

**Current Issues in U.S. Health Economics:**  
**Summary for Health Economics Course (ECN 132)**

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- The health care industry can benefit greatly from economic analysis, especially microeconomic analysis.
- More than many other areas of economics this theory needs to be modified or extended to accommodate institutional features.
- In particular health consumers are buying a product they know little about (information) with someone else's money (third-party payment) due to insurance (uncertainty).
- The big current issues always include the increasing cost of health care.

- A. Overview of U.S. Health Market
- B. Health Insurance in the U.S.
- C. Theory of Health Insurance
- D. Economic Evaluation of Health Services
- E. Individual Demand for Health
- F. Providers (Physicians, Hospitals, Pharmaceuticals)
- G. Government
- H. Medical Technology
- I. International Comparisons.

## **A. Overview of U.S. Health Market**

### **Total expenditures in 2014**

- \$3,030 billion
- \$9,500 per capita (Based on population of 316 million)
- 17.5% of GDP (Based on GDP of \$17,300 billion).

### **Use of Funds**

- The big three (hospital, physician, drugs&products) are 64% of total.

### **Source of Funds**

- 55% public and 45% private.
- Only 11% is out-of-pocket. Third payment is key feature of health market.

## **Trends since 1900**

- Expenditure risen dramatically and continuously and forecast to continue.
- Dramatic switch away from out-of-pocket payment to insurance.
- Hospital days little changed but costs much larger as more labor-intensive.
- More physician visits but smaller share of pie.
- Drugs decreased but now increasing share of pie.
- Nursing home care and home health care are growth areas.
- Health care expenditures have risen everywhere in the world. The U.S. has the largest expenditures because of higher base and higher growth rates.

## **Future**

- Pressures exist for continued increase. Forecast 20.0% of GDP in 2020.
- At same time U.S. is a real outlier and radical change is possible.

## Use of Funds in 2014

<b>Category</b>	<b>% of Total</b>	<b>Trend since 1960</b>	<b>Biggest Issues</b>
Hospital	32	Static	Managed care; technology
Physician & clinical	20	Static	Managed care; physician income
Drugs & Supplies	13	Up	Formularies; technology
Other professional	11		
Nursing Home	5	Up	
Home Health	3	Up	
Administration costs	7	Up	Standardization
Public Health	3	Up	
Research	2	Down	Switch from government to private
Construction	<u>4</u>		
Total	100		

## Source of Funds in 2014

<b>Category</b>	<b>% of Total</b>	<b>Biggest Issues</b>
Public (55%)		
Medicare	22	Insolvency; consumer choice; drugs
Medicaid	17	States; managed care; elderly poor; children
Other public	15	
Private (45%)		
Private insurance	31	Employers providing less; reaching uninsured; Future of Obamacare.
Out-of-pocket	11	
Other private	<u>4</u>	
Total	100	

## **B. Health Insurance in the U.S.**

### **General Principles**

- Risk-pooling is the reason insurance works.
- Risk-aversion is the reason consumers purchase insurance.
- Adverse-selection can lead to failure of insurance markets
- Moral hazard can lead to welfare loss due to excess consumption of health services (Pauly, and Manning et al RAND study).

### **Health Insurance Terminology**

- Copayment – a lump sum paid by insured per service e.g. \$20
- Coinsurance – a percentage paid by insured per service e.g. 10%
- Deductible – an annual amount paid before any insurance cover e.g. \$2,000
- Premia – the price of a health insurance policy.
- Pre-existing conditions – health conditions that may not be covered.

## **Rand Health Insurance Experiment**

- The RAND study in the late 1970's randomly gave individuals health insurance policies with varying coinsurance rates.
- Finds that demand for medical services responds to price.
- Arc price elasticity ranged from 0.1 to 0.2.

## **Health Insurance Coverage**

- Much insurance is **employment-related** or **government provided**.
- 33 million in 2011 or **10%** were not covered by insurance.



## Types of Health Insurance

- FFS – Fee for service
  - insured has great choice of treatment and provider
  - now disappeared but was dominant until 1990's.
- HMO – health maintenance organization
  - restricted choice of treatment and provider
  - introduced in 1980's, peaked in 1996, much less now.
- PPO – preferred provider organization
  - choice less restricted than HMO but much more than FFS.
  - introduced in 1990's, most common form now.
- HDHP – high deductible health plan
  - much higher deductibles, copays than traditional HMO, PPO
  - highly tax favored with health savings account (HSA) option
  - introduced in mid 2000's and increasingly popular.

## **Recent Trends in Health Insurance**

- Switch from indemnity FFS to managed care (PPO and HMO).
- Percentage uninsured up in early 1990's, down in late 1990's, rising in 2000's again.
- Obama's Affordable Care Act took effect in 2014, including insurance exchanges, individual mandates, no pre-existing conditions exclusions.

## **Future**

- Insurance is a key choice variable of consumers and is price-responsive.
- Movement to encourage insurance with higher copays and use of medical savings accounts to permit tax deductibility of out-of-pocket payments.
- Access to insurance for those not covered by government or employer insurance plans.

## **Managed Care Quality and Quantity**

- Very fast growth with indemnity insurance essentially eliminated.
- Recent anecdotal criticisms of access to care (quality and quantity) have led to actual reduction in HMO, so PPO is now dominant in much of U.S.
- Studies indicate much of the care in managed care is good (Miller and Luft).
- Based on difference-in-means tests.

## **Costs**

- One-time cost savings of 10-20 % (controlling for favorable selection into HMOs).
- Trend then appears to be same as non-managed care.
- High costs relative to premia has led to failure of managed care companies.

- Test Difference between two means (e.g. for FFS versus HMO)

$$\text{HMO} \quad \bar{x}_1 = 0.75 \quad s_{\bar{x}_1} = 0.02$$

$$\text{FFS} \quad \bar{x}_2 = 0.80 \quad s_{\bar{x}_2} = 0.01$$

$$\begin{aligned} \text{Then} \quad t &= (\bar{x}_1 - \bar{x}_2) / \text{sqrt}(s_{\bar{x}_1}^2 + s_{\bar{x}_2}^2) \\ &= (0.75 - 0.80) / \text{sqrt}(0.02^2 + 0.01^2) \\ &= -0.05 / \text{sqrt}(0.0005) = -0.05 / 0.02236 \\ &= -2.236 \end{aligned}$$

Since  $|t| = 2.236 > 1.96$  we reject  $H_0: \mu_1 = \mu_2$ .

Conclude that there is a statistically significant difference at 5%.

## **Government Insurance: Medicare**

- For those aged over 65 + disabled + end-point renal disease.
- Established in 1965 (parts A (hospital) & B (physician & outpatient))
- Federal program funded by payroll tax
- More recently Parts C (advantage) and D (pharmaceuticals) added

## **Government Insurance: Medicaid**

- For those poor
- Established in 1965
- Federal / state program financed out of general revenue
- Includes nursing home for elderly (not covered by Medicare)

## **Affordable Care Act (“Obamacare”)**

- Large employers must provide insurance to workers or face penalty
- Medicaid expanded to cover more poor people
- Health exchanges created for private purchase of insurance
- All people must have insurance and no exclude on preexisting conditions.

## C. Theory of Health Insurance

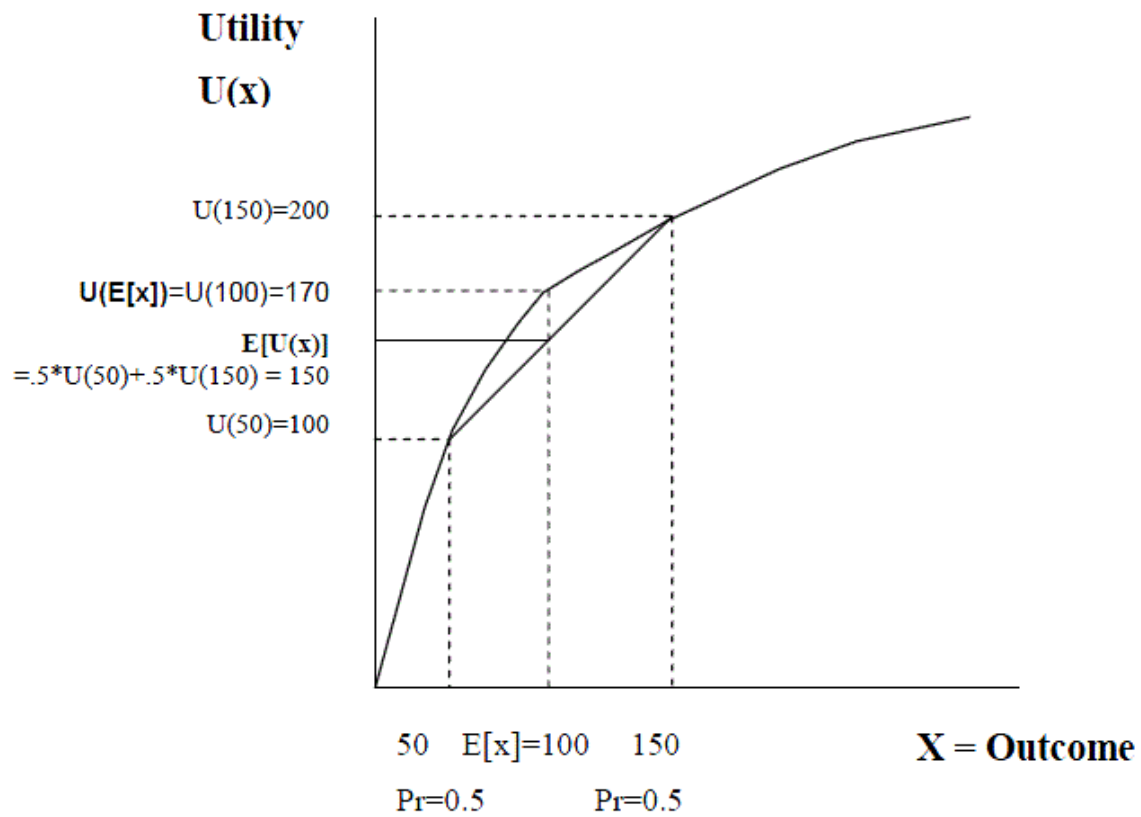
### General Principles

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### Risk Pooling

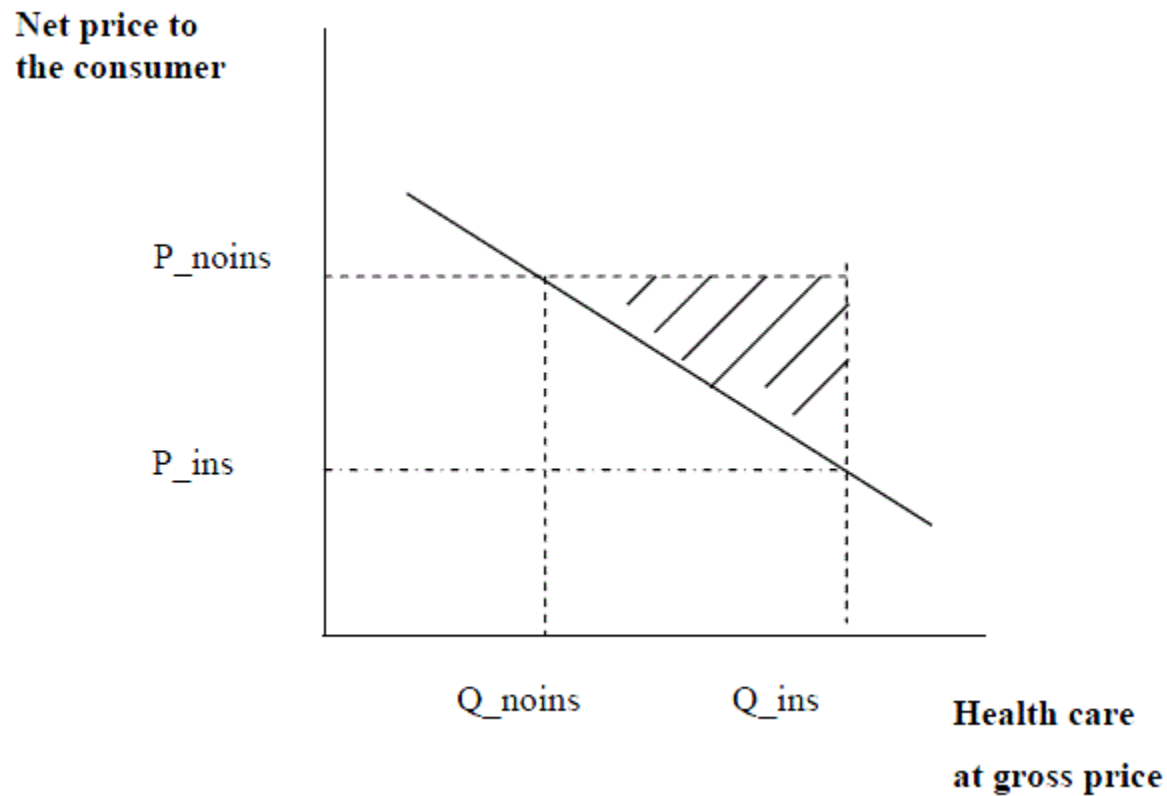
- Given  $n$  independent individuals with loss  $X$  with mean  $\mu$  and variance  $\sigma^2$
- For the average  $E[\bar{x}] = \mu$ 
  - standard deviation is  $S.D.[\bar{x}] = \sigma / n^{1/2}$
  - and 95% of time average claim is in range  $E[\bar{x}] \pm 2 \times S.D.[\bar{x}]$

# Risk-aversion



## Moral hazard

- RAND HIS provided estimate of price elasticity of demand.
- Moral hazard in simplest case (RAND more complicated)





## Tradeoff between moral hazard and risk reduction

- Prefer bottom right so I3 best then I2 then I1.
- No moral hazard. Highest indiff. curve gives F: full insurance.

**With moral hazard:** increasing premium per unit of coverage with level of insurance. **Now** at A: **partial insurance.**

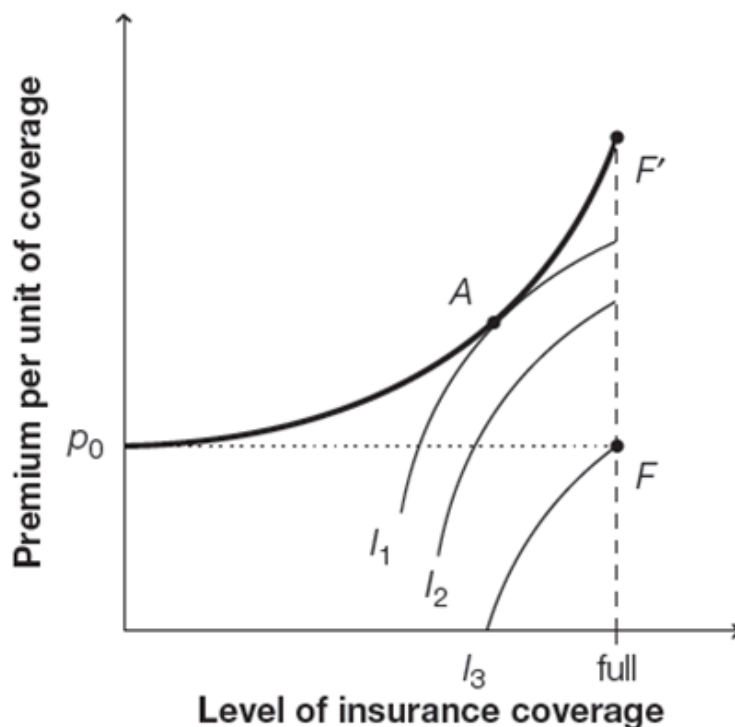


Figure 11.8. *The locus of feasible contracts in a world with moral hazard.*

## Adverse Selection

- Arises if there is a difference between those who buy insurance (high-risk where high-risk here means large average claims) and those who do not (low-risk).
- Can lead to an insurance death spiral.
- Akerlof's markets for lemons illustrates the problem.
- Asymmetric information
  - car sellers know value of the car
  - car buyers do not know the value so believe it is at most the posted price (the price the sellers are willing to sell it for).
- Adapted to health insurance
  - consumers know their health expenses
  - health insurance companies do not.

## **Health Care Systems across countries**

- Beveridge model – single-payer insurance and govt. provision
- Bismarck model – universal health insurance (possibly private) and private provision but with price controls
- American model – no universal insurance and mostly private provision with little price control.

## **D. Economic Evaluation of Health Services**

### **Cost Benefit Analysis**

- Tool used by economists.
- Replace demand and supply curves by social marginal benefit and social marginal cost curves. At optimum  $MB = MC$ .
- Sixth stool GUA IAC test (Neuhauser and Lewicki) shows importance of using marginal analysis.

### **Cost Effectiveness Analysis**

- Avoid putting \$ value on benefits by considering costs per unit of benefit.
- Life-years saved is often the unit of benefit.
- Quality-adjusted years of life (QALY) brings in benefit via backdoor.

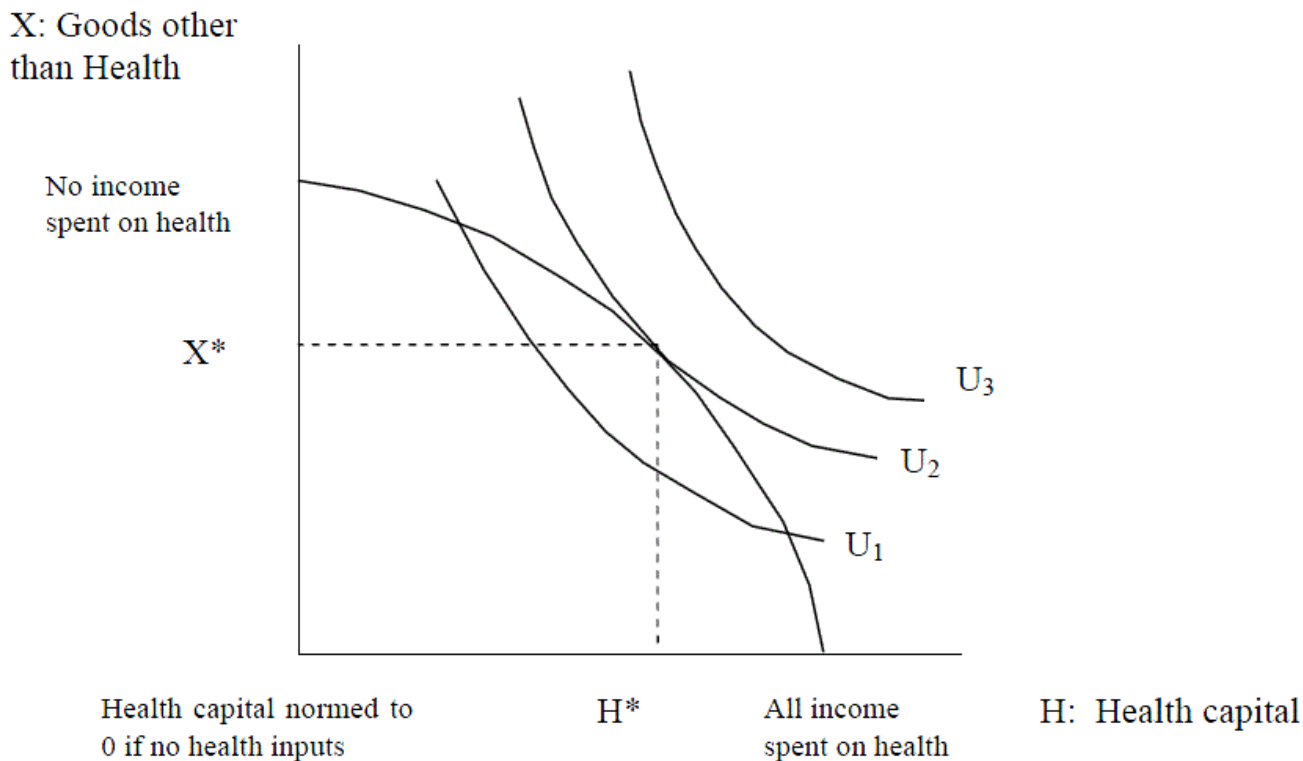
### **Future**

- Economic evaluation should be used much more in the U.S.
- Pharmaco-economics leading the way.

## E. Users (Individual Demand for Health)

### Grossman Model of Health Demand

- Utility depends on health stock (H) rather than health services per se.
- Health capital is in turn produced by medical inputs (m).
- Utility:  $U = U(x, H)$  + Health prodn:  $H = H(m)$  + Budget:  $I = x + p_m m$



## Grossman Model over Time

- Use marginal efficiency of capital (MEC) curve
- Lifetime return from a marginal health investment in health at any level of health stock  $H$
- At optimum  $MEC = \text{market interest rate} + \text{health depreciation rate}$ .
- **Individual Demand**
- $m = f(\text{price, coins. rate, time price, } p_x, \text{ income, health status, age, educn})$
- Price elasticity of health is low. E.g. RAND experiment: -0.17 to -0.22.
- Income elasticity of health is low but positive. So health is a normal good.
- Health demand is responsive to the time cost.

## Future

- The primary consumer choice is the health insurance policy, not inputs given the policy. This is changing with increased deductibles.
- So health insurance choice is the key part of consumer demand.

## **F1. Physicians**

### **Physician Quality and Quantity**

- Physician quality is viewed as very high (after Flexner 1910 report).
- Physician quantity is viewed as adequate to high

### **Physician Income**

- Very high.
- In 2016 median physician income was \$215,000 (Primary care) and \$260,000 (specialist).
- Human capital investment explains part, but high rate of return of 15-20%.
- Licensing (to ensure quality) explains some of this high return.
- Third party payment (insurance) explains some of this high return.
- Physician-induced demand may explain some of this high return.

## **F2. Hospitals**

### **Quality and Quantity**

- Quality viewed as high (big shift from hospice to acute care since 1930.)
- Quantity is adequate with some excess capacity.

### **Costs**

- In real 2009\$ costs per patient day up from \$100 in 1950 to \$330 in 1970 to \$1800 in 2009.
- Much of this increase due to higher staffing levels and greater technology.

### **Prices**

- Hospital markets in U.S. are highly concentrated with  $HHI = 0.33$
- Hospitals charge wildly different prices to different customers with different types of insurance (or no insurance).



## **F3. Pharmaceutical Drugs**

### **Quality and Quantity**

- Quality is high.
- Quantity is too low for some people as 18% of prescription costs paid out-of-pocket.
- 2006 Medicare Part D expansion to cover prescription drugs for elderly.

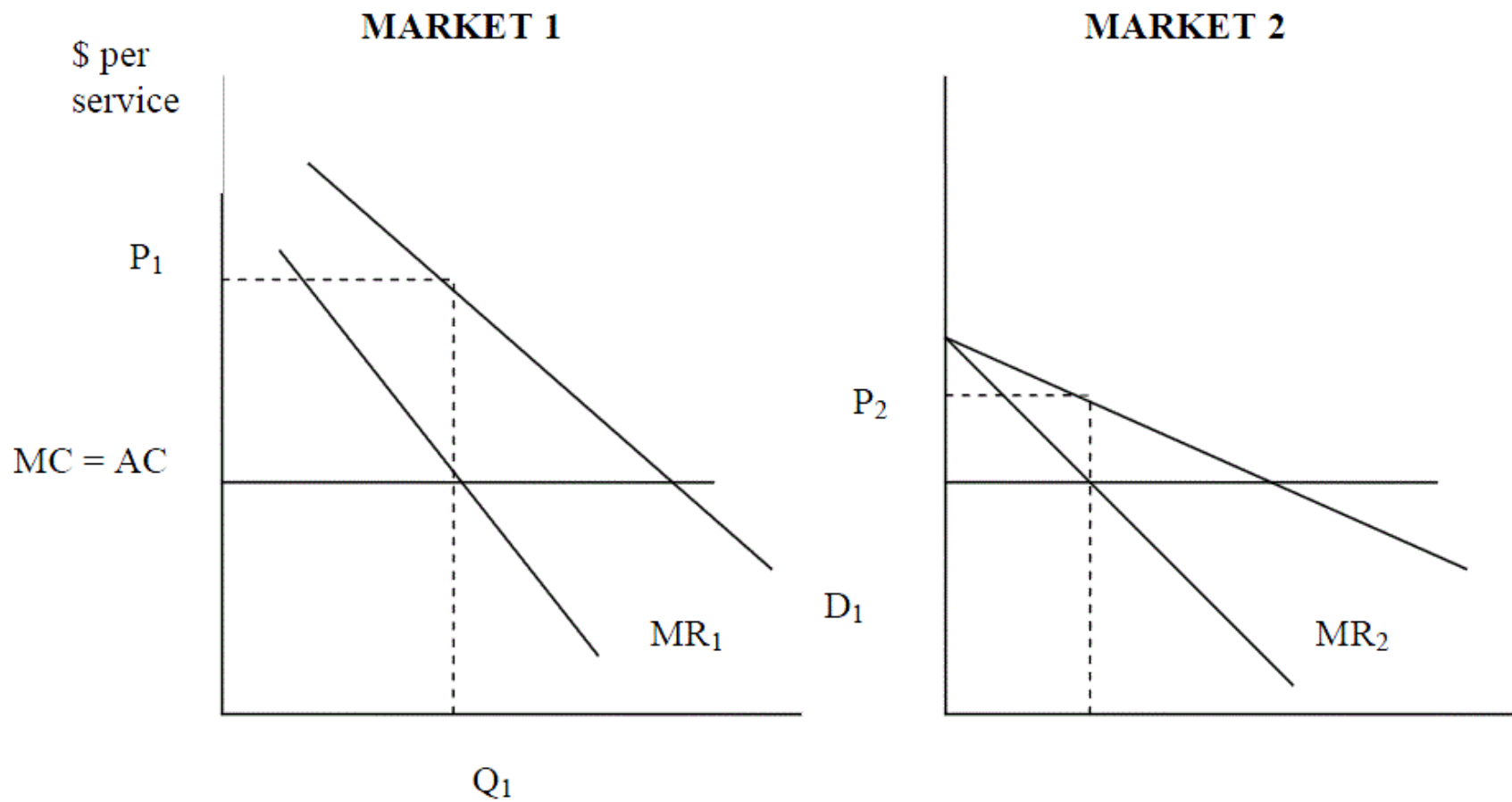
### **Costs**

- Viewed as excessive when patented, but patents needed to encourage R & D.
- Viewed as reasonable after patent has run out.
- Formularies are recent attempt to discourage use of high cost drugs.

## Future

- Potentially explosive area.
- New drug prices are rising much more than economy-wide prices.
- Consumers may demand access to better drugs due to liberalization of advertising to consumers.
- Consumers may be more selective in drug choice, preferring cheaper substitutes.
- Medicaid and other government will surely consider use of formularies.
- Few recent blockbuster drugs.
- Genomic revolution may lead to many discoveries.
- These are often biologics which are more difficult to become generic.
- Pharmaco-economics will increasingly evaluate cost-effectiveness of alternative drugs.

# Drug Pricing in Different Markets



## **F4. Bonus: Long-Term Care (LTC)**

- LTC is for people needing care but not in hospital.
- Nursing home quantity adequate in some states and inadequate in others.
- Part of problem is medical system is geared to acute not long-term care.

### **Costs**

- Not viewed as being excessive as much labor is nurses and lower-skilled.
- Concern that expanding nursing home and home health care will substitute for currently "free" family care.

### **Future**

- Growth in elderly potentially explosive.
- Impacts depend on change in average length of time per person in nursing home.
- Growth pressures Medicaid which pays half nursing home costs (little discussed).
- Home health care appears to be under-utilized to date.

## **G. Government**

### **General Principles**

- Major reasons for government involvement in economy are
  - public goods: e.g. information (NIH)
  - externalities: e.g. infectious diseases
  - monopoly
  - market failure: e.g. Medicare as insurance market for > 65's would fail
  - equity: e.g. Medicaid

### **Quality and Quantity**

- Despite preference for private provision, government pays for half of health care.
- Medicare viewed as good quality and good quantity aside from drugs.
- Medicaid is viewed as low quality and quantity due to low reimbursement rates and failure to include the working poor.

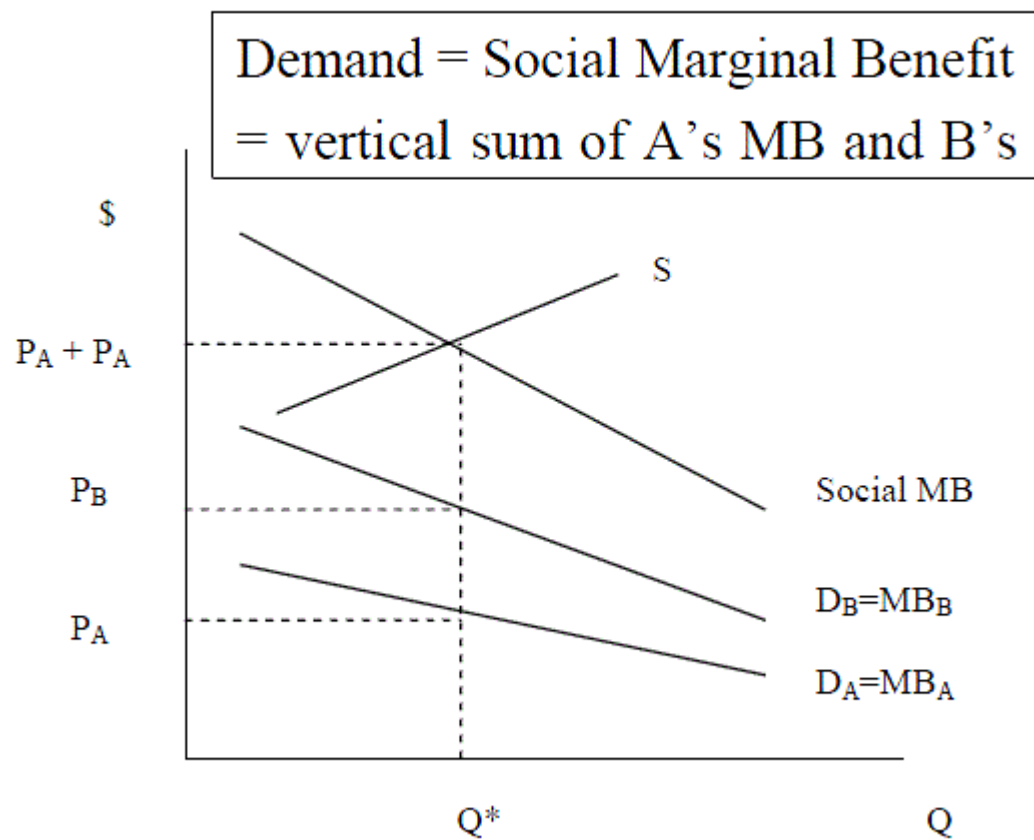
## **Costs**

- Medicaid very aggressive on costs with low reimbursements and managed care.
- And Medicaid also tight on nursing homes (half of Medicaid costs).
- But big problem for state budgets.
- Medicare less aggressive but leader in DRGs etc. and does not provide drugs.
- Medicare predicted to run out trust fund within ten years.

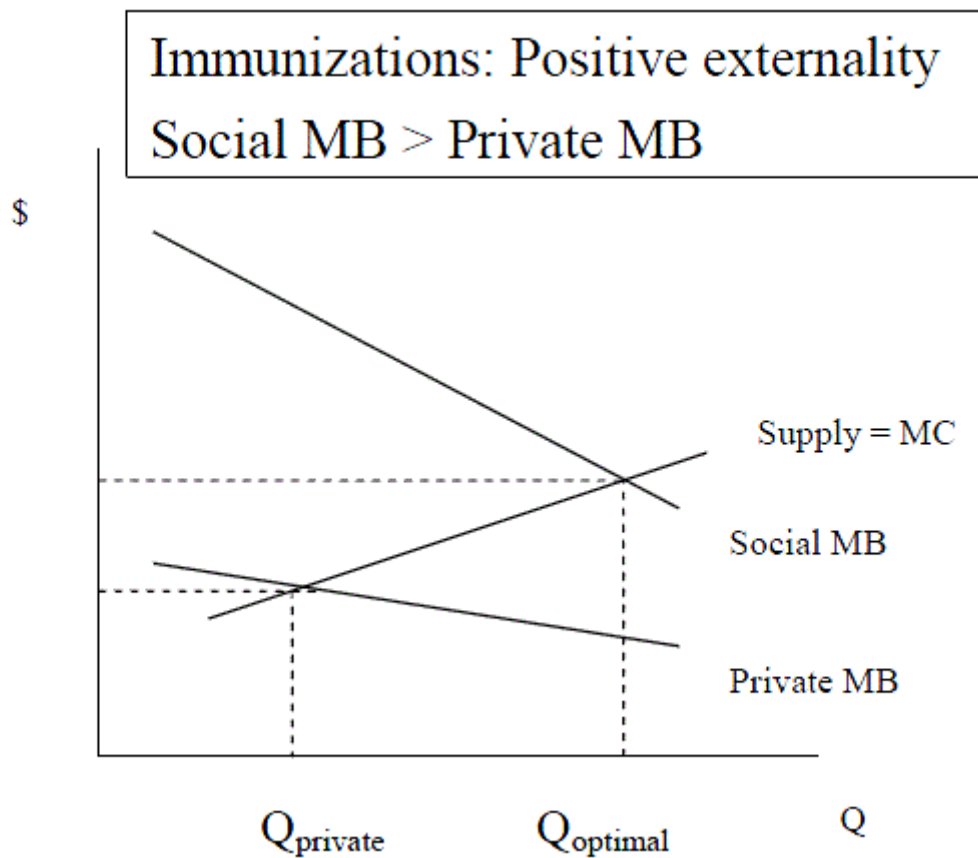
## **Future**

- Medicaid managed care and more help to those leaving welfare.
- Obama reforms will extend Medicaid to more low-income people.
- Medicare is the big problem down the line.

# Public goods



# Externality (positive in consumption)





## H. Medical Technology

- Big reason for increased health expenditures is doctors can do more.
- Cutler and McClellan (2001) consider five medical innovations (treatments for heart attack, low birthweight infant, depression, cataracts and breast cancer) and find all but last clearly have  $MB > MC$ .
- No doubt that overall net benefit to improved health technology.
- But there may be inefficient use of some technologies as there is considerable small area variation in practice styles. E.g. C-sections. Based on big coefficient of variation across regions.
- New medical technology will be a big reason (the biggest?) for further increased expenditures.

## **I. International Comparisons**

### **Quality and Quantity**

- Most wealthy countries viewed as having reasonable quality and quantity.
- U.S. viewed as best quality and quantity for all but poorest individuals.
- Yet measured outcomes - life expectancy and infant mortality - poor for the U.S. compared to other developed countries
- The real action is in poor countries versus developed countries.

### **Costs**

- All countries feel pressure.
- But only the U.S. has experienced such high growth rates.

### **Future**

- Health will creep up as fraction of GDP since health is superior good.
- Other developed countries' systems are radically different from U.S. This suggests radical change is possible here.

## **J. Obesity Not covered in Fall 2016**

- Example of unhealthy habits.
- More recent phenomenon than smoking and excess drinking.
- Obesity doubled from 15% in 1980 to 30% today.
- Associated especially with increased diabetes.
- Sturm (2002) compares to other risk factors and finds obesity has health impact similar to aging from 30 to 50 years and more than smoking and drinking.
- Chou, Grossman and Saffer (2004) use data on individuals over time and suggest that a big reason for increase in obesity / BMI is more restaurants.

## Sources

- Current notes: Jay Bhattacharya, Timothy Hyde and Peter Tu: *Health Economics*, First edition, Palgrave MacMillan, 2014.
- Older notes: Thomas E. Getzen, *Health Economics: Health Economics and Financing*, 4th Edition, Wiley, 2010 is an accessible text.
- *Health Affairs* is best current accessible journal for health economics.
- *NEJM* and *JAMA* have some good material but for economic policy it can be slanted towards government intervention.
- *NEJM* in early 1999 had excellent eight-part series on The American Health Care System.
- State of the art economics best source is NBER working papers ([www.nber.org](http://www.nber.org)).