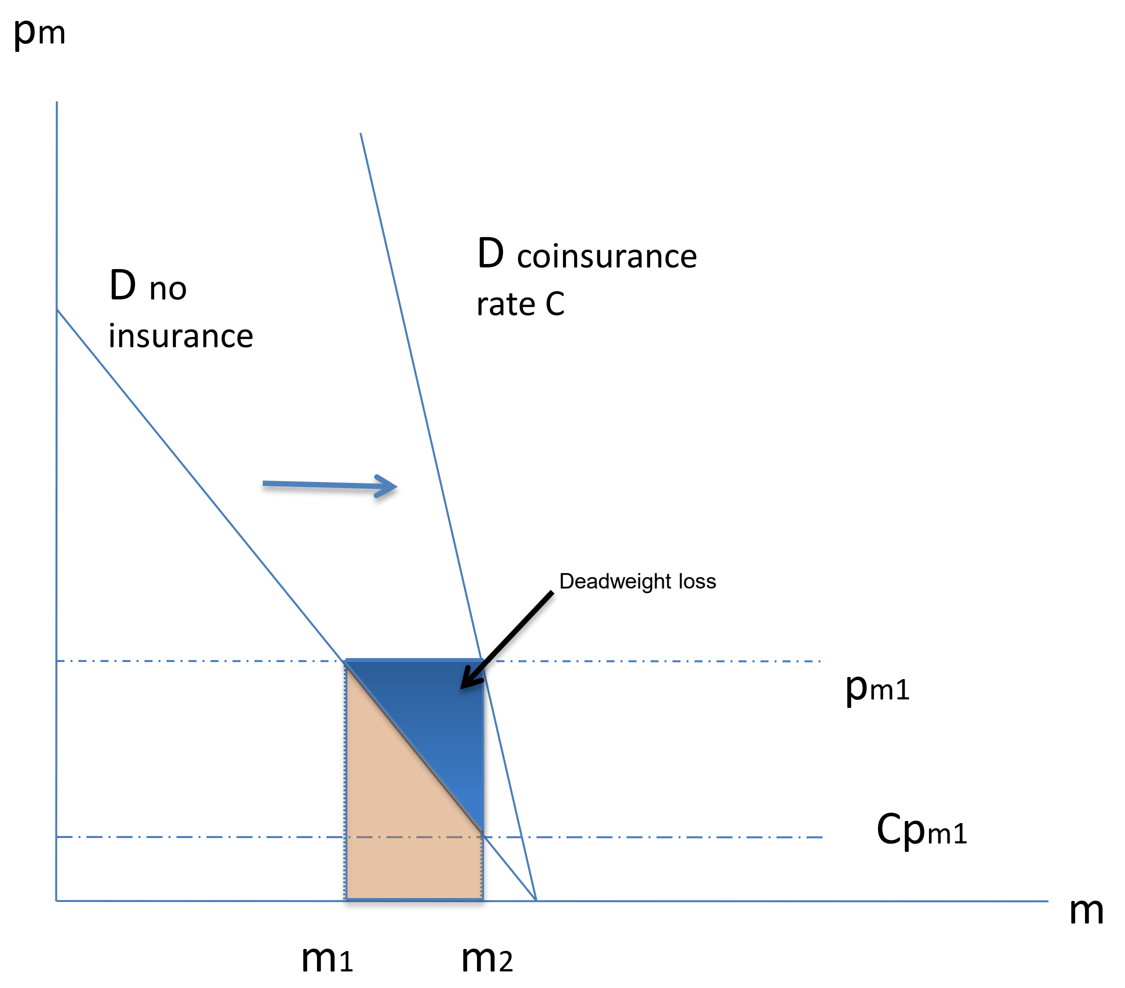


Moral Hazard

- Having consumers face prices / cost-sharing is a key part of rationing strategies for insurers / health systems. Tradeoff with risk protection in optimal insurance.

- Rational consumers consume care if they value it at higher than out-of-pocket cost, don't consume if they value it at lower than out-of-pocket cost

- Giving consumers "skin in the game" touted as key underpinning for many policy initiatives, but does skin in the game work like a hammer or a scalpel?

- <u>Many</u> empirical studies of moral hazard in health insurance broadly showing:
    -- Some price elasticity, though generally pretty low relative to other products
    -- Notion of prices is complicated in moral hazard framework due to dynamics
    -- Consumers seem to make consumption mistakes ("behavioral hazard")
    -- Price shopping for services doesn't seem to occur with great aggregate impact

Moral Hazard

- RAND Study
- Oregon Study
- Natural experiments
- Structural work
- Probably one of the topics in empirical health insurance where we have the most evidence on consumer responses
- Positive analysis is excellent / super strong, normative analysis is quite challenging
- Today we'll focus on prior paper I wrote as representative of literature, to dive into key topics

What Does a Deductible Do? The Impact of Cost-Sharing on Health Care Prices, Quantities, and Spending Dynamics

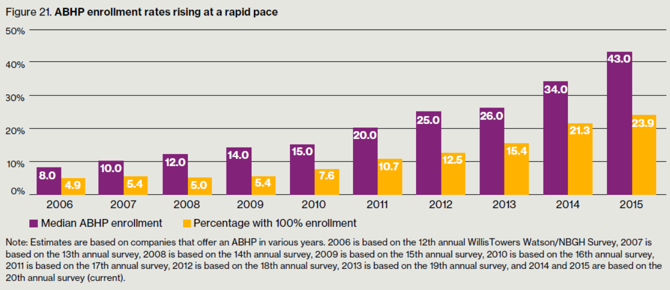
Zarek Brot-Goldberg,[1] Amitabh Chandra,[2,3]
Benjamin Handel,[1,3] and Jonathan Kolstad[1,3]

[1]UC Berkeley

[2]Harvard University

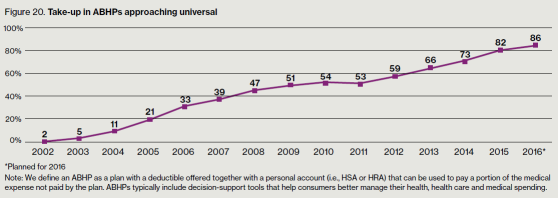
[3]NBER

Cost Control and Cost-Sharing



- Increasing consumer cost-sharing is primary strategy for controlling health care spending, across health care markets
- Strong trend in employer coverage towards high-deductible plans

Cost Control and Cost-Sharing



- Price elasticity, the response of total spending to changes in cost-sharing, is common measure used to assess effectiveness of HDHPs for cost control
- But, there is a lot more going on. How do people reduce spending? Do they do so efficiently? How does price-sensitivity manifest in non-linear contracts?
- Nuance also critical to other policy questions
  - Insurance menu offerings (e.g. ACA, large employer)
  - Design of payment structure within contract
  - National health system priorities / methods for cost control

Our Environment

- Study health care utilization of greater than 100,000 employees and dependents of large self-insured firm
  - Relatively high income (Median income $125,000-150,000)
  - Technology-savvy and educated
- The firm discontinued its primary health insurance option at end of year t_{-1}, forcing most employees into high-deductible plan
  - Shift from zero cost-sharing to HDHP
  - Income effect compensated for with HSA subsidy
  - Why? Cadillac tax, spending trends.
- Use shift together with detailed data to study many aspects of consumer price responsiveness

Key Questions 1

- Question 1: What are the effects of different marginal prices on health care spending?
  - 12-14% reduction in year t_0 total spending, much coming from sick quartile of consumers (ex ante)
  - Reductions apparent across all types of care
- Question 2: How do consumers reduce spending?
  - Consumer price shopping (+3.6%)
  - Consumer quantity reductions (-17.9%)
  - Consumer quantity substitutions (-2.2%)
  - Provider price changes (+1.2%)
- Importance of distinguishing between price shopping and quantity reductions for policy

Key Questions 2

- Question 3: What types of care are consumers reducing?
  - Almost all kinds: 26 out of 30 top procedures by revenue
  - Preventive care (free, valuable)
  - Imaging (potentially overused)
- Question 4: Are sicker consumers responding to true expected marginal prices or spot prices (short-run)?
  - 91% of reductions occur in months where consumer begins that month under deductible
  - 49% of all reductions from sickest half of consumers, under deductible
  - Structural regression analysis shows consumers reduce spending under deductible by 27%, controlling for true end of year price
- Comment: Analysis of learning for year t_1 show same results in year 2 post-change

Overview

1. Data & Environment
2. Impact on Utilization
3. Decomposition
4. Consumer Response to NL Contracts
5. Conclusion & Next Steps

Administrative Data

- Large firm with between 35,000-60,000 employees covering a total of between 100,000-200,000 lives
- Detailed administrative data from both the insurer / HR dept. of firm, covering six-year period in range 2006-2015
  - Insurance choices / design features
  - Demographic data
  - Health claims
  - Linked HR files (income, job description, etc.)
  - ACG medically relevant predictive metrics
  - Linked survey data for subset of consumers
- A lot of money at stake–firm's total health care spending in year before change of $750 million

Policy Change

From $t_{-4} - t_{-1}$ the firm had two primary insurance options:

- PPO:
  - Broad provider network
  - *Zero employee cost-sharing*
  - 80-85% market share
- HDHP:
  - Same providers
  - Linked health savings account *with direct subsidy*
  - Non-linear cost-sharing contract: consumers pay 22% on average
  - 10-15% market share
- Firm discontinued PPO option for t_0 and after, effectively moving all employees enrolled in the PPO into the HDHP
  - First announcement October 2010, many subsequent
  - Handel & Kolstad (2015)

Insurance Options

Health Plan Characteristics Family Tier	PPO	HDHP*
Premium	$0	$0
Health Savings Account (HSA)	No	Yes
HSA Subsidy	-	[$3,000-$4,000]**
Max. HSA Contribution	-	$6,250***
Deductible	$0****	[$3,000-$4,000]**
Coinsurance (IN)	0%	10%
Coinsurance (OUT)	20%	30%
Out-of-Pocket Max.	$0****	[$6,000-$7,000]**

* We don't provide exact HDHP characteristics to help preserve firm anonymity.
**Values for family coverage tier (2+ dependents). Single employees (or w/ one dependent) have $.4\times$ ($.8\times$) the values given here.
***For out-of-network spending, PPO has a very low deductible and out-of-pocket max. both less than $400 per person.

Primary Sample

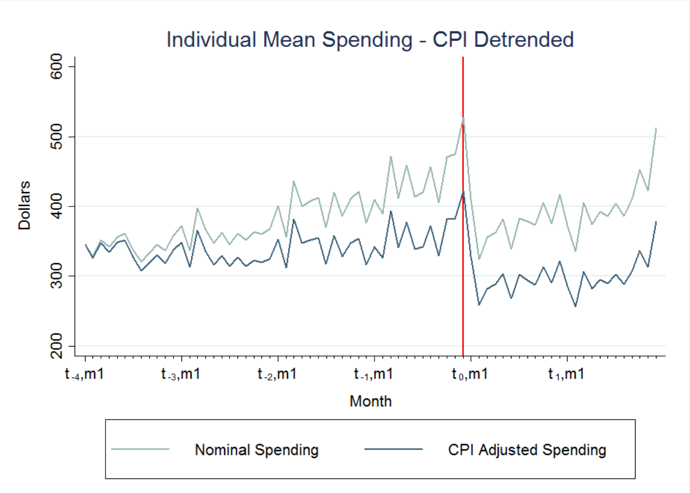
- Primary sample uses employees and dependents present over entire six-year sample $t_{-4} - t_1$
- Includes only those who were (i) in PPO $t_{-4} - t_{-1}$ (ii) in HDHP post-switch
- Internal selection concerns very limited:
  - 85% in PPO in pre-period, more than 95% of expenses
  - Robustness to different pre-horizons removes duration selection concerns
  - Limited differential attrition
  - Much of literature relies on structural assumptions to separate AS/MH
- Excludes those enrolled in HMO option (stable 3-4%)

Primary Sample

Sample Demographics	PPO or HDHP in t_{-1}	PPO in t_{-1}	Primary Sample
N - Employees	[35,000-60,000]*	[35,000-60,000]*	22,719
N - Emp. & Dep.	[105,000-200,000]*	[105,000-200,000]*	76,759
Gender, % Male - Emp. & Dep.	51.9%	51.5%	51.4%
Age, t_{-1} - Emp.& Dep.			
$<$ 18	34.5%	35.3%	36.1%
18-29	12.3%	11.5%	8.8%
30-54	50.1%	50.1%	52.0%
$\geq$ 55	3.1%	3.1%	2.8%
Income, t_{-1}			
Tier 1 ($<$ $100K)	8.4%	8.2%	7.3%
Tier 2 ($100K-$150K)	65.0%	64.9%	64.7%
Tier 3 ($150K-$200K)	21.8%	22.0%	22.6%
Tier 4 ($>$ $200K)	4.9%	4.9%	4.7%
Family Size, t_{-1}			
1	23.7%	21.4%	16.1%
2	19.6%	19.1%	17.9%
3+	56.7%	59.5%	65.9%
Individual Spending, t_{-1}			
Mean	$5,020	$5,401	$5,223
25th Percentile	$609	$687	$631
Median	$1,678	$1,869	$1,795
75th Percentile	$4,601	$5,036	$4,827
95th Percentile	$18,256	$19,367	$18,810
99th Percentile	$49,803	$52,872	$52,360

Overview

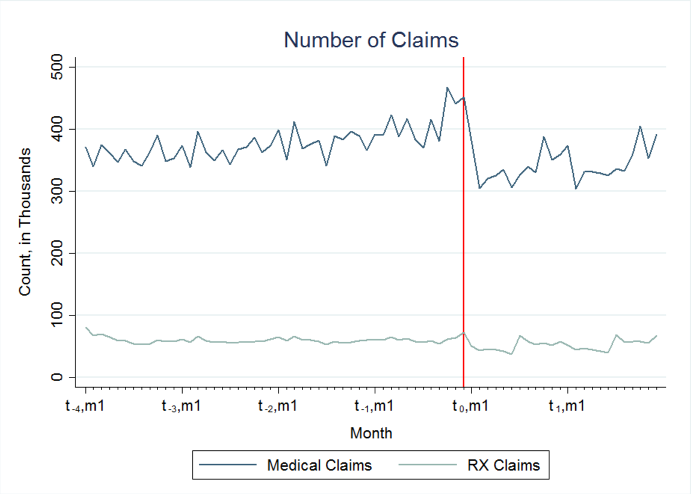
Primary Sample Spending



Causal Impact of Switch on Spending

- De-trend for baseline expenditure growth
- Correct for anticipatory spending
- Main strategy for estimating anticipatory spending:
  1. Identify months with statistically significant excess spending in t_{-1}
  2. Quantify excess spending with monthly spend regression t_{-4} to t_{-1}
- Estimate of $165.23 per person, 95% CI [$113.96, $216.50], October - December
- Bounds to characterize excess mass that *would have been spent* in t_0
  - All could be substited from t_0 to t_{-1}
  - Some may not have been spent at t_0 with higher prices

Anticipatory Spending October - December t_0



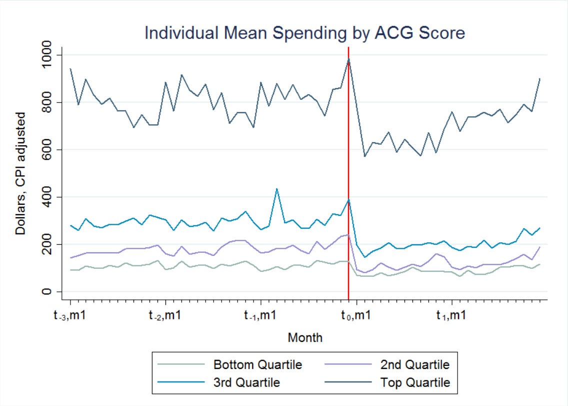
Treatment Effect of Policy Change

- Calculate 'treatment effect' taking % change in mean spending between t_{-1} and $t_0 - t_1$, with adjustments
- Bounds on results adjusting for anticipatory spending
- Discuss standard errors

HDHP Switch Spending Impact			Model	
	(1)	(2)	(3)	(4)
	–	CPI &	Intertemp.	Early Switcher
Year		Age Adj.	Substitution	Diff-in-Diff
t_{-4}	4,031.49	3,910.87	3,910.87	–
t_{-3}	4,256.21	3,858.78	3,858.78	–
t_{-2}	4,722.03	4,055.01	4,051.01	–
t_{-1}	5,222.60	4,277.84	4,112.61	–
t_0	4,446.08	3,490.97	[3,490.97 , 3,656.20]	–
t_1	4,799.14	3,599.25	3,599.25	–
% Decrease				
t_{-1}-t_0	-14.87%	-18.39%	[-11.09%, -15.12%]	[-11.31%, -15.21%]
t_{-1}-t_1	-8.01%	-15.86%	-12.48%	-13.43%
Semi-Arc Elasticity*	-0.57	-0.85	[-0.59,-0.69]	[-0.62,-0.72]

Heterogeneity: Health Status

- Classify consumers into ex ante health status quartiles at beginning of each year (uses ACG risk scores)
- Sickest consumers reduce spending by large magnitude (20%)
- Why do well-off / sick consumers reduce spending?



Additional Items on Spending Change

- Other heterogeneity results:
  - Spending reductions for inpatient (7-11%), RX (15-17%), Preventive (5-8%), office visit (13-16%), ER(25%)
  - 1-2 chronic conditions (18-20%), income, age, insurance status
- Additional Analyses:
  - Early Switcher DiD
  - Form matched control group with Truven IMS data, run DiD analysis
  - Match our sample to state or nationally representative weights, redo analysis

Overview

Prices vs. Quantities in Reduced Utilization

- It is important to understand how and why consumers reduce spending for policy discussions
- We analyze whether drop in utilization is from:
  - Price shopping
  - Quantity reductions
  - Quantity substitutions
  - Providers reducing prices (potential equilibrium effects)
- Decompose different effects by holding prices or quantities constant (in the spirit of Oaxaca (1973), Blinder (1973))
- Analysis leverages detailed data on procedure-provider combinations:
  - Over 15 observations in t_x / t_{x+1} (90% spending)
  - Main company region (70% spending)

Provider Price Changes

'

- Compute mean price for provider-procedure combinations in t_x and in t_{x+1}
- Compare the following statistics:
  - Total spending for t_{-1} choices at t_{-1} prices: $TS_{t_{-1},t_{-1}}$
  - Total spending for t_{-1} choices at t_0 prices: $TS_{t_0,t_{-1}}$
- Provider price changes equal:

$$\frac{TS_{t_0,t_{-1}} - TS_{t_{-1},t_{-1}}}{TS_{t_{-1},t_{-1}}}$$

- Not saying why prices changes happened, just that they did

Price Shopping

'

- If price shopping is source of spending reductions, this is good news for efficiency implications of HDHPs
- We compute this effect as follows:

$$PS_{m,t+1,t} = \frac{\mathbf{P}_{m,Q,t+1} \cdot \mathbf{C}_{m,Q,t+1} - \mathbf{P}_{m,Q,t+1} \cdot \mathbf{C}_{m,Q,t}}{\mathbf{P}_{m,Q,t+1} \cdot \mathbf{C}_{m,Q,t}}$$

$$PS_{t+1,t} = \Sigma_{m=1}^{M} \frac{Y_{m,t}}{Y_t} PS_{m,t+1,t}$$

- m is procedure, Q providers offering procedure
- First step is, for each type of procedures compare:
  - Mean provider-procedure prices for t_{-1} choices at t_0 prices
  - Mean provider-procedure prices for t_0 choices at t_0 prices
  - Verify that ordering of prices for providers similar over years
- Second step computes aggregate price-shopping effect across all procedures, holding procedure-specific revenue share constant

Price Shopping

Interpretation

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- Approach nets out provider price changes and focuses on shopping given t_0 prices
- Our approach is *conditional on procedure*
- Alternative approach would consider *episode of illness*
- Example: in our case, substitution to different procedures, that are lower price, enters through quantity substitution
  - With episode of illness, procedure substitution in price shopping
  - E.g. surgery vs. medical management

Quantity Reductions

‘

- We compute % decrease from quantity changes as remainder of total effect taking out other two mechanisms:
- Compute year to year % change in total spending as:

$$\Delta TS_{t+1,t} = \frac{\mathbf{P}_{t+1} \cdot \mathbf{C}_{t+1} - \mathbf{P}_t \cdot \mathbf{C}_t}{\mathbf{P}_t \cdot \mathbf{C}_t}$$

- Effect of quantity changes (reductions + substitutions):

$$QE_{t+1,t} = \Delta TS_{t+1,t} - PPI_{t+1,t} - PS_{t+1,t}$$

- Effect of quantity reductions:

$$Q_{t+1,t} = \frac{Q_{t+1} - Q_t}{Q_t}$$

- Effect of quantity substitutions:

$$QS_{t+1,t} = QE_{t+1,t} - Q_{t+1,t}$$

Results Decomposition

- Change for t_0 is large departure from trend of increasing health expenditures, and increasing service quantities

‘

Total Spending Change Decomposition					
	$\Delta TS_{t+1,t}$	$PPI_{t+1,t}$	$PS_{t+1,t}$	$Q_{t+1,t}$	$QS_{t+1,t}$
t_{-4}-t_{-3}	9.3%	3.4%	-0.6%	6.0%	0.5%
t_{-3}-t_{-2}	11.1%	2.0%	2.4%	6.8%	-0.1%
t_{-2}-t_{-1}	10.4%	0.2%	0.3%	8.4%	1.5%
t_{-1}-t_0	-15.3%	1.2%	3.6%	-17.9%	-2.2%
t_0-t_1	6.6%	1.7%	0.7%	0.7%	3.5%

- Similar in cross-sectional analysis of new employees (2,000):
  - Quantity changes give 22.3%
  - Price index rises by 2.7%
  - Price shopping gives 1.7% higher spend

Potential for Price Shopping

- What could be saved from price shopping if consumers spending above median on procedure reduced spending to median?
- Note: this ignores association between price and quality

‘

Price Shopping
Potential Savings

	Overall	Imaging	Preventive	Preventive w/ Diag.	Sickest 25%
t_{-4}-t_{-3}	18.3%	24.9%	11.8%	8.8%	18.1%
t_{-3}-t_{-2}	18.7%	28.1%	12.2%	10.5%	19.0%
t_{-2}-t_{-1}	21.1%	37.1%	12.4%	10.4%	21.5%
t_{-1}-t_0	20.1%	34.2%	12.5%	12.0%	21.3%
t_0-t_1	20.8%	37.0%	11.4%	12.5%	21.3%

Decomposition: Top 30 Procedures

- Reproduce decomposition analysis for:
  - 30 top procedures by revenue
  - 30 top procedures by count
- Substantial difference in changes for t_0 for these top 30 procedures, relative to earlier years
- Meaningful reductions in almost all procedures, including likely high value care and likely low value care

Total Spending Change Decomposition High Spend Procedures	% Total Spend	$\Delta TS_{t+1,t}$	$PPI_{t+1,t}$	$PS_{t+1,t}$	$QE_{t+1,t}$
t_{-3}-t_{-2}	-	24	19	13	22
t_{-2}-t_{-1}	-	24	21	19	24
t_{-1}-t_0	-	4	16	18	5
t_0-t_1	-	23	11	17	24

Impact on Potential High-Value Care

Spending Change Decomposition
Potential High Value Care

Medical Care	% Tot. Spend	$\Delta TS_{t+1,t}$	$\Delta PPI_{t+1,t}$	$\Delta PS_{t+1,t}$	$\Delta Q_{t+1,t}$	$\Delta QS_{t+1,t}$
Preventive Care, General	8.2%*	-0.3% 4.1%	6.4% -1.6%	2.1% 9.2%	-7.5% -0.4%	-1.3% -3.1%
Preventive Care, w/ Prior Diag.	14.5%*	-10.6% 3.0%	2.0% 2.4%	1.0% -0.7%	-12.2% 0.1%	-1.4% 1.2%
Preventive Care, Diabetics	0.04%*	-1.4% 15.9%	-2.0% -1.9%	-0.5% 2.9%	-1.6% 12.5%	2.7% 2.4%
Mental Health	14.11%*	-2.9% 16.2%	-1.0% -1.3%	0.0% 0.0%	-5.4% 14.8%	3.5% 2.7%
Physical Therapy	12.68%*	-23.8% 13.5%	0.3% 0.8%	7.1% 3.1%	-29.7% 8.5%	-1.5% 0.9%

Drugs	% Tot. Spend	$\Delta TS_{t+1,t}$	$\Delta PPI_{t+1,t}$	$\Delta Q_{t+1,t}$	$\Delta QS_{t+1,t}$
Diabetes Drugs	3.0%**	-44.5% 29.1%	6.7% 14.8%	-48.0% 12.6%	-3.2% 1.7%
Statins (for cholesterol)	1.7%**	-47.2% 14.6%	-34.3% 16.8%	-19.6% -1.8%	6.7% -0.4%
Antidepressants	5.5%**	-48.7% 12.0%	-37.4% 0.4%	-18.0% 11.6%	6.7% 0.0%

Impact on Potential Low-Value Care

Total Spending Change
Decomposition
Potential Low Value Care

Medical Care	% Tot. Spend	$\Delta TS_{t+1,t}$	$\Delta PPI_{t+1,t}$	$\Delta PS_{t+1,t}$	$\Delta Q_{t+1,t}$	$\Delta QS_{t+1,t}$
Imaging	10.0%*	-19.5%	-0.4%	0.6%	-17.7%	-2.0%
		5.5%	2.7%	-1.9%	6.3%	-1.6%
CT Scan for Sinuses w/ Acute Sinusitis	0.1%*	-24.8%	0.5%	1.1%	-26.0%	-0.4%
		11.3%	0.4%	3.9%	5.2%	1.8%
Back Imaging for Non-Specific Low Back Pain	0.3%*	-26.1%	6.9%	-6.8%	-21.3%	-4.9%
		22.2%	4.2%	-7.6%	14.5%	11.3%
Head Imaging for Uncomplicated Headache	0.2%*	-23.9%	-1.0%	6.6%	-30.7%	1.2%
		18.0%	0.4%	-1.8%	17.9%	1.5%
Colorectal Cancer Scrng. for Patients Under 50	0.5%*	-32.2%	0.7%	-0.8%	-26.2%	-5.9%
		7.6%	1.3%	5.2%	-3.4%	4.5%
Drugs	% Tot. Spend	$\Delta TS_{t+1,t}$	$\Delta PPI_{t+1,t}$		$\Delta Q_{t+1,t}$	$\Delta QS_{t+1,t}$
Antibiotics for Acute Respiratory Infection	0.9%**	-47.8%	-6.2%		-44.4%	2.8%
		-4.8%	-5.3%		0.4%	0.1%

Overview

Consumer Responses to Non-Linear Contracts

- Switching to the HDHP not only increases prices, but forces employees to respond to multi-part non-linear contract
- Non-linear contracts are more complicated than typical price (e.g. Einav et al., 2015). Are consumers responding to:
  - Marginal price (expected EOY)
  - Spot price
  - Average price
- How do educated, tech-savvy consumers respond to more complex contracts? What impacts on spending?

Policy Change: Price Impact
t_{-1} **Total Spending**

Coverage Tier	Avg. HDHP Price	% Under Deductible	% Over Ded., Under OOP Max.	% Over OOP Max.	Actuarial Value
0 Dependents	0.428	37.92%	49.16%	12.92%	78.31%
1 Dependent	0.293	23.22%	61.08%	15.70%	76.59%
2+ Dependents	0.201	13.30%	68.40%	18.30%	78.24%
All Tiers	0.249	18.42%	64.46%	17.12%	78.05%

Advantage of Our Setting

- Our setting is uniquely well-suited to answer this question:
  - Same large population of consumers over six years
  - First four years in free plan, last two in non-linear contract
- Key assumption: Constant population health

$$F_{t_0}[s_m|H, X] = F_{t_{-2}}[s_m|H, X], \forall m1....12$$

- H is ex ante health status, X is demographics, s_m is health status for month m
- Key Feature: Dynamics in health status from lower spending (offsets)bias *against* finding incremental spending reductions in treatment years, especially for those under deductible

Approach

- Consider distribution of incremental spending, based on observables, at date t for duration x:

$$G[S_{m+x} - S_m | s_m, H, X, Ins_m]$$

- Ins_m can be decomposed into non-linear contract prices
- We observe everything except for health status s_m, empirical approach only assumes monotonic mapping between s_m and YTD spending S_m
- Quantile Comparisons: Conditional on (H, X):
  - Examine incremental spending of people in given contract position in month m in treatment years (e.g. t_0)
  - Compare to incremental spending of consumers with associated quantiles of YTD spending in pre-period (e.g. t_{-2})

Prices

Spot vs. Marginal vs. Prior EOY Marginal

- Reduce contract position Ins_m conditional on (H,X) to four prices
- Spot price P_m^s: Either 1, 0.1, or 0 depending on NLC arm
- Expected EOY price $P_m^e = E_t[P_m^s | S_m, H, X, Ins_m]$
- Prior EOY Marginal: $P_{m,t}^L = P_{EOY,t-1}^s$ and equals either 1,0.1, or 0 depending on prior year plan and spending
- Additionally, in some specifications consider average price, which is forward looking average price for the year conditional on (H, X) and contract

Expected EOY Marginal Price

- Use minimal assumptions to get expected EOY marginal price
  - Rational expectations is benchmark, in essence testing this
- Step 1: For each individual i and each point in time t define cell by triple (H, X, M_{t-1})
- Step 2: Form non-parametric distribution of EOY spending $f_i(M_{i,T}|H, X, M_{i,t-1})$
- Step 3: Combine individual distributions within family:

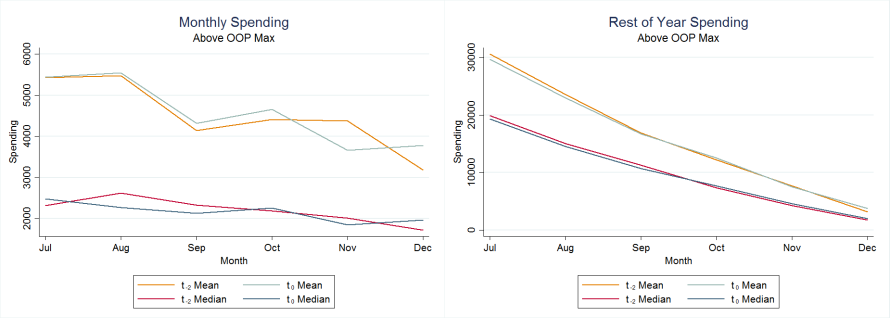
$$f_{J(i)}(M_T) = \Sigma_{\Sigma_{M_{i,t}=M_T}} \Pi_i^{J(i)} f_i(M_T) \quad (1)$$

- Step 4: Form expected EOY marginal price:

$$P^e_{j,t} = \int_{R_+^{J(i)}} P^s_{J(i)}(M_T) dF_{J(i)}(M_t)$$

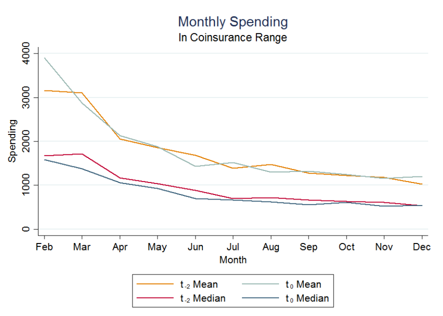
Incremental Spending Above OOP Max

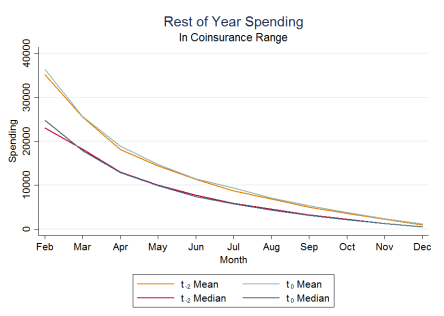
- Present analysis for families
- Good test of whether things other than contract structure changing in environment (though earlier evidence suggests not)



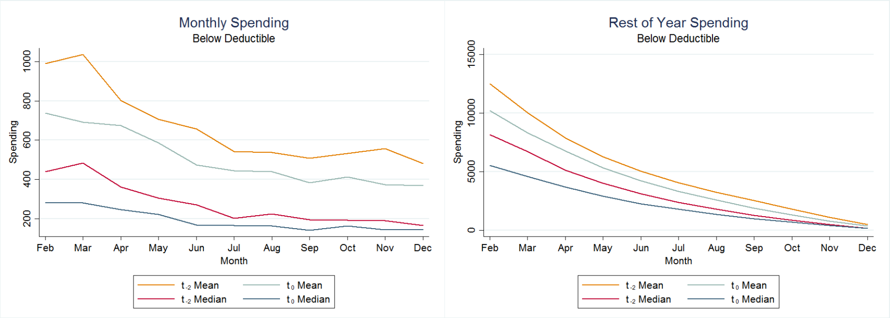
Incremental Spending: Coinsurance Region

- Almost no impact on incremental spending conditional on being in coinsurance region
- Spot price of 0.1, expected end of year price must be weakly below 0.1
- Together with OOP max charts, shows that almost all spending reductions come in months that people start under the deductible





Incremental Spending: Deductible Region

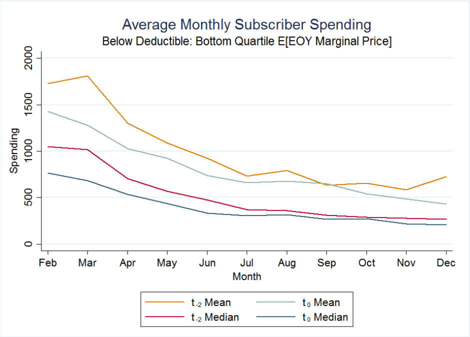


- Very large and meaningful decrease next month and ROY spending, figures suggest almost all spending reductions occur conditional on beginning month under deductible
- ROY spending chart suggests meaningful dynamic effects

Incremental Spending: Deductible Region

Spot vs. Expected EOY Price

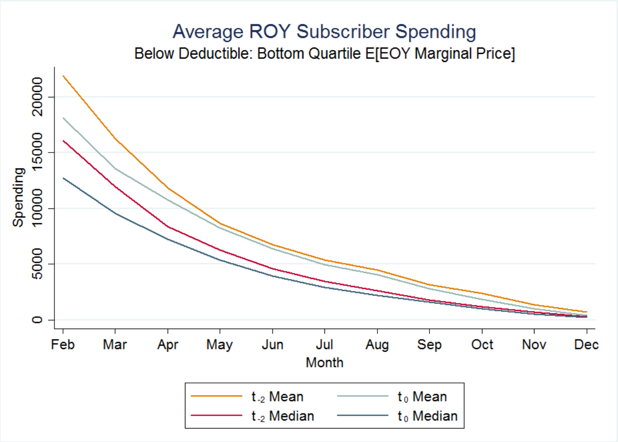
- What about people who should expect to spend a lot ex ante?
- Reduce spending, only when under deductible



- Average expected EOY marginal price in Feb. is 0.09 (Mar. 0.10)
- Also, results similar for *sickest 10%* of consumers ex ante, conditional on being under deductible!!

Incremental Spending: Deductible Region

Spot vs. Expected EOY Price



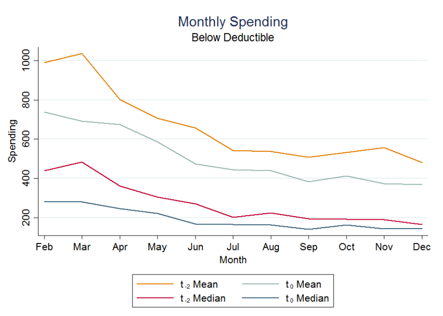
- Drop in ROY spending of approximately 20% in early months, despite fact that they are very likely to spend a lot!

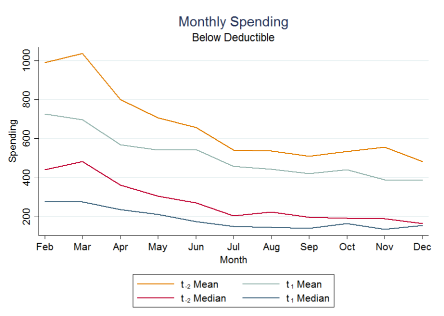
When do Consumers Reduce Spending in Contract?

% Savings by Start of Month Plan Arm	% t_0 Savings	% t_1 Savings
Start of Month Plan Arm		
Deductible	91%	120%
– EOY Q1 (Sick)	25%	33%
– EOY Q2	24%	30%
– EOY Q3	19%	24%
– EOY Q4 (Healthy)	23%	32%
Coinsurance	-5%	-10%
OOP Max	14%	-10%

- Almost all spending reductions that occur do so in months consumers start under deductible
- 25-33% of all spending reductions come from sickest quartile of consumers under deductible, despite fact that they can project to pass it easily and don't reduce spending in coinsurance region

Learning for Year t_1?





- Effects persist in second year after required switch to HDHP
- No descriptive evidence of learning to respond to shadow price / EOY marginal price relative to spot price
- Some evidence of learning to respond to past year EOY marginal price

NLC Analysis: Regressions Analysis

- We formalize this in regression analyses:

$$\begin{aligned}\log(Y_{i,m}) &= \alpha + [\beta_e P^e_{i,m} + \beta_s P^s_{i,m} + \beta_L P^L_i] + \\ &[\theta_e P^e_{i,m} + \theta_s P^s_{i,m} + \theta_L P^L_i] I_{t_0 - t_1} + \\ &+[\kappa_e P^e_{i,m} + \kappa_s P^s_{i,m} + \kappa_L P^L_i] I_{t_1} + \gamma_H H_i + \gamma_X X_i \\ &+\gamma_{Y^l} \Sigma^2_{l=1} \log(Y_{i,m-l}) + \Sigma_{m\in M} \gamma_m I_m + \Sigma_{t \in T} \gamma_t I_t + \epsilon_{i,m}\end{aligned}$$

- $Y_{i,m}$: Log total incremental spending for next month (plus 1)
- Include obs. for pre-period year t_{-2} and both post-period years
- Leverages pre-post and cross-section assumptions: construct counterfactual HDHP prices for pre-period consumers using cell-based quantile comparisons
- Independent variables: Prices faced at beginning of month, health status, demographics, spending to date, recent spending
- Range of alternative specifications (including LASSO)

Non-Linear Contract Regressions

Non-Linear Contract
Incremental Spending Regressions

Variable	Primary	Shadow P Ventiles	No Prior Year MP	No Shadow Price	Fewer Controls	t_0 Only
Spot Price X Treatment Year						
1 (Deductible)	-0.422***	-0.414***	-0.434***	-0.347***	-0.525***	-0.411***
	(0.0385)	(0.0458)	(0.0384)	(0.0328)	(0.0395)	(0.0386)
1 (Deductible X t_1)	-0.0547	-0.0727	-0.0671*	0.0323	-0.0860**	–
	(0.0374)	(0.0443)	(0.0372)	(0.0318)	(0.0860)	–
0.1 (Coinsurance)	-0.144***	-0.0938**	-0.143***	-0.117***	-0.181***	-0.139***
	(0.0377)	(0.0401)	(0.0335)	(0.0325)	(0.0346)	(0.0337)
0.1 (Coinsurance X t_1)	-0.0197	-0.0416	-0.0331	-0.001	-0.0314	–
	(0.0328)	(0.0390)	(0.0326)	(0.0307)	(0.0336)	–
Prior Yr. End MP X Treatment Yr.						
1 (Deductible)	0.0657***	0.0509*	–	0.0948***	0.0516*	0.0607
	(0.0262)	(0.0269)	–	(0.0244)	(0.0268)	(0.0384)
1 (Deductible X t_1)	-0.0962***	-0.0822***	–	-0.0569**	-0.0786***	–
	(0.0254)	(0.0260)	–	(0.0236)	(0.0260)	–
0.1 (Coinsurance)	-0.0333	-0.0308	–	-0.0497**	-0.0471**	-0.0384
	(0.0210)	(0.0216)	–	(0.0205)	(0.0215)	(0.0310)
0.1 (Coinsurance X t_1)	-0.0159	-0.0102	–	0.0283	-0.0181	–
	(0.0205)	(0.0216)	–	(0.0200)	(0.0210)	–
Demographics & Seasonality	YES	YES	YES	YES	YES	YES
Prior Month Spend Controls	YES	YES	YES	YES	NO	YES
Health Controls	YES	YES	YES	YES	NO	YES
Observations	749,705	749,705	749,705	749,705	749,705	499,796
R^2	0.381	0.383	0.374	0.371	0.349	0.382

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$

Non-Linear Contract Regressions

Non-Linear Contract
Incremental Spending Regressions

Variable	Primary	Shadow P Ventiles	No Prior Year MP	No Shadow Price	Fewer Controls	t_0 Only
Shadow Price X Treatment Yr.						
Quintile 2 – [0.089,0.100]	-0.0570***	– –[a]	-0.0655***	–	-0.0773***	-0.0597***
	(0.0217)	– –[a]	(0.0214)	–	(0.0222)	(0.0219)
Quintile 2 X t_1	0.0424*	– –[a]	0.0211	–	0.0456	–
	(0.0217)	– –[a]	(0.0214)	–	(0.0223)	–
Quintile 3 – [0.100,0.2755]	-0.0424*	– –[a]	-0.0443	–	-0.0479*	-0.0564***
	(0.0255)	– –[a]	(0.0249)	–	(0.0261)	(0.0262)
Quintile 3 X t_1	0.0549**	– –[a]	0.0253	–	0.0615*	–
	(0.0260)	– –[a]	(0.0256)	–	(0.0267)	–
Quintile 4 – [0.2756,0.7303]	-0.0666***	– –[a]	-0.0381	–	-0.0715**	-0.0513*
	(0.0294)	– –[a]	(0.0285)	–	(0.0301)	(0.0311)
Quintile 4 X t_1	0.106***	– –[a]	0.0196	–	0.115***	–
	(0.0292)	– –[a]	(0.0283)	–	(0.0300)	–
Quintile 5 – [0.7304,1]	0.135***	– –[a]	0.205***	–	0.167***	0.160***
	(0.0312)	– –[a]	(0.0288)	–	(0.0320)	(0.0355)
Quintile 5 X t_1	0.0967***	– –[a]	-0.0114	–	0.109***	–
	(0.0307)	– –[a]	(0.0284)	–	(0.0315)	–

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$

Non-Linear Contract Regressions

- Spot prices responsible for cost reductions relative to shadow prices / EOY marginal price
- Deductible spot price reduces incremental spending by 42%, ceteris paribus
- Relatively low elasticies wrt. expected EOY price controlling for spot price
- In paper: analysis of correlations between prices over course of year
- Second-year post change, consumers respond to last year's EOY maginal price (-10% for deductible relative to other arms)

Overview

Conclusion

- Large employer covering over 100,000 required employees to switch to HDHP from free health care
- Overall Causal Impact: 11.1-15.1% spending drop (off $750 M)
  - Pre-post and diff-in-diff with early switchers
  - Sicker consumers reduce spending by meaningful amount (18%)
- Study of price shopping vs. quantity reductions / substitutions:
  - Large quantity implications, both valuable / wasteful services
  - Limited to no price shopping effect, no improvement in year 2
- Educated, tech-savvy consumers respond to non-linear contract in unsophisticated manner
  - Sick consumers reduce spending a lot under deductible, *even when expected EOY price is low!!*
  - Limited to no response once over , or to shadow prices
  - Limited evidence of learning in year 2

Next Steps

- Optimal menu design depending on:
  - Consumer price response heterogeneity
  - Heterogeneity in medical services responses
  - Dynamic responses to non-linear contracts
- Welfare a la Baicker et al. (2015):
  - Informed consumers vs. uninformed consumers
  - Rational price responses
  - Categorization of services
- Mechanism underlying dynamic responses
  - Beliefs about health risk
  - Knowledge of contract
  - Myopia
- Long-term price shopping and offsets
- Other control groups

Behavioral Insights for Health Insurance Markets*

Ben Handel (Berkeley)
January 8, 2024

*Borrowed from keynote slides produced with Justin Sydnor (Wisconsin)

Overview Papers

Industrial Organization of Health Care Markets
(joint with Kate Ho)
Handbook of Industrial Organization, Vol. 4, 2021

Behavioral Economics and Health-Care Markets
(joint with Amitabh Chandra and Josh Schwartzstein)
Handbook of Behavioral Economics Vol. 2, 2019, 459-502.

Frictions or Mental Gaps: What's Behind the Information We (Don't) Use and When Do We Care?
(joint with Josh Schwartzstein) *Journal of Economic Perspectives* Vol. 32 (1), 2018, 155-178.

Example big questions in health insurance

- Should the government regulate the generosity of plans in private health insurance markets?

- Should the government regulate the benefit designs of plans in private health insurance markets?

- Should employers offer a menu of plan options or only one plan? What level of generosity for the plan(s)?

- Should people be required to make active plan selections each year or defaulted into their prior plan?

Traditional Insurance Economics

- Provides structure for analyzing these types of questions and highlights key tradeoffs between:
  - Adverse selection
  - Moral hazard
  - Risk protection (potential heterogeneity in preferences)

- Assumptions that people are:
  - Actively comparing options
  - Accurately perceiving risk
  - Making optimal selection given perceived risk and preferences

Behavioral Insurance Economics

- Health insurance markets are fantastic “laboratories” for studying consumer-decision making when choices are:
    - Complicated
    - Boring
    - Important

- Key additional ingredient: inherent uncertainty

- Market designers have substantial input into choice architecture and product regulation
    - Great context to translate behavioral economics research into policy
    - Fantastic micro-level data with ability to judge *right* and *wrong*
    - Many different environments to study

Behavioral Consumers

Do People Enroll in Bad Options?

- Yes, in many cases, the insurance options that people choose lead to large certainty equivalent financial losses, relative to other options

- Big positive / normative implications for efficiency and equity:

  -- Holding market options fixed

  -- Allowing firms / markets to adjust to behavioral decisions

- Measuring behavioral foundations can be quite subtle. When should researchers:

  -- Aggregate behavioral frictions together in reduced form setup

  -- Estimate structural model with specific behavioral mechanisms

Overview

1. Evidence for behavioral consumers
2. Broad insight 1: Behavioral "choice frictions" sometimes support markets by mitigating effects of adverse selection and/or lapsation
3. Broad insight 2: There can be significant distributional/equity issues that may call for more regulation.
4. Broad insight 3: Need approaches beyond "revealed preference" for evaluating welfare.

Evidence for Behavioral Consumers

Inertia

- Quite a few empirical papers studying inertia, many potential underlying mechanisms:

  -- Handel (2013*),* modeled as switching cost

  -- Ho et al. (2016), modeled with rational inattention

  -- Search costs, naïve present bias, endowment effect, switching providers other explanations

- Typical identification:

  -- Natural experiment where all consumers make active choice in one year, passive choices after

  -- Also, compare new enrollees to similar existing enrollees

- Though certain strategies used to suggest which mechanisms are in play, papers typically lump mechanisms together. Matters for some policy questions but not others

Inertia: Potential Micro-Foundations

- Potential mechanisms underlying inertia include:

    1. Switching costs
    2. Search costs
    3. Inattention
    4. Naïve present bias
    5. Switching providers

- Literature in general does not distinguish between these mechanisms: there are some policies / cases for which disentangling the mechanisms is crucial, and others for which it is less important. See Handel and Schwartzstein (forthcoming, *JEP*) for a discussion.

Inertia: Some Results

- Handel (2013) – Consumers on average willing to leave $2,000 on table to stay in default option
  - -- Evidence from new entrants compared to old
  - -- Evidence from dominated plan choice
- Ho et al. (2016) – Consumers switch 10% of time, similar likelihood of paying attention in rational inattention model
  - -- More likely to switch with shocks to (i) current plan premium change (ii) current plan cost-sharing change
  - -- Amount of money left on table due to inertia is significant
- Other papers also document significant losses from inertia:
  - -- Ericson (2014), Polyakova (2016), Heiss et al. (2016), Abaluck and Gruber (2017)

Limited Information and Choice Frictions (Handel and Kolstad 2015)

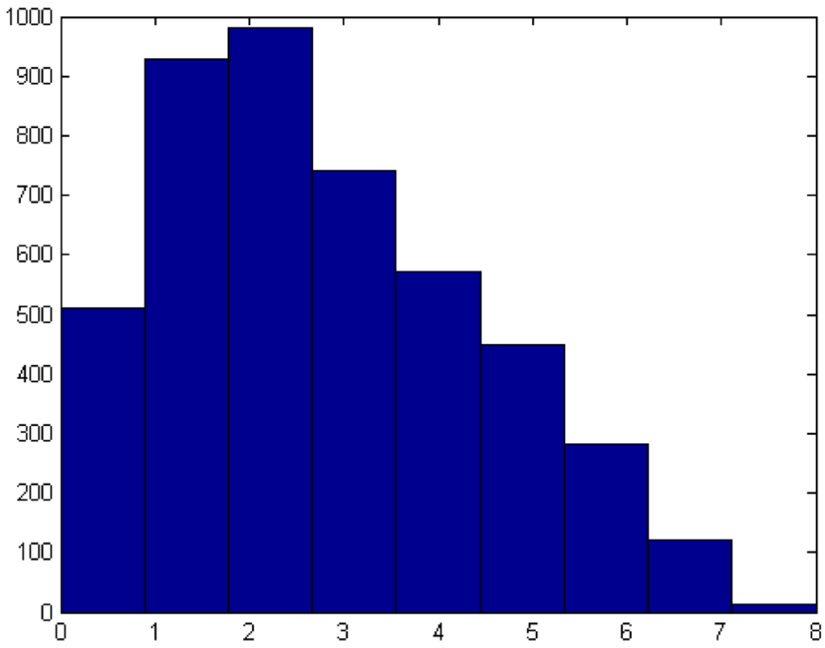
- Data from large employer with 150,000 consumers and 2 primary plan choices
- One method: use comprehensive survey data on consumer information about (i) health status (ii) provider network preferences and (iii) plan characteristics
- Identification Strategy: rational / fully informed consumers make choices with baseline expected utility, biased / uninformed consumers leave money on the table

Key Results:
Handel + Kolstad (2015 , *AER*)

- Average consumer with limited information / biases willing to leave almost $2,000 on table relative to fully informed rational consumer

- Consumer choice issues:
  - Provider networks
  - Plan Characteristics
  - Projected Health Spend
  - Hassle Costs

- Implications for Risk Preference Estimates:
  - Consumers estimated to be much less risk averse once precise signals on information sets considered
  - Important implications for welfare analysis of insurance market policies



More Evidence
Abaluck and Gruber 2017

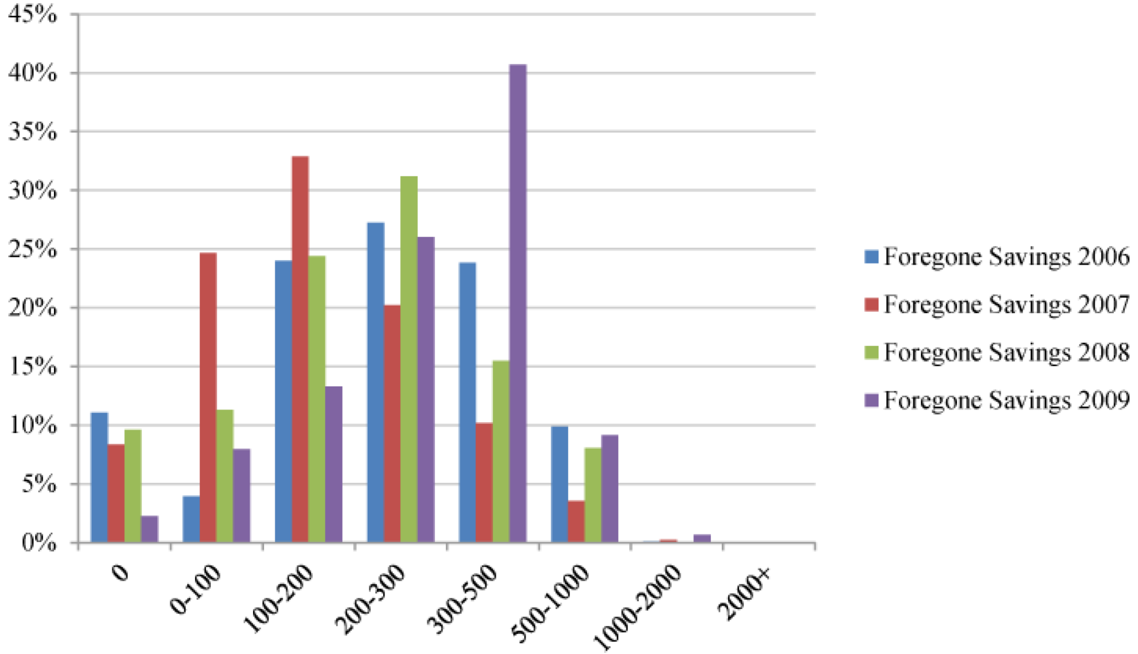
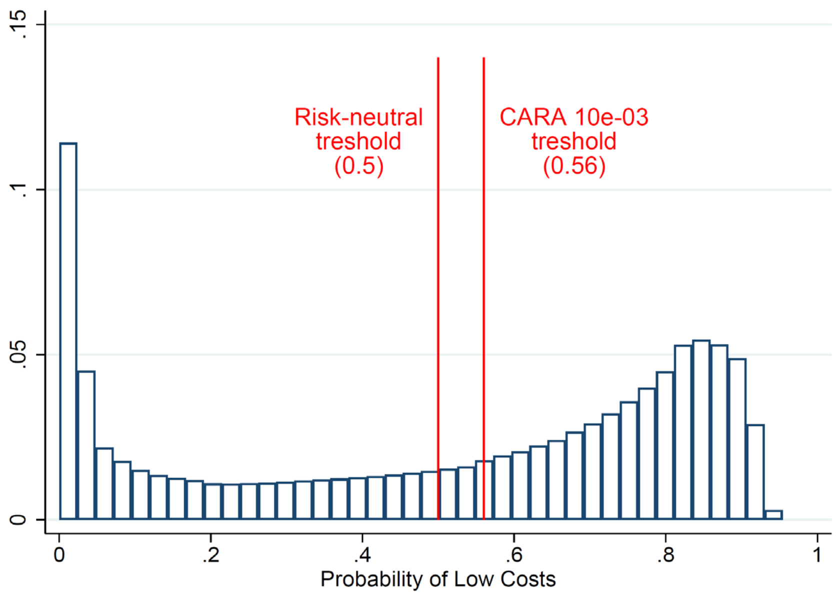
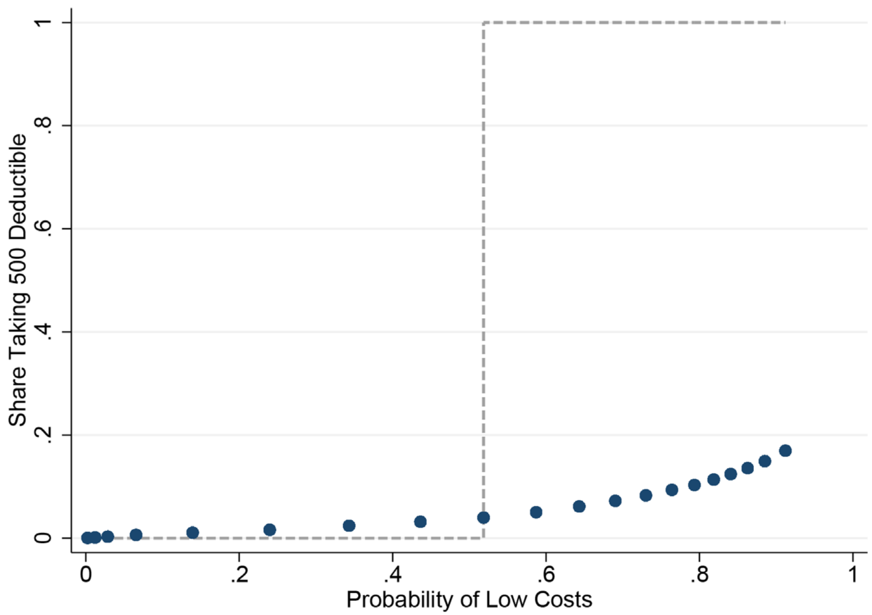


FIGURE 2.
RATIONAL EXPECTATIONS PREDICTED FOREGONE SAVINGS

- Substantial foregone financial savings in active choice and passive choices years for millions of seniors in Medicare Part D
- Models suggest risk aversion, brand effects don't rationalize this

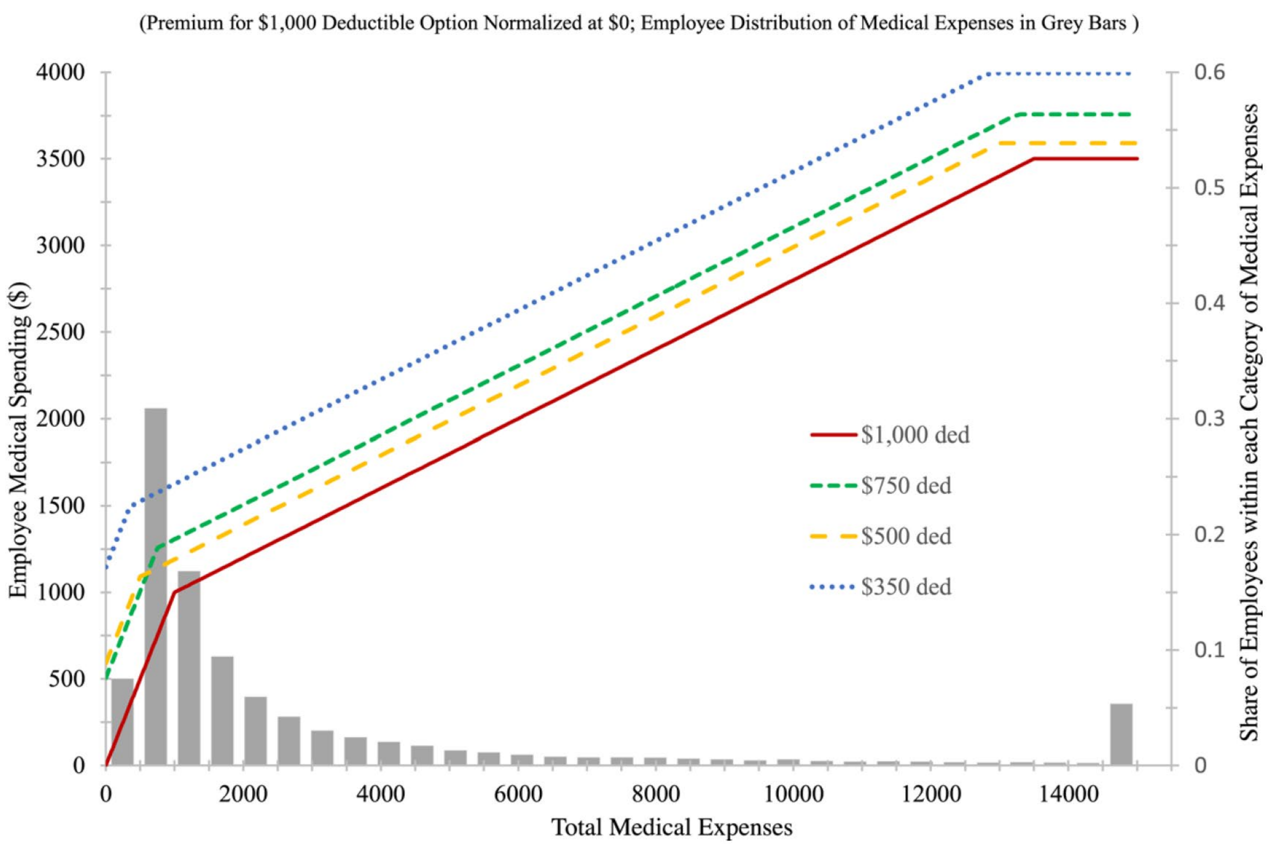
Deductible Choice Netherlands
Handel et al. 2022





- Data on deductible choices and health / demographics for entire country
- Widespread over-choosing of lower deductible options
- Granular evidence of inequality motivated by income / education (more on this later)

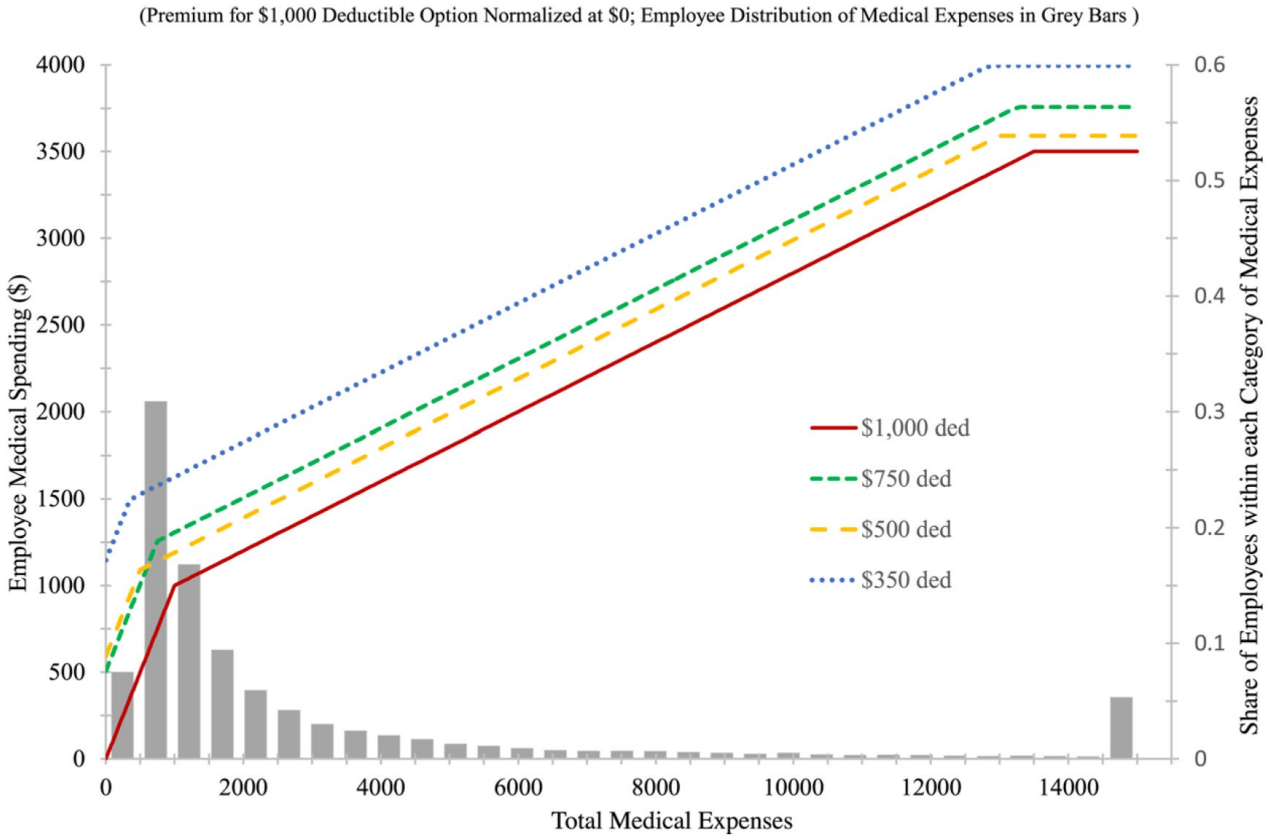
Dominated Plans (Bhargava et al. 2017)



61% chose lower deductible

Average expected excess saving from choosing dominated options ~ $350 yr

Dominated Plans (Bhargava et al. 2017)



Liu and Sydnor (2022): Dominant options common feature of employer-sponsored health insurance in the U.S.

Potential Key Drivers of Choice Patterns?

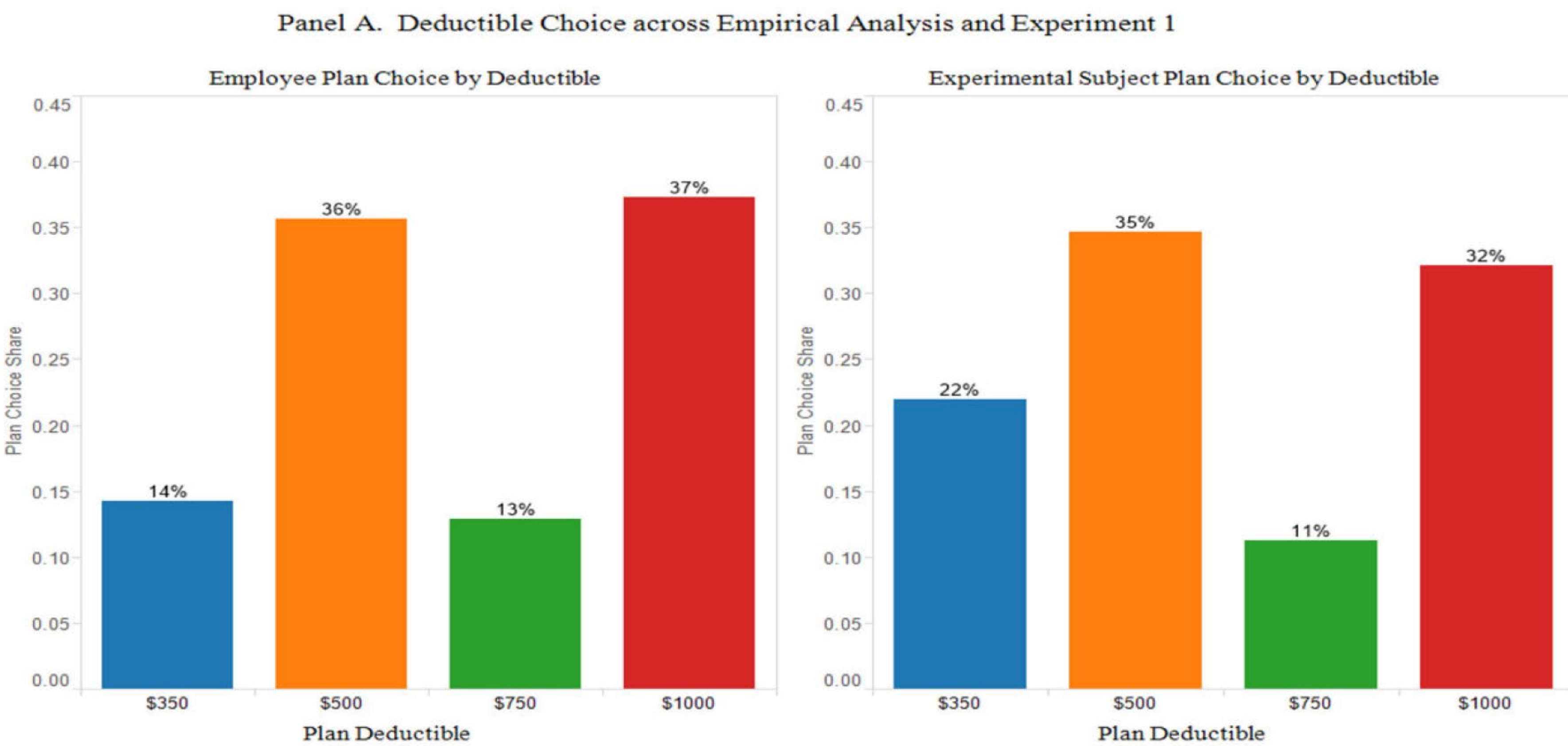
Choice overload?

Hypothesis: Too many options to compare causes people to disengage and make mistakes.

- E.g., 48 different plan options at employer in Bhargava et al. (2017)
- In many private insurance markets in the U.S. ~ 40 plans to choose from

Evidence: This is probably *not* the first-order issue in health insurance markets.

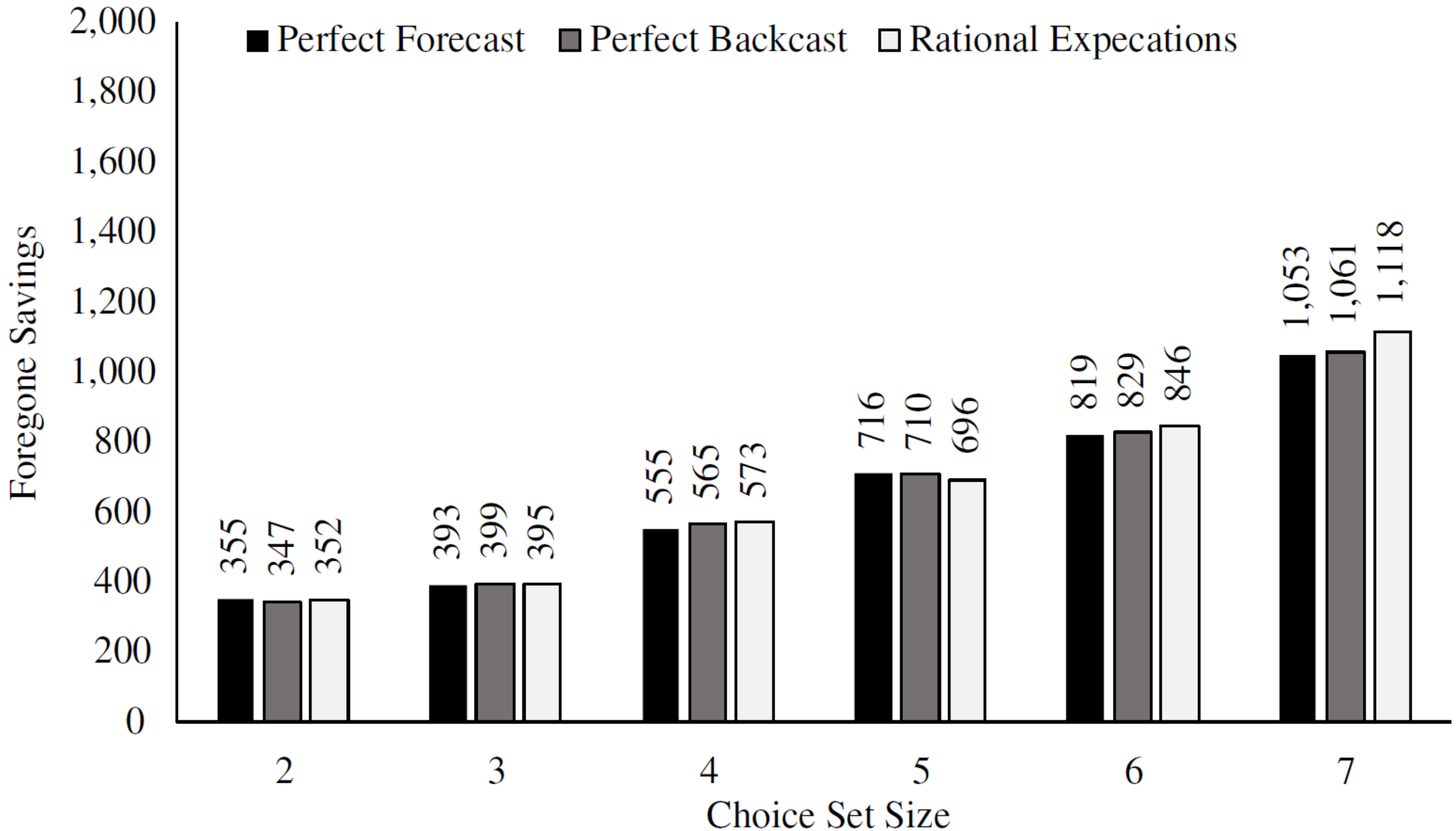
Experiment in Bhargava et al., 2017



Violations of dominance occur frequently when there are small numbers of plans (including down to 2 options).

Abaluck & Gruber (forthcoming RESTUD)

Figure 3: Foregone Savings by Choice Set Size (MODA Only)



Abaluck & Gruber (forthcoming RESTUD)

Table 6: Simulated Foregone Welfare and Total Costs

Sample	MODA Only	
Metric	Foregone Welfare	Total Costs
Simulated - 2 Plans	550	2,785
Simulated - 3 Plans	535	2,770
Simulated - 4 Plans	502	2,736
Simulated - 5 Plans	479	2,713
Simulated - 6 Plans	506	2,740
Simulated - 7 Plans	555	2,790

People did not choose differently when there were more plans.
But menus with lots of plans had more high-cost plans.

Potential Key Drivers of Choice Patterns?

Two classes of hypotheses:

1. People are confused or poorly informed.
   - Clarifying total costs reduces dominated choice substantially
   - Confusion ≠ random choice (health gradients)

2. People have some genuine preference for certain plan features even at high cost.
   - Ericson and Sydnor (2022): Liquidity constraints.
   - Possible stories via loss aversion or strong dislike of uncertainty.

Evidence of Alternative Preferences

Ericson and Sydnor (2022) NBER WP

Table 2: Survey Results: Liquidity Constraints and Demand for Insurance

	Measures of desire for insurance to smooth consumption			
	(1) Chose dominated health plan	**(2) Find argument for dominated plan persuasive**	**(3) Chose and agree w/ dominated (Combo 1 + 2)**	**(4) Prefer rebate to deductible**
Overall mean of dependent var:	0.54	0.33	0.27	0.34
Estimated effect of going from 0 to 100% share of $1k bill paid with available money:	-0.23	-0.19	-0.26	-0.16
	(0.11)	(0.10)	(0.10)	(0.10)
	[-0.44, -0.03]	[-0.39, -0.01]	[-0.45, -0.07]	[-0.35, 0.03]
Controls	Yes	Yes	Yes	Yes
Number of observations	206	206	206	206

Broad insight 1:

Behavioral “choice frictions” sometimes support markets by mitigating effects of adverse selection and/or lapsation

Key Themes

What are the implications of behavioral consumers for market design and competition policy?

-- Adverse selection and choice quality

-- Long-term contracts and switching costs / myopia

-- Regulation and welfare analysis

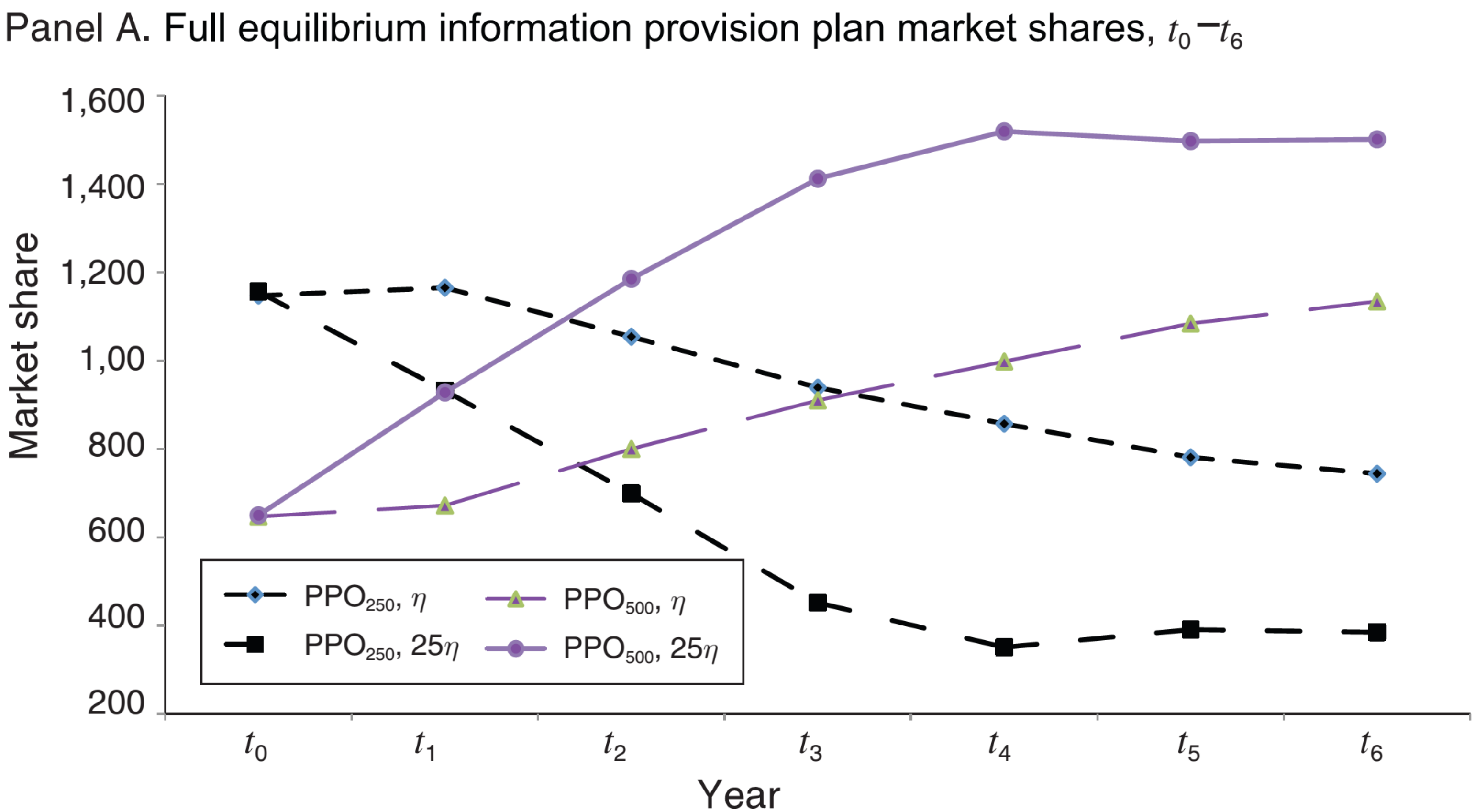
-- Firm pricing with behavioral consumers

-- Paternalistic policies and competition

Adverse Selection and Choice Quality

- In insurance markets, costs depend on who chooses the product.
- This can lead to adverse selection, which can lead to inefficient provision and even market unraveling
- Improving consumer choices can lead to worse outcomes for the market overall by exacerbating adverse selection
- Relationship between adverse selection and choice quality depends on choice environment / market foundations

Example: Handel (2013)



- Population is worse off overall after choices improve w/ reduced inertia
- Polyakova (2016) shows example where reverse is true

Adverse Selection and Choice Quality
Handel et al. (2019)

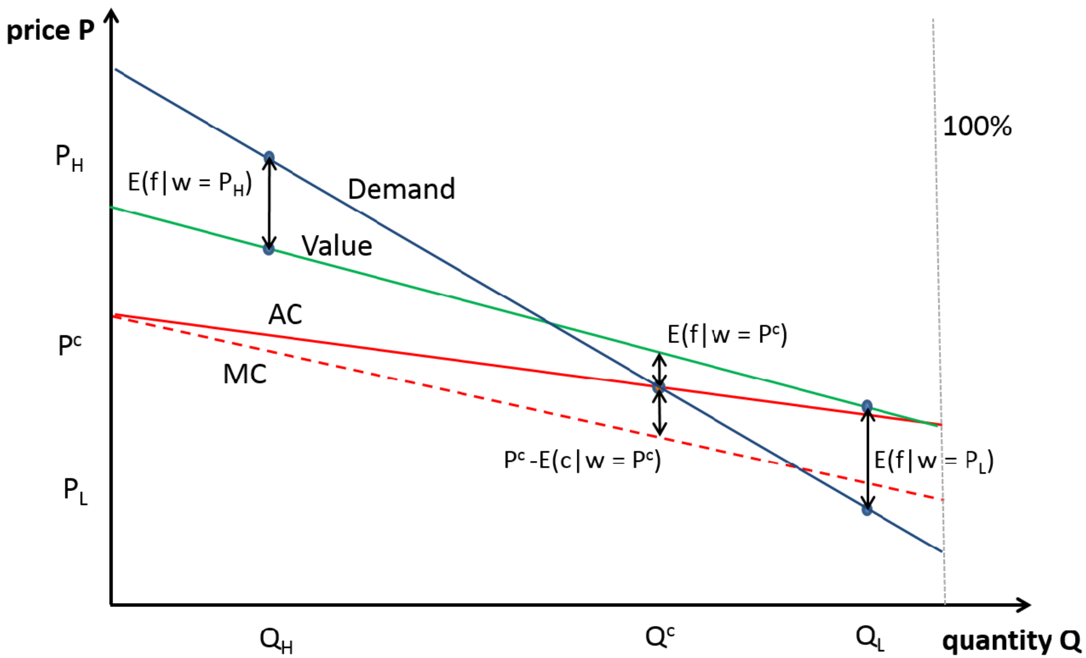


Figure 1: Demand, value and cost curves in an adversely selected market with heterogeneous frictions

Relative to typical reduced-form selection market graphs, add in possibility of choice frictions driving wedge between demand and welfare-relevant value.

Adverse Selection and Choice Quality
Handel et al. (2019)

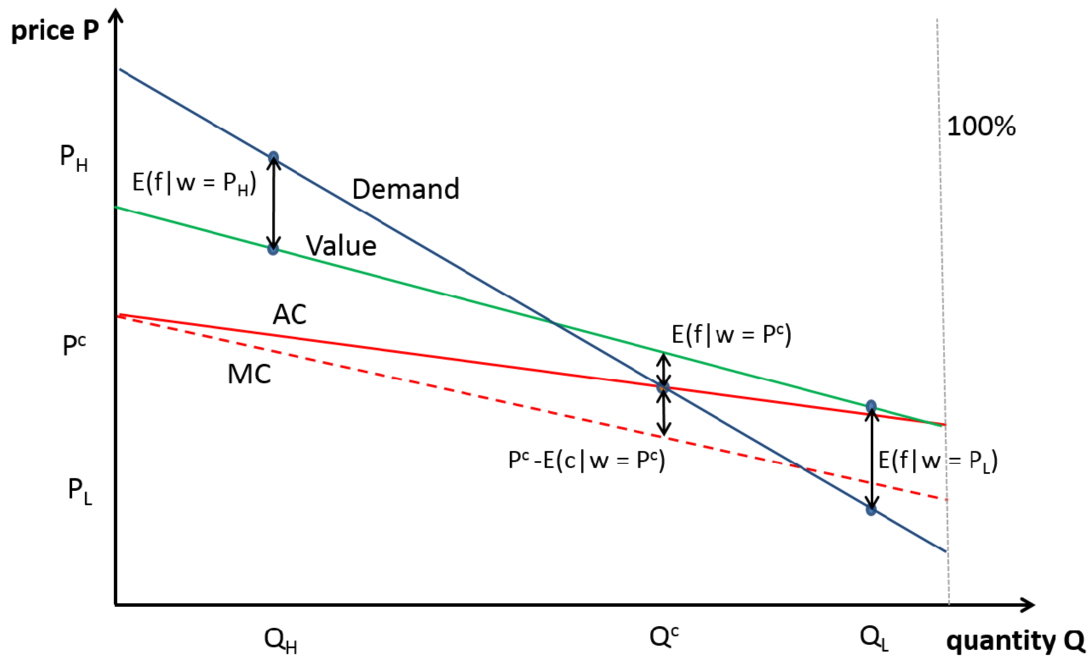


Figure 1: Demand, value and cost curves in an adversely selected market with heterogeneous frictions

Paper studies, in active choice environment, when improved choices do or do not improve consumer welfare. Relies on distributions of, correlations between, demand, value, frictions, costs

Adverse Selection and Choice Quality
Handel et al. (2019)

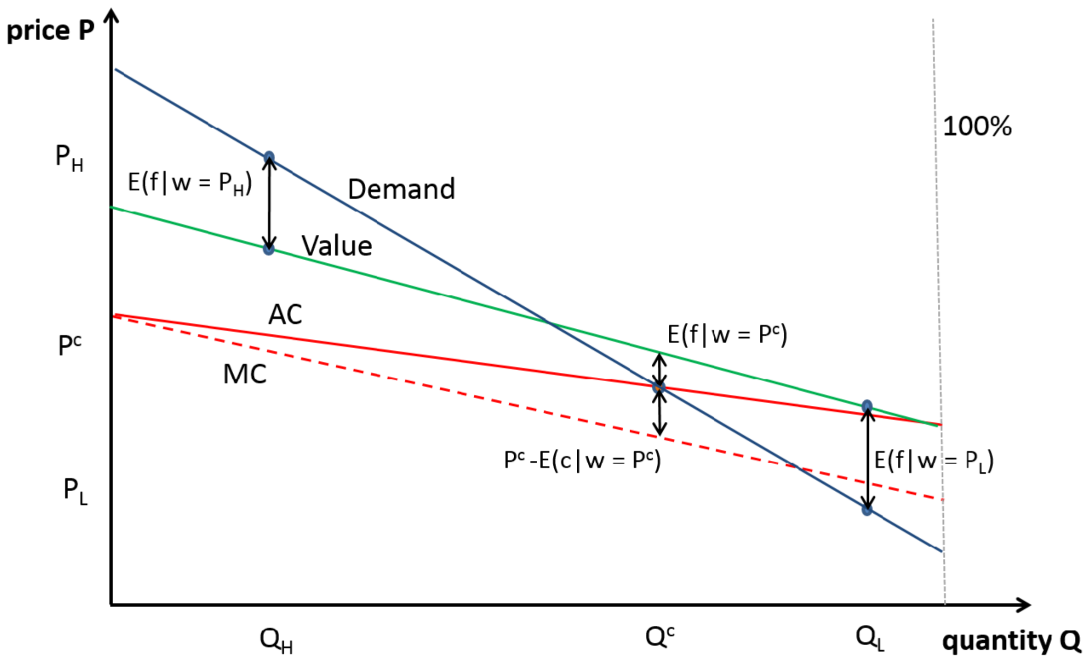


Figure 1: Demand, value and cost curves in an adversely selected market with heterogeneous frictions

When choices improve, if consumers resort along the demand curve according to cost then welfare impact is lower (or negative); if they resort according to surplus more than welfare impact is greater

Adverse Selection and Choice Quality
Handel et al. (2019)

- Risk-adjustment transfers are complementary to choice-improving policies that reduce frictions
- Strengthens sorting based on surplus relative to surplus based on costs

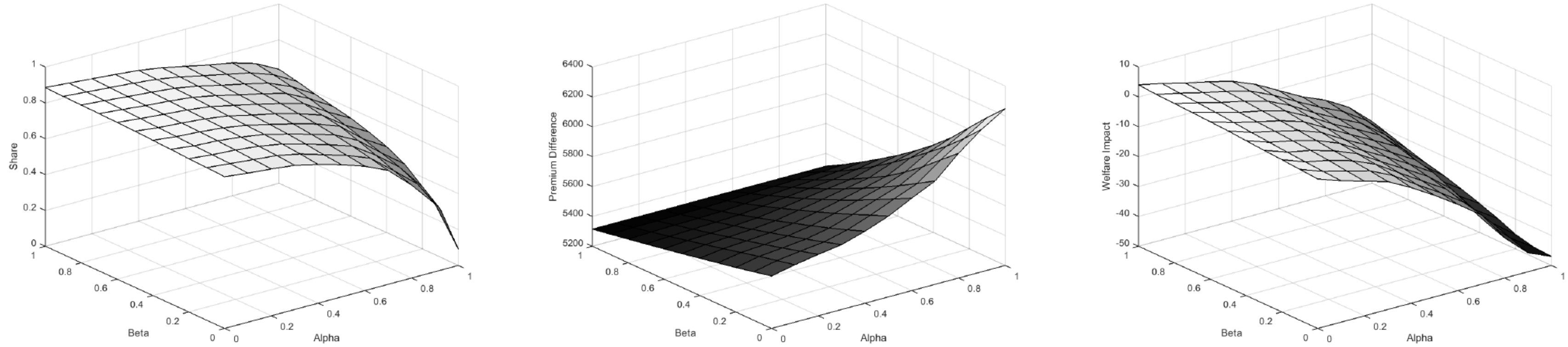


Figure 7: The top figure shows market equilibrium PPO market shares for ranges of policies for α and β between 0 and 1, with full interactions. The middle figure shows market equilibrium δP for ranges of policies for α and β between 0 and 1, with full interactions. The bottom figure shows market equilibrium welfare outcomes for ranges of policies for α and β between 0 and 1, with full interactions.

Long-Term Contracts + Behavioral Consumers
Ghili et al. (2022)

- Long-term, guaranteed renewable insurance contracts are one potential product / market design solution to simultaneously reduce adverse selection and reclassification risk

- Prevalent in:
  -- Life insurance (e.g. Hendel and Lizzeri 2001)
  -- Annuities
  -- Health insurance (e.g., Germany, Atal et. al. 2022)

- Ghili et al. 2022 provides positive and normative solutions for competitive markets for long-term health insurance with one-sided commitment by the firm
  -- Lapsation constraint for when consumers become healthier leads to front-loading in early years. The more the lapsation constraint binds, the higher (and more costlier) front-loading

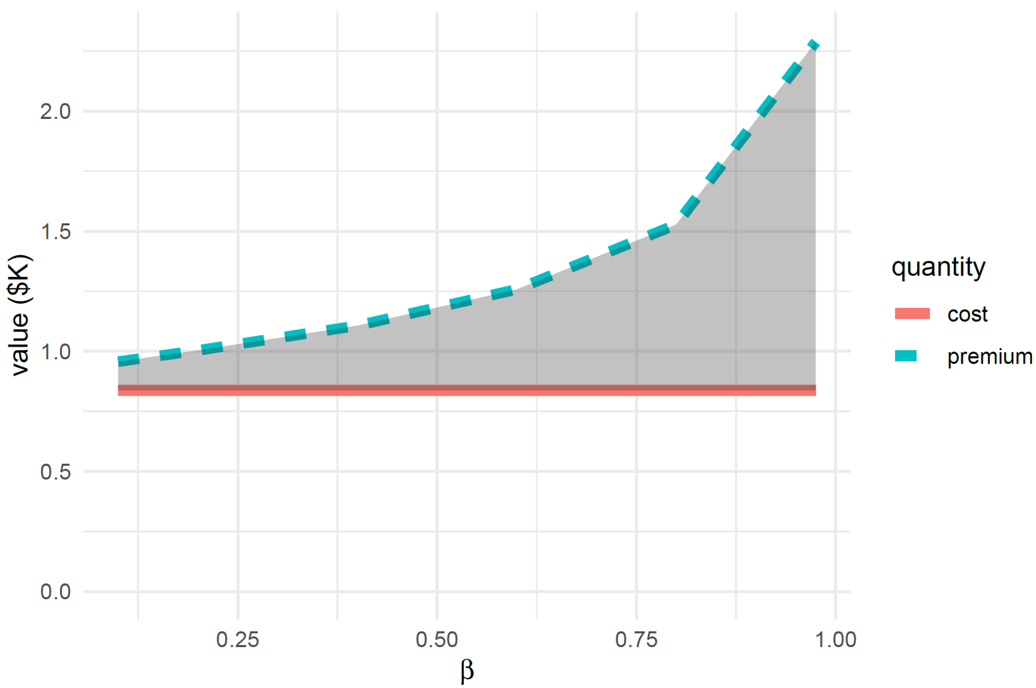
Long-Term Contracts + Behavioral Consumers

Ghili et al. (2022)

- As extensions, paper studies two behavioral phenomena that impact lapsation constraints and equilibrium contracts:

    -- Myopia

    -- Switching costs / inertia



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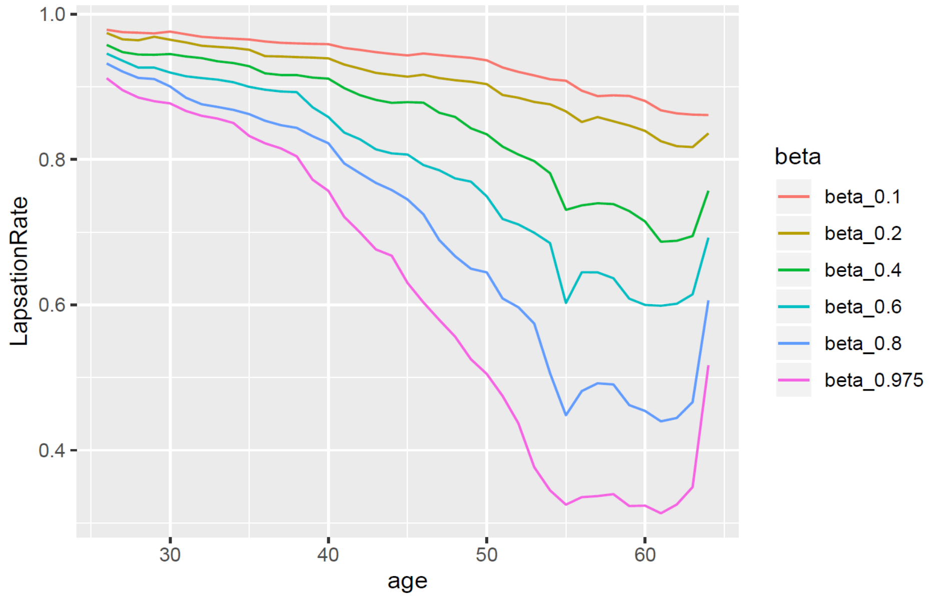


- <u>Welfare decreases with higher myopia</u>, more so for flatter income paths

Long-Term Contracts + Behavioral Consumers
Ghili et al. (2022)

- As extensions, paper studies two behavioral phenomena that impact lapsation constraints and equilibrium contracts:

  -- Myopia

  -- Switching costs / inertia

Switching cost	Flat net	Non-manager	Manager	Downs mngr
0	48.83	38.08	45.91	28.13
10	50.37	41.13	50.46	31.79
50	53.37	47.06	58.95	38.92
100	54.15	51.47	65.58	44.57
500	54.19	54.19	84.51	54.19
C^*	54.67	54.67	85.00	54.67
C^*_{NBNS}	54.67	47.37	55.67	37.68

- <u>Switching costs / inertia improves performance of long-term contracts</u>

Broad insight 2:

There can be significant distributional and equity issues that may call for more regulation.

Key points

- Vertical choice in coverage levels:
  - Can lead to unraveling to least generous coverage when all are fully informed.
  - With “choice frictions” can lead to large premium differentials between plans as generous plans come to reflect costs of less healthy.
- Vertical choice will tend to harm:
  - Less healthy
  - Confused or those with strong preference for avoiding cost sharing
- Social welfare issue: poor health & insurance confusion both negatively correlated with wealth.

Example from Ericson & Sydnor (JEP 2017)

Medical Spending for Example of Population with Two Health-Risk Types

Population group	*Percent of population*	*Average medical spending*	*Probability of $0 medical spending*	*Probability of $10,000+ medical Spending*
All adults (18–64)	100%	$4,380	13%	10%
Healthy adults	68%	$3,045	15%	7%
Unhealthy adults	32%	$7,227	9%	18%

Note: Source is authors' calculations from 2012/2013 Medical Expenditure Panel Survey (MEPS) data.

Two Examples of Health Plans

Plan type	*Actuarial value*	*Deductible*	*Coinsurance rate*	*Maximum out-of-pocket limit*
High actuarial value	90%	$250	10%	$1,250
Low actuarial value	70%	$2,000	10%	$4,500

Example from Ericson & Sydnor (JEP 2017)

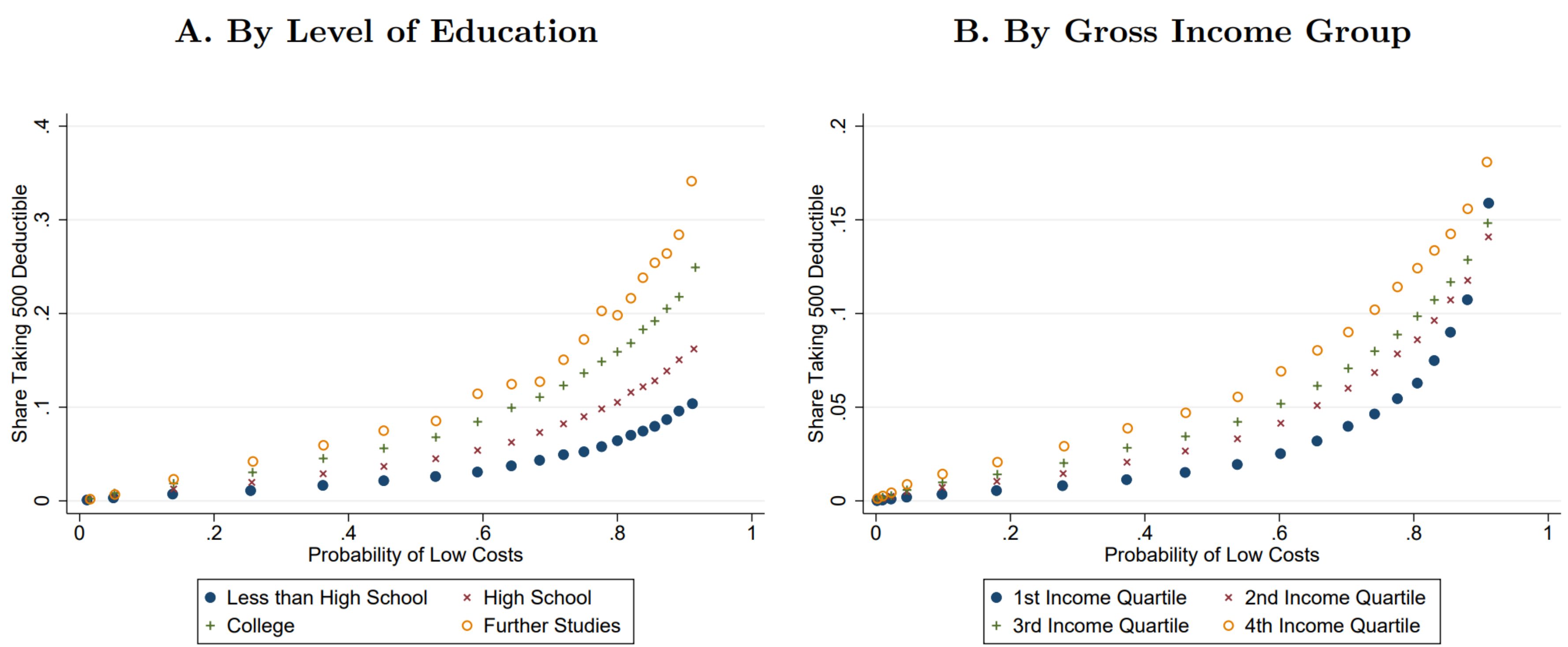
Example Simulations of the Effect of Introducing Choice Relative to Baseline with Only the High Actuarial Value Plan Available

			Average change in per-person consumer welfare			
Market environment	*Share of uninformed choosers*	*How the uninformed choose*	*Overall*	*Healthy types*	*Unhealthy types*	*Empirical pattern in equilibrium*
No regulation: premiums reflect average costs of people who enroll in that plan.	0%	—	*–$127*	$25	*–$449*	Market fully unravels so all choose low actuarial value plan.
	50%	Randomly	*–$78*	$31	*–$310*	Plan selection by health type, mitigated in part by random errors. Moderately elevated premium differences between plans. Both plans selected by some informed and some uninformed choosers.
	50%	Nonrandom: inattention heuristic	*–$59*	$151	*–$505*	Plan selection strongly related to health type and large resulting premium differences between plans. Only uninformed select the high actuarial value plan.

Bhargava et al. (2017)

Handel et al. (2022)

Figure 6: Deductible Take-up by Education and by Income



Implications

- "Community rating" regulations imply society cares about distributional effects.
- Likely the case that offering choice over coverage generosity is decreasing social welfare.
- Pairing choice with regulations like risk adjustment that control premium differences can substantially mitigate negative effects of choice.

Paternalistic Policies and Competition

- Several papers suggest that information provision to consumers alone is not enough to markedly improve choices

- What about more paternalistic policies:

  -- Curating choice sets

  -- Smart / Targeted Defaults

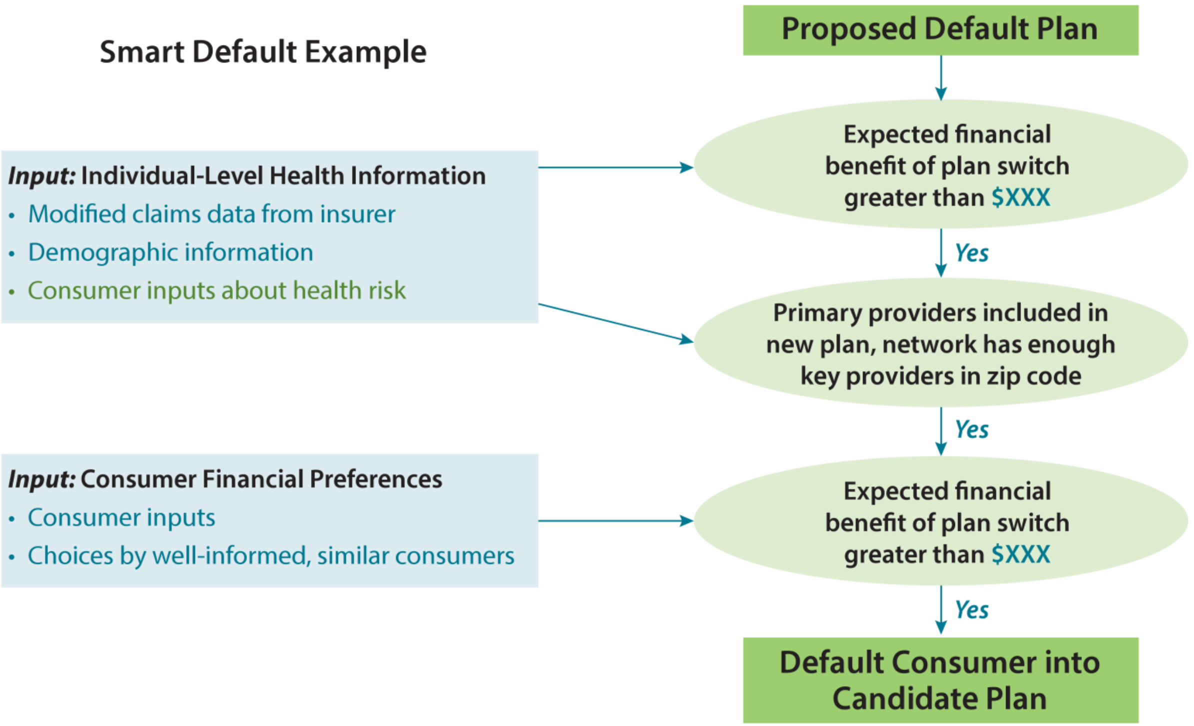
- Abaluck and Gruber (2017) empirical work showing that curating choice set leads to welfare improvement: greater benefit from reduced errors relative to heterogeneous prefs

- Handel and Kolstad (2015, *Brookings)* study targeted defaults

Targeted Defaults: Example

FIGURE 1.

Smart Default Example

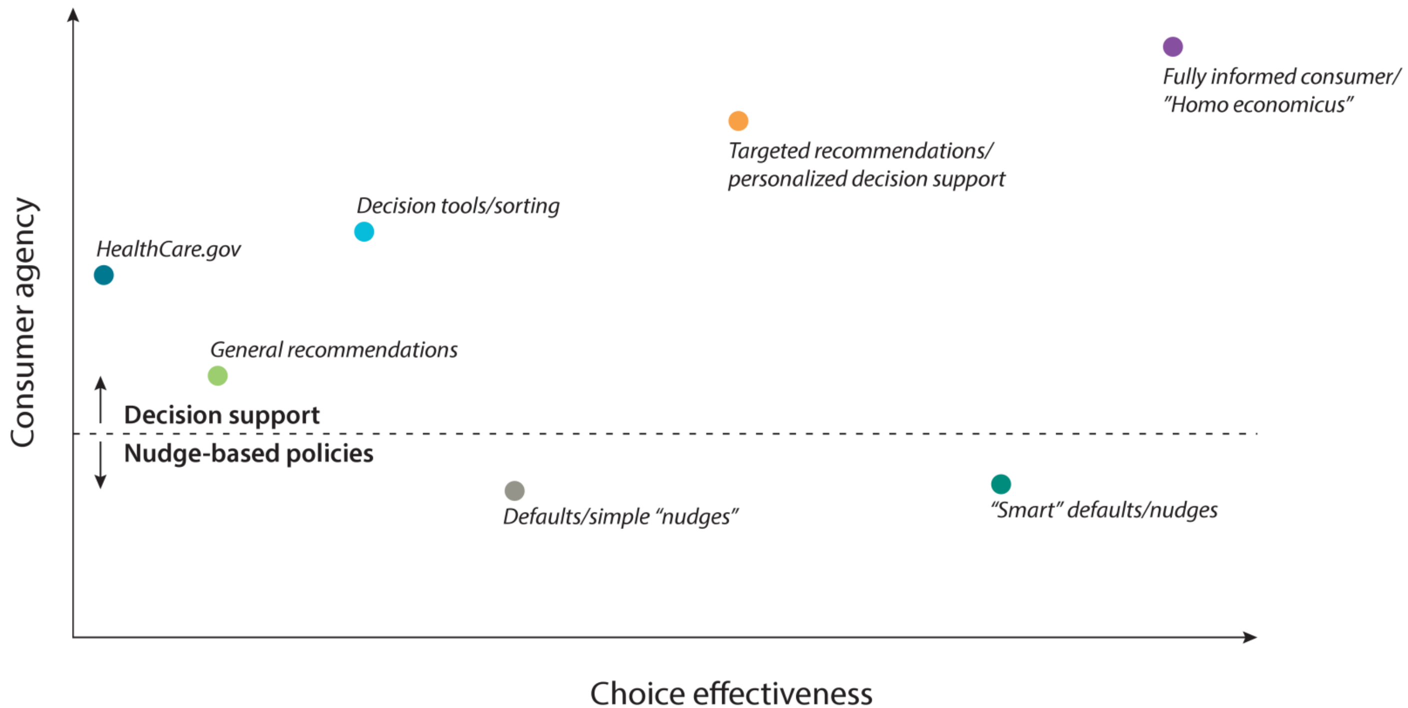


THE HAMILTON PROJECT
BROOKINGS

Paternalism and ACA / Competition

FIGURE 2.

Choice Policies: Consumer Agency and Choice Effectiveness



THE HAMILTON PROJECT
BROOKINGS

Targeted Defaults: Some Questions to Answer

- What forms of agency-preserving interventions are most effective? What is the upper bound on effectiveness?
- When consumers now have a default option, is forced active choice a welfare improving policy?
- Targeted defaults: impact on choices, social objectives, and impact on competitive markets
- How can choice sets be curated to maximize welfare?
- Redistributive impacts

Broad insight 3:

Need approaches beyond “revealed preference” for evaluating welfare.

Regulation and Welfare Analysis
Reduced Form vs. Structural

- Both reduced-form and structural analyses add valuable insights to empirical work on behavioral consumers in insurance markets

- For some policy questions, disentangling distinct behavioral foundations from one another is not particularly valuable

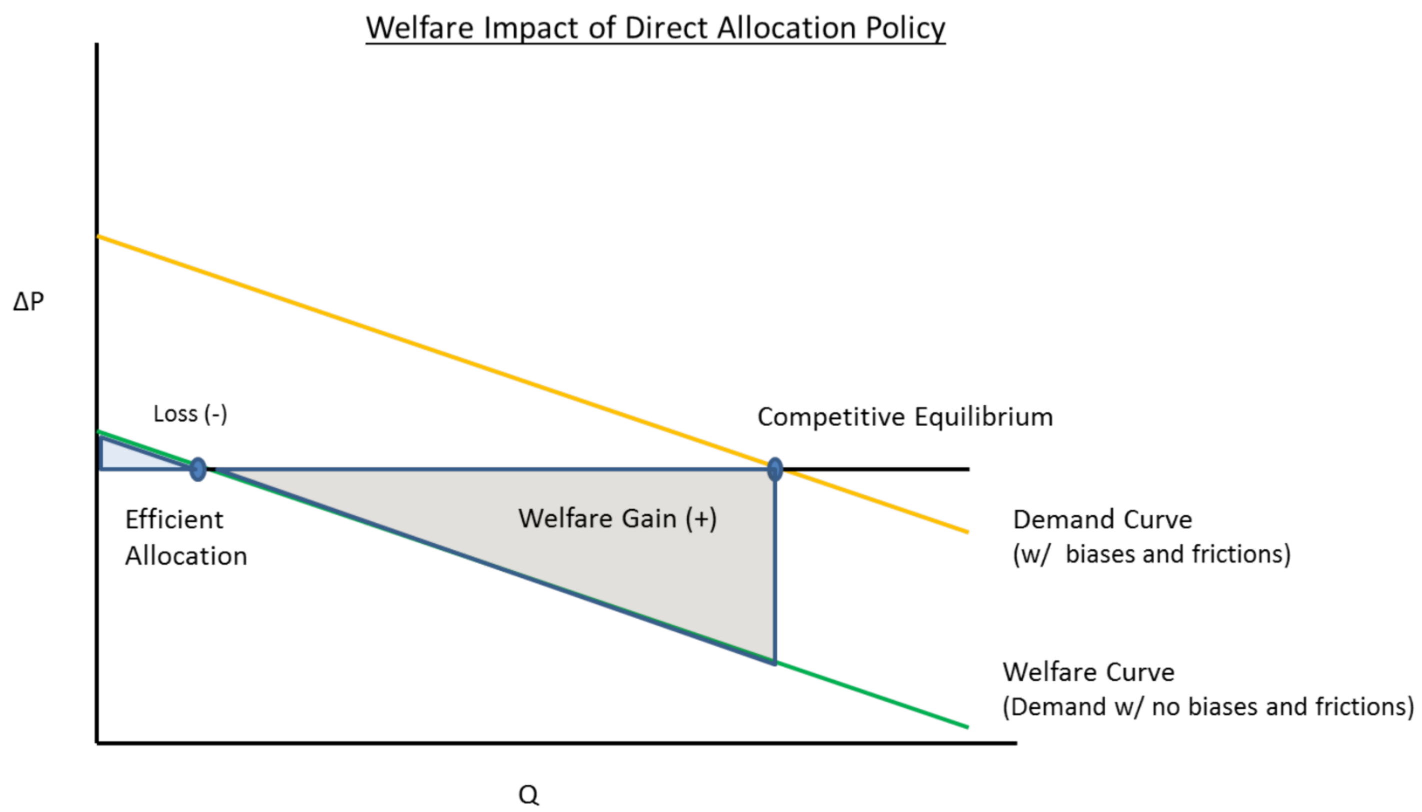
  -- <u>Allocation policies</u> that strongly steer / force consumers into new options, without engaging behavioral choice foundations.

- For some policy questions, it is (i) difficult to experimentally test intervention and (ii) specific behavioral mechanism behind poor choices is crucial for policy impact

  -- <u>Mechanism policies</u> that engage behavioral choice foundations

Regulation and Welfare Analysis
Reduced Form

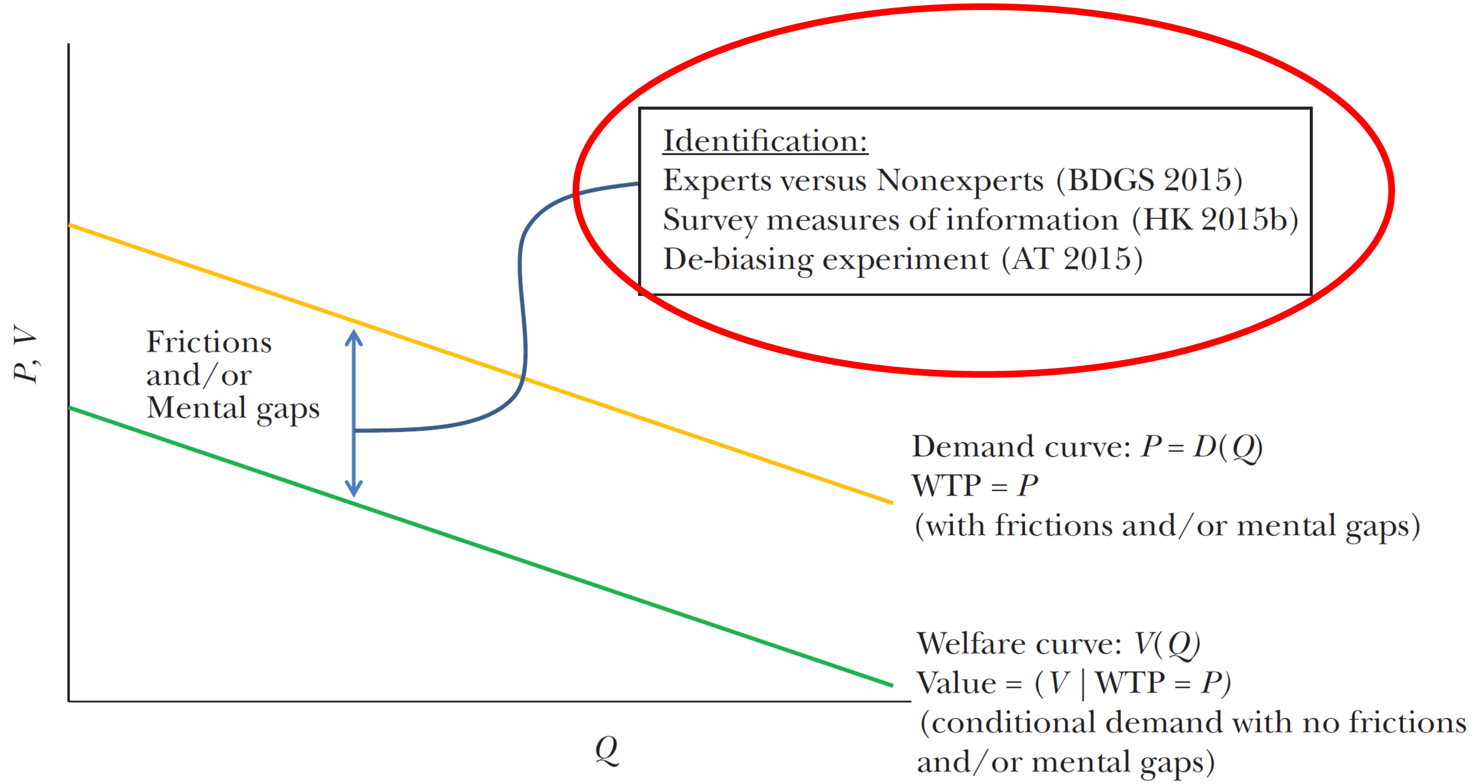
- To assess welfare impact of allocation policies, demand and welfare-relevant value are separate objects that need to be quantified



Regulation and Welfare Analysis
Reduced Form

- Three strategies that literature has used to identify these objects

Figure 1
Demand versus Welfare-Relevant Valuation



Regulation and Welfare Analysis

Mechanism Policies

- For mechanism policies, researcher can either:

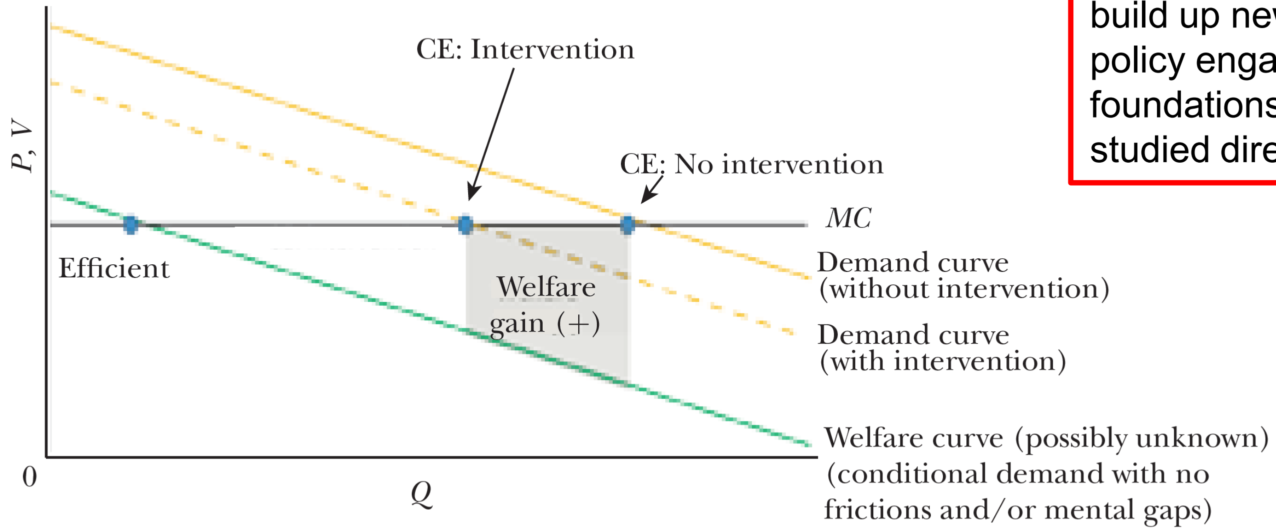
-- Implement intervention and study effect

-- Structurally estimate micro-foundations and simulate policy effect

Figure 3

Welfare Impact of a Mechanism Policy

(for instance, providing consumers with information about the relative value of branded drugs and generic drugs)



Structural analysis needed to build up new demand curve if policy engages micro-foundations and can't be studied directly

Need for caution with structural simulations

- Little evidence to date of structural estimates that produce accurate out-of-sample predictions for insurance choices.
  - Empirical studies tend to simulate *unobserved* policy counterfactuals, so no test of accuracy of estimated models.
  - Experimental studies not encouraging: e.g., Harrison & Ng (2016), Harrison et al., (2020), Jaspersen et al., (2022)
- Example:
  - Suppose people tend to make menu-dependent choices (e.g., choose middle options).
  - Structural model that incorporates only elements of costs and features (but not menu) will be misspecified and will give poor simulations of impact of policies that add or subtract choice options.
- Providing better micro-foundation evidence for structural exercise would be valuable area for future research.

Wrap up and Q&A

Key points

1. Lots of evidence of "choice frictions" in health insurance: inertia and confusion (+some evidence of alt. prefs.)

2. Impact of these frictions on market outcomes can be subtle:
   - Sometimes support better outcomes (e.g., less unraveling)
   - But often distributional impacts against the less healthy and poorer

3. Market regulations like risk adjustment can be important especially with behavioral consumers

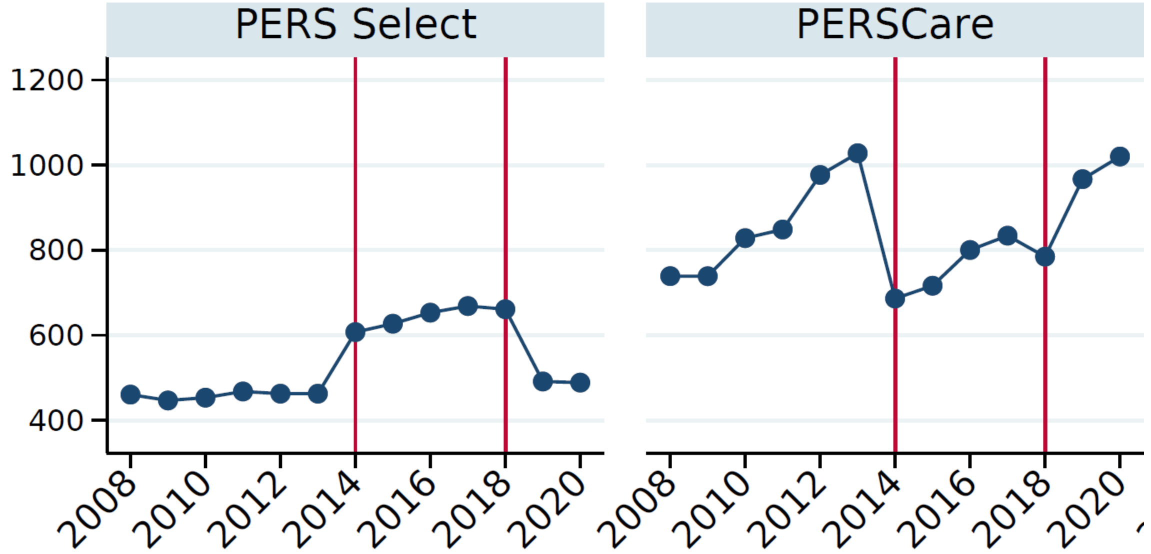
4. Evaluating welfare with behavioral consumers requires separating "demand models" and "welfare models"

Appendix

Regulation and Inertia
Handel et al. (2023)

- Paper studies empirical implementation of risk-adjustment transfer scheme at CalPERS, with over 1.5 million health beneficiaries who have approximately 12 health plan choices.

- CalPERS implemented risk-adjustment transfer program to reduce adverse selection, then took program away due to implementation issues



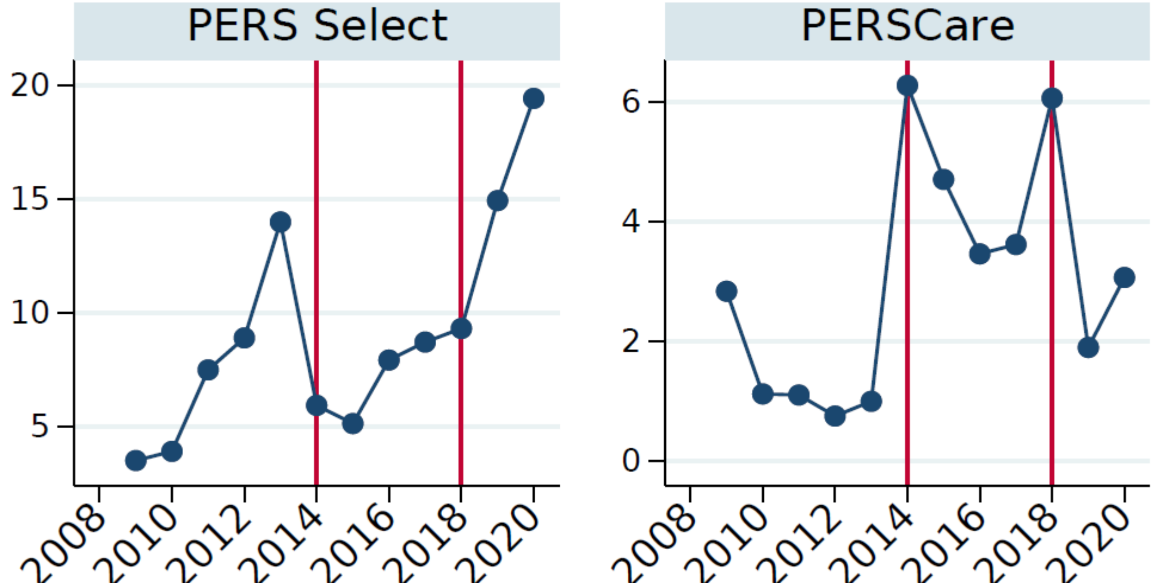
Regulation and Inertia
Handel et al. (2023)

- Significant consumer inertia, with no remedy around time of policy change, meant that:

  -- New, active consumers respond to premium changes

  -- Inertial consumers with default option respond only minimally

  -- Policy thus had minimal efficiency impact but substantial distributional impacts. Interaction btw. policy / inertia important.



Firm Pricing with Behavioral Consumers

- Insurers could take advantage of consumer frictions / biases systematically in their pricing / markups
- Not many papers on this: but a few that study invest-then-harvest pricing when consumers have inertia
- Ho et al. (2017) low pricing at outset of Medicare Part D market, fast price rises afterwards. In counterfactual analysis, predict government savings of $550 million per year due to reduced subsidies if inertia removed entirely
- In many insurance settings, prices heavily regulated so this may be less of a concern here than in other sectors

Market Design in Health Care: New Directions

Ben Handel (Berkeley)

May 11, 2023

Market Design in Health Care

Free markets with limited regulation struggle to deliver in health care:

(i) "right to care" implies need for non-price rationing

(ii) Adverse selection / moral hazard / info asymmetries must be dealt with to unlock private market benefits

Market design research instrumental in health care markets:

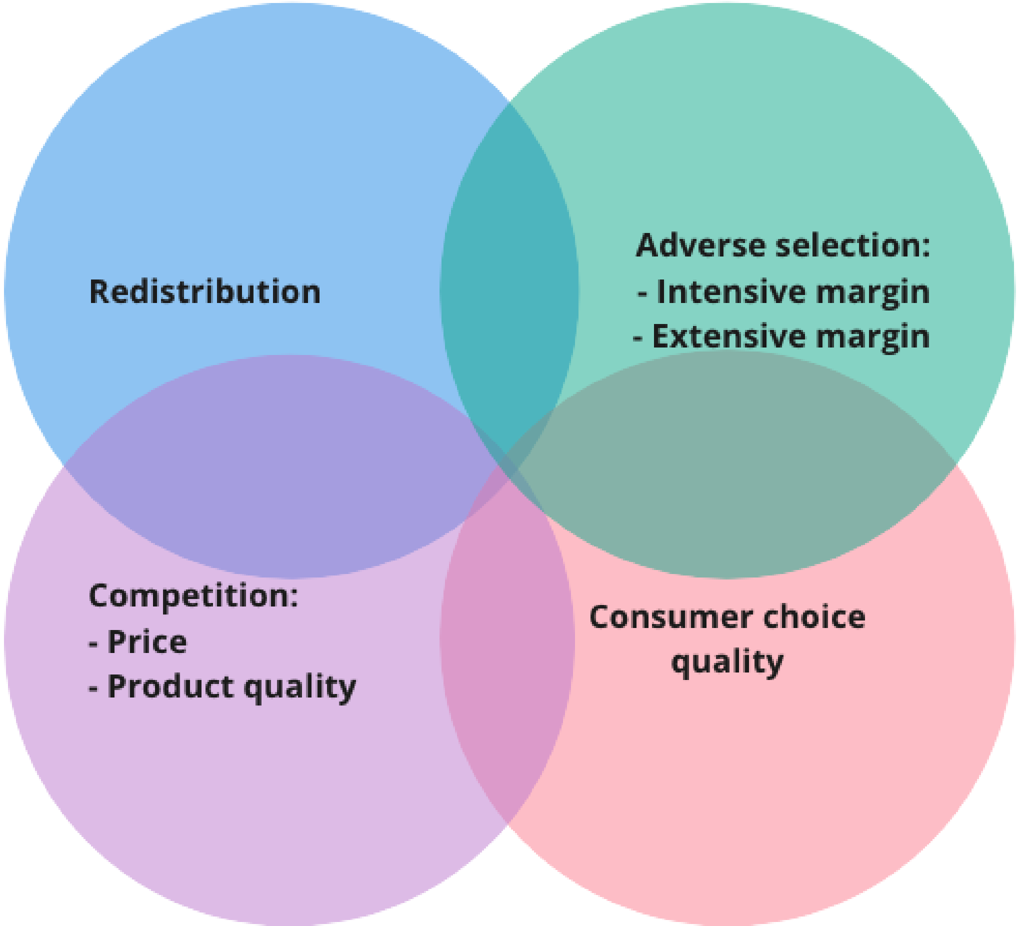
- Heath insurance market design, e.g., privatized Medicare / ACA mkts.
- Vaccine supply during the COVID-19 pandemic

Market design research will be applied in new ways to health care:

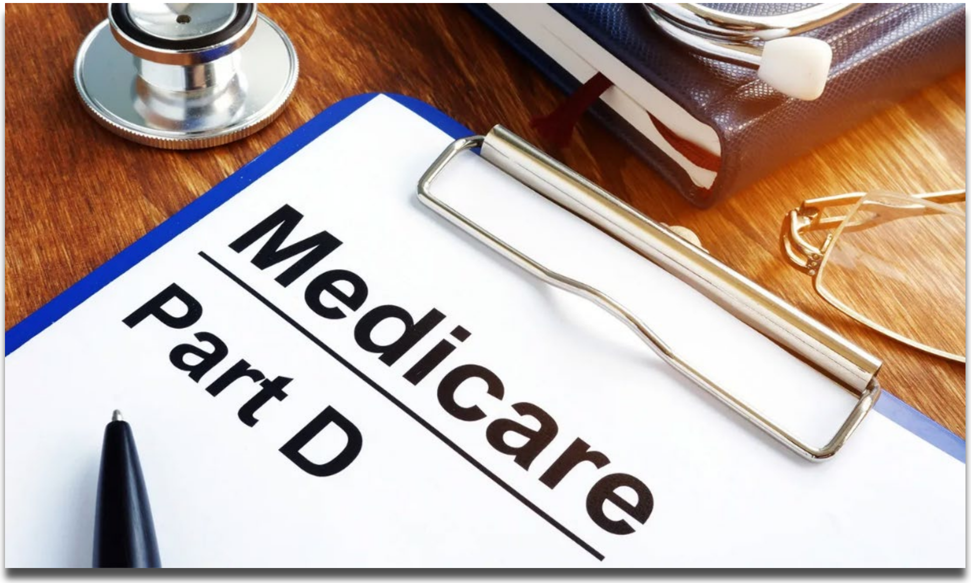
- Payment models for gene therapies / high-cost curative drugs
- Outcome-based payments for drugs / providers
- Robust paternalistic choice aids
- Addressing provider deserts

Health Insurance Market Design

Design of private, regulated health insurance markets has been high-impact research area over past 30 years



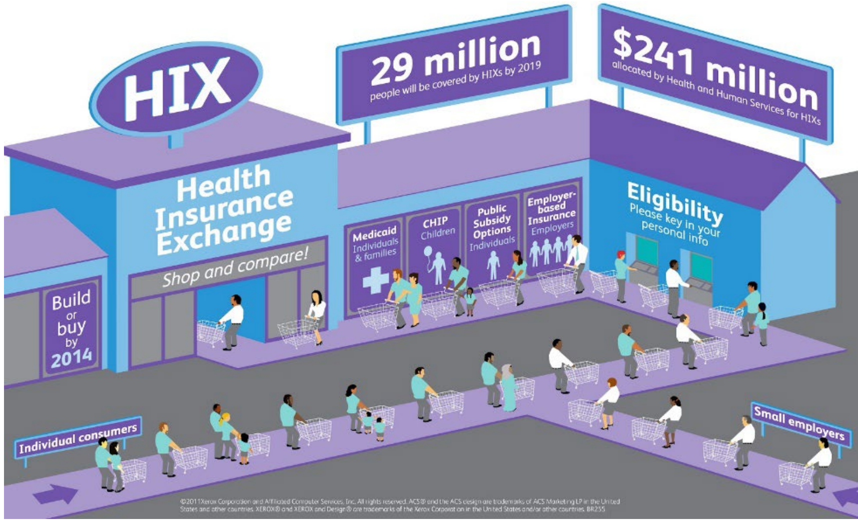
Health Insurance Market Design



The market reform in Dutch health care

Results, lessons and prospects

COVERED CALIFORNIA



Contract pricing / duration	Adverse selection Reclassification risk Redistribution Life-Cycle income	Handel et al. (2015) Ghili et al. (2023) Atal et al. (2023)
Subsidy Design	Adverse selection Competition Redistribution	Cutler Reber (1998) Shepard + Jaffe (2015) Polyakova + Ryan (2021) Tebaldi (2023)
Choice Frictions	Adverse selection Consumer matching Competition/Innovation	Handel (2013) Handel et al. (2019) Abaluck and Gruber (2022)
Product Regulation	Adverse selection Product variety Moral hazard / cost	Einav et al. (2015) Ericson + Starc (2016) Marone + Sabety (2022)
Adverse Select. Corrective	Mandate Risk-adjustment	Geruso + Layton (2020) Einav et al. (2023)

Health Insurance: Going Forward

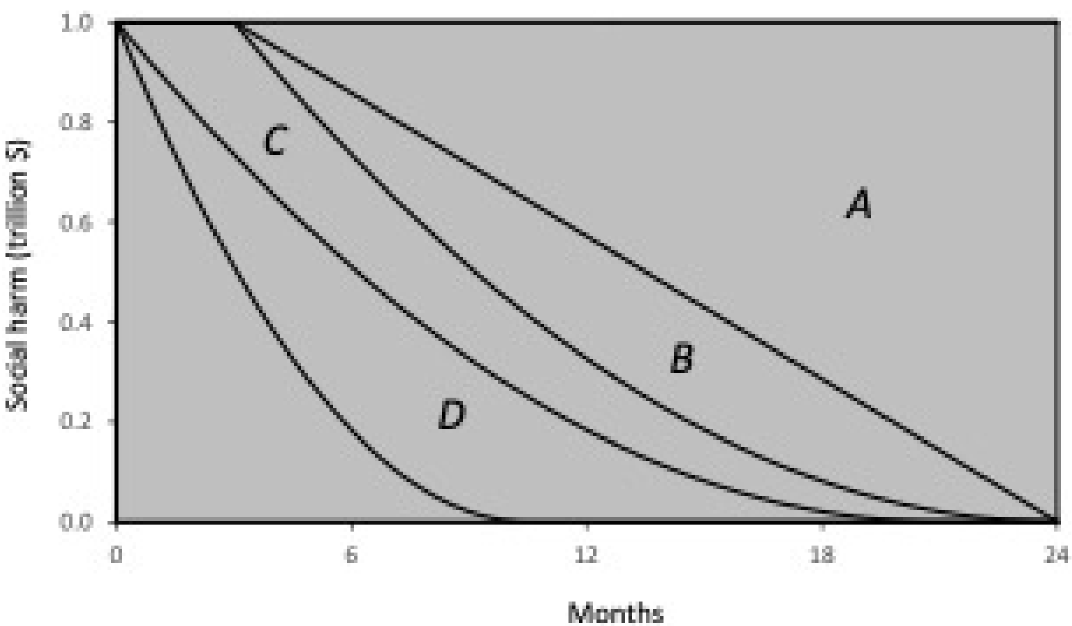
What are we getting from private insurance markets?
-- Innovation
-- Differentiation
-- Profits / gaming

Can we generate / leverage possible benefits from private insurance markets with more paternalistic choice policies?
-- Targeted defaults (robust design?)
-- Active re-enrollment

What are the implications of vertical integration, e.g. with medical providers and/or PBMs, for competition and quality?
-- Significant movement by insurers in this direction
-- Increases potential efficiencies and potential competitive harm

Vaccine Supply in a Pandemic

World Bank estimates a $12 trillion loss (globally) in 2020-2021 due to COVID-19. This implies huge social welfare gain from speeding up vaccine development, which the market won't achieve on its own due to externality.



Source: Fig. 1 from Athey et al. (2022)

A
harm avoided from no gov't intervention, randomly allocating shots

B
harm avoided from prioritizing certain groups (e.g., elderly, health workers)

C
harm avoided from gov't subsidizing at-risk capacity

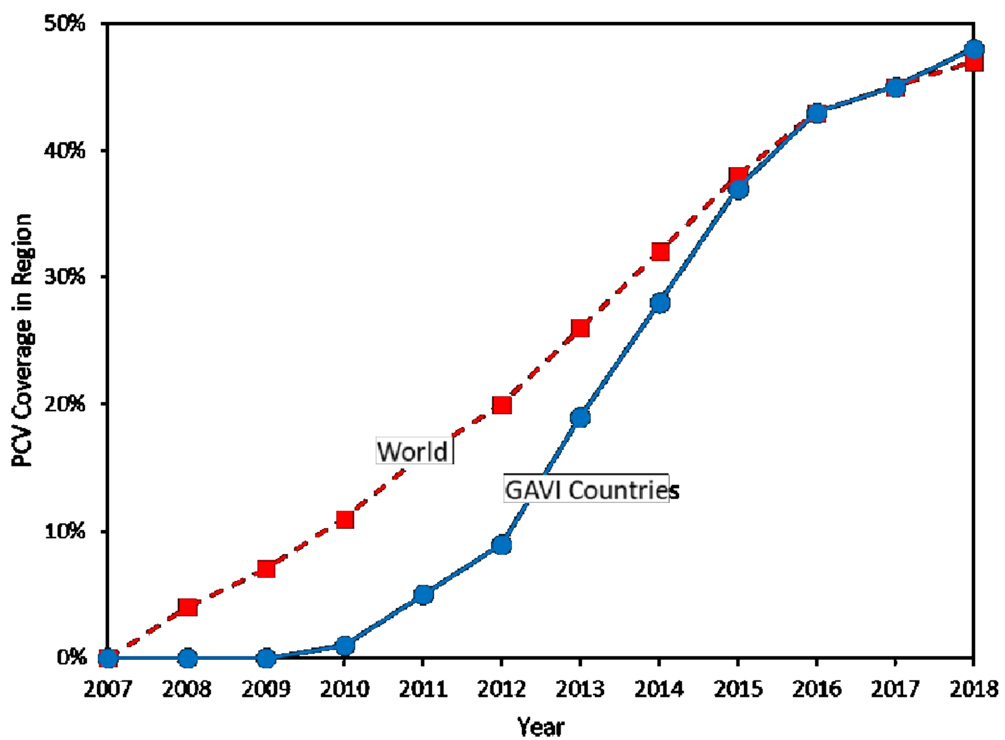
D
harm avoided from gov't subsidizing 2x at-risk capacity

Vaccine Supply in a Pandemic

Optimal incentive structure combines push and pull funding

- **Push funding**: payment not conditional on success
  - Solves holdup problem, but opens door to adverse selection and moral hazard
- **Pull funding**: payment given success
  - Increases incentive to co-invest in at-risk capacity (mitigate adverse selection and moral hazard)
  - Can be used as top-up to MC pricing, to void deadweight loss due to monopoly distortion
- Pneumococcal pilot AMC combined elements of push and pull funding and is estimated to have saved 700,000 lives at highly favorable cost.

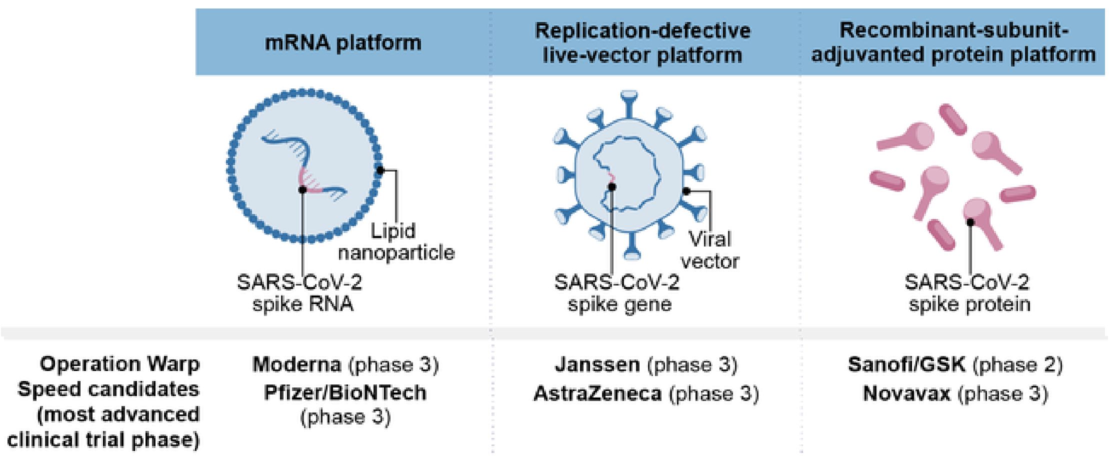
Figure: PCV coverage in GAVI countries relative to world



Source: Kremer et al. (2020)

Vaccine Supply in a Pandemic

Optimal COVID-19 investment portfolio far more ambitious than Operation Warp Speed



Source: GAO (analysis); Adaptation of images depicting vaccine technologies with permission from Springer Nature: *Nature* ("The Race for Coronavirus Vaccines: A Graphical Guide," Ewen Callaway) © 2020. | GAO-21-319

Athey et al. (2020): selection of optimal portfolio of vaccines to get funding, given info set available to officials from Operation Warp Speed.

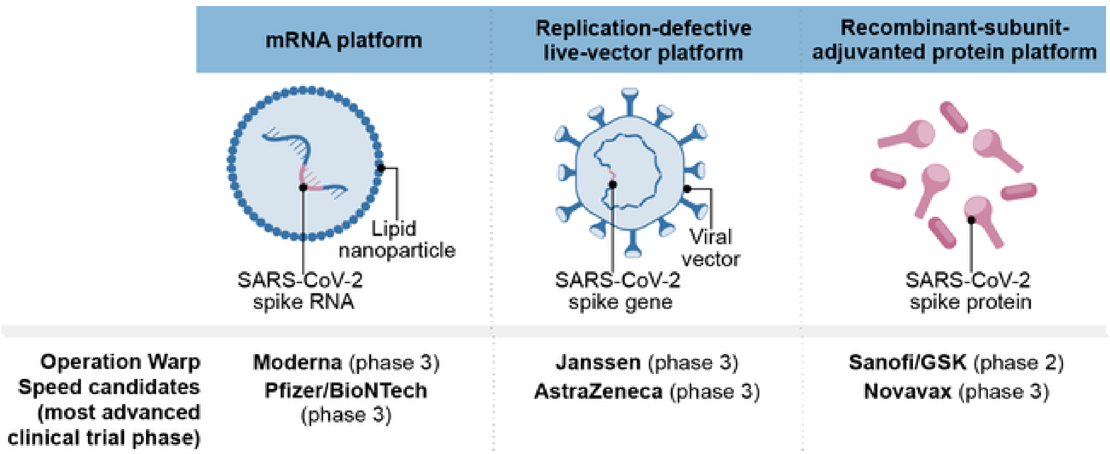
- Each candidate invests in at-risk capacity (85% covered) to fully vaccinate US while trials ongoing
- Price to induce optimal particip.
- Planner trades probability >=1 winner vs. MC to induce particip.

Finding

US should have spent $70 bn to develop and procure 15-20 vaccine candidates. (Operation Warp Speed: $18 bn on 6 vaccine candidates)

Vaccine Supply in a Pandemic

Optimal COVID-19 investment portfolio far more ambitious than Operation Warp Speed



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- Price to induce optimal particip.
- Planner trades probability >=1 winner vs. MC to induce particip.

Going Forward: Future Pandemics

1. Political will to invest in capacity / preparedness (political economy?)
2. "Peace time" production capacity building [Glennerster et al. (2022)]: vaccinate 70% of world population in 6 months w/ $60 bn up-front & $5 bn annually to expand production capacity → NPV of +$400 bn

Payment Model for Gene Therapy

Gene therapy is leading example of novel therapeutics that cure diseases that greatly diminish lifespan and quality of life

Can deliver significant value net of cost despite high “sticker shock”

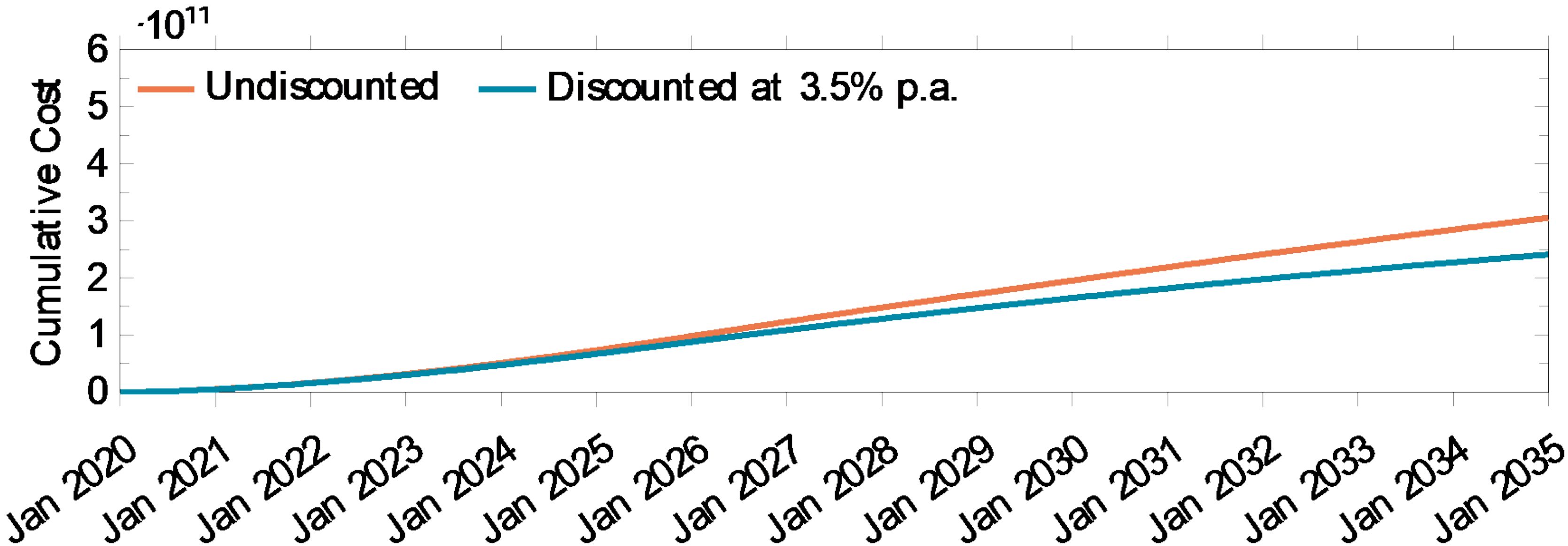
Zolgensma – $2.1 Million
Spinal Muscular Atrophy

Luxturna – $850,000
Inherited Retinal Disease

Payment Model for Gene Therapy

Gene therapy is leading example of novel therapeutics that cure diseases that greatly diminish lifespan and quality of life

Can deliver significant value net of cost despite high “sticker shock”



* Wong et al., NBER working paper no. 28628, Apr. 2021

Payment Model for Gene Therapy

Private health insurance in U.S. has significant impediments to covering high-cost curative drugs:

- Churn is high in the commercial under-65 market (~20% / year)
- Patients often switch insurers / payer source at age 65
- Coverage rationing / denials key strategic factor for insurers

Implication: due to (i) lack of long-run internalization of benefits and (ii) adverse selection, without additional market design interventions many insurers may not want to cover valuable therapies

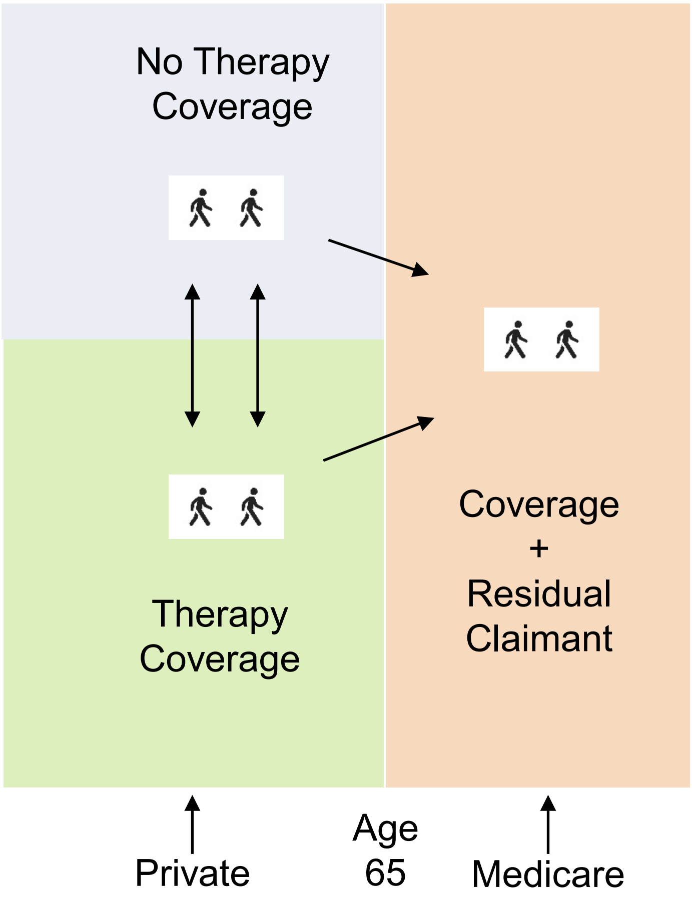
Payment Model for Gene Therapy

Q1: What are possible tools to incentivize appropriate coverage?

- Long-term reinsurance of therapy use, likely with reinsurer developed covg. protocols
- Securitization of cost that follows individuals around to participating insurers

Q2: Should market designers intervene to ensure full participation in mechanisms above, given adverse selection and churn?

Q3: What are implications of above potential policies for drug pricing?



More Topics

- Outcomes-based payments for physicians / integrated organizations
  - Some significant attempts [ACOs, insurer-driven P4Q]
  - Measurement is hard, typical principal-agent contracting tradeoffs
  - Tradeoff: integration good for care coordination, not for market power
- Outcomes-based payments for drugs
  - Limited use thus far but becoming more popular as drugs are more expensive / outcomes are easier to measure
  - How should contracts be structured as outcomes unfold over time
- Reference pricing
  - Many markets / countries use reference pricing for drugs
  - Optimal design of programs in equilibrium with and without externalities

More Topics

Quality Score Design

Insurance Markets
Provider Markets

→

Levers

Measure type
Measure granularity
Regulator incentives

→

Factors

Supply elasticity
Consumer info
Demand elasticity

Provider Deserts

Mental Health
Rural Markets

→

Levers

Entry requirements
Network regulation
Program participation requirements

→

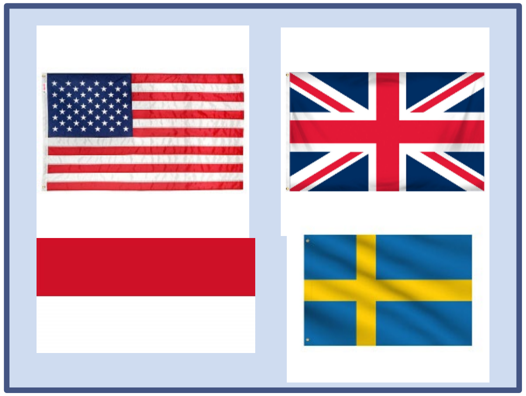
Factors

Labor preferences
Access
Cost
Quality
Patient prefs.

More Topics

National Health System Design

- Mixture of rationing mechanisms to achieve equity / efficiency
- Prices, queues, gatekeeping, health tech assessment, supply
- Developing country issues



Bulk Purchase of High-Cost Drugs

Patient Cost-Sharing / Rebates for Cheaper Doctors

AI and Health Care Delivery

Looking Ahead

Health care one of the most exciting areas for market design research going forward

- Far from frontier in practice / concepts and rapidly evolving sector
- Tight links with research / policy [e.g., residency match, exchanges]
- Opportunity to use range of market design tools

Market design solutions should be robust to key environment and implementation factors

- Policymaker, legal, political economy constraints
- Measurement and data integration capabilities
- Nature of health care treatments

Extra Slides

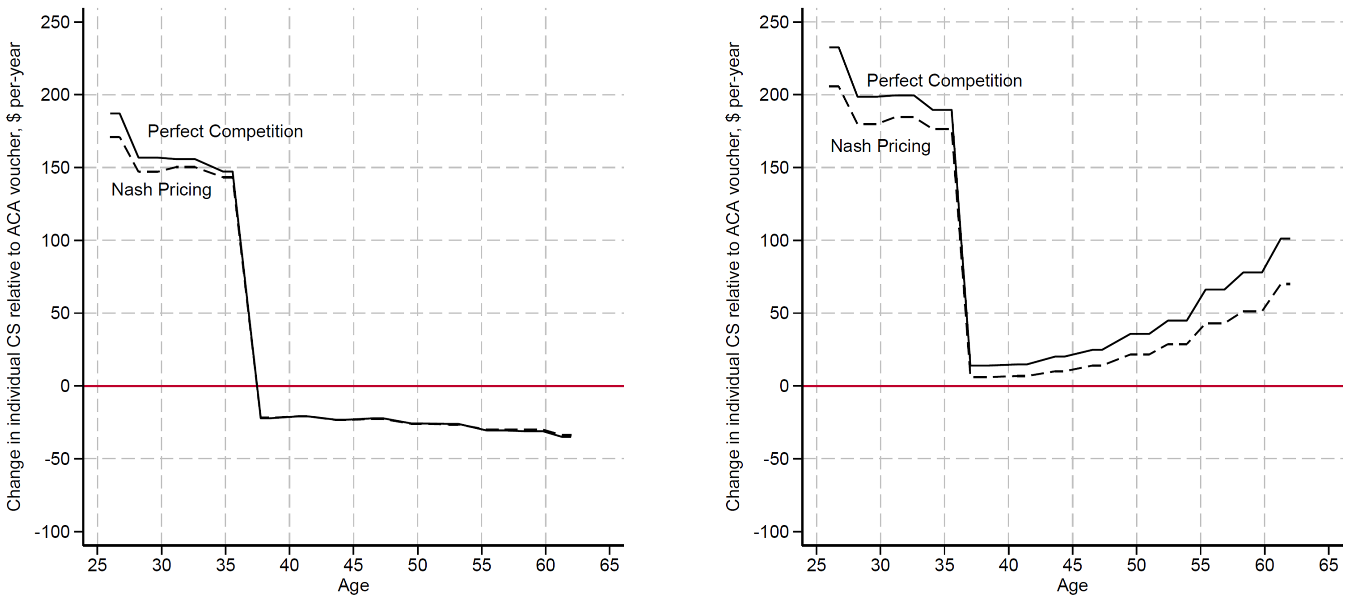
Health Insurance: Subsidy Design

- Subsidy design: how should subsidies be designed (to help make care more affordable) in the presence of adverse selection, competition, and redistribution?

  Related literature: Cutler & Reber (1998), Shepard & Jaffe (2015), Tebaldi (2023), Polyakova & Ryan (2021)

Figure 6: ΔConsumer Surplus by Age: +\$600 Under-35 Voucher, -\$100 Over-35 Voucher

(a) Off-Equilibrium (b) Equilibrium



Health Insurance: Key Questions

- <u>Choice policy</u>: how consumers make choice, which is likely subject to various frictions and adverse selection, matters for insurance design.

  Related literature: Handel et al. (2019), Handel (2013), Abaluck and Gruber (2022)

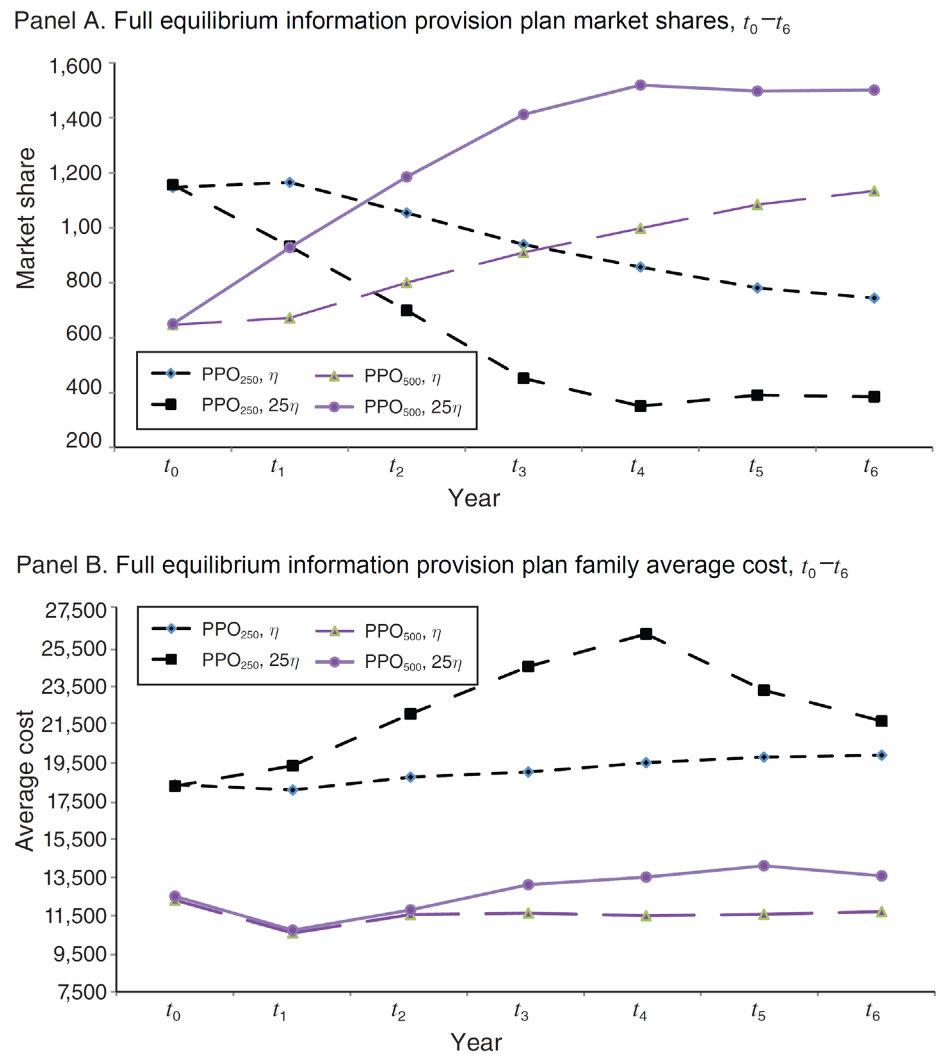


FIGURE 3. IMPACT OF REDUCED INERTIA ON CHOICES AND COSTS: WHEN NUDGING HURTS

Health Insurance: Selection + Risk Adjustment

- Adverse selection: mandates and risk-adjustments are commonly used to address adverse selection, but these tools themselves can be problematic.

  Related literature: Geruso & Layton (2020)

Note: The figures are diff-in-diff event study at age 65, where coefficients are estimated from flexible diff-in-diff regressions in which the dep. var. is risk score (A) or an indicatory for any HCC (B). HCC are indicators for condition categories that go into risk adj. calculations.