Adverse Selection and Moral Hazard in Health Insurance

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Why insurance?

- Insurance markets make a good target for economists
  - Large and important
  - Potential market failures
  - Common government interventions via regulation or provision
  - Large and detailed data sets that are increasingly available

- Extremely influential theory work on the potential for market failures (e.g., Arrow 1963; Akerlof 1970; Rothschild and Stiglitz 1976)

- Early empirical work on insurance (e.g., Chiappori and Salanie 2000) mostly focused on testing; in recent years more IO economists got into the game
  - On the demand side, increasing evidence of important and relevant consumer heterogeneity, taking it closer to the empirical IO "toolbox"
  - On the supply side, increased concerns about "lemon dropping" and "cherry picking" and the more general need to better understand competition, market power, and "supply chains" in these "contract/selection markets"

Why health insurance?

Two major concerns about the current U.S. healthcare and health insurance situation:

1. Many Americans are uninsured, in particular the young and the poor

Table 2: Nonelderly Population With Selected Sources of Health Insurance, by Family Income

Family Income	Total	Employment-Based Coverage	Individually Purchased	Public	Uninsured
		Population (Millions)			
Total	260	161.7	17.7	45.5	46.5
Under $10,000	20.5	2.2	2.1	9.5	7.3
$10,000-$19,999	22.8	4.9	2.1	9.1	7.8
$20,000-$29,999	25	9.8	2	6.8	7.6
$30,000-$39,999	25.6	13.4	1.9	5.5	6.1
$40,000-$49,999	23.4	15	1.6	3.6	4.5
$50,000-$74,999	48.9	36.6	3	5.2	6.4
$75,000 and over	93.8	79.9	5	5.7	6.7

46M!!!

= 35%

= 34%

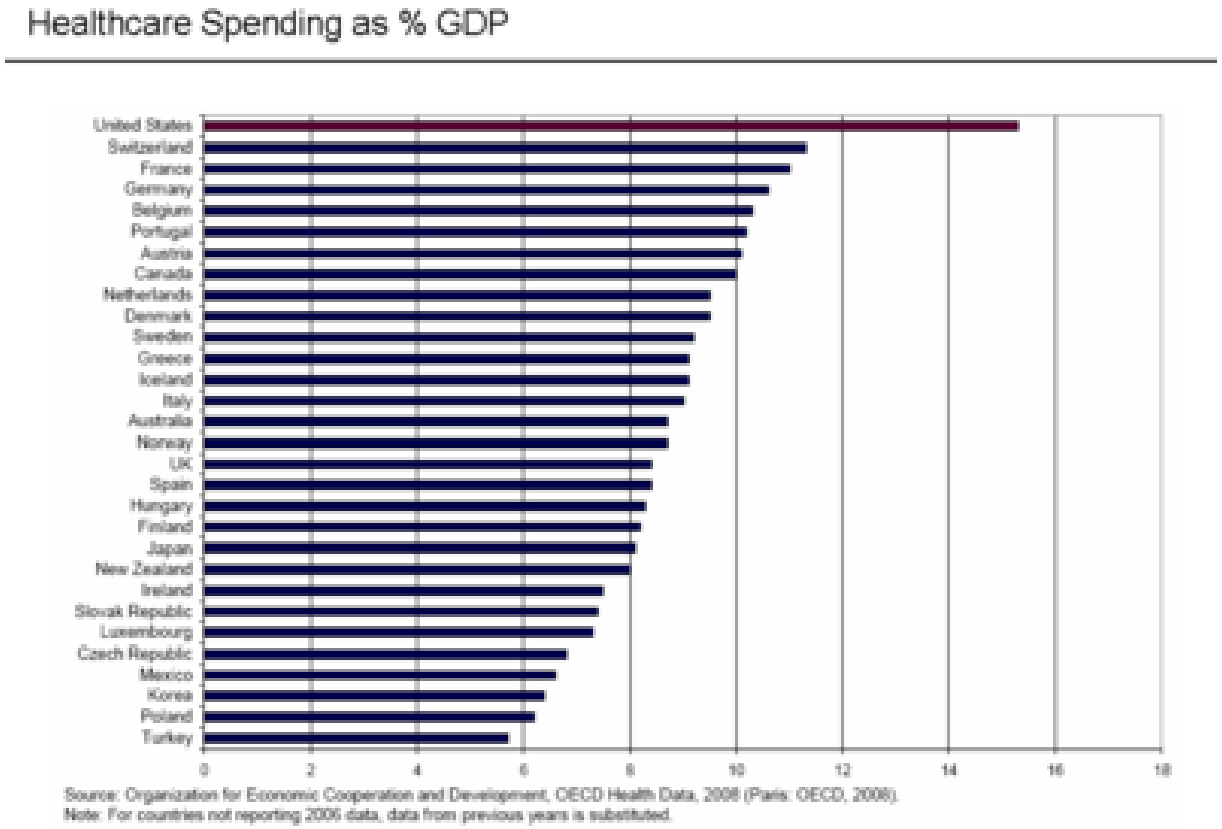
= 30%

= 7%

Why health insurance?

Two (not obviously related) major concerns about the current U.S. healthcare / health insurance situation:

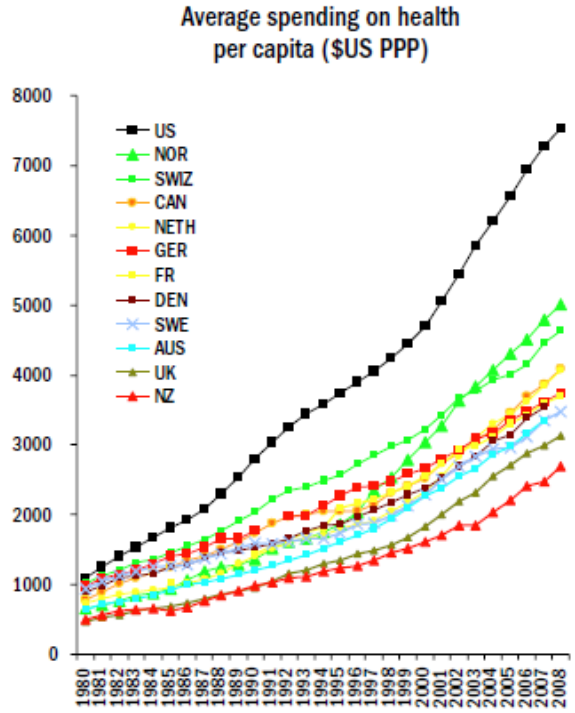
1. Many Americans are uninsured, in particular the young and the poor
2. Total healthcare costs are: (a) **high**

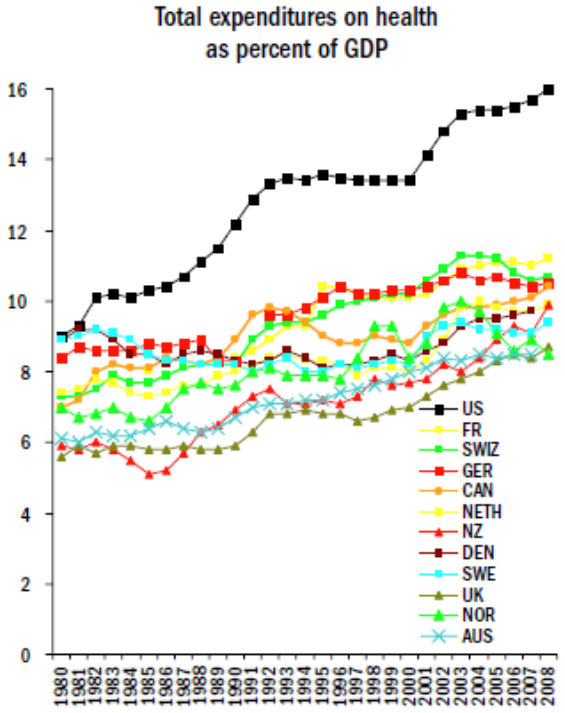


Why health insurance?

Two (not obviously related) major concerns about the current U.S. healthcare / health insurance situation:

1. Many Americans are uninsured, in particular the young and the poor
2. Total healthcare costs are: (a) high; and (b) **rapidly rising**





Note: PPP = purchasing power parity—an estimate of the exchange rate required to equalize the purchasing power of different currencies, given the prices of goods and services in the countries concerned.
Source: OECD Health Data 2010 (Oct. 2010).

Plan for today's talk

Focus on two main "problems" often associated with health (and other) insurance markets:

- **Adverse selection**: Greater coverage more likely to be selected by sicker people, thus making (relative) prices "too high" and coverage "too low"

- **"Moral hazard"**: Once insured, individuals consume more care than optimal because they don't internalize the full price (= social cost?)

Outline of the talk

1. Describe some of our papers that address these issues
   - All primarily based on 2003-06 health insurance data (menus, choices, and claims) from Alcoa, Inc.
   - In this part of the talk, will try to emphasize the more conceptual (rather than quantitative) points

2. Return to the original motivating facts, and discuss the extent to which AS can explain the uninsured and MH can explain the high and rising healthcare cost

3. (More speculatively …) Try to engage in what else may be going on, and raise related points / researchable questions along the way

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Adverse selection

- Based on Einav, Finkelstein, and Cullen (2010) and Einav and Finkelstein (2011)

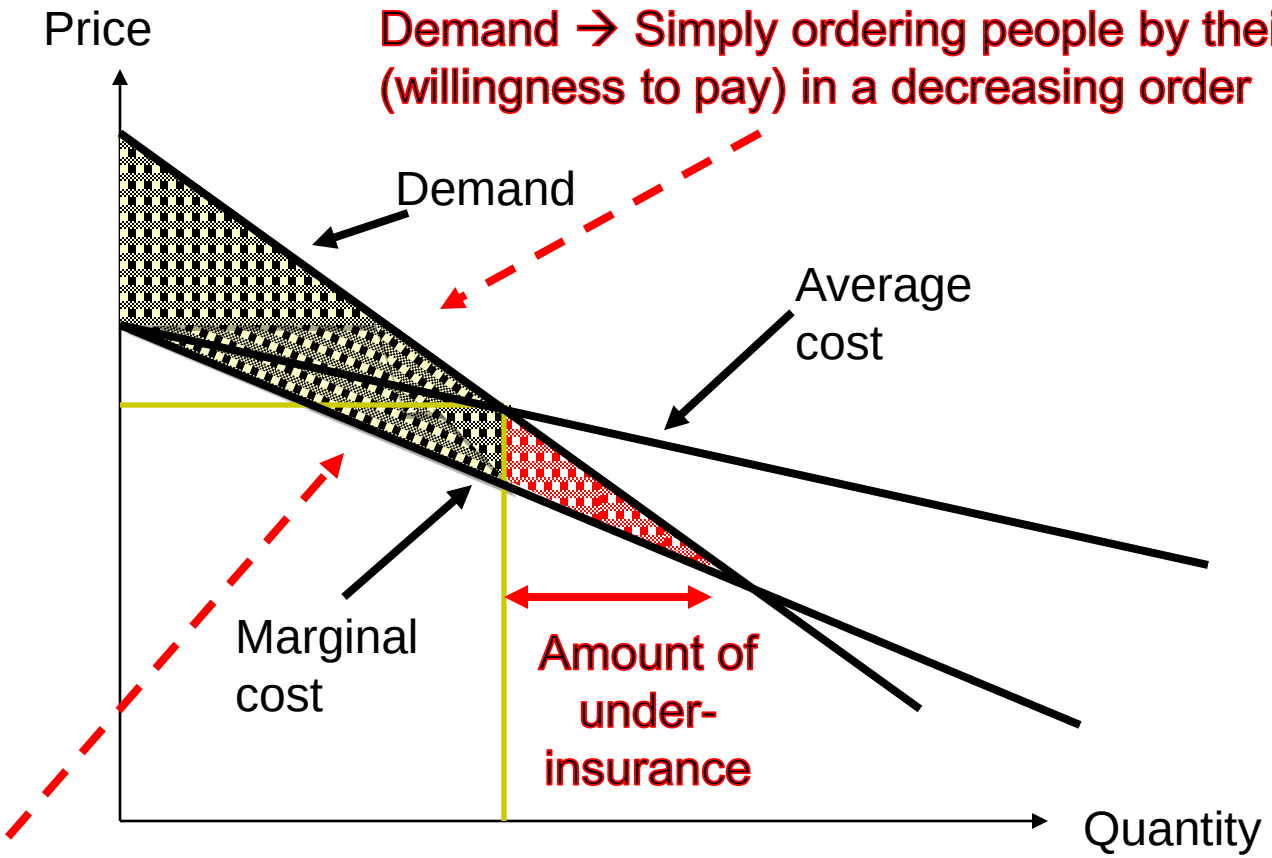
- Present a graphical way to think about adverse selection, about why it is a problem, and offer one way to measure its quantitative importance

Adverse selection

Stylized framework …

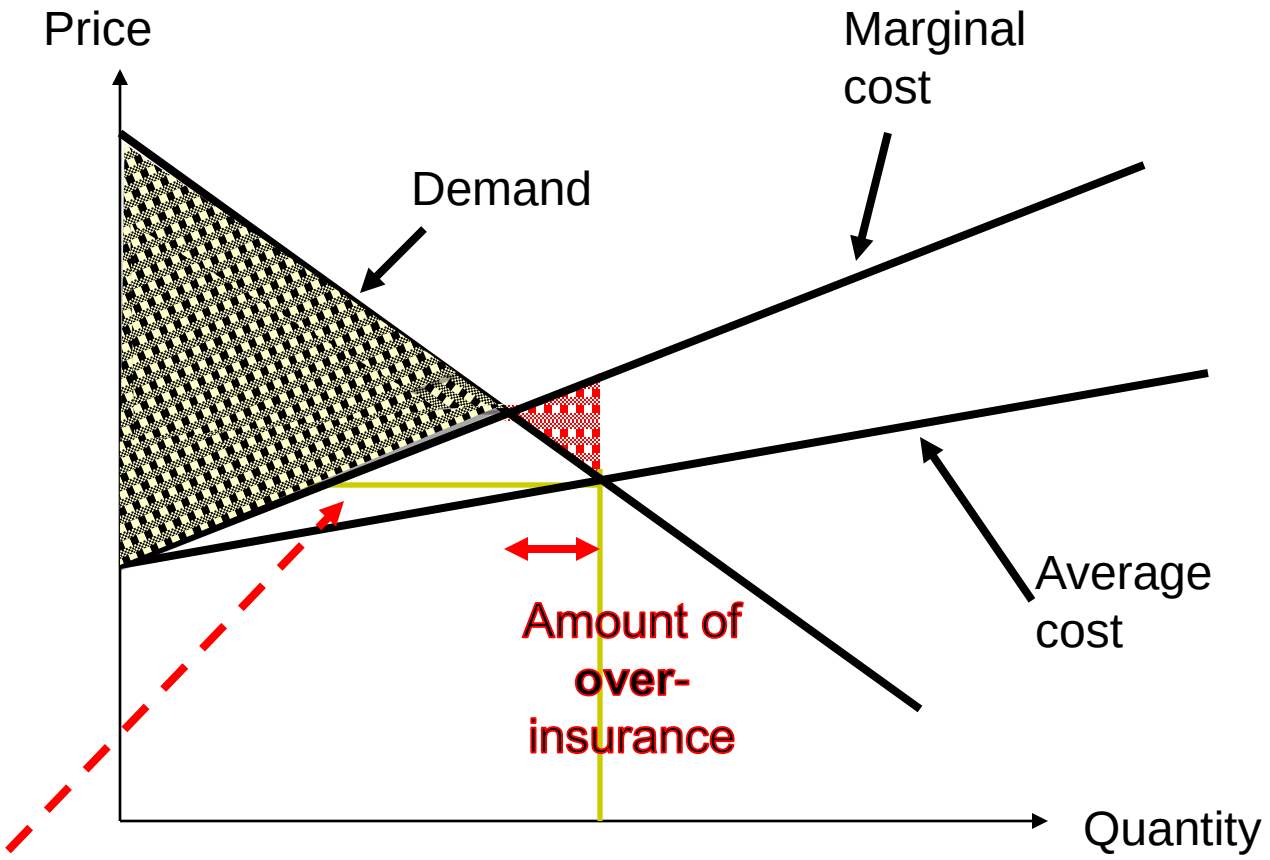
- Only two plans: **H** (high coverage) and **L** (lower or no coverage)
  - $p = p^H - p^L$ is the relative price of contract **H**
- Key point: for many questions (but not all, as we will see), sufficient to "summarize" people by two objects:
  - v_i is willingness to pay for **H** → Demand for insurance
  - c_i is expected costs (to insurer) given **H** → Cost of insurance
- Main problem of adverse selection: insurer does not know/see v_i or c_i, so needs to set a single price
  - Need to price to the average rather than marginal buyer → The **key** feature of selection markets
- Implications can then be seen graphically

Adverse Selection



Decreasing → "Adverse selection": Riskiest customers are those with highest v

Advantageous Selection



Increasing → "Advantageous selection": Cheapest customers are those with highest v

Taking this to data

- So all we need to know is:
  - The demand curve
  - The average cost curve
  - The marginal cost curve

- Good price variation & quantity data → estimate demand
- Same price variation & cost data → estimate avg. costs (using sample who endogenously choose **H**)
  - Very difficult to make progress in insurance markets without data on costs or other outcomes
- From demand and avg. costs can back out marginal costs

- Use 2004 Alcoa data on salaried employees, comparing individuals in the two modal plans:
  - **L**: $500 deductible; 10% coinsurance; $5,500 out-of-pocket max
  - **H**: no deductible; 10% coinsurance; $5,000 out-of-pocket max

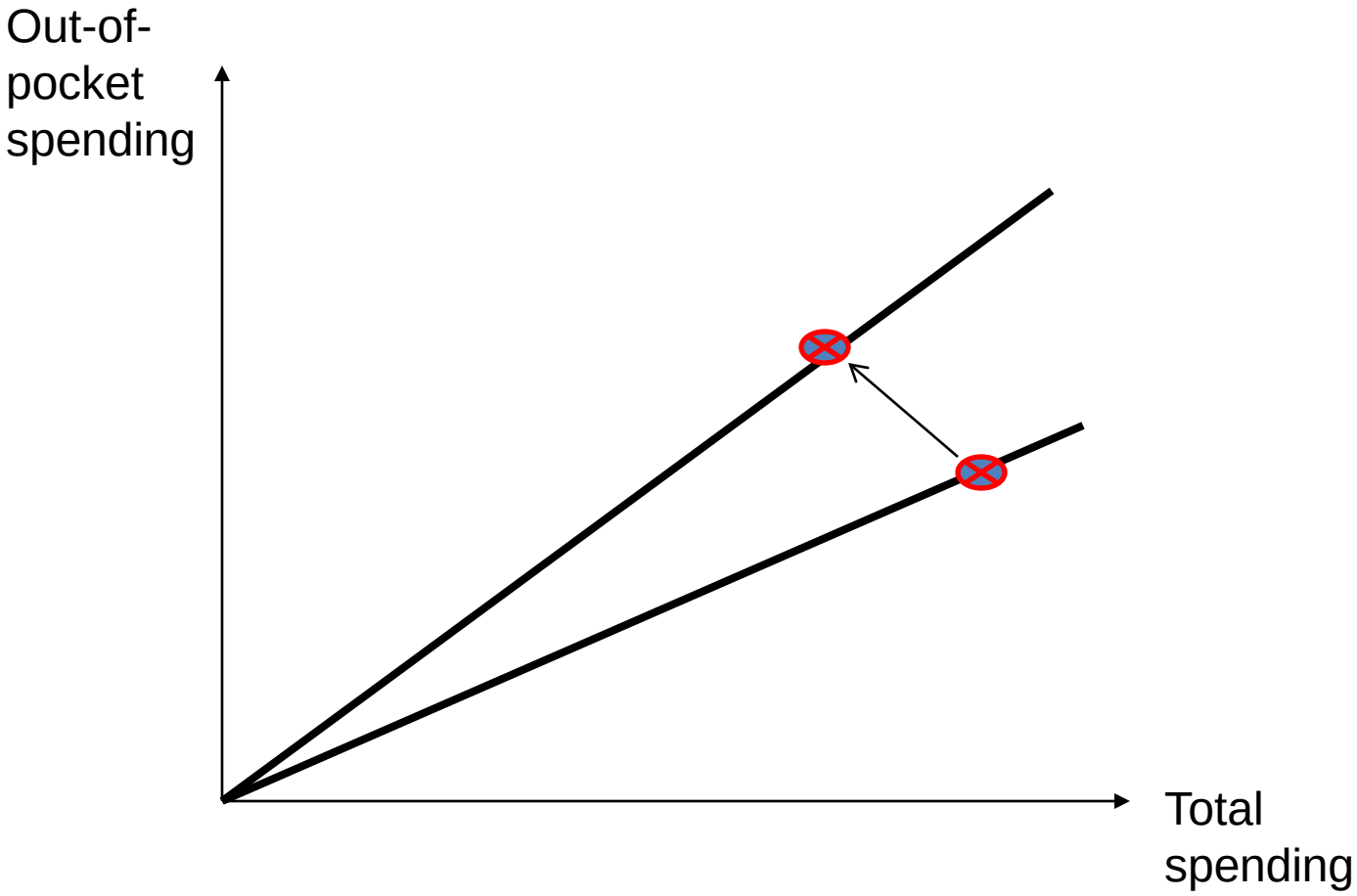
Will present the results later

Moral hazard

- Not so great terminology … In the context of health insurance, moral hazard essentially means the elasticity of healthcare expenditure/utilization with respect to its out-of-pocket price
- High elasticity: consumers will expand consumption much more when out-of-pocket price (co-pays, co-insurance rates) becomes cheaper
- Ideally they would face the full price, but need to trade off this moral hazard vis-à-vis the benefits from insurance provision
  - This may not be true if the market price does not reflect social marginal cost
- Dating back to the RAND experiment in the 1970s, large literature that tries to estimate this price elasticity. Commonly used number is a price of elasticity of 0.2 (most estimates range between 0.1 and 0.4, although some confirmatory bias may play a role)

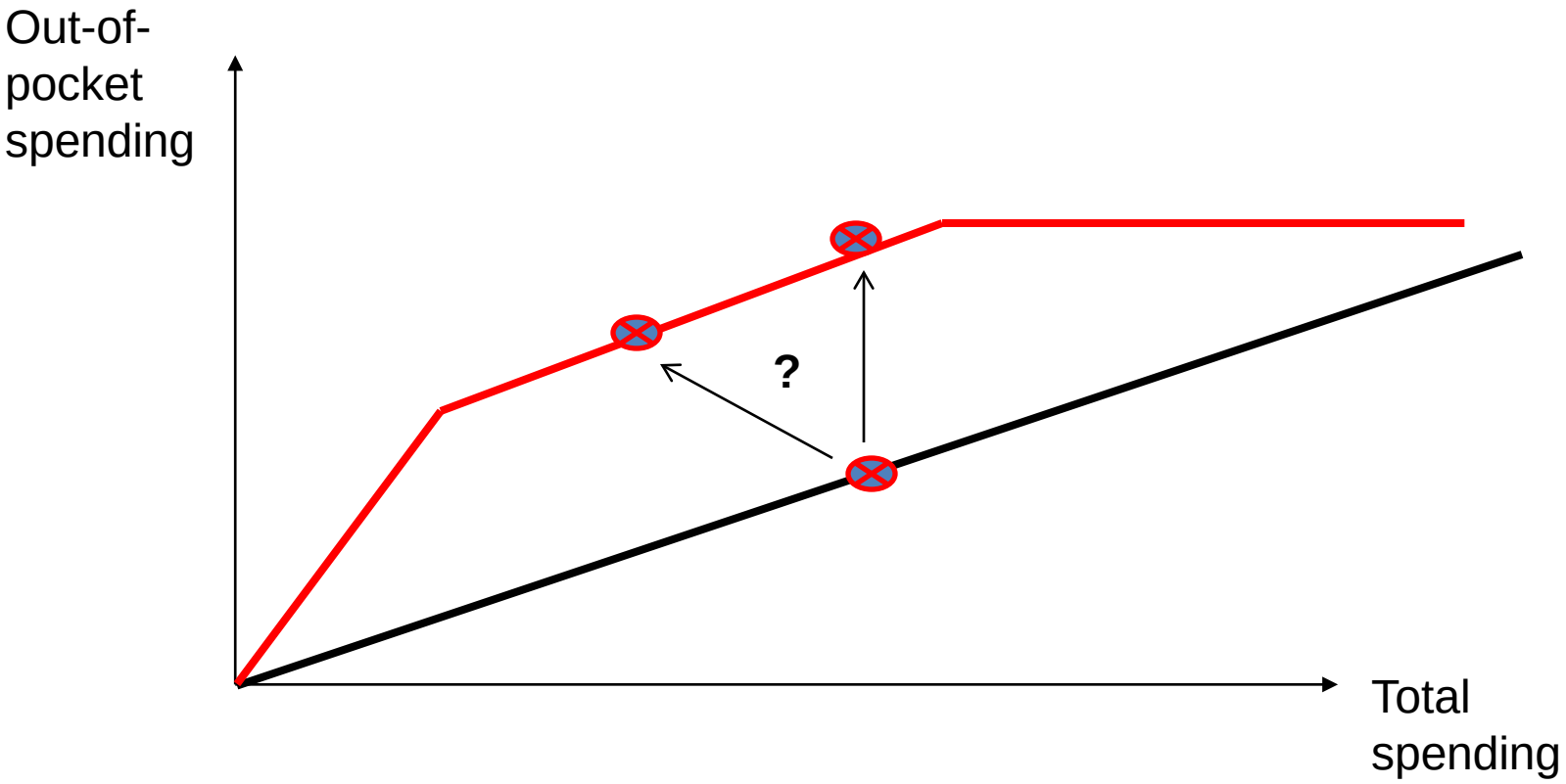
Easy when coverage is linear

Say 0.2 is the right number. Very easy to understand (and apply!) in the context of linear contracts:



Which price?

- But typical plans are highly non-linear
  - In fact, even the RAND experiment used non-linear (experimental) coverage



- So what is “the price”? How can/should we apply the estimate of, say, 0.2?

Moral Hazard

- Based on Aron-Dine, Einav, Finkelstein, and Cullen (2012)

- Key question: given these typical non-linearities of health insurance plans, what is the price to which individuals respond?

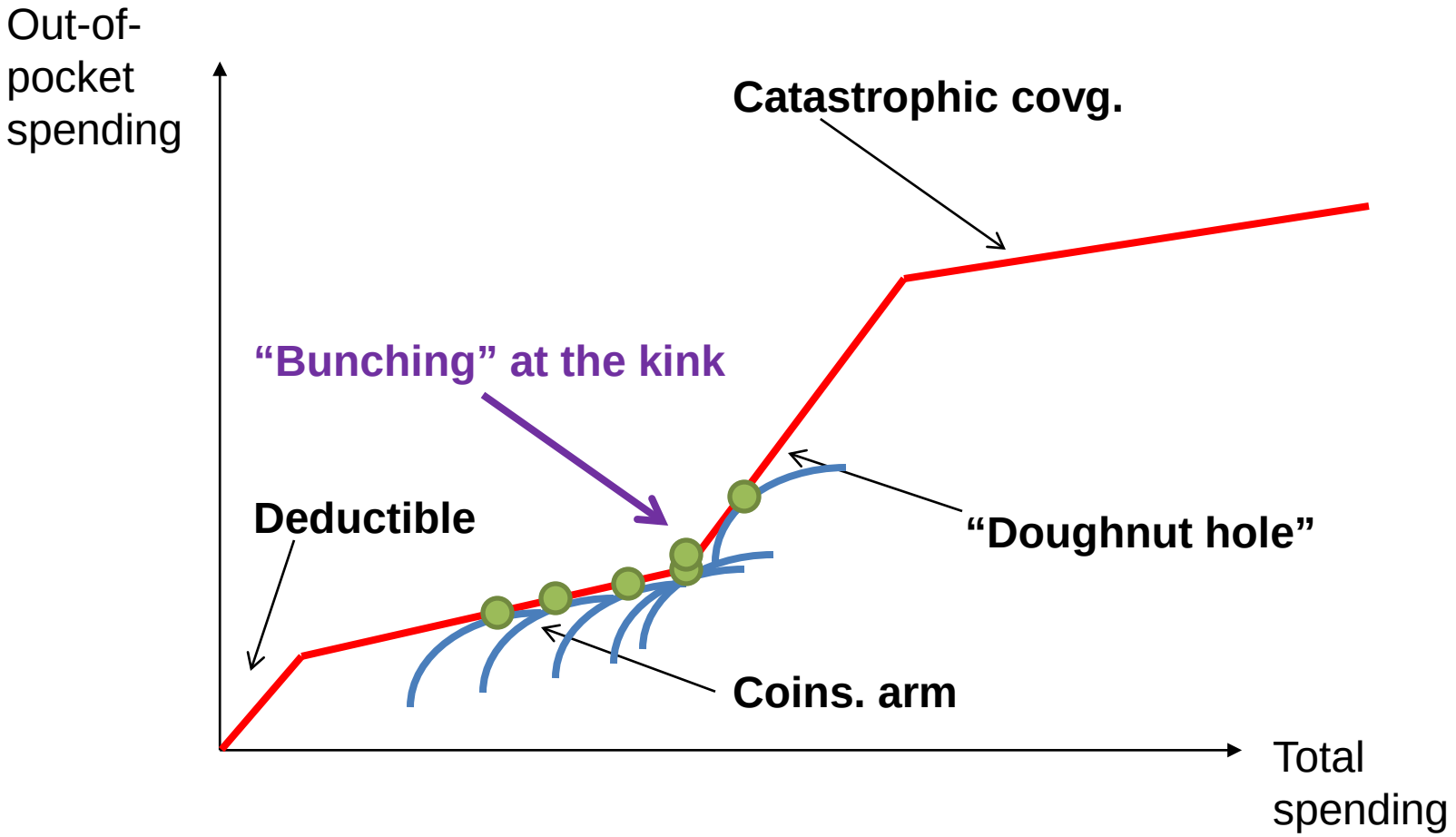
- Main idea: look at new hires, and compare initial utilization for early vs. late in the year hires, exploiting the fact that deductible remains fixed at its annual level

- Show that individuals hired early in the year spend (initially) more → This suggests that they are forward looking
  - They face the same initial ("spot") price (= one), but recognize that they are more likely to hit the deductible by year end, so the expected marginal price is lower

- Then we use a simple model to ask whether individuals are "fully" forward looking (answer: no)
  - Gets a bit tricky because we need to benchmark against the "primitive" MH

More of the same in Medicare Part D

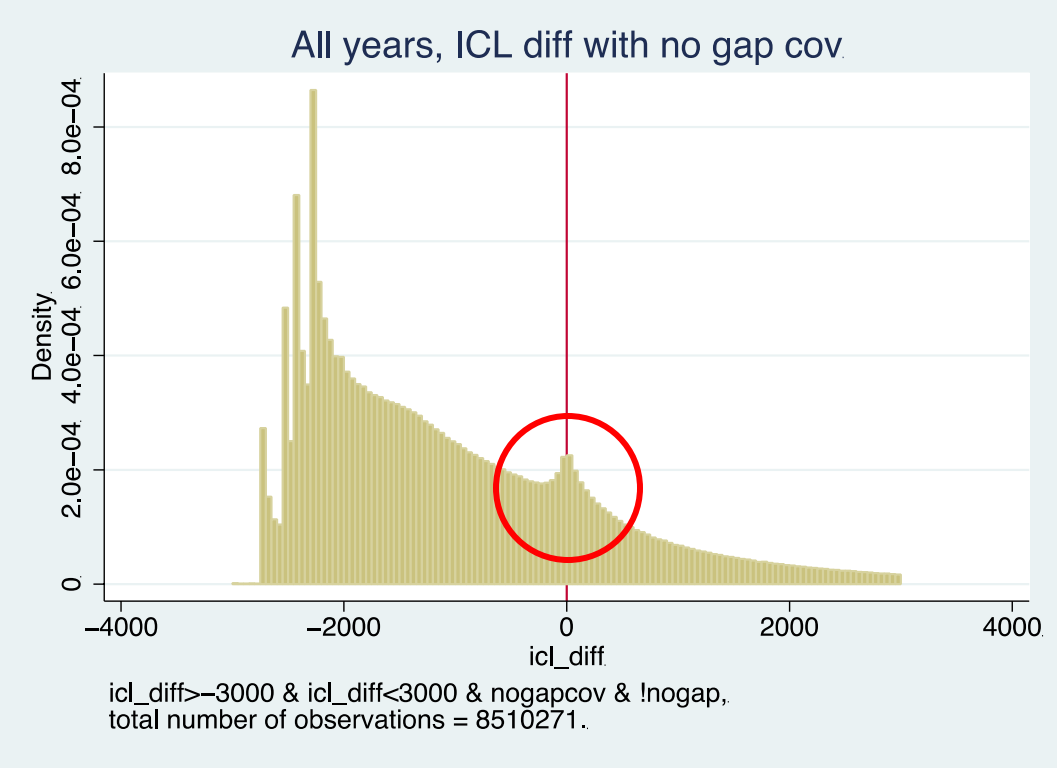
- Based on ongoing work with Amy Finkelstein and Paul Schrimpf
- Use Medicare part D for a similar analysis.
  - Part D contracts have a "doughnut hole," so we can obtain more directly estimates of "primitive" moral hazard



More of the same in Medicare Part D

- Preliminary results regarding the forward looking behavior are similar
  - Now timing variation driven by birth date (at 65 becomes eligible)

- In addition, fairly clear evidence for the primitive moral hazard within the same context



Now working on a model that would put the two findings together

What do we make of it?

- Need to take the non-linearity seriously, as it can be important for predictions about spending

- Perhaps unfortunately, there is no simple single price by which the "complex" plan can be summarized
  - Individuals respond to both the "spot" and the future price, and the entire "budget set" should be taken into account

- Think of introducing a high deductible plan: its effect on spending will be much smaller for individuals who expect to spend past the deductible and understand that their marginal price is not affected

- Subsequent question: what is this moral hazard? In part D there is evidence that at least some of it is inter-temporal substitution, which would presumably be less of a concern (See also Marika Cabral 2012)

MH and AS could be inter-related: "Selection on Moral Hazard"

- Most papers and analyses treat selection and moral hazard as distinct issues.
  - Adverse selection: people vary in how sick they are, and sicker people demand more coverage
  - Moral hazard: focus on the **average** price elasticity

- (Trivial?) observation: people may be different not only in how sick they are, but also in their price elasticity

- Consider two distinct reasons for someone to be an expensive (to the insurance company) consumer:
  1. A sick person who is likely to need more care regardless of price
  2. A hypochondriac who would go see the doc as often as he can afford

- Question: Does this distinction matter? For what?

A simple model

- Based on Einav, Finkelstein, Ryan, Schrimpf, and Cullen
- Develop a stylized model designed to isolate 3 reasons to demand more insurance:
  1. Sicker individuals
  2. Individuals who are more sensitive to price
  3. Individuals who are more risk averse
- An individual 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 $(F_\lambda(\cdot), \psi, \omega)$, make optimal plan choice j^* from plan menu J.
  - Period 2: given plan j, health realization λ, and ω, make optimal utilization (spending) choice $m^* \geq 0$.

A simple model (cont.)

- **Period 2**: Individual's realized utility trades off health *h* and money *y*

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

and is parameterized to deliver optimal utilization choice:

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

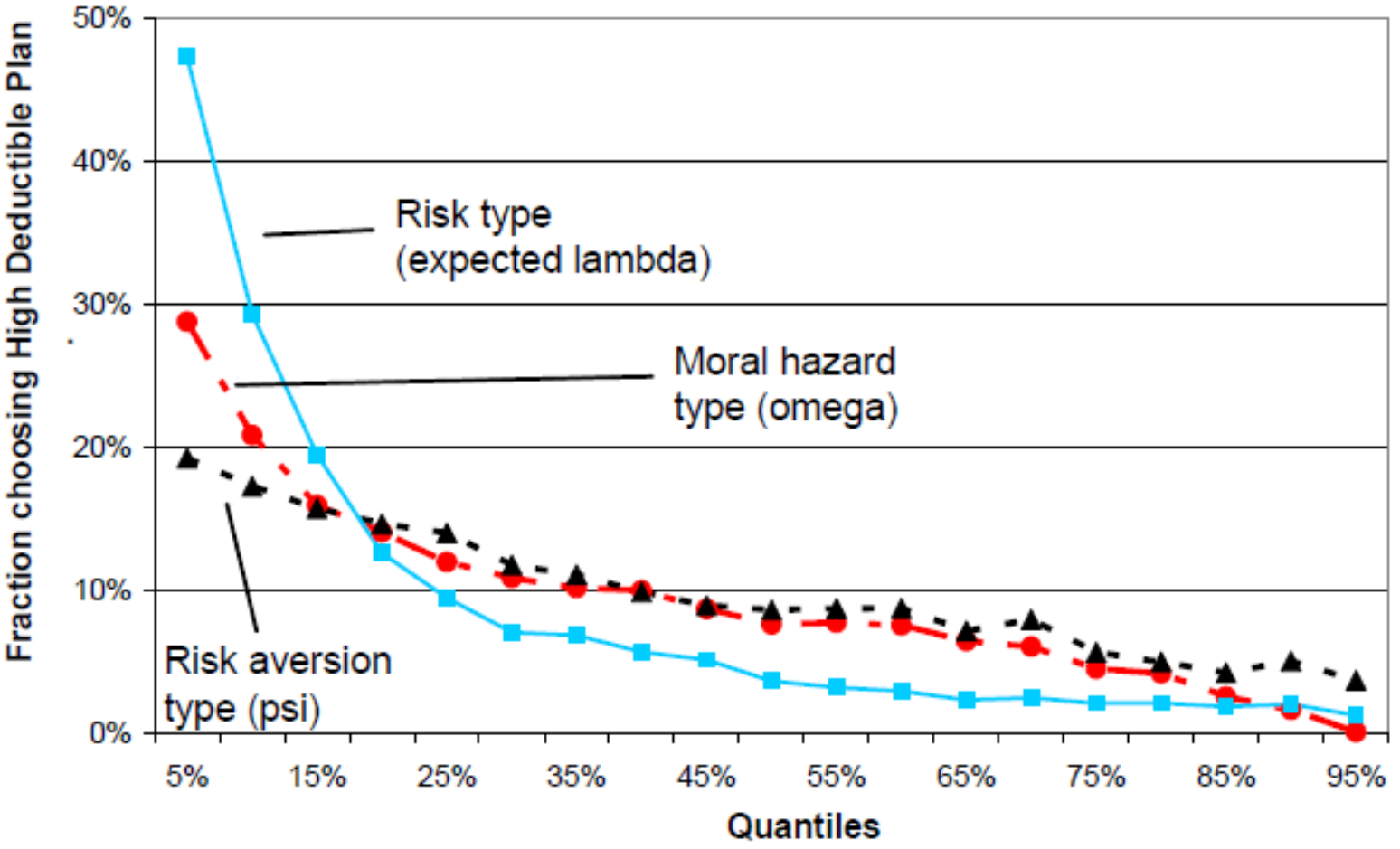
  - (Ignoring truncation) With no insurance ($c = 1$) spend λ.
  - (Ignoring truncation) With full insurance ($c = 0$) spend $\lambda+\omega$.

And we can think of ω ("moral hazard type") as (roughly) the utilization difference between full and no insurance

- **Period 1**: optimal choice based on maximizing expected CARA utility from period 2's realized utility. Higher coverage is then more attractive for "higher" $F_\lambda(\cdot)$ (risk), higher ψ (risk aversion), and higher ω (moral hazard)

Results (in our specific context)

Selection on moral hazard appears important (although not as important as risk):

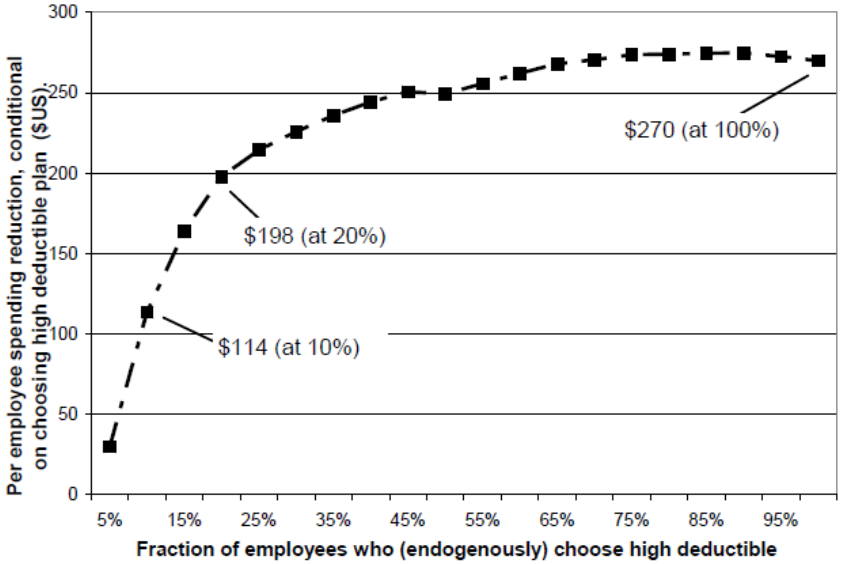


Results (cont.)

- Why should we care? Consider for example the spending reduction associated with a new high deductible plan ($3,000/family) that was available in Alcoa

- Naïve answer: apply an average moral hazard estimate and see how much of a utilization response one would obtain → $270 per employee

- Our answer: those who are likely to select the high deductible plan are the least price sensitive, so spending response may be much lower. Depending on pricing, utilization effect is lower by a factor of two or three (at 20% and 10% share of the plan)



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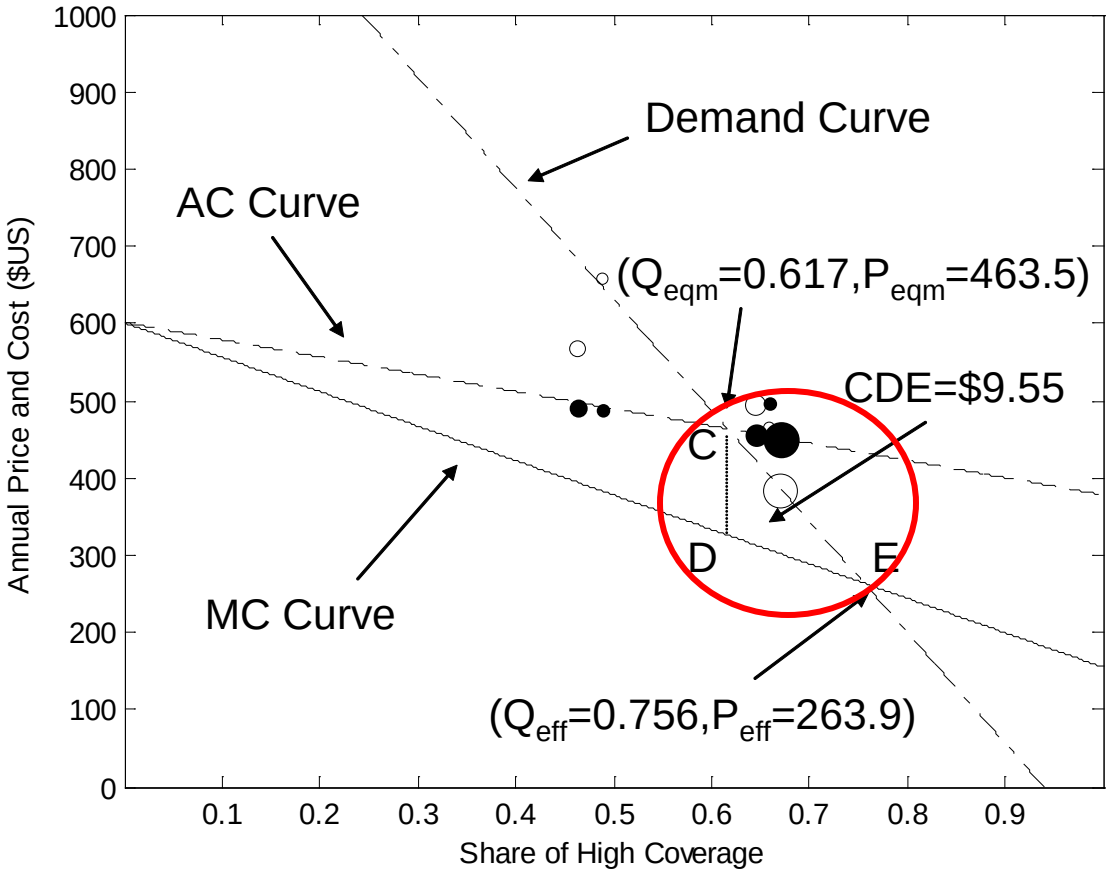
Back to the motivating facts

- Recall the two motivating facts:
  1. Many Americans are uninsured, in particular the young and the poor
  2. Total healthcare costs are: high and rapidly rising

- Can adverse selection explain the uninsured? Can moral hazard account for the high healthcare cost? Will discuss one at a time

Our estimate for the importance of AS



- Relatively small costs:
  - In absolute dollars ($10/year per employee)
  - Relative to comparable benchmarks (3% of “total pie”).

So is adverse selection not important?

- Several other recent studies (Carlin and Town 2010; Bundorf, Levin, and Mahoney 2012) found similar modest welfare costs.
  - Primary reason: estimated demand for higher coverage is not very elastic

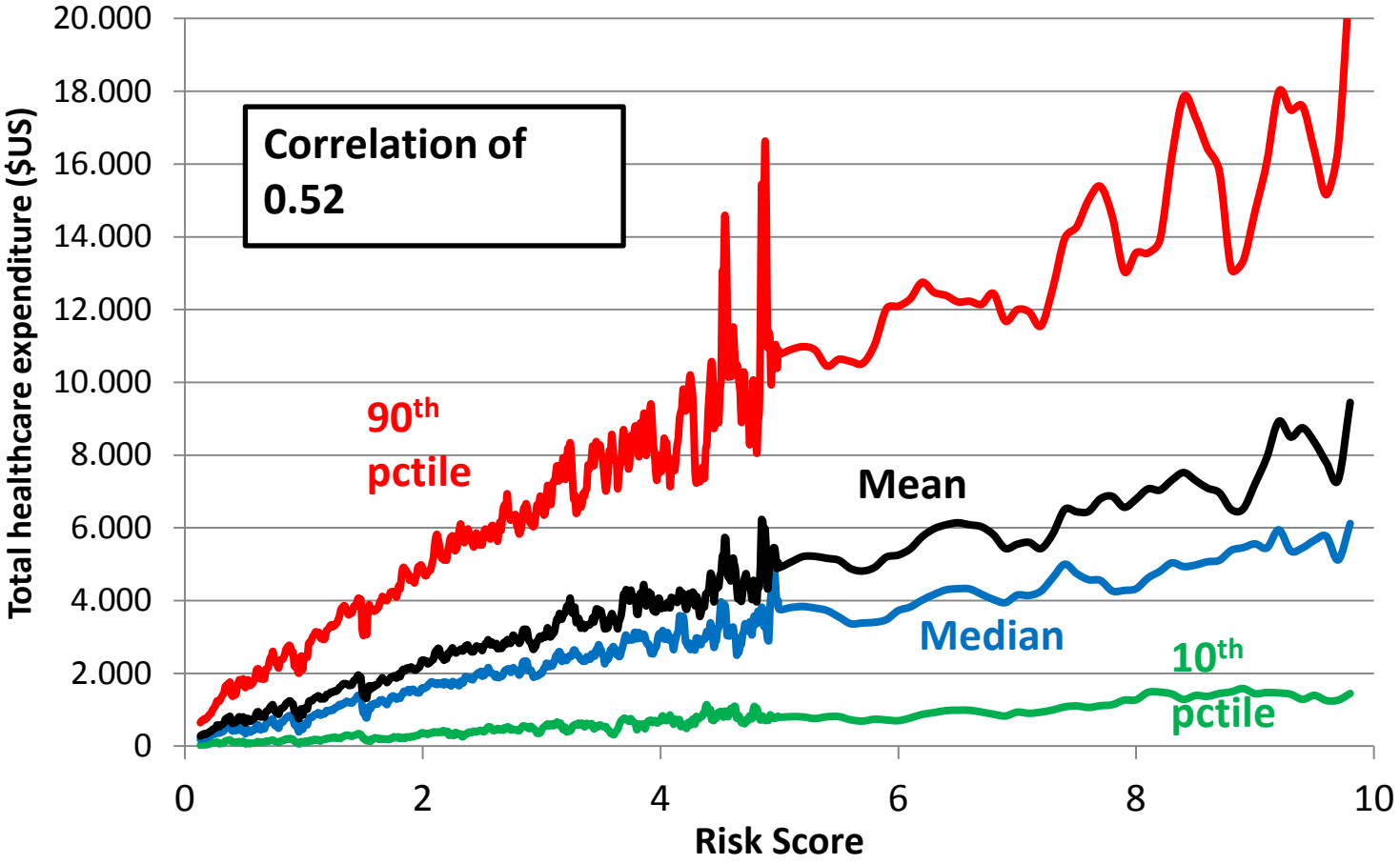
- But some of this may not generalize and may be a feature of employer-provided coverage
  - Inertia in choices due to specific setting (Handel 2012)
  - Perhaps(??) empirical work is most credible where variation is good, and variation is more likely to be good when consequences of "mispricing" not so large → May gravitate empirical work toward setting where selection may be less of an issue

- Indeed, more concerns about adverse selection raised in other health insurance markets:
  - Non-group markets, where many of the uninsureds would obtain coverage
  - Plan selection in Medicare

  One reason that the new ObamaCare imposes fines on non-coverage

Short digression: insurance against what?

- In economics we typically think of insurance against uncertain events in the future
- But much of the health risk is predictable



Short digression: insurance against what?

- In economics we typically think of insurance against uncertain events in the future
- But much of the health risk is predictable
- Yet, many one-year health insurance markets "bundle" insurance with redsitribution (from rich to poor; from healthy to sick)
  - E.g., the commonly used interface that guides the elderly about their Medicare part D choices requests to enter their last year's subscription drugs, and uses this input to suggest the "lowest cost" plan
  - Can think of this redistribution as a longer run insurance against reclassification risk (Hendel and Lizzeri 2003) or as insurance behind the veil of ignorance
  - Some markets deal with this by risk-adjusting transfers (Obama's health exchanges, Netherlands' managed competition, Medicare Advnatge)
- Seems plausible that much of these unpriced attributes account for, or exacerbate adverse selection
- Would be interesting to investigate how much, as well as the consequences and robustness of different types of risk scoring strategies

Back to the motivating facts

- What about Fact #2: can this type of moral hazard account for the high level (or growth) of healthcare spending?

- Recall some facts about how skewed healthcare spending is (using same Alcoa data):
  - Top 1% account for 16% of overall spending; Top 10% account for 51%; Top 20% for 70%

- Top spenders are less likely to be affected by the relatively small deductible, and more likely to be associated with "low moral hazard" conditions (e.g. inpatient)

- So this type of moral hazard is unlikely to be the entire story
  - Although could be important (88% spend below $3,000), and may be the easiest to implement on (for the same reason it may be the "easiest" to research)

- So what else could it be? We are in IO – it must be Q and/or P

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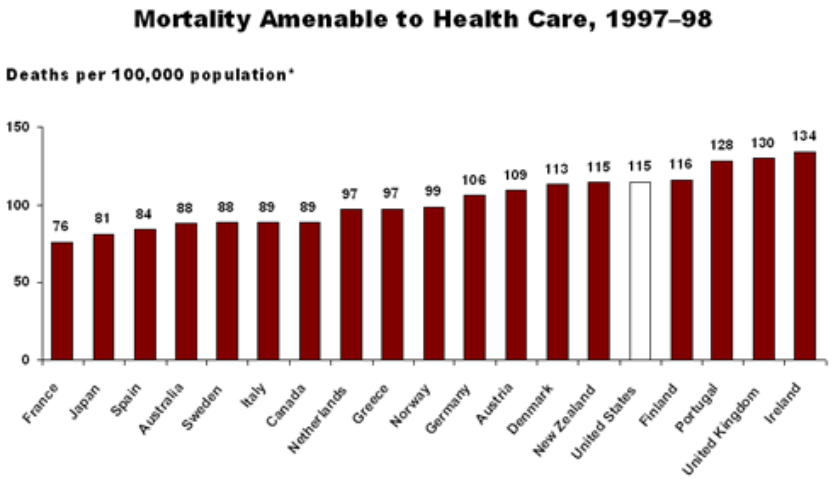
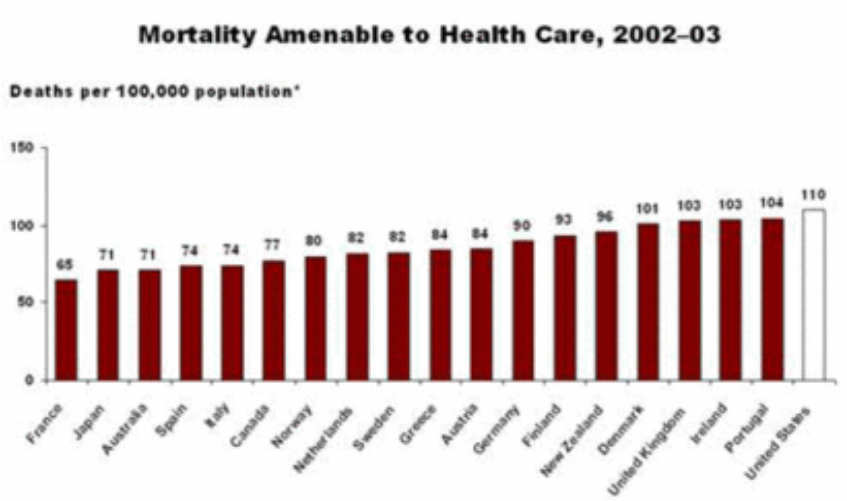
The case for Q

- Most (I think) health economists think it's excess Q:
  - Americans seem to utilize more healthcare (as we saw) …

… and with little results





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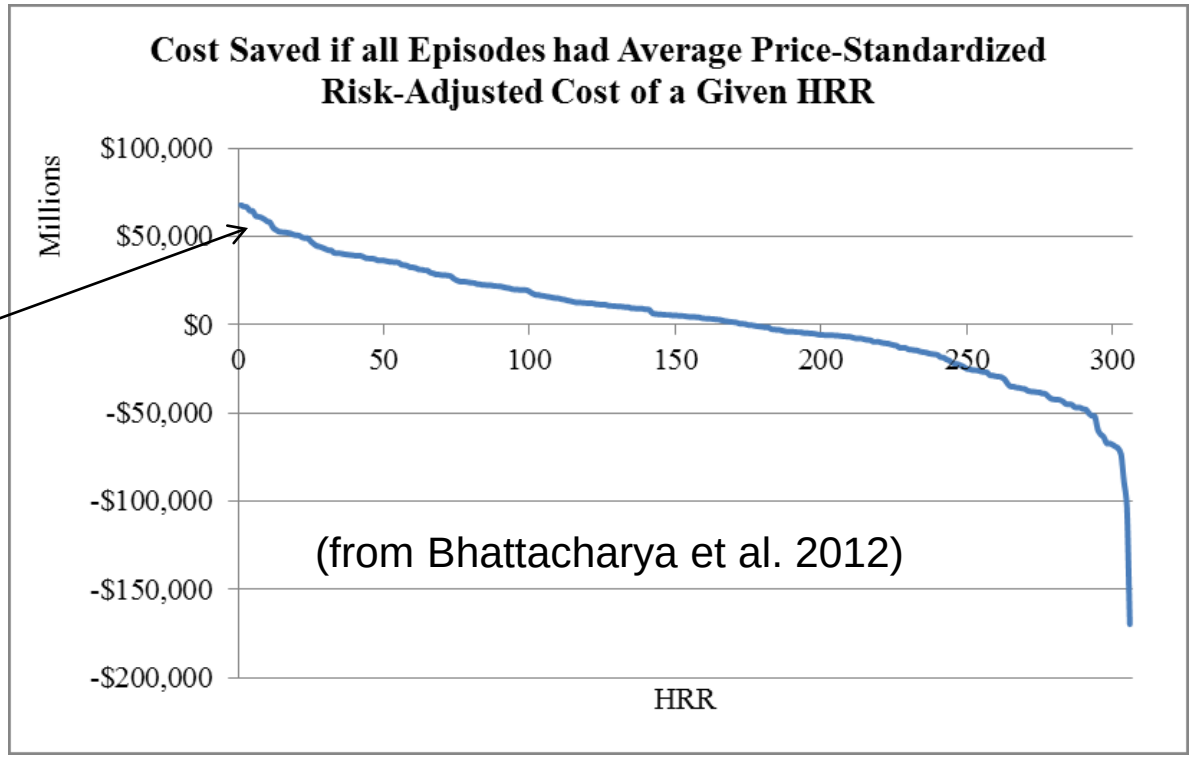
- Often point to excessive(?) use of unproven medical technology, to various misaligned incentives, and to large regional differences in costs (per comparable episode, after adjusting for risk and Medicare prices)

Rochester, NY is the cheapest (18% below average) = 68B/year saving



The case for Q

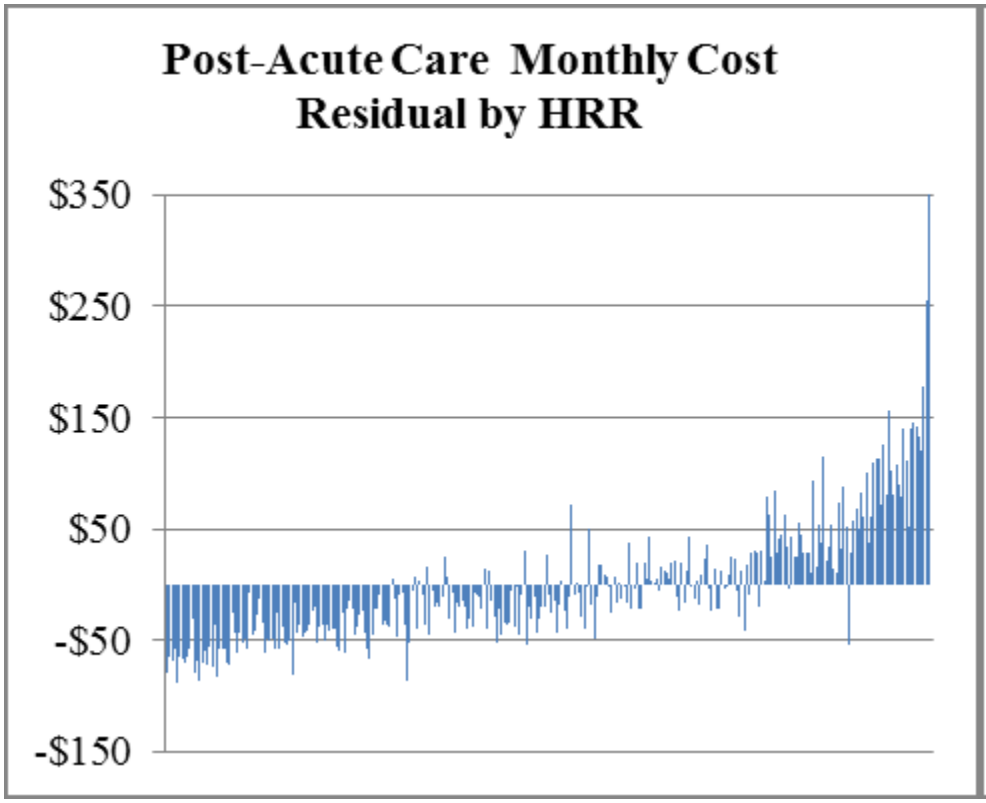
- Most (I think) health economists think it's Q:
  - Americans spend more than any others (as we saw) … and with little results

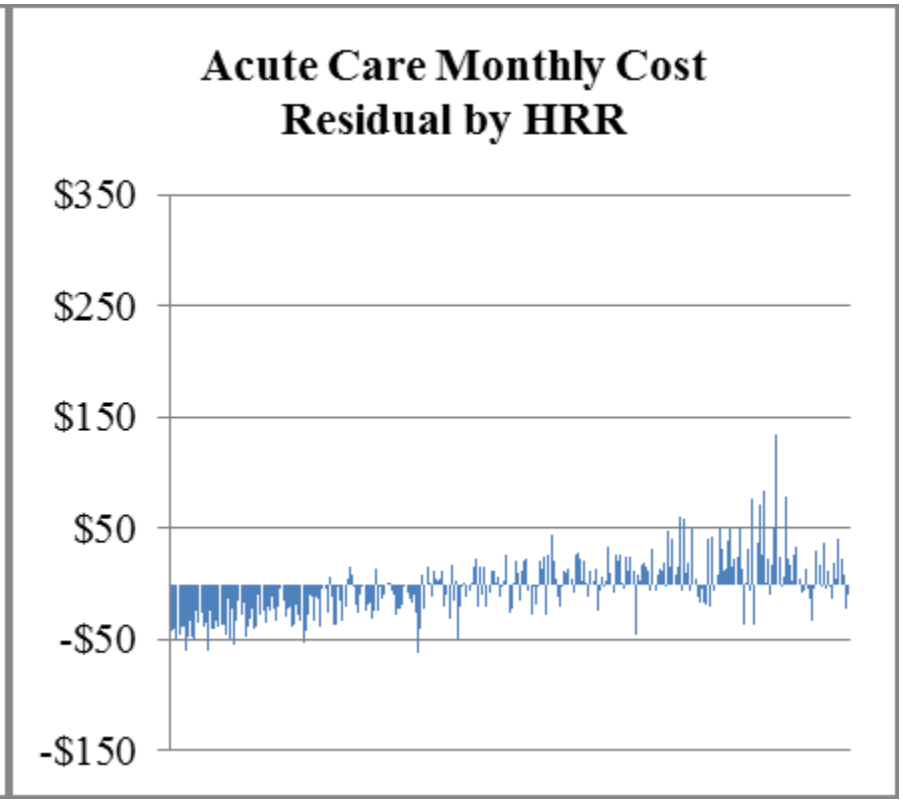
- Often point to excessive(?) use of unproven medical technology, to various misaligned incentives, and to large regional differences in costs (per comparable episode, after adjusting for risk and Medicare prices)

- But one could plausibly ask (and research)
  - Is this regional variation abnormal (relative to productivity diff in other industries)?
  - What is the option value of trying unproven technology?
  - Are mortality rates (even if adjusted) capture the key benefits?

Or perhaps all Americans are flying Business?

- One aspect of medical care is the bundling of healthcare services with many other complementary services
  - Waiting time for the doctor
  - Driving time to surgical or radiation facility
  - Quality of post-labor recovery room





Or perhaps all Americans are flying Business?

- One aspect of medical care is the bundling of healthcare services with many other complementary services
  - Waiting time for the doctor
  - Driving time to surgical or radiation facility
  - Quality of post-labor recovery room

- These services cost money and provide benefits, but are unlikely to generate different health or mortality outcomes

- As if all domestic planes were fully converted to only Business Class: people will not reach their destination faster, but may have more fun (or suffer less) doing so
  - And with the US government heavily subsidizing Business class, it's easy to imagine how it may be difficult to offer Economy and make profits, so the entire airline fleet gets converted to Business
  - May call for limiting insurance to only "basic" needs, but defining what "basic" is could be politically tricky

The case for P

- Some evidence for price differentials for comparable services:

The case for P

- Some evidence for price differentials for comparable services
- Consider one of these, using our own analysis of the data (in 2009):
  - The average length of an inpatient stay in the US is 3 days
  - The average cost is $16,600 (median $9,000), and only a small fraction of it goes to the physician
  - A little unfair, but compare this to cost of three nights at the Palo Alto Four Seasons hotel, which is less than $1,500
- Where does the price difference go?
  - Into excessive profits?
  - Into excessive overhead?

- A better understanding of the supply chain, incentives, competition, and market power in these settings is critical to get at these questions

Final slide

1. Insurance markets are fun, interesting, and offer great data

2. Healthcare and health insurance issues are <u>really</u> important

3. There is a lot going on, but there is much more stuff that we don't fully understand than stuff that we do

1 + 2 + 3 → excellent point for researchers to get into this area, so (borrowing from my colleague Tim Bresnahan) … go get 'em !

And if still not sure … Michael Katz, in his keynote address tomorrow afternoon, will (coincidentally!) give it another try … stay tuned …

Thank you!