

Price Theory  
**Lecture 1: Basic Notions and Concepts**

**I. What Is Economics?**

Economics: the study of choice under conditions of scarcity. This definition requires some unpacking, to be more precise about the notions of choice and scarcity.

Microeconomics: the branch of economics that deals with the choices of individuals and firms, and how those choices interact to produce social outcomes.

**II. Scarcity**

Scarcity: a situation in which the amount of something available is insufficient to satisfy everyone's desire for it.

Applies most obviously to resources of a material variety (timber, ore, grain, etc.), but also applies to:

- Time (only so much time for sleeping and studying)
- Labor services (only so many workers with so many hours to spend)
- Energy (in the broadest sense – you only have so much energy to expend)
- Space

In short, scarcity is a ubiquitous phenomenon.

Scarcity implies the need to make trade-offs: giving up one thing in order to get another.

- Personal trade-offs (you give up apartment space in return for more spending money)
- Interpersonal trade-offs (resources spent on one person's project are unavailable for others' projects)

A market economy typically uses prices to signal scarcity. A more scarce resource will tend to have its price bid up by people competing to use it.

**III. Opportunity Cost**

The notion of choice involves both selecting and setting aside.

The term "cost" is used casually in a variety of ways, but economists attach a special meaning to it; generally, they mean opportunity cost, which refers to that which is set aside in the act of choice.

Opportunity cost: the opportunity cost of any choice is [the value of] what we give up when we make that choice. More specifically, it is what you could have gotten with the scarce resources used or otherwise given up for one's choices. Alternative definition: the value of the next best alternative sacrificed when taking an action.

Example: Going to a movie. Is the cost just the \$9.00 to get in? No – it’s also the cost of getting there (taxicab, your own car’s gas) and the time taken. To find the true cost, we’d have to consider what could have been done with both the money and the time – say, buying a CD and studying some more.

Example: Running a sandwich shop. Suppose you run this shop and make total weekly revenues of \$2000, with weekly labor, food, and rent totaling \$1500. Are you making a profit? What if, instead of running the shop, you could have worked for someone else and gotten paid \$800? This forgone payment is part of the opportunity cost of running the shop, and it should be added to the \$1500 to get a total cost of \$2300. Since this is greater than your \$2000 in revenue, you are making an economic loss, not an economic profit.

Example: During the Superbowl, the network airing the game shows lots of advertisements for its own television shows. Is the network that airs the game lucky because it gets free air time that other advertisers have to pay \$1 million a minute for? No, because the network sacrifices revenues whenever it uses air time for its own advertising instead of paid advertising. The opportunity cost is whatever they could have gotten paid. Of course, it's probably worth it; obviously the network thinks so.

Note: If you have more than two other options available to you, the opportunity cost of your choice is equal to the value of the better forgone option.

Example: Two companies, Guinness and Sam Adams, wish to buy advertisement time during the Superbowl. The network uses the time to advertise its primetime line-up instead. Guinness would have paid as much as \$800,000, and Coors would have paid up to \$700,000. The opportunity cost is \$800,000.

In all the examples thus far, the alternative activity involved only *benefits* that would be forgone. But often the alternative activity involves *costs* that would be forgone as well. (Note that I’m using “cost” here in the traditional sense, not in the economic sense of opportunity cost.) The value of the alternative activity, then, is the *net* of its benefits and costs.

Example: Suppose you have a free ticket to see Eric Clapton (which you cannot resell). Going to the concert would be worth \$30 to you. But on the same night, Bob Dylan will be performing. Going to see Bob Dylan would be worth \$50 to you, but you’d have to pay \$40 for the ticket. What is the opportunity cost, and which show should you see? Answer: By choosing to see Clapton, you forgo a benefit of \$50 but also a cost of \$40, for a net forgone value of \$10. So \$10 is the opportunity cost. Since seeing Clapton is worth \$30, which is greater than \$10, you should see Clapton.

But there is often more than one way to calculate opportunity cost. This is because the benefit of one activity is the cost (forgone benefit) of another activity, and the cost of one activity is the benefit (forgone cost) of another activity.

Example: Same as above. But notice that the \$40 cost of buying a Dylan ticket is a benefit of seeing Clapton instead. So an alternative way to solve the problem is to add that \$40 to the \$30 benefit of seeing Clapton, for a total benefit of \$70. The opportunity cost is \$50, the value of seeing Dylan. Since \$70 is greater than \$50, you should see Clapton.

Notice that the answer to the important question – which concert to see – is the same regardless. The question of whether the opportunity cost is \$10 or \$50 is semantic; it depends on whether you define it as the *gross* value of the next best alternative or the *net* value of the next best alternative. There is some debate among economists on this point, but all good economists will get the right answer to the question of which concert to attend! In this class, we will define opportunity cost as the *net* value of the next best alternative.

The main lesson of opportunity cost is that the cost of doing something is not only the money that must be spent, but also what you could have done instead. In the Clapton/Dylan example, the explicit payment to see Clapton is \$0, but that doesn't mean there's no cost to seeing Clapton! The cost is not seeing Dylan.

For the remainder of this course, whenever we use the term cost, you should remember that we're talking about opportunity cost. Opportunity cost can be divided into two parts, implicit and explicit costs.

Explicit cost: costs that require a monetary payment.

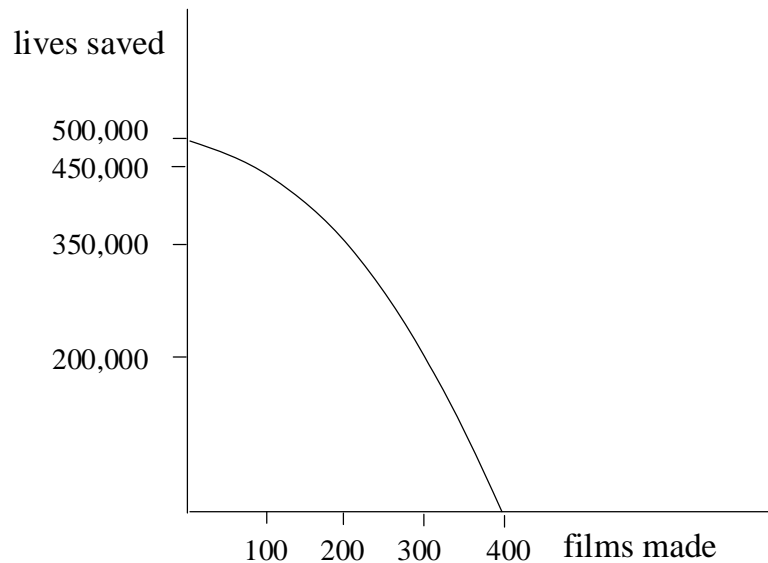
Implicit cost: costs that do not require a monetary payment. Implicit costs often (but not always) involve forgone payments -- that is, payments you could have received if you had made a different choice.

#### **IV. Production Possibilities**

On a social or aggregate level, scarcity of resources implies the existence of trade-offs between different uses of those resources.

We can summarize these trade-offs with a diagram of the Production Possibilities Frontier. This is a curve representing all combinations of two goods that can be produced with given resources and technology.

The figure below is a PPF for a society that has only two industries: film and healthcare. The output of these industries is measured in lives saved and films made.



Some things to observe about this graph:

- Downward-sloping curve implies trade-offs.
- Movements along the curve can be used to show opportunity costs. For example, the choice to move from A to B (producing 100 more feature films) is 50,000 lives not saved.
- Outward-bowed shape illustrates the law of increasing opportunity cost. The law of increasing opportunity cost says that the more you are doing of an activity, the greater is the added cost of doing yet more. In the diagram above, notice that to get the first 100 films, you only give up 50,000 lives. The next 100 films require 100,000 lives; the next 100 films require 150,000 lives. Why? Because some resources are better suited to one activity than another. So the more of something you do, the more unsuitable resources you have to use. (Imagine drawing brilliant surgeons into the film industry, or training Oliver Stone and Kevin Costner to be surgeons.)
- Technical inefficiency is illustrated by points inside the PPF, from waste or misused resources.
- Technical inefficiency is illustrated by points inside the PPF. If you're at any point inside the PPF, you can move upward or rightward to produce more of one good without producing less of the other. This means resources are currently being wasted or misused. Technical efficiency exists when you cannot produce more of one good (or activity) without producing less of another good (or activity), and this is true of any point on the PPF curve. Technical inefficiency exists if you could produce more of one good without producing less of another, and this is true of any point inside the curve.

A change in the resources or technology available to society would shift the PPF. An increase in resources (say, labor) would shift the whole curve out. An improvement in film technology, without an improvement in medical technology, would shift the PPF outward, but the endpoint on the lives saved axis would stay fixed. The new PPF would be flatter than the old one. An improvement in medical technology, without an

improvement in film technology, would shift the PPF outward, but the endpoint on the films made axis would stay fixed. The new PPF would be steeper than the old one.

## V. Preferences and Subjectivity

Economists work on the assumption that people have preferences that they act to satisfy. They can say, “I like this better than that.” They can compare situations and alternatives, and say which they consider to be better. We’ll talk later about the properties we think people’s preferences have.

The preferences people have differ across individuals, and we don’t have an objective means of saying whose preferences are “correct.” This is the concept of subjectivity – which essentially means “personal” or “individualized.”

The concept of subjective preferences is important because, in modern economics, we use the subjective theory of value, which says that the value of goods – the price they command on the market – is determined by consumers’ subjective preferences for those goods.

Up through the 1870s, just about all economists (including both Adam Smith and Karl Marx) subscribed to the labor theory of value, which says that the value of a good was equal to the amount of labor that went into producing it.

Example: Adam Smith’s story of beavers and deer. If it took 2 hours of labor to catch and prepare a beaver, and it took 3 hours of labor to catch and prepare a deer, then 3 beaver should trade for 2 deer. Or, the price of a beaver should be  $\frac{2}{3}$  that of a deer because it required only  $\frac{2}{3}$  as much labor.

The problem with the labor theory of value is that it’s manifestly untrue in some cases. People may spend much labor on something that no one wants – say, really bad artwork. Also, the labor theory of value cannot explain the market value of labor itself, the wage. The labor theory of value is no longer used by economists. Now we understand that the price a good commands depends crucially on people’s taste for it. Even the price (or wage) of labor depends on how much it contributes to producing things that people want.

## VI. Rationality

Economists typically use a “rational choice” model of human behavior.

Rationality does not mean exactly the same thing in economics as it does in everyday language. In economics, rationality means that people choose means that are appropriate to their ends. They try to do as well as they can, subject to constraints.

N.B.: Rationality is not used by economists to judge people’s ends, i.e., their preferences.

In short, rationality is not about ends, but about the relationship between means and ends. However, economists sometimes use rationality in a somewhat narrower sense, to describe certain assumptions we make about people's preferences. Specifically, it refers to people's preferences being internally consistent (e.g., I don't simultaneously prefer A to B and B to A). But even here, rationality does not involve any kind of value judgment.

## VII. Costs, Benefits, and Marginal Decision-Making

Economists have a very rule principle for how people do, and should, make decisions. It is this: do something if the benefits exceed the costs, and don't do it if the costs exceed the benefits. Call this the *cost-benefit principle*.

In light of what we've said already, the cost-benefit principle needs to be clarified in a couple of ways. First, when we talk about costs, we mean opportunity costs. Second, both costs and benefits are inherently subjective. Even when a cost or benefit is seemingly objective (as when it takes the form of a dollar payment), the value of those dollars to an individual is subjective, corresponding to what the individual could do with those dollars.

To apply the cost-benefit principle correctly, however, it must be applied to a particular choice, and the costs and benefits must be those actually affected by that choice. It turns out that many of the choices we make are *at the margin*. That means they are not choices about whether to do something *at all*; they are choices about *how much* of something to do.

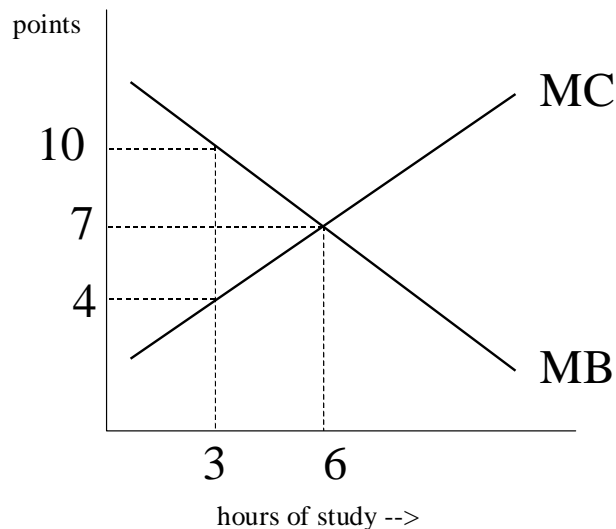
The word "marginal" means "next," "additional," or "incremental." For example, when we talk about the marginal cost of a good, we mean the cost of producing one more unit of the good. The next unit of the good is the marginal unit.

It turns out that marginal decisions are extremely important in economics. Why? Because we are rarely in situations where we have to choose between total quantities of things. For example:

- A firm has to decide whether to increase or decrease production. GM is not usually in the position of choosing between building 10 million cars or none at all; instead, GM decides whether to increase or decrease production from its current level, and how much.
- You don't generally decide to either study for 10 hours or not study at all. Rather, you decide whether or not to study more than you already have studied or plan to study.
- Even when individuals make all-or-nothing decisions, we are often interested in the marginal behavior of a population. For instance, most individuals makes an all-or-nothing decision about whether to deal drugs. Either you do or you don't. But if the criminal punishment for selling drugs increases, we can see the marginal effect on the population: some people will continue selling, some will continue not selling, and some will switch from selling to not selling. The people who switch illustrate the marginal response of the population to a change in criminal justice policies.

Marginal decision-making is also important because of its relationship to rational choice. If you're trying to get the maximum net benefit from an activity (in terms of your own goals and preferences), you want to find where the difference between total benefits and total costs is greatest. You can do that by increasing the level of an activity whenever the added benefit of doing so exceeds the added cost. That is, do more when  $MB > MC$ . Stop when  $MB \leq MC$ .

Example: Suppose your only goal is to get the highest grade you can on tomorrow's economics exam. There are twelve hours until then, and you can use each hour to study or to sleep. Now, each hour you study will allow you to raise your grade a little bit. But you will learn less each hour, because (a) the things you learn are less likely to be on the exam, and (b) you're getting sleepier, so you're retaining less material. Thus, the marginal benefit (MB) curve slopes downward (see graph). Meanwhile, each hour of study is a lost hour of sleep. Losing sleep causes you to lose points on your exam, because you can't concentrate and aren't thinking clearly. And the more sleep you lose, the worse it is. (Having 8 hours of sleep instead of 9 has little effect, but getting 2 hours instead of 3 has a large effect.) Thus, the marginal cost (MC) of studying which is the same as the MB of sleep) is upward sloping (see graph).



Suppose you've studied for 2 hours. Should you study for a third? You'll gain 10 points from the studying, but lose 4 from loss of sleep, for a net increase of 6 points – so do it. The same goes for hours 4, 5, and 6. But by the time you're thinking of studying a seventh hour,  $MB < MC$ . You'll lose more points from lack of sleep than you'll gain from studying. So you decide to study for 6 hours and sleep the rest of the night.

The rule of  $MC = MB$  turns out to be a nearly universal rule for economic decision-making.

Marginalism was very important in the historical development of economics. Up through the 1870s, the marginal idea had not been grasped, which led to “paradoxes” such as the diamond-water paradox. This paradox was resolved by the introduction of marginal thinking.

A modern equivalent of the diamond-water paradox: Why do basketball players get paid so much more than teachers, when teachers are so much more important? Because we have plenty of people who are capable of doing what a teacher has to do (at least at the elementary/middle/high school level), whereas we have very few people who can do what a pro basketball player does.

Not all decisions are marginal, however. Some decisions really are all-or-nothing: deciding whether to shut down your business or stay open; deciding whether to offer a new product line; deciding whether to get married; deciding whether to move to New York. For decisions like these, you need to compare the total expected benefit to the total expected cost.

### **VIII. The “No Cash on the Table” Principle**

When people observe a chance to have something for free, they will usually take it. That’s assuming it is truly free; that is, there aren’t hidden costs that make the net benefit zero after all. More broadly, when people see an opportunity to make pure economic profit – to claim benefits in excess of costs – they take the opportunity. For this reason, economists often say that we don’t expect there to be “cash on the table.” If money is sitting there waiting to be taken, someone will take it.

The “no cash on the table” principle is an important part of the market process. When there are economics profits in a given industry or line of business, those profits will attract more competition (because there’s cash on the table). But the entry of more competition will tend to drive down prices, and sometimes to drive up costs. As a result, the economic profits are *dissipated*. In the long-run, we don’t expect true economic profits to persist.

There is an important caveat to the “no cash on the table” principle, however. It must be possible for people to enter a line of business and take the cash. In economics jargon, we say there must not be *barriers to entry* (or if there are, they must be substantial). In the presence of substantial barriers to entry, the “no cash on the table” principle will cease to operate.

When you think you see cash on the table, then, economic theory implies that one of two things is happening. Either (a) there is some barrier to entry that prevents the “no cash on the table” principle from operating, or (b) you’re mistaken, because there are actually hidden costs or other factors that imply the pure economic profit is illusory. Another possibility is that you’re in a temporary state of disequilibrium.

Example: Different prices for men's and women's shirt cleaning at a laundry service.

## IX. Mutually Beneficial Trade

Economists used to think people would only trade things of equal value. After all, if A is worth more than B, then why would anyone ever give up A for B?

The problem was a lack of subjectivism. If preferences differ across individuals, then there is no difficulty explaining why people trade. They do it because they value things differently, not in spite of it. They make a mutually beneficial trade, which means a transaction that benefits both (or all) parties to the transaction.

Example: I trade you an orange for an apple. Clearly, I value the apple more than the orange, and you value the orange more than the apple. It is the fact that we value them differently that makes trade possible. And since both of us benefit from the transaction, there is not a "loser" here.

This is a general feature of almost any voluntary transaction: that each party is necessarily better off, or at least not worse off. Otherwise, why would they agree? They wouldn't, unless they were irrational.

When mutually beneficial transactions can be made, but for some reason they are not, economists generally consider this a kind of inefficiency – more on that later.

## X. Specialization & Division of Labor

One of the earliest insights of economics, dating back to Adam Smith, is that people can expand their productivity by dividing their labor among different tasks and specializing. Smith observed three main reasons that division of labor increase productivity:

- Workers get better at a task when they focus exclusively on that one task; they increase their skill at the task.
- They save time through not having to go from task to task several times a day.
- They are more likely to discover new techniques and devices for faster or better completion of their task.

To these I would add one more:

- They can take advantage of innate differences in talents or propensities for different tasks.

Example: Suppose in one day Bill and Mary can produce according to the following table:

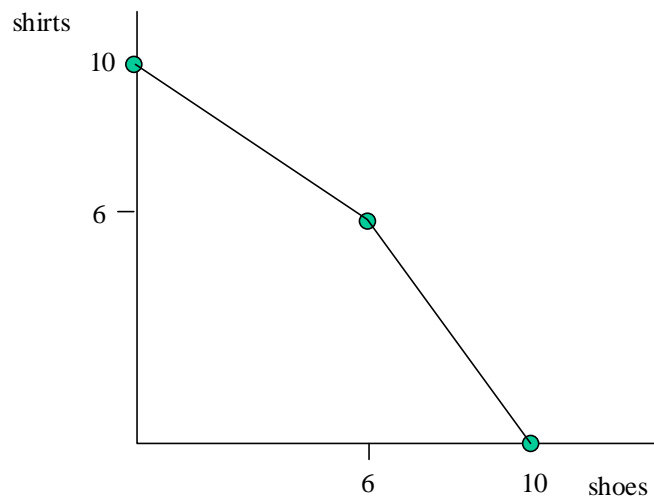
	BILL	MARY
Shoes	4	6
Shirts	6	4

Now suppose each one has one day to work, and they each split their time between shoes and shirts. Then the total production is  $2 + 3 = 5$  of each good.

But if Bill spends all day on shirts, and Mary spends all day on shoes, then the total production is 6 of each good.

The opportunity for trade gives Bill and Mary an incentive to take advantage of the division of labor. Neither can live on shirts and shoes alone, but if they can trade with each other, they can get both items in greater quantity.

We can use the information in the table above to create a PPF for the society composed of Bill and Mary. First, find the maximum amount of shoes they can produce in a day:  $4 + 6 = 10$ . Mark that point on the shoe axis. Second, find the maximum amount of shirts they can produce in a day:  $6 + 4 = 10$ . Mark that point on the shirt axis. Third, find the point of perfect specialization, which occurs when Bill only makes shirts and Mary only makes shoes. This results in 6 of each; mark this point as well. Then connect the dots using straight lines. The resulting graph looks like so:



Note that the PPF is not nicely curved like the earlier PPF, but it is bowed outward. The two straight sections of the PPF correspond to the two different individuals in this society, and their slopes are the two individuals' opportunity costs. If we had a society of three individuals, we'd get three sections with three different slopes. If we kept on adding more and more individuals, we'd get closer and closer to a smooth PPF like the one shown earlier.

## **XI. Comparative Advantage**

This concept is usually introduced in the context of international trade, but it is actually a ubiquitous phenomenon.

The basic idea of comparative advantage: that gains from trade resulting from division of labor can be available even if one person (or country) is better at producing both goods.

Example:

	Lawyer	Secretary
Pages of research	12	2
Pages of typing	6	4

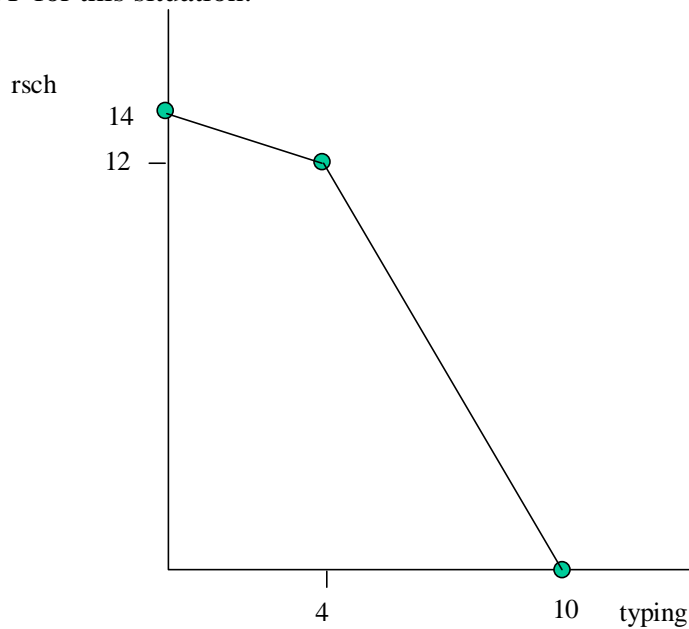
If both divide their time equally between the two tasks, the total production is  $6 + 1 = 7$  pages of research and  $3 + 2 = 5$  pages of typing.

If the lawyer specializes in research and the secretary in typing, the total production is 12 research and 4 typing.

Now, maybe that's preferable (5 extra pages of research are probably worth more than one page of typing). But if not, just let the lawyer spend 10 minutes ( $1/6$  hour) on typing to get  $(1/6)(6) = 1$  typed page. That reduces his research by  $(1/6)(12) = 2$  pages, so the totals are now 10 and 5. That's unambiguously better than 7 and 5.

Gains from trade may not always be available, but usually they are. Specifically, gains from trade will exist whenever the traders' opportunity costs differ. Here, the lawyer's opportunity cost of a typed page is 2 pages of research. The secretary's opportunity cost of a typed page is  $1/2$  page of research. Since these are different, there are gains from trade.

Here is the PPF for this situation:



Notice that the point (7, 5), which results from both people splitting their time between the two activities, is inside the PPF. That means it's inefficient.

N.B.: The principle demonstrated here does not require that each party be "better" at something. In this example, the lawyer is a better typist and a better researcher, while the secretary is neither.

Definition of absolute advantage: You have an absolute advantage over someone else if you can produce more of some good or service in the same amount of time and with the same resources.

Definition of comparative advantage: You have a comparative advantage over someone else if you can produce a good or service with a lower opportunity cost.

When it comes to explaining why people trade, it turns out that comparative advantage is much more important than absolute advantage. The importance of comparative advantage is that it means trade can be beneficial to everyone, even when one party is more capable than the other. The intelligent and the stupid, the rich and the poor, the developed and the underdeveloped, etc.

## **XII. Normative versus Positive**

Economists try to distinguish sharply between two different types of analysis:

- Positive: how things are or could be or would be under certain circumstances. The analyst does not necessarily like or dislike, approve or disapprove of the result.
- Normative: how things should be, or whether a situation is good or bad, or better or worse than another situation.

In short, it is the distinction between "is" and "ought."

A complication: "if-then" statements.

Example: "If you want to decrease unemployment, then you should adopt Policy X." The last half is normative, but it depends for its normative force on accepting the "if" statement. The whole statement is positive, because it does not actually pass judgment about whether you should adopt X or not.

## **XIII. Efficiency**

There are multiple meanings of this term, but all share the same basic idea: efficiency means doing the best we can with the means we have at our disposal – or, in short, not be wasteful.

The Pareto Criterion says:

- Situation A is Pareto superior to situation B if at least one person is better off in A, and no one is worse off in A.

- Situation A is Pareto inferior to situation B if at least one person is worse off in A, and no one is better off in A.
- Situations A and B are Pareto incomparable if at least one person is better off in A and at least one person is better off in B.

Example of a Pareto improvement: You offer to trade lunches. I agree, because I like your lunch better. We both trade, and we both get better off. (Alternatively, maybe I agree because I'm indifferent.)

Pareto Efficiency: Situation A is Pareto efficient if there does not exist another situation that is Pareto superior to A. That is, a situation is efficient if you can't make any Pareto improvements.

Advantage: this is a concept of efficiency that requires no IUC's.

Disadvantage: leaves a lot of situations being Pareto-incomparable. There are very few policy changes that don't hurt someone.

The Kaldor-Hicks Criterion says:

- Situation A is K-H superior to situation B if those who are better off in A could compensate those worse off in A and still remain better off than in B. (i.e., the gainers gain enough to compensate the losers; the gainers gain more than the losers lose.)
- Situation A is K-H inferior to situation B if those who are better off in A cannot compensate those worse off in A without making themselves worse off than in B. (i.e., the gainers do not gain enough to compensate the losers; the losers lose more than the gainers gain.)

This may seem very intuitive, but here's the hitch: the compensation payments don't actually have to be made. Why not? Because if compensation is actually paid, so that losers don't actually lose, then we're back to Pareto. To say anything that the Pareto criterion didn't already say, K-H must make comparisons in cases where compensation is not actually paid.

Example of a Kaldor-Hicks improvement: I'm a basketball player who gets paid \$1 million per year to play for the Lakers. I bring the owners \$1.5 million in added revenue each year, or \$500,000 in profit. But they fire me and hire a better player who generates \$1.7 million in revenue. They pay him \$1.1 million. The new player is better off by \$1.1 million (assuming he would have earned nothing otherwise). The owners now earn \$600,000 in profit, so they are better off by \$100,000. I'm worse off by \$1 million (assuming I can't get another job), but my loss is less than the total gain shared by the other player and the owners. Note: The Pareto criterion would say the two situations are incomparable, because I'm better off in the original situation, but the new player and the owners are better off in the new situation.

Kaldor-Hicks Efficiency: Situation A is Kaldor-Hicks efficient if there does not exist another situation that is Kaldor-Hicks superior to A. That is, a situation is efficient if you can't make any Kaldor-Hicks improvements.

Advantage of this concept: It overcomes disadvantage number (2) of Pareto efficiency, because it allows more Pareto-incomparable situations to be compared.

Disadvantages: (1) Like Pareto, it is consistent with a great deal of unfairness or inequality. (2) It achieves greater comparability than Pareto only by sneaking IUC's in the "back door." Essentially, it assumes that the utility value of a dollar is the same to everyone.

Let's compare Pareto and Kaldor-Hicks efficiency with an example:

	Situation		
	A	B	C
Itchy	\$10	\$10	\$11
Scratchy	\$10	\$16	\$14

According to Pareto efficiency, B is superior to A, C is superior to A, and B and C are incomparable.

According to Kaldor-Hicks, we need only look at the totals in each column. Thus, B is better than C which is better than A (\$26 versus \$25 versus \$20).

But what about efficiency?

According to Pareto, A is inefficient because B is superior to it (as is C). B and C are both efficient (there is no situation Pareto-superior to B, and there is no situation Pareto-superior to C).

According to Kaldor-Hicks, we need only look at the totals: B is efficient, because it generates greater wealth than either alternative.

Wealth maximization. Wealth maximization is another kind of efficiency, but it's really just a simple extension of Kaldor-Hicks. K-H made us think in terms of money for compensation payments. So why can't we just think in terms of money all the time? Let's say that some policy change will create benefits for some people, and losses for other people. Suppose the dollar value of the benefits is \$1 million, while the dollar value of the losses are \$500,000. Then obviously, the winners could theoretically pay off the losers. More generally, any time situation A creates greater wealth than situation B when summed across all persons, A is K-H superior to B.

Thus, the Kaldor-Hicks Criterion leads easily to wealth maximization as a standard of efficiency. And that is the kind of efficiency that economists usually employ when evaluating policies.