

## Mgmt 444

### Pricing

You already know a lot about pricing from other economics courses, so I will focus on pricing issues that are especially relevant, if not unique, to healthcare

Let us begin by revisiting the topic of price competition that we introduced in the context of selective contracting

- Extend this discussion using a formal model of *monopolistic competition*

E. H. Chamberlin's model of monopolistic competition considers demand and pricing in differentiated goods markets

- Sellers are similar in size, but consumers have distinct preferences for different sellers, based on tastes, location, etc.

- . This nicely describes health care provider markets
- . For simplicity, we will assume identical-size firms, each facing downward sloping demand

- Let  $DD$  represent demand facing each firm if they all set prices in lockstep.

- . In this simple model, each firm gets an equal share of the market, and  $DD$  is just each firm's share of the market demand curve
- . The elasticity of  $DD$  is the market elasticity; for example, this was measured by  $RAND$

- Let  $dd$  represent demand facing a firm that deviates from the price set by its rivals

- . At the point where the firm in question sets the same price as its rivals,  $dd$  and  $DD$  intersect
- . Otherwise,  $dd$  is steeper than  $DD$ , because the individual sellers can steal business from rivals

- Let  $MC$  denote marginal cost.

Following figure shows the optimal pricing (all graphs to be done in class)

The optimal price, as always, depend on the price elasticity of demand

Chamberlin's model reminds us that this elasticity has two components:

- The market price sensitivity (if all firms raise price in lockstep, do customers leave the market?)
- Firm level price sensitivity (if one firm raises its price unilaterally, will its customers *switch* to other firms?)
- We know that when it comes to health care services, the market price sensitivity is very low (RAND)
- Thus, *the price elasticity of demand facing sellers of health care services depends critically on the willingness of patients to switch*

Under Marcus Welby Medicine, there was very little switching of providers.

- Sellers faced relatively low price elasticities
- This led to high prices and high profits
- This, in turn, encouraged entry (e.g., new hospitals) and excess capacity (e.g., empty beds)

At its zenith, selective contracting effectively increased switching

- Plans steer patients from high price providers
- The resulting increase in the elasticity encourages price reduction

This creates an evolutionary force in the market (depicted in handout)

- P falls below the level needed to cover fixed costs. Providers lose money. This is not sustainable.

- Several responses are possible:

1) Some providers will exit or cut capacity. This will reduce fixed costs and shift out the DD and dd curves (fewer providers means more demand per provider).

- . Profits are restored and excess capacity shrinks
- . But if hospitals operate nearer to capacity, MC increases. This leads to higher prices

2) Providers may merge, obtaining countervailing power. (In effect, dd begins to resemble DD). Prices rise without any necessary reduction in capacity.

Both of these have transpired. In some ways, selective contracting sowed the seeds of its own destruction

Chamberlin's model also reminds us to pay attention to factors that contributed to the success of selective contracting:

- The willingness of payers to exclude providers from networks
  - . This affects the ability of payers to move market share based on exclusion; i.e., the extent of switching
  - . If switching lessens, dd begins to resemble DD and prices increase

Conclusion: Excess capacity combined with increased switching leads to price reductions, but this triggers further evolutionary changes

Let's move from discussions of market equilibrium to analyze the pricing decisions of individual sellers

Any discussion of pricing in health care address *price discrimination*

- A seller price discriminates by charging different prices for what is seemingly the same product or service

Price discrimination can take many forms including quantity discounts, age-related discounts, and time-of-year discounts

Perhaps the most interesting examples in healthcare arise when customers must pay different prices for the same goods or services

- This is “third degree” price discrimination. Here are some examples:
  - . The price of a given prescription drug varies across nations, and varies substantially within the U.S.
  - . Health insurers price discriminate across employers and individuals
  - . Hospitals price discriminate across insurers and individuals; patients without insurance are often handed the biggest bills
- Price discrimination often reflects differences in the costs of doing business
  - . This helps explain the difference between individual and group insurance premiums
  - . This does not explain Rx pricing, as the nature of production and distribution rules out large cost differences based on customer size
- At other times, price discrimination reflects market demand
  - . Sellers set different prices (or agree to accept different prices) because some customers are more price sensitive than others

## Basics of Price Discrimination

Third degree PD is possible if two conditions hold:

- It is possible to set different prices to different groups of customers
- It is costly to resell the good or service in a secondary market
  - . Unlimited resale would yield the “law of one price”. That is, all consumers to obtain the good at the lowest available price.
  - . In this way, unlimited, drug reimportation would ultimately lead to a single world price for drugs.
  - . (Genzyme has already adopted a one price policy for all its drugs, but other drug makers have failed to follow suit. If import barriers fall, they will be forced to do so.)

If third degree PD is possible, then the seller will attempt to maximize aggregate profits by applying the optimal pricing rule to each customer segment

- Specifically, the seller will set price to segment  $i$  so that:  $MR_i = MC_i$ .
- This generates an optimal pricing rule for each segment, based on its price elasticity of demand and the cost of serving it:  $1/\eta_i = (P_i - MC_i)/P_i$ 
  - . In general, prices are lower when (a) the segment is more price sensitive) and/or (b) the cost of serving the segment is lower

The basic model gets a twist when one customer has sufficient power to name its price but others purchase the good or service in the market

- This occurs in *mixed health economies* with both public and private payers. The public payer, such as Medicare, dictates prices
- In these markets, the simple elasticity rule does not tell the whole story, as the effective elasticity for the public payer is  $\infty$ . (We will see this graphically)

## Graphical Model of Third Degree Price Discrimination in a Mixed Economy

Key assumption: Provider is maximizing profits while facing both public and private payers.

Let demand for the provider's services be as follows:

- Private payer has downward sloping demand:  $P_p = 100 - Q_p$
- Government payer pays a fixed price of  $P_g = 40$ .
- It is helpful to draw the demand curves and the MR curve.

Recall that MR is the extra revenue that a firm brings in as it increases output

- In this example, MR depends on which type of patient the provider admits
- The following thought experiment will help nail this down:
  - . If the provider treats just one patient, should it be a P or a G?
  - . If it wants to treat a second patient, should it be a P or G?
  - . How many private patients must it treat before it is more profitable to treat a government patient?
- This generates the following "effective MR curve" (SHOWN IN CLASS)

The kink occurs where  $MR_p = MR_g = 40$ , or  $Q_p = 30$ .

- To attract 30 privately insured patients, the provider should set  $P_p = 70$ .
- If the provider chooses to treat fewer than 30 private patients, it should raise  $P_p$  and treat no government patients
- If it chooses to treat more than 30 patients, it should keep  $P_p = 70$  and expand by treating government patients

This tells us how the provider can maximize revenues for any particular number of patients. To maximize profits, the provider equates MR to its MC

- E.g. Let  $MC = 20 + .5(Q_t)$  where  $Q_t = Q_p + Q_g$
- We note that  $MR = MC$  at  $Q_t = 40$ .
- Based on our analysis, because  $Q_t > 30$ , the provider sets  $P_p = 70$  and treats 30 private and 10 government patients
- We can see this graphically

- Q: What happens if MC intersects MR to the left of  $Q_t = 30$ ?

Here are some graphical thought experiments (you should try it at home with real numbers):

- If  $P_g$  falls, what happens?
- If MC rises or falls, what happens?
- In each case, government patients bear the brunt of the change

Now let's add another wrinkle

- Suppose that there is a cap on the number of G patients available to the hospital

Your homework asks you to try yet another wrinkle

In all cases, a decline in  $P_g$  leads the profit maximizing hospital to decrease  $P_p$  or keep it constant

## Cost-shifting

Economic models have the virtue of complete internal consistency

- If we accept the assumptions of the model, then the model tells us how firms ought to behave
- Sometimes, firms don't seem to behave like the model suggests they should
- This certainly seems to be the case when it comes to provider pricing, as illustrated by the phenomenon known as cost-shifting

The term cost-shifting is used in a variety of contexts

- Insurers raise copayments, shifting costs onto enrollees
- Employers increase contributions, doing likewise
- In the case of pricing, it is used to describe increases in private prices in response to government cutbacks

Firms that follow the PD model should not cost shift in this way

- E.g., Consider Delta Airlines setting prices for passengers on its DC to NYC flights
- Delta does a lot of business with the federal government, which dictates the price it will pay
- Q: If the federal price falls, would we expect Delta to raise its price for all other passengers?
- Yet this is exactly how many providers seem to behave when Medicare or Medicaid prices fall
  - . This is often cited as a reason to maintain higher Medicare prices
  - . When some states wanted to cap Medicaid prices in the 1970s, some private insurers asked that the states regulate all prices, lest they fall victim to cost shifting

## A Model of Cost-shifting

- The theory of PD shows that a profit-maximizing firm will not cost-shift.
- Conclusion: cost-shifting can only occur if firms are not profit-maximizing.
  - . If it is possible to squeeze out more profits by raising prices, why wait for public sector price reductions to do so?
  - . Perhaps they were not maximizing profits prior to the public sector price reductions
  - . Perhaps they are not trying to maximize profits at all!

In the case of hospitals, we should note that most in the U.S. are nonprofit

- There are many theories of what it is that nonprofits try to accomplish
- There is little consensus among theorists, but several themes emerge:
  - . Profits are always a goal; one cannot accomplish other aspects of mission without money
  - . Hospitals seem to want to be bigger, though for a variety of reasons
- “Size” may not be the ultimate goal, but may reflect other goals
  - . Managers may be pursuing “prestige”
  - . Managers might increase quality above profit maximizing levels, and this might attract more patients
  - . Hospitals might view size as an indication of how well they are serving their communities
  - . Bigger size might reflect a wider array of services, some of which may be unprofitable at any price. (These include neonatal care, trauma or burn care.)
  - . Many of these arguments might apply to other providers besides hospitals

Q: How might the behavior of nonprofits affect the behavior of competing for-profits?

No matter what nonprofits are trying to accomplish, it seems that in the big picture, they are balancing a mix of profits and size

- The hospital might not set price to maximize profits
- By increasing output a bit, the hospital may lose some profits but do a better job of fulfilling its mission
- We can show this graphically, using indifference curves!

Let's relate this to the model of price discrimination.

- Q: In that model, how would a provider increase its output to privately insured patients?
- So we might expect the same in a cost-shifting model: When  $P_g$  declines,  $P_p$  increases.
  - . This is opposite of what happens in price discrimination model
  - . Note: we may see cutbacks in other mission-driven activities

I proposed this model in a paper I published in the 1980s.

- I studied hospital pricing in Illinois
- The state cut Medicaid payments drastically in early 1980s (prior to growth of managed care), making this a terrific “natural experiment”
- I found that for every \$1 in cuts, hospitals recovered about \$.40-\$.50 through price increases in the private sector

More recent evidence comes from work I did with Will White

- We examined transaction prices and service levels provided to Medicaid and other patients in California between 1983 and 1992
- This was a period of substantial cutbacks in Medicaid payments, again suggesting that we would observe cost shifting
  - . But conditions in California in the late 1980s were quite different from those in Illinois in the early 1980s
  - . California was dominated by managed care purchasers
  - . Could California hospitals really pass price increases along to privately insured patients, when managed care dominated the market?
- Result: hospitals hardest hit by Medicaid cuts *lowered* private prices; Cutbacks were not enough to fully offset Medicaid cuts, and a disproportionate number of hard hit hospitals closed

Even today, hospitals may try to raise prices to private payers when government payers cut back

- It is not clear whether this is a rational pursuit of a complex mix of mission and profits or reflects irrational pricing
- Whether hospitals can succeed depends to a large extent on whether the payers are willing to bear the higher price

## Other Pricing Issues

### Most Favored Nation Pricing

Private sector payers may not have enough power to dictate price, but some are powerful enough to demand “most favored nation” pricing

- They are guaranteed to pay the lowest price of any buyer (usually the price is set equal to the lowest price paid by anyone else)
- Some insurers are able to obtain MFN pricing from hospitals
- Medicaid in each state is guaranteed MFN for prescription drugs

Q: How does MFN pricing affect the prices charged to less powerful buyers?

- Fiona Scott-Morton has answered this question for drug buyers
- The underlying theory: Drug makers calculate that if they reduce price to a PBM, they must pass that price decrease on to Medicaid. This reduces the benefit from pricing aggressively to land the PBM contract.
- This effect is magnified when Medicaid is a major purchaser of the drug.

Scott Morton presents evidence to support this theory

- In one study, she finds that introduction of MFN caused an additional 4 percent increase in the price of branded drugs facing generic competition and had no effect on drugs that did not face competition
- The effect was stronger for drugs for which Medicaid was a big purchaser
- A later study (with Mark Duggan) updates these results (see handout)
  - . The higher the Medicaid market share, the higher the private sector price
  - . The effect is potentially huge – a 10 percent increase in Medicaid share is associated with a 9.4-10 percent increase in price
  - . Of course, Medicaid’s market share is fairly low in most drug classes
  - . But what if Medicare had similar MFN rules?

Based on findings such as these, there have been recent antitrust challenges to the use of MFN in private contracts (including Blue Cross MFNs with hospitals)

- The argument is twofold. First, MFNs encourage sellers to raise prices
- Second, MFNs allow large purchasers to outcompete their rivals without delivering any value. In fact, the large purchasers do not even need to aggressively seek discounts. They let the MFNs do all the work for them!

## **Pragmatic Pricing Issues**

### 1) International pricing of pharmaceuticals

Some nations directly regulate Rx pricing

- In France, Italy, and Spain, a regulatory body must review and approve all prices and price changes
- These agencies generally consider the prices of comparable products and the therapeutic value of the drug
  - Here is where pharmacoeconomic studies play a role
- Canada's pricing is based on "reasonableness" –how much the companies charge for the drug in other nations
- Politics plays a role
  - . Nations have much leeway when making price comparisons, for example by their choice of dosage and delivery mechanism, and choice of exchange rate
  - . There has been much conjecture of a "home court advantage" in pricing. There is evidence of a home court bias in drug approval, so a similar bias for pricing would not be surprising

Another common regulatory methodology is Reference Pricing

- Present in Germany, the Netherlands, parts of Canada and elsewhere
- Drugs are grouped into therapeutically similar clusters
- The government sets a common price for the cluster. If companies want to charge above this price, they may, but patients have to pay the differential
- Reference pricing forces companies to justify higher prices, as patients bear the full financial burden; it does little to promote lower prices, as patients do not keep any savings
- This usually involves pharmacoeconomic analysis along the lines discussed in week 1

## 2) Price sensitivity of Hospital Purchasers

Many medical supply companies, such as GE Medical, Medtronic, or Becton Dickinson, sell directly to hospitals.

- An obvious key question for these companies is what factors influence the price elasticity of demand for their products
- This is a difficult question empirically because few companies have performed the necessary experiments to generate the required data
- This is a difficult question conceptually because “demand” depends on several decision makers
  - . CEO and CFO who set policy regarding quality, cost, and MD autonomy
  - . Purchasing groups that may purchase in bulk (especially for small ticket items)
  - . Hospital purchasing officer who directly negotiates with vendors (for larger ticket items)
  - . Doctors who choose which products to use

- Demand complicated by fact that the technology represents just a part of the medical bill, and that the payment to the hospital is by a formula
- Analysis of demand is highly idiosyncratic, but does require paying attention to a well-identified set of issues

E.g., Implantable Defibrillators

- Three major manufacturers
  - . Medtronic
  - . Boston Scientific
  - . St. Jude
- Device costs about \$30,000 and overall the procedure costs \$50,000
  - . Most patients in US have insurance that pays a flat DRG-based fee (there is a specific DRG for this procedure)
  - . Hospitals believe they make a small margin on this DRG
  - . Physicians receive substantial fees
- Q: What factors do you think affect the choice of defibrillator?
- Q: How would you limit the price sensitivity of customers?

### 3) Pricing transparency for provider services

A lot has been written lately about how difficult it is to comparison shop for healthcare services in the U.S.

- A portion of Michael Porter's new book on healthcare strategy is given over to this topic
- This is hardly news, and a bit of historical perspective helps us understand the problem better and also helps explain why it is so difficult to solve

Let's begin with hospitals; similar issues arise on a smaller scale with other providers

- For accounting and billing purposes, hospitals are divided into cost centers (see handout)
  - . Although this practice predates Medicare, it continues to be required
- A hospital bill consists of units of service delivered within each cost center, along with the accompanying charges
  - . The bill is usually pages long
- Remarkably, hospitals nowadays do not collect anything resembling the amount on the bill
  - . Medicare dictates a single price per admission based on the diagnosis
  - . Private insurers and Medicaid may do the same, or may pay a flat discounted percentage of the bill, or may pay a fixed fee per day
- What does the patient pay?
  - . Patients may pay some copayment
  - . Things are changing a bit, due to high deductible health plans

Pricing transparency is one of many things that advocates of Consumer Directed Health Plans are seeking to accomplish

## **Consumer Directed Health Plans**

Your reading gives you some of the history behind CDHP

The MMA of 2003 establishes the current rules for CDHPs

- Employers and employees can contribute tax deductible funds to a HSA (renamed MSAs), up to \$5450 annually for a family.
- The accompanying insurance plan must have a deductible of at least \$2000 for a family.
- The individual can use the HSA to cover deductibles, copayments and various uncovered medical expenses.
- Upon retirement, the individual can withdraw funds for any purpose. If the funds are used for health care they are subject to traditional income taxes. If used for any other spending, they are subject to an additional 10 percent tax. *Thus, the HSA is like a restricted individual retirement account (IRA).*

Many CDHPs also offer a web-based information management portal

- Patients can diagnose symptoms and identify treatment options.
- Without debating the merits of these portals, note that they can be offered by any insurer; they are not the exclusive domain of CDHPs.

The key distinguishing feature of CDHPs remains the big deductible

- CDHP enthusiasts predict that shifting all Americans into these plans could save us several hundred billion dollars annually!
- Q: How does the RAND Study inform these calculations?

RAND researchers have made their own estimates

- They project that if everyone enrolled, the savings would be about 50-100 billion (3-5 percent of the total health economy) if everyone enrolled!

- Perhaps the biggest reason why there is less here than meets the eye is that CDHP copayments will only affect those who are healthy and do not exhaust their deductibles.

Q: Is the RAND study a valid basis for predicting CDHP effects?

Q: Should deductibles be identical for all enrollees?

### **The Market Reaction**

CDHPs became widely available to employers and employees in 2004 and by most accounts the market for CDHPs is growing

- The consensus is that several million Americans are enrolled, but there is remarkably little consensus among estimates

- CDHP enrollments could top 20 million by 2010

Unfortunately, the early evidence suggests that the pessimists are correct

- CDHP enrollees are healthier, wealthier, and younger

- Second generation CDHP experiences may prove to be different

*In-class discussion question:*

Consumer-directed health plans seemed like a good idea just a few years ago, but enrollments have begun to flatten out. Why have consumers resisted CDHPs? What will it take for CDHPs to regain their momentum in the market?