

Consumer Choice and Demand

Chapter 9

Lecture Outline

- Applying The Standard Budget Constraint Model
- Two Additional Demand Shifters—Time and Coinsurance
- Issues in Measuring Health Care Demand
- Impacts of Insurance on Aggregate Expenditures
- Other Variables Affecting Demand

Stylized Facts on Demand for Healthcare

1. It is not medical care services that consumers want, but health. Demand for medical care is a derived demand, so it is an input to produce health.
2. Consumers don't purchase health from the market, they produce it by spending time on health improving activities (e.g., better nutrition, exercise) in addition purchasing medical care inputs

Applying the Standard Budget Constraint Model

- Demand for medical care services is derived from the demand for health and how the consumer produces health
- Model assumptions –
 - Consumer is rational and perfectly informed
 - There is no uncertainty about the future
 - Important decisions are made as if the future were known with certainty

Logic of Consumer Choice

- Consumers can choose any affordable combination or bundle of goods, and from among these affordable bundles, they will choose the one preferred.
- The depiction of this choice requires two elements:
 - The consumer's preferences—described by a set of indifference curves
 - The consumer's budget constraint—described by the straight budget line

Consumer's Problem

- There are two goods:
 - Healthcare, denoted visits
 - A composite good, that represents all other goods, denoted OG
- The individual has an ordinal preference ordering over these goods that satisfies all the usual assumptions (e.g., transitivity)
 - $U(\text{OG}, \text{visits})$

- The individual has a total income of Y , and the prices of the two goods are P_{OG} and P_v , which implies the following budget constraint
 - $P_{OG} * OG + P_v * \text{visits} = Y$
- The consumers problem is to pick the optimal quantities of the two goods subject to the budget constraint

- Max $U(\text{OG}, \text{visits})$ subject to $P_{\text{OG}} * \text{OG} + P_v * \text{visits} = Y$
- The solution to this problem can be obtained by differentiating the following
 - $U(\text{OG}, \text{visits}) + \lambda(Y - P_{\text{OG}} * \text{OG} + P_v * \text{visits})$
- We'll just work with diagrams ..
- The solution to the problem can be represented as the tangency between an indifference curve and the budget constraint.

Figure 9-2 Consumer's Equilibrium Analysis

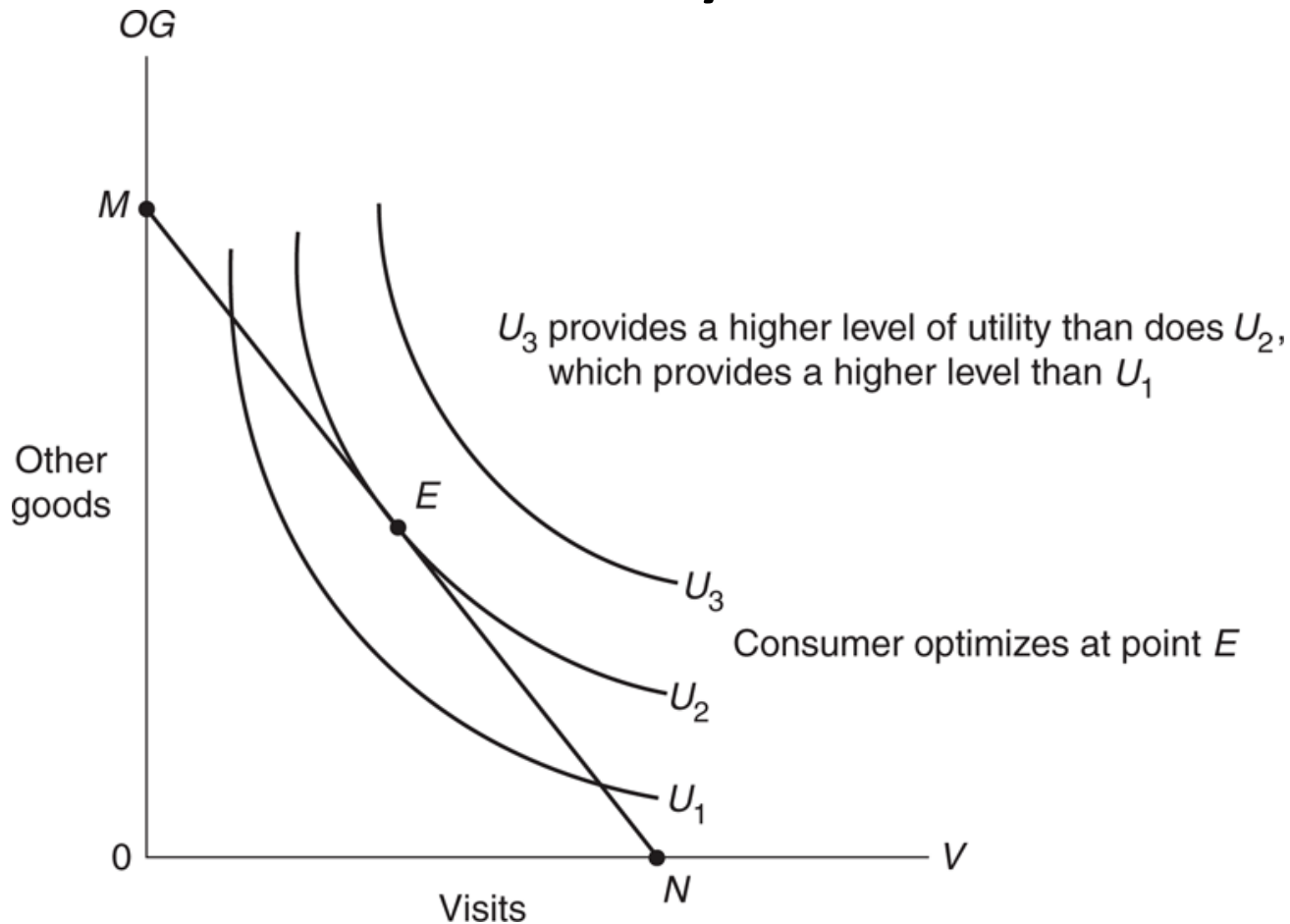


Figure 9-2 Consumer's Equilibrium Analysis

- Summary of Figure:
 - Budget Constraint = MN
 - U_1 , U_2 and U_3 represent indifference curves of higher and higher levels of utility.
 - E represents the consumers utility maximizing choice.

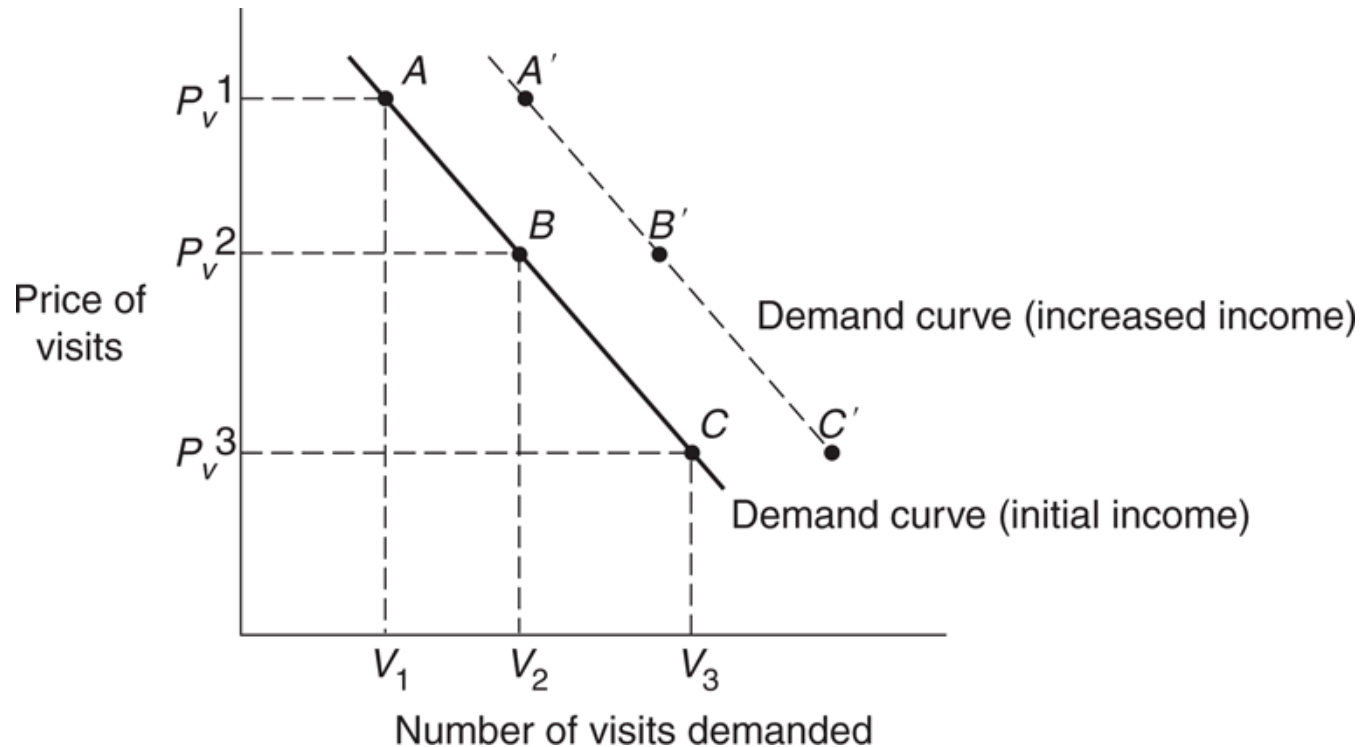
Utility Maximization

- At point E the slope of indifference curve U_2 (marginal rate of substitution) is just equal to the price ratio P_V/P_{OG} .
- The marginal rate of substitution (MRS) is a measure of the rate at which a consumer is willing to trade other goods for physician visits and the price ratio is a measure of the price at which she can trade other goods for physician visits.

- Can take the consumers choice problem and use it to derive the demand curve for an individual
- As the price of physician visits change the budget constraint pivots out around point M. This pivoting is illustrated on the next slide and it causes a change in consumer choice from E_1 to E_2 to E_3 , resulting in an increase in physician visits.

The Demand Curve

Figure 9-4 Demand Curve Derived from Figure 9-3



Price Elasticity

- The responsiveness of the consumer's demand to price is measured by the price elasticity. Price elasticity, E_p , is the ratio of the percentage change in quantity demanded to the percentage change in price. Algebraically, it is:

$$\text{Elasticity} = E_p = \frac{(\Delta Q / Q)}{(\Delta P / P)}$$

- As we will see, price elasticities are quite important. In a graphical sense, the more elastic demand is the flatter the demand curve, the more inelastic demand is the more steeper the demand curve.
- The price elasticity of demand provides information on how big a change in quantity would result from a change in price, the more elastic the demand is the bigger the change in quantity for a change in price.

- From a policy perspective elasticities are quite important because healthcare is often financed through payroll taxes; also taxes on cigarettes and alcohol are often used to finance healthcare in many countries.

Income Elasticity

- The responsiveness of demand to changes in income is measured by the income elasticity. Income elasticity, E_Y , is the percentage change in quantity demanded divided by the percentage change in income:

Income elasticity = $E_Y = (\Delta Q / Q) / (\Delta Y / Y)$, or

$$E_Y = \frac{\Delta Q}{\Delta Y} \left(\frac{Y}{Q} \right)$$

- Income elasticities are also important, from a policy perspective,
 - An income elasticity > 0 means the good is a normal good
 - An income elasticity between greater than 0 and less than or equal to 1 means the good is a necessity
 - An income elasticity greater than 1 means the good is a luxury

Demand and Supply

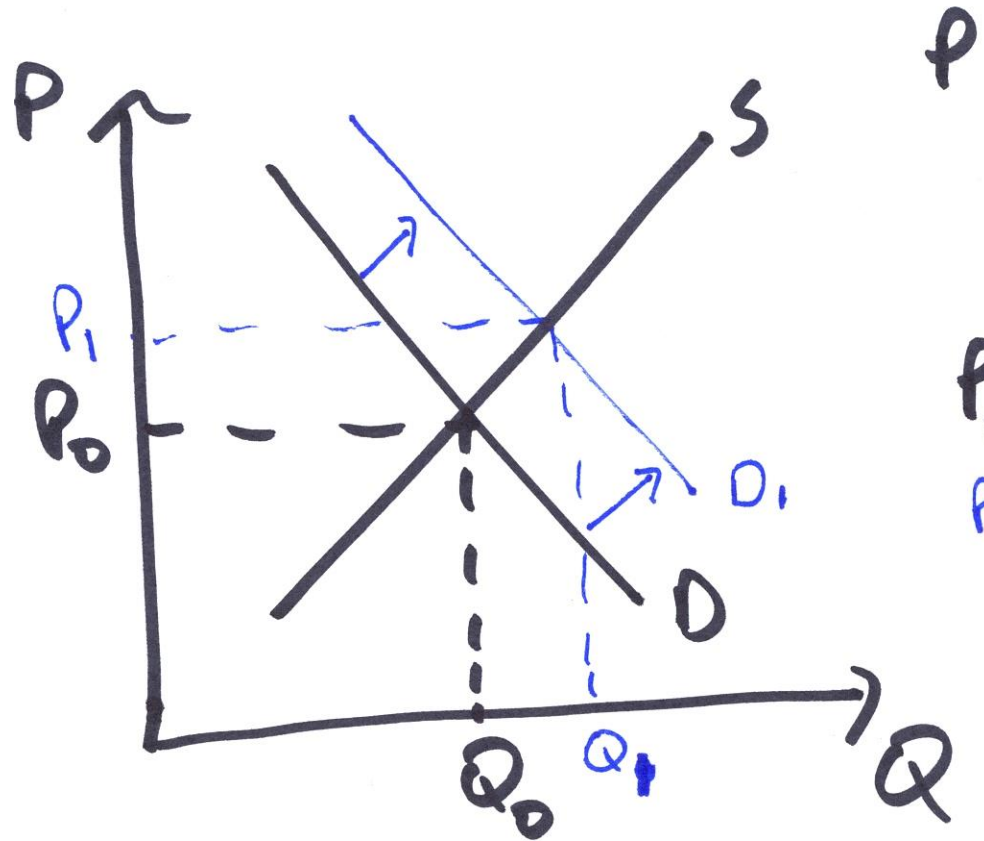
- The demand is important to know, but to really understand the market we need to know the supply curve.
 - Recall that the supply curve will be the sum of the individual producer's marginal cost curves
- Combining the demand and supply side we can talk about the market equilibrium and use it as a framework to think of the factors that can have effect on the demand and supply and hence the market equilibrium.

Textbook Demand Function for Medical Services/Healthcare

- $D=f(Y, P_{\text{complements}}, P_{\text{substitutes}}, \text{insurance}, \text{tastes})$

Where Y is income, $P_{\text{complements}}$ is price of complements, $P_{\text{substitutes}}$ is price of substitutes, insurance we will discuss in more detail later in the lecture, and tastes are changes in the preferences for healthcare that can reflect factors such as advertising or health promotion, aging and other demographic changes

An Increase in Demand



What increase demand for medical care services?

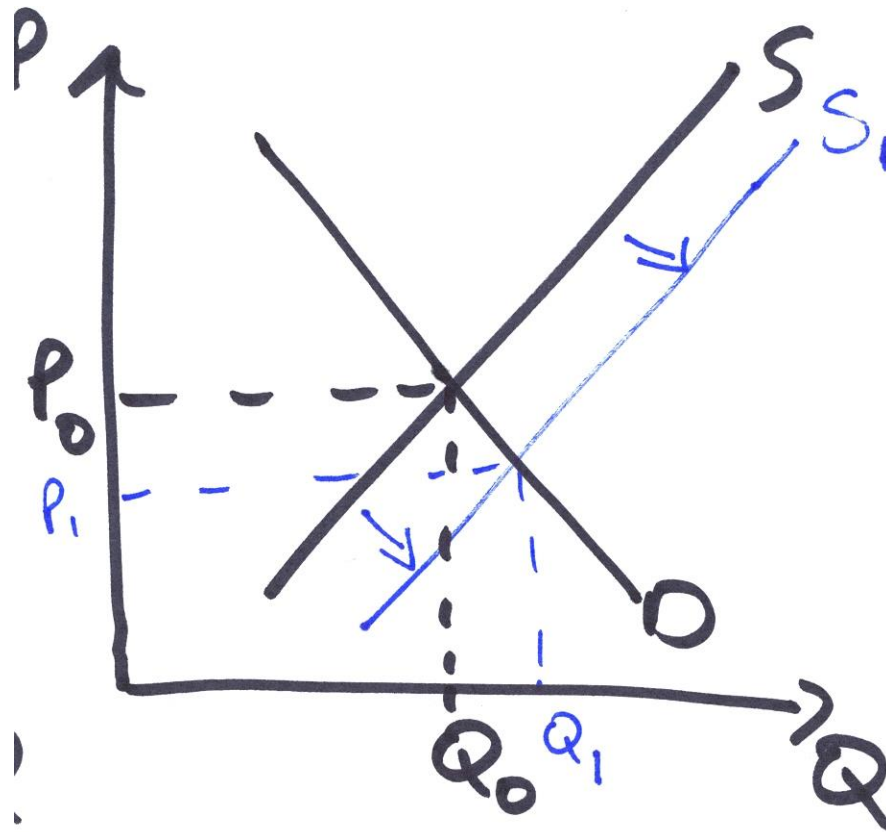
- If you have a normal good, then increases in income shift demand
- An increase in price of a substitute good
- A decrease in the price of a complement
 - Consider the following example, suppose you have Nutella, peanut butter and bread;
 - Bread is a complement for Nutella, so if the price of bread falls there would be an increase in demand for Nutella
 - Nutella and peanut butter are substitutes (plant based protein), so if price of peanut butter rises the demand for Nutella increases.

- Insurance, which decreases the cost at point of purchase
- Changes in taste that would increase demand, health promotion (get your flu shot or other vaccination, get checked out for some sort of cancer), an increase in the proportion of older persons, an increase in the number of women who can have children, increases in the number of educated persons,

Textbook Supply function for Supply of Medical Care

- *$S=f(\text{Technological change}, \text{Input Prices}, \text{Price of related good}, \text{Size of Industry}, \text{Weather})$*

An Increase in Supply



What increases the Supply of medical care services?

- Technological improvements that reduce the marginal cost of providing medical services
- Decreases in Input prices (lower rents for office space, lower malpractice insurance premiums, lower wages for administrative and nursing staff that work for physicians)
- An increase in the price of a related good
 - This don't exist in Canada, but do in other countries, e.g., the U.S., India.

- Suppose you have two (or more) markets that physicians can supply medical care services to. Suppose that the price that physicians receive in one market falls, then physicians will supply more of their services to the market with the higher price
- Increase in the size of the industry, i.e., raising medical school enrollments, making it easier for foreign trained physicians to get licensed to practice medicine in Canada

- Weather, has an effect on the supply of agriculture commodities (good weather generally increases supply of agricultural output).

Always label the diagram

- You may have to use supply and demand diagrams on tests and exams, please make sure that you label the diagrams; i.e., the axis, the initial price and quantity, how the curve shifted, and the new equilibrium price and quantity.

TWO ADDITIONAL DEMAND SHIFTERS-TIME AND COINSURANCE: The Role of Time

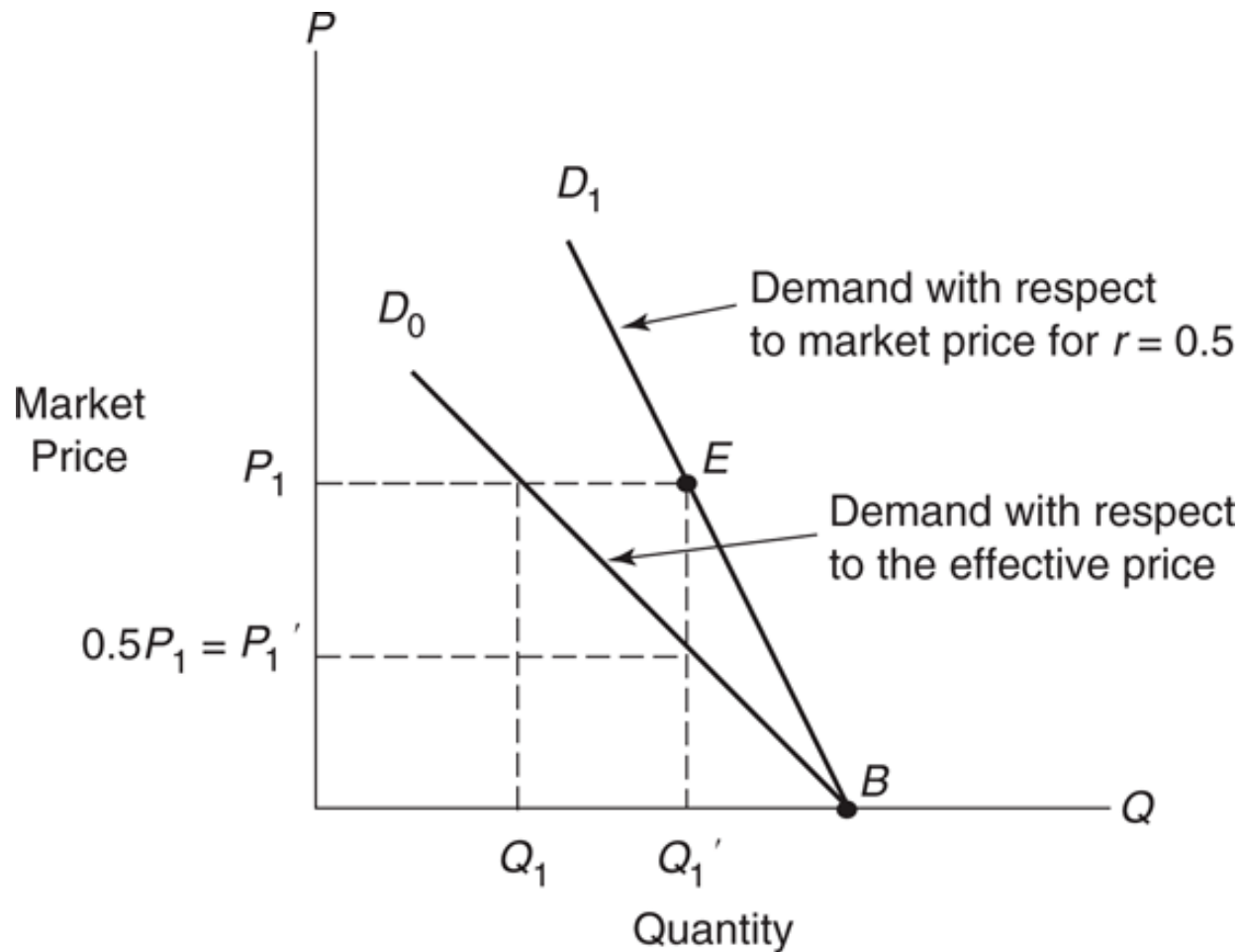
- Consuming healthcare services requires time, which means that there is an opportunity cost to consume these services
 - As an example of time cost effects, suppose that Ellen must go to the doctor for a 10-minute visit. It will take her 15 minutes to travel each way (30 minutes in all), 20 minutes to wait in the office, and 10 minutes with the doctor. Suppose further that the money cost of the visit is \$25, and that she values her time at \$10 per hour. Traveling and parking cost \$5 total. The full price of each visit is then \$40:
 - One hour of time valued at \$10
 - One visit priced at \$25
 - Travel and parking costs at \$5
- The opportunity cost of time makes the demand for healthcare more elastic

TWO ADDITIONAL DEMAND SHIFTERS-TIME AND COINSURANCE: Role of Coinsurance

- Coinsurance effectively pivots the demand out from D_0 to D_1 and increases the demand for health care.

Recall that insurance lowers the price at point of purchase, but the coinsurance will have more of an effect at higher prices.

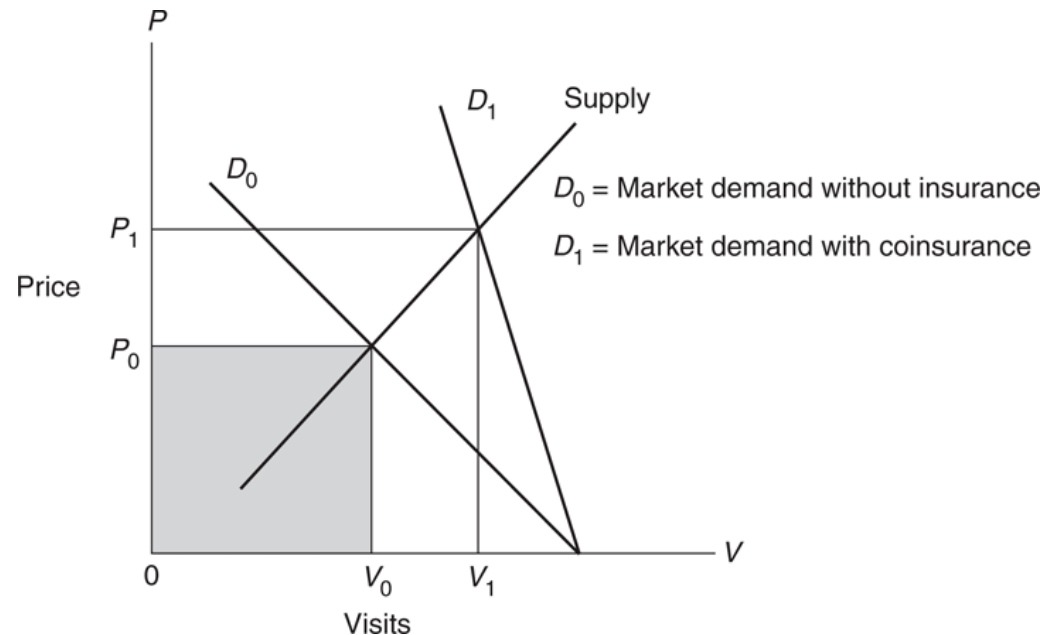
Figure 9-7 The Effect of a Coinsurance Rate on Health Care



Market Effects

- For the market as a whole, coinsurance shifts the market demand curve from D_0 to D_1 , resulting in an increase in the price of office visits and an increase in the number of visits.
- Overall health expenditures will rise from P_0V_0 to P_1V_1 .

Figure 9-8 Market Impact of Coinsurance



Market Demand Functions, Expanded from Textbook version

- It suggested the following type of demand function for physician visits, referred to as V :

$$V = f(Y, r, t, P_o, Y, HS, AGE, ED, \dots)$$

- where Y income, r is the patient's coinsurance rate, t is a time price, P_o is the price of other goods, Y is a measure of income, HS is the patient's health status, and AGE and ED stand for variables such as age and education to reflect other need and taste factors.

OTHER VARIABLES AFFECTING DEMAND

Ethnicity and Gender

- Many studies of demand examine the influence of race, and find that blacks tend to consume less medical care than the other large, self-identified ethnic groups when other factors are held constant.
- Females differ from males most clearly in their time pattern of medical care usage. During childbearing years, women are relatively heavy users of health care, but women are healthier in the long run and they predominate in the numbers of the elderly.

Urban vs. Rural

- Studies sometimes find differences in health care usage due to rural status. If rural residents use less care, the reasons why are not necessarily clear. Rural dwellers may differ culturally, and some analysts argue that this factor is more important to one's perception of life than ethnicity is.

Education

- Education is strongly associated with better health. If you are a university graduate, the odds are very good that you are healthier than your non-university graduate (recall the gradient in socioeconomic status).
 - Mechanisms are still not well understood for this correlation; those with higher educational attainment are more efficient producers of health, those with a higher level of educational attainment may have healthy lifestyles.

Age, Health Status and Uncertainty

- Older people consume three to four times more health care than the younger population.
- Wedig (1988) finds that the price elasticity of the decision to seek health care tends to be lower in absolute value for those with poorer health status, regardless of which measure is used to record health status.
- Finally, uncertainty will affect health care demand. When a consumer, worried about a future health risk, seeks advice or preventive treatment, we call this a precautionary demand (Picone, Uribe, and Wilson, 1998).

EMPIRICAL MEASUREMENTS OF DEMAND ELASTICITIES

Table 9-2 Price Elasticities from Selected Studies

Study	Dependent Variable	Price Elasticity
All Expenditures: Manning et al. (1987)	All expenditures	-0.17 to -0.22
Physician Services:		
Newhouse and Phelps (1976)	Physician office visits	-0.08
Cromwell and Mitchell (1986)	Surgical services	-0.14 to -0.18
Wedig (1988)		
Health perceived excellent/good	Physician visits	-0.35
Health perceived fair/poor	Physician visits	-0.16
Hospital Services:		
Newhouse and Phelps (1976)	Hospital length of stay	-0.06
Manning et al. (1987)	Hospital admissions	-0.14 to -0.17
Nursing Homes:		
Chiswick (1976)	Nursing home residents per elderly population	-0.69 to -2.40
Lamberton et al. (1986)	Nursing home patient days per capita elderly	-0.69 to -0.76

Table 9-4 Income Elasticities from Selected Studies

Study	Dependent Variable	Income Elasticity
All Expenditures: Rosett and Huang (1973)	Expenditures	0.25 to 0.45
Hospital Services: Newhouse and Phelps (1976)	Admissions	0.02 to 0.04
Physician Services: Newhouse and Phelps (1976)	Visits	0.01 to 0.04
Nursing Homes: Chiswick (1976)	Residents per elderly population	0.60 to 0.90

CONCLUSIONS

Key Concepts

- Demand theory is crucial to our understanding of health care markets.
- The substantial increases in out-of-pocket costs for prescription products experienced by many patients have affected utilization of drugs in the expected negative direction.
- Time and distance can also be important as theory suggests.