HOSPITAL SERVICES

7MHPH010 – Health Economics and Health Policy

Department of Primary Care and Public Health Sciences
Kings College London

Farasat A.S. Bokhari
farasat.bokhari@kcl.ac.uk
http://phs.kcl.ac.uk/fbokhari/

Spring 2012

Hospital Services

Outline

- Hospital services industry consists of different type of hospitals
  - Public
  - Private
    - Not for Profit (NFP) hospitals
    - For profit (FP) hospitlas
  - How do these different types of hospitals differ from each other
    - In behavior
    - In conduct
    - In performance
- Hospitals are reimbursed according different mechanisms
  - Retrospective
  - Prospective
  - How do these different mechanisms effect
    - Efficiency
    - Quantity
    - Quality

Not for Profits

Differences between Not for profit (NFP) and for profit (FP) hospitals

- Not for profit (NFP) firms are prevalent in health care (hospitals, nursing homes etc.)
- Is the behavior of NFPs different from for profit (FPs) firms?
- What is a not for profit firm?
  - The important distinction for NFP is the nondistribution constraint
  - No one has a legal claim on the firms residual, the difference between the revenues and its costs, or what an ordinary firm would call its profits
  - Additionally, NFPs are exempt from corporate income taxes and often from property and sales taxes and donations to NFPs receive favorable tax treatment

Not for Profits

Providers of Unmet Demands for Public Goods

- A pure public good is nonexcludable and nonrival
  - Nonexcludable means that people cannot be economically excluded from consuming the good even if they refuse to pay for it
  - Nonrival means that one person can consume the good without depleting it for others
  - An externality is an uncompensated direct effect of the production or consumption of a good on persons other than the producers or consumers
    - Vaccination for influenza: this good entails a private benefit (the purchaser will less likely suffer from influenza) but there is also an external benefit to others because the purchaser will be less likely to infect others
- Market Failure – markets have trouble providing the efficient amount of a public good, if they are able to provide it at all
  - Free markets tend to underproduce goods for which there exist significant external benefits
  - For example, the purchasers of vaccinations will tend to consider primarily the private benefits and will ignore the external benefits to the community
  - In the case of market failure, the economy often turns to government and when government fails the economy usually turns to the nonprofit sector
    - Hospital services, nursing home services, kidney dialysis services, etc. are probably not pure private goods

Not for Profits

Not for profits as a Response to Contract Failure

- People may prefer to work with a NFP firm when part of the contract is not observable/varifiable
- Example
  - Want to send charity (food, clothing, etc.) to impoverished people of another nation
  - Find a firm to deliver this care on your behalf
  - Costly to verify that the company is actually delivering to the targeted population
  - May prefer to work with a not for profit firm
- Application to Nursing Homes
  - Nonprofit nursing homes and for-profit hotels provide very similar services, what is the difference?
  - Quality of care is more difficult for residents of nursing homes to assess than it is for hotel customers
  - Nonprofit ownership in nursing homes tends to signal higher quality
    - Hirth (1999) demonstrated that an influx of nonprofit homes will drive up the average quality in the market, making the nonprofit a productive agent for change whether or not it exhibits a higher quality itself
    - Much of the available evidence suggests that there is an apparent for-profit advantage in cost without apparently lower quality

Not for Profits Hospitals

Why are there any NFP hospitals

- Weisbrod – Hospital services are not pure private goods
  - NFPs arise to provide for unmet demand for public goods
  - Most notably in cases where there are significant external benefits to the provision of a good
    - Provides a plausible account of the historic rise of not for profit hospitals
    - Hospitals often started as charitable institutions providing care primarily to the poor and relying heavily on donations
- Hansmann (1980) – Contract failure
  - Contract failure occurs when the quality/quantity of output is not easily observable by the purchaser
  - The asymmetry of information between the firm and the buyer of services becomes important in explaining the role of NFP
    - Contract failure may apply to nursing homes
    - Does it apply to hospitals as well? Physicians act as agents for patients and can observe quality/qunatity – also, physician incentives are such that they may want patient to choose highest quality available
- Bayes – Interest group theory
  - Physicians prefer NFP so that they can further their own personal gains

Not for Profits

Residual Claimant

- What are the differences between NFP and FP hospitals?
  - NFP Hospitals
    - Many can and do earn profits
    - They may not/can not/do not distribute profits to share holders
    - Additionally, they are also exempt from corporate income taxes (and other property and sales taxes) and donations to NFPs receive favorable tax treatments
  - FP Hospitals
    - Shareholders are the residual claimants receiving revenue of the organization net of all profits
- Who is the residual claimant in NFP hospitals?
  - Physicians (Pauly & Redisch, 1973)
  - Administrators (Newhouse, 1970)
  - Nurses (Feldstein, 1971)

Not for Profits

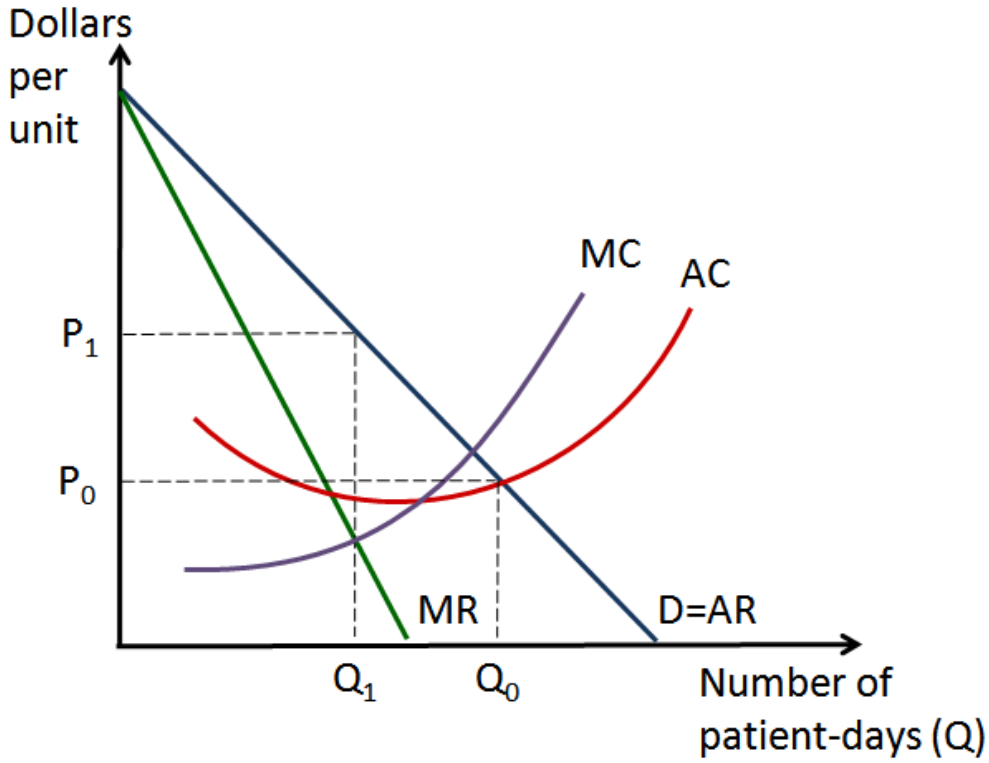
Models Of NFP Hospital Behavior

- Hospitals are depicted in research as being either utility maximizers or profit maximizers
  - Of the profit-maximizing models, the Pauly-Redisch physicians cooperative version is most prominent
  - Of the utility-maximizing type, the Newhouse model is a prominent example

Not for Profits

Models Of NFP Hospital Behavior

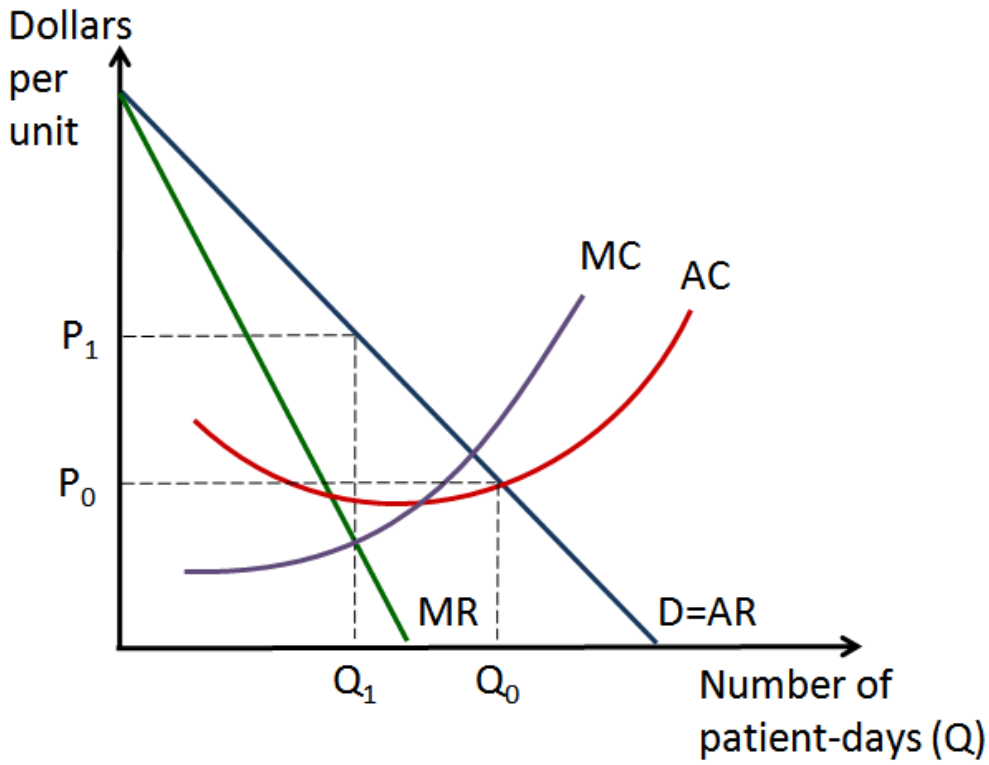
- Quantity maximization, Baumol (1967)
  - Maximize output subject to a break-even level of profits
  - Managers try to expand sales at the expense of profits
  - Suppose the typical not-for-profit hospital faces a downward-sloping demand curve and the usually shaped average and marginal cost curves and attempts to maximize the quantity of hospital services subject to a break-even constraint (P = AC)
  - If so, the not-for-profit firm produces more services (Q_0) but charges a lower price (P_0) than an otherwise comparable for-profit hospital (P_1, Q_1)



Not for Profits

Models Of NFP Hospital Behavior

- Quantity maximization – Long-run implications
  - Hospital may generate some profits to acquire the funds it needs for expansion
  - Price - slightly above the average cost of production
  - Provide more output
  - Have a higher rate of expansion over time than the profit-maximizing hospital
  - Excess capacity in hospital services – acquire an additional piece of medical equipment even if it does not generate a profit
  - Duplication of resources and overcapacity
  - However, cannot explain why the cost of hospital services has been rising so rapidly



Not for Profits

Models Of NFP Hospital Behavior

- Quality maximization, Lee (1971)
  - Managers of not-for-profit hospitals maximize utility
    - By attempting to enhance the status of their hospital
    - Maximize quality
  - Any increase in the quality of care
    - Likely to drive up the cost of producing medical services
    - Relatively inelastic demand for hospital services – any increase in the cost can be passed on to the payer through a higher price
  - Any new technology/medical equipment likely to be first adopted by status conscious institutions such and teaching and research hospitals
  - Quality maximization model may explain why hospital sector tends towards duplication and overspecialization – hospitals tend to expand services to enhance status rather than profit or due to concerns of efficiency

Quantity Quality Maximization

A Utility Maximizing Model

- Feldstein (1971) and Newhouse (1970)
  - Combine quality and quantity maximization
- Management
  - Determines the quantity and quality of output
  - Produces the levels that maximize utility
- Trade-off
  - Increased quality at the expense of quantity
- Management
  - Choose that mixture of quantity and quality that maximizes their personal utility

Quantity Quality Maximization

A Utility Maximizing Model

- In Newhouse's model, hospitals objective is maximize the utility of the decision maker
- Utility is a function of quality (S) and quantity (N)

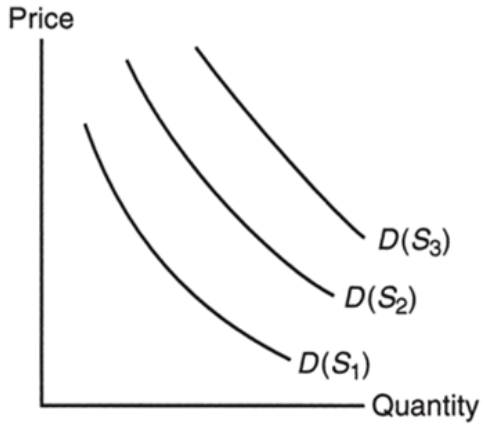
$$u = u(S, N)$$

- Administrator wants to maximize utility subject to non-negative revenues
  - No incentive to get net positive revenue
  - Implies zero profit condition
- Model is useful
  - For understanding the effect of quality-quantity change by a competing hospital
  - Impact of change in insurance for hospital services

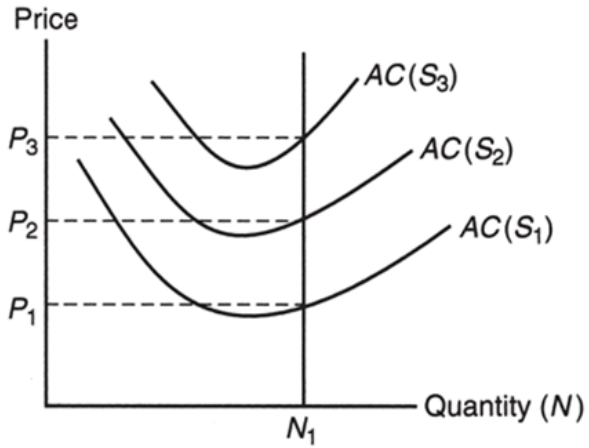
Quantity Quality Maximization

A Utility Maximizing Model

- In Newhouse's model, hospitals objective is maximize the utility of the decision maker $u = U(S,N)$ subject to the zero profit constraint
- Quality $S_1 < S_2 < S_3$



- Demand curve facing a hospital is left to right downward sloping
- The higher the quality, the greater the willingness to pay
- At higher quality, the demand curve shifts up



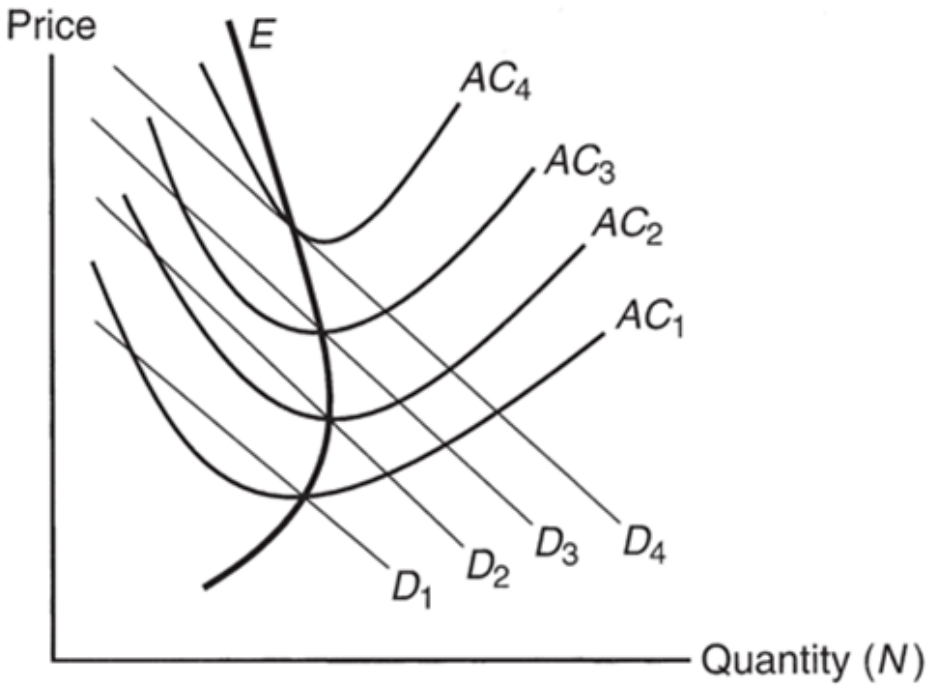
- U Shaped average cost curve
- The higher the quality, the greater the cost to the hospital
- At higher quality, cost curves facing a hospital shift up

Quantity Quality Maximization

A Utility Maximizing Model

- Combine the two graphs above to get equilibrium points
  - D_i and AC_i correspond to quality level S_i
  - For any given quality and hence D and AC pair, the constraint (zero profit) requires that hospital produce where AR equals AC – i.e. intersection of demand curve and average cost curve
  - Intersection points show the combinations of quality, quantity, price and cost that keep the hospital in equilibrium
  - In general, the demand curve may intersect AC curve, twice, once (just tangent) or never – when there are two intersections, the lower right is the relevant one since it has more output (which is better by assumption on utility of administrator)

Equilibrium combinations of quality and quantity.

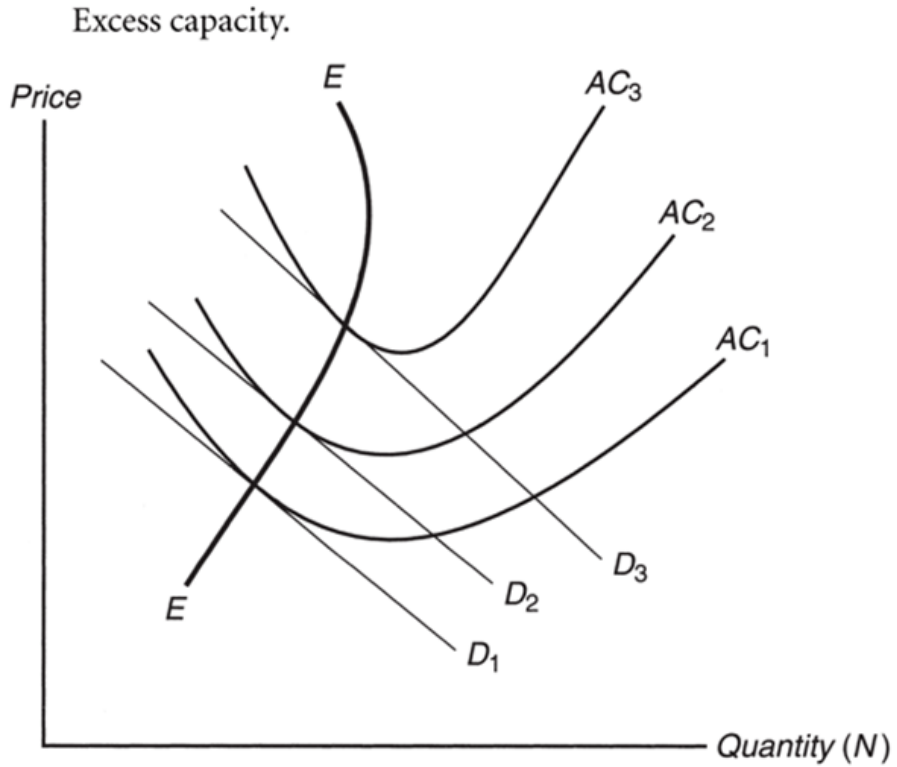


- The line E shows the combination of quality-quantity points that satisfy the demand conditions facing a hospital and zero profit constraint

Quantity Quality Maximization

A Utility Maximizing Model

- Monopolistic Competition and Excess Capacity
  - Entry by other hospitals will shift the demand curves faced by the original hospital
  - The limiting case occurs when each hospital in the market has its demand curves (at all levels of quality) just touching their AC curves at one point
  - This happens where AC is declining and hospitals capacity in under utilized
  - If every hospital in the community has similar *EE* curve, then the market is stable with no incentives for entry and exit



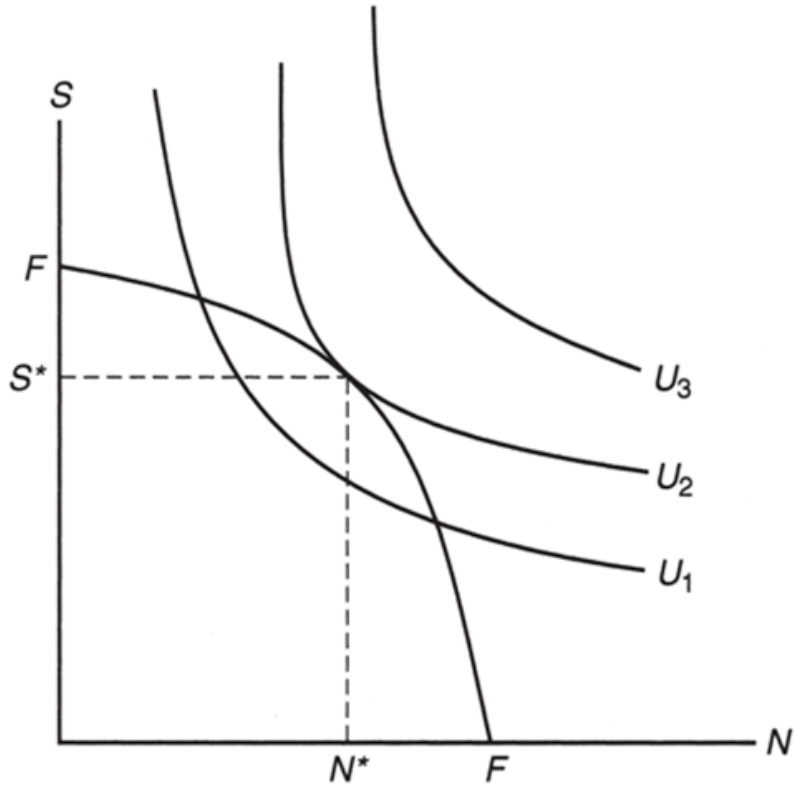
Quantity Quality Maximization

A Utility Maximizing Model

- What is the optimal combination of quality-quantity – i.e. which equilibrium point on *EE* to choose?

  - Redraw the *EE* curve (which was on price vs quantity axes) on the quality-quantity axis
  - The point on *EE* map into an opportunity-possibilities frontier *FF* for the hospital
  - Superimpose the administrators indifference curves (corresponding to the utility $u = U(S,N)$
  - The point (N^*, S^*) is where the tangency occurs
  - The point (N^*, S^*) is the optimal combination of quality-quantity from the administrators point of view – maximizes utility subject to zero profit constraint

Indifference curves for quality and quantity.



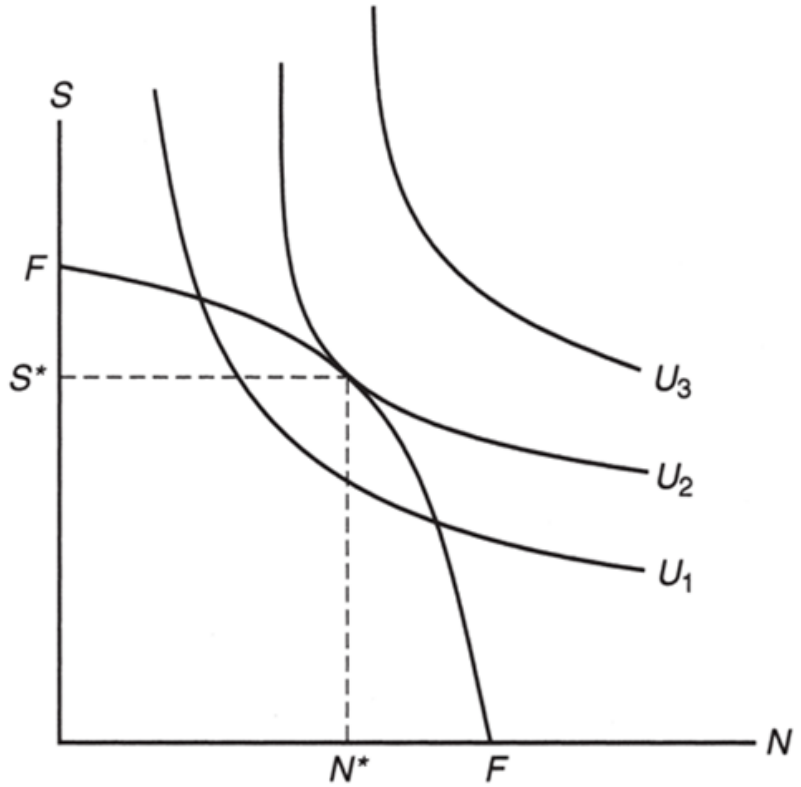
Quantity Quality Maximization

Predictions of the model

- What happens if coinsurance increases?

  - If coinsurance increases, all demand curves rotate around the quantity axis
  - Demand curves will become steeper
  - *EE* curve shifts out to the right
  - Quality-Quantity curve also expands outwards
  - New equilibrium such that N, S will both increase (i.e., greater than the original (N^*, S^*)

Indifference curves for quality and quantity.



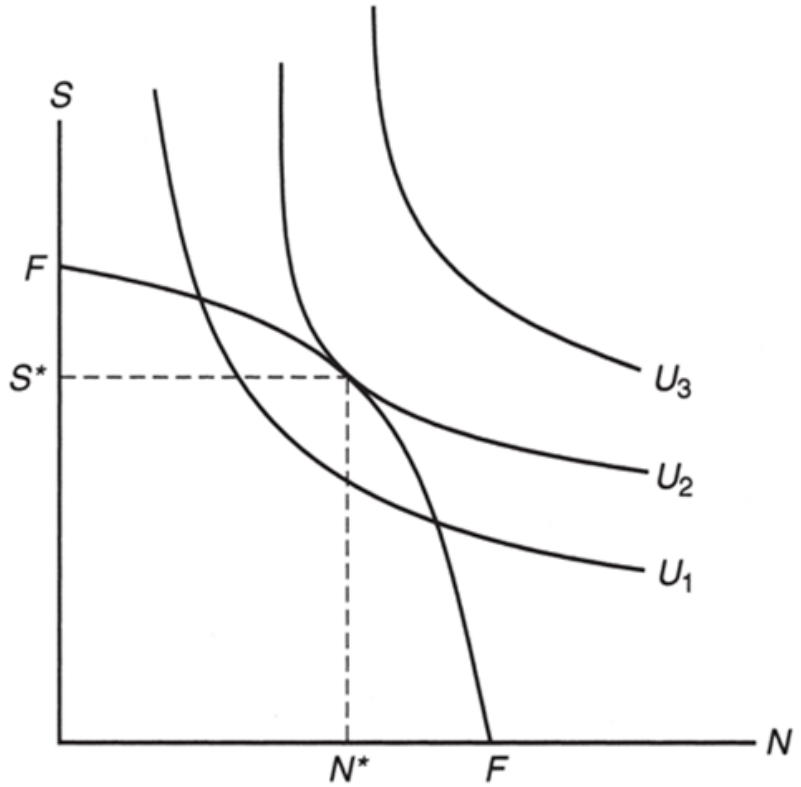
Quantity Quality Maximization

Predictions of the model

- What happens if a competing hospital increases quality?

  - If the competitor increases quality, demand curves facing the original hospital shift
    - Demand curve at lower quality may shift outwards
    - Demand curve at higher quality may shift inwards
  - The *EE* curve of the original hospital will tip, i.e., rotate counter-clockwise
  - In turn, the Quality-Quantity curve will flatten out
  - New equilibrium such that original hospital will have higher output N and lower quality S compared to the original point (N^*, S^*)
  - Suggests that hospitals tend to specialize in different styles of output (differences in quality)

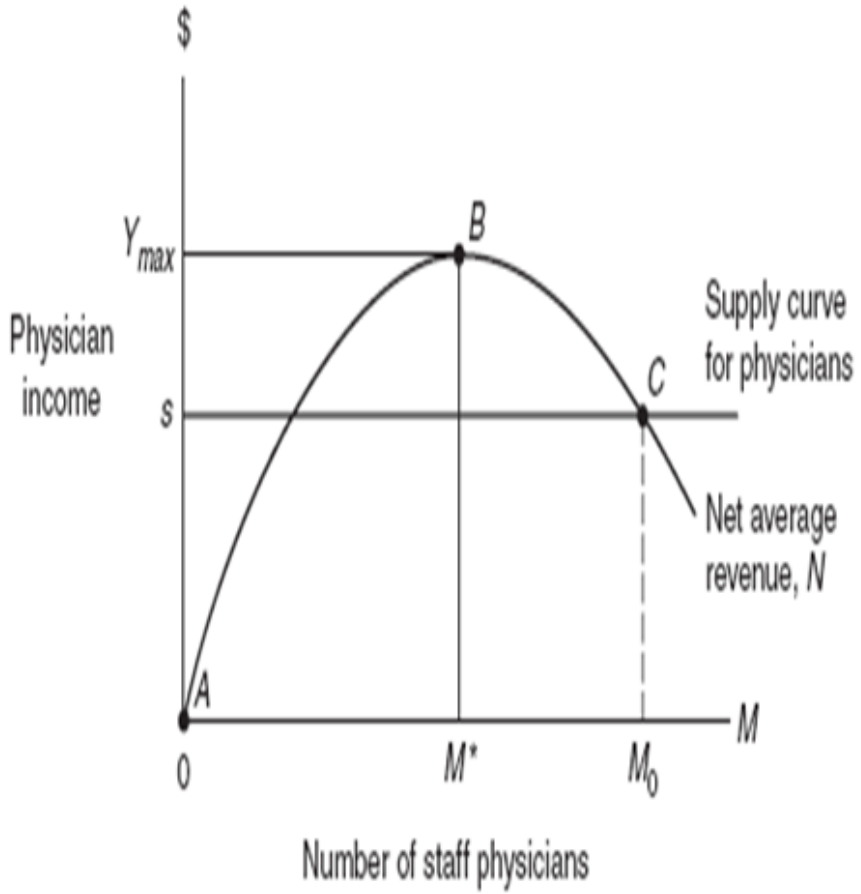
Indifference curves for quality and quantity.



Not for Profit Hospitals

Physicians Cooperative

- Mark Pauly and Michael Redisch (1973)
  - Describe the nonprofit hospital as a "physicians cooperative"
  - Assumes that the hospital is controlled by a physician staff who operate the hospital so as to maximize their net incomes
  - This view of the hospital focuses on the "full price" of the hospital care, meaning the total charges to the patient by both the hospital and the physician
  - The hospital is then run so as to maximize the net revenue (NR) per physician (M), or NR/M
  - Optimal staff size, which would also determine the amount of services provided, occurs at M^*, where net revenue per physician is maximized



Not for Profits vs For Profits

Some Empirical Studies

- Are NFP health care firms less efficient than FP firms?
  - Property rights theories generally show that when participants in a firm have claims on the firms profit, this tends to improve their efficiency at work
  - Nonfrontier studies matched hospitals pair-wise or compared carefully selected groups of hospitals usually found little, if any, cost efficiency differences between the non-profits and the for-profits
  - Wilson and Jadlow (1982) compared nuclear medicine services in nonprofit and for-profit hospitals and found for-profits more efficient
  - Kessler and McClellan (2001) found the for-profit hospitals could treat elderly heart attack patients at somewhat less expense (2.4 percent less) without reduction in quality of care
  - An earlier comparison study using DEA (Ozcan et al., 1992) had suggested small differences, more recent work (Burgess and Wilson, 1998) concludes that no significant difference in efficiency can be found between nonprofit and for-profit hospitals

Not for Profits vs For Profits

Some Empirical Studies

- Do NFP hospitals differ from FP hospitals?
  - Norton and Staiger (1994) found that hospitals in the same market area tend to serve the same number of uninsured
  - McClellan and Staiger (1999) find higher mortality rates for the elderly in for-profit hospitals overall, but the small difference on average masked substantial variation with a number of markets showing quality superiority in the for-profit hospitals
  - Grabowski and Hirth (2003) find that competition from not for profits tends to provide spill over effects so as to improve the quality of the for profits
  - Ballou and Weisbrod (2003) find substantial differences among religious, secular nonprofit, and government hospitals in patterns of CEO compensation
  - Brickley and van Horn (2002) find for a large sample of nonprofit hospitals that compensation incentives for CEOs are significantly related to financial performance
  - Hansmann et al. (2002) found the for-profit to be quicker in adjusting to market demand changes
  - Chakvarty et al. (2005) find the for-profits to be more "nimble" in adjusting to new economic conditions

Hospital Ownership and Hospital Behavior

Summary

- Costs, prices, and quality of care
  - Reasonably similar across differently owned hospitals
- Uncompensated care (bad debts)
  - Public hospitals provide greater amounts of uncompensated care
  - NFP hospitals uncompensated care - only 5% of expenses
  - FP hospitals also provide uncompensated care (why? – low marginal cost and favorable impact on hospitals relationship with regulatory agencies and the community at large)
  - 20% of all not-for-profit hospitals do not provide uncompensated care sufficient to compensate for the tax subsidies they receive

Hospital Financing

Reimbursement Mechanisms

- Regardless of the hospital type/owenership (public, private FP, private NFP) how a hospital is reimbursed for services may effect quality and quantity of services
  - Efficient production of health care relates to both quality as well as quantity of care provided
  - From a social welfare perspective, $MC = MB$
  - But if setting out the MB and MC curves relies on the effort of an agent, specifying these curves may be difficult to achieve
- Design reimbursement systems to confront these two questions - how much and of what quality?
- Two basic concepts behind reimbursement for care
  - Level of output (quantity)- Purchaser of care (PCT, insurer) applies the appropriate reimbursement mechanism to ensure the "efficient" level of output and quality of output is achieved
  - Costs of output - Purchaser passes some financial risk to the provider as an incentive to minimize costs and increase effort

Hospital Financing

Prospective Payment System (PPS) and Diagnostic Related Groups (DRGs)

- In the U.S., hospitals were traditionally reimbursed on a retrospective or cost plus basis
- Due to concerns about rising health care costs, starting in 1983 (and phased in over 5 years) hospitals were reimbursed on prospective payment system (PPS) for medicare patients
- Under PPS, hospitals are reimbursed on the basis of a diagnostic related group (DRG)
  - DRG groups are cases with similar conditions and processes of care
  - DRGs modified to take account of local wages, teaching hospital status, etc.
- Since then, the DRG based reimbursement has also been adopted by many other countries
  - Denmark, 2002
  - Germany, 2003
  - England, 2003/04
  - France, 2004/5
  - Australia, 1997
  - Spain, 1996
  - Italy, 1995
  - Sweden, early 1990s

Hospital Financing

Reimbursement for hospital care

- Reimbursement

$$R = a + b \times C$$

where R is the reimbursed price for treatment, a is a fixed fee, C expenditure (cost) of treatment and b ratio of costs borne by provider

  - If $R = c$, cost based reimbursement
  - if $R = a$, prospective payment system
  - If $b > 0$, a mixed payment system

- *Retrospective reimbursement* - A payment scheme whose level is determined only after services have been provided
  - Full cost reimbursement, fee for service
- *Prospective reimbursement* - A payment whose level is fixed in advance of actually providing a service
  - Cost-sharing – such as Disease-Related Groups (DRGs) are a sub-set of this

Hospital Financing

Retrospective payment

- *Retrospective reimbursement* - A payment scheme whose level is determined only after services have been provided
- Examples – fee for service (FFS), Cost/fee per case or historical contracts
- Care has been given, costs are known – providers remunerated on basis of activities or costs, after performed
- Hospital recovers all expenses
  - Cost recovery regardless of high or low costs, excessive or efficient use of resources
  - Low powered incentives to conserve costs and/or obtain efficient level of output
- Implications of retrospective or cost reimbursement
  - Any action taking by clinician will not reduce profit surplus
  - No incentive for provider to minimize costs
  - Clinician maximizes benefit to patient

Hospital Financing

Prospective reimbursement

- *Prospective reimbursement* - A payment whose level is fixed in advance of actually providing a service
- Examples – fixed budgets, block contracts, capitation payments
- Physicians and hospital have some interests in costs
  - Up-front payment is given to the hospital prior to services (e.g., annual budget, capitation per patient)
  - OR can be fixed reimbursement level per admission (e.g. Example DRGs set reimbursement per admission)
    - Hospitals who spend more than the flat reimbursement rate lose
    - Hospitals who spend less gain
- Implications of prospective reimbursement
  - Provides high powered incentives for efficiency
  - The provider would always like to have, on average, costs lower than the price in each episode

Hospital Financing

A reimbursement model

- Ellis and McGuire (1986) provide a model to study the impact of different reimbursement mechanisms
  - In their model, physician is the primary decision maker and derives utility from benefits to the patient and hospital profits

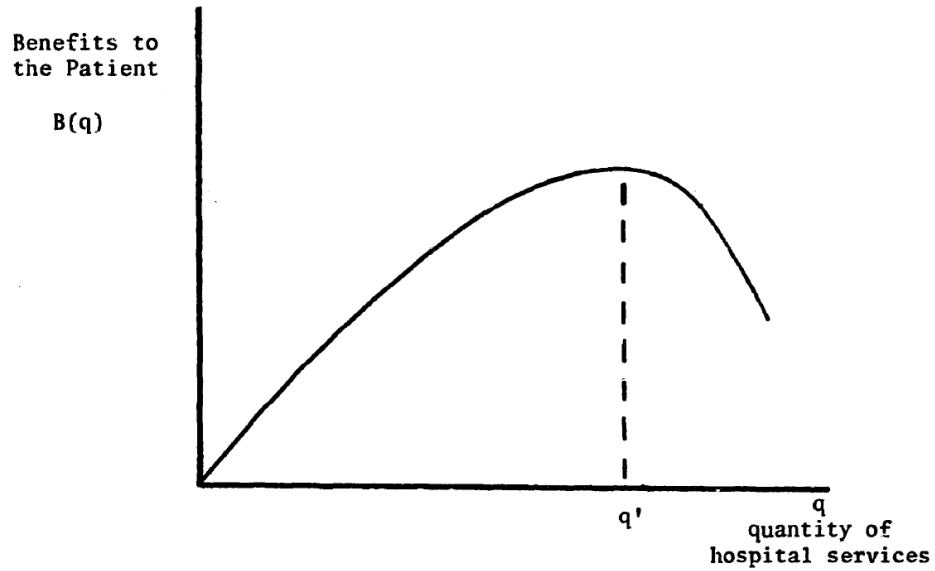
$$u(B(q), \pi(q))$$

    where
    - $u(\ )$ is the physicians utility function
    - q is the level of services to be provided to the patient
    - $B(q)$ is the benefit to the patient due to hospital services q
    - $\pi(q)$ is the hospital profit and is equal to reimbursement minus cost (i.e., $\pi(q) = R(q) - C(q)$) and
    - $R(q)$ is the reimbursement to the hospital and is given by $R(q) = a + bC(q)$
  - The physician has to trade-off benefits to payments and net income to hospital
  - The optimal decision of the physician depends on the payment system
  - Different payment rules ($R(q) = a + bC(q)$) generate different optimal quantities q
    - If $R = C$, cost based reimbursement
    - if $R = a$, prospective payment system
    - If $b > 0$, a mixed payment system

Hospital Financing

A reimbursement model

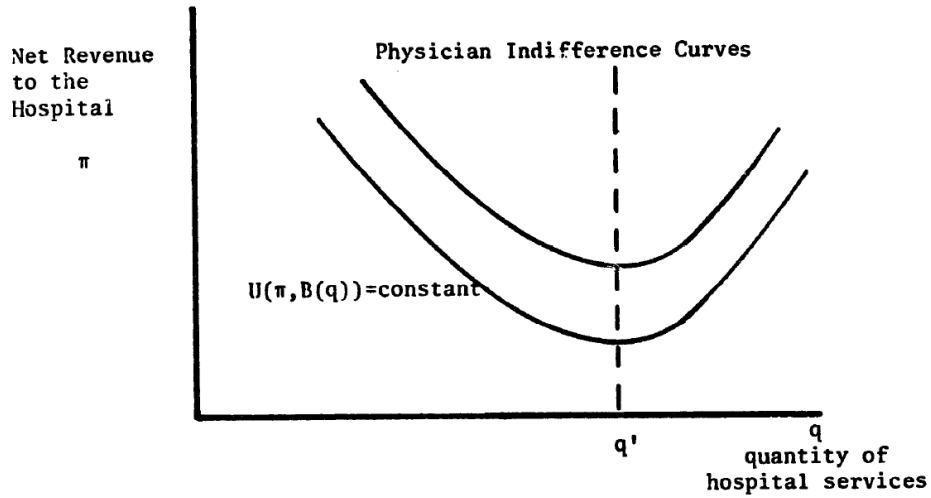
- Ellis and McGuire (1986) provide a model to study the impact of different reimbursement mechanisms
  - The total benefit function $B(q)$ increases with quantity of services provided and then fall after some point (say q')
  - Total benefits will fall after q' both because of the time-price of receiving treatment and because of the risk of infection and other iatrogenic illness associated with a continued hospital stay



Hospital Financing

A reimbursement model

- Ellis and McGuire (1986) provide a model to study the impact of different reimbursement mechanisms
  - The utility function of the physician is $u(B(q), \pi(q))$
  - Given that profits are a good, and $B(q)$ reaches a maximum at q', typical indifference curves of the physician will look like the curves shown below
  - The shape of the indifference curves shown depends upon the relative weights placed by the physician on hospital profits and the benefits of treatment to the patient



Hospital Financing

A reimbursement model

- Ellis and McGuire (1986) provide a model to study the impact of different reimbursement mechanisms

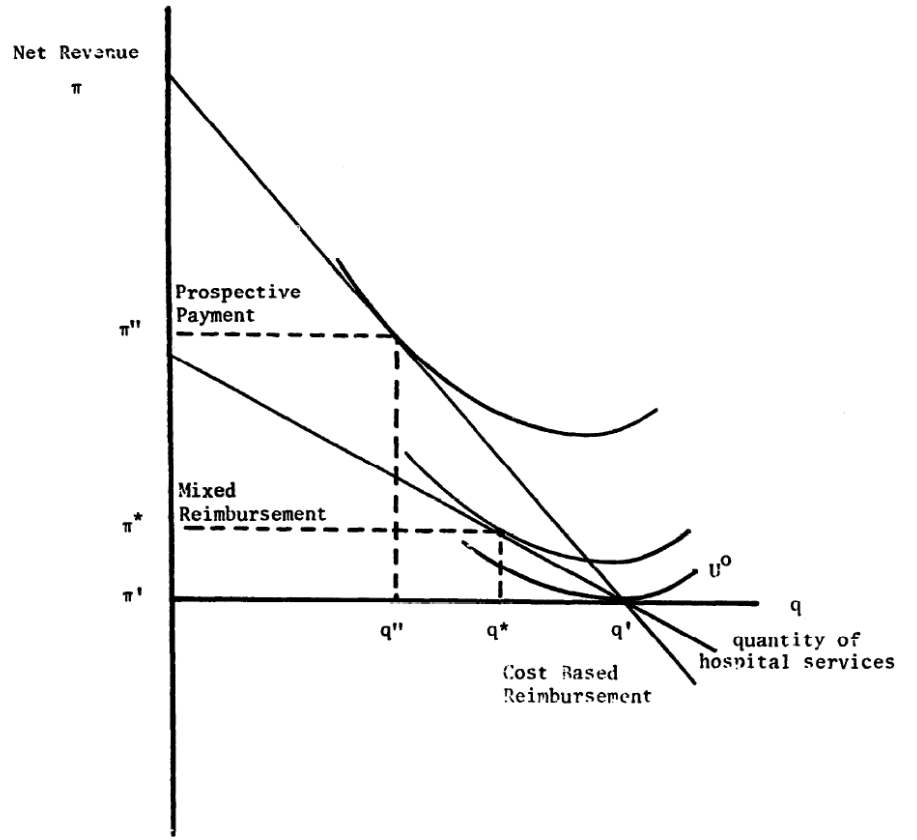


Fig. 4. A comparison of cost-based reimbursement, prospective payment, and mixed reimbursement.

Hospital Financing

A reimbursement model

- Some results/implications of the model
  - With full reimbursement of costs, there is no trade-off to be made - the physician always selects the quantity that maximizes patients benefits
  - But this is not socially optimal, as it is determined by zero marginal benefit condition, while in social terms there is a positive marginal cost
    - **Result 1:** cost reimbursement generates a socially excessive provision of health care
    - **Result 2:** a cost-reimbursement system implies a higher quantity than a prospective payment system, for each clinical episode
    - **Result 3:** if the physician gives equal weight, in its objective function, to patients benefits and hospitals surplus, then a prospective system leads to the socially optimal choice
  - The above three results justify the interest in moving from reimbursement to prospective payment systems

Hospital Financing

A reimbursement model

- Some results/implications of the model
  - Since total costs are higher in the cost reimbursement system, there is scope for all to improve
    - **Result 4:** moving from cost-reimbursement to prospective payment yields a higher surplus to the hospital and to a lower payment by the third-party payer
  - What about patients?
    - Receive less care - lower overall benefits
    - But they have to contribute less in equilibrium
    - The excess health care quantity is the moral hazard effect we discussed earlier
    - Here, the moral hazard effect is being controlled through decisions on the supplyside

Hospital Financing

A reimbursement model

- Some results/implications of the model
  - The optimality properties are conditional on the equal weight assumption on physicians marginal utilities
  - If the assumption does not hold, the prospective payment system will not lead to the social optimum
  - In this case, none of the two extreme systems reaches the social optimum
  - Can a mixed system restore the social optimum?
    - **Result 5:** If the physician gives relatively more weight to the financial results of the hospital, a prospective payment system leads to under-provision of hospital services
    - **Result 6:** with a suitably calibrated mixed system it is possible to achieve the first-best
  - Thus, the higher weight given to hospital's surplus means that a cost-reimbursement component must be included as to counteract on under-provision incentives
  - Finally, the prospective payment system provides higher incentives for efficiency, as the hospital keeps the gains it obtains
    - **Result 7:** incentives for technical efficiency are higher under the prospective system

Evidence on PPS

Lessons from U.S.

- PPS was introduced in the U.S. in 1983
- What was the impact of this introduction?
- Background
  - Trends in hospital costs
  - Story of hospital competition and medical arms race (MAR)
- Empirical Studies

Trends in hospital costs

Evidence on PPS

- Trends in hospital costs
  - Hospital costs account for 35% of total health care expenditures (in 1996) and have increased at an annual rate of 10.7% since 1960
  - The increasing costs are not necessarily just the result of more inpatient admissions, despite growing and aging population
  - In fact, number of hospital beds and occupancy has been decreasing
  - Rather, cost per day, cost per admission (and shift to outpatient services) are the driving forces

Hospital Competition and Medical Arms Race

Evidence on PPS

- Medical Arms Race (MAR)
  - Provides one explanation for increasing costs
  - Background
    - Medicare and Medicaid introduced in mid 60s
    - Hospitals paid for costs for services rendered to the aged and poor
    - Private insurance, which was widespread among the remainder of the population, also reimbursed hospitals according to the costs or charges
  - No incentives to be concerned about hospital efficiency
  - To attract patients (and physicians), hospitals started competing on non-price dimensions
    - Particularly, they duplicated high fixed cost technologies already available at other close by hospitals

- Example – Payoffs for two competing hospitals from adopting/not adopting an expensive technology
- In equilibrium, both hospitals will adopt

		Hospital B	
		Adopt	**Not Adopt**
Hospital A	**Adopt**	100,100	200,-50
	Not Adopt	-50,200	150,150

Changes in Reimbursement Methods and other Institutional Responses

Evidence on PPS

- PPS introduced in 1983 (and phased in over five years)
  - Hospitals reimbursed on the bases of DRGs for medicare
  - Thus, hospitals were payed a fixed amount (price) per admission depending on the type of admission (DRG)
- Pressured from employers about rising hospital costs, insurers changed benefits to encourage patients to have diagnostic tests and minor surgical procedures on outpatient basis
- Insurers instituted utilization reviews for inpatient admissions
  - Lead to reduction in hospital occupancy rates (76% in 1980 to 65% in 1985)
- Also, selective contacting in California started in mid 1980s
- Hospitals willing to negotiate price discounts with insurers

Empirical Studies

Evidence on PPS

- Hospital Costs
  - Melnick and Zwanziger (1988): During 1983-1985, hospital costs in low competition markets increased by 1%, but hospital costs in high competition markets decreased by 11%
  - Robinson and Luft (1987): Compared hospital costs per adjusted admission and hospital costs per adjusted patient day across hospital markets for the entire U.S. in 1982
  - Found that hospitals with 10 or more competing hospitals within 24 mile radius had 26% higher costs per admissions and 15% higher costs per patient days than hospitals in markets that had no competing hospitals
- Revenues
- Prices

Empirical Studies

Evidence on PPS

- Hospital Costs
- Revenues
  - Melnick et al (1989)
    - Found that hospital revenues in low/high competition markets had about the same percentage increase upto 1982
    - But between 1983-85, hospitals in more competitive markets either had a decrease in actual net revenues or a substantial decline in the growth of net revenues
    - Hospitals in less competitive markets also experienced a decline in the growth of net revenues but not as much as those in high competition markets
    - Outpatient revenues increased in all hospital markets but the fastest growth was in highly competitive markets
  - Zwanziger et al (1994)
    - Found similar trends in hospital revenues
    - Between 1980-82, hospitals in more competitive markets had about 13% greater revenue than hospitals in less competitive markets
    - But by 1990, the revenue in more competitive markets was actually less than the revenue in less competitive markets by about 40%
- Prices
  - Melnick et al (1992) – found that PPOs in more competitive hospital markets got greater discounts from hospitals