

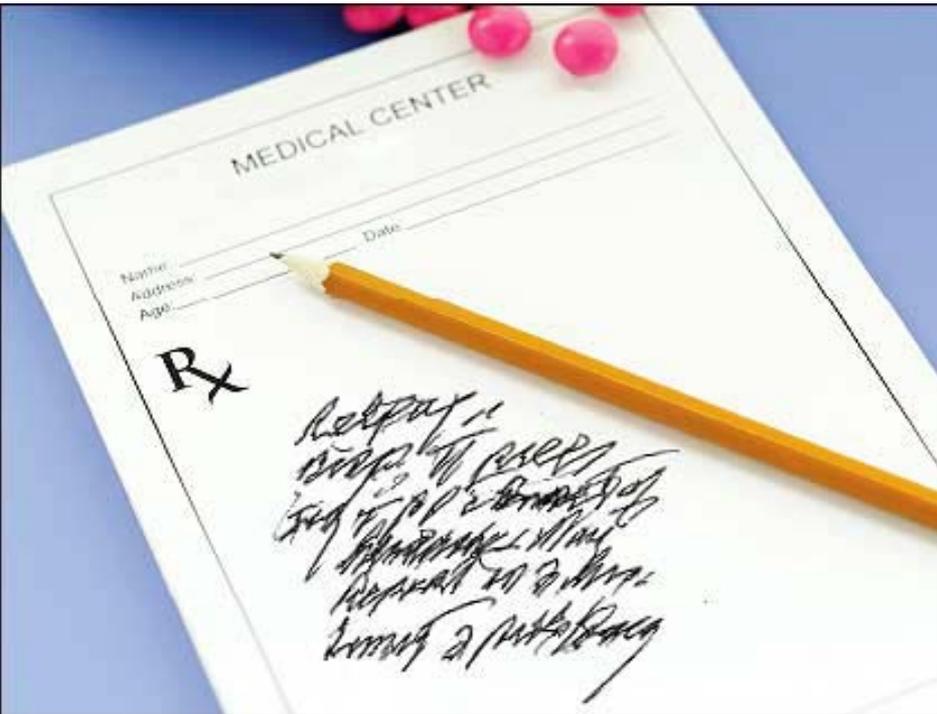
Is there an IO Theorist in the House?
We have a healthcare incentive emergency.

Michael L. Katz
4 September 2012



Katheryn D. Katz: 1933-2012.

If your dry cleaner was as poorly organized as many hospitals, you would fire your dry cleaner.



	A	B	C	D	E	F	G	H	I	J
1										
2	Georgetown Dry Cleaning Services									
4	Order Identification									
6	Receipt #:					Order Status:				
7	Customer Name:					Customer Phone:				
9	Date Left:					Time Left:				
10	Date Expected:					Time Expected:				
11	Date Picked Up:					Time Picked Up:				
13	Items to Clean									
14	Item	Unit Price	Qty	Sub-Total						
15	Shirts									
16	Pants									
17	None									
18	None									
19	None									
20	None									
	Order Summary									
	Cleaning Total:									
	Tax Rate:					5.75 %				
	Tax Amount:									
	Order Total:									

What can be done to improve the quality of health care?

1. Pay more money.

- Not evident that $\partial q / \partial \epsilon$ is positive, at least under U.S. insurance schemes.
- Many public insurance schemes face limited budgets and private insurance schemes want more for less.

2. Strengthen pay-for-performance elements of provider compensation.

- Make greater use of payments tied explicitly to measures of provider performance.
- Increase competition among healthcare providers, both private and government.
- Reorganize healthcare providers and, possibly, healthcare insurers to improve performance.

Plan for Today

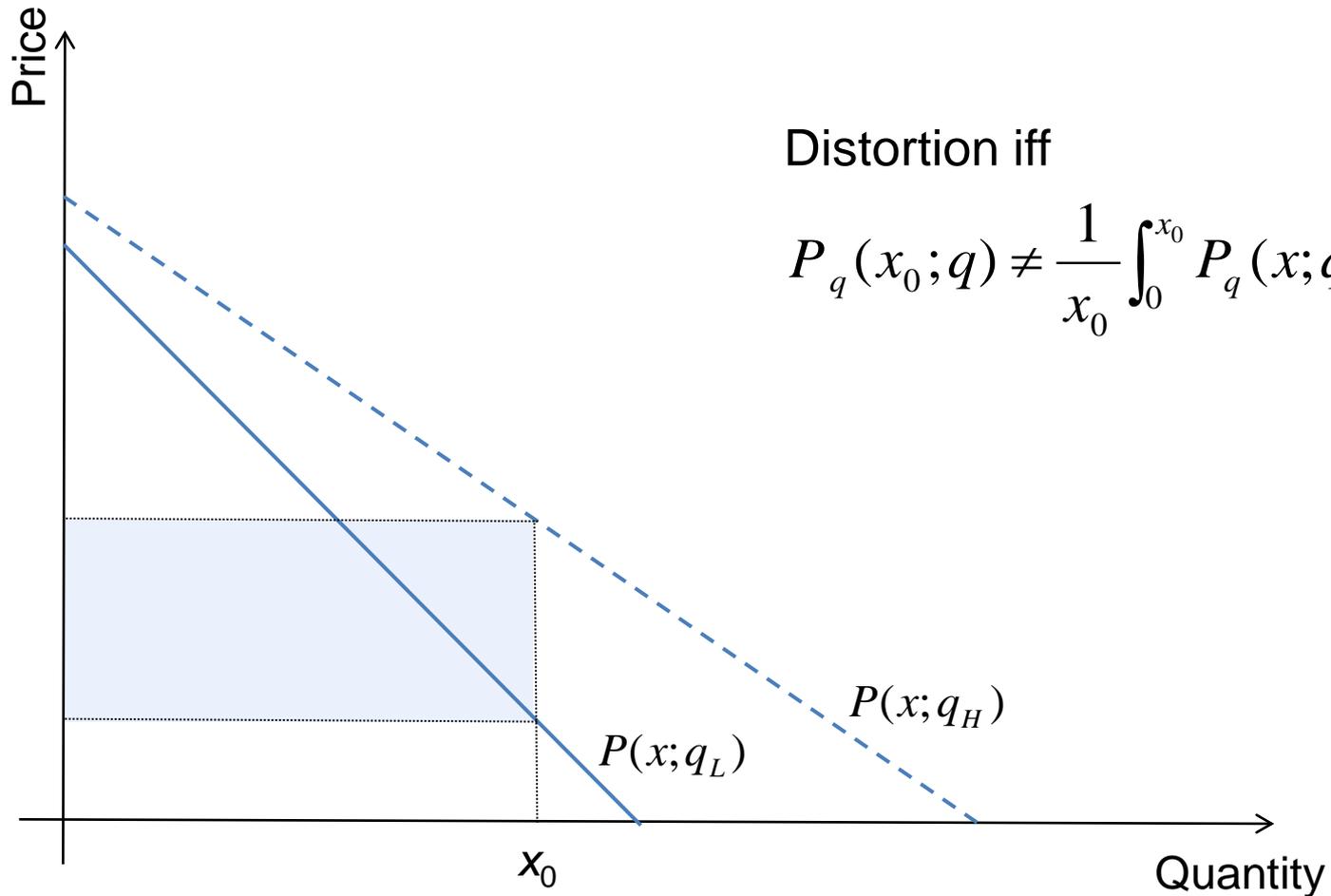
1. Examine the linkage between competition and quality.
 - Economists have a lot to learn.
 - Economic theorists have a lot to offer to empirical researchers and policy makers.
2. Examine the linkages between pay-for-performance and organizational structure.
 - Policy makers need a lot of help to replace magical thinking with analysis.
 - Economic theorists have a lot to offer but it can be hard for outsiders to tell.
3. Drink.

COMPETITION AND QUALITY

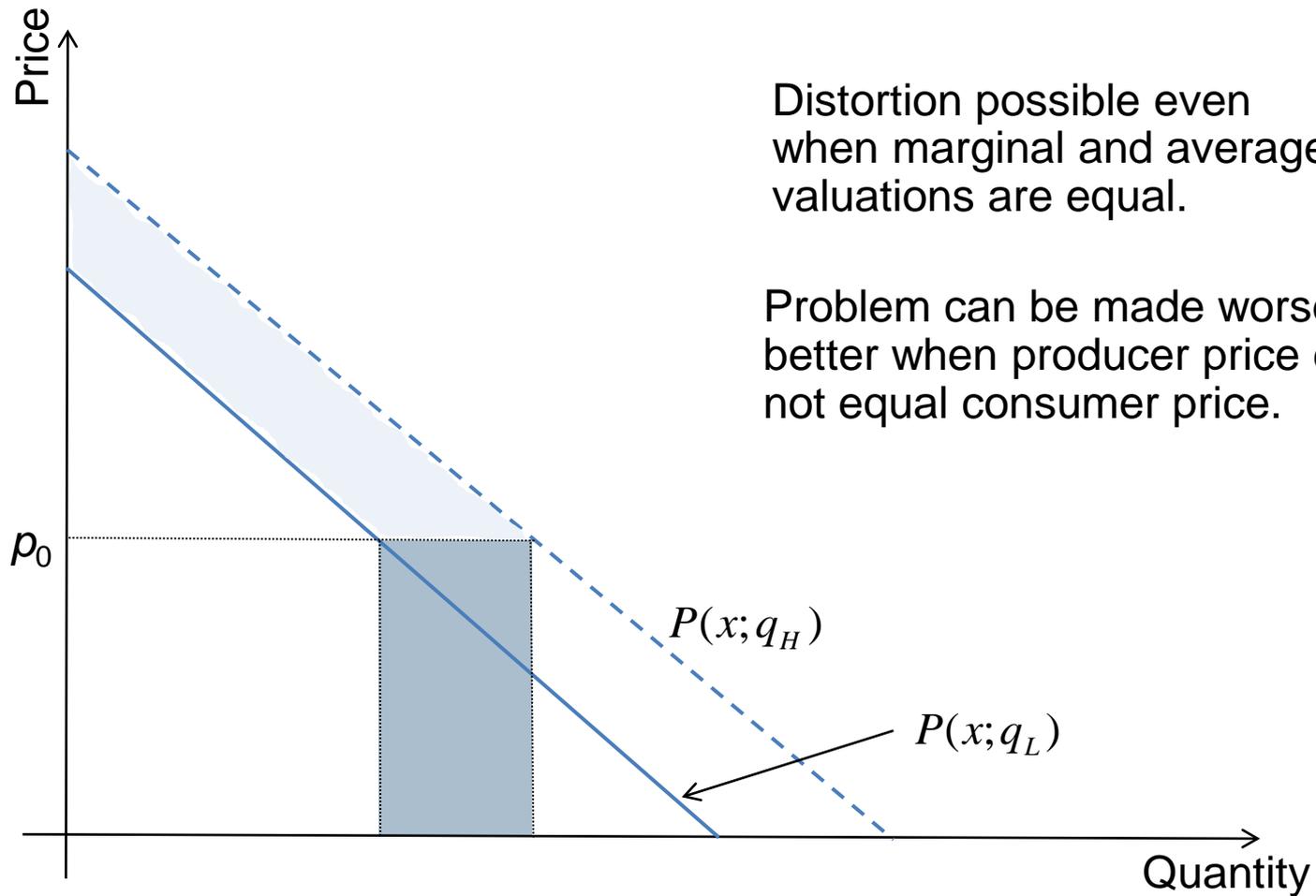
Three Views on Quality & Competition

- Policymakers and many consumers:
 - Quality is too low, especially under monopoly.
 - Competition can drive higher quality if consumers have choices but can also create pressures to cut quality to save money.
- Economists
 - Quality can be too high or too low under monopoly with perfect consumer information.
 - There can be complications from imperfect consumer information and various market imperfections (*e.g.*, moral hazard and insurance).
 - Competition will lower quality-adjusted prices and, hence, raise quality taking the nominal price as fixed.
- Data
 - Even with fixed prices, increased competition can raise or lower quality.

Monopoly & Quality: The Spence Distortion



Monopoly & Quality: The Fixed-Price Distortion



Does anyone seriously think quality is too high?

- In part, it depends on what you mean by “quality.”
- The *quantity* of healthcare procedures and pharmaceuticals consumed may be excessive.
 - Excessive treatment can and should be viewed as *low quality*.
- There is no doubt that there are important elements of substandard quality.
 - Insufficient coordination.
 - Failure to apply best practice and evidence-based medicine.
- Loss function is asymmetric.
 - Similar to response of competition policy: try justifying a merger with the promise you will lower quality and innovation because they are excessive.

A Brief History of Competition & Healthcare

- In the early 1990s, several countries around the world introduced greater competition into their health systems. in attempts to reduce costs.
- There was a backlash in the late 1990s, and many European and UK nations reversed course.
- Over the past decade, there has been a renewed emphasis on competition focused on using consumer sovereignty to drive quality improvements.
- U.S. always implicitly relied on consumer choice to drive quality, but widely seen has having provided weak incentives because of uninvolved and uninformed consumers.

“I am not here to write, but to be mad.”

—Robert Walser

- Patient Model: the patient’s job was to focus on being ill.
- Consumer Model: People are now seen as playing an active role in choosing their providers and course of treatment.
- Will the consumer model work?
 - Concerns about “unique” features of healthcare markets.



What's so special about healthcare markets?

- Pervasive public and private insurance.
- Poorly informed consumers: asymmetric information even after consumption.
- For profit, non-profit, and governmental providers often co-exist.
- Team production with difficult-to-verify effort levels.
- Multiple decision makers: patients, physicians, insurance companies, government, and (in U.S., employers).

What does “increased competition” mean?

- Higher demand elasticity with respect to price and quality.
 - This is too vague. We need to know what is driving the change.
- Less product differentiation.
 - But this means changing underlying utility functions, raising questions about what is being compared.
- Eliminating market division.
 - A change in locus of decision making (Brekke *et al.* 2011).
- A greater number of suppliers.
 - We will see that this has some problems.
- Improved consumer information.
 - Can hold underlying utility functions constant while examining effects of changes in the nature of demand.

Let's look at the last three...

1. Eliminating Market Division

- Consider two single-product suppliers in a spatial market with endogenous vertical quality.
 - Monopoly regime: each consumer is assigned to a specific supplier as the sole source of the service. The assignment is made without regard for either supplier's quality (*e.g.*, each supplier is given an exclusive geographic market).
 - Competitive regime: each consumer is free to purchase the service from either supplier.
- It is well known that, *at any given price*, competitive regime has greater quality incentives because demand is more elastic with respect to quality.
- Intuition:
 - When monopolist increases quality, only margin is between purchase and not.
 - When competitor increases quality, there is also a positive share-shift effect.

The Well-Known Result is False

- Brekke et al. (2011) show effects of partially altruistic providers.
- Standard argument breaks down more generally:
 - Monopolist: $X(\mathbf{q})$
 - Competitor: $s_i(\mathbf{q})X(\mathbf{q})$, so there is indeed extra effect $\partial s_i / \partial q_i \cdot X$.
 - But unless $X(\mathbf{q})$ independent of \mathbf{q} , have to account for $s_i \cdot \partial X / \partial q_i$ (as well figure out what $X(\mathbf{q})$ means).
- Getting into the guts of the issue:
 - Suppose provider i 's value to consumers has CDF $G(v; q_i)$ and density $g(v; q_i)$.
 - Normalize price so buyers choose outside option iff $v < 0$.
 - The elasticities faced by a monopolist and duopolist are:

$$\frac{q_i \int_0^\infty \frac{\partial g_i(v; q_i)}{\partial q_i} dv}{\int_0^\infty g_i(v; q_i) dv}$$

$$\frac{q_i \int_0^\infty \frac{\partial g_i(v; q_i)}{\partial q_i} G_{-i}(v; q_{-i}) dv}{\int_0^\infty g_i(v; q_i) G_{-i}(v; q_{-i}) dv}$$

2. A Greater Number of Suppliers

- Need to understand what is driving the change/differences.
 - Market conditions, such as demographics.
 - Public policies that block or promote mergers, block or subsidize entry.
 - Level of administered prices.
- Be careful not to confuse the number of suppliers with the number of products.
 - Could have multiproduct suppliers.
 - In practice, numbers of firms and products can be closely related because of profit effects and organizational inability to engage in *selective* intervention.

A Well-Known Result that is True

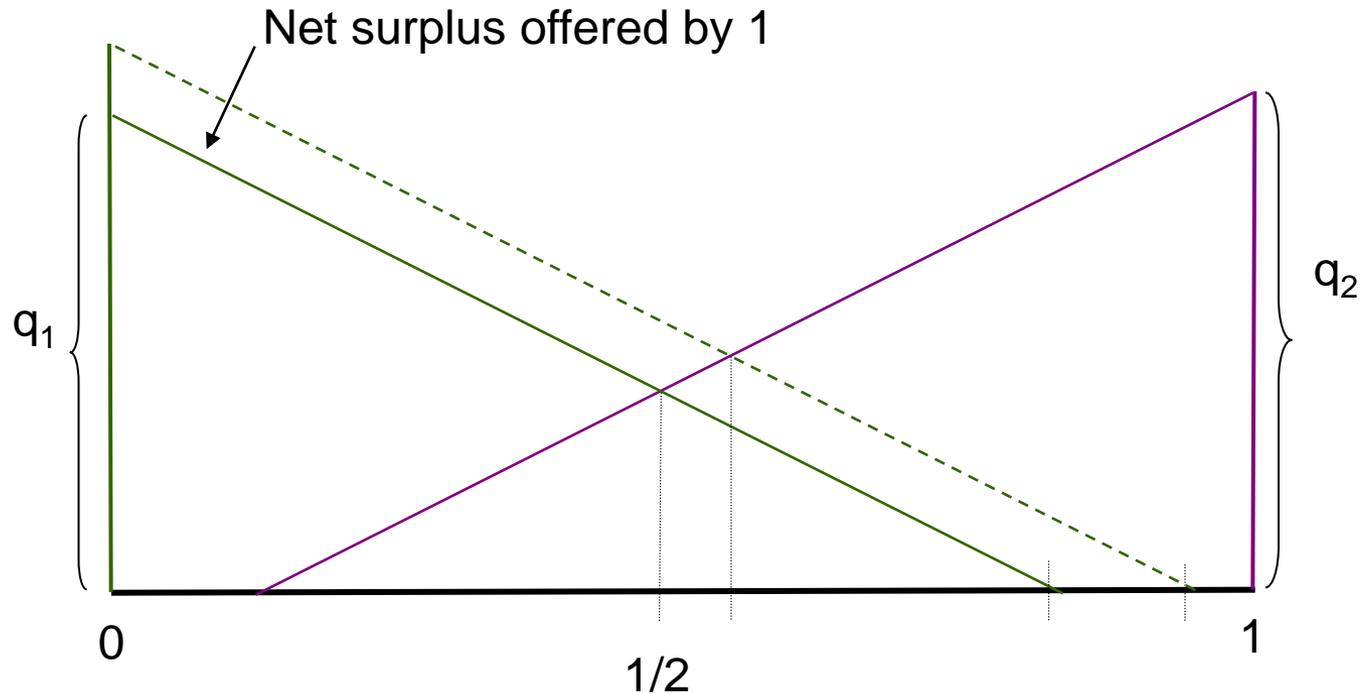
- Suppose that the two healthcare providers in the random-utility example merge.

- Gain to the monopolist:
$$\int_0^\infty \frac{\partial g_i(v; q_i)}{\partial q_i} G_{-i}(0) dv$$

- Gain to duopolist:
$$\int_0^\infty \frac{\partial g_i(v; q_i)}{\partial q_i} G_{-i}(v) dv$$

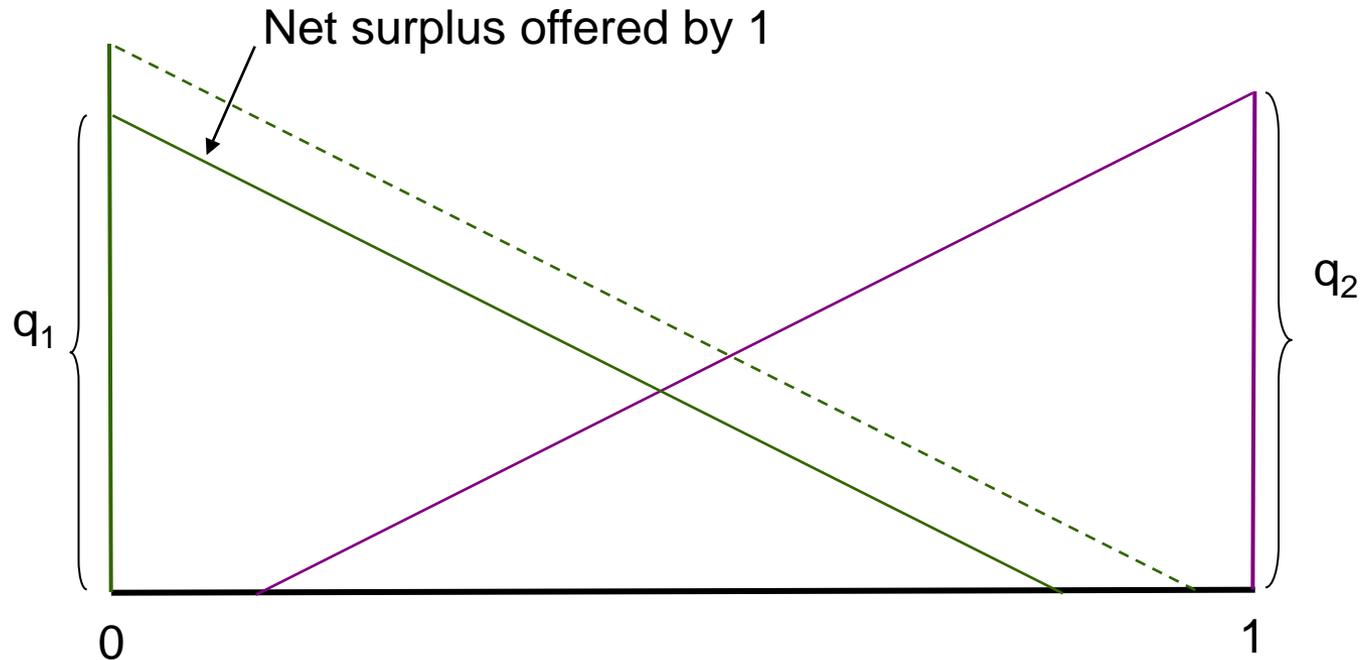
- Quantities are the same, so elasticity is lower for monopoly.
- In a symmetric equilibrium, monopolist chooses a lower quality due to internalization.

Hotelling Elasticities w.r.t. Quality



In covered-market case the elasticity with respect to quality is higher for the **single-product** monopolist than for a duopolist.

Hotelling Duopoly v. Multiproduct Monopoly



In covered-market case the elasticity with respect to quality is lower for the **multi-product** monopolist than for a duopolist.

Multiproduct monopolist chooses lower quality due to internalization of competitive effects.

Increasing the price can induce entry and lower equilibrium quality.

- Consider the Hotelling model with fixed costs of operating at each end point and monopolist chooses whether to serve them both.
- For some parameter values:
 - Low price: single-product monopoly.
 - High price: a pair of single-product providers.
 - The high price leads to lower equilibrium quality and consumer welfare (even ignoring the price itself).

3. Improved Consumer Information

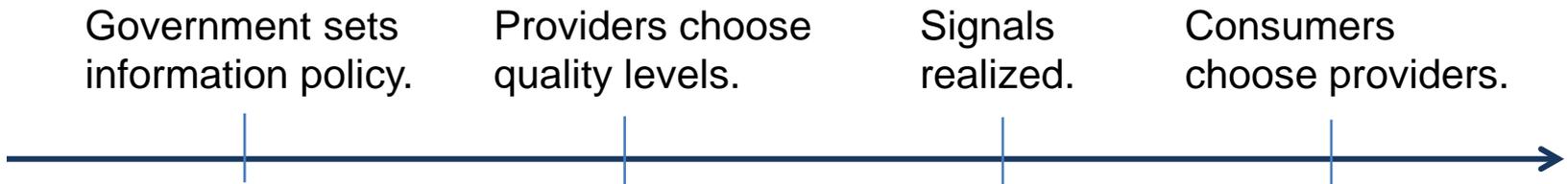
- We have been assuming that consumers are perfectly informed.
- In reality, they are not.
- Good disclosure is a hard thing to do for many reasons.
 - “Behavioral” Consumers: Consumers find soup labeled “low fat” to be less satisfying.
 - Provider Gaming: Dranove *et al.* (2003) found hospitals avoided sicker patients.
- Let’s assume we have hyper-rational consumers and no provider gaming.

This ain't agency.

- In a principal-agent problem, an additional signal is never harmful and better information in the Blackwell sense is better information in the economic sense.
 - Use signal to pay $w^*(s,b)$. At worst, fall back on $w^*(s,b) = w^*(b)$.
- This is not a textbook agency problem: Signal induces consumer behavior $x(s,b)$.
 - It may be impossible to find $W(\cdot)$ such that $W(x(s,b)) \equiv w^*(b)$.
 - Real-world compensation schemes often are much simpler than theoretical schemes, so solution may be impractical.
 - There are lots of distortions in these markets, so $x(s,b)$ may have “funny” properties.
 - Even if competition works well with perfect information, it does not follow that a move from one imperfect level to another will improve performance.
- Three examples in which better information is worse...

A Family of Normal Examples

- True quality q_i .
- Consumer priors are $N(0, \underline{\sigma}^2)$
- Signal $s_i \sim N(q_i, \sigma^2)$.
- Consumers are fully insured and risk neutral with respect to quality. Choose provider with highest expected quality conditional on available information.



Discouragement Effect

- In the symmetric case, greater precision leads to greater marginal effect of quality changes and, hence, higher equilibrium quality.
- In the asymmetric case, greater precision can lead to lower quality.
 - Discouraged lagging supplier because it realizes it has little chance of attracting customers.
 - Reduces pressure on lead supplier because it does not have to overcome unduly favorable beliefs about rival.
- Point made by Gravelle & Sivey (2010) in a related model.
- Similar effects can arise in auctions and tournaments, where noise can help.

Leveraging Consumer Pressure

- Suppose there are two groups.
 - Cardiac patients care about cardiac quality, q_c .
 - Cancer patients care about oncological quality, q_o .
- With separate signals, each group responds to relevant signal.
- With aggregated signals, noise is introduced but each group responds to both signals (and, hence, to both underlying quality levels),
- Reporting only an aggregate signal can leverage consumer pressure to promote quality:
 - A low signal for oncology will drive away cardiac patients too.

Multitasking Mismatches

- Suppose that there are two dimensions of quality and all consumers care about both.
- Increasing the precision of one of them leads to a relatively greater relative allocation of effort to improving quality along that dimension.
- When there are increasing marginal costs of a common resource (*e.g.*, physician time), quality in dimension with more precise signal can rise while other quality falls.
- Improving the precision of a signal can make the allocation of effort better or worse, depending on parameter values.
- Very similar to Holmstrom and Milgrom's (1991) analysis of multitasking agents.

PAY FOR PERFORMANCE & ORGANIZATIONAL STRUCTURE

Code of Hammurabi Quiz: Warm-Up Question



4



“If a man put out the eye of
another man, his eye shall be put out.”

There is a long history of pay for performance in health care.



or



4



Social Justice: Rich people receive poorly delivered healthcare too.

“[Steve Jobs] realized that he was facing the type of problem he never permitted at Apple. His treatment was fragmented rather than integrated. Each of his myriad maladies was being treated by different specialists... but they were not coordinated in a cohesive approach... This was particularly true at Stanford, where nobody seemed in charge of figuring out how nutrition was related to pain care and to oncology.”

“So [Job’s wife] asked various Stanford specialists to come to their house for a meeting... They agreed on a new regimen ... for coordinating the other treatments.”



Should complementary providers be jointly rewarded or even integrated?

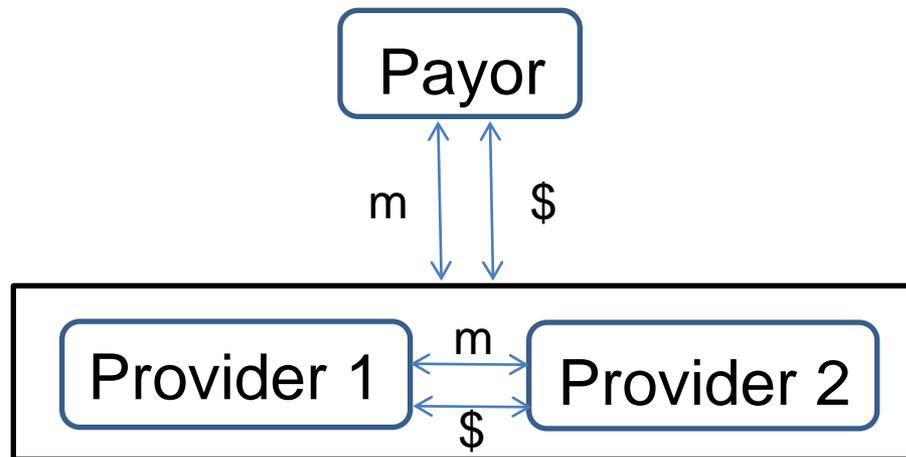
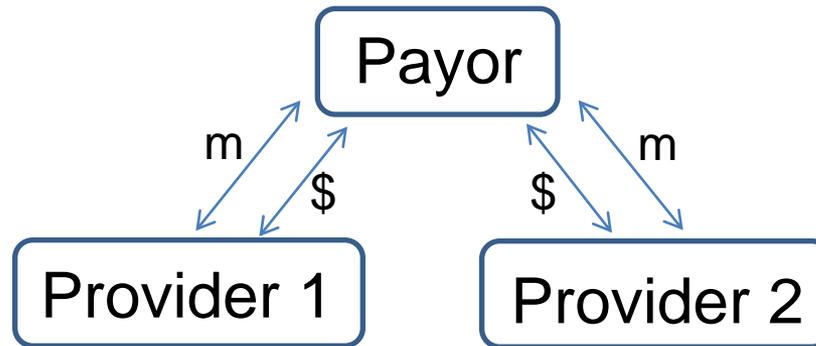


Who needs organizations when we have mechanisms?

- Why not rely on mechanisms or contracts entirely with individuals?
- In fact, it would seem that contracting with groups of physicians could lead to “collusion” rather than “coordination.”



Is paying a black box a good idea?



A Simple Game with Team Production

- Two types of specialists: $i = 1, 2$
- Health of patient in dimension i : θ_i .
- Number of necessary procedures: $\theta_i - e_i - a_{-i}$.
- Physician i 's disutility of effort: $\frac{1}{2} (e_i^2 + a_i^2)$.
- Hard MC of procedure: $c = 1$.
- Each team member can infer effort level of the other at the end of the period but nothing is verifiable.

One-shot Game

- Pay each physician fee for service:

$$\max \{p-1\}\{\theta_i - e_i - a_{-i}\} - \frac{1}{2} (e_i^2 + a_i^2) : e_i = 0 = a_i .$$

- One-shot, individual capitation:

$$\max P - \{\theta_i - e_i - a_{-i}\} - \frac{1}{2} (e_i^2 + a_i^2) : e_i = 1, a_i = 0 .$$

- One-shot, joint capitation:

Need to decide how to share the money. Say 50/50.

$$\max P - \frac{1}{2} \sum_k \{\theta_k - e_k - a_{-k}\} - \frac{1}{2} (e_i^2 + a_i^2) : e_i = 1/2 = a_i .$$

Repeat Play

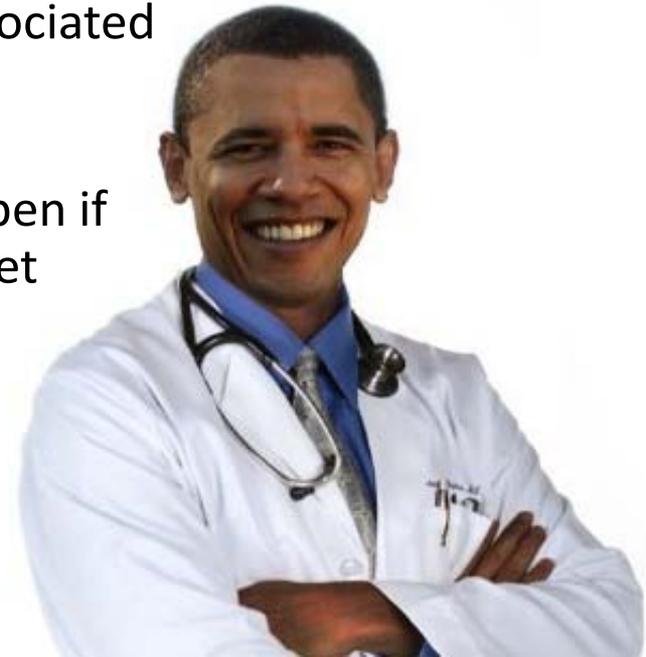
- If matched with each other repeatedly, can use relational contracts.
 - Grim-trigger strategies under individual capitation: set $a_i = 0$ forever in response to shirking by other doctor.
 - Abreu penal codes under joint capitation: set $a_i = 0$ for one period in response to shirking by other doctor while other doctor has to engage in a high level of effort.
- Suggests that long-term *exclusive relationships* could be good, despite competition authorities' concerns.
- *Joint capitation* can sustain coordination for higher discount rates because bear half the lost benefits when reducing either type of effort, while bear none of the lost benefits when reducing altruistic effort under individual capitation.

CONCLUSION

Who needs theorists?

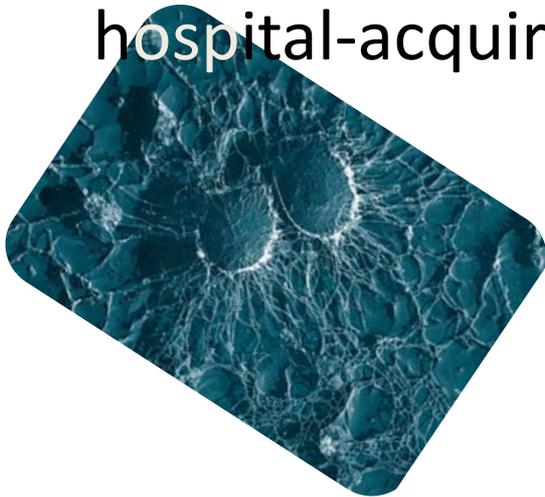
- Policy makers.
- Empirical researchers.
 - Yes, theory says anything can happen.
 - But empiricists still need help determining what might happen *next*.
 - Example:
 - Data can show reveal if competition is associated with higher or lower quality given current institutions.
 - But how can one predict what would happen if institutions were to change in a way not yet observed?

You can't have a structural model without structure.



This stuff is a big deal.

- There are women who would kill for an American Express Black Card.
- There are a lot more women who will die of hospital-acquired infections.



Some Big Questions for Theorists

- Under what conditions does greater competition lead to greater quality?
- What does an optimal provider report card look like?
- Should doctors in complementary roles have integrated practices?
- Should public and private insurers be integrated with care providers?
- Should physicians be employees with low-powered incentives?