Quality Disclosure and Regulation

Scoring Design in Medicare Advantage

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What's the point?

1. Endogenous quality (Spence, 1975)

- **Setting:** Monopoly (or oligopoly) when firms set both price and quality
- **Intuition:** Firm invests to the point where marginal quality valuation meets marginal costs of quality, but socially optimal quality depends on average valuation
- **Takeaway:** Profit-maximizing quality will differ from socially optimal quality when the marginal customer is not representative of the average

Natural in the presence of adverse selection, where the marginal patient is almost always different from the average patient

2. Types of quality disclosure

- Self-disclosed quality via advertising
- Word-of-mouth and aggregated reviews form users (Google, Rotten Tomatoes, etc.)
- Third-party rating agencies
- **Government regulation via mandated disclosure or licensing**

The main idea

- Need some form of quality disclosure to aid decision making
- Full-disclosure likely yields under-investment in quality
- Regulator can improve quality via coarse rating scores
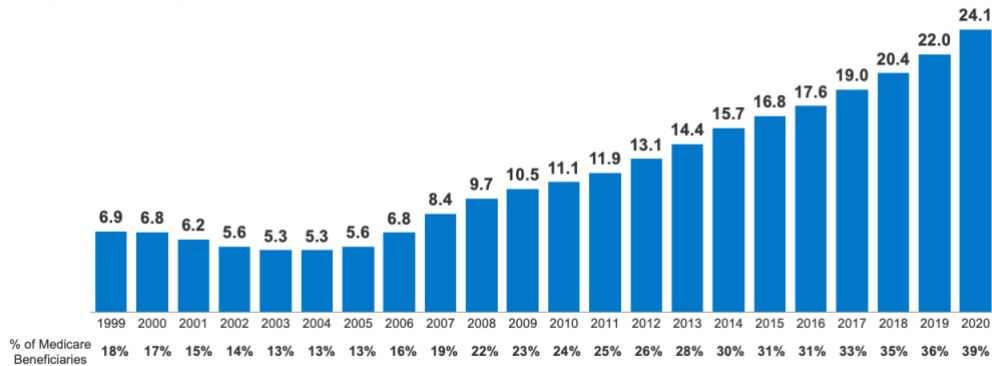- but...firms will respond to the scoring design accordingly

Context

Medicare Advantage

Figure 1

Total Medicare Advantage Enrollment, 1999-2020
(in millions)

Year	Enrollment	% of Medicare Beneficiaries
1999	6.9	18%
2000	6.8	17%
2001	6.2	15%
2002	5.6	14%
2003	5.3	13%
2004	5.3	13%
2005	5.6	13%
2006	6.8	16%
2007	8.4	19%
2008	9.7	22%
2009	10.5	23%
2010	11.1	24%
2011	11.9	25%
2012	13.1	26%
2013	14.4	28%
2014	15.7	30%
2015	16.8	31%
2016	17.6	31%
2017	19.0	33%
2018	20.4	35%
2019	22.0	36%
2020	24.1	39%

NOTE: Includes cost plans as well Medicare Advantage plans. About 62 million people are enrolled in Medicare in 2020.
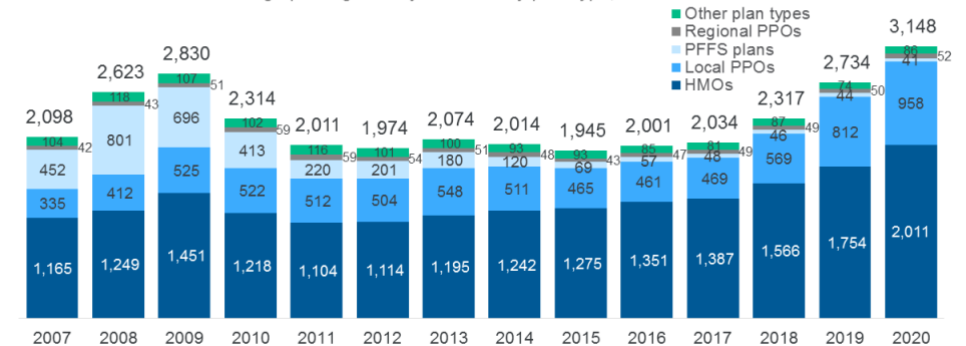SOURCE: KFF analysis of CMS Medicare Advantage Enrollment Files 2008-2020, and MPR, 1999-2007; enrollment numbers from March of the respective year, with the exception of 2006, which is from April. Number of people eligible for Medicare comes from the CMS Medicare Advantage Penetration Files for years 2008-2009; for years 2010-2020, number of people eligible for Medicare comes from the Medicare Enrollment Dashboard.

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Figure 1

More Medicare Advantage plans are available in 2020 than in any other year

Number of Medicare Advantage plans generally available by plan type, 2007-2020

Legend:
- Other plan types
- Regional PPOs
- PFFS plans
- Local PPOs
- HMOs

Year	Total	HMOs	Local PPOs	PFFS plans	Regional PPOs	Other plan types
2007	2,098	1,165	335	452	104	42
2008	2,623	1,249	412	801	118	43
2009	2,830	1,451	525	696	107	51
2010	2,314	1,218	522	413	102	59
2011	2,011	1,104	512	220	116	59
2012	1,974	1,114	504	201	101	54
2013	2,074	1,195	548	180	100	51
2014	2,014	1,242	511	120	93	48
2015	1,945	1,275	465	69	93	43
2016	2,001	1,351	461	57	85	47
2017	2,034	1,387	469	48	81	49
2018	2,317	1,566	569	46	87	49
2019	2,734	1,754	812	74	44	50
2020	3,148	2,011	958	41	89	52

NOTE: Excludes SNPs, EGHPs, HCPPs, and PACE plans. Other category includes cost plans and Medicare MSAs.
SOURCE: Kaiser Family Foundation analysis of CMS's Landscape Files for 2007 – 2020.

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Selecting an MA plan

When someone nears 65, they'll receive:

- Medicare & You Booklet (128 pages in 2022)
- Points beneficiary to Medicare's online plan finder tool
- **Lots** of other marketing materials touting different types of plans
  - Standalone Part D plans
  - Medicare supplemental plans
  - Medicare Advantage plans
- Assume someone has decided to search for an MA plan online

eneral Search

eneral plan search only requires your zip code.

ZIP Code: 37920

r selecting this button you are agreeing ~~ement~~

Find

Your ZIP Code spans multiple counties

Choose your county:
- ○ BLOUNT
- ○ KNOX
- ○ SEVIER

[Continue] or [Cancel]

ersonalized Search

ersonalized plan search requires your z
dicare information. This page is secured
rmation. If you don't want to enter you
y use the general search option above.

ZIP Code:

Medicare Number: ❶
Where can I find my Medicare
Number?

Last Name:

Getting to the Medicare Plan Find

Medicare.gov
he Official U.S. Government Site for Medicare

Medicare Plan Finder

View more videos

◀ ① ② ③ ④

Additional Tools

- ◆ Help with your Medicare choic
- ◆ Find PACE Plan(s)
- ◆ Find and compare Medigap policies
- ◆ Search by plan name and/or
- ◆ Enroll now
- ◆ Check your enrollment
- ◆ Medicare complaint form

All fields on the page are required unless noted as Optional.

How do you get your Medicare coverage?

○ Original Medicare

○ Medicare Health Plan (Such as an HMO, PPO, or Private-Fee-for-service plan)

○ I don't have any Medicare coverage yet

○ I don't know what coverage I have

Do you get help from Medicare or your state to pay your Medicare prescription drug costs?

○ I get help from Medicaid

○ I get supplemental security income

○ I belong to a Medicare Savings Program (MSP)

○ I applied for and got extra help through social security

○ I don't get any extra help

○ I don't know

Go Back   **Continue to Plan Results** ▶

Please select the information (e.g. dosing frequency) as prescribed by your doctor. Failure to enter information consistent with your prescription may result in the display of inaccurate pricing information. For example, if you select a frequency greater than that prescribed by your doctor, it may result in the display of the full drug cost rather than the appropriate cost-sharing amount. This will help us estimate your costs and allow you to see which plans cover your drugs. The site doesn't show pricing for most over the counter drugs or diabetic supplies. For more information, you may contact the plan.

I don't take any drugs I don't want to add drugs now

Type the name of your drug:

Find My Drug ▶

Or Browse A-Z:

A B C D E F G H I J K L M
N O P Q R S T U V W X Y Z

Help with common drug abbreviations
Hints on how to enter drug information
Why can't I find my drug?

Retrieve My Saved Drug List:

Your personal information cannot be
drug ID list. Medicare doesn't share t
you enter.

Drug List ID: What is

Password Date: What

May ▼ 9 ▼ 20

Retrieve My Drug Li

Refine Your Search

Update Plan Results ›

+ **Limit Your Monthly Plan Premium**

+ **Limit Your Annual Drug Deductible**

+ **Select Drug Options**

+ **Select Star Ratings**

+ **Select Coverage Options**

+ **Select Special Needs Plans**

+ **Change Health Status**

Summary of Your Search Results

There are a total of 45 plans available in your area including Original Medicare. **You may also use the filters on the left to narrow your search results. Please select one or more plan types to continue.**

Select All	Available Plans Based On Your Filters	Number of Plans Available: 44
☐	**Prescription Drug Plans (with Original Medicare)**	25 plan(s) available
☐	**Medicare Health Plans with drug coverage**	15 plan(s) available
☐	**Medicare Health Plans without drug coverage**	4 plan(s) available

Continue To Plan Results ›

Original Medicare (H0001-001-0)

Includes Part A (Hospital Insurance) and/or Part B (Medical Insurance) - Excludes Part D Drug Coverage

Estimated Annual Drug Costs: [?]	Monthly Premium: [?]	Deductibles: [?] and Drug Copay [?] / Coinsurance: [?]	Health Benefits: [?]	Drug Coverage [?] , Drug Restrictions [?]	Estimated Annual Health and Drug Costs: [?]	Overall Star Rating: [?]
Retail Annual: N/A **Mail Order** Annual: N/A	Standard Part B: $134	Part B Deductible: $183	Doctor Choice: Any Willing Doctor Out of Pocket Spending Limit: Not Applicable Ⓝ	N/A	$3,890	Not Available

⊟ Medicare Health Plans with Drug Coverage

Star Ratings

15 plans were found in **37920** based on your search criteria.   View 10 **View 15**

Compare Plans ▶

Sort Results by [Lowest Estimated Annual Health and Drug Cost ▾]   **Sort** ▶

Cigna-HealthSpring Preferred KNX (HMO) (H4454-031-0)

Organization: Cigna-HealthSpring

Estimated Annual Drug Costs: [?]	Monthly Premium: [?]	Deductibles: [?] and Drug Copay [?] / Coinsurance: [?]	Health Benefits: [?]	Drug Coverage [?] , Drug Restrictions [?] and Other Programs:	Estimated Annual Health and Drug Costs: [?]	Overall Star Rating: [?]	
Retail Annual: $96.00	$8.00	Annual Drug Deductible:	Doctor Choice: Plan	All Your Drugs on Formulary :N/A	$2,920	★★★✦	Enroll

Overview	Health & Drug Plan Benefits	Drug Costs & Coverage	Star Ratings	Manage Drugs

Humana Gold Plus H4461-031 (HMO)

(H4461-031) [1] Plan Type: HMO
Organization: Cariten Health Plan Inc.

Members: 1-800-457-4708
711(TTY/TDD)
Non Members: 1-800-833-2364
711(TTY/TDD)

Coverage: Provides health and drug coverage

D **V**

Enroll

AARP MedicareComplete Plus Plan 1 (HMO-POS)

(H5253-047) [1] Plan Type: HMO with POS Option
Organization: UnitedHealthcare

Members: 1-800-643-4845
711(TTY/TDD)
Non Members: 1-800-555-5757
711(TTY/TDD)

Coverage: Provides health and drug coverage

D **V** **H**

Enroll

BlueAdvantage Sapphire (PPO)

(H7917-030) [1] Plan Type: Local Preferred Provider Organization
Organization: BlueCross BlueShield of Tennessee

Members: 1-800-831-2583
711(TTY/TDD)
Non Members: 1-800-292-5146
711(TTY/TDD)

Coverage: Provides health and drug coverage

D **V** **H**

Enroll

⊟ Additional Plan Information

	Humana Gold Plus	AARP MedicareComplete	BlueAdvantage Sapphire
Overall Star Rating: [?]	★★★★⯪ 4.5 out of 5 stars	★★★★ 4 out of 5 stars	★★★★ 4 out of 5 stars
Health Plan Star Ratings: [?]	★★★★ 4 out of 5 stars	★★★★ 4 out of 5 stars	★★★★ 4 out of 5 stars
Drug Plan Star Ratings: [?]	★★★★⯪ 4.5 out of 5 stars	★★★⯪ 3.5 out of 5 stars	★★★★⯪ 4.5 out of 5 stars
Plan Type: HMO		**Plan Type:** HMO with POS Option	**Plan Type:** Local Preferred Provider

# Star Ratings

MEASURE	DEFINITION
Overall Star Rating	The **Overall Star Rating** gives an overall rating of the plan's quality and performance for the types of services each plan offers. For plans covering health services, this is an overall rating for the quality of many medical/health care services that fall into 5 categories: ◆ **Staying healthy: screening tests and vaccines.** Includes whether members got various screening tests, vaccines, and other check-ups to help them stay healthy. ◆ **Managing chronic (long-term) conditions**: Includes how often members with certain conditions got recommended tests and treatments to help manage their condition. ◆ **Member experience with the health plan**: Includes member ratings of the plan. ◆ **Member complaints and changes in the health plan's performance:** Includes how often Medicare found problems with the plan and how often members had problems with the plan. Includes how much the plan's performance has improved (if at all) over time. ◆ **Health plan customer service**: Includes how well the plan handles member appeals. For plans covering drug services, this is an overall rating for the quality of prescription-related services that fall into 4 categories: ◆ **Drug plan customer service:** Includes how well the plan handles member appeals. ◆ **Member complaints and changes in the drug plan's performance**: Includes how often Medicare found problems with the plan and how often members had problems with the plan. Includes how much the plan's performance has improved (if at all) over time. ◆ **Member experience with plan's drug services:** Includes member ratings of the plan. ◆ **Drug safety and accuracy of drug pricing**: Includes how accurate the plan's pricing information is and how often members with certain medical conditions are prescribed drugs in a way that is safer and clinically recommended for their condition.

Preview of findings

1. Estimate structural model of price **and quality investments**

2. Identify optimal scoring design
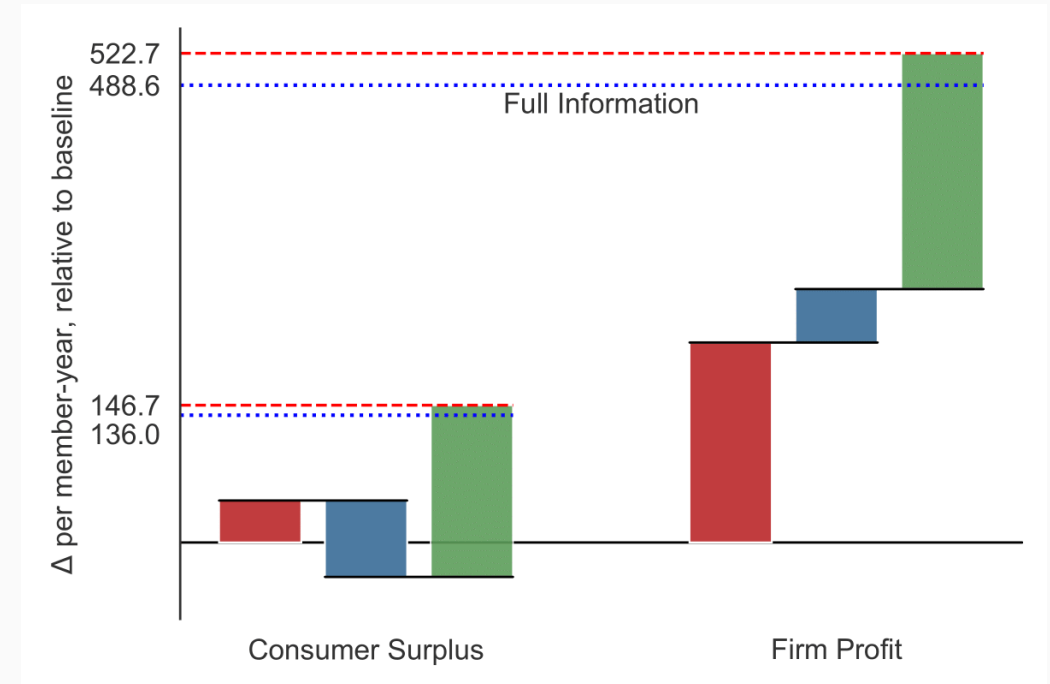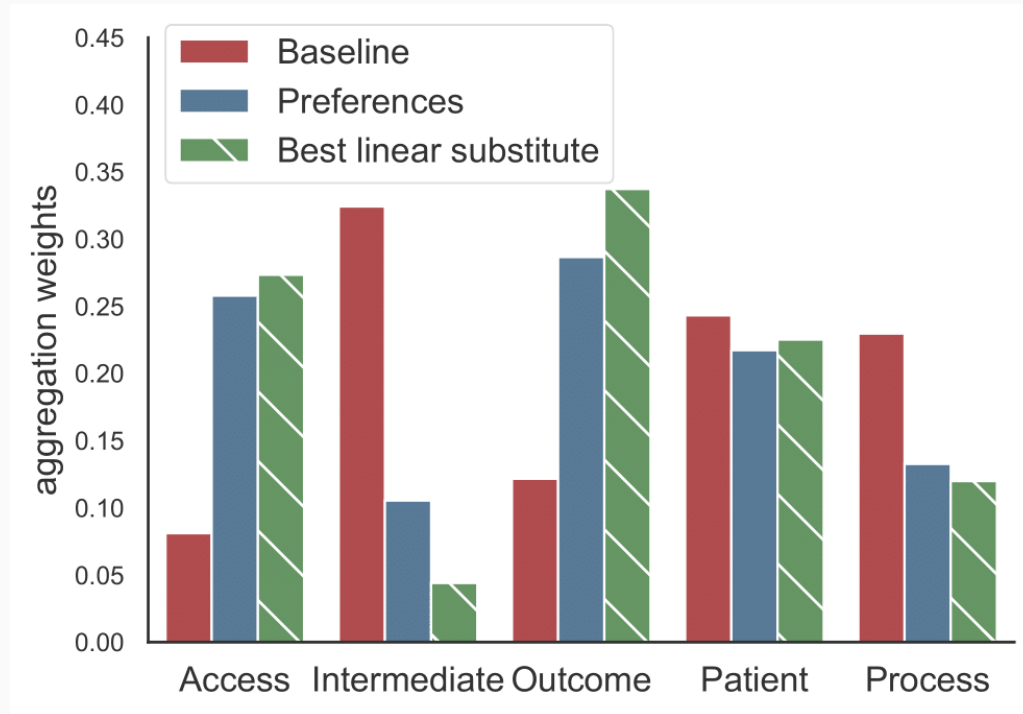
Some points of applause

- Substantial contribution, both theoretical and empirical
- Highly policy relevant

"To address this, I completed the data by reviewing a decade of public communications by CMS aimed at insurers. I recover year-to-year changes to the scoring design, **replicating the public scoring assignment perfectly.**"

Setup and estimation

Scoring ψ Investments $\boldsymbol{x}$ Quality $\boldsymbol{q} \sim F(\cdot|\boldsymbol{x})$ Prices $\boldsymbol{p}$ $D(\boldsymbol{p}, \psi(\boldsymbol{q}), \psi)$
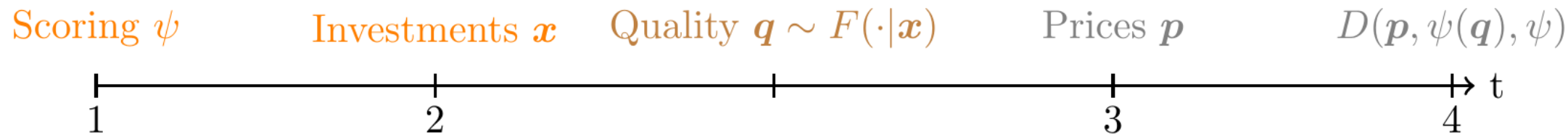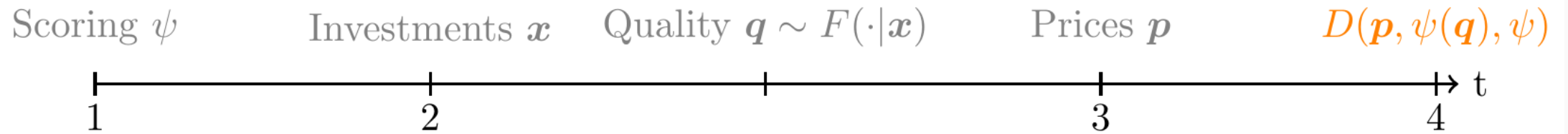
1   2   3   4   t

$\text{Scoring } \psi \qquad \text{Investments } \boldsymbol{x} \qquad \text{Quality } \boldsymbol{q} \sim F(\cdot|\boldsymbol{x}) \qquad \text{Prices } \boldsymbol{p} \qquad D(\boldsymbol{p}, \psi(\boldsymbol{q}), \psi)$

$$1 \qquad\qquad 2 \qquad\qquad\qquad\qquad 3 \qquad\qquad 4 \qquad t$$

What's new here?

- Endogenous quality investments with imperfect mapping into quality scores
- Endogenous scoring design

$$\begin{array}{c} \text{1} \qquad\qquad \text{2} \qquad\qquad \qquad\qquad \text{3} \qquad\qquad \text{4} \end{array} \longrightarrow t$$

$$u_{ij} = \underbrace{\alpha_i P_j}_{\text{premium}} + \underbrace{\beta_i b_j}_{\text{coverage}} + \underbrace{\mathcal{E}_\psi[\boldsymbol{\gamma}'\boldsymbol{q}|\psi(q_j)]}_{\text{quality}} + \underbrace{\lambda' z_{ij}}_{\substack{\text{Obs.} \\ \text{attributes}}} + \underbrace{\xi_j}_{\substack{\text{unobs.} \\ \text{preferences}}} + \underbrace{\varepsilon_{ij}}_{\sim\text{T1EV}}$$

Note: when you see j, think jmt

Demand estimation

$$u_{ij} = \underbrace{\alpha_i P_j}_{\text{premium}} + \underbrace{\beta_i b_j}_{\text{coverage}} + \underbrace{\mathcal{E}_\psi[\boldsymbol{\gamma}'\boldsymbol{q}|\psi(q_j)]}_{\text{quality}} + \underbrace{\lambda' z_{ij}}_{\substack{\text{Obs.} \\ \text{attributes}}} + \underbrace{\xi_j}_{\substack{\text{unobs.} \\ \text{preferences}}} + \underbrace{\varepsilon_{ij}}_{\sim \text{T1EV}}$$
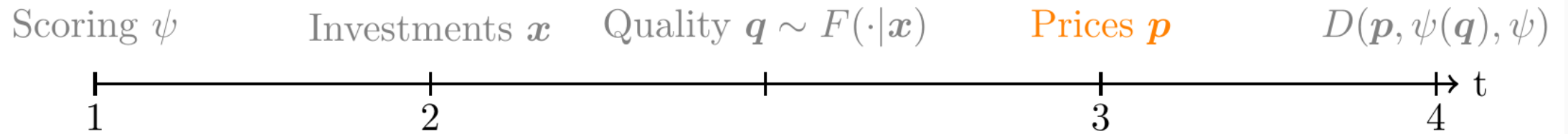
Two(three)-step process:

1. Estimate mean preferences, $\hat{\boldsymbol{\delta}}_j$, from $u_{ij} = \color{red}{\delta_j} \color{black}{} + \color{blue}{\kappa_{ij}} \color{black}{} + \varepsilon_{ij}$

2. TSLS regression of $\hat{\boldsymbol{\delta}}_j$ on observable characteristics and fixed effects.

3. (if needed) Estimate preference for quality by minimizing the square difference between a contract fixed effect and expected quality, $\eta_j - \boldsymbol{\gamma}\mathcal{E}[\boldsymbol{q}|r,\psi]$, across time periods (pairwise time period differences).

Question/concern

Estimating preferences for quality...

- within an estimated fixed effect, $\hat{\eta}$
- within an estimated mean preference, $\hat{\delta}$
- What does the distribution of these fixed effects look like?
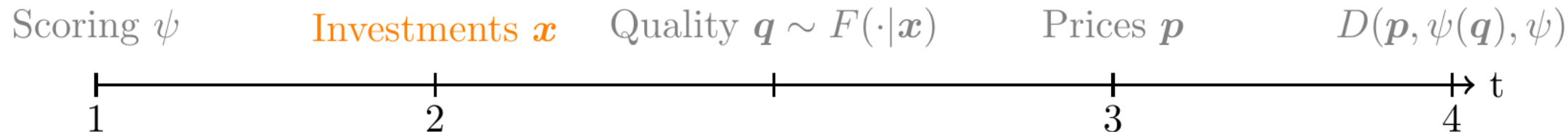- How much variation exists in **within-contract** quality (or expected quality) over time?

Scoring ψ | Investments $\boldsymbol{x}$ | Quality $\boldsymbol{q} \sim F(\cdot|\boldsymbol{x})$ | Prices $\boldsymbol{p}$ | $D(\boldsymbol{p}, \psi(\boldsymbol{q}), \psi)$

$$\begin{array}{cccc} \vdash & \vdash & \vdash & \vdash\!\!\!\rightarrow \; t \\ 1 & 2 & 3 & 4 \end{array}$$

$$\pi_f(\boldsymbol{q}, \psi) = \max_{\{p_j\}_{j \in J_f}} \sum_{j \in J_f} \underbrace{D_j(\boldsymbol{p}, \psi(\boldsymbol{q}))}_{\text{demand}} (\underbrace{R_j(p_j)}_{\text{mg. revenue}} - \underbrace{C(\boldsymbol{q}_j, \boldsymbol{z}_j, \boldsymbol{\theta}_j)}_{\text{mg. cost}}))$$

$$\pi_f(\boldsymbol{q}, \psi) = \max_{\{p_j\}_{j \in J_f}} \sum_{j \in J_f} \underbrace{D_j(\boldsymbol{p}, \psi(\boldsymbol{q}))}_{\text{demand}} (\underbrace{R_j(p_j)}_{\text{mg. revenue}} - \underbrace{C(\boldsymbol{q}_j, \boldsymbol{z}_j, \boldsymbol{\theta}_j)}_{\text{mg. cost}}))$$

- Profit maximization yields standard $MR = MC$ expression
- Recover marginal costs
- Decompose marginal costs into part due to quality, other observable components, and residual,

$$MC = \boldsymbol{\theta}_q^c \boldsymbol{q} + \boldsymbol{\theta}_a^c \boldsymbol{a} + c$$

$$\max_{\boldsymbol{x}_f \in \mathbb{R}^{|\mathcal{Q}| \times |J_f|}} \underbrace{\int E\left[\pi_f(\boldsymbol{q}_f, \boldsymbol{q}_{-f}, \psi)\right] dF(\boldsymbol{q}_f|\boldsymbol{x}_f)}_{\text{expected insurance profit}} - \underbrace{I(\boldsymbol{x}_f, \boldsymbol{\mu_f})}_{\text{investment cost}}$$

Quality (investment costs) estimation

$$\max_{\boldsymbol{x}_f \in \mathbb{R}^{|\mathcal{Q}| \times |J_f|}} \underbrace{\int E\left[\pi_f(\boldsymbol{q}_f, \boldsymbol{q}_{-f}, \psi)\right] dF(\boldsymbol{q}_f | \boldsymbol{x}_f)}_{\text{expected insurance profit}} - \underbrace{I(\boldsymbol{x}_f, \boldsymbol{\mu_f})}_{\text{investment cost}}$$

- Equate marginal revenue from quality investment with marginal investment cost
- Assume investment costs are quadratic and **separable across products and categories**

Question/concern

- Costs almost surely are **not** separable across categories
- Investment in network changes access, outcomes, patient surveys
- Investment for one contract likely spills over into other contracts for same insurer
- How much does this matter?
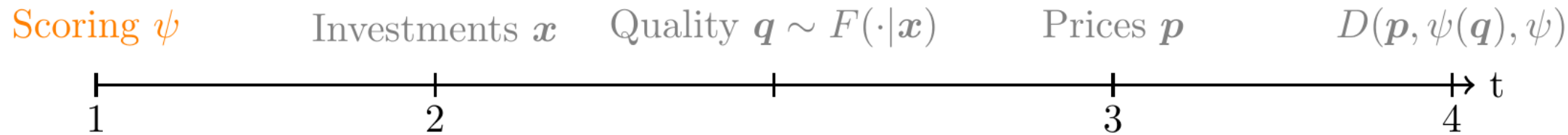
$$\max_{\psi \in \Psi} E_{\boldsymbol{q}}[\underbrace{CS(\psi, \boldsymbol{q})}_{\substack{\text{Consumer} \\ \text{surplus}}} + \rho^F \underbrace{\sum_f V_f(\psi, \boldsymbol{q}) - I(\boldsymbol{x}_f^*(\psi), \mu_f)}_{\substack{\text{Insurer} \\ \text{profit}}} - \rho^G \underbrace{Gov(\psi, \boldsymbol{q})}_{\substack{\text{Government} \\ \text{spending}}} | \boldsymbol{x}^*(\psi)]$$

Scoring design estimation

$$\max_{\psi \in \Psi} E_{\boldsymbol{q}}[\underbrace{CS(\psi, \boldsymbol{q})}_{\substack{\text{Consumer} \\ \text{surplus}}} + \rho^F \underbrace{\sum_f V_f(\psi, \boldsymbol{q}) - I(\boldsymbol{x}_f^*(\psi), \mu_f)}_{\substack{\text{Insurer} \\ \text{profit}}} - \rho^G \underbrace{Gov(\psi, \boldsymbol{q})}_{\substack{\text{Government} \\ \text{spending}}} | \boldsymbol{x}^*(\psi)]$$

- Designer chooses scoring rule, ψ, from class of rules, $\boldsymbol{\Psi}$
- Trades off information for efficiency
- Paper shows that any monotone partitional score reduces to two elements: an aggregator and a cutoff function
- Considers optimal design among the set of designs with no more than 15 partitions and quadratic aggregators, setting $\rho^F = 1$ and $\rho^G = 0$, for year 2015

- Do optimal cutoffs and aggregator change in different years?
- With different ρ^F and ρ^G?
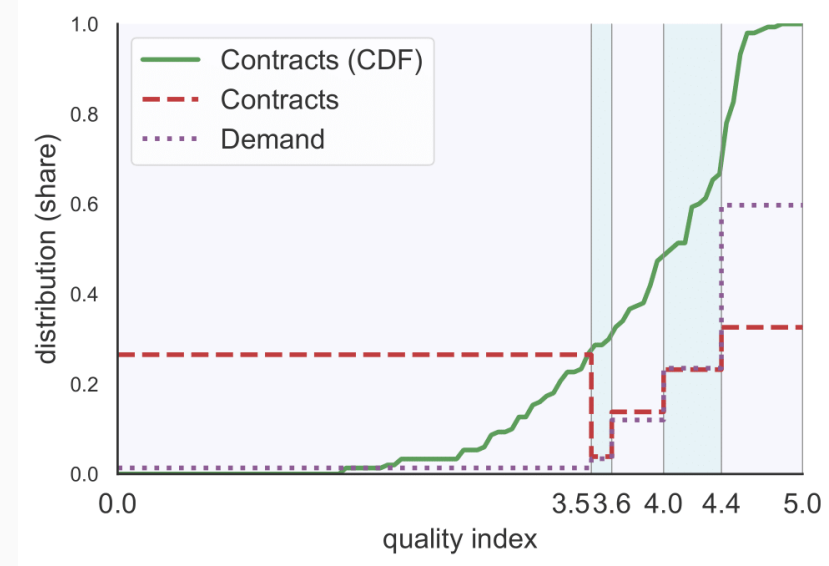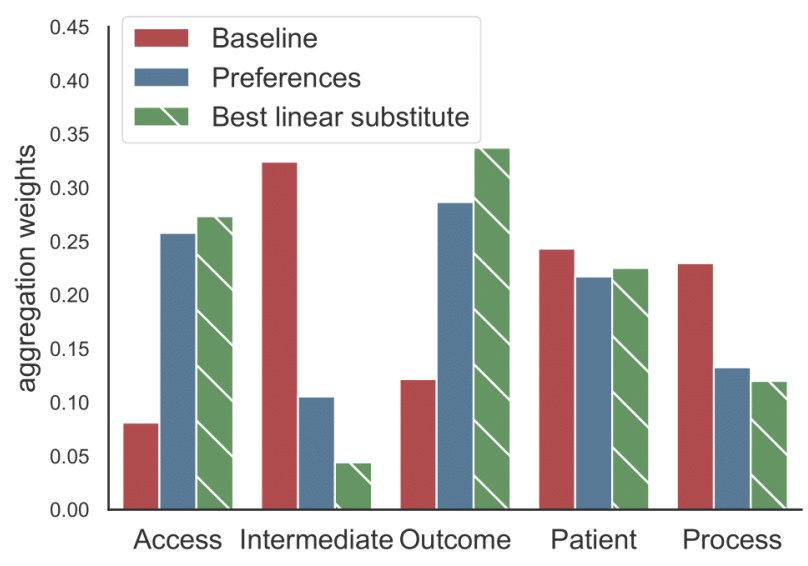- No firm response to quality bonuses, but costs to CMS could be in ρ^G

Main results

Demand
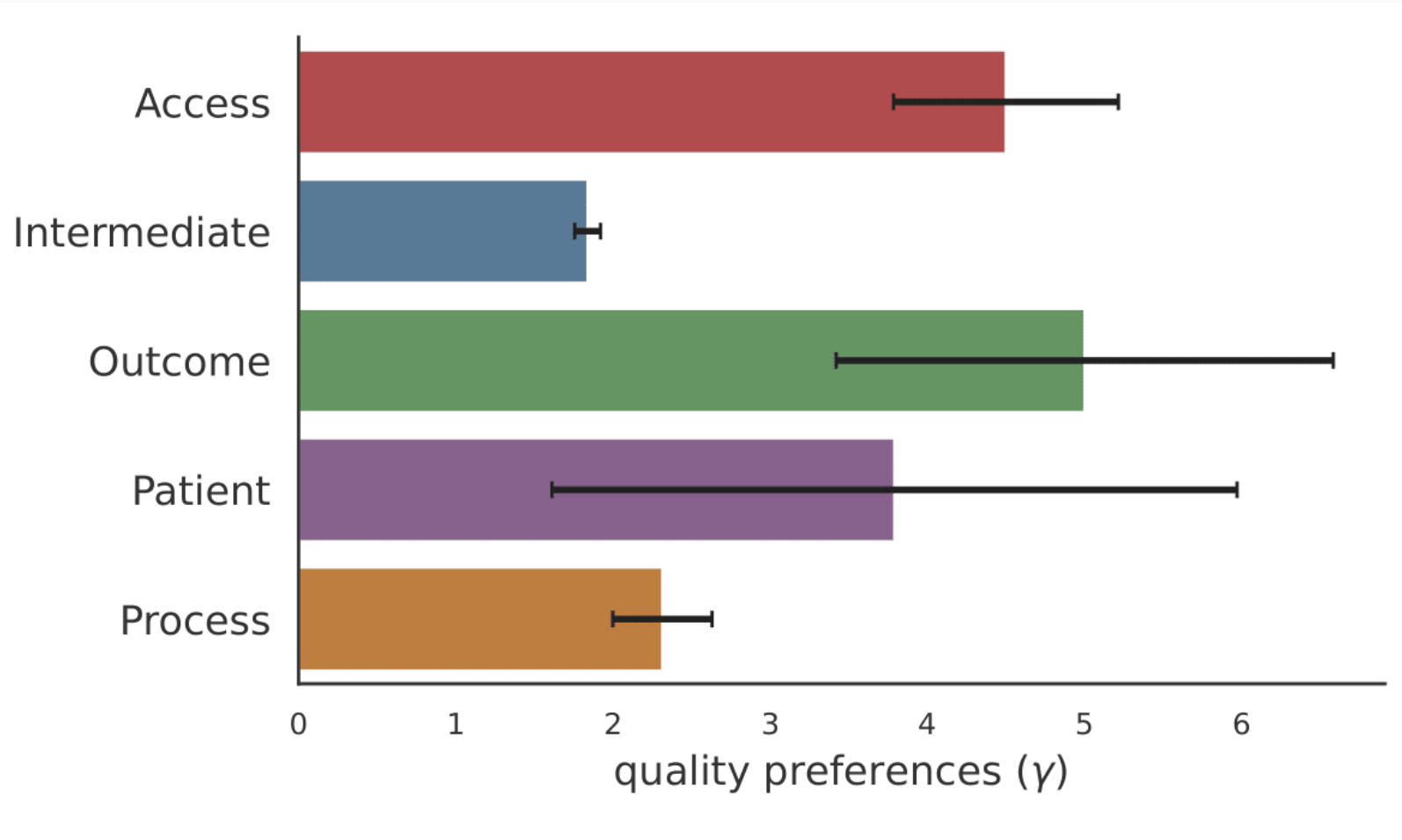
| Category	Insurance Costs, θ_q	Investment Costs, μ_k
Access	31.16	15.620*
Intermediate	108.40*	19.530*
Outcome	16.810*	15.000*
Patient	-244.30*	14.730*
Process	-175.60*	1.106

Scoring design

- Optimal design involves linear aggregator among 5 partitions
- Pooling at the bottom, with very little demand for low-quality plans
- Closely matches consumer WTP (except for Intermediate category?)
- **Question:** How much is 3.5 vs 3.6 just noise?
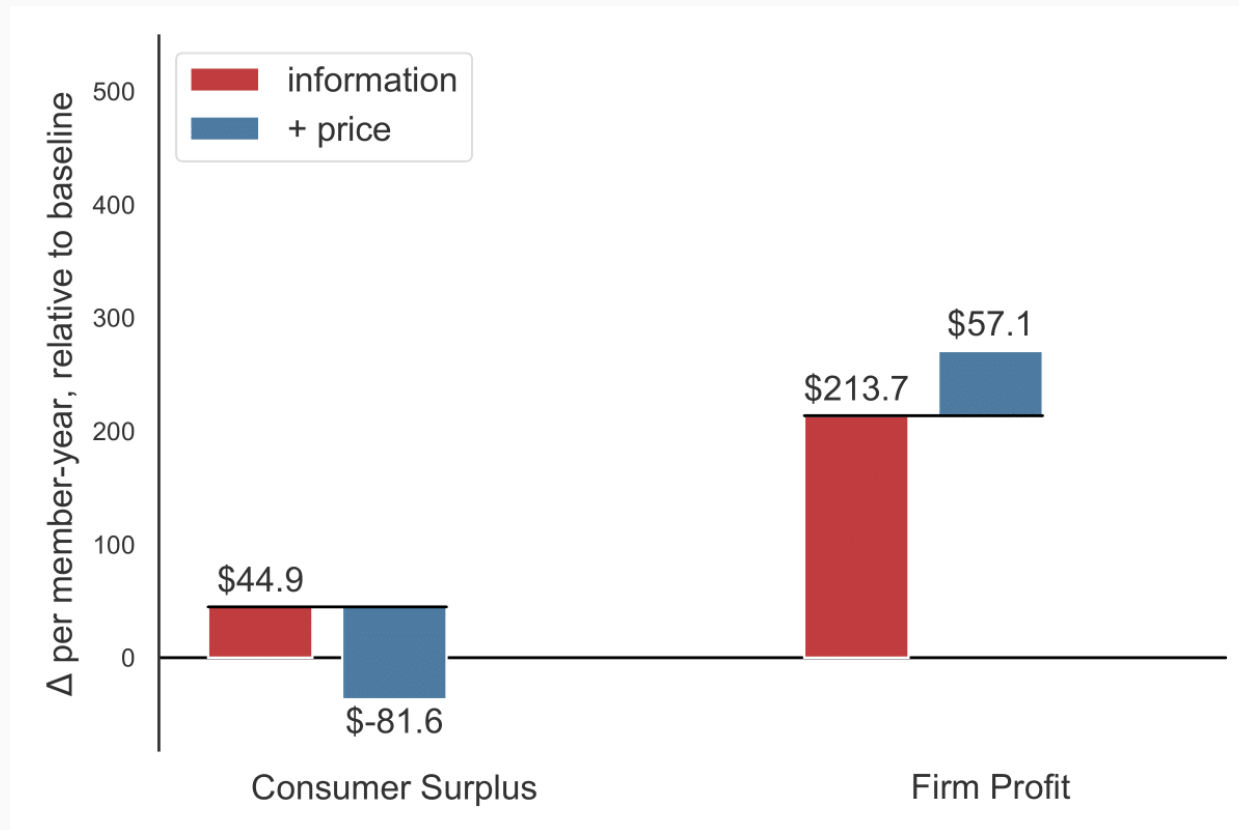
Scoring design with uninformed beneficiaries
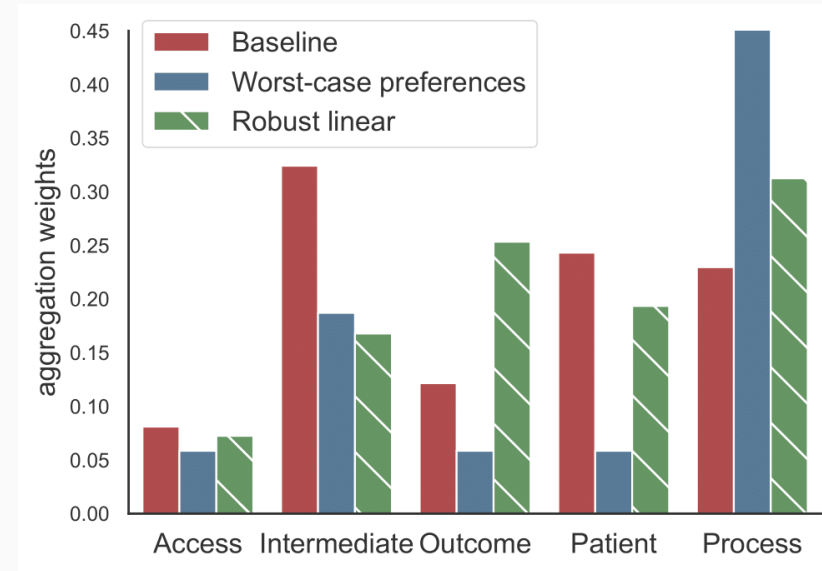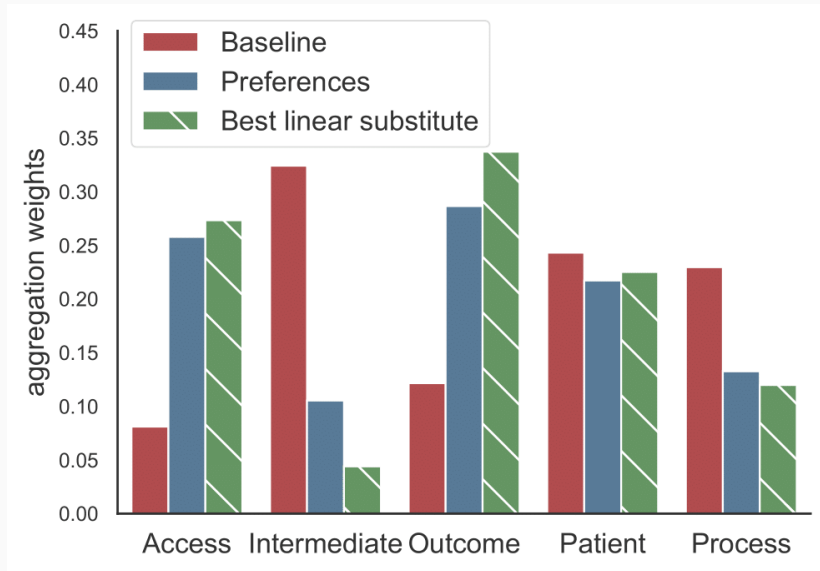
- Is CMS pretty close already?
- Current design seems consistent with some feasible set of preferences
- Would be very interesting to know under what preferences the current design is actually optimal
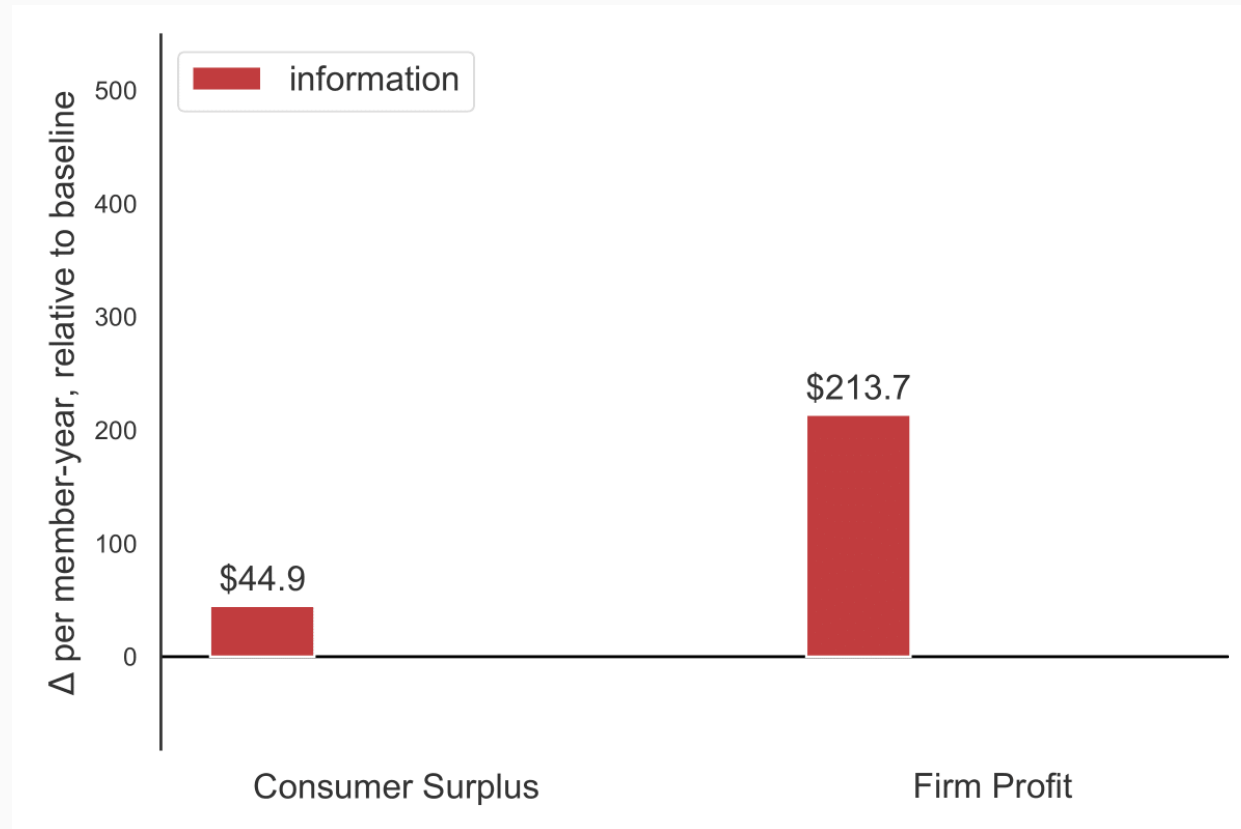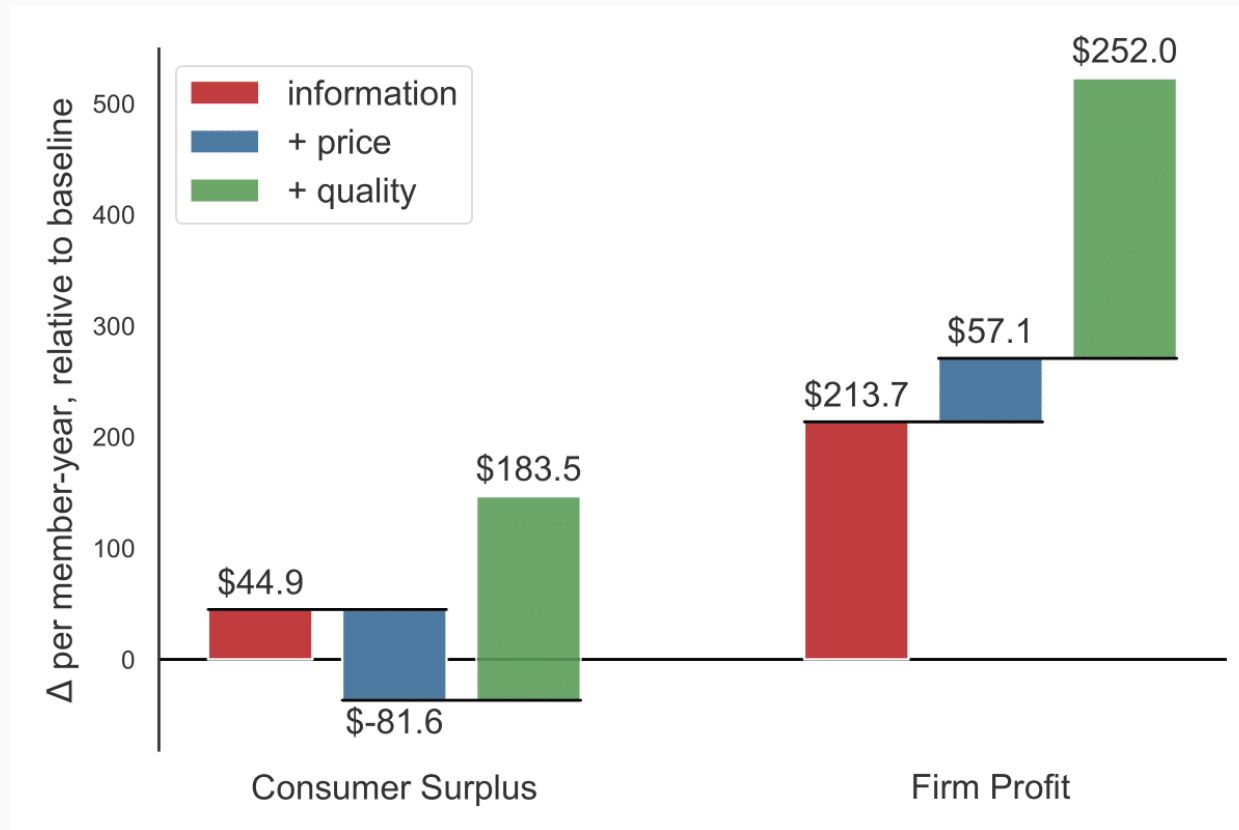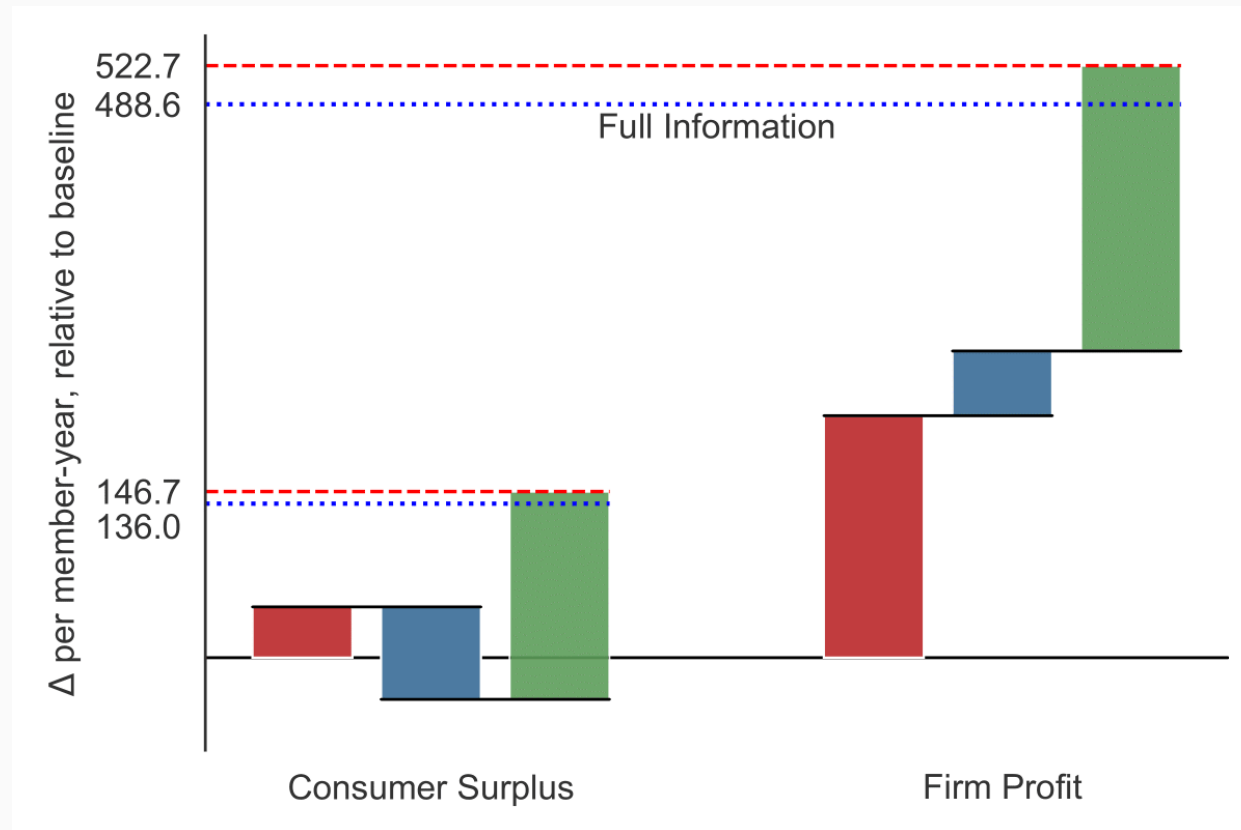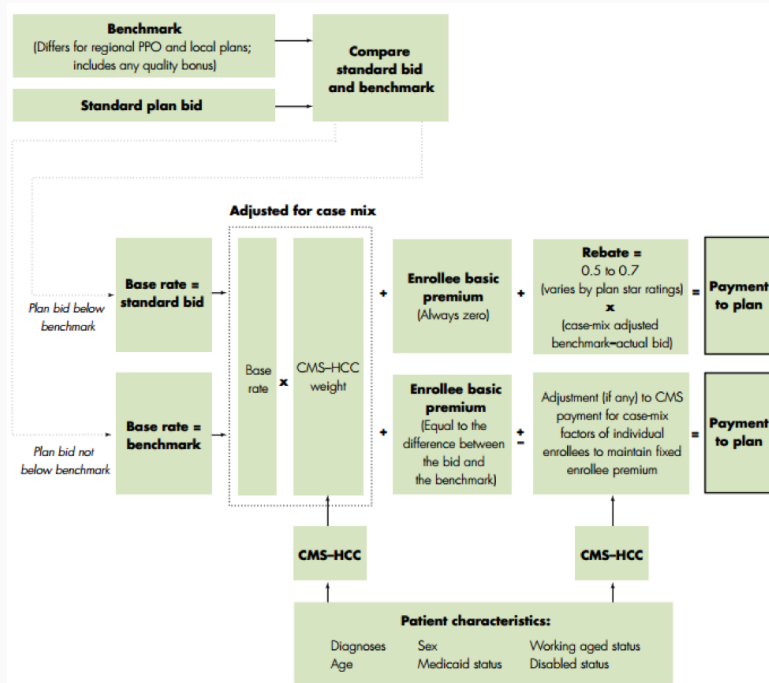
Welfare

Welfare

Welfare

Considerations for this paper

(not necessarily actionable)

The bid process

- Not just setting price
- Separate Part D bid process
- Ability to use Part C rebate to go toward Part D premium

Contracts vs plans

- Beneficiaries choose plans, defined by specific premium and benefits
- Quality is measured by contract
- Paper argues that there is really only one plan per contract
  - Makes sense in recent years but maybe not in early years
- Can't have it both ways
  - Price variation within contract good
  - but product differentiation within given quality score irrelevant?

Scoring design

Does (should) the setup incorporate...

- Bonuses for high scores? **No**
- Contract consolidation of plans? **No**
- Part D quality? **No**
- Penalty for high-variance contracts (i-factor)? **Maybe**
- Alert for ratings below 3 stars or at 5 stars? **Maybe**

Scoring design

More fundamental questions...

- Are ratings reflective of quality? How do we define a "good" health insurance plan?
- Is the rating monotonically increasing in underlying quality?

Considerations for more papers

1. Measuring quality

- What's the best way to measure the underlying quality score?
- Many of the current measures are provider (network) specific
- Relates to the *aggregator* in current framework, but would not take current categories (or construction of current categories) as given

2. Policy uncertainty

- Can some policy uncertainty avoid bunching just above the threshold values?
- How much policy uncertainty is optimal?
- How do insurers respond to such uncertainty?
- Already in the model: mapping between quality investments and the quality score
- Already in the data: introduction of new measures and publication of specific threshold values for some measures

3. Learning about scoring designs

- The scoring designs are complicated
- Likely takes time for insurers to understand the policy and update plans/contracts accordingly

Final thoughts