"Using Price Variation to Estimate Welfare in Insurance Markets," by Einav, Finkelstein, and Cullen (*QJE*, 2010)

Specific motivation (beyond the general "beyond testing" agenda):

- Quantification exercises are (by nature) "very" structural, so:
  - Difficult and time-consuming
  - Many hard-to-test assumptions
  - Hard to replicate and/or compare across contexts

This paper tries to still quantify but with less/minimal structure:

- Propose a conceptual approach that allows welfare calculation in selection markets but doesn't suffer from the above limitations
- Rely on standard consumer and producer theory
- Model demand and costs, but doesn't require modeling of primitives that give rise to them
- Extremely simple to implement, and in principle broadly applicable

Key requirements: cost data and good price variation

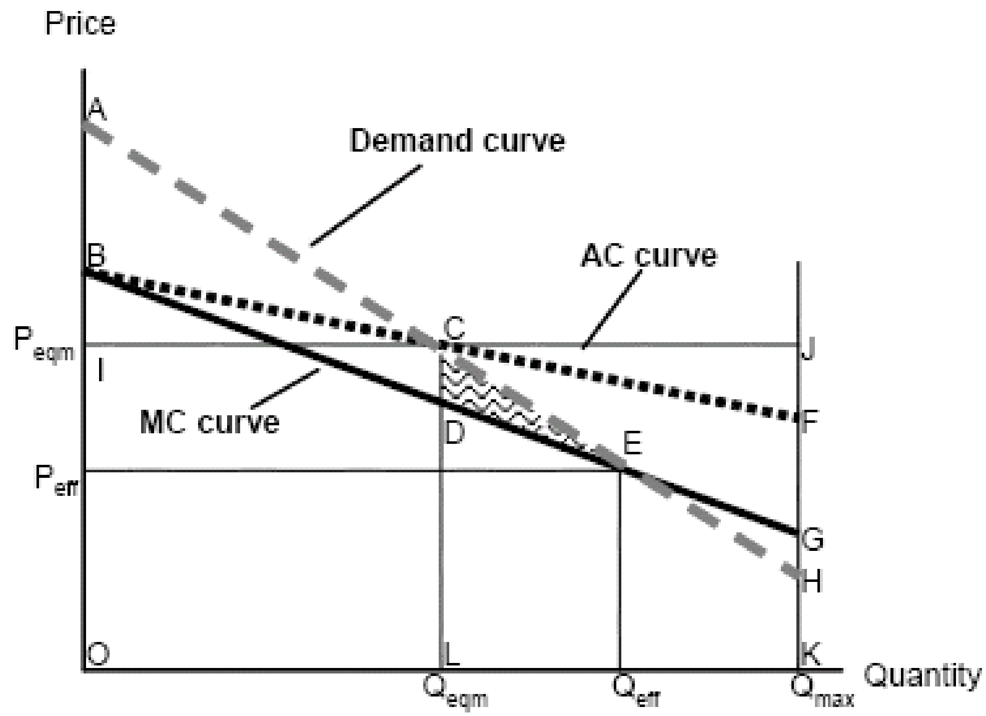
A side benefit: direct test of selection, and straightforward quantification of moral hazard

Main limitations:

- Rely on a fixed set of contracts
  - Empirically relevant: annuities, Medicare part D, our setting
- Cannot evaluate welfare from new contracts, so must focus on the mispricing cost of adverse selection
  - Somewhat related to product-space vs. characteristic-space approaches to demand estimation in IO

Already talked in my first class about the key idea:

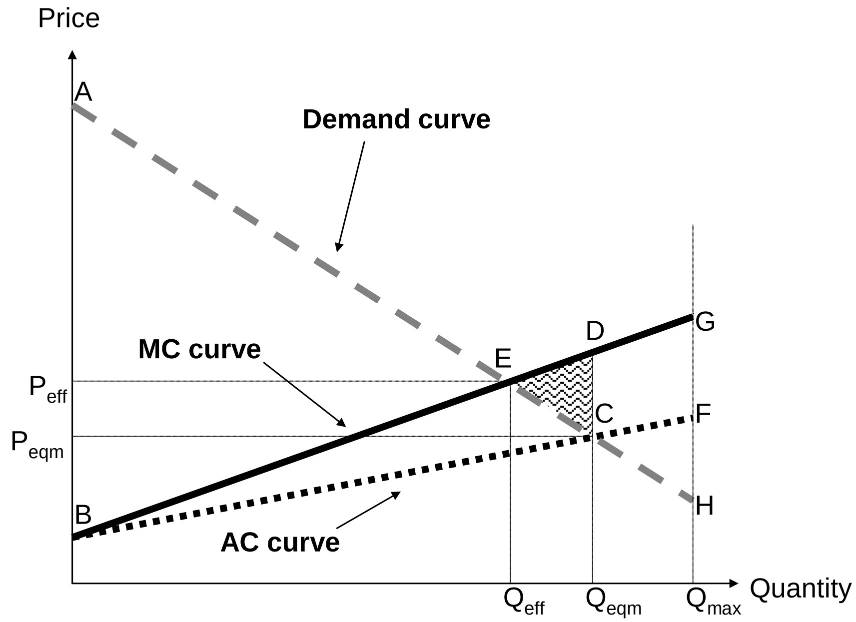
- Two contracts: full and no insurance (for simplicity)
- Order individuals by their willingness-to-pay
- Underlying insurer's cost depend on (unmodeled) primitives



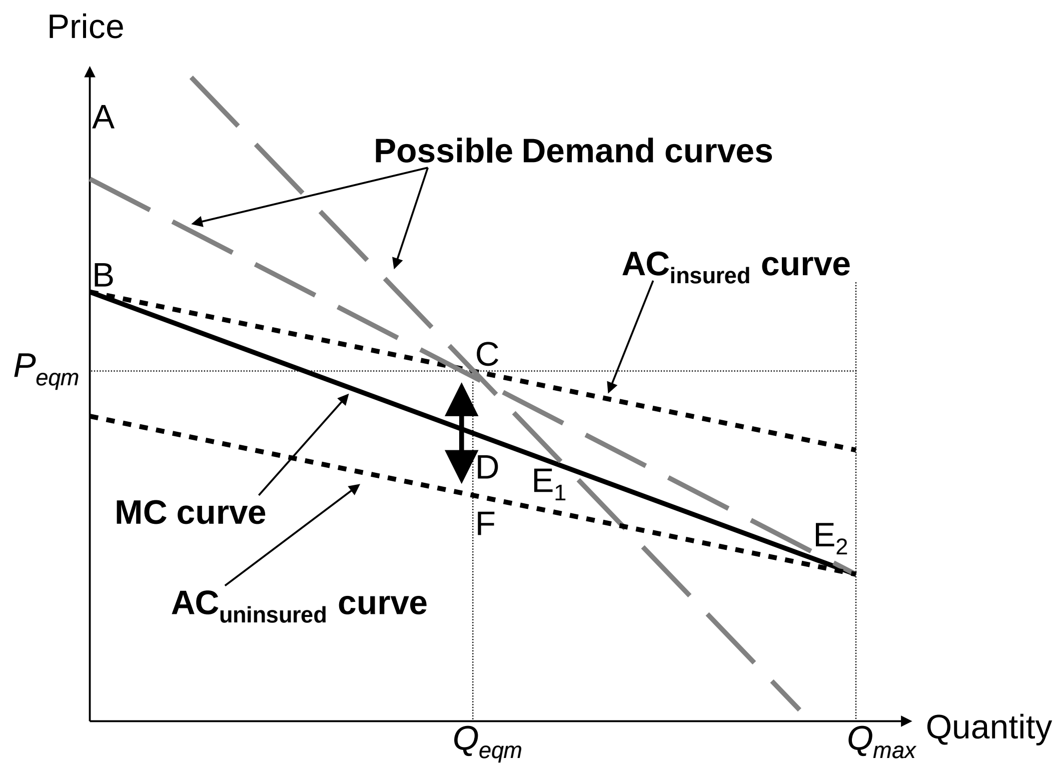
So estimate demand and AC from data, and back out MC. Then we have everything we need for welfare calculation.

Before moving to application, two more points about the pictures:

As mentioned in the first class, advantageous selection could be depicted using the same graphs:



Cost difference alone cannot determine welfare cost:



Application:

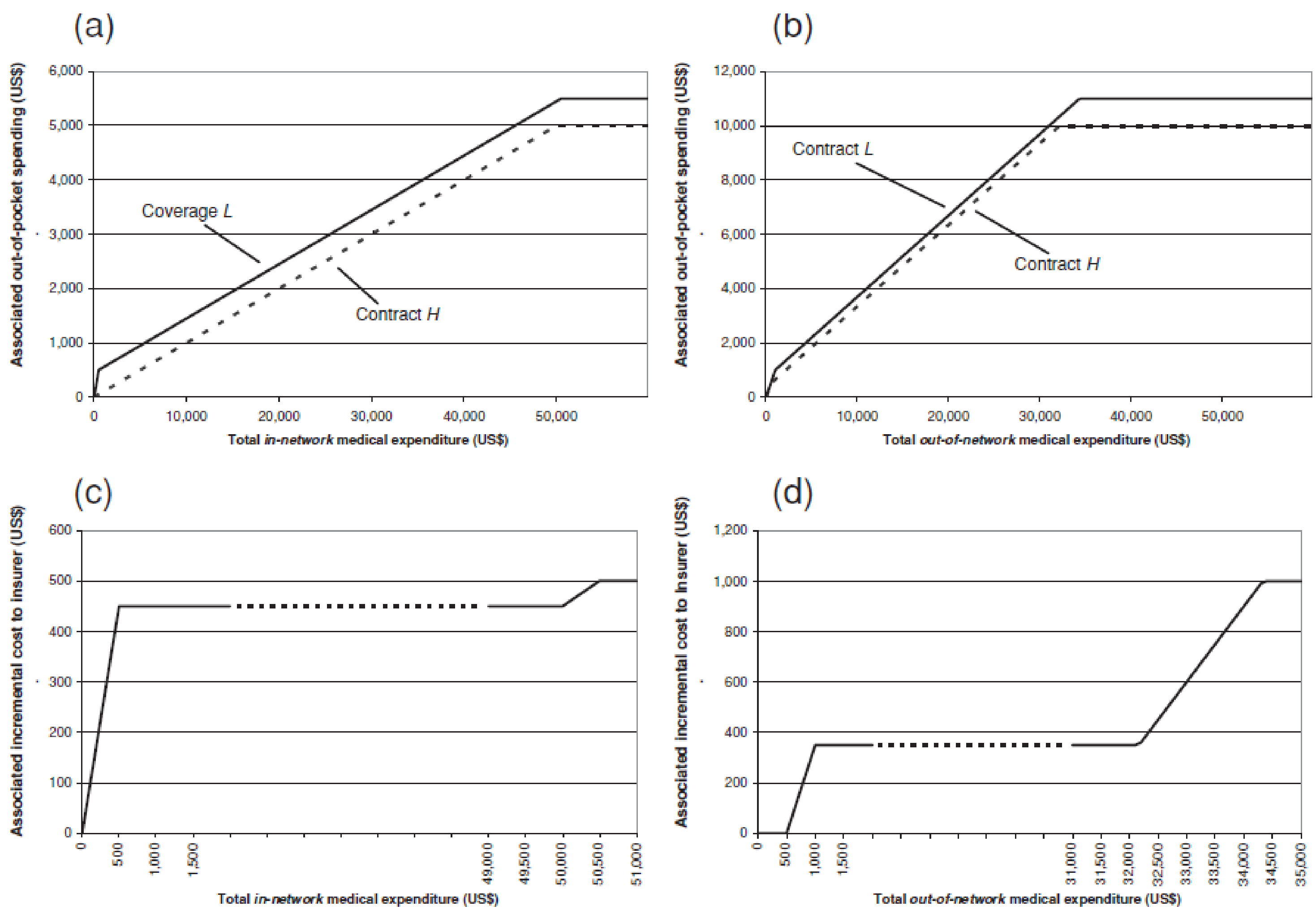
- Health insurance choices by Alcoa employees
- Same contracts, good price variation
- Conceptual exercise: if this was in a competitive market, what would have been the efficiency costs of adverse selection

Moral hazard is obviously a big deal in health insurance. In principle, same approach (and variation) can accommodate this too.

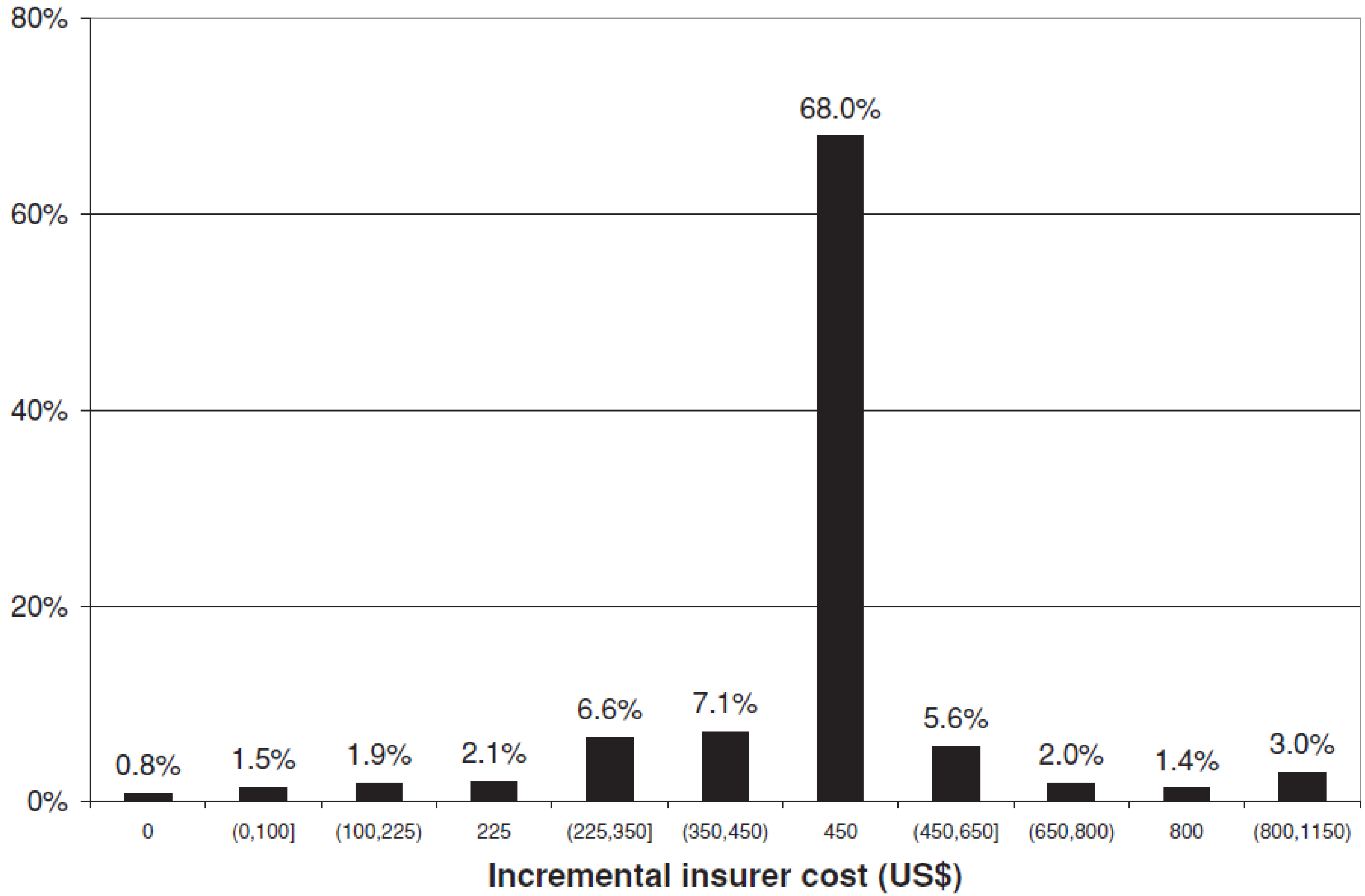
What we do?

- Focus on the two most common contracts
- Get data on Q (binary), p (relative), and (incremental) cost (lots of data work!)
- Estimate the curves and compute the triangle

Contracts:

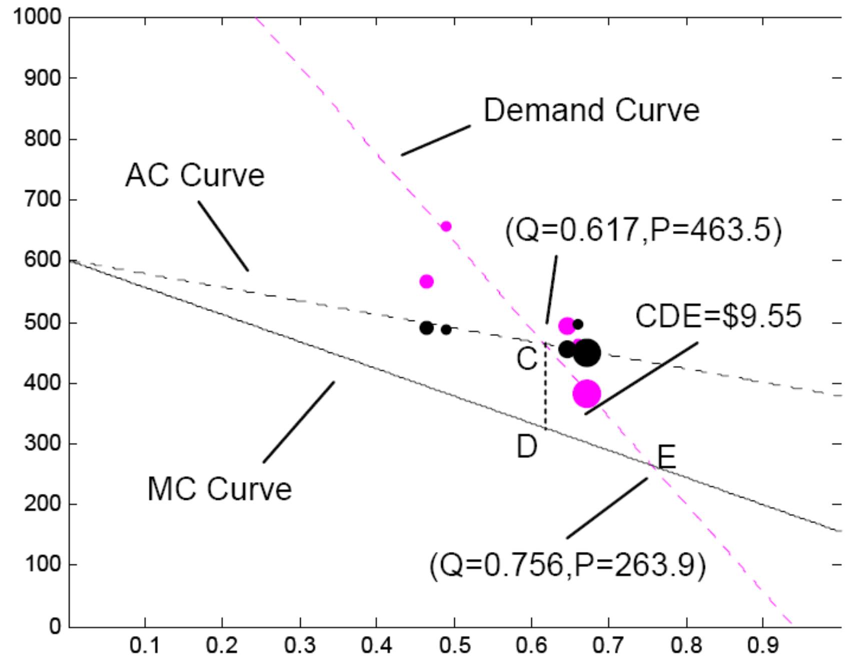

(a)
Associated out-of-pocket spending (US$)
Coverage L
Contract H
Total in-network medical expenditure (US$)
(b)
Associated out-of-pocket spending (US$)
Contract L
Contract H
Total out-of-network medical expenditure (US$)
(c)
Associated incremental cost to insurer (US$)
Total in-network medical expenditure (US$)
(d)
Associated incremental cost to insurer (US$)
Total out-of-network medical expenditure (US$)

Incermental cost:



(Relative) price ($) (1)	Number of employees (2)	Fraction chose contract *H* (3)	Average incremental cost ($) for those covered under: Contract *H* (4)	Contract *L* (5)
384	2,939	0.67	451.40	425.48
466	67	0.66	499.32	423.30
489	7	0.43	661.27	517.00
495	526	0.64	458.60	421.42
570	199	0.46	492.59	438.83
659	41	0.49	489.05	448.50

Results:



Small welfare cost!

- In absolute level (but this doesn't mean much)
- In relative terms (vs. total size of market, vs. mandates, vs. social cost of optimal subsidy)
- (yes, again, perhaps most of the costs is on the contract space, on which in this paper we have nothing to say)

"Pricing and Welfare in Health Plan Choice," by Bundorf, Levin, and Mahoney (*AER*, 2013)

Specific motivation (beyond the above general agenda):

- How much of the welfare cost can be recovered by restricting attention to uniform pricing?
    - A second dimension of individual heterogeneity would make uniform price a second best (there would be multiple, different marginal consumers)
    - While likely in a vertical choice (e.g. previous paper, due to heterogeneity in, say, risk aversion), it is even more important with more horizontal differentiation components (e.g. PPO vs. HMO).

What they do?

- Estimate demand for health insurance and insurance pricing
- Use these to perform counterfactuals

Note: somewhat closer to standard IO models of demand, so can see very clearly the "extra" stuff required for selection markets.

Data from an intermediary that helps small firms manage their plan offering

- Nice feature that allows observing pricing and choices of similar products by employees in <u>different</u> firms

Rich data on demographics, risk scores, menus, choices, and (average) costs

See tables 1 and 2

Table 1: Risk and Demographics

	Mean	Sd.	Min.	Max.
Employees (N = 3683)				
Risk Score	1.21	1.56	0.18	30.06
Age	40.56	12.01	18.00	72.00
Female	0.62	0.48	-	-
Spouse	0.28	0.45	-	-
Child	0.27	0.44	-	-
Enrollees (N = 6603)				
Risk Score	1.01	1.45	0.14	30.06
Age	32.13	17.67	0.00	72.00
Female	0.58	0.49	-	-
Spouse	0.19	0.39	-	-
Child	0.26	0.44	-	-
Firm-Years (N = 16)				
Risk Score	0.97	0.31	0.63	1.91
Age	31.67	4.63	25.71	46.09
Female	0.53	0.12	0.30	0.70
Spouse	0.19	0.07	0.08	0.27
Child	0.26	0.08	0.06	0.39
Employees	230.19	241.51	28.00	838.00
Dependents	182.50	117.51	9.00	331.00

Notes: In the first panel, spouse and child refer to the fraction of employees who enroll with a spouse or at least one child. In the second and third panels, these entries are the fraction of spouses and children in the set of enrollees. The first and second panels pool observations across firms and years. The third panel shows statistics of firm-year level averages, taken across all enrollees.

Table 2: Plan Characteristics

	Network		Integrated		
	HMO	PPO	HMO	POS	All
Offering Plan					
Firms	11	10	11	9	-
Firm-Years	16	14	16	13	-
Bid (Monthly)					
Employee	307	332	260	276	294
	(64)	(59)	(30)	(26)	(54)
Employee plus spouse	645	689	544	579	616
	(154)	(123)	(61)	(54)	(120)
Employee plus child(ren)	591	632	498	532	565
	(143)	(115)	(58)	(53)	(111)
Employee plus family	918	989	779	832	882
	(200)	(176)	(87)	(76)	(164)
Contribution (Monthly)					
Employee	45	73	38	58	53
	(34)	(54)	(32)	(40)	(41)
Employee plus spouse	252	303	203	255	253
	(120)	(103)	(77)	(75)	(100)
Employee plus child(ren)	221	265	177	223	222
	(97)	(86)	(62)	(55)	(81)
Employee plus family	418	495	342	415	418
	(213)	(182)	(144)	(140)	(176)
Coinsurance (%)					
Employee	87	86	97	78	87
	(6)	(5)	(7)	(2)	(9)
Deductible (Annual)					
Employee	387	440	69	336	304
	(264)	(306)	(163)	(94)	(262)
Out-of-Pocket Max (Annual)					
Employee	2818	2850	1591	2686	2468
	(462)	(474)	(625)	(731)	(775)

Notes: Mean plan characteristics, with standard deviations in parentheses. Plan characteristics are pooled across years. Coinsurance, deductible, and out-of-pocket maximum are in-network values and are highly correlated ($\rho > .9$) with out-of-network coinsurance, deductible and out-of-pocket maximum. Coverage tiers based on employee plus one dependent and employee plus two or more dependents are used at two firms. Bids and costs for these coverage tiers are not shown.

Model

Individual choice is similar to standard discrete-choice demand models:

$$u_{hj} = \phi_j \alpha_\phi + x_h \alpha_{xj} + \psi(r_h + \mu_h; \alpha_{rj}) - p_j + \sigma_\varepsilon \varepsilon_{hj}.$$

(Q: where is the adverse selection?)

Note the difference from Cohen/Einav or Einav/Finkelstein/Schrimpf: here they model indirect utility (rather than the utility that would give rise to it). This is good enough for everything we'd like to do (simply less guidance from theory about functional form).

Plan cost assumed proportional to the risk score:

$$c_{ij} = a_j + b_j \cdot (r_i + \mu_i - 1) + \eta_{ij}.$$

And then aggregated to the level of the data:

$$C_{kf} = \sum_{j \in \mathcal{J}_{kf}} \sum_{i \in \mathcal{I}_{jf}} \left\{ a_j + b_j \cdot (r_i + \mu_i - 1) + \eta_{ij} \right\}.$$

Supply side is modeled as a fixed mark-up over expected cost

$$B_{jf} = \delta_j \cdot (a_j + b_j \cdot (\mathbb{E}[\overline{r}_f | x_f] - 1)) + \nu_{jf}.$$

And a rule-of-thumb (which strongly shows up in the data) of the way employers translate the firms' bids to employee contributions

$$p_{j\iota f} = \beta_{\iota f} \cdot \underline{B}_{\iota f} + \gamma_{\iota f} \cdot (B_{j\iota f} - \underline{B}_{\iota f}) + \xi_{j\iota f}.$$

Key to identification is the heterogeneity of private (unobserved) types (σ_μ), which one can get from observing the ex-post realization of plan costs.

Estimation through method of simulated moments, which allows them to match moments at different levels of aggregation (which is the way they have the data).

Main results: welfare counterfactuals (assuming other stuff stay fixed):

Table 6: Matching and Welfare under Alternative Contribution Policies

	Matching				Welfare†			Truncated
	NHMO	NPPO	IHMO	IPOS	Gross Surplus‡	Insurer Costs‡	Social Surplus‡	Social Surplus‡
Observed								
Market Shares	0.25	0.09	0.54	0.12	0.00	0.00	0.00	0.00
Risk Score	1.03	1.07	0.99	1.02				
Incremental Contribution†	9.30	23.70	0.00	5.00				
Feasible Risk Rated Contributions								
Market Shares	0.37	0.09	0.43	0.11	-16.60	-43.70	27.10	5.00
Risk Score	0.58	0.78	1.49	0.74				
Incremental Contribution	-14.70	11.80	0.00	-1.30				
Optimal Risk Rated Contributions								
Market Shares	0.38	0.08	0.44	0.10	-22.10	-57.50	35.50	7.80
Risk Score	0.60	0.79	1.46	0.76				
Incremental Contribution	-14.90	11.80	0.00	-1.60				
Uniform by Tier within Firms								
Market Shares	0.31	0.09	0.49	0.12	-6.10	-12.80	6.70	1.40
Risk Score	0.86	1.02	1.11	0.97				
Incremental Contribution	-16.50	8.90	0.00	-1.10				
Enthoven Rule								
Market Shares	0.22	0.08	0.58	0.13	-1.10	-0.80	-0.30	-0.50
Risk Score	1.01	1.05	1.00	1.02				
Incremental Contribution	28.70	39.90	0.00	10.80				

Table 8: The Value of Plan Choice

	Welfare†		
	Gross Surplus‡	Insurer Costs‡	Social Surplus‡
Observed	0.0	0.0	0.0
All enrolled in:			
NHMO	-148.8	-9.2	-139.7
NPPO	-216.9	5.8	-222.7
IHMO	-71.4	-2.1	-69.4
IPOS	-180.7	4.5	-185.2

Other topics: Selection on moral hazard

"Selection on Moral Hazard in Health Insurance" (Einav, Finkelstein, Ryan, Schrimpf, and Cullen, *AER* 2013)

Main (economic) point of the paper:

- Common to think about two key determinants of insurance selection: risk and preferences.
- This paper makes the distinction between heterogeneity in the "level" vs. the "slope," and whether (and for what) it matters.
  - Can think (loosely!) of level as "health" and slope as "moral hazard"
  - Intuition from "all you can eat" restaurants …
- With heterogeneity in the slope, the marginal rather than the average individual is important. E.g., if we introduce a high-deductible plan and the people who choose it are the "low slope" people then we would get much less of a spending effect relative to what we may get from applying standard (average) moral hazard estimates.

Data for the paper:

- “Typical” data from one company (Alcoa, Inc.) about employees’ health plan options, health plan choices, and subsequent claims.
- Key aspects of the data:
    - Panel structure of employees
    - (arguably) Good variation in employees’ choice set (due to staggered timing of labor contract expiration dates).
    - All plans (old and new) only vary along financial dimensions, making the modeling “cleaner.”

- Paper spends a lot of time on describing the data and pushing “reduced form” analysis as far as we could. In class I’ll emphasize the model and its estimation, so I’m going to pretty much skip this extremely important part of the paper.

    - Just imagine a panel structure of employees, facing one of two choice sets (of 3 and 5 plans each), making a plan choice, and then utilization decisions.

Model:

- Model is stylized and is designed to isolate three distinct determinants of an individual's coverage choice: health risk, risk aversion, and "moral hazard type."
  - Note: model is not supposed to "mimic" reality, but to help us make a point.

"

- An employee (in a given year) is characterized by
  - λ (monetized) health realization
  - $F_\lambda(\cdot)$ that govern health risk
  - ψ coefficient of absolute risk aversion
  - ω moral hazard type (price sensitivity)

- (Standard) Two period model:
  - Period 1: given ($F_\lambda(\cdot)$, ψ, ω), make optimal plan choice j^* from plan menu J.
  - Period 2: given plan j, health realization λ, and ω, make optimal utilization (spending) choice $m^* \geq 0$.

Period 2 utility:

- Individual's realized utility trades off health *h* and money *y*

$$u(m;\lambda,\omega) = h(m-\lambda;\omega) + y(m)$$

- Specifically, utility in period 2 given by:

$$u(m;\lambda,\omega,j) = \left[(m-\lambda) - \frac{1}{2\omega}(m-\lambda)^2\right] + \left[y - c_j(m) - p_j\right]$$

  - Higher ω individuals have higher relative weight on health

- Convenient to define

$$\tilde{u}(m;\lambda,\omega,j) = \left[(m-\lambda) - \frac{1}{2\omega}(m-\lambda)^2\right] - c_j(m)$$

Period 2 spending:

- Optimal spending given by

$$m^*(\lambda, \omega, j) = \arg\max_{m \geq 0} \tilde{u}(m; \lambda, \omega, j)$$

- With linear contracts ($c_j(m) = c_j m$):

$$m^*(\lambda, \omega, j) = \max[0, \lambda + \omega(1 - c)]$$

  - (Ignoring truncation) With no insurance ($c = 1$) spend λ.
  - With full insurance ($c = 0$) spend $\lambda + \omega$.

- So we can think of ω ("moral hazard type") as (roughly) the utilization difference between full and no insurance; spending responds more to changes in coverage for individuals with higher ω

Period 1:

- An individual valuation of plans has a CARA form over period 2's realized utility (which is monetized):

$$v_j(F_\lambda(\cdot),\omega,\psi)=\int -\exp\left(-\psi u^*(\lambda,\omega,j)\right)dF_\lambda \lambda$$

  so optimal plan choice given by

$$j^*(F_\lambda(\cdot),\omega,\psi)=\arg\max_{j\in J} v_j(F_\lambda(\cdot),\omega,\psi)$$

- Optimal choice trades off higher up-front payment for more subsequent coverage
  - More coverage means both higher expected reimbursement and sheds off more risk

- Higher coverage more attractive for "higher" $F_\lambda(\cdot)$ (risk), higher ψ (risk aversion), and higher ω (moral hazard)

- Efficient coverage trades off risk aversion against moral hazard

Econometric model:

- Unit of observation is an employee-year.

- Individuals defined by a "triplet": $F_\lambda(\cdot)$, ψ, ω.

- To take the model to data, we:
  - Parametrize $F_\lambda(\cdot)$ ("shifted" log-normal distribution with heterogeneity in mean, variance, and support; latter to get at mass point of zero spending)
  - Parametrize heterogeneity, and within individuals over time (joint normal)

- Notes:
  - Add union and year fixed effects, so rely on a DD design for moral hazard
  - No choice-specific iid error term, which seems unappealing

Intuition for identification:

- Cross-sectional data on choices and utilization (and some assumptions …) can get risk and risk aversion ("two-to-two" mapping).
  - Similar to some of our earlier work (Cohen and Einav; Einav, Finkelstein, and Schrimpf)

- Panel structure and DD design provides a third dimension, which allows us to get at moral hazard ("three-to-three" mapping).

- Conceptually, can think in several steps:
  - Long history for person *i* gets us risk, $F_{\lambda}(\cdot)$
  - Change in utilization in response to plan change gets us moral hazard, ω
  - Endogenous choice from a menu, conditional on risk and moral hazard, gets us risk preferences, ψ

➔ Estimation using MCMC Gibbs Sampler.

Results:

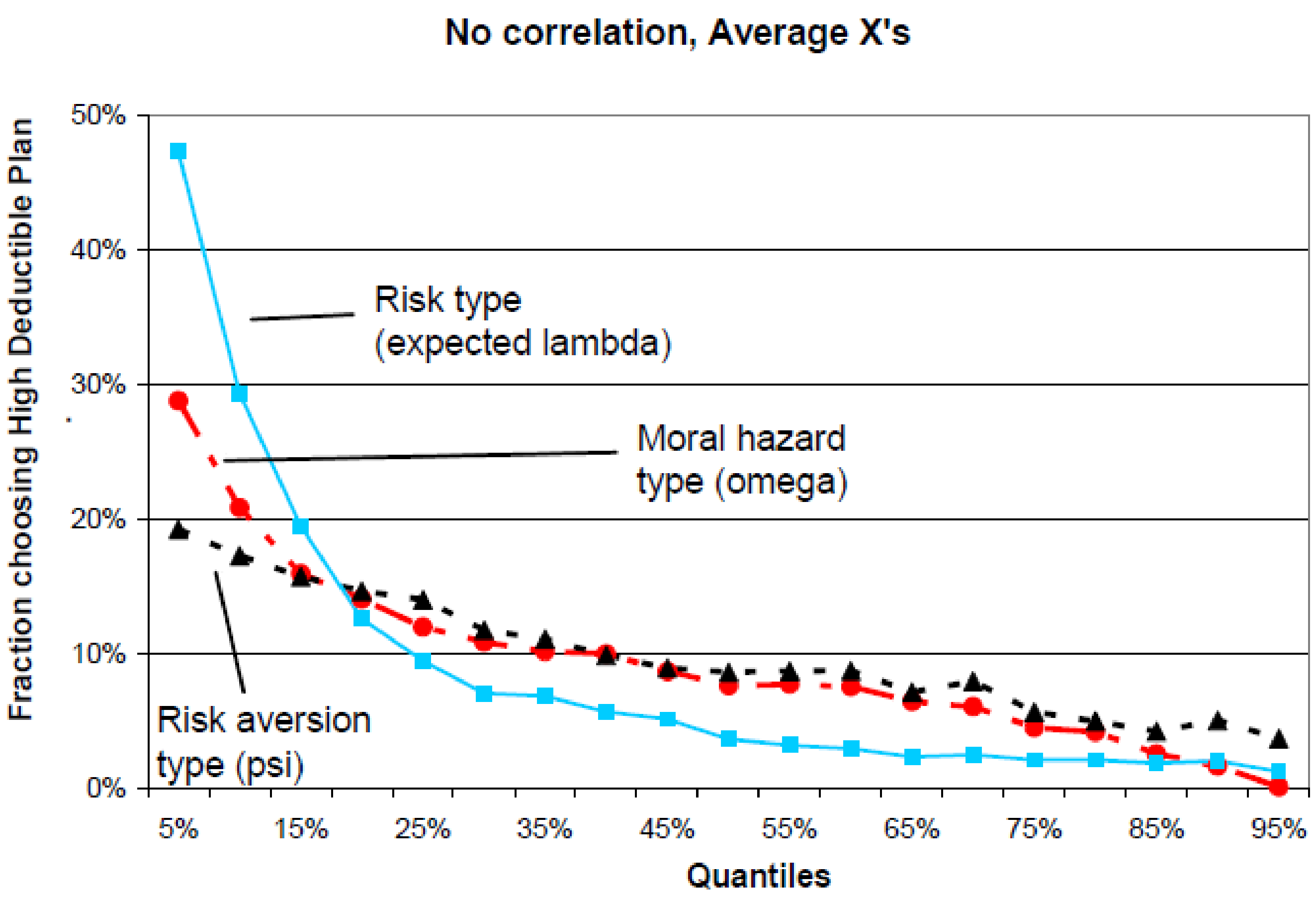
- Recall (abstracting from truncation) employee spends λ w/o insurance, $\lambda + \omega$ with full insurance

- Moral hazard is large on average:
  - o $E(\omega)$ = \$820, or 15% of estimated health risk $E(\lambda)$ = \$5, 620

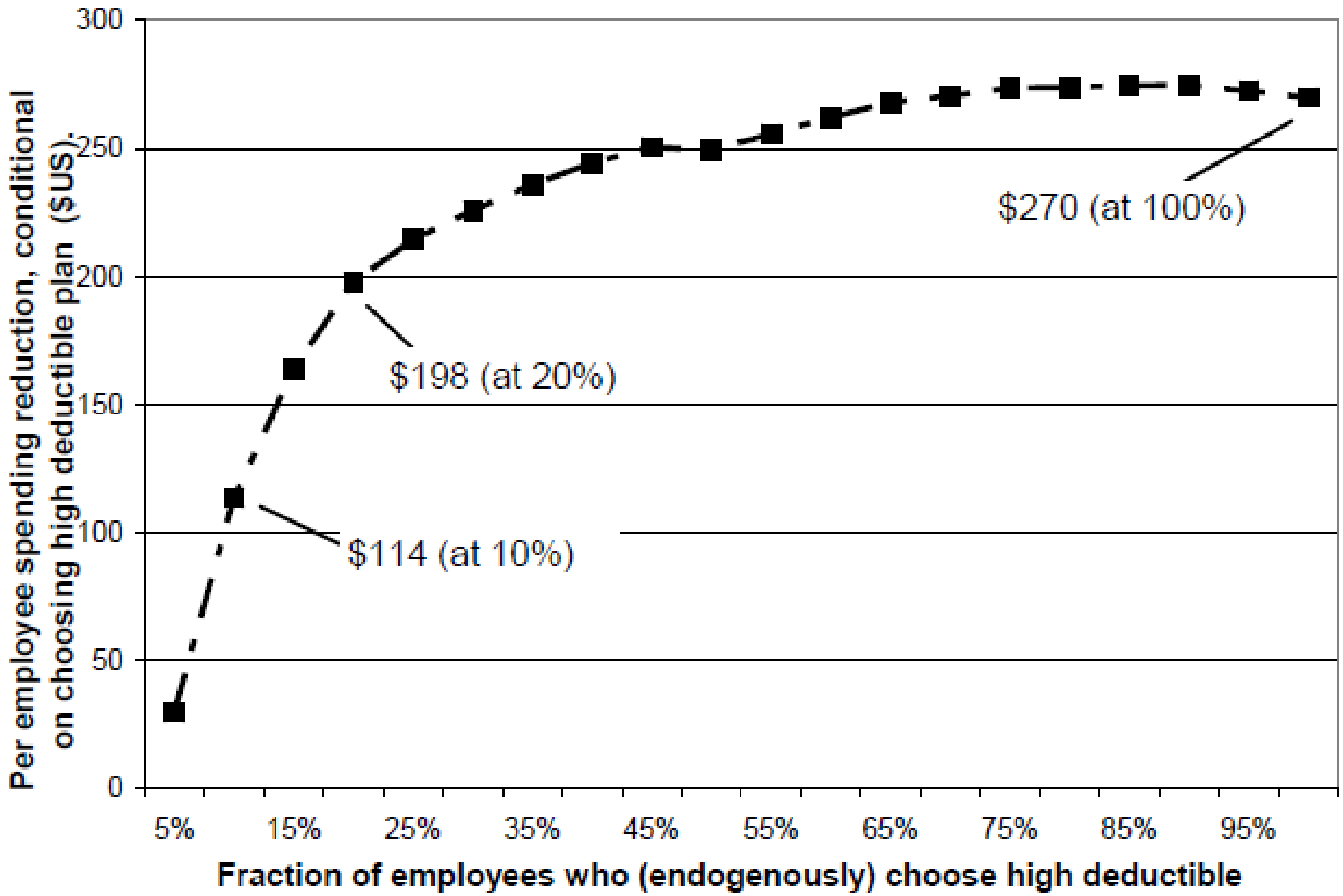
- Quite heterogeneous (necessary condition for selection on it):
  - o Std. dev. of ω is ~\$2,400 (coeff. of variation of 3)
  - o Impact of cost sharing on spending varies substantially:

	Mean	Std. Dev.	25th	50th	75th	90th
Spending effect: no to high deductible	270	571	0	37	273	787
Spending effect: full to no insurance	790	2,427	64	237	703	1,777

The relative importance of selection on moral hazard:



The quantitative importance of selection on moral hazard (which is, of course, **<u>very</u>** specific to our setting!):



Other topics: Dynamics in insurance contracts, commitment, and reclassification risk

Everything we have done so far was about static markets for insurance:

- Individuals have information about their risk type and face uncertainty about (short-term) risk realization; after the coverage period, the same happens again: new (or the same) risk types are measured, and a new contract is selected.

Key issue: if risk types (that is, expected risk) move a lot over time then static short-term contracts don't really insure against the important "reclassification" risk. This would require long-term contracts.

At an extreme, one can think of insuring lifetime types. For example, Ran Abramitzky's work on the Israeli Kibutz points to the role of the kibutz as providing insurance against bad types: you get insurance against having "dumb" (= low earning) kids – they still get an equal share of the kibutz earning.

Commitment is a key aspect: how can we force good types (e.g., smart kids) not to leave. In the kibutz it's done through the lock in of assets. Next we'll talk about market forces in life insurance.

"The Role of Commitment in Dynamic Contracts: Evidence from Life Insurance," by Hendel and Lizzeri (*QJE*, 2003)

Focus on term life insurance contracts, which have one-sided commitment:

TABLE I
TYPES OF TERM CONTRACTS

			S&U ART						
			Policy year						
Age	ART	LT10	1	2	3	10	11	19	20
40	459	574	370	475	640	1485	2555	5680	6375
41	499	574	385	490	660	1565	2815	6375	7040
42	539	574	400	530	690	1705	3105	7040	7790
49	909	574	630	890	1080	2725	6375	13675	14785
50	974	1064	690	945	1155	2895	7040	14785	15765
51	1044	1064	735	1050	1295	3230	7790	15765	17230
58	2009	1064	1245	1750	2295	6420	14785	33165	35445
59	2289	1064	1340	1785	2480	6945	15765	35445	38715

These are contracts offered in 7/1997 to a preferred nonsmoker, male, by Northwestern Mutual (ART and LT10) and Jackson National (S&U ART) for $500,000 of coverage.

ART = annual renewable term policy.

LT10 = term policy with level premiums for ten years.

S&U ART = annual contract that allows for reclassification, by showing good health.

Data on rate quotes by the main life insurers (240 firms, but focus on 55 of them). These are used by agents, who sell them (one can imagine similar data for mortgage reps and other insurance markets that operate on a non-exclusive basis).

Key: entire future profile of rates is in the data, not only current price.

TABLE II
CONTRACT DESCRIPTIVES

Contracts		Premium at age 40		PV 20 years of coverage	
Type	Observations	Mean	Std dev	Mean	Std dev
All types	125	645.9	185.0	16,054.2	5,244.7
LT20	25	866.6	168.4	9,187.4	1,785.1
LT10	42	647.1	141.9	17,657.4	4,090.7
LT5	14	593.9	100.1	18,889.3	3,839.9
Aggregate ART	16	645.4	154.6	12,878.3	2,984.7
S&U ART	28	473.2	96.3	20,180.2	3,251.8

Model

Idea very similar to Holmstrom's career concerns model in labor.

Two periods. Timing:
Period 1: insurers offer contracts, (homogeneous) buyers choose, buyers die or consume.
Period 2: first health status realized, and then it is like period 1.

Period 1 death probability is p, and period 2 is p_i (with probability π_i), with even $p_1 < p$.

- The realization of health status is the source of reclassification risk.
- Assume perfect competition.
- Assume one-sided commitment: buyers (good risks) can shop around in period 2 for spot contracts, sellers are committed to the long term contract.

Period 1 (long-term) contracts: (Q_1,F_1) and a vector of (Q_{2i},F_{2i}).
Period 2 (spot) contracts: a vector of (Q'_{2i},F'_{2i}).

Need to explain the existence (in equilibrium) of different contracts. They do so by introducing consumer heterogeneity in liquidity constraints (specifically, income is y-g first and $y+g$ later, where g is heterogeneous and there is no borrowing).

To solve the model, they solve for the contracts that maximize consumers' expected utility, subject to non-negative profits and not losing consumers to period 2 spot contracts.

Equilibrium is characterized by g (Prop 1). For low enough g there is front loading, and the more there is front-loading there is more insurance against reclassification risk (in the form of flat rates for more of the bad risks; without full insurance, the best risks no-commitment is binding so they get offered spot (break even) rates).

Some discussion in the paper how contingent (ART S&U) and non-contingent (ART) contracts can be mapped to the same space (front-loading and PV of future rates).

Key prediction (Prop 2): In equilibrium, contracts with higher first period premium (more front-loading) will have:

- Lower PV of premiums
- Consumers with lower income growth (less credit constraints)
- Less lapsation (that is, less selection out of good risks, so better pool)

TABLE III
PREMIUM PROFILES AND PREMIUM TO MORTALITY RATIOS

	Aggregate ART		LT20		S&U ART		
					NoRequal		Requal
Age	AvgPrm	Prm/Death	AvgPrm	Prm/Death	AvgPrm	Prm/Death	AvgPrm
	1	2	3	4	5	6	7
40	645	100	866	100	473	100	473
42	739	60	866	52	700	77	513
44	852	50	866	38	926	74	553
46	1,000	44	866	29	1,202	73	618
48	1,184	39	866	21	1,593	71	708
50	1,395	37	866	17	2,500	91	813
52	1,611	34	866	14	3,073	90	937
54	1,877	30	866	10	3,825	84	1,091
56	2,223	27	866	8	4,690	78	1,293
58	2,746	27	866	6	5,795	78	1,583

Note:

- Very different contracts
- Even steepest contracts have front loading

TABLE V

REGRESSION: PRESENT VALUES ON SLOPE OF PREMIUMS

	log(PV)				
	(1)	(2)	(3)	(4)	(5)
Q(1st)/Q(11th)	−1.06	—	−1.35	−1.05	−0.73
	(−16.79)	—	(−8.77)	(−4.84)	(−2.84)
Guarant	0.01	−0.02	0.01	0.004	0.01
	(2.95)	(−3.96)	(1.74)	(1.03)	(1.33)
Renew	−0.002	−0.003	−.002	−0.001	0.001
	(−1.22)	(−1.18)	(−1.00)	(−0.01)	(0.39)
Convert	0.01	0.01	.006	.007	0.004
	(3.19)	(2.85)	(3.41)	(2.73)	(1.56)
Spec Cond	0.21	0.11	0.21	0.21	0.33
	(3.22)	(0.97)	(3.14)	(1.83)	(3.28)
Constant	9.63	9.20	9.62	9.38	9.22
	(62.1)	(33.3)	(53.5)	(36.7)	(29.7)
R^2	74.4	16.6	56.1	44.9	53.8
N	125	125	100	57	41

More front-loading associated with lower PV of premiums!

TABLE VI
Lapsation by Age and Contract Type

	% of face amount		% of policies		% of face amount			
	ART	Term	ART	Term	ART	Term	ART	Term
Contract year					Ages 20–39		Ages 40–59	
1	11.8	14.2	15.0	21.2	14.3	18.2	14.4	10.8
2	14.1	11.4	14.8	14.1	15.3	13.2	16.4	9.5
3–5	13.4	8.0	12.4	7.4	12.5	7.4	16.2	6.4
6–10	10.1	5.0	9.4	5.2	9.2	5.1	14.1	4.5
11+	7.0	3.9	6.5	3.8	7.0	4.1	9.8	3.9

Lapsation rates lower for more front-loaded contracts (Term).
(except for first year of policy, where not much lock in yet)

Other topics: inertic choice behavior / switching costs

"Adverse Selection and Inertia in Health Insurance Markets: When Nudging Hurts" by Ben Handel (*AER*, forthcoming)

Make the important observation that inertic behavior appears to be a an important feature of health (and other?) insurance markets.

What does it do?

- Injects "noise" to plan choices, which reduces adverse selection (agree? Could it exacerbate it?)
- Makes dynamics / path dependence important

Data and Setting

Data and setting very similar to the Alcoa data we covered earlier (but different firm)

Key feature:

- Plans stay fixed, but premiums change quite a bit from year to year.
- Premiums change so much that a plan becomes dominated.

Key observation:

- Despite plan changes, choices of existing employees are quite stable (while choices of new employees respond to prices)

FIGURE 2. EVOLUTION OF HEALTH PLAN PREMIUMS

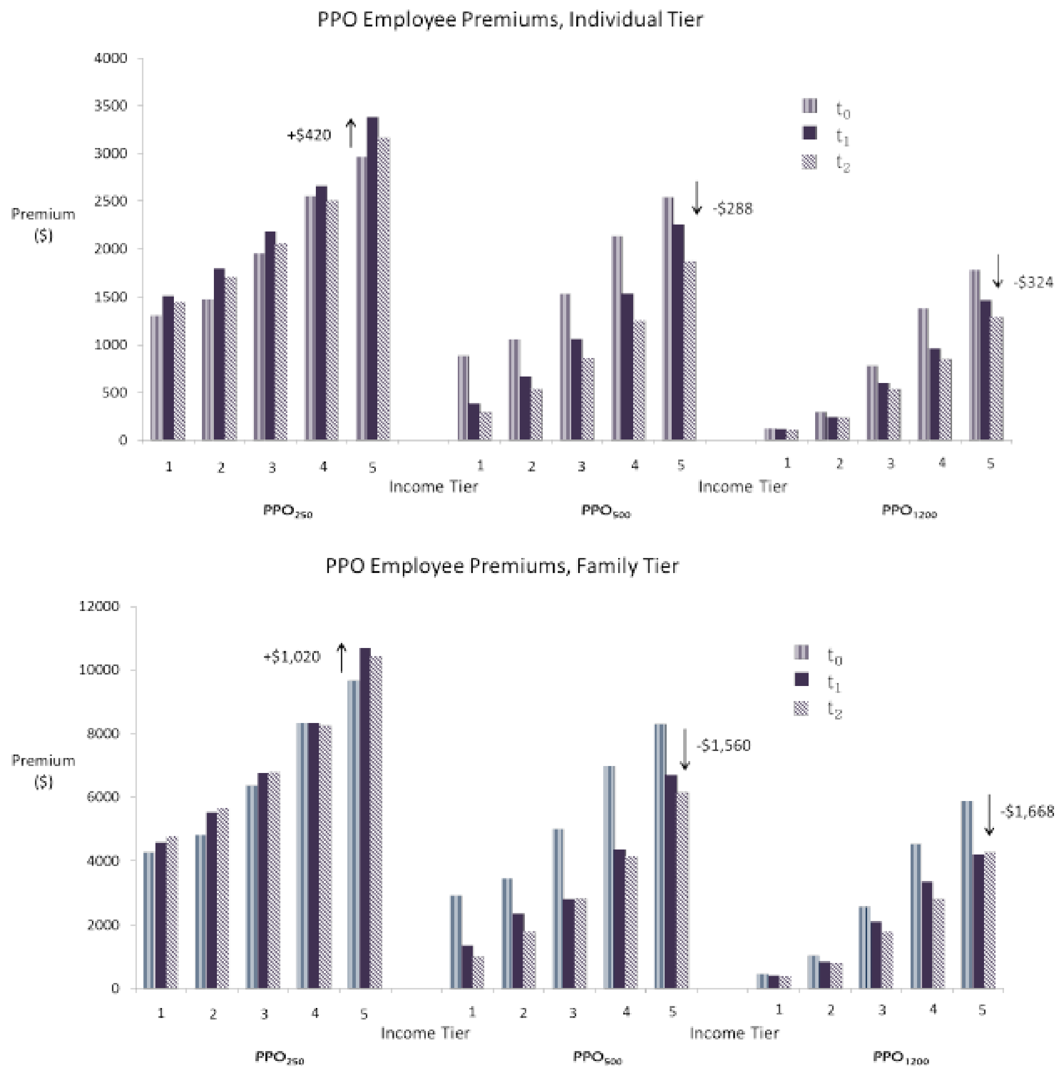


FIGURE 1. FINANCIAL CHARACTERISTICS OF PPO_{250} AND PPO_{500}

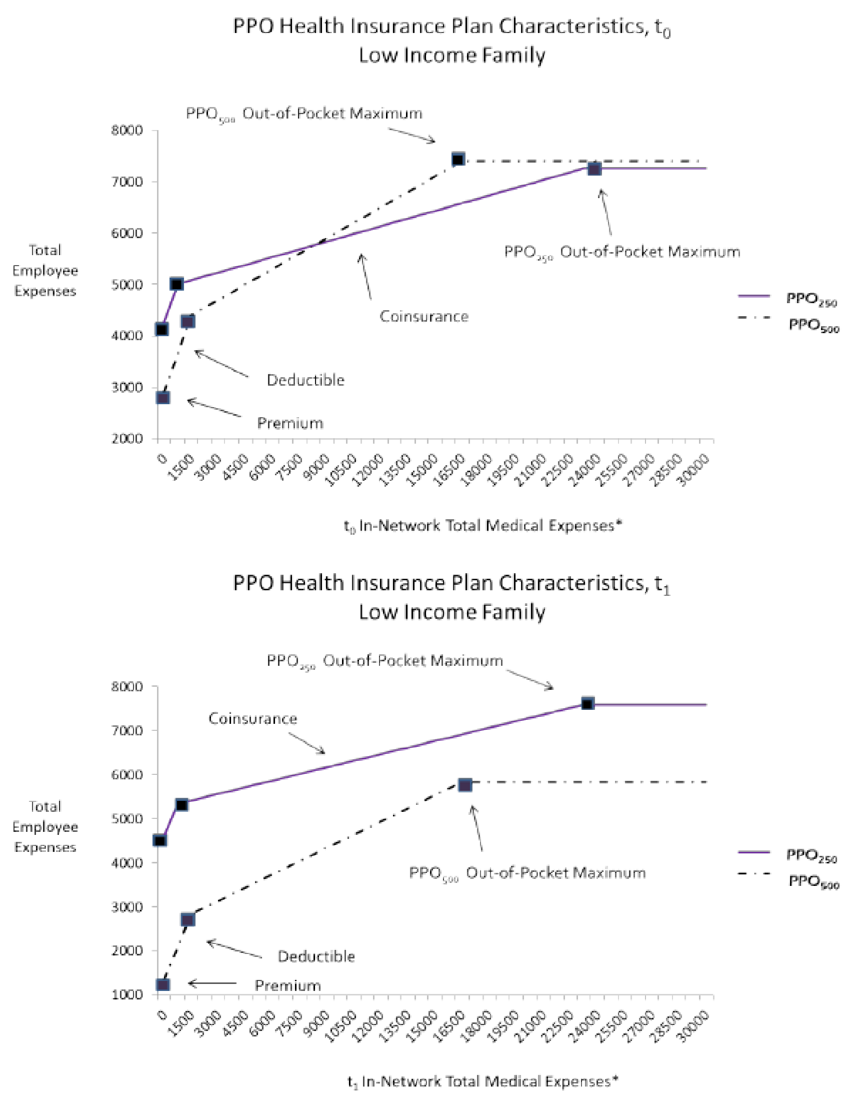


TABLE 2—NEW EMPLOYEE HEALTH PLAN CHOICES

New Enrollee Analysis	New Enrollee t_{-1}	New Enrollee t_0	New Enrollee t_1
N, t_0	1056	1377	-
N, t_1	784	1267	1305
t_0 **Choices**			
PPO_{250}	259 (**25%**)	287 (**21%**)	-
PPO_{500}	205 (**19%**)	306 (**23%**)	-
PPO_{1200}	155 (15%)	236 (17%)	-
HMO_1	238 (23%)	278 (20%)	-
HMO_2	199 (18%)	270 (19%)	-
t_1 **Choices**			
PPO_{250}	182 (**23%**)	253 (**20%**)	142 (**11%**)
PPO_{500}	201 (**26%**)	324 (**26%**)	562 (**43%**)
PPO_{1200}	95 (12%)	194 (15%)	188 (14%)
HMO_1	171 (22%)	257 (20%)	262 (20%)
HMO_2	135 (17%)	239 (19%)	151 (12%)

Model

Similar to models we have seen, with some twists.

Expected utility given by

$$U_{kjt} = \int_0^\infty f_{kjt}(OOP) u_k(W_k, OOP, P_{kjt}, \mathbf{1}_{kj,t-1}) dOOP$$

CARA utility:

$$u_k(x) = -\frac{1}{\gamma_k(X_k^A)} e^{-\gamma(X_k^A)x}$$

over

$$x = W_k - P_{kjt} - OOP + \eta(X_{kt}^B, Y_k)\mathbf{1}_{kj,t-1} + \delta_k(Y_k)\mathbf{1}_{1200} + \alpha H_{k,t-1}\mathbf{1}_{250} + \epsilon_{kjt}(Y_k)$$

Note: all uncertainty is “observed” rather than estimated, by heavily using the ex-ante risk scores. Simplifying estimation quite a bit, yet pretty sensible.

Results

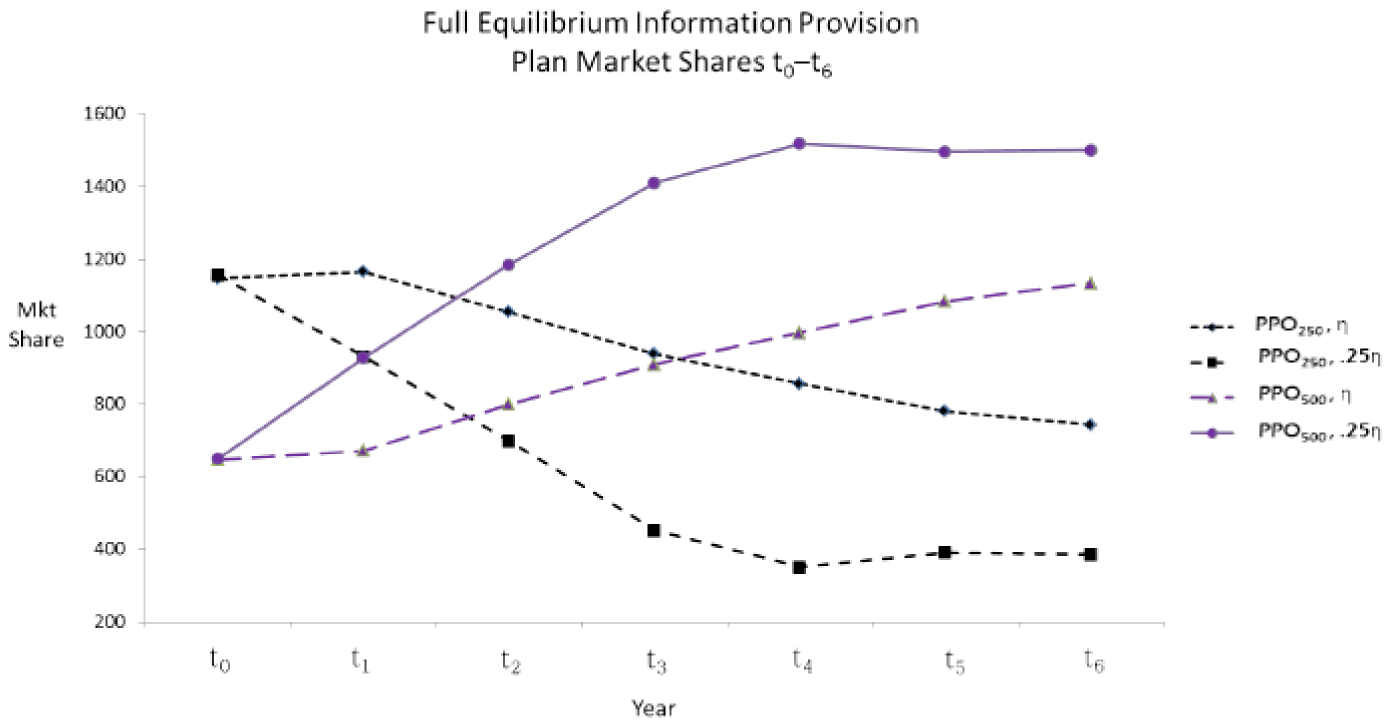

Full Equilibrium Information Provision
Plan Market Shares t_0–t_6
Mkt Share
1600
1400
1200
1000
800
600
400
200
t_0
t_1
t_2
t_3
t_4
t_5
t_6
Year
PPO_{250}, η
PPO_{250}, .25η
PPO_{500}, η
PPO_{500}, .25η

TABLE 6—WELFARE IMPACT OF REDUCED INERTIA: η TO $.25\eta$

Full Equilibrium Welfare Analysis **Reduced Inertia: η to $.25\eta$**	t_1	t_2	t_4	t_6	**Avg.** t_1-t_6
Mean Δ CEQ					
Population	-\$63	-\$104	-\$144	-\$118	-\$115
Switcher Pop. %	51%	49%	48%	53%	49%
Switchers Only	\$86	\$175	\$ 245	\$242	\$186
Non-Switchers Only	-\$205	-\$391	-\$555	-\$432	-\$442
High Expense Pop. %	10%	11%	11%	11%	11%
High Expense	\$26	\$106	\$119	\$65	\$62
Non-High Expense	-\$73	-\$130	-\$177	-\$141	-\$137
Single Pop. %	47%	46%	46%	46%	46%
Single	-\$249	-\$367	-\$414	-\$195	-\$319
w/ Dependents	\$99	\$124	\$89	-\$51	\$61
Low Income Pop. %	40%	41%	41%	41%	41%
Low Income	-\$81	-\$218	-\$282	-\$178	-\$200
High Income	-\$36	\$62	\$57	-\$30	\$0