# 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 2019

- $3,800 billion (or $3.8 trillion)
- $11,600 per capita (Based on population of 328 million)
- 17.7% of GDP (Based on GDP of $21,400 billion).

## Use of Funds

- The big three (hospital, physician, drugs&products) are 65% of total.

## Source of Funds

- Roughly 50% public and 50% 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 2028.
- At same time U.S. is a real outlier and radical change is possible.

# Use of Funds in 2019

| Category | % of Total | Trend since 1960 | Biggest Issues |
|---|---|---|---|
| Hospital | 32 | Static | Managed care; technology |
| Physician & clinical | 20 | Static | Managed care; physician income |
| Drugs & Supplies | 13 | Up | Formularies; technology |
| Other professional | 12 | | |
| Nursing Home | 5 | Up | |
| Home Health | 3 | Up | |
| Administration costs | 8 | Up | Standardization |
| Public Health | 3 | Up | |
| Research | 1 | Down | Switch from government to private |
| Construction | 4 | | |
| Total | 100 | | |

# Source of Funds in 2019

| Category | % of Total | Biggest Issues |
|---|---|---|
| Public (roughly 50%) | | |
| Medicare | 21 | Insolvency; consumer choice. |
| Medicaid | 16 | States; managed care; elderly poor; children |
| Other public | 11 | |
| Private (roughly 50%) | | |
| Private insurance | 32 | High cost; reaching uninsured; future of Obamacare. |
| Out-of-pocket | 11 | |
| Investment | 5 | |
| Other private | 4 | |
| 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 (Paully, 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**.
- 28 million or **8.6% did not have health insurance at any time in the year 2020.**

## Types of Health Insurance

- FFS – Fee for service
  - insured has great choice of treatment and provider
  - now disappeared but was dominant until late 1980's.
- HMO – health maintenance organization
  - restricted choice of treatment and provider (e.g.gatekeeper)
  - introduced in 1980's, peaked in 1996, much less now.
- PPO – preferred provider organization
  - FFS if in network and pay more outside network.
  - introduced in 1990's, most common form now.
- POS – point of service
  - HMO in network with more expensive out-of-network option.
- HDHP – high deductible health plan
  - much higher deductibles, copays than traditional HMO, PPO
  - highly tax favored with health savings account (HCA) 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 then lowering in mid 2010's with Obamacare.
- Obama's Affordable Care Act took effect in 2014, including insurance exchanges, individual mandates, no pre-existing conditions exclusions.
- High deductible health plans becoming more common and even regular plans have higher deductibles than in the past.

## 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 (FFS) 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.

## Managed Care Costs

- One-time cost savings of 10-20 % (controlling for favorable selection into HMOs).
- Trend then is similar to non-managed care.

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

HMO $\bar{x}_1 = 0.75$ $s_{\bar{x}1} = 0.02$

FFS $\bar{x}_2 = 0.80$ $s_{\bar{x}2} = 0.01$

Then $t = (\bar{x}_1 - \bar{x}_2) / \text{sqrt}(s_{\bar{x}1}^2 + s_{\bar{x}2}^2)$

$= (0.75 - 0.80) / \text{sqrt}(0.02^2 + 0.01^2)$

$= - 0.05 / \text{sqrt}\ (0.0005) = - 0.05 / 0.02236$

$= - 2.236$

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 for private purchase of insurance (with subsidy)
- All people must have insurance and no exclude on preexisting conditions.

# C. Theory of Health Insurance

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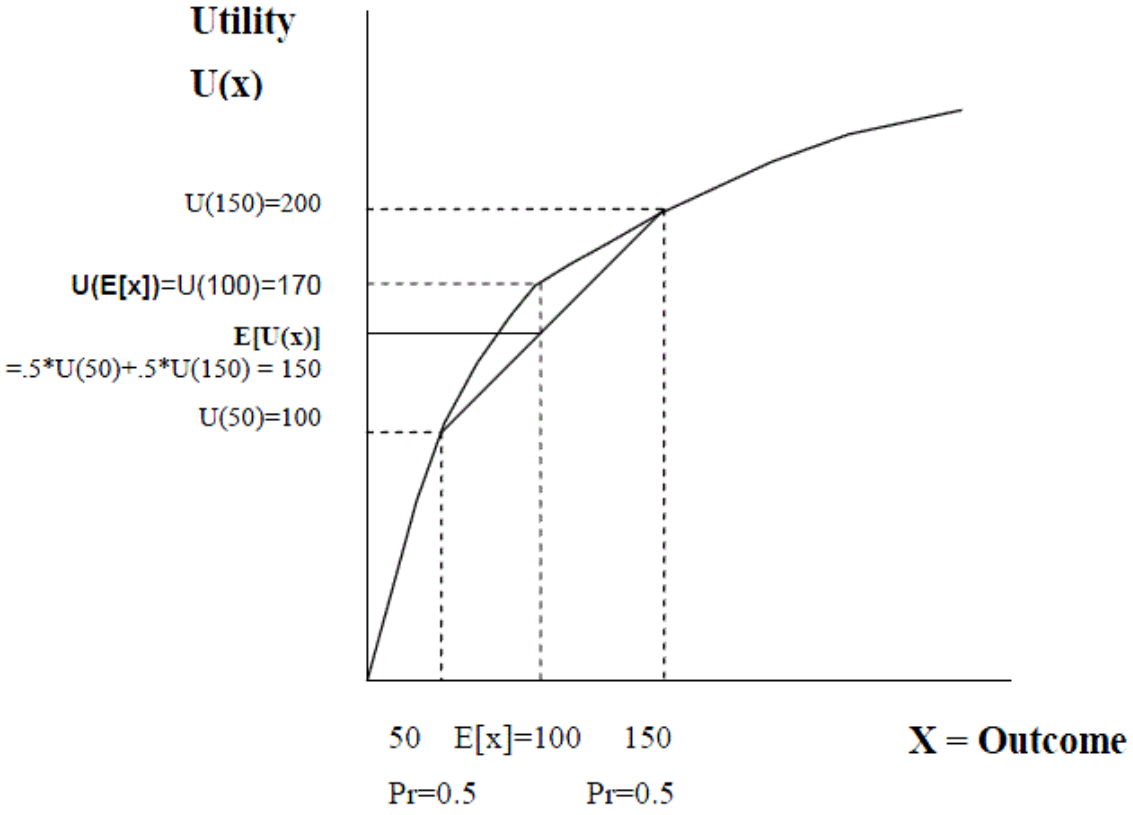
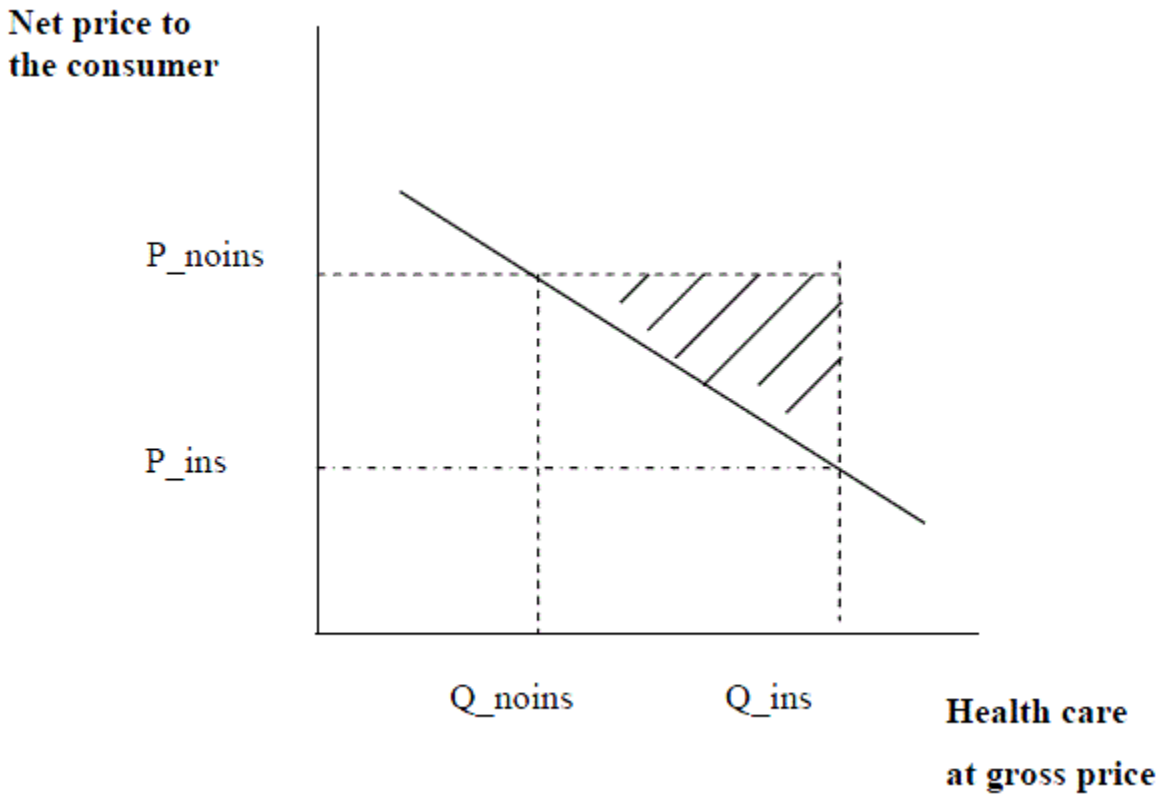
## Risk Pooling

- 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 $E[\bar{x}] \pm 2 \times S.D.[\bar{x}]$


Utility
U(x)
U(150)=200
U(E[x])=U(100)=170
E[U(x)]
=.5*U(50)+.5*U(150) = 150
U(50)=100
50
E[x]=100
150
Pr=0.5
Pr=0.5
X = Outcome

# 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.

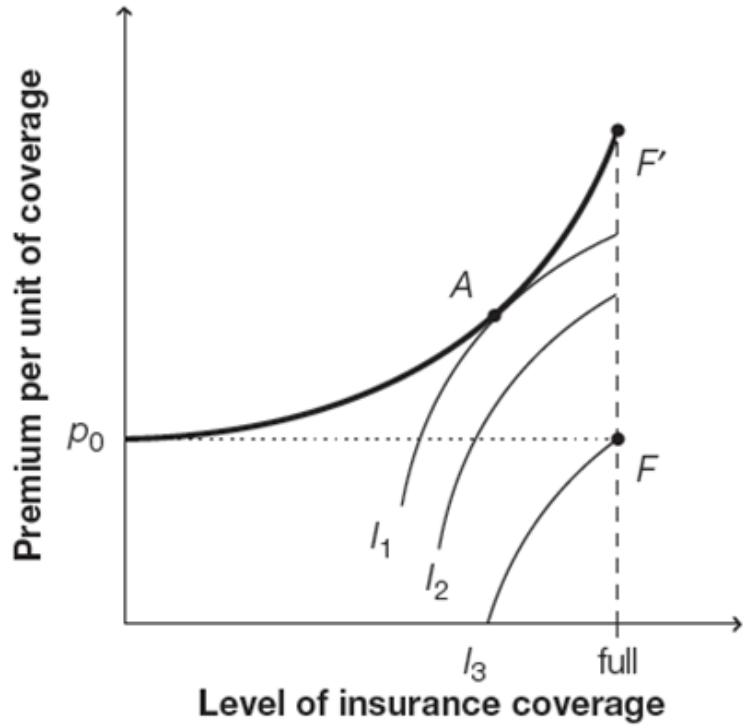



Figure 11.8. *The locus of feasible contracts in a world with moral hazard.*

## 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 (U.K.)
  – single-payer insurance and govt. provision
- Bismarck model (Germany)
  – universal health insurance (possibly private) and private provision but with price controls
- American model (U.S.A.)
  – 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 GUAIAC 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 some valuation of benefit via backdoor.

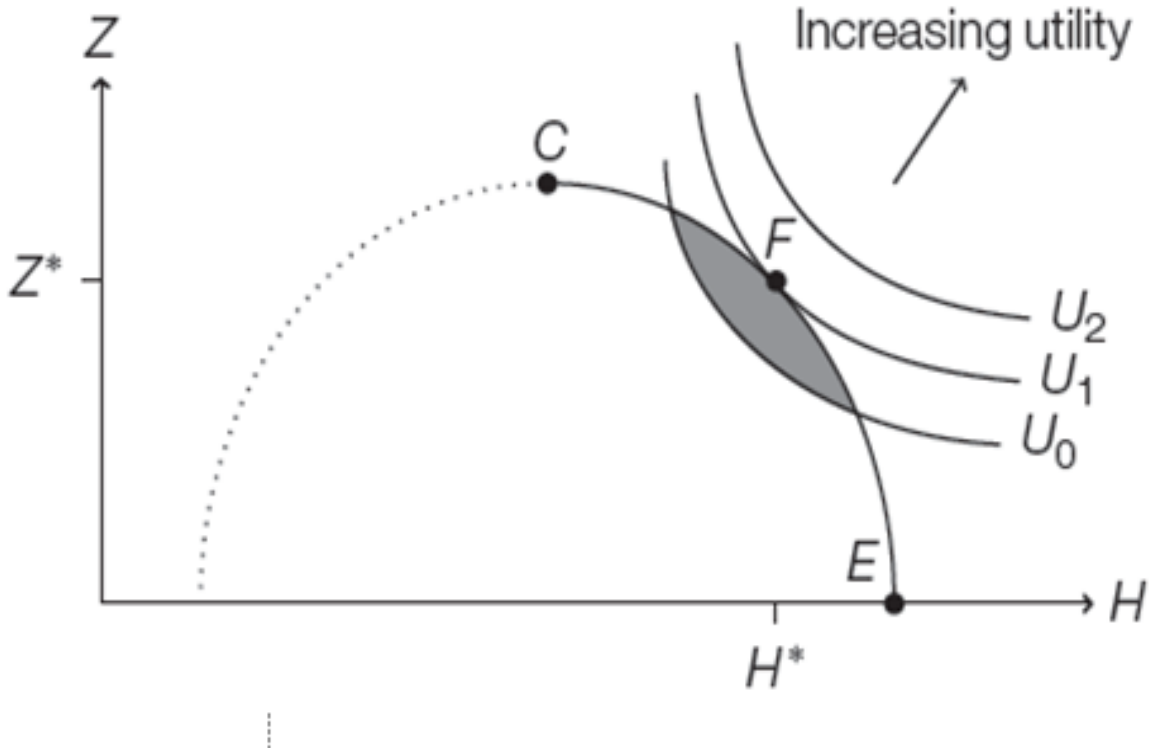
## Future

- 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(z, H) & Health prodn: H = H(m) & Budget: I = z + $p_m$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 = market interest rate + health depreciation rate.

- **Individual Demand**
- m = f(price, coins. rate, time price, $p_x$, income, health status, age, educn)
- Price elasticity of health is low. E.g. RAND experiment: -0.17 to -0.22.
- Income elasticity of health using aggregate data over time 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 2020 median physician income was $242,000 (Primary care) and $344,000 (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 2010 and to $3,100 in 2019 (which was $2,600 in 2019$).
- 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.

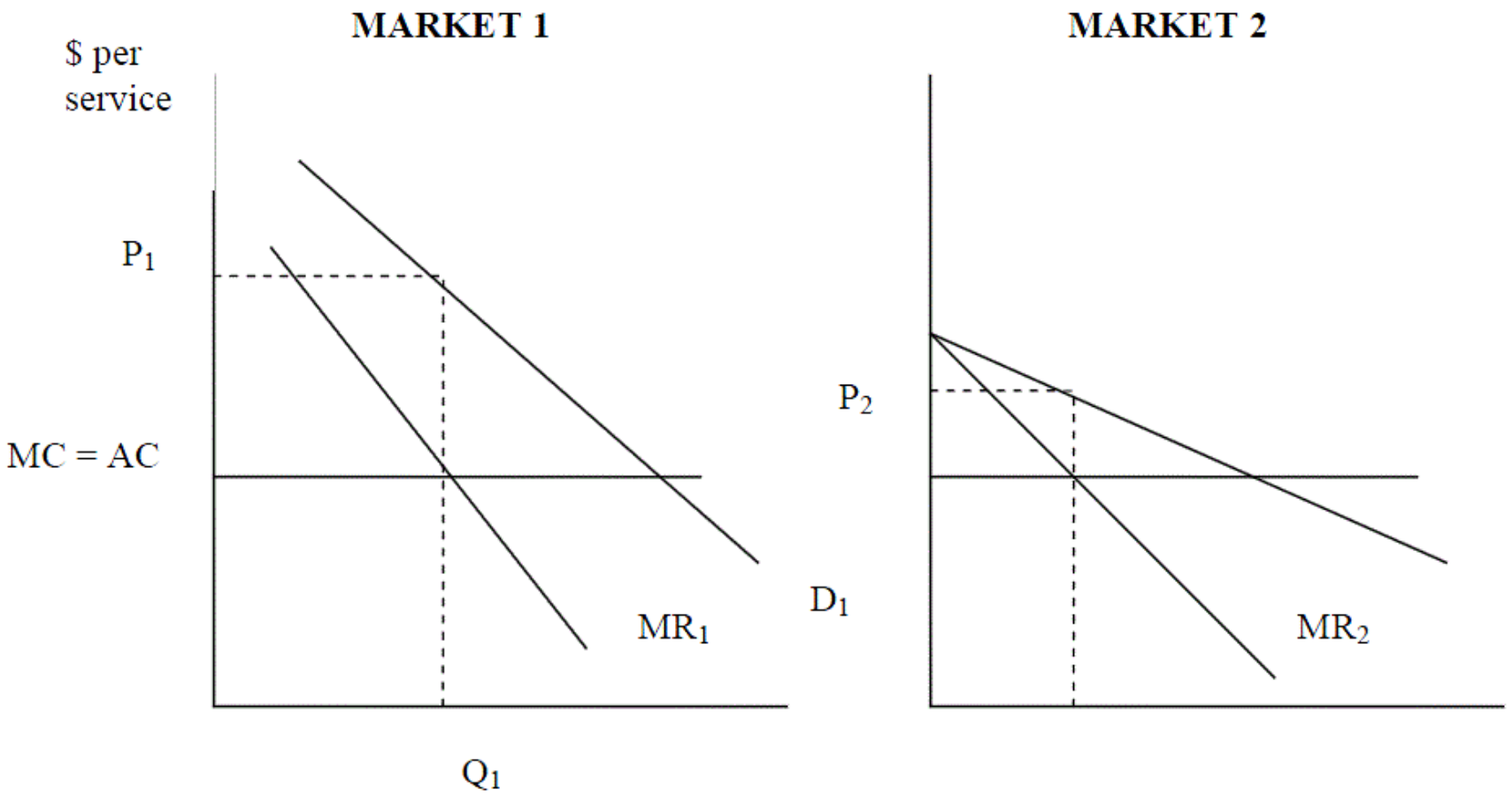
## Costs

- Viewed as excessive when patented, but patents needed to encourage R&D.
- Viewed as reasonable after patent has run out (exception is orphan drugs).
- 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.
- MRNA vaccines developed for Covid-19.
- Immunotherapy for cancer.

# 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.

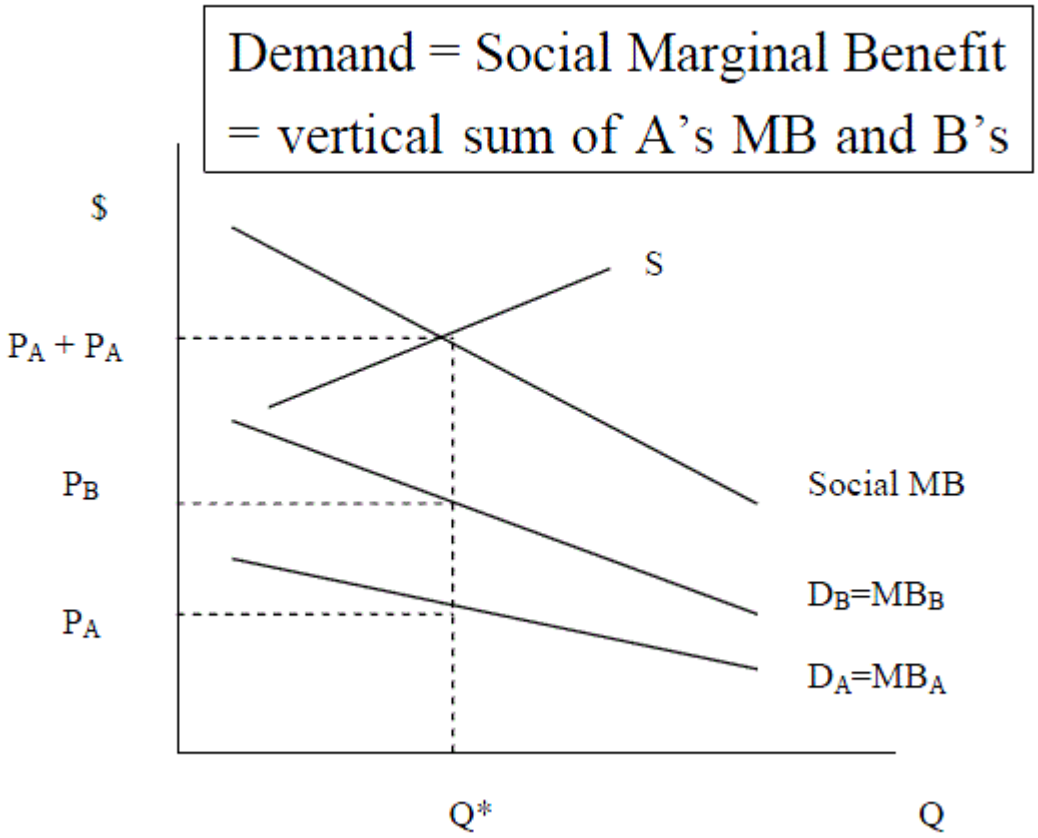
## Costs

- 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.

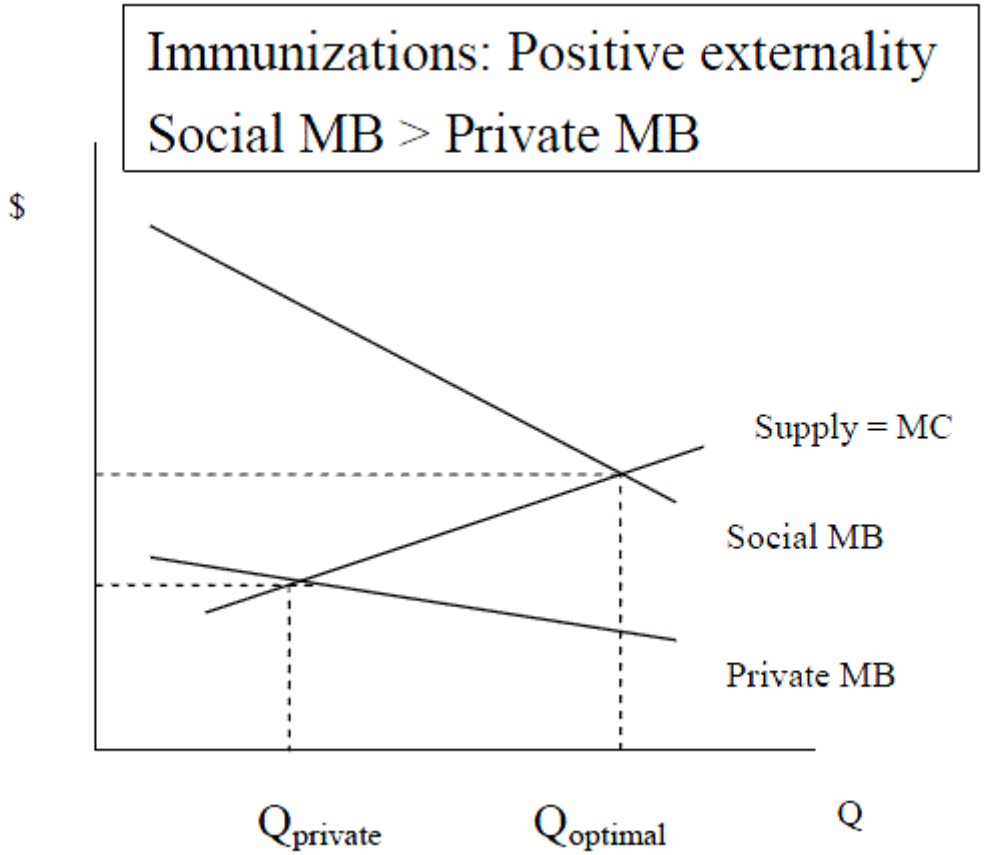
## Future

- 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.
- Cutler et al. (2022) find productivity improvements especially in cardiovascular disease.

# 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 currently covered

- 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).