



CHAPTER 21

Taxes, Social Insurance, and Income Distribution

Perfect Market Theory

Free markets with no government intervention are perfectly efficient under three general conditions:

- Perfect Competition – no increasing returns, many buyers and sellers, all are price takers, not price makers.
- Perfect Information – buyers and sellers know all they need to know about what they are buying and selling to make the right decisions.
- Complete Markets – no externalities or public goods, no transactions costs, “thick” markets.

When one of these three conditions are present, we have “Market Failure” and markets will not be perfectly efficient.

In theory, government intervention can sometimes correct market failures, but it can also create “Government Failure” by making things worse.

2

Government intervention in a capitalist market economy

- **Correcting Market Failures:** for example, regulating natural monopolies and industries with significant externalities (e.g., banking), enforcing antitrust policy, preventing fraud, taxing/subsidizing goods with negative/positive externalities, regulating use of common goods, et cetera.
- **Providing Public Goods:** legal system, police & fire, national defense, social insurance, et cetera.
- **Encouraging Social Cooperation:** the Prisoner’s Dilemma model.
- **Macroeconomic Stabilization:** monetary and fiscal policies (ECON 103).

3

U.S. Government Role in Allocation and Production

- Highways – Federal government provides grants to states.
- State production – limited to education, post, administration.
- Military – Federal government tends to be sole purchaser.
- State ownership – limited to public lands, military bases, government buildings.
- Police, fire protection, education, etc. mostly provided by states.
- Health care largely private (except for Medicare, Medicaid as single payers, V.A. as provider).
- Product Market Regulation – pricing (e.g., utilities), consumer safety.
- Environmental Policy – natural resource use, endangered species, air and water quality.

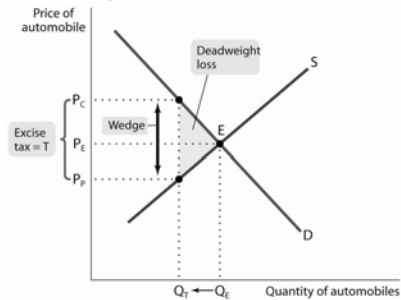
4

U.S. Government Role in Distribution

- Welfare reform in 1990s limited most poverty subsidies.
- Redistribution in-kind: public housing, food stamps.
- Social Insurance (Safety Net): Social Security, Medicare are “pay-as-you-go.”
- Limited unemployment insurance.
- Political preference for “tax expenditures.”

5

Deadweight Loss of a Tax



As a result of DWL, incentives are distorted and inefficiency arises: consumers consume less than is efficient and producers produce less than is efficient. In addition to deadweight loss, taxes typically incur **administrative costs**.

Taxes

- When markets are efficient, taxes (or subsidies) create a deadweight loss. Taxes might improve efficiency when markets fail, but with the information problem they might not.
- Nobody likes to pay taxes. Taxes are by necessity coercive, not voluntary.
- Taxes provide revenue to government, which can be used to provide public goods. "Taxes are the price we pay for a civilized society." -- Justice Oliver Wendell Holmes.
- Principal-agent problem suggests that we should be skeptical of people who are spending other people's money (whether it is a bank, a CEO, or a government official). Some governments may use taxes for their own benefit, or for inefficient purposes.
- There is thus a tradeoff between too little government and too much, but no certainty as to how much is the optimal amount.
 - Estimates range from 20% to 40% of GDP.
 - It depends on the type of expenditure and the type of tax.

7

Tax Policy

Tax policy always has two goals:

- **Tax Efficiency** - minimizes the costs to the economy of tax collection
- **Tax Fairness, or Tax Equity** - the "right" people actually bear the burden of taxes.
 - **Benefits principle** of tax fairness - those who benefit from public spending should bear the burden of the tax that pays for that spending.
 - **Ability-to-pay principle** of tax fairness - those with greater ability to pay a tax should pay more tax.

8

Equity versus Efficiency

A lump-sum tax (same for everyone, regardless of any actions people take) is efficient because it does not distort incentives, but it is unfair.

User fees may satisfy the benefits principle, but does not work with public goods.

Taxes that rise with income are more fair, but distort incentives.

In any well-designed tax system, there is a **trade-off between equity and efficiency** in devising tax policy.

9

Understanding the Tax System

- The **tax base** is the measure or value, such as income or property value, that determines how much tax an individual pays.
- The **tax structure** specifies how the tax depends on the tax base.
- Taxes are derived from many sources: income, payrolls, final sales, value-added, inventories, corporate profits, property value, and wealth, and specific markets (import duties, excise taxes).

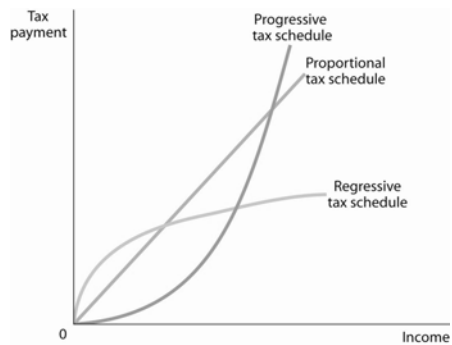
10

Tax Bases and Tax Rate Structure

- A **proportional tax** (flat tax) - the same percentage of the base regardless of the taxpayer's income or wealth.
- A **progressive tax** - a larger share of the income of high-income taxpayers than of low-income taxpayers. Often excludes lower-income taxpayers from paying any tax.
- A **regressive tax** - a smaller share of the income of high-income taxpayers than of low-income taxpayers.

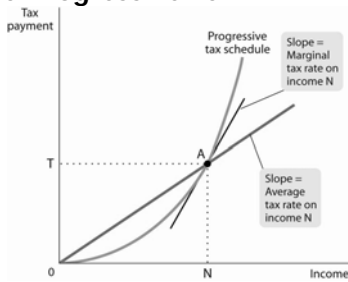
11

Proportional, Regressive, and Progressive Income Taxes



12

The Marginal Tax Rate vs. The Average Tax Rate for a Progressive Tax



For a progressive tax the marginal tax rate is greater than the average tax rate. As a result, progressive taxes result in reduced incentives for higher income people to work and invest compared to a proportional tax or a regressive tax.

Taxes in the United States

The United States has *a mixture of progressive and regressive taxes*, both because we have different levels of government and because different principles of fairness are applied to different taxes. However, the overall structure of taxes is progressive.

Revenue from Major Taxes in the United States, Fiscal Year 2002 (billions of dollars)

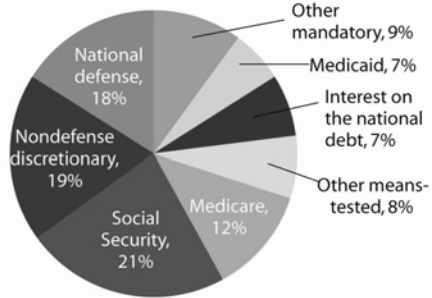
Federal	State and local
Income tax: \$858.3	Sales tax: \$333.5
Payroll tax: 700.8	Income tax: 200.7
Profits tax: 148.0	Property tax: 267.8
	Profits tax: 33.5

Source: Statistical Abstract of the United States, 2004.

U.S. Tax System

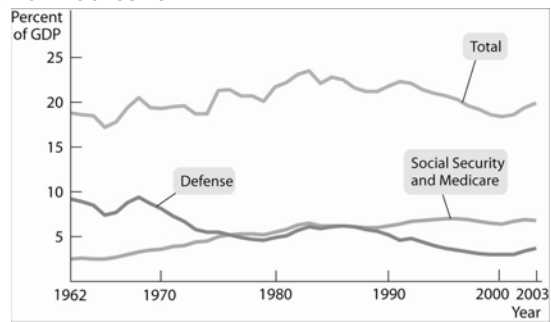
- Personal income tax, payroll taxes currently account for almost 90% of federal revenue.
- State and local governments depend mostly on property taxes, sales taxes.
- Redistribution of income – prior to 1964, 1981, 1986, income tax was significantly progressive.
- Currently, maximum federal tax rate < 40%, Social Security and Medicare contributions capped, some states have income taxes.
- Capital gains taxed at lower rate, double taxation of dividends.

Distribution of Federal Spending, Fiscal 2003



16

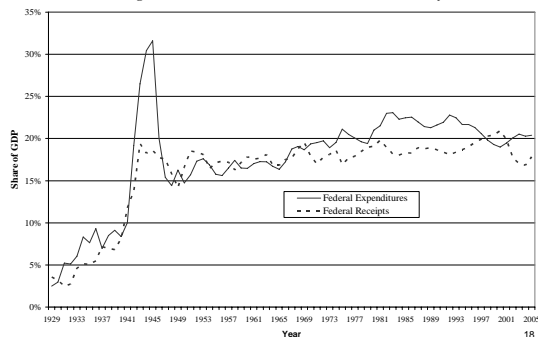
Total U.S. Federal Spending, Spending on Defense, and Spending on Social Security and Medicare



17

Longer View of the Federal Government's Size

Figure 1: Federal Government's Share of the Economy



18

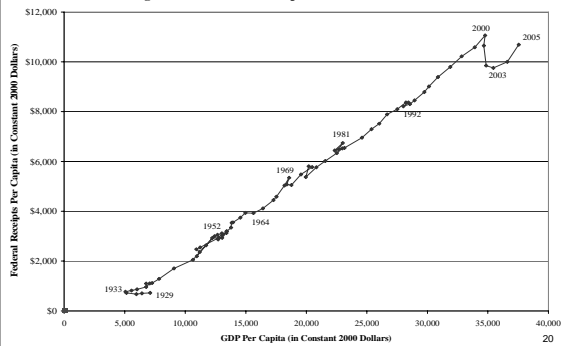
U.S. Government Spending over Time

Average Share of GDP	Total Federal Spending	Net State and Local Spending	Total Govt Spending	Total Govt Surplus
1929-1932	4.0%	7.2%	11.2%	0.4%
1932-1940	8.0%	7.2%	15.2%	0.0%
1941-1945	23.5%	4.2%	27.8%	-6.2%
1946-1950	16.2%	4.9%	21.1%	0.7%
1951-1960	16.6%	5.6%	22.2%	1.7%
1961-1970	17.8%	7.7%	25.4%	0.9%
1971-1980	19.9%	9.3%	29.2%	-1.3%
1981-1985	22.5%	9.7%	32.2%	-3.5%
1986-1990	21.8%	10.4%	32.1%	-2.7%
1991-1995	22.1%	10.9%	33.0%	-3.6%
1996-2000	20.0%	10.4%	30.4%	0.7%
2001-2005	20.1%	10.7%	30.9%	-2.4%

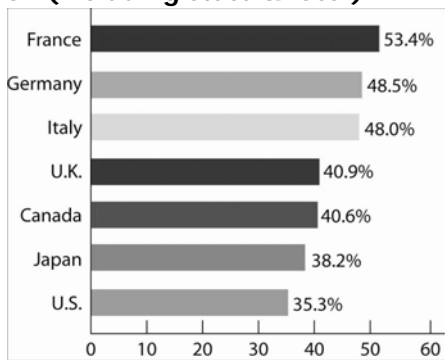
19

Taxes have risen with Income (until just recently) Tax Elasticity > 1

Figure 2: The Relationship between Income and Taxes

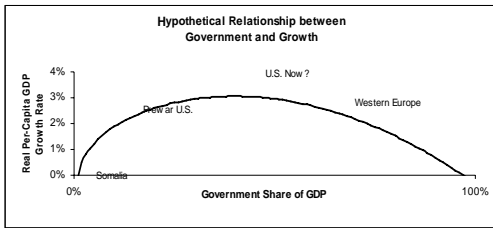


Government Spending as a Percent of GDP in 2002 (including state & local)



21

What is the relationship between government and growth?



The relationship between government and growth is probably shaped like an inverted U. Too much or too little government is bad for growth. It is not clear that the U.S. is on the downward-sloping portion.

22

Growth and Inflation by Period

Annualized Rates	Real GDP	Std. Dev.	Real GDP Per Capita	Inflation	Std. Dev.
1820-1910	3.9%	4.9%	1.5%	0.1%	6.6%
1910-1920	2.5%	6.5%	1.1%	8.0%	7.7%
1920-1930	2.7%	6.2%	1.1%	-2.1%	4.8%
1930-1940	2.7%	8.6%	1.2%	-1.6%	5.8%
1940-1950	5.5%	9.6%	3.3%	5.4%	4.0%
1950-1960	3.5%	3.1%	1.7%	2.4%	1.8%
1960-1970	4.2%	2.1%	2.9%	2.7%	1.6%
1970-1980	3.2%	2.6%	2.1%	7.0%	1.9%
1980-1985	3.2%	3.3%	2.3%	3.4%	2.6%
1985-1990	3.3%	0.8%	2.3%	2.7%	0.7%
1990-1995	2.5%	1.4%	1.2%	1.8%	0.6%
1995-2000	4.1%	0.7%	2.9%	1.3%	0.4%
2000-2005	2.6%	1.3%	1.5%	1.8%	0.4%

23

Defining Poverty

The **poverty line** is a minimum income that the government defines as adequate.

Families whose income falls below the poverty line are considered poor.

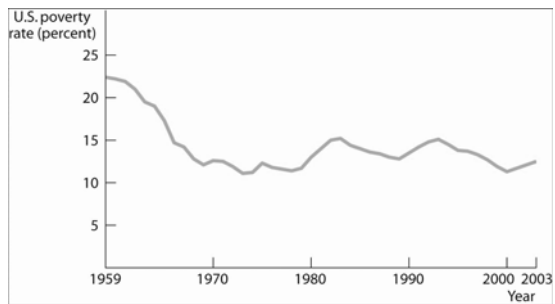
Trends in Poverty

The **poverty rate** is the percentage of the population living below the poverty line.

The following graph shows the U.S. **poverty rate** since 1959.

24

Trends in the Poverty Rate



25

The Origins and Consequences of Poverty

The most important factors contributing to poverty are

lack of education,
discrimination, and
adverse events.

26

Antipoverty Programs

Families below the poverty line receive three main types of government aid:

- **Welfare** is monetary aid to poor families.
- **In-kind transfers** provide poor families with specific goods and services.
- A **negative income tax** is a program that supplements the earnings of low income families.

27

The Big Debate: Taxes, Transfers, and Income Distribution

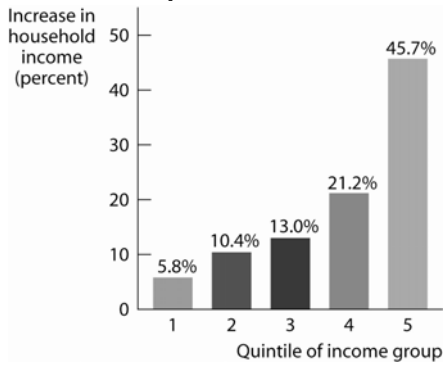
Income in the United States is quite unequally distributed among families, and this distribution has become more unequal in recent decades.

Share of Income and Federal Income Taxes, by Quintile, 2001

Quintile of income group	Percent of total pre-tax income received	Percent of total federal income tax paid	Percent of total payroll tax paid
Lowest	4.2%	-2.3%	4.2%
Second	9.2	0.3	10.3
Third	14.2	5.2	16.0
Fourth	20.7	14.3	25.6
Top	52.4	82.5	43.9

Source: Congressional Budget Office, 1979-2001

Percentage Increases in Household Income by Income Group, 1979-2002



29

The Politics of Equity and Efficiency

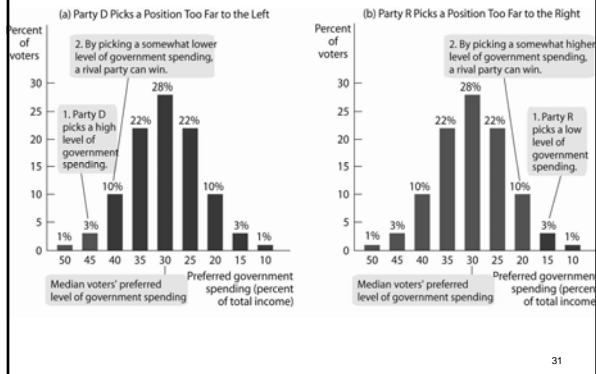
There are clear differences in the interests of different voters. Whose interests prevail?

In an election by majority rule where voters decide how much of a given policy action should be taken, the **median voter theorem** says that actual policies will most clearly reflect the preferences of the median voter.

An implication of the *median voter theorem* is that parties that compete for votes on how much redistribution to undertake will choose positions close to the preferences of the median voter. But in practice, parties' positions have not obeyed that result.

30

The Median Voter Theory



Condorcet's Voting Paradox

Persons 1, 2, 3 voting on outcomes A, B, C

- Person 1: $A > B > C$
- Person 2: $B > C > A$
- Person 3: $C > A > B$

Majority vote: $A > B > C > A$

- Majority voting is inconsistent, even cyclical

32

Is a better voting rule possible?

A social choice rule should be able to convert any set of individual preferences into a social choice ordering. This ordering should be:

1. Consistent: (a) transitive; (b) independent of irrelevant alternatives.
2. Decisive: (c) follows the Pareto rule. If A is preferred to B by at least one person and B is preferred by nobody, then society should prefer A over B.
3. Fair: (d) nondictatorial; (e) preferences are not imposed.

33

Arrow's General Impossibility Theorem

"If we exclude interpersonal comparisons of utility, then no social choice rule can satisfy these conditions." -- Kenneth Arrow

- ✓ No voting rule can be dependably consistent, decisive, and fair. (examples of majority rule, consensus, dictatorship).
- ✓ Society's choices are not reliably rational, even if everybody in society is rational and well-informed.
- ✓ Proof works by demonstrating how any coalition can be split on the right issue.
- ✓ We should take any claims that a party or position "represents the will of the voters" with a big grain of salt.

34

Madisonian Liberalism

- No method of voting can determine what society *most* prefers, because such a thing cannot be reliably determined.
- Madison recognized that decisions in democratic societies can be influenced by special interest group politics, demagogues, and uninformed voting.
- Nonetheless, voting serves as a check on power, preventing the outcomes that society *least* prefers.
- Democracy is "the worst system, except for all the others" -- Winston Churchill

35



CHAPTER 22

Technology, Information Goods, and Network Externalities

Technological Progress

- A society's production function can be written as:
 $Q = \text{Efficiency} \times f(\text{technology, labor, produced capital, human capital, natural resources})$
- Growth that comes from using more labor, produced capital, and natural resources is called extensive growth.
- Growth that comes from more efficiency, better technology, and human capital is called intensive growth.
- In poor countries, most economic growth appears to be extensive growth, and this is subject to diminishing returns and sustainability constraints.
Savings and investment, exploration, labor force participation
- In richer countries, most economic growth appears to be intensive growth, and this is more sustainable.
Education, incentives, research, and development

37

Technological Progress

- Basic Science
 - No direct application
 - Need for open communication
 - Pure public good -- subsidization may be necessary
- Invention vs. Innovation
- Research and Development
 - More direct application possible
 - New combinations of old and new ideas
 - Patents solve excludability problem by creating legal artificial scarcity
 - High fixed costs (falling ATC) → natural monopolies
 - Uncertain revenues → risk

38

Combinations Explode!

- Suppose that new products are created from different combinations of old ideas: $X = f(I)$.
 - If $I = 1$, then there is only one combination (1)
 - If $I = 2$, then there are three possible combinations (1, 2, and 1-2)
 - If $I = 3$, then there are seven possible combinations (1, 2, 3, 1-2, 1-3, 2-3, 1-2-3)
 - If $I = 10$, combinations > 1000
 - If $I = 20$, combinations $> 1,000,000$
 - If $I = 30$, combinations $> 1,000,000,000$

39

Technological Progress

- Schumpeter's "Creative Destruction" – a theory that entrepreneurs that can get access to start-up capital apply new ideas that create new industries that in turn attract more of society's resources, but this also destroys the old industries through competition for customers and resources.
- Technology widens the gap between the wages of skilled and unskilled labor, and labor that is skilled in new technologies versus old technologies.
- Market economies do a better job of encouraging change and rewarding successful entrepreneurship, but there are market failures too.

40

The Economics of Information Goods

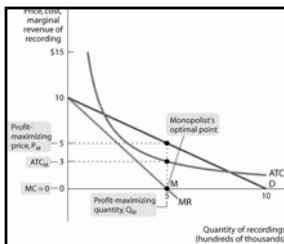
Information goods → products whose value comes not from their physical characteristics but from the information they embody.

Information goods have low marginal cost, however, because they have high fixed cost, they won't be created unless the producer can cover its cost of production by charging a price well above marginal cost.

Like monopoly, this leads to an inefficiently low quantity of output.

41

The Profit-Maximizing Quantity of an Information Good

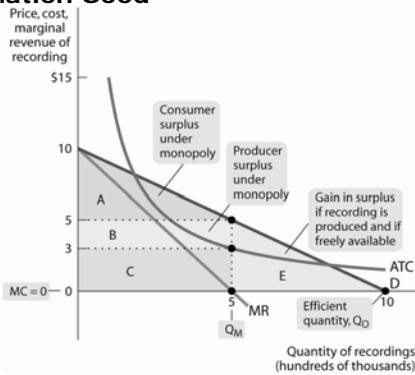


Demand for Recording		Production Cost of Recording		
Quantity of recordings demanded (hundreds of thousands)	Price of recording	Quantity of recordings produced (hundreds of thousands)	Fixed cost (millions)	Average total cost
10	\$10	0	\$1.5	—
9	9	1	1.5	\$15.00
8	8	2	1.5	7.50
7	7	3	1.5	5.00
6	6	4	1.5	3.75
5	5	5	1.5	3.00
4	4	6	1.5	2.50
3	3	7	1.5	2.14
2	2	8	1.5	1.88
1	1	9	1.5	1.67
0	0	10	1.5	1.50

A musical recording has high fixed cost and low marginal cost, a situation similar to natural monopoly. The profit-maximizing price, P_M is \$5, the average total cost, ATC_M is \$3, resulting in a per-unit profit of \$2.

42

The Problem of Achieving Efficiency with an Information Good



Pricing Problems for Information Goods

Information goods create a special tension.

Monopoly is a bad thing, other things equal; it is inefficient to charge a price that is above marginal cost. But the *expectation* of monopoly profits may be necessary to induce the company to produce the good at all.

→ This is more likely to be a problem when the outcome is uncertain. Firms might avoid risk by not investing in research and development, but if all firms become free riders then nobody invests.

→ A *temporary* monopoly may thus be the necessary price of progress.

Intellectual Property Rights in Information

A **patent** gives the right to exclude others from using (or selling, or importing) an invention, usually for 20 years from the filing date. The government provides a limited property right to inventors in exchange for sharing the details of their inventions with the public. Some firms may prefer to keep **trade secrets** so they don't have to share details.

A **copyright** similarly gives the creator of a literary or artistic work sole rights to profit from that work.

A **trademark** is a legal right to use a specific name or image.

These create temporary monopolies.

Network Externalities

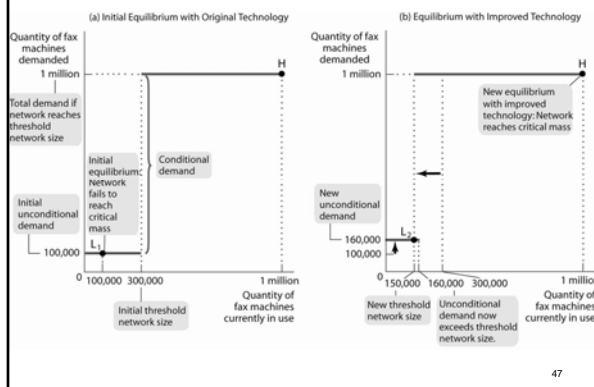
Many information goods are also characterized by **network externalities**: the value of the good to an individual is greater when a large number of people also use the good. e.g. fax machines.

Network externalities cause **positive feedback**, in which either initial success or initial failure is self-reinforcing.

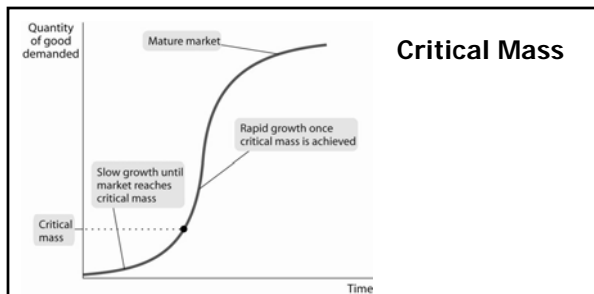
Threshold network size, critical mass, and tipping points

46

Network Externalities

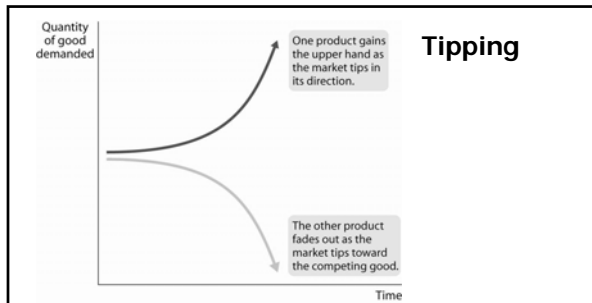


47



This figure illustrates how critical mass effects change the quantity demanded over time of a good with network externalities. The quantity demanded grows slowly until critical mass is reached; once reached the quantity demanded suddenly explodes.

48



This figure illustrates how tipping can affect the quantity demanded of two competing goods or technologies over time. The demand for one of the goods can suddenly explode as customers decide en masse to switch to that good and away from its competitor. Simultaneously, the demand for the competitor will suddenly fade.

**Policy Toward Information Goods:
Antitrust Policy and Setting Standards**

Information goods pose difficulties for antitrust policy because firms investing in new technologies may be engaging in aggressive tactics to establish monopolies, tactics that may or may not be legal.

To facilitate network externalities, industries can coordinate on **standards** that let competing goods work together.

Government can play a useful role both in helping an industry establish a standard and in helping it avoid getting trapped in an inferior standard, known as the **QWERTY problem**.

**I hope you enjoyed the class, and
learned something useful.**

**The Review is Wednesday, May 7
9:00-10:30
AB 107**

**The Final is Monday, May 12
9:45 – 11:45 AM
This Room**
