



CHAPTER 12

Factor Markets and the Distribution of Income

1

What are Factors of Production?

- **Capital –**
 - Produced, productive assets.
- **Natural resources (rents)**
 - Land, mineral rights, et cetera.
- **Entrepreneurship and management**
 - Risk-taking usually connected to capital investment.
 - Management usually the agent of owners.
- **Labor (wages)**
 - includes time, effort, and skills
 - Skills and ability can be called “Human Capital”

2

Capital

- **Capital – produced and productive assets**
 - Capital includes factories, machinery, housing, etc.
 - Financial capital (paper wealth) includes rights to income produced by real capital.
 - Capital is very specific to firm, and usually the residual claimant (profits).
 - When capital is purchased, this is investment. When capital is consumed through use, time or obsolescence, this is depreciation.

3

Firm Structure

In the U.S., most firms are privately-owned, and there are three basic types:

- Sole proprietorships ~ around 80% of firms, 10% of sales.
- Partnerships ~ around 10% of firms, 10% of sales.
- Corporations ~ around 10% of firms, 80% of sales.

4

Corporations

- Pooling funds from multiple owners requires some protection
- Limited liability – owners can't lose more than financial investment in firm
- Legal personhood – can survive owners, appoint officers, sign contracts, pay taxes, be sued, et cetera.
- Ownership divided into shares of stocks – if public, may be traded or sold.
- Owners receive dividends: net profits minus taxes minus corporate savings, divided by the number of shares.
- Leveraging – owners may rely in part on debt instead of equity, which increases risk and return for owners.

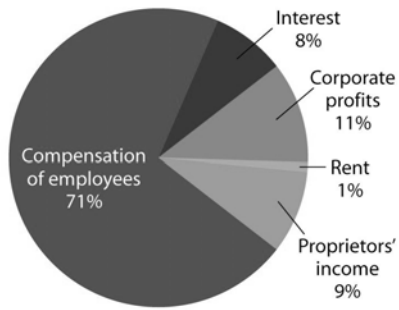
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Derived Demand and Income

- Factor markets are said to come from **derived demand**.
 - This means that demand for factors is created by the output choices of firms.
- Income is earned from firms purchasing these factors.
 - By far, the most important factor is labor.

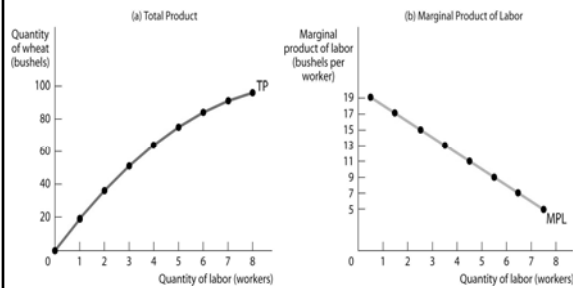
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Factor Distribution of Income in the United States in 2003



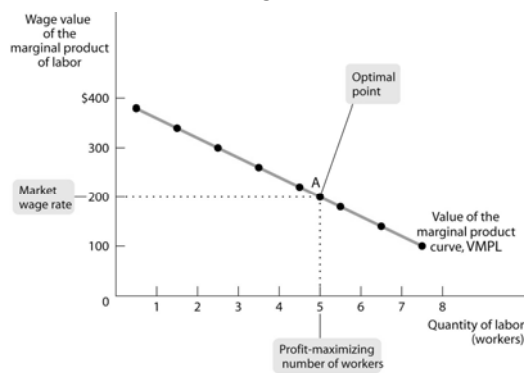
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The Production Function for George and Martha's Farm



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The Value of the Marginal Product Curve



9

Equilibrium in the Labor Market

Each firm will hire labor up to the point at which **the value of the marginal product of labor is equal to the equilibrium wage rate.**

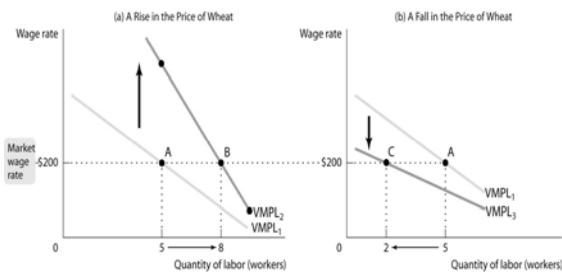
$$P \cdot MPL = W$$

In a competitive equilibrium, the marginal product of labor will be the same for all employers – assuming we are talking about the same type of labor, of course.

So the equilibrium (or market) wage rate is equal to the **equilibrium value of the marginal product.**

10

Shifts of the Value of the Marginal Product Curve



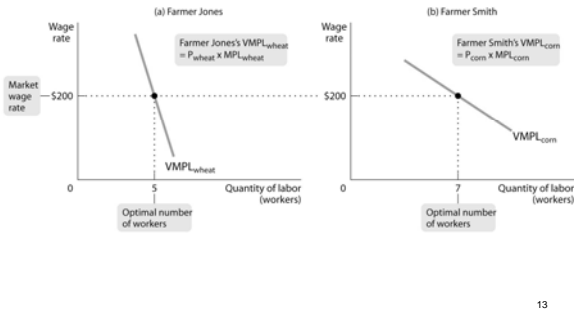
11

Labor Demand

- A firm's labor demand will rise if the firm's output price rises.
- A firm's labor demand will rise if workers become more productive.
- An increase in the use of other factors – through investment in capital, or access to more natural resources – also affects labor demand:
 - If factors are complements, labor demand rises.
 - If factors are substitutes, labor demand falls.
- Similarly, the prices of other factors affects labor demand.

12

All Producers Face the Same Wage Rate, even if their productivities differ.

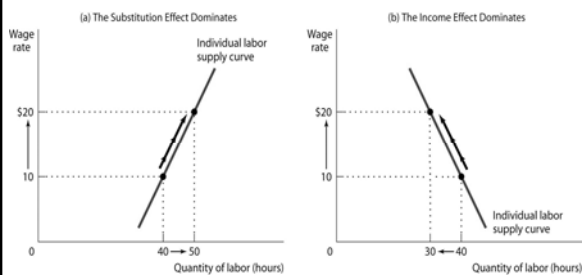


Labor Supply?

- An individual's labor supply is derived from the tradeoff between leisure and other goods.
- Higher after-tax wages have a substitution effect – leading to less leisure (more labor) – and an income effect, leading to more leisure (less labor) if leisure is a normal good.
- In the simple model, the budget line is:
 $G = (T-L) \times W/P$, where $H = T-L$.
- We rotate the budget line, and find the new indifference curve tangency.
- Market labor supply is the horizontal summation for all individuals for a particular type of labor.

14

The Individual Labor Supply Curve



If the income effect dominates, a rise in the wage rate can actually cause the *individual labor supply curve* to slope downward!!!

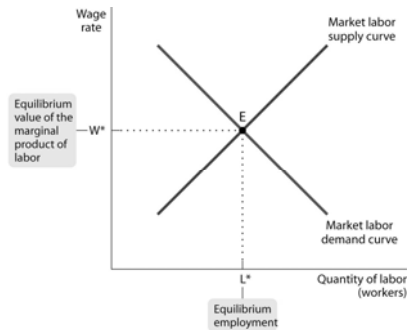
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The Market Labor Supply

- The labor supply for an individual may be upward-sloping, but it also may not be.
- The labor supply for the entire economy may be upward-sloping, but it also may not be.
- The labor supply curve for a specific firm or market will be upward-sloping, since the substitution effect will dominate. Workers will switch from other firms or other markets for higher wages.

16

Equilibrium in the Labor Market



17

Competitive Labor Equilibrium

- In a competitive labor market equilibrium with perfect information, the labor market always clears.
 - Everyone willing and able to work at the current market wage rate can get a job.
 - Everyone selling the same type of labor will sell at the same market-clearing wage.
 - Wages include money wages as well as benefits.
- What accounts for unemployment?
- What accounts for wage disparities?

18

Marginal Product Theory of Income Distribution

- If markets are perfectly competitive, then an individual's income depends on two things:
 - what you brought to the market, your labor, your capital, and your other productive assets.
 - how the market valued it (the price of the good times the marginal product of the resource).
- This might be considered "fair" if the ownership of capital and other resources was dependent only on the individual's own past efforts and good decisions, and if individuals had perfect information about the future.
- If markets are not perfectly competitive, however, or if other market failures are present, or even if government intervention favors some individuals over others, then the outcome might be very far from what we consider "fair."

19

Unemployment

- In a free and competitive labor market equilibrium with perfect information, unemployment is either temporary – until the market adjusts to the new equilibrium – or voluntary.
- If involuntary unemployment exists, this is either because the market is not free – government may regulate the level of wages and benefits – or because of market failure.
- Some workers may have low productivity, or require excessive management, so a minimum wage may lead to unemployment.
- Payroll taxes create a tax wedge, which can reduce employment if supply is upward-sloping, but this would not cause involuntary unemployment.

20

Market Failure in the Labor Market

- Some workers may have such low productivity that when we add in the cost of management the marginal product is negative. Market-clearing may then be impossible at any positive wage.
- Imperfect competition in firms may lead to less demand and lower wages.
- Imperfect competition by workers (i.e., unions) may lead to higher wages and involuntary unemployment.
 - Unions may also lower wages in non-union sectors.
 - If both are present, however, unions may offset the power of noncompetitive firms and reduce inefficiency.
- Imperfect information may lead firms to not be willing to hire productive workers, or to pay them more than market-clearing to motivate them.

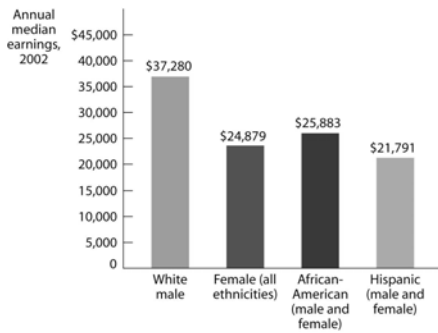
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Wage Disparities

- Different people may have different levels of human capital – due to investment in education, experience, et cetera – and this would cause wage disparities.
- Different jobs may have different conditions (e.g., garbage collection vs. clerical work), leading to compensating differentials.
- Without perfect information and competition, workers may take jobs at lower wages than they could get elsewhere, or firms might more than they must.

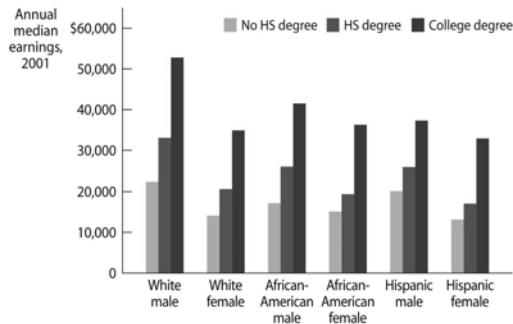
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Wage Disparities in Practice



23

Earnings Differentials by Education, Gender, and Ethnicity, 2002



24

Discrimination in Efficient Markets

- When scarcity is present, there must be some form of rationing. Markets use price rationing.
- Discrimination implies that people make judgments not based on price, but on some other basis like race, ethnicity, gender, sexual orientation, height, attractiveness, religion, or whatever.
- If markets are working, then discrimination is costly – to both employers and to customers.
 - Some people may have a preference to hire, work with, or buy from people like them. If so, then they may be willing to pay higher wages (or higher prices) for these preferences.
 - Weak preferences can result in surprising and significant results → Schelling's checkerboard
 - If markets are not clearing, then discrimination is relatively costless.

25

Legal Discrimination

- Discrimination often results not from free markets themselves, but from government regulation:
 - Apartheid in South Africa – raising wages for white workers, who voted for the Nationalist Party.
 - Jim Crow Laws in South.
 - Immigration policies.
 - Political pressure for discriminatory laws comes from other workers, not employers.

26

Imperfect Information can lead to Inefficient Discrimination

- Discrimination is often based on imperfect information, which can be thought of as mere ignorance but can also lead to a self-fulfilling prophecy.
- One form of discrimination is often called "statistical discrimination," and a good model of it works like this:
 - 1) Assume there are two types of people, Purple and Green (or whites and blacks, Chinese and Malays, Protestants and Catholics, Mormons and Gentiles, thin people and fat people, whatever).
 - 2) Assume that it is costly for any worker to acquire work skills (e.g., the cost of education), and only a permanent skilled position makes it worthwhile.
 - 3) Assume that employers care only about profit, and do not care about Purple/Green differences.

27

More Assumptions of the Purple/Green Model

4) Assume there are two types of jobs, skilled and unskilled. Hiring a skilled worker for a skilled job benefits both the worker and the employer, and hiring an unskilled worker for an unskilled job benefits both the worker and the employer. A skilled worker is worse off if he has an unskilled job because his education was expensive, and an employer is hurt if he hires an unskilled worker for a skilled job.

5) Assume Purples have *historically* had better job skills, better education, et cetera, so they are on average more productive. Employers tend to be purple. Maybe this is because there was *legal* discrimination in the past.

28

Implications of the Purple/Green Model

➤ Who gets which kinds of jobs? What happens to skilled Green workers?

➤ Who acquires work skills? Do Green workers get educated?

This is a self-fulfilling prophecy. Discrimination continues even once legal discrimination is gone, and even if nobody wants to discriminate any more.

➤ How do you fix it?

➤ What if unskilled green workers get skilled jobs?

➤ What if skilled purple workers get unskilled jobs?

➤ What if skilled green workers are given a chance to get skilled jobs, so that young greens believe that it is worthwhile to get educated?

29



CHAPTER 13 Efficiency and Equity

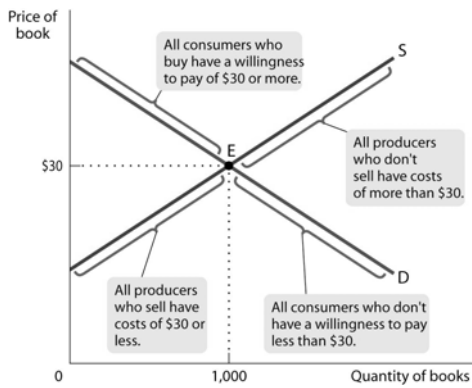
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What you will learn in this chapter:

- **Efficiency in consumption, efficiency in production, and efficiency in output levels**
- A perfectly competitive market achieves efficiency in all three components
- An economy consisting of many perfectly competitive markets is typically, but not always, efficient
- The limits of efficiency

31

Why a Market Maximizes Total Surplus



32

Efficiency in the Economy as a Whole

When prices perform properly as economic signals, a *complete and competitive market economy in general equilibrium* is efficient.

➤ efficient in consumption:

MRS = Relative Price, for all goods and consumers.
(tangency of budget line and indifference curve)

➤ efficient in production:

VMPL = W for all workers and all firms, and all resources too.
(production point is on the PPF)

efficient in output levels:

MC = P for all goods and all firms.
(producing on the "right" point on the PPF)

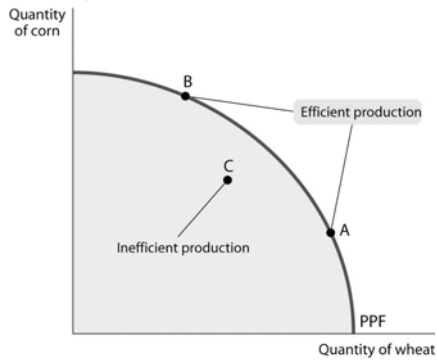
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How to get Consumption Efficiency?

- Consumers maximize their utility. This implies that the marginal utility per dollar is the same for all goods they consume, so that:
 - $MU_X / P_X = MU_Y / P_Y$ for all possible X, Y goods.
- Consumers compete with each other, know what they are buying, and pay the same prices for the same goods.
- For each consumer the optimal point is where the indifference curve is tangent to the budget constraint, so that the marginal rate of substitution (the relative marginal utility of the good on the horizontal axis) is equal to the relative price of that good.
- That is:
 - $MU_X / MU_Y = P_X / P_Y$ for all possible X, Y goods, and all consumers.

34

The Production Possibility Frontier and Efficiency in Production

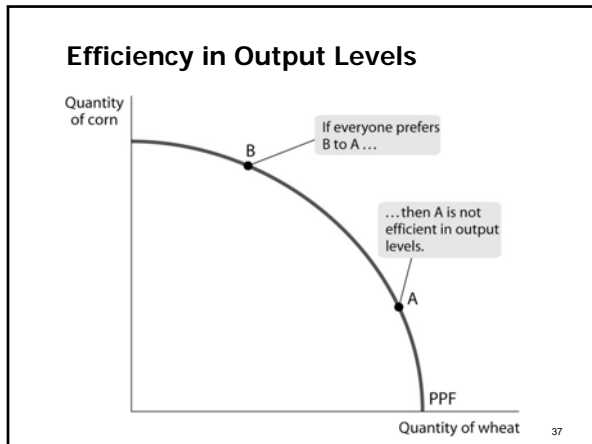


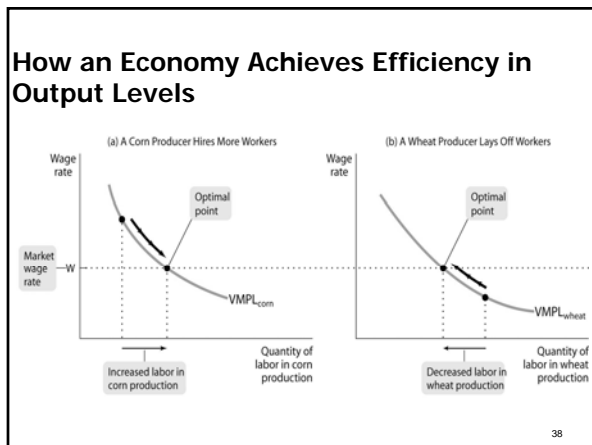
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How to get Production Efficiency?

- Suppose the value of marginal product for labor is \$30 in industry A, and \$20 in industry B. Moving one unit of labor from B to A would increase total value by \$10.
- Suppose the VMP of labor is 300 units of Industry A output and 400 units of Industry B output ($P_A=0.10, P_B=0.05$), while, the VMP of capital is 1200 units in A and 800 in B. If you could trade one unit of capital in B for two units of labor in A, production of A would rise by $1200 \cdot 2 = 2400$, and production of B would stay the same ($2 \cdot 400 = 800$).
- Production efficiency thus requires that the value of marginal product of any factor be the same for all firms and industries. It implies that we are using comparative advantage in resource allocation.
- So:
 - $P_X \cdot MP^i_X = P_Y \cdot MP^i_Y$ for all possible X, Y goods and all possible i factors.
 - $MP^i_Y / MP^j_X = MP^i_Y / MP^j_Y$ for all possible X, Y goods and all possible i, j factors.

36



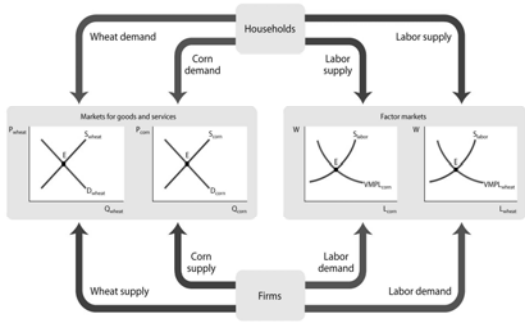


How to get the optimal output level?

- Firms hire their inputs until the value of marginal products equals the price of the input.
- Firms then sell their outputs until the output price equals their marginal cost.
- The slope of the PPF is the relative marginal opportunity cost of the good on the horizontal axis (this is called the marginal rate of transformation). The optimal point on the PPF is therefore the tangency of the PPF to a downward-sloping line with a slope equal to the relative price of the good on the horizontal axis. That is:
 - $MC_X / MC_Y = P_X / P_Y$ for all possible X, Y goods.

39

Efficiency in Output Levels in a Circular-Flow Framework



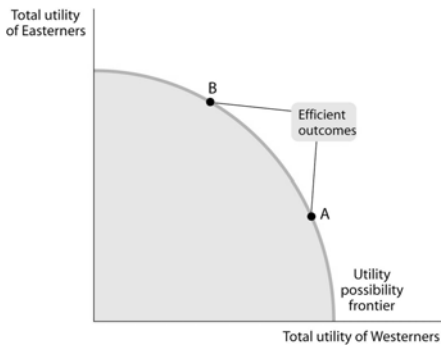
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Efficiency

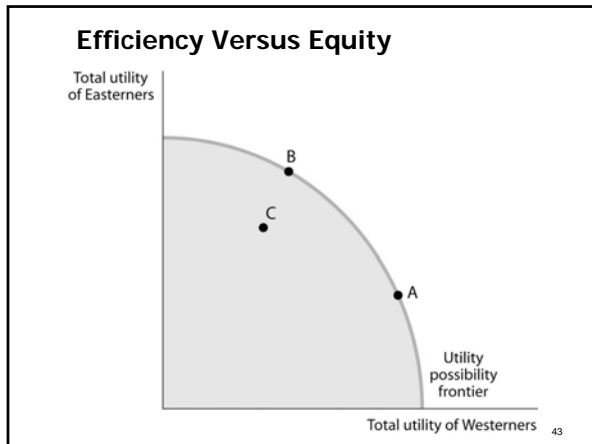
- Efficiency means the maximization of total value produced from scarce resources.
 - Relative index = total output value/total input value
- Not just short-run: maximizing the net present value into the infinite future.
- Not just monetary goods: nonmarket goods also create value, and use scarce resources.
- Efficiency is about maximizing the total value of output, but says very little about who gets it.

41

The Utility Possibility Frontier



42



How to compare?

- We can say that points B and A exhibit efficient production, though we don't know enough yet to say if they are efficient in consumption and output mix.

Theoretical Efficiency of the Market

Two Major Contributors:

- Alfred Marshall – *partial* equilibrium, competitive markets, and efficiency.
- Leon Walras – competitive *general* equilibrium conditions, for n markets that are inter-related:
 Find a set of prices $P = [p_1, p_2, p_3, \dots, p_n]$, such that for each and every one of $i = n$ markets,
 if $p_i > 0$, $q_s = q_d$;
 if $p_i = 0$, $q_s \geq q_d$;
 Only $n-1$ prices are necessary, since prices are relative.

Pareto Optimality

- If we can make a change from the current state that makes one person better off without making another person worse off, then this is a Pareto Improvement.
- Any mutually beneficial trade makes a Pareto Improvement, as long as there is no externality.
- If all such possible trades are made, and a Pareto Improvement is no longer possible, then the current state is Pareto Optimal (or Pareto Efficient).
- But what if you could make one person a lot better off only by making somebody else a little worse off?

46

Kaldor's Compensation Criterion

- Suppose winners could afford to compensate losers?
- Suppose there are only two possible economies. In Economy A, 51 people have two cookies each. In Economy B, 50 people have only one cookie each, but one person has 100 cookies. Which is more efficient?
- Kaldor said that compensation has to be potential, not actual.
- If it were actually done, only Economy B would be Pareto Optimal.
- Pareto Optimality under the Kaldor Compensation Criterion is thus a definition of maximum possible efficiency.
- Compensation may be potential in the Kaldor Criterion, but for it to really happen would require perfect information, which we don't have, and a government to enforce it.

47

The "Perfect Market" 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, including information about the characteristics of future risk.
- **Complete Markets** – there is a market for every possible transaction that could create gains from trade. No externalities, no public goods, no transactions costs, "thick" markets, et cetera.

48

The Existence Theorem

Just like it can be shown in partial equilibrium that there is at least one price that equates quantity-supplied and quantity-demanded (except when the good is “free”), it can be mathematically proven that:

There is at least one set of relative prices that would cause a Walrasian competitive general equilibrium.

Reaching it, however, implicitly requires both perfect information and perfect competition.

49

The Efficiency Theorem

Just like it can be shown in partial equilibrium that there the competitive market price maximizes total value (if there are no externalities), it can be mathematically proven that:

If markets are complete, any competitive general equilibrium is Pareto Efficient, even under the Kaldor Compensation Criterion.

Perfect markets are therefore perfectly efficient.

50

Perfect free markets are perfectly efficient, but are free markets ever perfect?

- All inefficiency thus must come from violation of the three perfect market conditions. That is the real world.
- Few markets meet the conditions for perfect markets in partial equilibrium, and the economy is certainly not perfect in general equilibrium. A free market economy is therefore not perfectly efficient, though it may be *relatively* more efficient than the alternative.

51

Redistribution

- Under competitive market conditions, income distribution depends on the ownership of resources.
- It is theoretically possible to redistribute income under perfect free markets by redistributing resource ownership, and then letting the market take over allocate resources and distribute goods.
- Of course, to *actually* redistribute resources without interfering with market prices would require perfect information, which we don't have, and a government to do it.

52

What comes next?

- After the second exam, we will begin to cover market failures:
 - Imperfect competition: monopoly, et cetera.
 - Incomplete markets: externalities, public goods, natural resources and common goods, et cetera.
 - Imperfect information: adverse selection, the lemons market, et cetera.
- We will also focus more on the potential effects of government intervention, both positive and negative.

53
