

MARKET SEGMENTATION AND COMPETITION IN HEALTH INSURANCE

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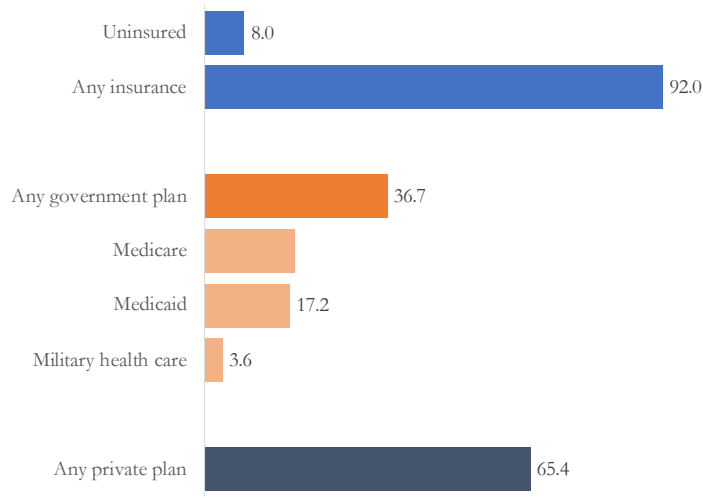
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DSE Conference: Market Design

The views expressed herein do not represent the views of the U.S. Department of Justice. Throughout this paper, we use the term “market” in ways that do not necessarily reflect the product and geographic boundaries of antitrust markets.

MOTIVATION: SEGMENTATION IN US HEALTH INSURANCE

SHARE OF US POPULATION IN 2019

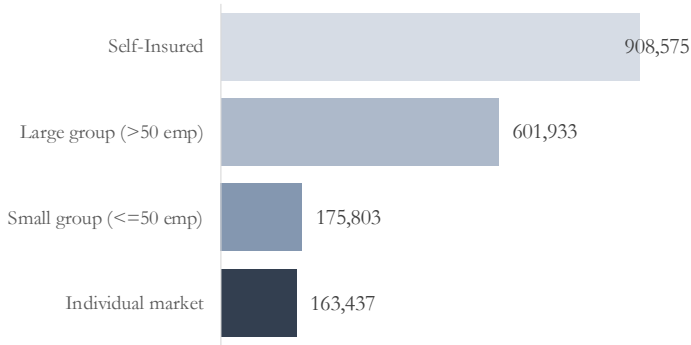


► Note: Military health care includes TRICARE, VA, and CHAMPVA enrollment. The estimates are not exclusive by type; individuals can be covered by more than one type of health insurance during the year.

► Source: US Census Bureau, Current Population Survey, 2020 Annual Social and Economic Supplement (CPS ASEC). [Dickstein, Ho, and Mark \(2021\): Market Segmentation](#)

MOTIVATION: SEGMENTATION IN US HEALTH INSURANCE

PRIVATE INSURANCE IN OREGON, 2019



► Source: Oregon Division of Financial Regulation, Dept of Consumer and Business Services, Health Enrollment Quarterly Report, Dec 31, 2019.

OUR APPROACH

RESEARCH QUESTIONS

- ▶ Broadly: What are the consequences of insurance segmentation? Key dimensions of interest:
 - ▶ changes in insurance participation?
 - ▶ changes in consumer surplus?
 - ▶ changes in public expenditures (e.g. premium subsidies)?
- ▶ Focused: What are the effects of merging the individual and small group markets?

OUR APPROACH

RESEARCH QUESTIONS

Why focus?

- ▶ The Affordable Care Act (ACA) regulates both markets:
 - ▶ Plans defined by financial terms (“metal tiers”)
 - ▶ Community-rated premiums
 - ▶ Guaranteed issue
- ▶ Size: In 2016, approx. 30 million enrollees nationally in the two markets
- ▶ Policy relevance: “Individual coverage” HRA [new in 2020]

OUR APPROACH

ECONOMIC ENVIRONMENT

- ▶ **Small employer market**

- ▶ plan selection via brokers
- ▶ premiums paid pre-tax (“tax wedge”)
- ▶ employer premium subsidies (2020: average of 65% of family premiums)



OUR APPROACH

ECONOMIC ENVIRONMENT

► **Small employer market**

- plan selection via brokers
- premiums paid pre-tax (“tax wedge”)
- employer premium subsidies (2020: average of 65% of family premiums)

► **Individual market**

- plan selection via marketplaces (often)
- premiums paid post-tax
- federal premium/cost-sharing subsidies for low-income HHs

Trade-offs from pooling

- ▶ Adverse selection in individual market:
 - ▶ (+) improve selection in individual market by enrolling healthier types
 - ▶ (-) worsen selection for small group members
 - ▶ (+) decrease federal premium subsidies (if premiums fall)
- ▶

OUR APPROACH

ECONOMIC ENVIRONMENT

Trade-offs from pooling

- ▶ Adverse selection in individual market:
 - ▶ (+) improve selection in individual market by enrolling healthier types
 - ▶ (-) worsen selection for small group members
 - ▶ (+) decrease federal premium subsidies (if premiums fall)
- ▶ Agency in small group market:
 - ▶ (+) eliminate broker/employer intermediation (and potential markups)

OUR APPROACH

DATA AND MEASUREMENT

Oregon Health Authority's All-Payer All-Claims dataset, 2014-2016

- ▶ We observe plan choices, premiums, and spending in the two markets
- ▶ We observe “forced switchers” in the small group market who migrate to individual insurance or uninsurance

Estimation

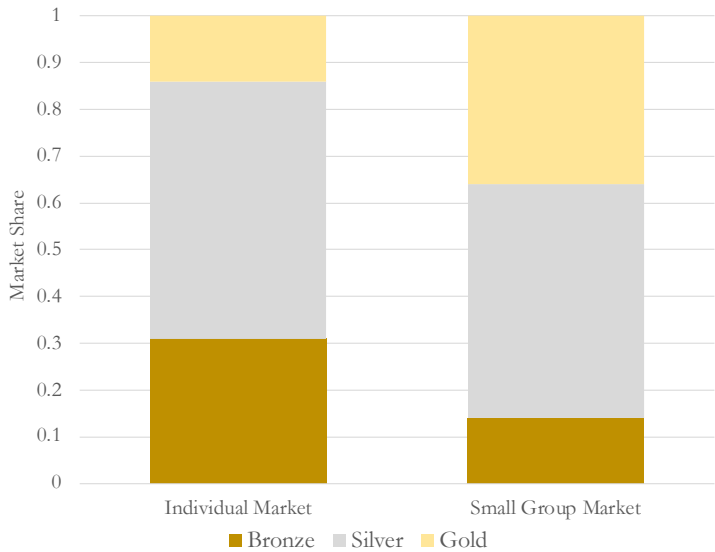
- ▶ Recover distribution of health severity, risk preferences, and moral hazard (Einav et al. (2013), Marone and Sabety (2020))
- ▶ Predict equilibrium premiums under counterfactual policies

DATA: SUMMARY STATISTICS

DEMOGRAPHICS OF ENROLLEES IN INDIVIDUAL AND SMALL GROUP MARKETS

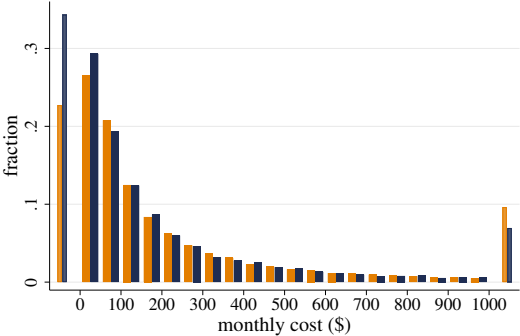
Variable	Individual Market		Small-Group Market	
	Mean	S.D.	Mean	S.D.
Single-membered	0.70		0.75	
Married, no dependent	0.14		0.08	
Not married, with dependent(s)	0.07		0.07	
Married, with dependent(s)	0.09		0.10	
Number of dependents	1.93	1.09	2.21	1.25
Health severity scores (HH sum)	1.39	2.44	1.25	2.20
Income (as ratios of the FPL)	2.46	0.29	2.38	0.29
Age	46.96	11.75	42.62	11.28
Living in urban rating areas	0.69		0.78	
No. of unique subscribers	354,344		218,817	
No. of subscriber-year observations	512,486		383,017	

DATA: TIER CHOICE BY MARKET SEGMENT, 2014-2016

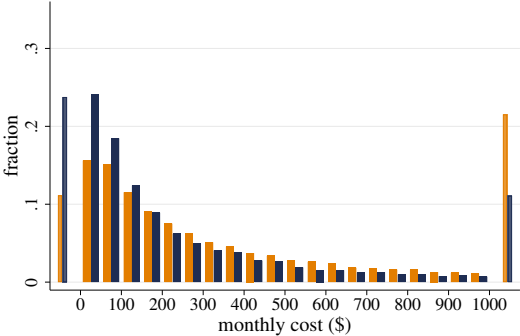


DATA: MONTHLY MEDICAL COSTS BY MARKET SEGMENT, 2015

Silver



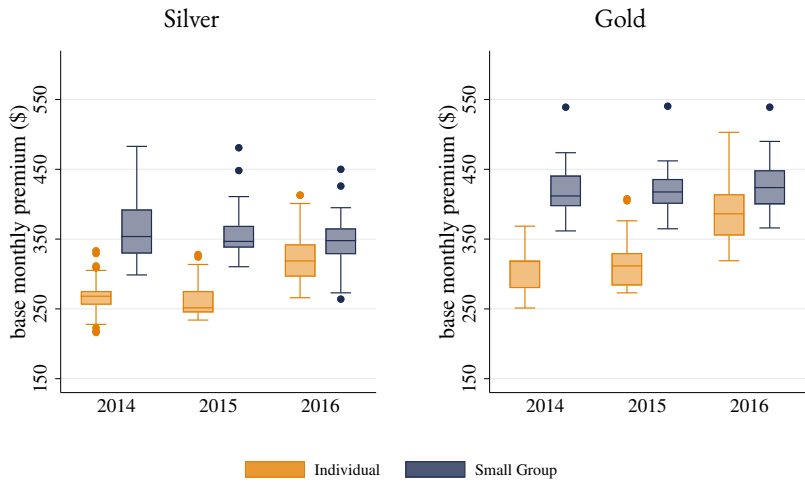
Gold



Individual Small Group

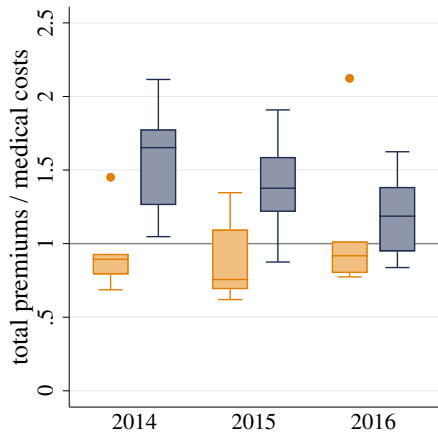
DATA: SMALL GROUP VS. INDIVIDUAL MARKET PREMIUMS

BASE MONTHLY PREMIUM, 40 YEAR OLD SINGLE ENROLLEE

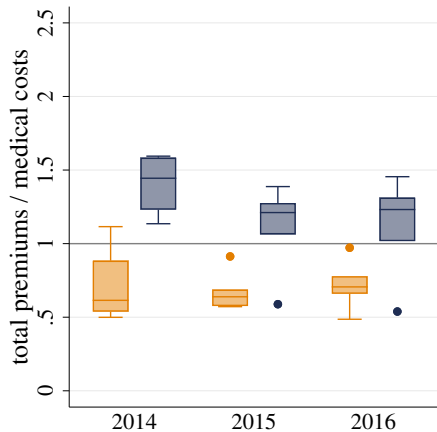


DATA: MEDICAL MARKUPS (TOTAL PREMIUMS OVER MEDICAL COSTS)

Panel A: Silver



Panel B: Gold



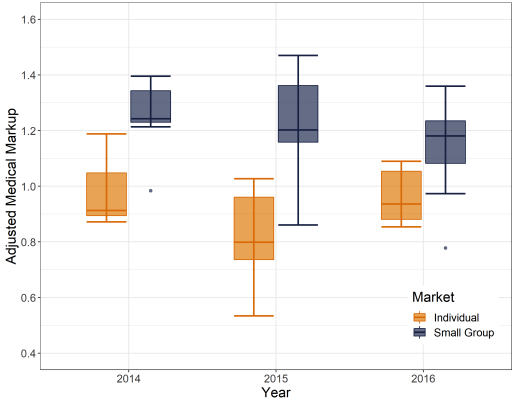
Individual



Small Group

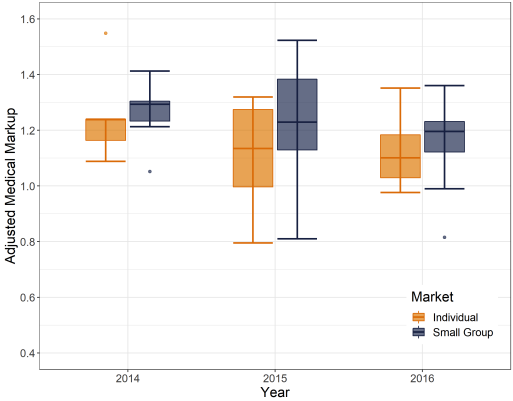
DATA: MEDICAL MARKUPS (TOTAL PREMIUMS OVER MEDICAL COSTS) WITH FEDERAL RISK ADJUSTMENT/RISK CORRIDORS/REINSURANCE?

Unadjusted



The data are restricted to insurers with 5,000 covered lives in the relevant market.
Unadjusted medical markup is premiums / medical costs.

Adjusted



The data are restricted to insurers with 5,000 covered lives in the relevant market.
Adjusted medical markup is (premiums + government transfers) / medical costs.

MODEL OF DEMAND AND SUPPLY

MODEL: KEY ELEMENTS

Demand side

- ▶ Stage 1 - plan choice [risk aversion, adverse selection]
- ▶ Stage 2 - medical care utilization [moral hazard]

Supply side - premium setting

- ▶ Perfect competition in the individual market (carrier-plan-year)
- ▶ Equilibrium follows Azevedo and Gottlieb (2017)

MODEL: CONSUMER DEMAND AND SPENDING

STAGE 2 - MEDICAL CARE UTILIZATION

In year t , a household enrolls in plan j and realizes health status λ . The household chooses medical spending $m \geq 0$ to maximize utility:

$$u_{j,t}(m; \lambda, \omega) = (m - \lambda) - \frac{1}{2\omega\lambda}(m - \lambda)^2 + [y_t - c_{j,t}^{OOP}(m) - p_{j,t}] + g(X_{j,t}, \epsilon_{j,t}) .$$

- ▶ y_t : annual income
- ▶ $c_{j,t}^{OOP}(m) = (1 - x_{j,t}) \times m$: out-of-pocket costs; $x_{j,t}$ is actuarial value
- ▶ $p_{j,t}$: annual plan premium.
- ▶ $g(\cdot)$: a function of other variables that can affect utility.

MODEL: CONSUMER DEMAND AND SPENDING

STAGE 2 - MEDICAL CARE UTILIZATION

The household's medical spending, $m_{j,t}^*$, satisfies the first-order condition from utility:

$$m_{j,t}^* = \lambda + \omega \lambda x_{j,t} .$$

- ▶ part of $m_{j,t}^*$ due to cost-sharing increases with moral hazard (ω) and health severity (λ)
- ▶ if $\lambda = 0$, $m_{j,t}^* = 0$, even under full insurance.

MODEL: CONSUMER DEMAND AND SPENDING

STAGE 1 - INSURANCE PLAN CHOICE

Household realizes its $\epsilon_{j,t}$ and chooses plan $j \in \mathcal{J}_t$ to maximize its expected utility:

$$v_{j,t}(F_{\lambda,t}, \omega, \psi) = - \int \exp(-\psi \times u_{j,t}^*(\lambda, \omega)) dF_{\lambda,t}(\lambda) ,$$

Here, the household:

- ▶ anticipates that (a) its health needs follow $F_{\lambda,t}$ and (b) it will choose optimal Stage-2 behavior
- ▶ has CARA preferences over Stage-2 utilities, $u_{j,t}^*(\lambda, \omega) \equiv u_{j,t}(m_{j,t}^*(\lambda); \lambda, \omega)$

MODEL: INSURANCE SUPPLY

- Recall, the household's optimal medical spending is:

$$m_{j,t}^* = \lambda + \omega \lambda x_{j,t} .$$

- The insurer's expected claims costs for a household with (λ, ω) are:

$$c_{j,t} = \int (x_{j,t} \lambda + \omega x_{j,t}^2 \lambda) dF_{\lambda,t}(\lambda).$$

- Premiums set equal to average total costs (sum of claims and admin costs)

EMPIRICAL IMPLEMENTATION

EMPIRICAL MODEL: DEMAND SPECIFICATION

- ▶ Assume $\lambda \sim \text{exponential}(\alpha)$
- ▶ Expected utility for plan j :

$$U_{i,j} = -p_{i,j} + \frac{x_{i,j}}{\alpha_i - \psi_i} + \frac{x_{i,j}^2 \omega_i}{2(\alpha_i - \psi_i)} + \frac{\beta_0 X_j + \epsilon_{i,j}}{\alpha_i - \psi_i}$$

- ▶ Components to utility in words:
 1. disutility from premiums
 2. utility from covered non-discretionary spending
 3. utility from spending due to moral hazard
 4. utility from non-financial characteristics (e.g. insurer identity)
 5. utility from risk coverage: divide by $\alpha_i - \psi_i$ in place of α_i .

EMPIRICAL MODEL: DEMAND SPECIFICATION

The expected medical claims cost to the insurer:

$$c_{i,j} = \int (x_{i,j}\lambda_i + \omega_i x_{i,j}^2 \lambda_i) dF_{\lambda,i}(\lambda)$$

$$c_{i,j} = \frac{x_{i,j}}{\alpha_i} + \frac{\omega_i x_{i,j}^2}{\alpha_i}$$

Notes:

- ▶ expected cost approaches zero when α_i is large.
- ▶ insurer is risk neutral

EMPIRICAL MODEL: DEMAND SPECIFICATION

NOTES ON IMPLEMENTATION

- ▶ **Household heterogeneity:** α_i depends on HH health severity, age of HH head, dependent coverage
- ▶ **Price endogeneity:** rely on premium variation due to statutory formulas fixed across carriers, plans (Polyakova and Ryan (2019), Tebaldi (2020))
- ▶ **\$0 spending:** define cutoff \underline{c} such that, for $0 \leq c_i \leq \underline{c}$, enrollees do not submit claims (due to hassle)
 - ▶ fix \underline{c} and treat $c_i \leq \underline{c}$ as censored [robustness: estimate \underline{c}]
 - ▶ adjust $f(c_{i,j}|\cdot, \theta)$ to account for \underline{c}
- ▶ **Joint likelihood:** of HH plan choice and health spending

details

EMPIRICAL MODEL: SMALL GROUP PREFERENCES

Demographic variable	Small-Group		Switchers	
	Mean	S.D.	Mean	S.D.
Single-membered	0.75		0.73	
Number of dependents	2.21	1.25	2.30	1.32
HH sum of health status scores	1.25	2.20	1.33	2.56
Income (as ratios of the FPL)	2.38	0.29	2.39	0.28
Age	42.62	11.28	45.56	11.10
Urban rating area	0.78		0.67	
Number of subscriber-year observations	383,017		16,630	

Table: Demographics of the switchers

RESULTS: DEMAND SPECIFICATION

- From main estimates, HHs eligible for cost-sharing subsidies prefer silver tier; greater for switchers

Household type	Main		Switchers	
	(1)	(2)	(1)	(2)
ω_i				
Constant	0.112 (0.001)	0.222 (0.001)	0.222 (0.015)	0.315 (0.017)
ψ_i				
Constant	0.068 (0.001)	0.077 (0.001)	0.267 (0.007)	0.276 (0.007)
Loss interpretation of ψ_i				
Constant	99.323 (0.008)	99.232 (0.008)	97.401 (0.063)	97.316 (0.063)
\underline{c}	\$20	\$50	\$20	\$50
\underline{N}	512,486		16,630	

Table: Derived parameter estimates

RESULTS: DEMAND SPECIFICATION (CONT'D)

$E[\lambda_i]$	Individual			Small-Group		
	Mean	S.D.	Share	Mean	S.D.	Share
Overall	5.47	13.88		4.19	11.72	
No dependent, under-50	2.52	7.99	0.46	1.75	5.66	0.59
With dependent(s), under-50	6.18	13.90	0.12	7.11	15.18	0.13
No dependent, over-50	7.98	17.11	0.38	6.54	14.87	0.24
With dependent(s), over-50	13.59	22.27	0.04	16.19	23.98	0.04
N	512,486			383,017		

Table: Derived parameters across markets

EMPIRICAL MODEL: COST SPECIFICATION

- Equate revenue with total health and administrative costs [by plan-year], with γ_1 :

$$R_j = \sum_i^N (\hat{s}_{i,j} * \gamma_1 c_{i,j}^e) + \gamma_2 * A_j + \eta_j$$

- R_j : plan-level premium revenue
 - $\hat{s}_{i,j}$: probability that household i chooses plan j
 - $c_{i,j}^e$: expected claims of household i in plan j , adjusting for subsidies
 - A_j : administrative costs
- Endogeneity concern: η_j may be correlated with both $\hat{s}_{i,j}$ and $c_{i,j}^e$ → use demand shifters as instruments.

RESULTS: COST SPECIFICATION

	(1)	(2)	(3)	(4)
Medical costs	0.745 (0.026)	0.737 (0.027)	0.733 (0.024)	0.547 (0.054)
Administrative costs (t-1)				0.617 (0.166)
Year FEs				✓
Payer-Year FEs		✓	✓	
N	240	238	238	186
1 st -stage F-stat			18.329	4.948
R^2	0.976	0.983	0.983	0.975

Table: Premium setting equation, 2015-2016

RESULTS: COUNTERFACTUALS

RESULTS: COUNTERFACTUALS

(1) EXTEND ICHRA

Counterfactual	Individual Market (N= 178,157)		Small Group (N=125,527)	
	Base	Extend ICHRA	Base	Extend ICHRA
<i>Welfare</i>				
Consumer surplus (change from base)	-	28	-	255
Government expenditure	67	57	124	42
<i>Market Shares</i>				
Uninsurance	0.57	0.53	0.00	0.54
Bronze	0.17	0.16	0.14	0.14
Silver	0.20	0.20	0.49	0.17
Gold	0.07	0.11	0.25	0.15

RESULTS: COUNTERFACTUALS

(1) EXTEND ICHRA

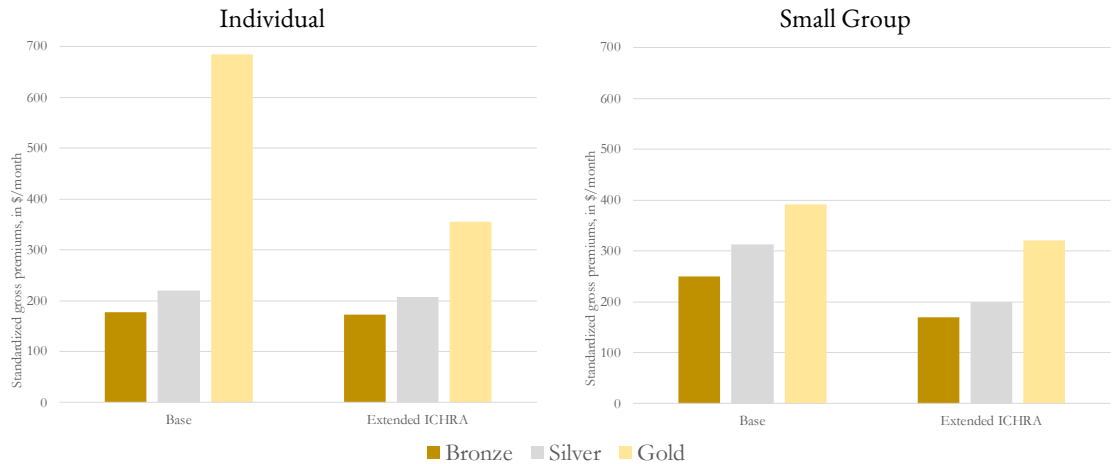


Figure: Standardized Gross Premiums

RESULTS: COUNTERFACTUALS

(2) ICHRA + MANDATE

Counterfactual	Individual Market (N= 178,157)			Small Group Market (N=125,527)		
	Base	Extend ICHRA	+ Mandate Insurance	Base	Extend ICHRA	+ Mandate Insurance
<i>Welfare</i>						
Consumer surplus (change from base)	-	28	44	-	255	49
Government expenditure	67	57	52	124	42	75
<i>Market Shares</i>						
Uninsurance	0.57	0.53	0.51	0.00	0.54	0.00
Bronze	0.17	0.16	0.16	0.14	0.14	0.28
Silver	0.20	0.20	0.20	0.49	0.17	0.36
Gold	0.07	0.11	0.14	0.25	0.15	0.36

CS Change with λ_i

RESULTS: COUNTERFACTUALS

(2) ICHRA + MANDATE

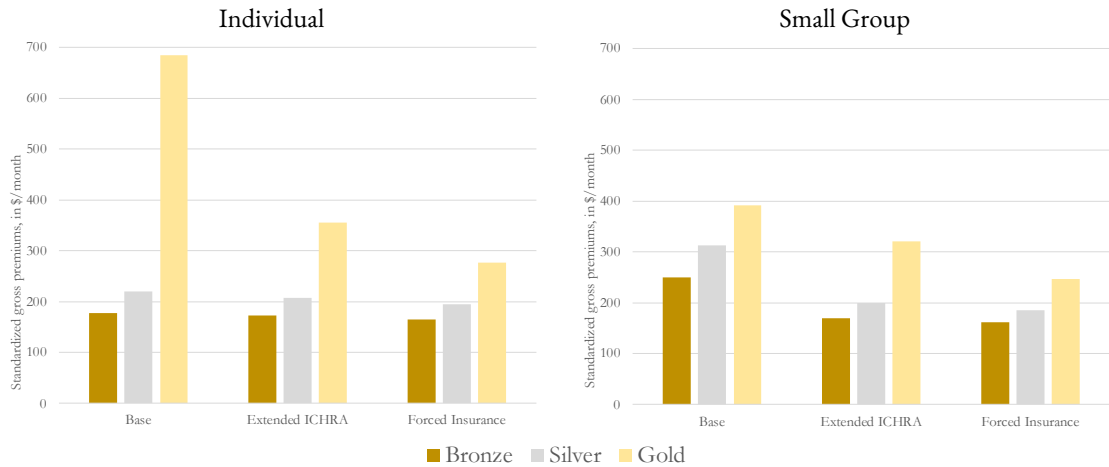
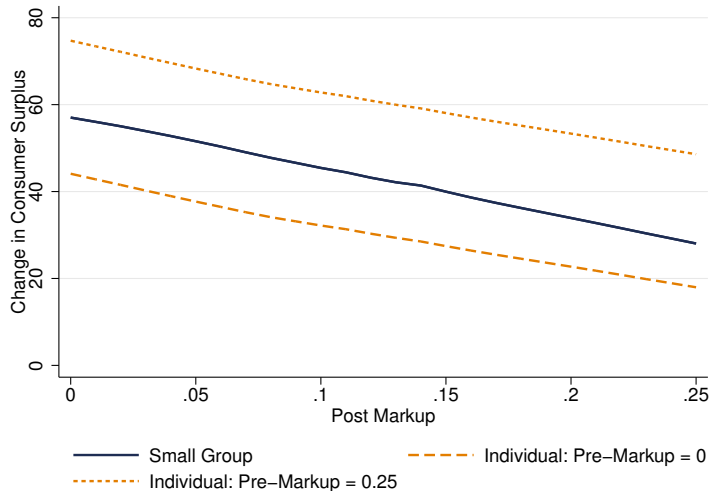


Figure: Standardized Gross Premiums

RESULTS: INSURER CONDUCT



CONCLUSION

New market designs can improve consumer welfare in both market segments

- ▶ Individual market - adverse selection (common trade-off):
 - ▶ pooling with healthier small group enrollees reduces adverse selection
- ▶ Small group - agency (new):
 - ▶ admin costs higher (> \$10 per member-month in broker fees)
 - ▶ markups higher due to limited competition, tax wedge
 - ▶ pooling within employer lowers young/single members' surplus
- ▶ In Oregon in 2016, even if individual market markups rise, pooling benefits the average small group and individual market household

DATA: SMALL GROUP VS. INDIVIDUAL MARKET PREMIUMS

ADJUSTING FOR SUBSIDIES

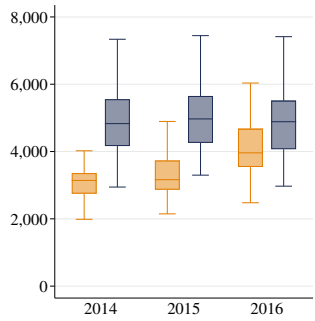
- ▶ Step 1: Adjusting for distribution of family composition and enrollee ages in Oregon's small groups
- ▶ Step 2: Adjusting to post tax dollars for tax advantaged small group premiums
- ▶ Step 3: Adjusting for employer subsidy (set=50%, minimum required for SB tax credit)

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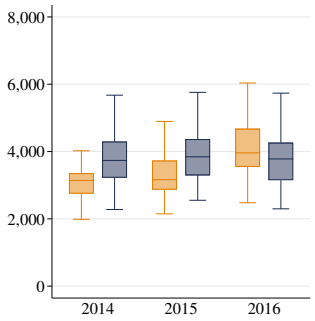
DATA: SMALL GROUP VS. INDIVIDUAL MARKET PREMIUMS

COMPARISON OF SUBSIDY SCHEMES (ALL METAL TIERS)

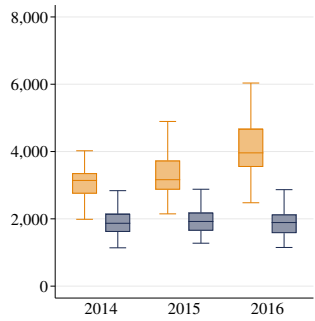
+ Tiered-composite pricing



+ Premium tax-subsidy



+ Employer contribution



Individual Small Group

EMPIRICAL MODEL: DEMAND SPECIFICATION

Cost threshold Given our assumption that λ_i follows an exponential distribution with parameter α_i , we can write:

$$f(c_{i,j}|x_{i,j}, \omega_i, \alpha_i) = \begin{cases} 1 & x_{i,j} = 0, c_{i,j} = 0 \\ 0 & x_{i,j} = 0, c_{i,j} \neq 0 \\ 1 - \exp\left(-\alpha_i \left(\frac{\underline{c}}{x_{i,j} + \omega_i x_{i,j}^2}\right)\right) & x_{i,j} \neq 0, c_{i,j} \leq \underline{c} \\ \frac{\alpha_i}{x_{i,j} + \omega_i x_{i,j}^2} \exp\left(-c_{i,j} \frac{\alpha_i}{x_{i,j} + \omega_i x_{i,j}^2}\right) & x_{i,j} \neq 0, c_{i,j} > \underline{c} \end{cases}$$

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RESULTS: VARYING λ

