Adverse Selection and (un)Natural Monopoly in Insurance Markets

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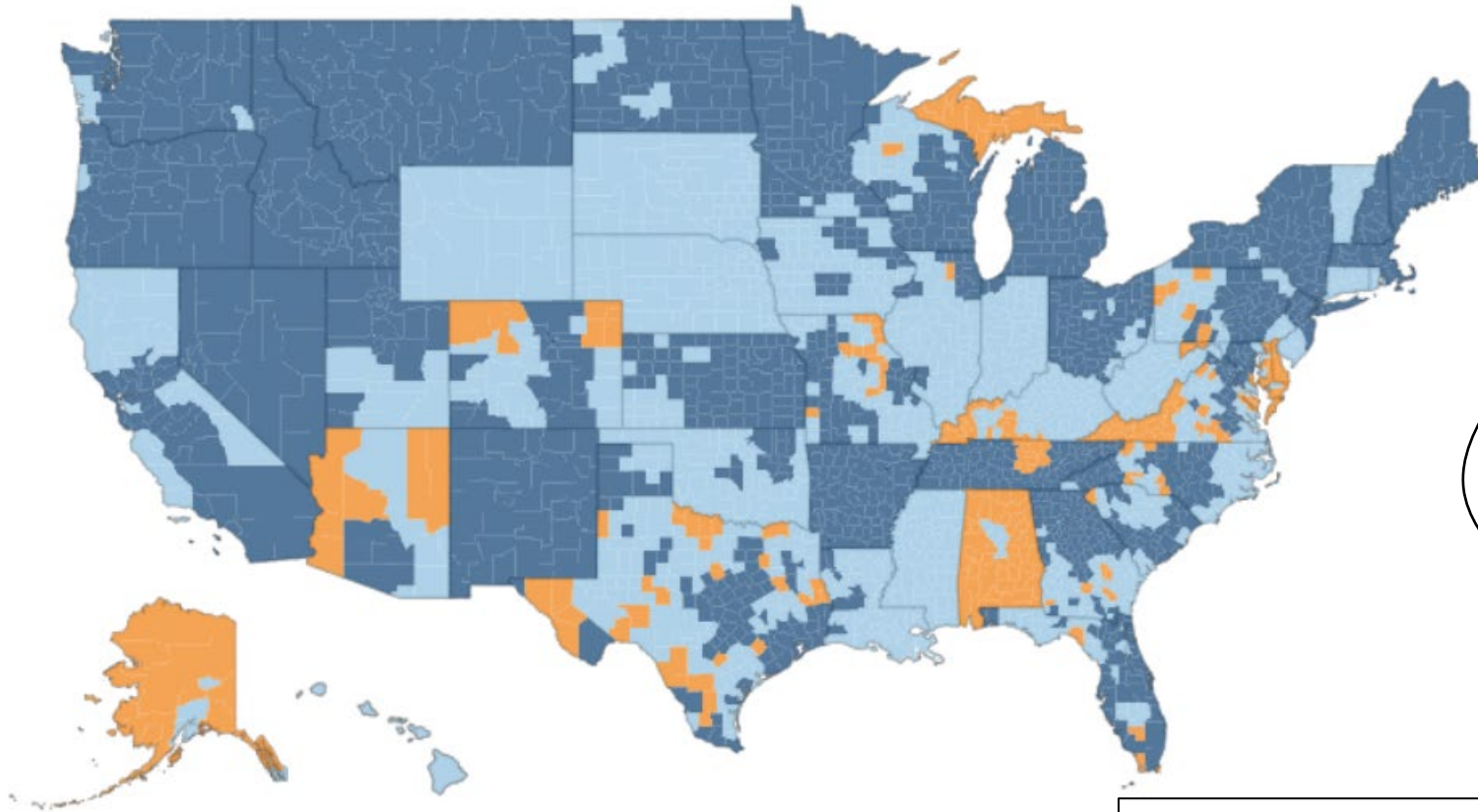**Mark Shepard**
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Motivation

- Health insurance systems increasingly rely on **market-based programs**

  - E.g., Medicare Advantage, Obamacare (ACA) exchanges, National systems in many countries (e.g., Germany, Switzerland, Netherlands, Israel, Chile, Australia)

- **Key premise:** Robust participation by enough insurers

  - Most prior research assumes *perfect competition* or treats set of competitors as *exogenous* (e.g., EFC 2010; Starc 2014; Mahoney & Weyl 2017; Decarolis et al. 2020; Curto et al. 2021; Tebaldi 2024)
  - Not much insurance work analyzing competition as an *equilibrium* phenomenon

- **Concern with un-competitive insurance markets**

  - Broadly true for U.S. health insurance *(e.g., Medicare Advantage, commercial, medigap – all have >70% of markets "highly concentrated (HHI > 2500))*
  - Particularly severe in Obamacare exchanges *(next slide)*

Low Competition: ACA Insurance Exchanges

# Insurers	Share of Markets	
	Counties	Enrollees
1 insurer	10%	3%
2 insurers	44%	19%
3+ insurers	46%	78%

54% of county markets *(with 20% of enrollees)* had just <u>1-2 competitors</u>

<u>24 whole states</u> had ≤ 3 competitors

<u>95% of MSAs</u> "highly concentrated" by antitrust metric (HHI > 2500)

Source: <u>Kaiser Family Foundation</u> (data for 2021)

Number of Insurers

One

Two

Three or More

What Explains Limited Participation?

- **Why is robust insurance competition so difficult to sustain?**

- **Standard explanations:**

  1. **Regulatory barriers** *(e.g., state licensing rules, limits on cross-state insurance)*

  2. **Fixed/sunk costs** *(e.g., capital requirements, negotiating with hospitals, setting up billing systems)*

  3. **Political factors** *(especially for Obamacare)*

- **This paper:** We suggest another novel explanation that (concerningly) is a fundamental feature of insurance markets: **Adverse Selection**

  - Classic insurance market failure. Associated with "unraveling" of trade (Akerlof 1970) and "race to the bottom" in insurance quality / benefits (Rothschild & Stiglitz, 1976)

  - ➢ **Question:** Can adverse selection also be a <u>barrier to robust competition</u>?

This Paper: Adverse Selection → Low Competition

- We suggest a **new implication of adverse selection** – it can be a barrier to robust firm entry

- **Key insight:** Adverse selection can create a **"race to the bottom" in prices**

  - Firms have incentives to <u>strategically undercut</u> competitors to steal price-sensitive, healthy consumers (Starc 2014, Mahoney & Weyl 2017)
  - ➢ Price becomes a tool for "cherry picking" favorable risks.

- **Result:** Hard to sustain markups needed to support profitable entry (while covering fixed costs)

  - (1) Analogous to natural monopoly due to fixed costs – but via an inefficient coordination failure
    - ➢ **"Un-Natural" Monopoly**
  - (2) Analogous to quality "race to the bottom" (Rothschild & Stiglitz, 1976) – but for prices *(w/ fixed quality)*

- ➢ **Take-away:** Unregulated price competition can be a problem in selection markets

  - Policy to <u>soften/limit price competition</u> (including price floors) can be desirable to boost entry, *lower* prices

Outline of Talk

1. **Model:** Adverse Selection Pricing and Competition

   - Framework for understanding when selection market can(not) support a given set of competitors

2. **Descriptive Evidence:**

   - <u>Setting</u>: Massachusetts health insurance exchange

   - <u>Reduced form</u>: Use quasi-experimental price variation to estimate key elasticities from model.

3. **Structural Model and Policy Analysis:**

   - Estimate structural model using Massachusetts market

   - Analyze impact of policies to correct adverse selection on firm entry and prices

1. Model: Adverse Selection Pricing and Competition

Plan for Model Section

1. **Setup the model**

2. Walk you through a **simple example** to show the key ideas

3. Discuss **general results** on impact of adverse selection on prices, profits, entry

Model Setup

- **Simple model of insurance market** where firms $j \in \{1, \dots, J\}$ engage in a two-stage entry/competition game:

  1. **Entry:** Each firm j decides whether to participate in the market (involves fixed cost $F \geq 0$)

  2. **Price competition:** Set prices (P_j) to max profits $(\pi_j(P))$ in standard Nash-Bertrand equilibrium

- **Each insurer *j* has a single (fixed) contract** that differs on attributes X_j

  - General (horizontal) differentiation → Need not be ranked on "vertical" quality

  - <u>Examples</u>: Hospital/doctor networks (non-nested), Rx drug coverage, Brand preferences/loyalty

- **Consumers (i) vary** in both preferences ($U_i(X_j)$) and risk/costs (C_{ij})

  - Defining feature of a **"selection market"** (Einav, Finkelstein, Mahoney 2021)

    ➢ Firms cannot price-discriminate against high-risk consumers (as in ACA, many other programs)

- Firms are generally ("horizontally") differentiated – no clear "High" vs. "Low" quality plan

- **But adverse selection is still relevant!**

- **Key reason:** Sick care more about plans that are a "good match" for their preferred attributes:

$$U_{ij} = \left(\underbrace{\beta_i}_{WTP\ for\ quality} \times \underbrace{Q_{ij}}_{Match\ Quality} \right) - P_j + \varepsilon_{ij}$$

  - **Key condition:** $Corr(\beta_i, Cost_{ij}) > 0$ (Sick have higher demand for match quality)

    $\leftrightarrow$ Healthy are <u>more price-sensitive</u> in their demand

- <u>Implication</u>**: Adverse Selection in Pricing**

  - Price cutting differentially attracts low-cost marginal consumers
  - ➤ **Implication #1:** "Wedge" b/n Average and Marginal Costs = $AC_j(P) - MC_j(P) > 0$
  - ➤ **Implication #2:** Price increases raise Avg Costs, $\partial AC_j / \partial P_j > 0$ $\leftrightarrow$ "Downward-sloping" AC in quantity

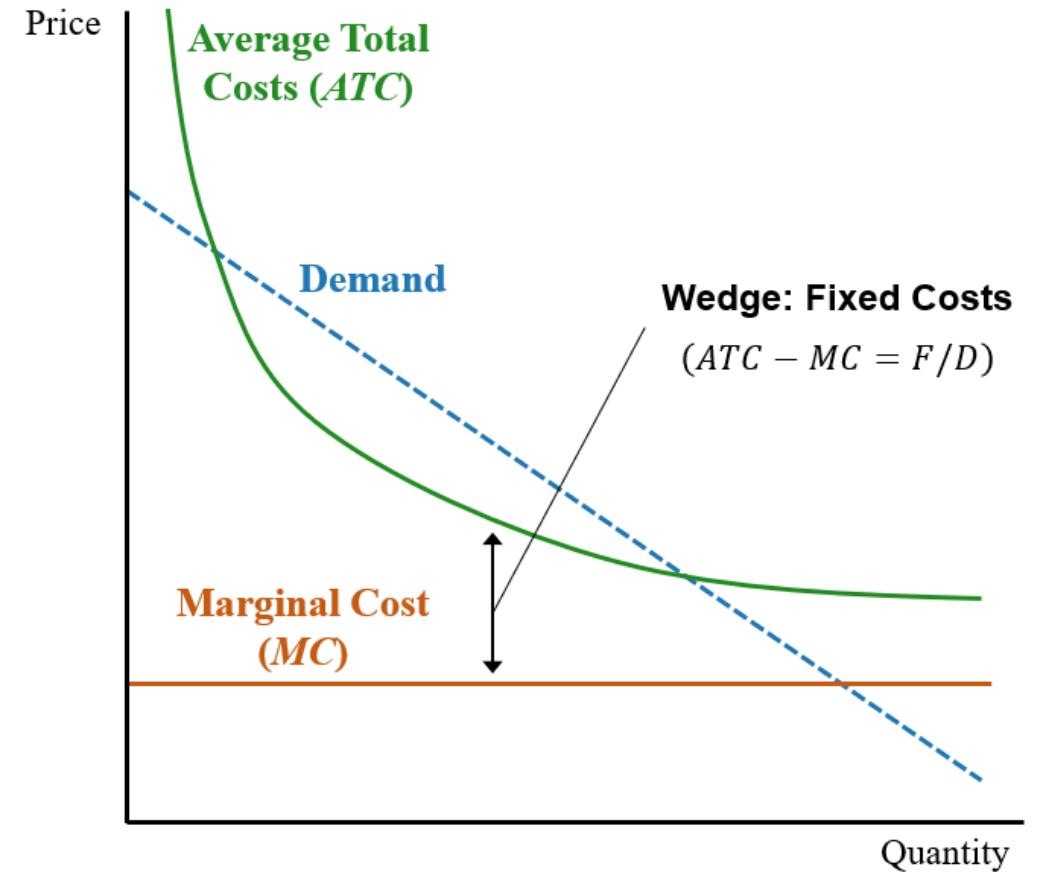# Parallel: Adverse Selection and Natural Monopoly

Adverse Selection Market
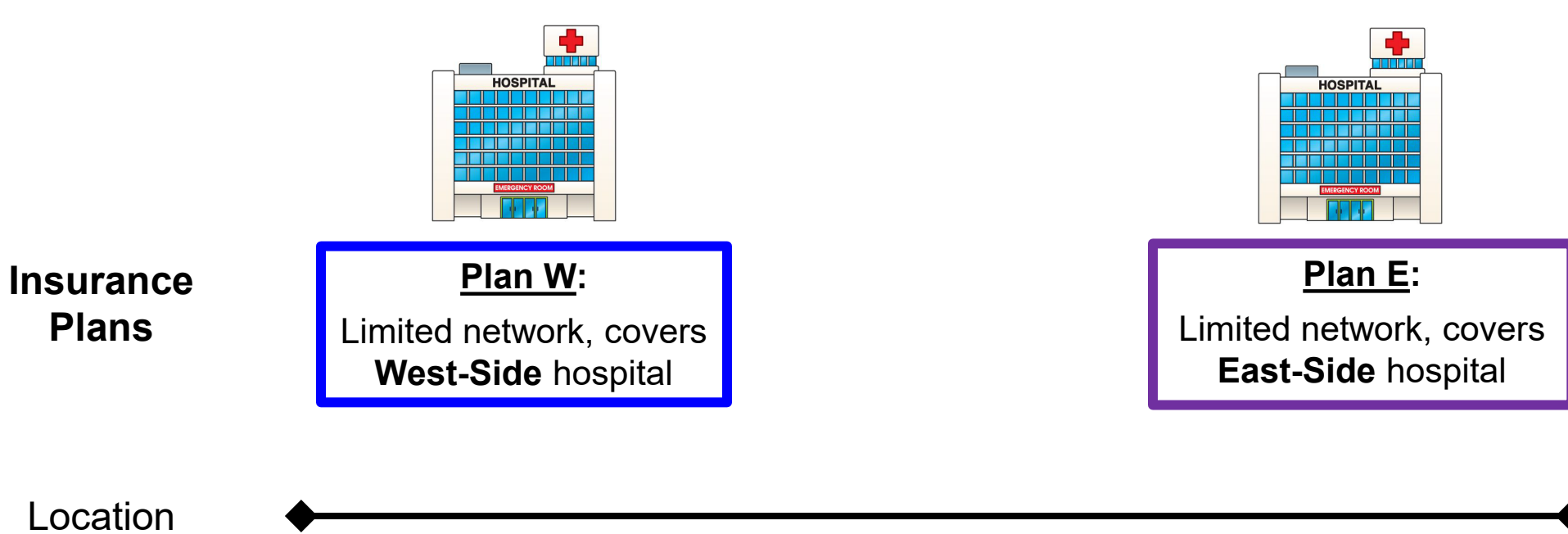(due to risk/cost variation)
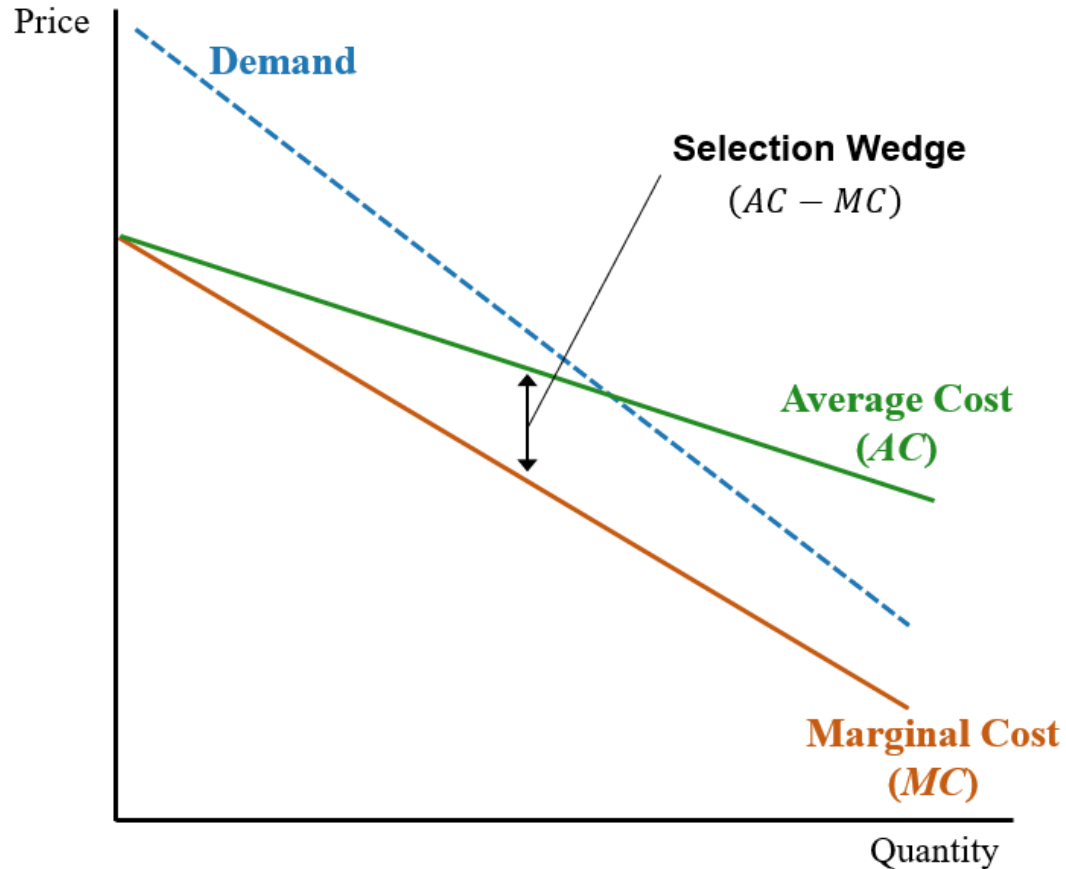
Natural Monopoly Market
(High fixed costs)

➤ **Common features:** (1) Downward-sloping Average Cost curve
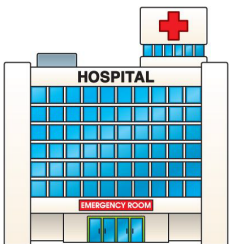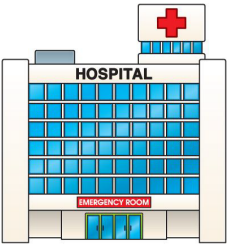(2) "Wedge" b/n Average and Marginal Costs

Example: East- vs. West-Side Network Plans *(Hotelling + Risk)*

Notes:

1. Differentiated but symmetric plans

Insurance Plans

Plan W:
Limited network, covers **West-Side** hospital

Plan E:
Limited network, covers **East-Side** hospital

Location

Example: East- vs. West-Side Network Plans *(Hotelling + Risk)*

Insurance Plans

Plan W:
Limited network, covers **West-Side** hospital

Plan E:
Limited network, covers **East-Side** hospital

Location

Consumer Types
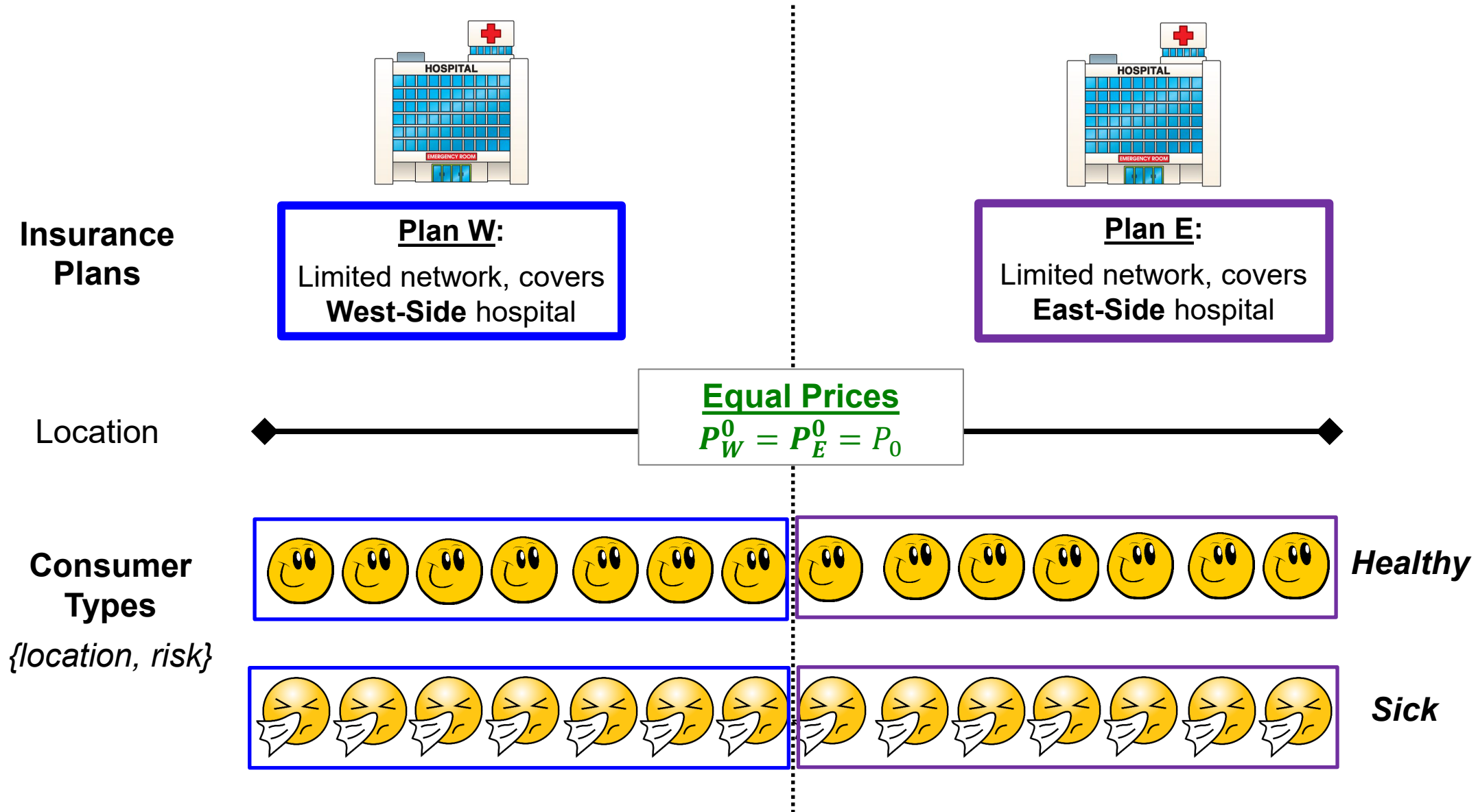
{location, risk}

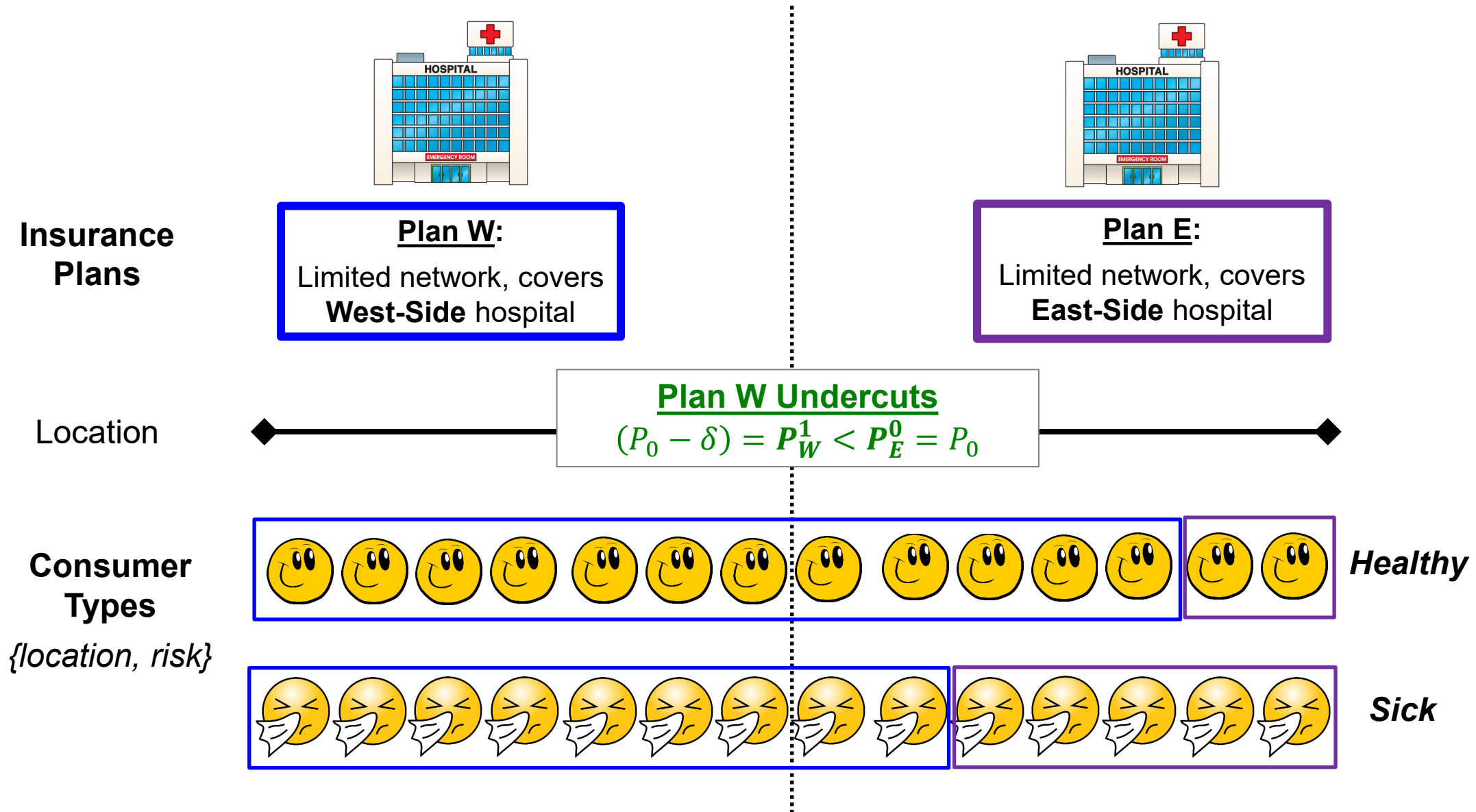*Healthy*

Sick

Notes:

1. Differentiated but symmetric plans

2. Consumers vary in:
   - Location
   - Health risk

3. Consumers value:
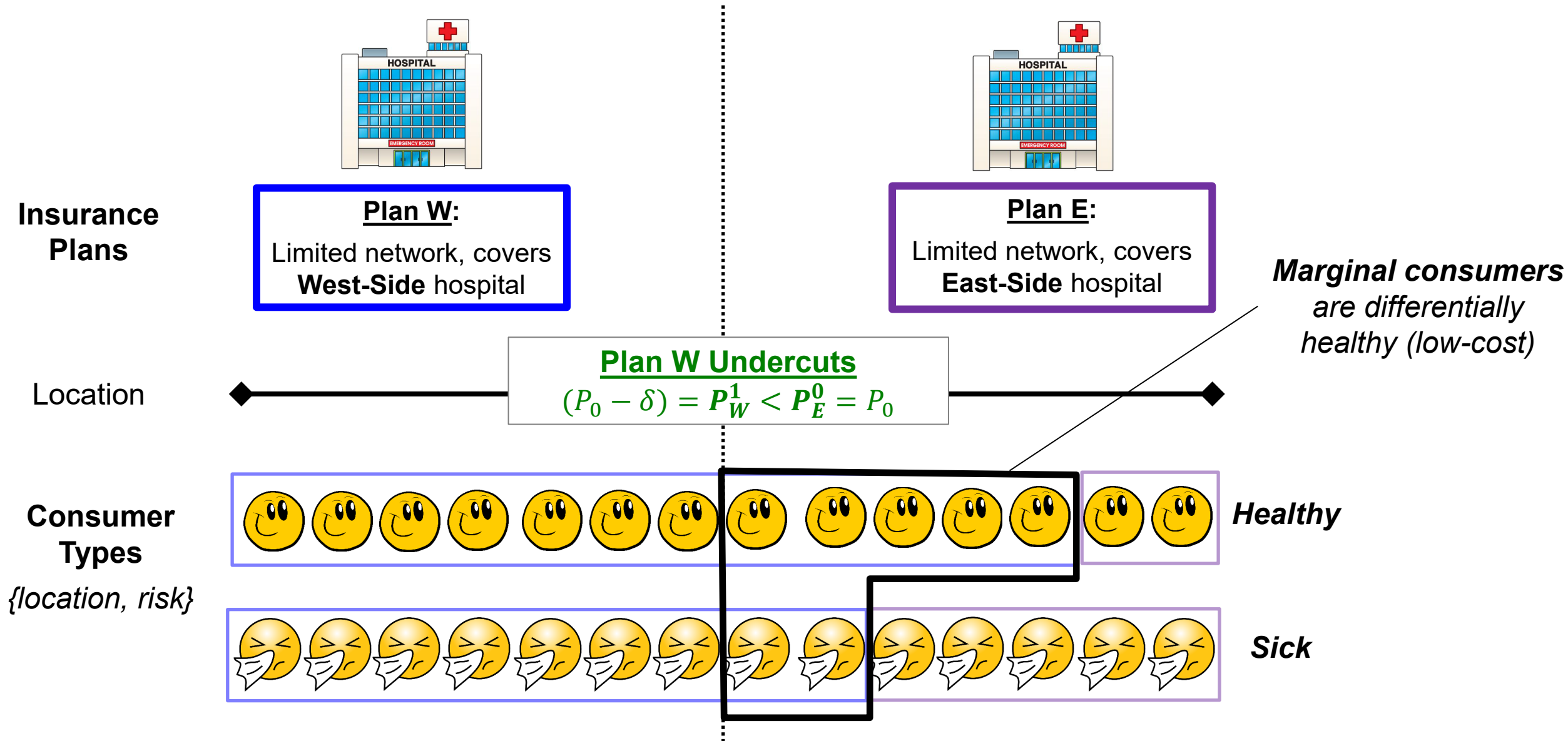   - Coverage of their nearby hospital
   - Lower prices

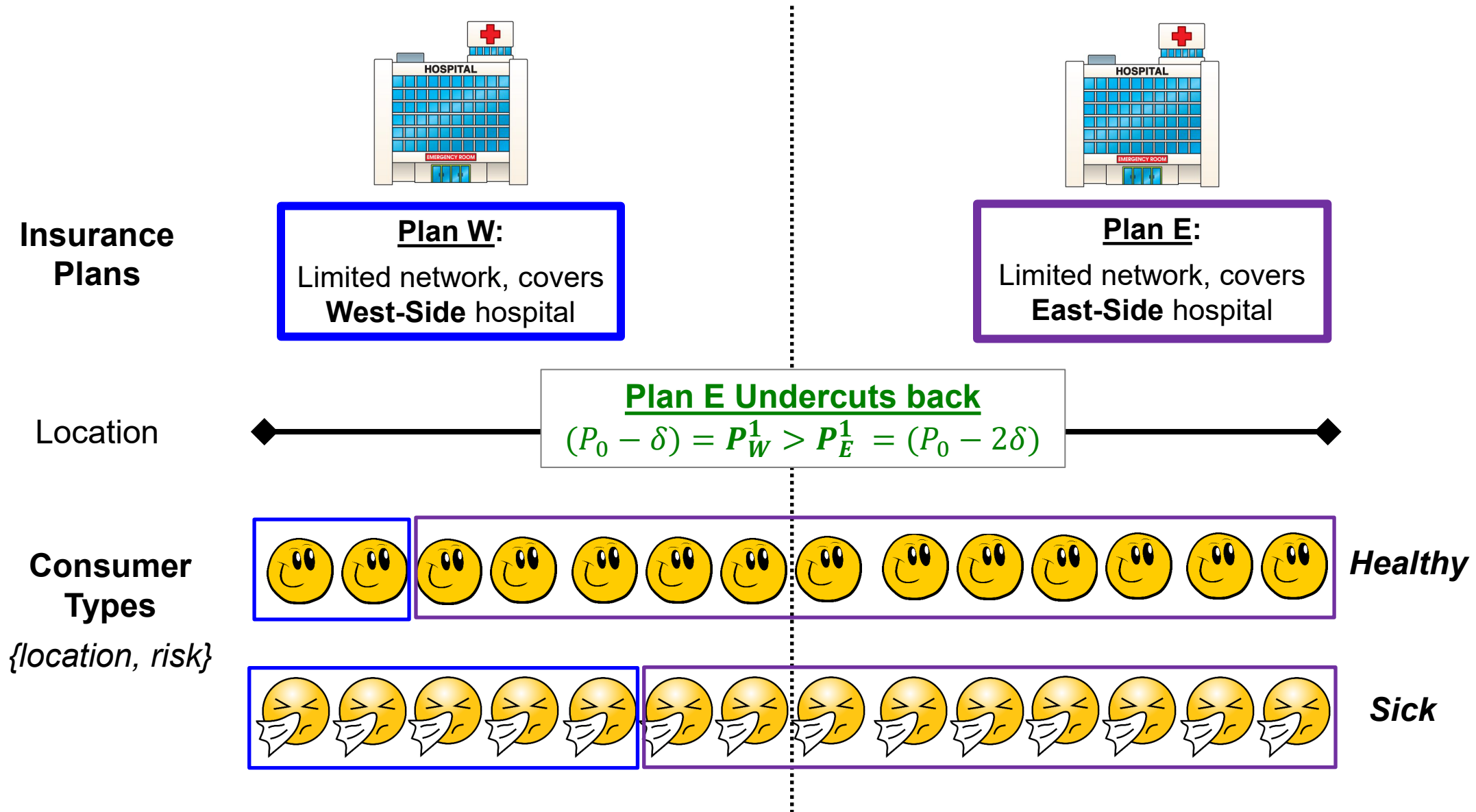# Simple Example: Adverse Selection Pricing Incentives

Insurance Plans

Plan W:
Limited network, covers **West-Side** hospital

Plan E:
Limited network, covers **East-Side** hospital

Location

Equal Prices
$$P_W^0 = P_E^0 = P_0$$

Consumer Types

{location, risk}

Healthy

Sick

Simple Example: Adverse Selection Pricing Incentives

Insurance Plans

Plan W:
Limited network, covers **West-Side** hospital

Plan E:
Limited network, covers **East-Side** hospital

Location

Plan W Undercuts
$(P_0 - \delta) = P_W^1 < P_E^0 = P_0$

Consumer Types

{location, risk}

Healthy

Sick

Simple Example: Adverse Selection Pricing Incentives

Insurance Plans

Plan W:
Limited network, covers **West-Side** hospital

Plan E:
Limited network, covers **East-Side** hospital

Marginal consumers are differentially healthy (low-cost)

Location

Plan W Undercuts
$(P_0 - \delta) = P_W^1 < P_E^0 = P_0$

Consumer Types
{location, risk}

Healthy

Sick

Insurance Plans

Plan W:
Limited network, covers **West-Side** hospital

Plan E:
Limited network, covers **East-Side** hospital

Location

Plan E Undercuts back
$$(P_0 - \delta) = P_W^1 > P_E^1 = (P_0 - 2\delta)$$

Consumer Types

{location, risk}

Healthy

Sick

Insurance Plans

Plan W:
Limited network, covers **West-Side** hospital

Plan E:
Limited network, covers **East-Side** hospital

Marginal consumers are also low-cost for plan E

Location

Plan E Undercuts back
$(P_0 - \delta) = P_W^1 > P_E^1 = (P_0 - 2\delta)$

Consumer Types

{location, risk}

Healthy

Sick

Simple Example: Adverse Selection Pricing Incentives

Insurance Plans

Plan W:
Limited network, covers **West-Side** hospital

Plan E:
Limited network, covers **East-Side** hospital

Location

Plan W Undercuts back
$$(P_0 - 3\delta) = P_W^2 < P_E^1 = (P_0 - 2\delta)$$

Consumer Types

{location, risk}

Healthy

Sick

Insurance Plans

Plan W:
Limited network, covers **West-Side** hospital

Plan E:
Limited network, covers **East-Side** hospital

Location

Plan E Undercuts back
$$(P_0 - 3\delta) = P_W^2 > P_E^2 = (P_0 - 4\delta)$$

Consumer Types

{location, risk}

Healthy

Sick

Simple Example: Unraveling to "Un-Natural Monopoly"

Insurance Plans

Plan W:
Limited network, covers **West-Side** hospital

Plan E:
Limited network, covers **East-Side** hospital

Location

Consumer Types
{location, risk}

Healthy

Sick

Insurance Plans

Plan W:
Limited network, covers **West-Side** hospital

Plan E:
Limited network, covers **East-Side** hospital

Consumer welfare lower because of:

1. **Higher prices** *(monopoly markup)*

2. **Lost plan variety** *(less access to east-side hospital)*

Location

Plan W only
$$P_W = (\overline{AC} + Mkup^*)$$

Consumer Types

{location, risk}

Healthy

Sick

General Theory

- **FOC for insurer pricing (standard):** $\quad P_j^* = MC_j(P) + \underbrace{\dfrac{1}{\eta_{j,P_j}}}_{\textbf{Lerner Markup}}$

$$\eta_{j,P_j} = -\frac{\partial \log D_j}{\partial P_j}$$
(demand semi-elasticity)

- **Implies net profit margin after fixed costs** $(= P_j - ATC_j)$ **of:**

$$\underbrace{P_j^* - ATC_j(P)}_{\textbf{Net profit margin}} \quad = \quad \underbrace{\frac{1}{\eta_{j,P_j}}}_{\textbf{Lerner Markup}} \quad - \quad \underbrace{\left[AC_j(P) - MC_j(P)\right]}_{\substack{\textbf{Adverse Selection} \\ \textbf{wedge}}} \quad - \quad \underbrace{\frac{F}{D_j(P)}}_{\substack{\textbf{Fixed Costs} \\ \textbf{per consumer}}}$$

- **Prior work:** With *fixed* participation, adverse selection constrains market power, leading to lower prices and profit margins [Starc (2014), Mahoney & Weyl (2017)]

- ➢ **Our point:** With *endogenous* entry, selection also <u>limits</u> how many firms can survive

  - To break even, need positive net profit margin ↔ **Lerner markup** *(differentiation)* > **Adverse selection** + **Fixed costs** *(limits on entry)*

Summary and Policy Implications

- **Main point:** Adverse selection <u>limits entry</u> when insurers strategically compete on prices.

  - Analogous to implications of fixed costs as barrier to entry

- But unlike fixed costs (which are a real cost), this arises from a (potentially inefficient) **coordination failure in price competition**

  - More firms could enter if could commit to not undercut, but <u>cannot coordinate</u> in std competition

  - Equilibrium level of entry may be lower than optimal for consumer welfare
    - ➤ **"Un-natural" Monopoly**

- **Role for Policy:** Soften or regulate (downward) price competition

  - Examples: Risk adjustment, Incremental price subsidies (soften); Price floors (regulation)

  - By softening price competition (in moderation!), may sustain more entry and *lower* prices

2. Setting and Descriptive Evidence

Setting: Massachusetts Health Insurance Exchange

- **Setting:** Subsidized pre-ACA Massachusetts insurance exchange ("CommCare")

  - Population: Low-income adults (0-300% of poverty) without other sources of coverage

  - Heavily subsidized insurance offered by competing private plans (4-5 insurers)

  - Standardized cost sharing & covered services. Plans differ on hospital/doctor networks.

- **CommCare did more to regulate/soften competition** than in the ACA today

  1. Standardized plan designs

  2. Price ceilings and floors *(via "actuarially sound rate regulation")*

  3. Incremental subsidies: Below-poverty enrollees are fully subsidized (pay $0 for all plans).

     - Above-poverty enrollees: Pay base amount + ΔPremium for higher-price plans.

- **Incremental subsidies:** Provide useful premium variation to identify key elasticities in our model *(price elasticity of demand, slope of average cost curve)*

Difference-in-Differences Design:

- Use changes in plan premiums over time x Effect of incremental subsidies by income group
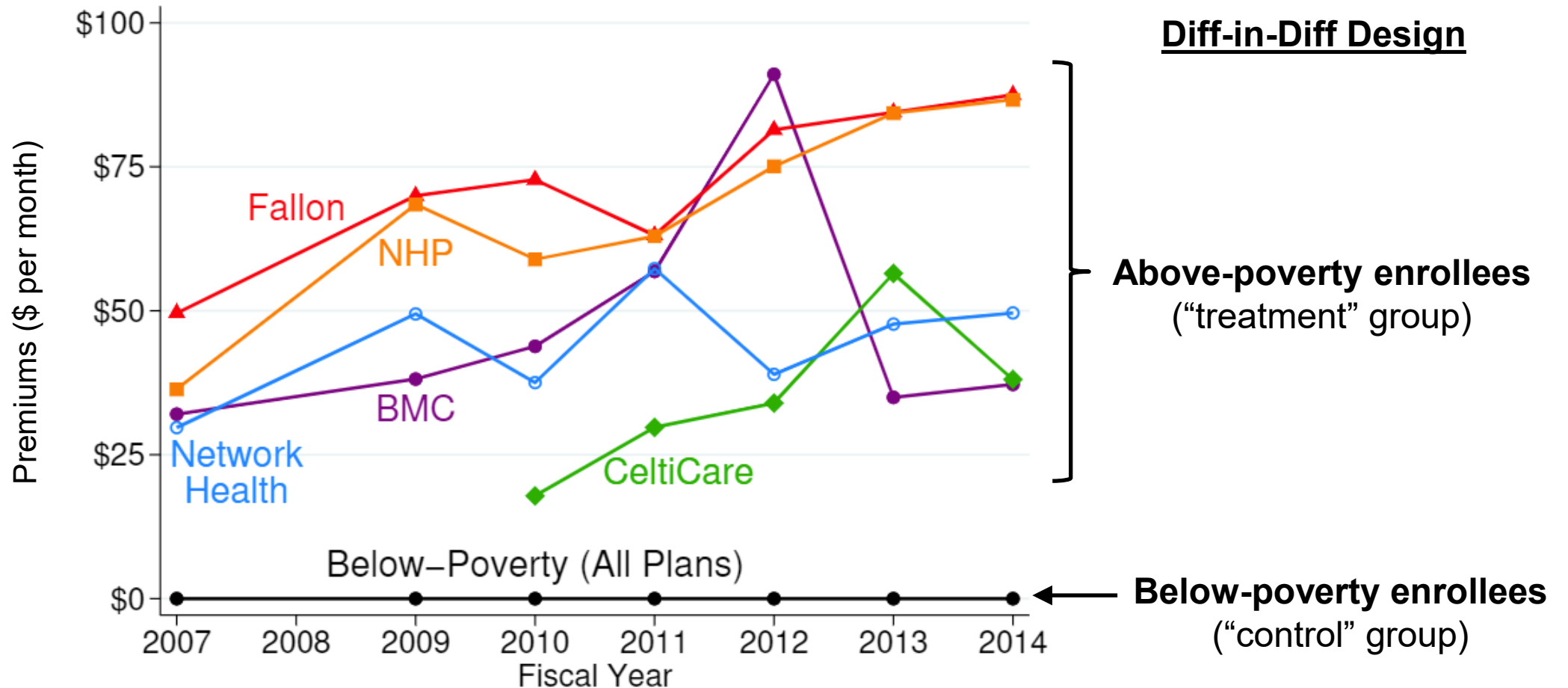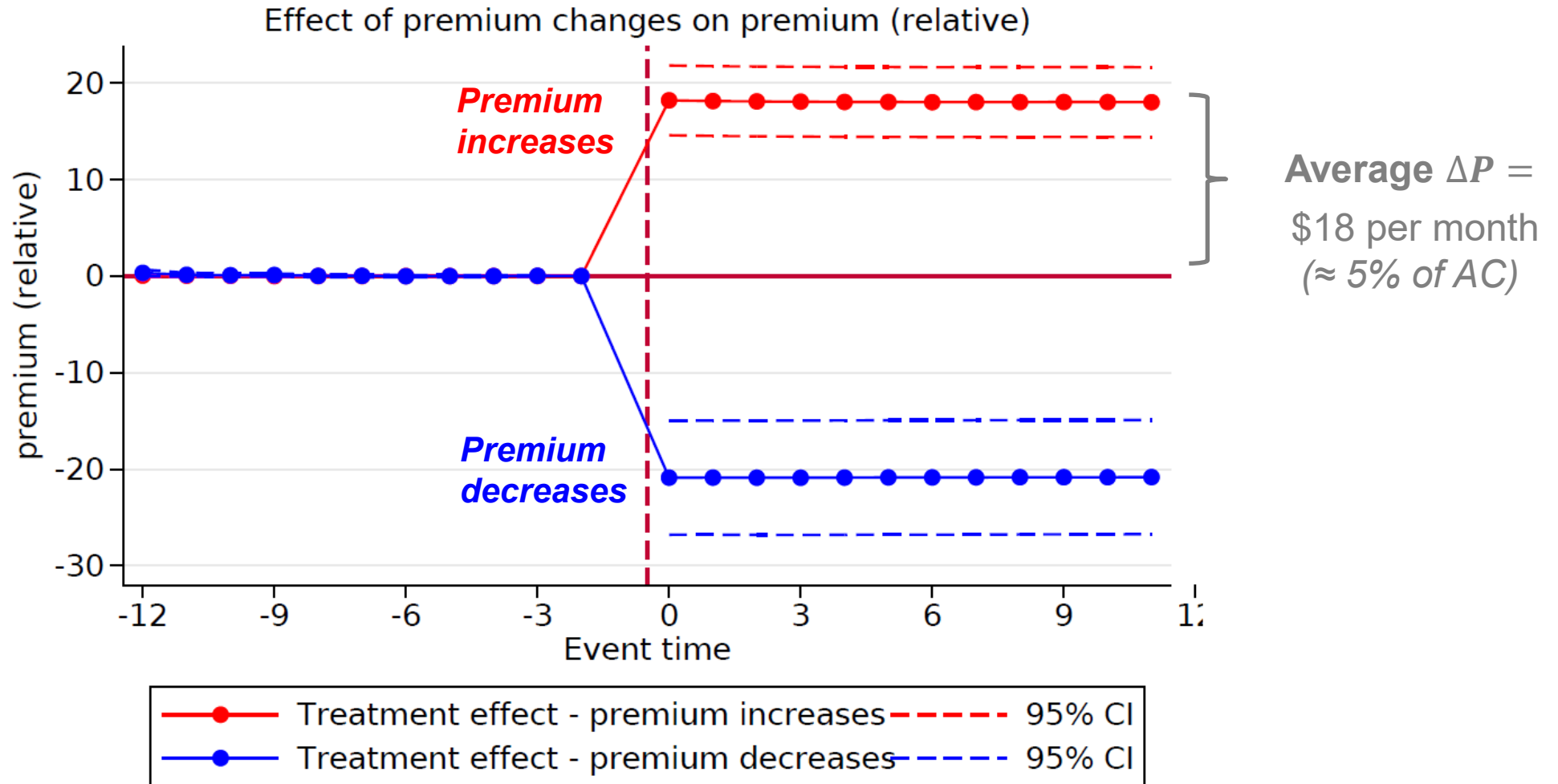
(a) Relative Premiums

(a) Log Market Shares

(b) Average Cost ($/month)
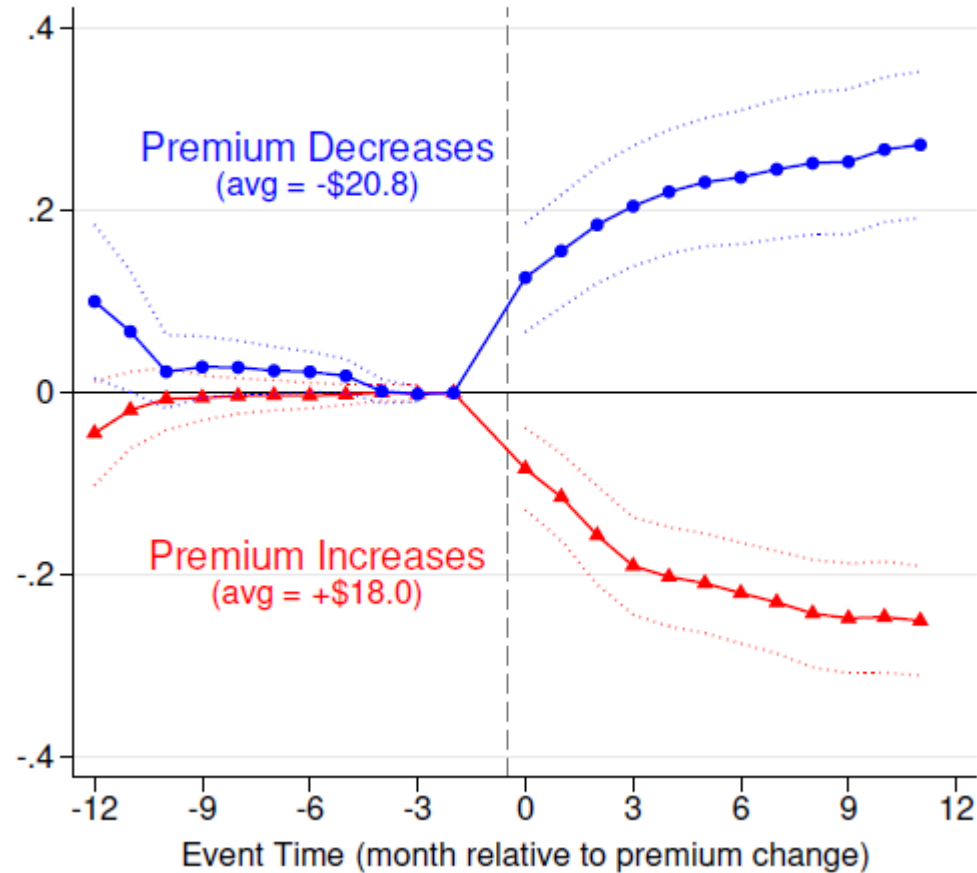
Demand (all enrollees):
Each +$10 premium → ↓ 10% market share
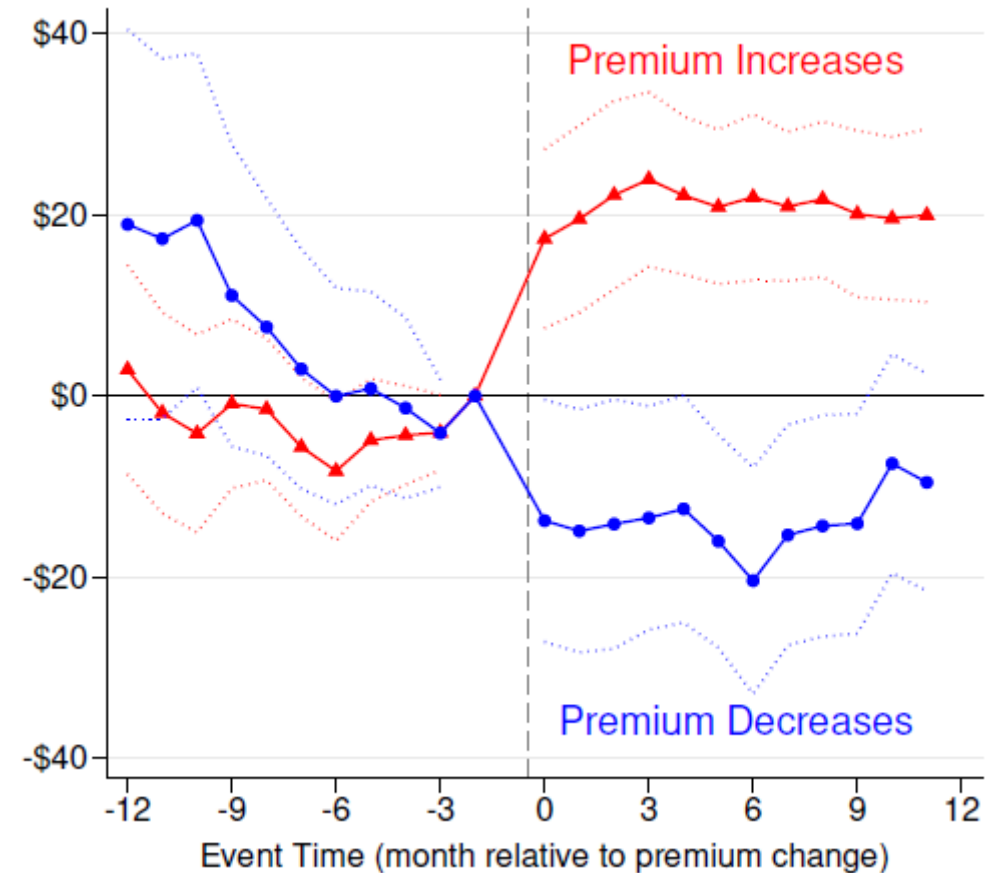
Average Cost (all enrollees):
Each +$10 premium → ↑ $11 Avg Cost
(Slope ≈ 1.1)

	Baseline	**By Enrollee Type**		**By Enrollee Risk**		
	All Enrollees	New Enrollees	Current Enrollees	Low Risk (0-25%)	Mid Risk (25-75%)	High Risk (75-100%)
	(1)	(2)	(3)	(4)	(5)	(6)
Panel (a): Regression results						
Premium	17.87***	17.90***	17.08***	17.25***	18.09***	17.79***
	(1.45)	(1.56)	(1.43)	(1.47)	(1.44)	(1.51)
Log Market Share	-0.181***	-0.429***	-0.080***	-0.257***	-0.178***	-0.130***
	(0.019)	(0.040)	(0.015)	(0.026)	(0.018)	(0.016)
Average Cost	20.02***	37.15***	16.04***	---	---	---
	(2.67)	(5.08)	(3.44)			
Panel (b): Theory-Relevant Statistics						
Demand Semi-Elasticity	-0.0101	-0.0240	-0.0047	-0.0149	-0.0098	-0.0073
Slope of Avg Costs (=dAC/dP)	1.12	2.08	0.94	---	---	---
Adverse Selection Wedge [% of Avg Cost]	**$110.9 [30%]**	**$86.5 [21%]**	**$201.5 [56%]**	---	---	---
Num. Observations	5,888	4,922	5,750	5,359	5,819	5,612
Average Cost ($/month)	$374	$411	$360	$134	$239	$865

Standard errors reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, and * $p < 0.10$.

→ *Regressions after Risk Adjustment*

Summary of Reduced Form

- Reduced form results suggest **high price sensitivity** and **strong adverse selection**

  - Large adverse selection "wedge" of 20-30% of average medical costs

    - Large compared to estimate of administrative costs *(~8% of average med costs)*
    - Still 8-10% of avg medical costs even after risk adjustment

- But the Massachusetts market was able to support 4-5 competing insurers. How?

  - Key reason: Use of robust set of "corrective policies" – including price floors, incremental subsidies (<100% poverty), and risk adjustment

- **Next step:** Estimate structural model of insurance demand/cost to assess:

  - What would market competition look like without these corrective policies?
  - What role does each play in sustaining competition / affecting prices?

3. Structural Model and Policy Analysis

Structural Model: Overview

- Follow setup and approach of **Shepard (2022)** and **Jaffe & Shepard (2020)** in estimating structural insurance demand and cost model on CommCare data

1. **Demand:** Multinomial logit choice model using observed micro-data

    - Allow rich observed heterogeneity in price coefficients and value for plan provider network
    - <u>Identification</u>: Include detailed plan FEs in utility → price coefficients identified from same subsidy-driven variation as in our DD strategy

2. **Insurer Cost:** $C_{ij} = Risk_i \cdot \delta_{j,r}$

    - Estimate risk ($Risk_i$) from observed cost in claims data + Plan effects ($\delta_{j,r}$) using regression model with observable controls + individual FE *(use plan switchers over time)*

3. **Equilibrium** (two-stage entry game):

    - <u>Stage 2</u>: Conditional on set of entrants E, find Nash equilibrium price P_E^* *(use grid search)*
    - <u>Stage 1</u>: *E* is an equilibrium if: (a) There is an equilibrium P_E^* where all participants earn profits ≥ 0

        (b) No non-participant $k \notin E$ can enter and earn profits at equil. price $P_{E \cup k}^*$

Model Estimates: Demand Elasticities and Adverse Selection

	(a) Demand Semi-Elasticity		(b) Avg. Cost Slope (dAC/dP)	
	All Enrollees	New Enrollees	All Enrollees	New Enrollees
Overall	**-0.016**	**-0.029**	**0.899**	**1.685**
By Plan				
BMC	-0.013	-0.024	0.647	1.107
CeltiCare	-0.037	-0.041	0.891	1.057
NHP	-0.021	-0.037	1.376	3.060
Network	-0.015	-0.028	0.881	1.682
By Income Group				
100-150% Poverty	-0.022	-0.043	0.843	1.763
150-200% Poverty	-0.013	-0.022	0.778	1.335
200-250% Povery	-0.012	-0.019	0.960	1.365
250-300% Poverty	-0.010	-0.016	0.843	1.242

- ***All*** plans face adverse selection in pricing
  - $\frac{dAC}{dP} > 0$ for all plans
  - Consistent with competition with horizontal differentiation

- Slope of AC curve is close to 1.0 for all enrollees
  - Even larger for new enrollees (due to less inertia)

Market Shares
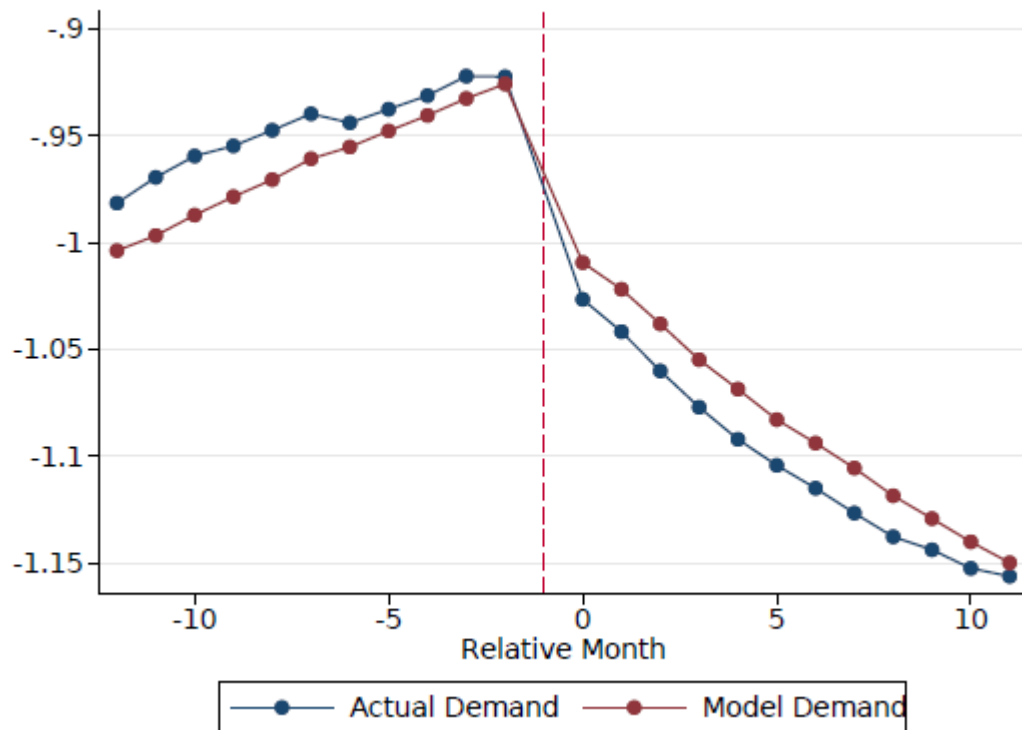
Average Costs
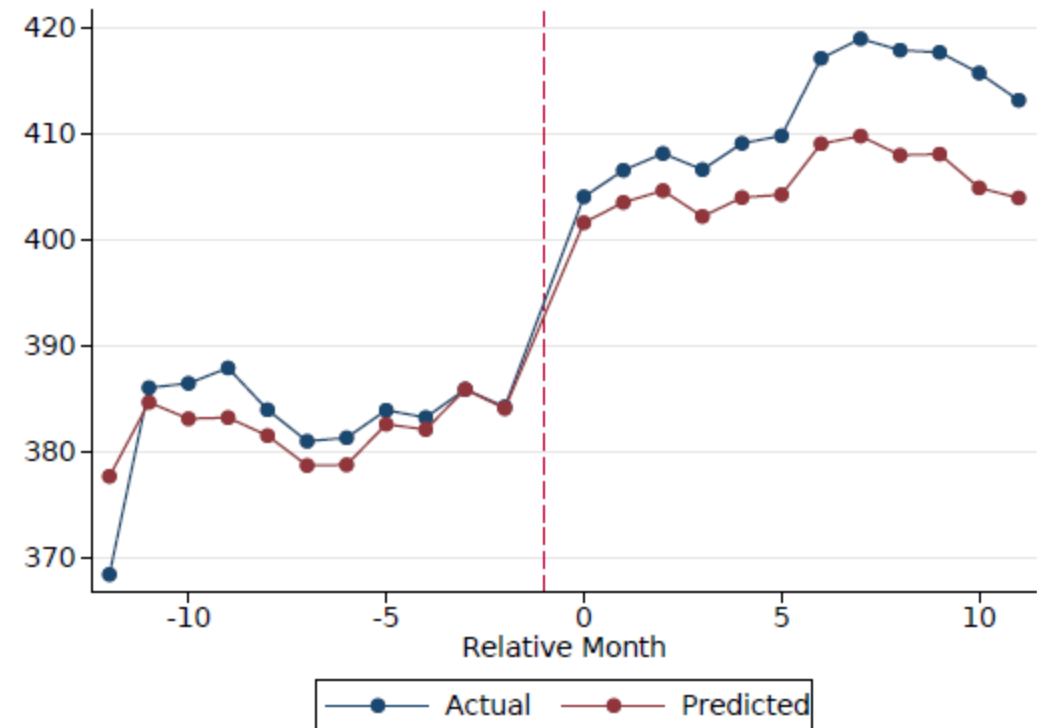
Policy Counterfactuals

- **Goals:** Understand impact of selection on equilibrium insurer participation, and impact of corrective policies (risk adjustment, price floors)

- **Nash equilibrium in two-stage entry game** *(solve by backward induction)*

  - Stage 2 (pricing): Search for Nash pricing equilibrium among firms $j \in E$ (careful grid search)
    - If no pure strategy equilibrium (occurs when market unravels), find mixed strategy equilibrium
  - Stage 1 (entry): (1) All entrants must earn non-negative profits, (2) No non-entrant can unilaterally enter and earn profits in stage 2 pricing equilibrium that results

- **Additional details:**

  - **Potential entrants:** Four statewide Massachusetts exchange plans
  - **Fixed costs:** In main analysis, use $F = \$0$ (conservative)
  - **Monopoly pricing:** Assume regulator imposes P ceiling of \$475 *(≈1.25*AC)* to constrain markups

(1) Policy Scenario	(2) Entrants	(3) Prices	(4) Average price	(5) Surplus
Panel (a): Equilibria as a function of risk adjustment and price floors				
(1) **Actual Risk Adj.** (*baseline*)	**Monopoly** [*CeltiCare*]	[$475]	$475	$0
(2) **No Risk Adj.** ($\lambda = 0$)	**Monopoly** [*CeltiCare*]	[$475]	$475	$0

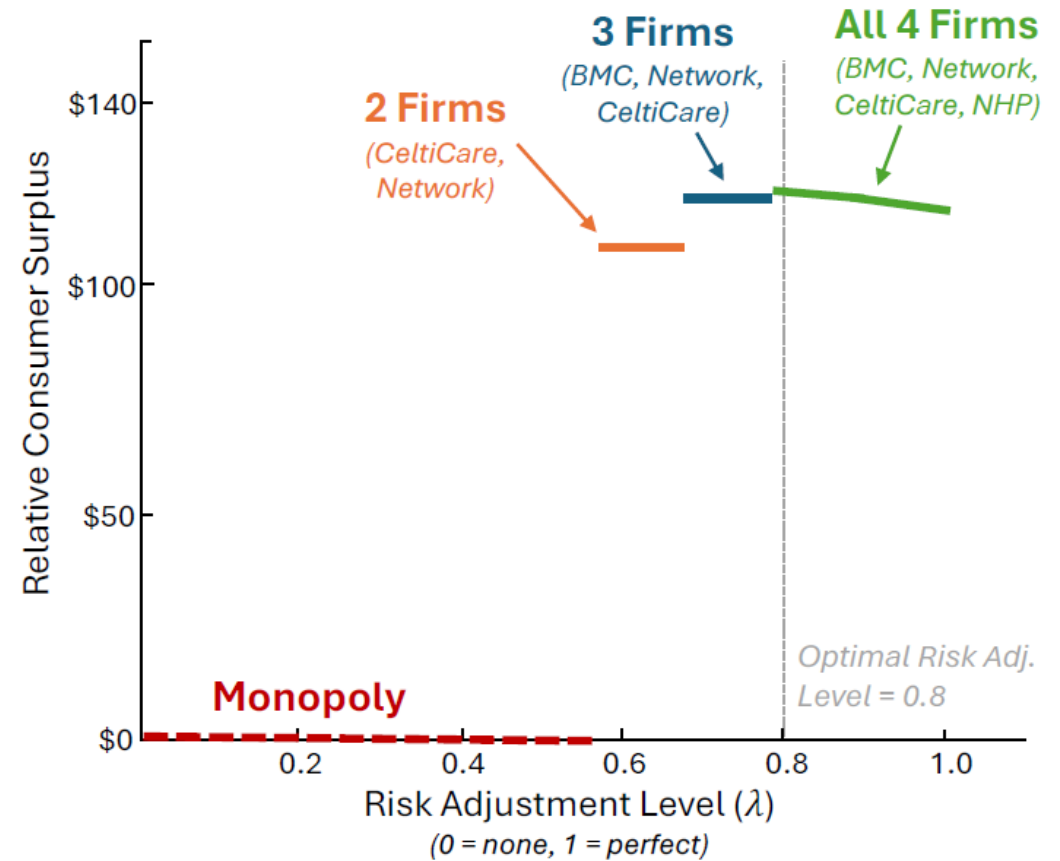➤ **"Un-natural Monopoly" is the only equilibria that survive**

→ *Pricing Reaction Functions*

(a) Average Price ($/month)
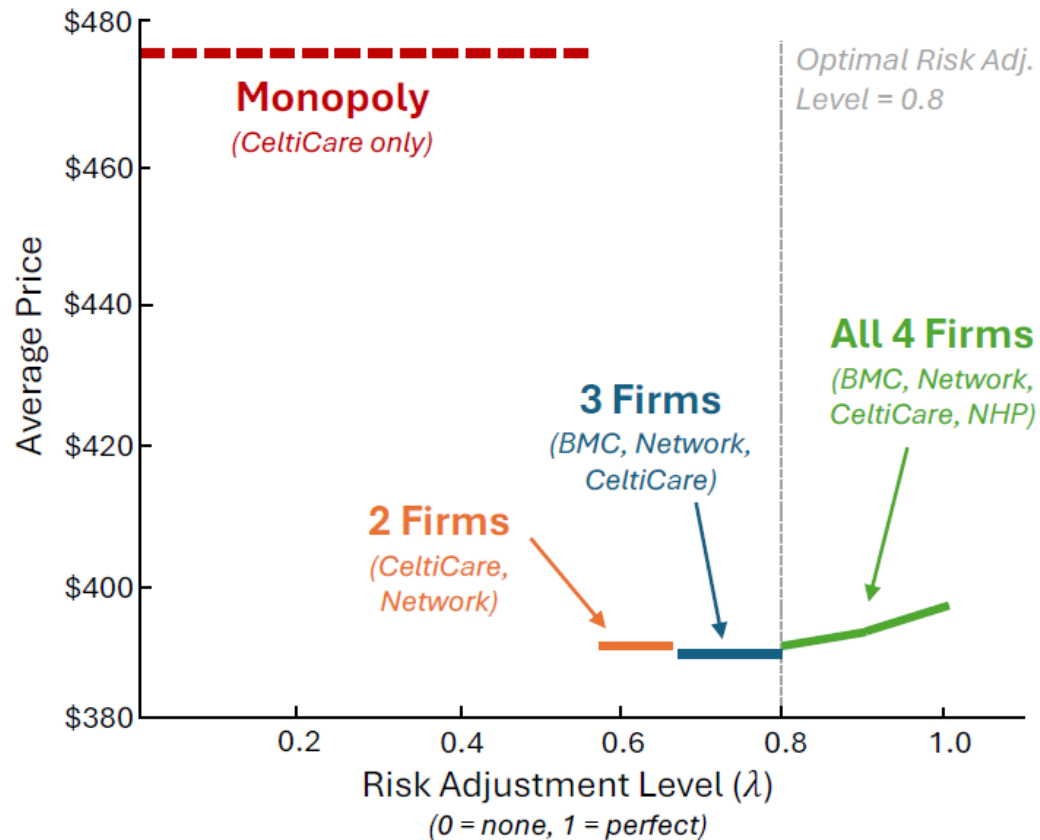
(b) Consumer Surplus ($/month)

> ➤ **Take-aways:** (1) Strong risk adjustment ($\lambda > 0.6$) allows for <u>more entry, lower prices</u>
>
> (2) But this may be stronger than feasible *(e.g., actual risk adj. was $\lambda \approx 0.10\text{-}0.30$)*
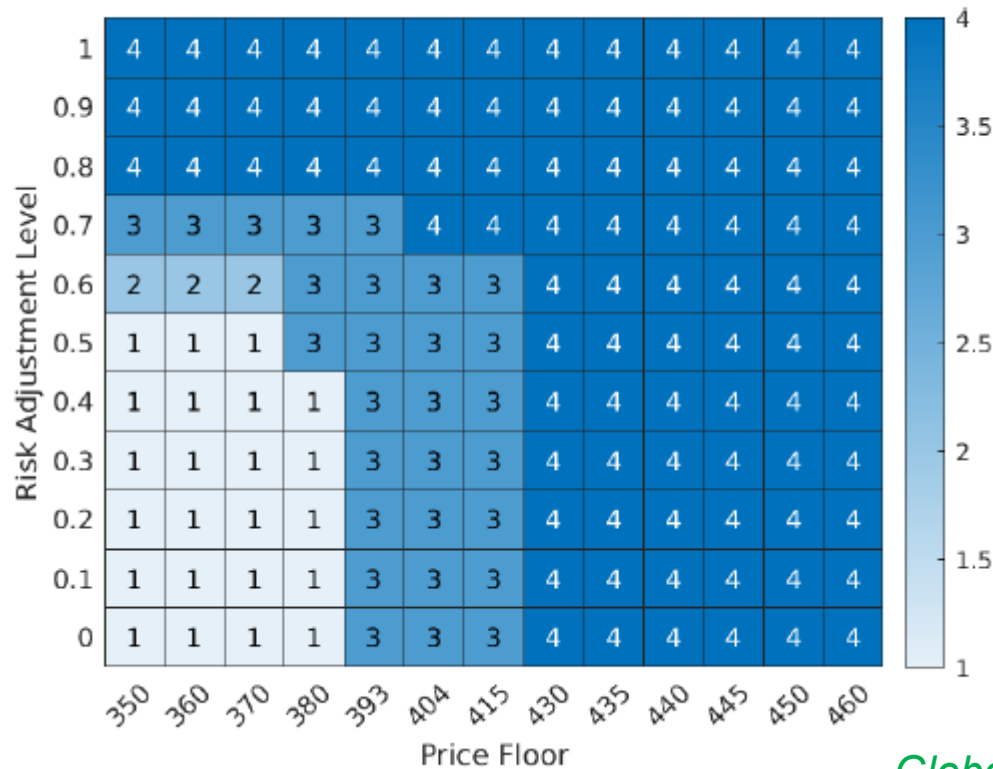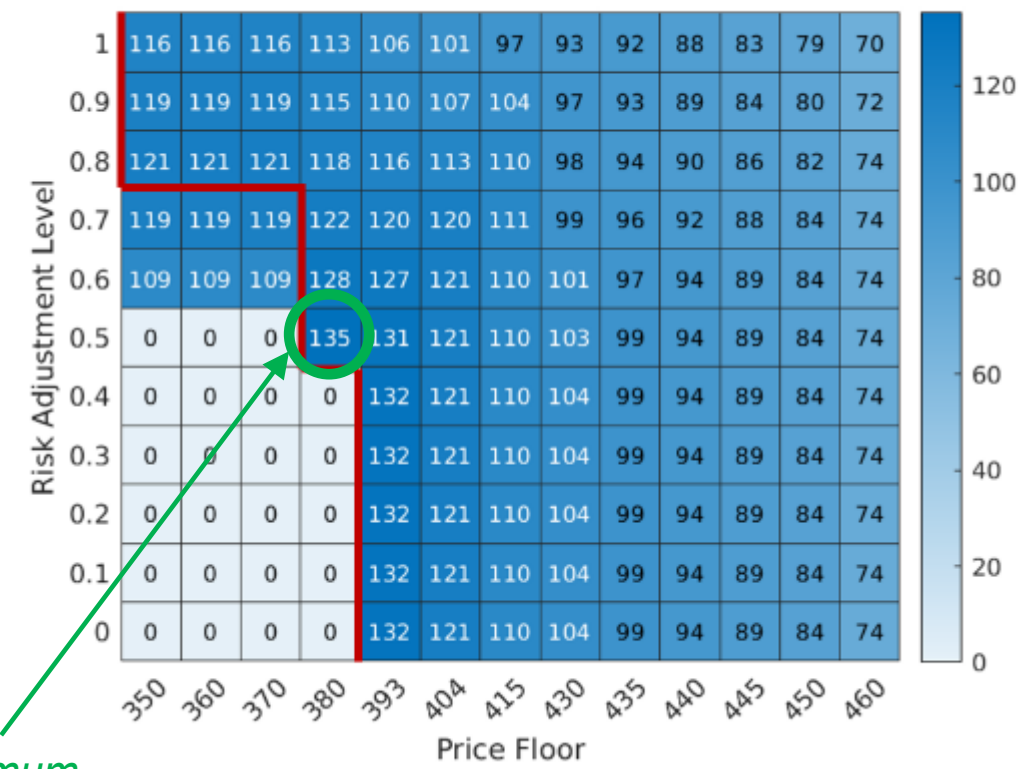
(a) Average Price ($/month)
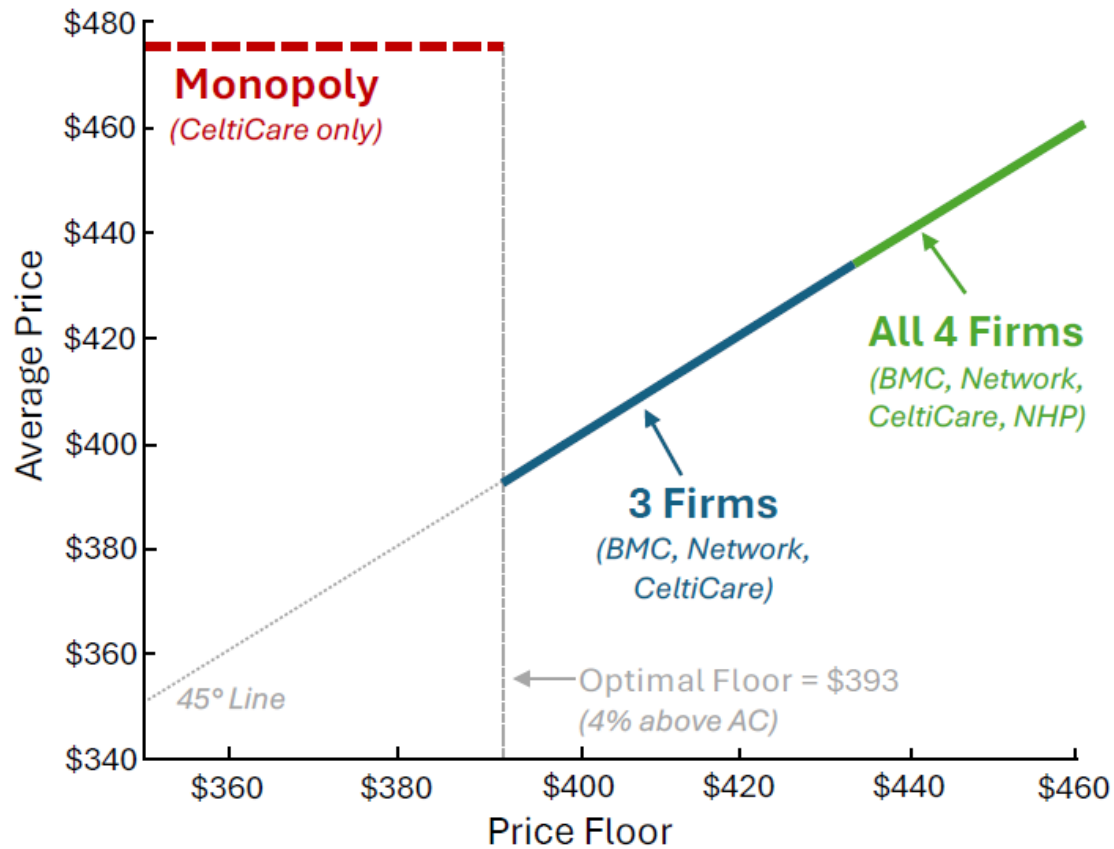
(b) Consumer Surplus ($/month)
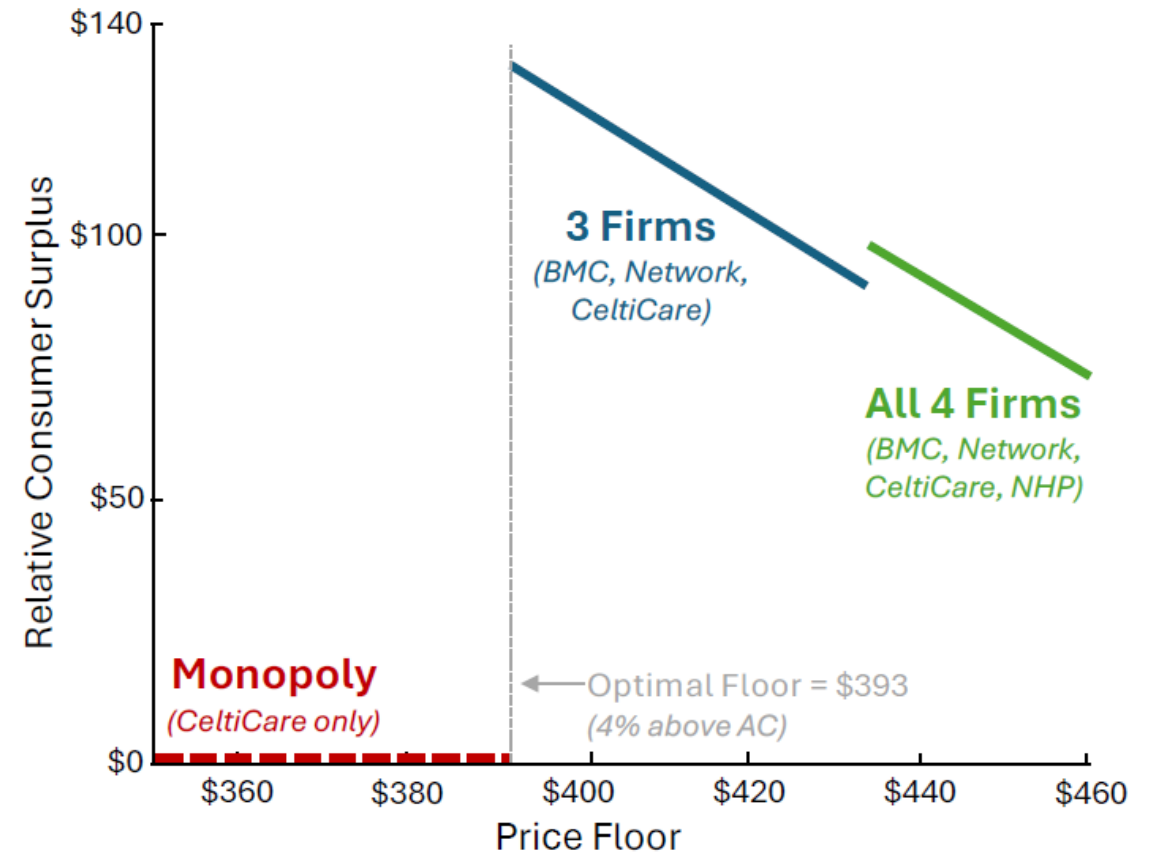
> ➤ **Take-aways:** <u>Modest price floor</u> *(just above mkt avg costs of $379)* is a **win-win for consumers** →
> more entry/variety, lower prices, and very feasible policy. But higher price floors are not worth it.

(a) Number of Firms

(b) Consumer Surplus ($/month)

Global optimum

➢ **Optimal policy:** Modest risk adjustment + Modest price floor (just above mkt avg. costs of $379). This leads to 3 of 4 firms entering, and relatively low prices.

Conclusion

Conclusion

- **Main point:** Adverse selection limits entry/competition in insurance markets

  - Behaves like fixed costs → downward-sloping AC curve → strong under-cutting incentives
  - In extreme case, market devolves to monopoly

- **Price floors may seem like unlikely policy choice, but they're actually widely used!**

  - MA, Part D have implicit price floors → could explain greater firm participation in these markets

- **Overall:** Provides a <u>new framework</u> to understand role of adverse selection and price competition (and policies to soften/regulate it) in selection markets.

  - Our paper suggests insurance markets are more "fragile" than previously understood.
  - The "managed" part of "managed competition" is critical to making market competition work.

Thank You!

General Results

1. **Limits on profitable pricing equilibrium:** In any profitable equilibrium P^*, no firm j can have an *"undercutting deviation"* $\widetilde{P}_j < P_j^*$ s.t.

$$\frac{\Delta ATC_j}{\Delta P_j} > 1 \qquad \leftrightarrow \qquad \frac{\Delta AC_j}{\Delta P_j} > 1 - \tilde{\eta}_{j,P_j} \cdot \left(\frac{F_j}{D_j}\right)$$

2. **Limits on # of firms (N^*) in any symmetric pricing equilibrium:**

$$N^* \quad < \quad \left[\underbrace{\left(-\frac{\partial D_j/D_{Mkt}}{\partial P_j/P_j}\right)}_{\substack{\textbf{Share of all consumers} \\ \textbf{attracted per 1\% price cut}}} \quad \times \quad \underbrace{\left(\frac{AC_j - MC_j}{P_j}\right)}_{\substack{\textbf{\% Lower cost that marginal} \\ \textbf{consumers are (selection)}}} \right]^{-1}$$

- <u>Example</u> *(based on our empirical work)*: If a 5% price undercut attracts 20% of consumers with 15% below-average cost → $N^* < 1.67$

 - No symmetric equilibrium with 2+ firms (less clear whether can support asymmetric eq.)

| | Baseline | By Enrollee Type | | By Enrollee Risk | | |
| | All Enrollees | New Enrollees | Current Enrollees | Low Risk (0-25%) | Mid Risk (25-75%) | High Risk (75-100%) |
	(1)	(2)	(3)	(4)	(5)	(6)
Panel (a): Regression results						
Premium	17.87***	17.90***	17.08***	17.25***	18.09***	17.79***
	(1.45)	(1.56)	(1.43)	(1.47)	(1.44)	(1.51)
Log Market Share (risk wgt.)	-0.137***	-0.376***	-0.049***	-0.248***	-0.169***	-0.118***
	(0.017)	(0.038)	(0.014)	(0.025)	(0.018)	(0.017)
Average Costs (risk-adjusted)	6.185**	13.60***	8.345*	---	---	---
	(2.28)	(3.49)	(3.33)			
Panel (b): Theory-Relevant Statistics						
Demand Semi-Elasticity	-0.0077	-0.0210	-0.0029	-0.0144	-0.0093	-0.0066
Slope of Avg Costs (risk adj.)	0.35	0.76	0.49	---	---	---
Adverse Selection Wedge	**$45.1**	**$36.2**	**$168.9**	---	---	---
[% of Avg Cost]	**[12%]**	**[9%]**	**[44%]**			
Num. Observations	5,888	4,922	5,750	5,359	5,819	5,612
Risk Adj Average Cost ($/month)	$383	$394	$385	$131	$239	$897

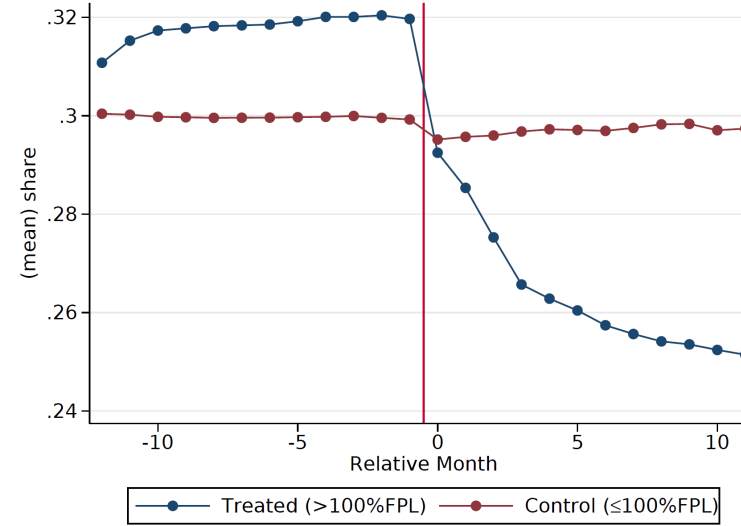Standard errors reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, and * $p < 0.10$.

← Go back

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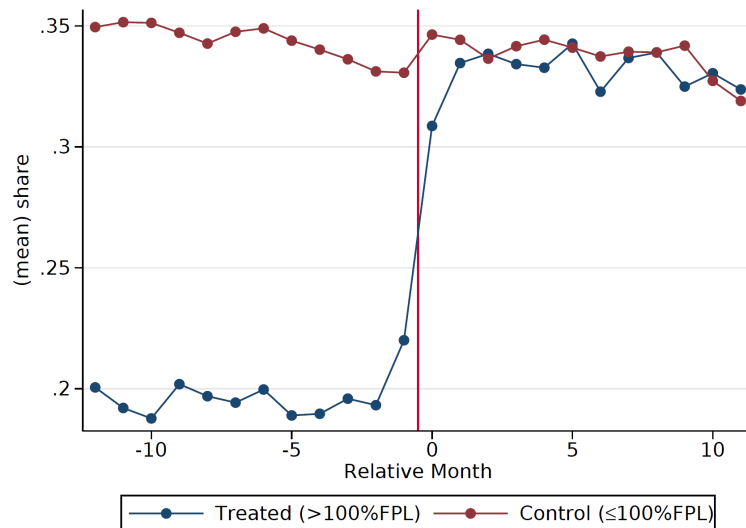# Effect of premium increase on average plan shares

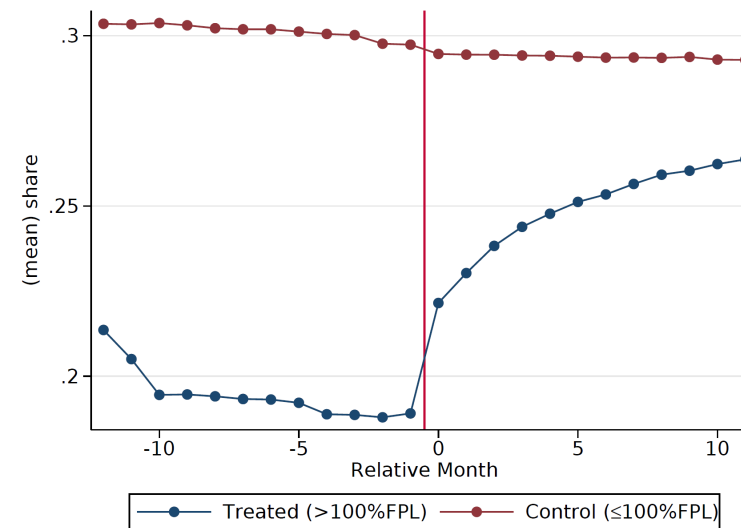**New enrollees, Premium Increase**
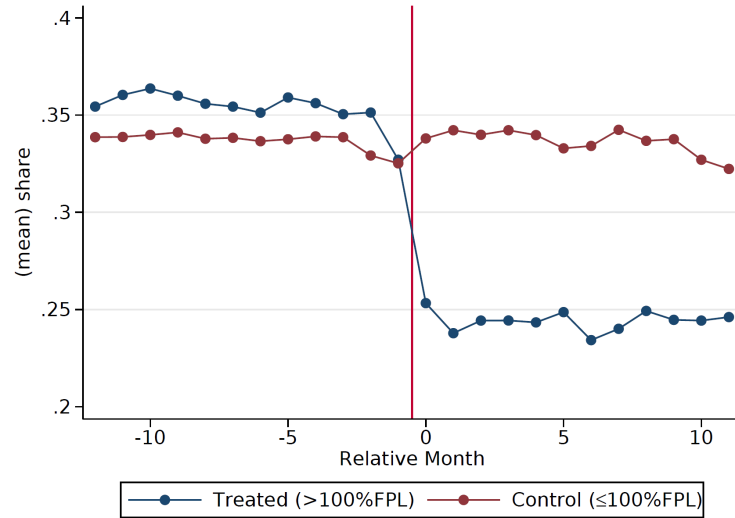
All enrollees, Premium Increase
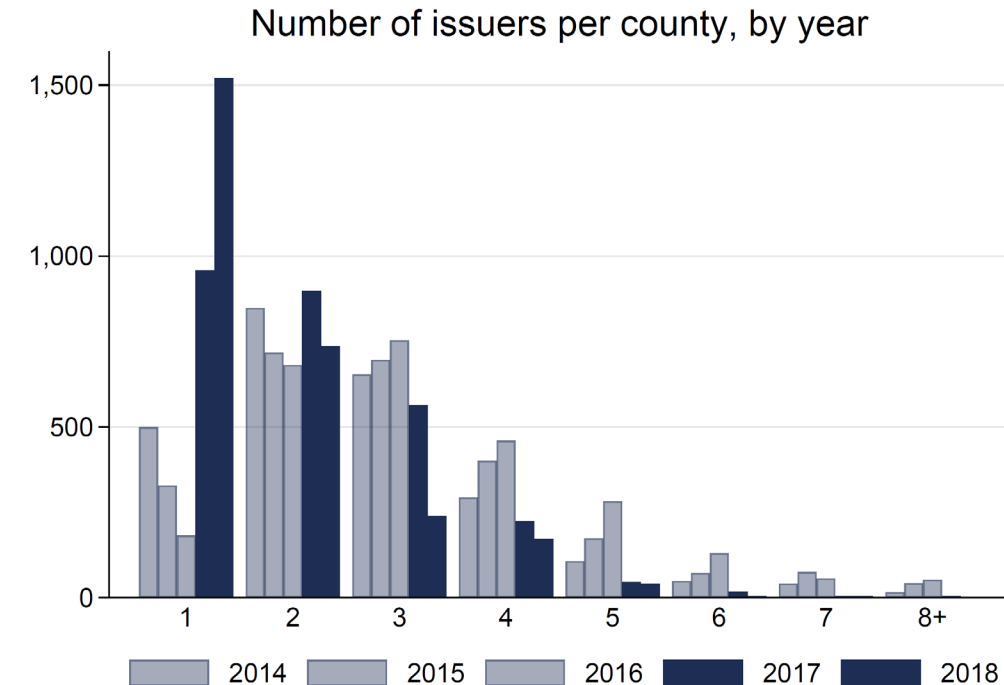
New enrollees, Premium Decrease

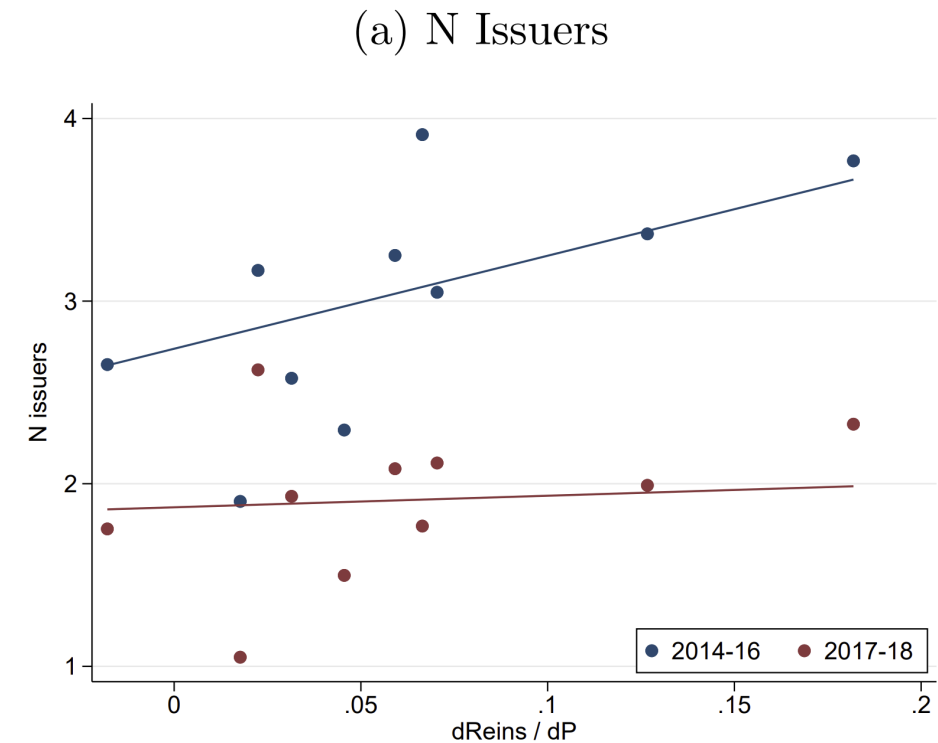**All enrollees Premium Decrease**

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Explaining firm exit in the ACA

- In 2016, the ACA reinsurance scheme expired
- Over the next 2 years, the number of monopoly counties increased from <250 to >1500.
- Our model predicts that removing reinsurance increases the slope of the average cost curve (dAC/dP), leading to exit

- To test this, we estimate state-specific "reinsurance slopes" (dReinsurance/dP)
- On average, dReinsurance/dP was about 1.3. That is, reinsurance significantly flattened the dAC/dP slope

- In a diff-in-diff framework, we find that states with larger reinsurance slopes (and hence more steepening of their dAC/dP curves after 2016) have more exit
- The dAC/dP effect can explain >20% of the decrease in # of firms per county

Number of issuers per county, by year

2014   2015   2016   2017   2018

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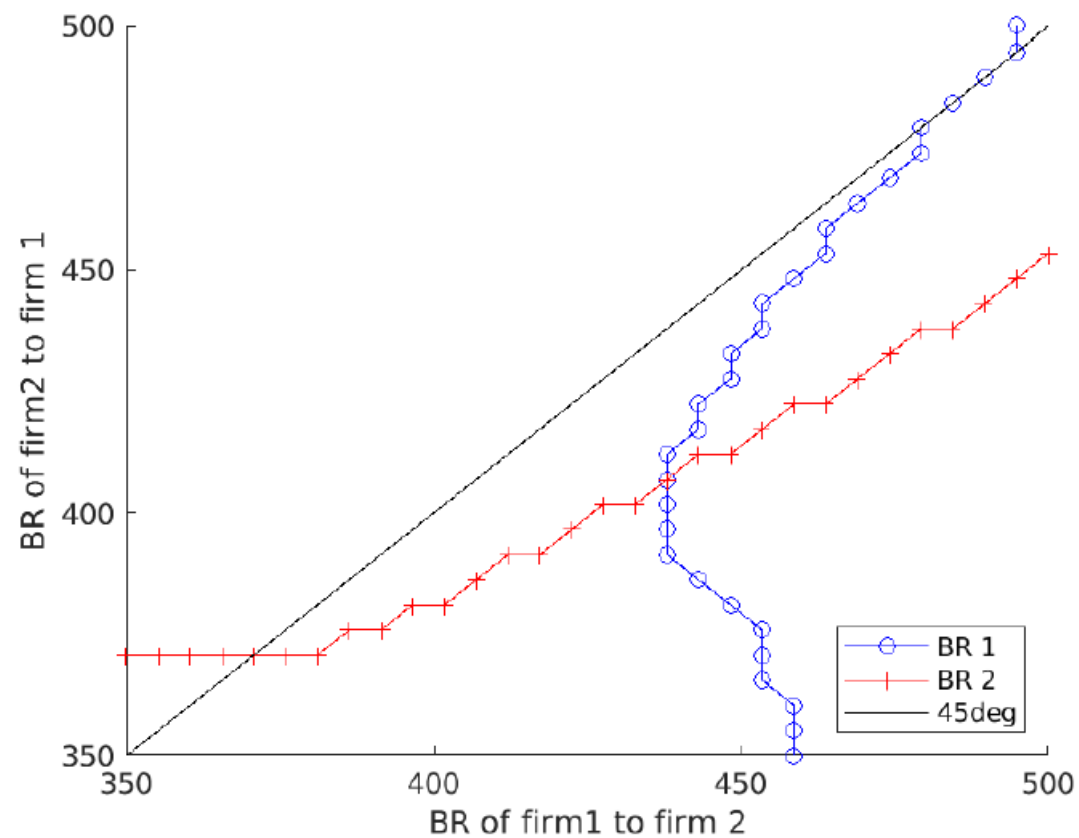- The dAC/dP effect can explain >20% of the decrease in # of firms per county

(a) N Issuers

Figure 9. Best Response Curves for BMC and Celticare

(a) No Risk Adjustment
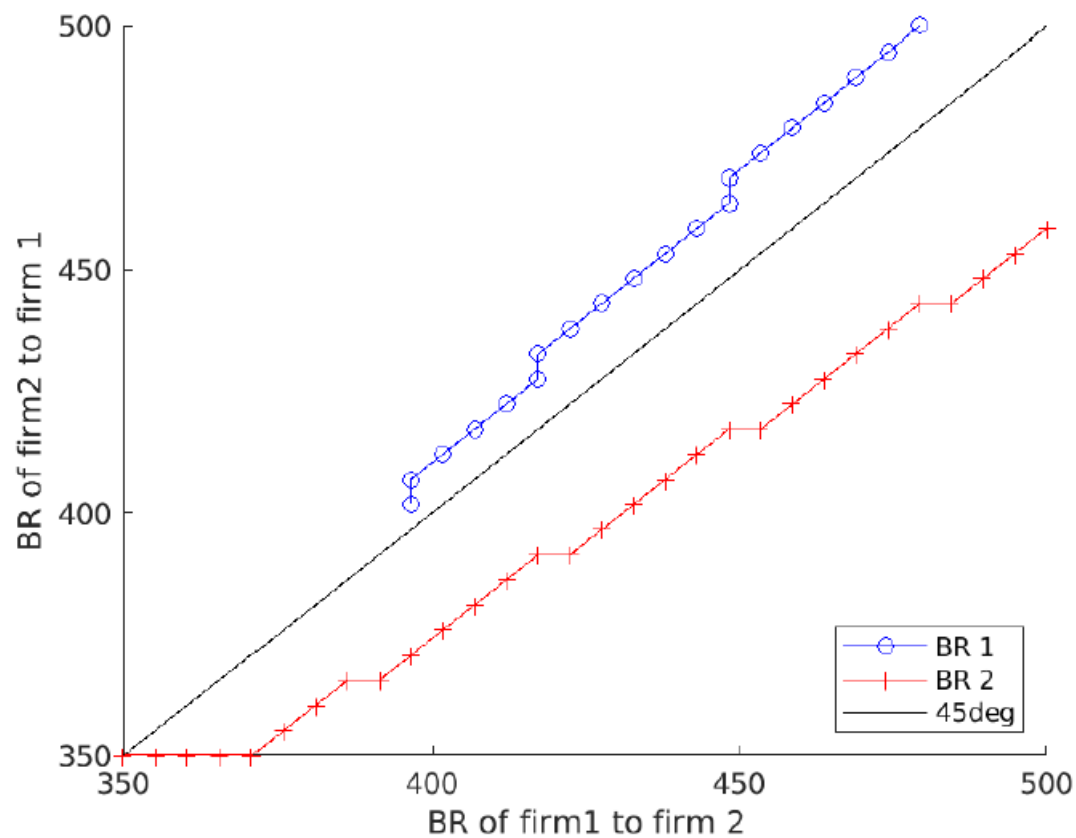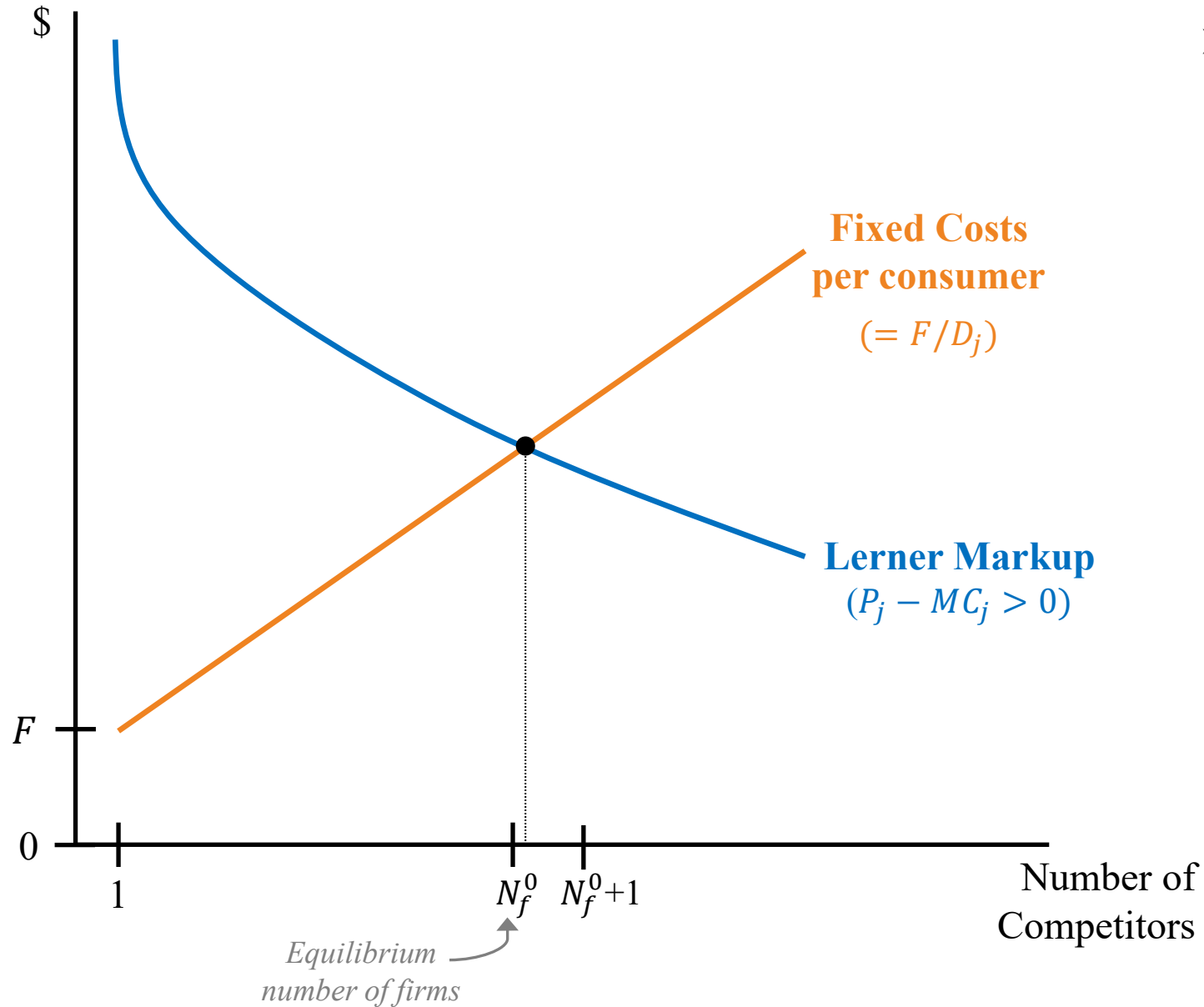
(b) Perfect Risk Adjustment

$\$$

Fixed Costs per consumer

$(= F/D_j)$

Lerner Markup

$(P_j - MC_j > 0)$

➢ Note: Curves based on simple example with symmetric firms, homogenous fixed costs *(e.g., Salop, 1979)*

F

0

1 N_f^0 N_f^0+1

Number of Competitors

Equilibrium number of firms

← *Go back*
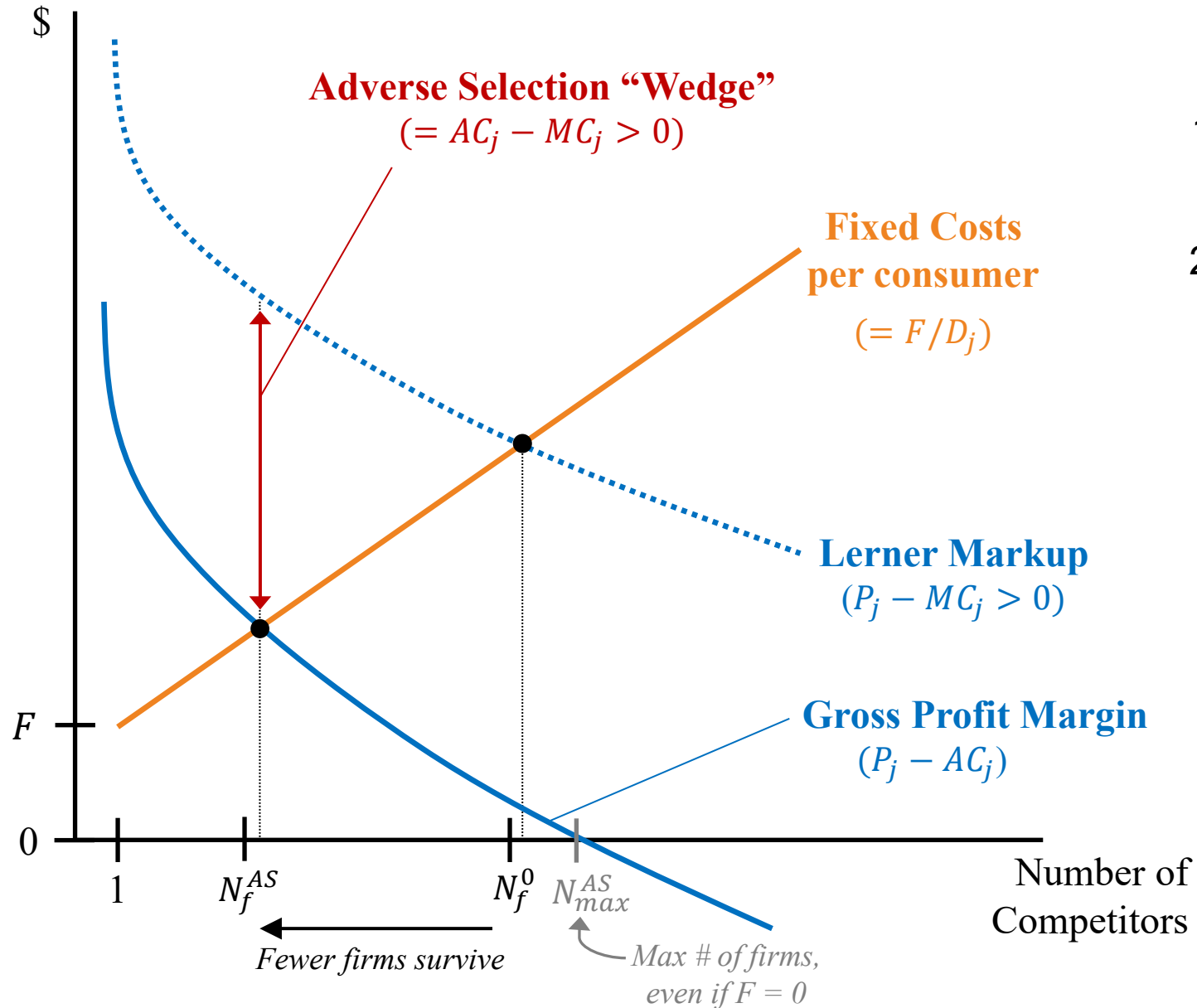
Implications

1. Fewer firms can compete in equilibrium

2. Limit on how many firms can compete, even without fixed costs

$

Adverse Selection "Wedge"
$(= AC_j - MC_j > 0)$

Fixed Costs per consumer
$(= F/D_j)$

Lerner Markup
$(P_j - MC_j > 0)$

Gross Profit Margin
$(P_j - AC_j)$

F

0

1 $\quad N_f^{AS}$ $\quad N_f^0$ $\;N_{max}^{AS}$

Number of Competitors

Fewer firms survive

Max # of firms, even if F = 0