

What is Economics (and Finance) About?



OPTIMIZATION

The first thing we need to understand is the idea of **optimization**

This just means finding the best alternative. The best alternative is called the **optimal** alternative, or the **optimum**

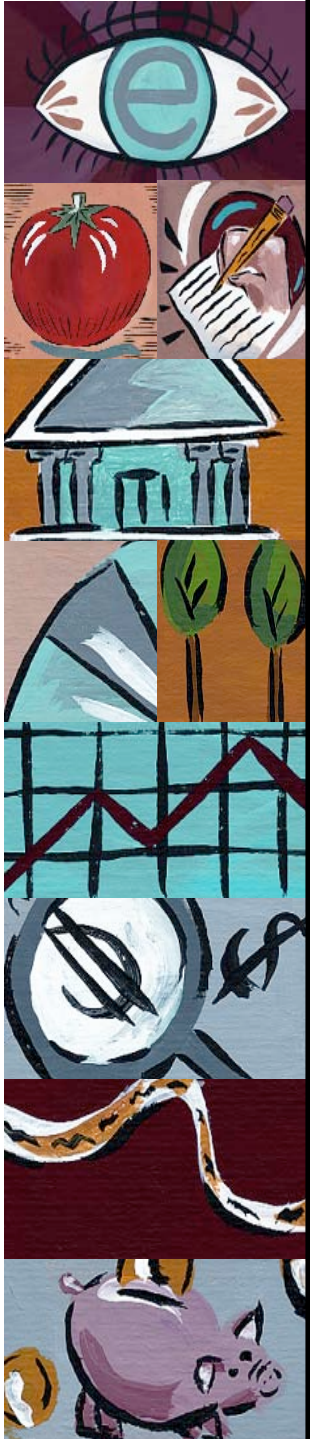
- Optimizing may entail **maximizing** something good, or **minimizing** something bad.



Benefits

Benefits are anything that you consider good in a particular situation. That could be:

- Money
- Lives saved
- Votes (if you are a politician)
- Free time



Let's look at lives saved.

An example of a benefit that you *can* see directly, but that is difficult to put in terms of money



The Situation 1:

you're the Minister of Health in a third-world country. The World Health Organization has given you a grant to hire some doctors. You must decide where to put them—in which district. The more doctors you put into a district, the more lives you will save in that district. Your objective is to save as many lives as possible.



The Situation 2:

- You have five doctors and two districts, Kinshasa and Ituri.
- If we must use all the doctors together: we will put all five in Kinshasa or all five in Ituri. If we put them in Kinshasa we estimate they will save 925 lives; in Ituri, 920.
- If our objective is to save as many lives as possible, to maximize lives saved, where should we put the doctors

Kinshasa



The rule is: choose the alternative with the biggest benefits.

- Why can't we save 925 lives in Kinshasa and 920 in Ituri?
- **Limited or scarce resources.** This means is that if we want to get benefits in one place, we have to give up benefits someplace else. Benefits we have to give up are called **costs**: the cost of something is whatever other benefits we have to give up to get it.



WHY?

- But the World Health Organization is paying for these doctors. So what are we giving up (*opportunity cost*) by using them in the Kinshasa district?
- Answer: we are giving up lives in the Ituri district.
- So we could say that putting the doctors in Kinshasa has *benefits* of 925 lives and *costs* of 920 lives.



Rule 1a: Do something if its benefits are bigger than its costs.

- We can write this more compactly as:

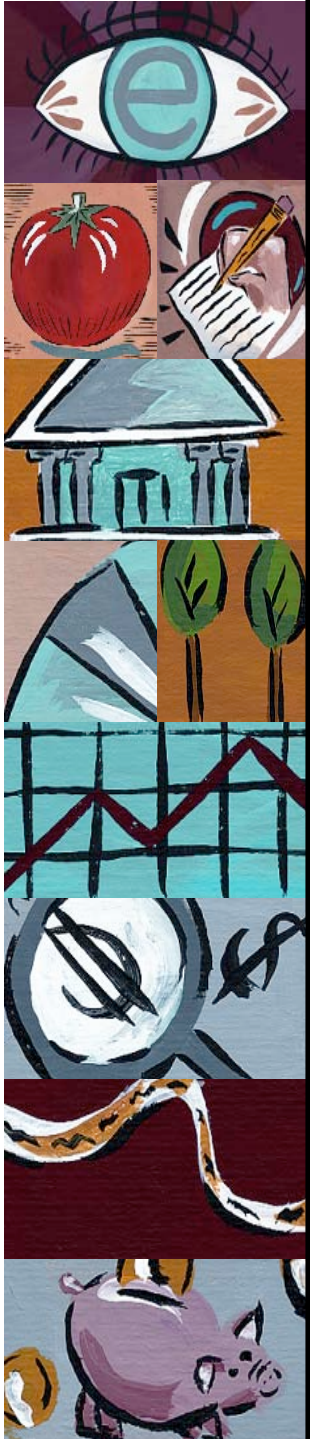
Do something if $B > C$.

- This is equivalent to saying:

Do something if $B - C > 0$.

- The term $B - C$, the difference between benefits and costs, is referred to as the **net benefits** of that activity. So we could say:

Do something if its net benefits are positive.



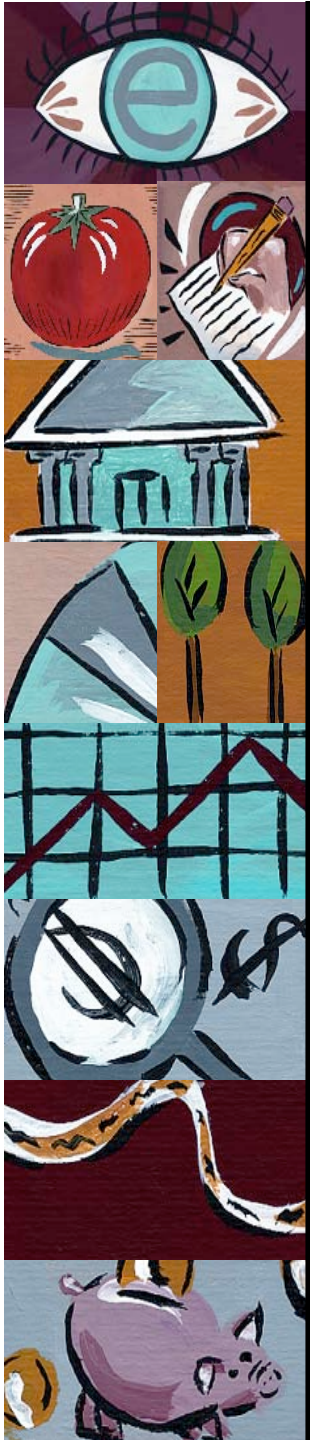
Marginal analysis

- Now we can split up the doctors; we can send some to Kinshasa and some to Ituri. Our objective is the same as before: to save as many lives as possible. How many doctors should we send to each district?
- To answer this question, we need information on the benefits of different numbers of doctors.



Benefit figures for Kinshasa:

# of doctors	Total Benefit (lives saved)
1	300
2	550
3	750
4	850
5	925



There are two things about adding doctors in the Kinshasa district you should notice:

- *Benefits are increasing.* More is better: the more doctors we have, the more lives we save. *WHY?*
- *Benefits are increasing at a decreasing rate* *WHY?*

[We can see this more easily if we calculate what is called the *marginal benefit*. This simply means the *increase in total benefits* from adding one more unit -- doctor]



What is the marginal benefit of adding a doctor in Kinshasa?

Here's what that calculation looks like:

# of doctors	Total Benefit	Marginal Benefit
1	300	300
2	550	250
3	750	200
4	850	100
5	925	75



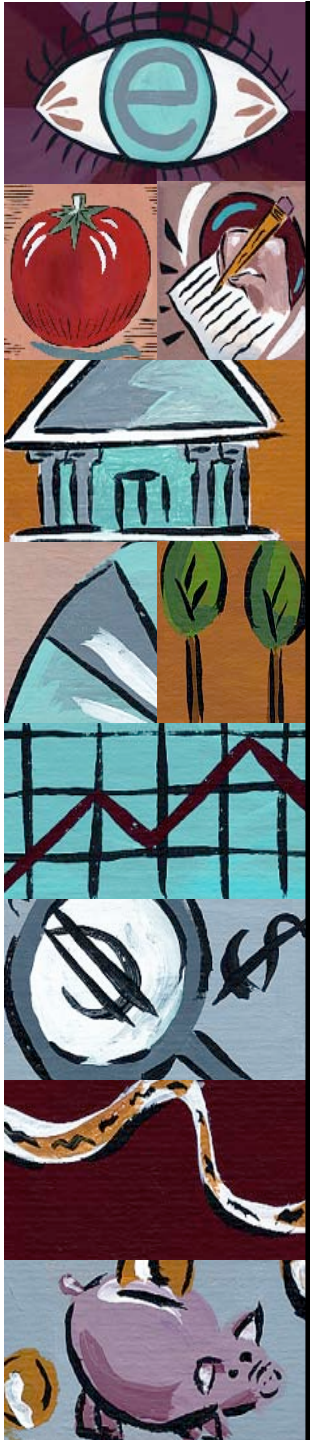
Relationship between TB & MB

Because the concepts of total and marginal are used a lot in economics, it's important to make sure that you understand the relation between the two.

As long as marginal benefits are *positive* (i.e. greater than zero), *total benefits will be increasing*.

Only when marginal benefits are *negative* will *total benefits start to decrease*.

How would we go from marginal benefit to total benefit? *The total benefits are just the sum of the marginal benefits.*



What is the marginal benefit of adding a doctor in Ituri?

# of doctors	Total Benefit	Marginal Benefit
1	320	320
2	560	240
3	730	170
4	840	100
5	920	80



Questions for thought

1. Suppose we start with 5 doctors in Ituri and none in Kinshasa. What is the cost of moving one doctor from Ituri to Kinshasa?

Answer: the cost is the people who will die in Ituri because we only have four doctors instead of five—in other words the cost is the marginal benefit of the fifth doctor in Ituri. We can call this the *marginal cost* of the first doctor in Kinshasa.



Questions for thought

2. Then what is the marginal cost of the second doctor in Kinshasa?

Ans. The marginal benefit of the fourth doctor in Ituri, because that's what we're giving up. So we can just go backwards up the table of marginal benefits for Ituri, to get the marginal costs for Kinshasa.

Let's take a close look at what this table is telling us. The first doctor that we move from Ituri to Kinshasa saves 300 lives in Kinshasa, but an additional 80 people die in Ituri. If our objective is to maximize the number of lives saved, is this a good idea? Yes. The second doctor saves 250 lives in Kinshasa but we lose 110 in Ituri; the third saves 220 in Kinshasa and we lose 170 in Ituri. Can we save lives overall by moving doctors 2 and 3 to Kinshasa? Yes. But when we get to doctor 4 (which means going from 2 doctors to 1 in Ituri) we save 100 lives in Kinshasa but lose 240 in Ituri, and adding a fifth doctor is even worse.

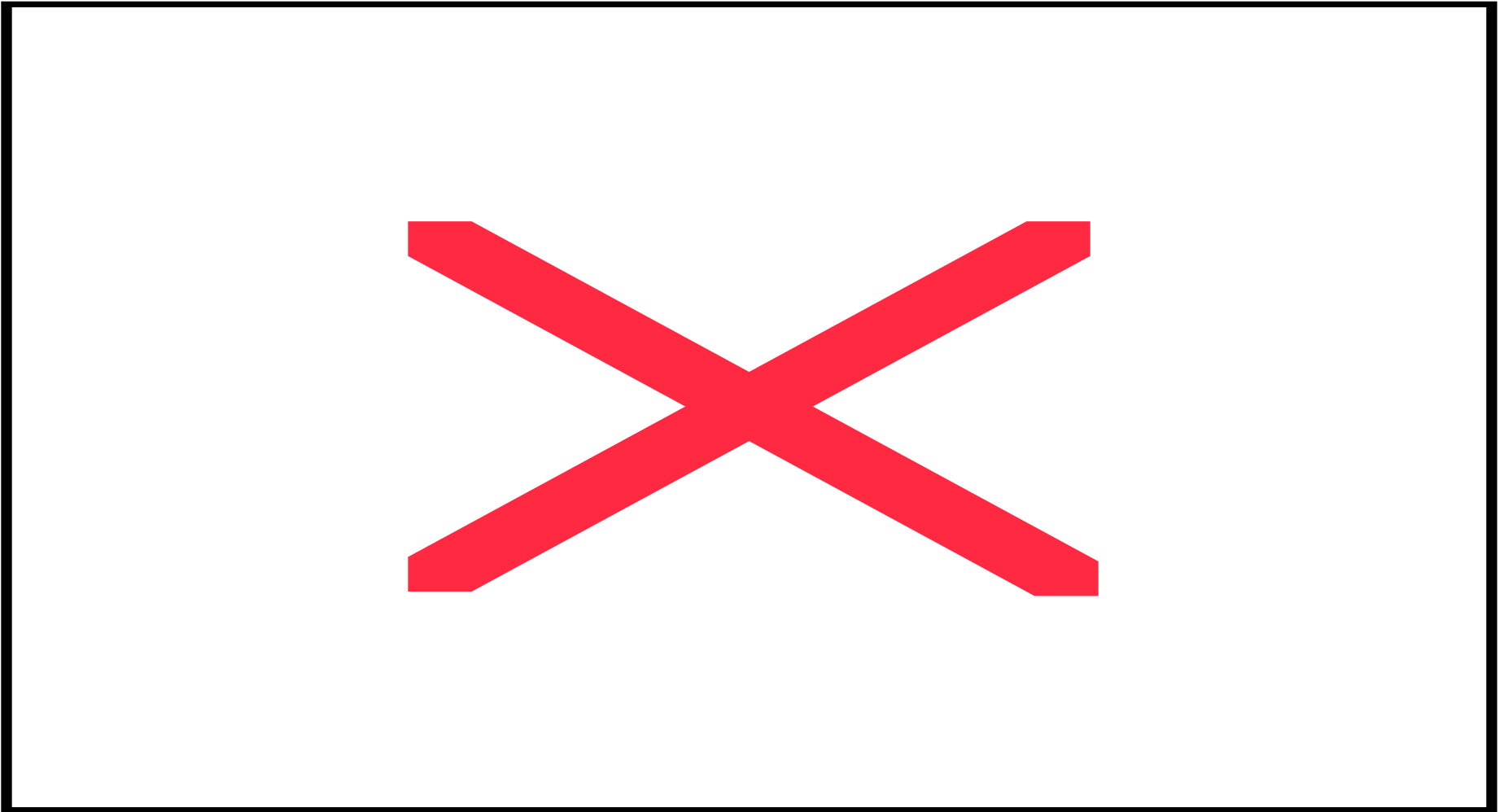
So it seems that we ought to have 3 doctors in Kinshasa and 2 in Ituri. To confirm this, let's look at the **net benefits**, the difference between benefits and costs—here it's how many lives we save in total

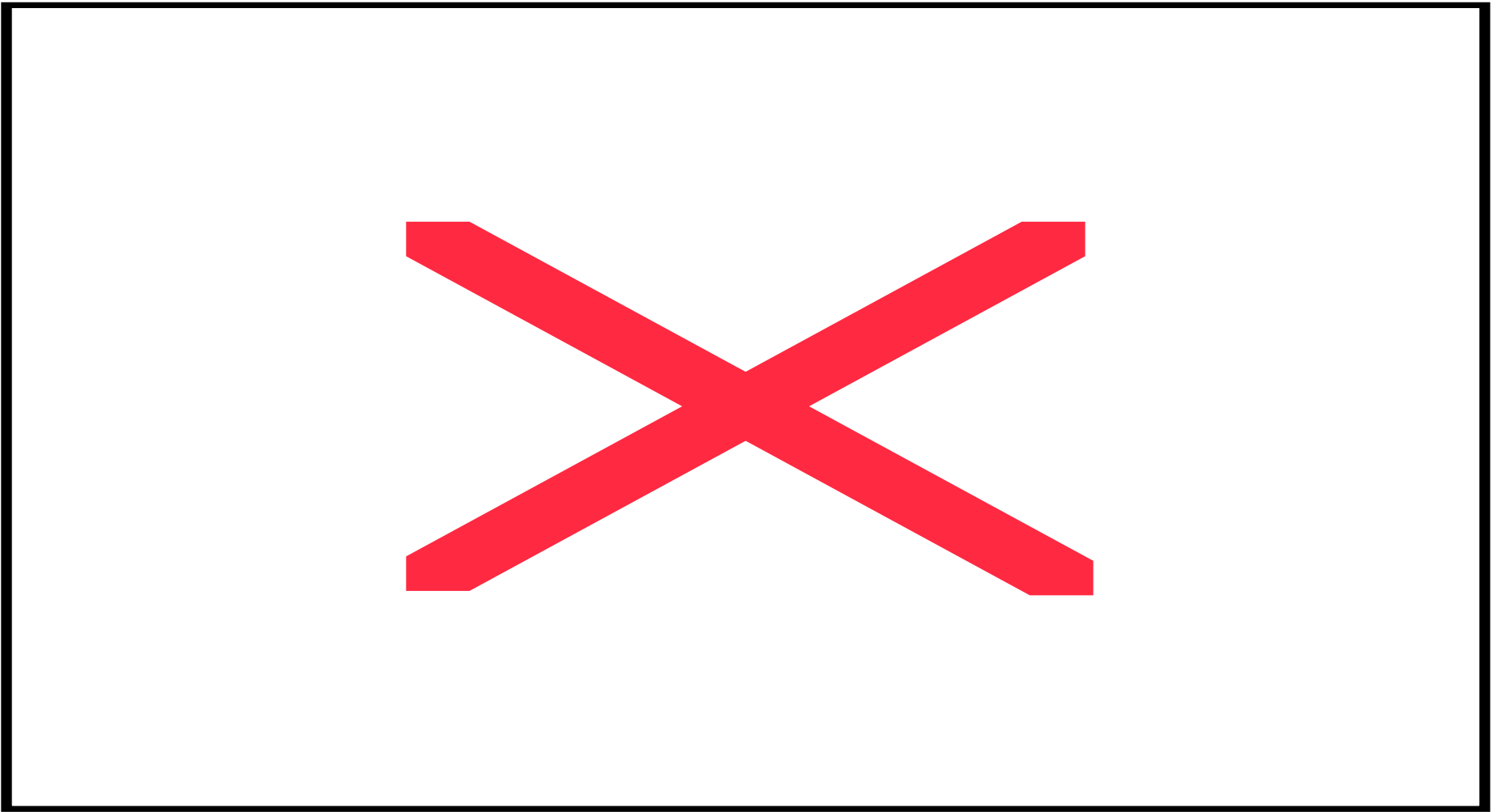


# of doctors	Marginal Benefit	Marginal Cost	Total Benefit	Total Cost
1	300	80	300	80
2	250	110	550	190
3	200	170	750	360
4	100	240	850	600
5	75	320	925	920

Net Benefits of doctors in Kinshasa

# of doctors	Marginal Benefit	Marginal Cost	Total Benefit	Total Cost	Net Benefit
1	300	80	300	80	220
2	250	110	550	190	360
3	200	170	750	360	390
4	100	240	850	600	250
5	75	320	925	920	5







The general rule that we can see from this example is:

- **Rule 2a: To maximize net benefits, continue as long as marginal net benefits are positive ($MNB > 0$).**

Or equivalently:

Rule 2b: To maximize net benefits, continue as long as marginal benefits are greater than marginal costs ($MB > MC$).



Review of what we did 1

- First, we had an **objective**. Here, our objective was to save as many lives as possible.
- Then, we had to make some decisions about alternative ways of meeting those objectives. We are trying to optimize, which just means to do the best we can do with respect to our alternative. Each alternative had **benefits** associated with it, which are good things that we get from those alternatives. It also had **costs**, which are *other* good things that we have to give up in order to get *these* good things.



Review of what we did 2

- What we want is for the **net benefits**, the benefits minus the costs, to be as **big as possible**. *If we had a money-making business, say a restaurant, then benefits would be the money that comes in from our customers, and the costs would be the money that goes out for food and cooks and waitresses and rent and so on. Then net benefits would be the same thing as profit. But net benefits could be something else, like lives saved.*



Review of what we did 3

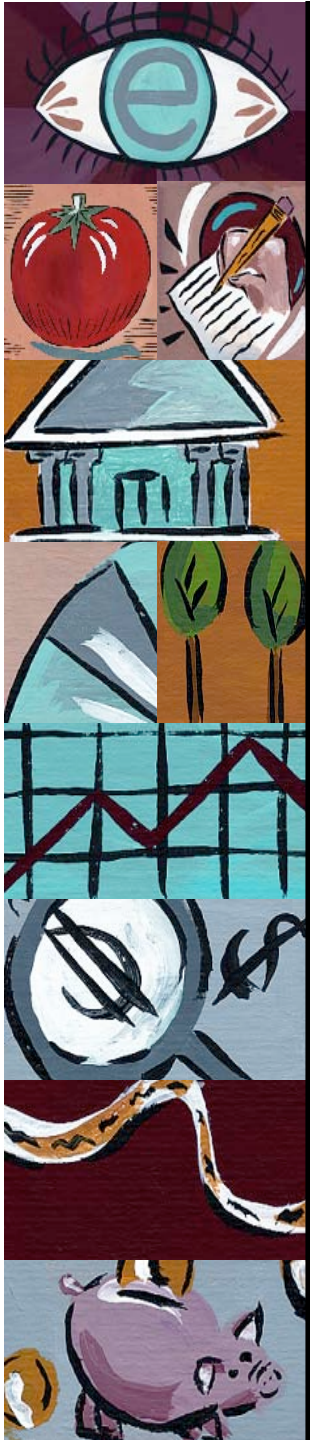
- When the question is how much of something to do, it's helpful to look at **marginal** benefits and costs. Saying that we want net benefits to be as big as possible is the same as saying that we want to continue as long as **marginal net benefits** are positive, which is to say, as long as marginal benefits are greater than marginal costs.



If we know the objective, the benefits, and the costs, then the right answer is not a matter of opinion, it's a matter of calculation.

If people disagree about the right answer it means either

- (1) someone made a mistake in calculation
- (2) someone made a mistake in estimating benefits and costs, or
- (3) people disagree about the correct objective (which *is* a matter of opinion, but also usually the most important question).



Dealing with large numbers.

- (say, producing a million automobiles), it's inconvenient to think of benefits and costs as changing in many tiny little steps (although that is what's actually happening) and we can think of them as changing continuously. Then we continue, as before, as long as marginal net benefits are positive, and stop at the point where they are exactly zero, or where $MB = MC$.
- Most of the time this is only an approximation, and there won't be any point where marginal benefits and marginal costs are exactly equal. The more general rule is Rule 2, to continue as long as marginal net benefits are positive, or $MB > MC$



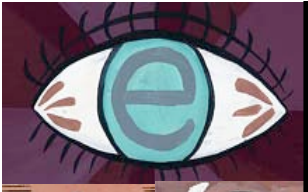
Some Basic Economic Tools

Opportunity Cost
Exchange
Private Property
Production Possibilities Frontier
Gains from Trade



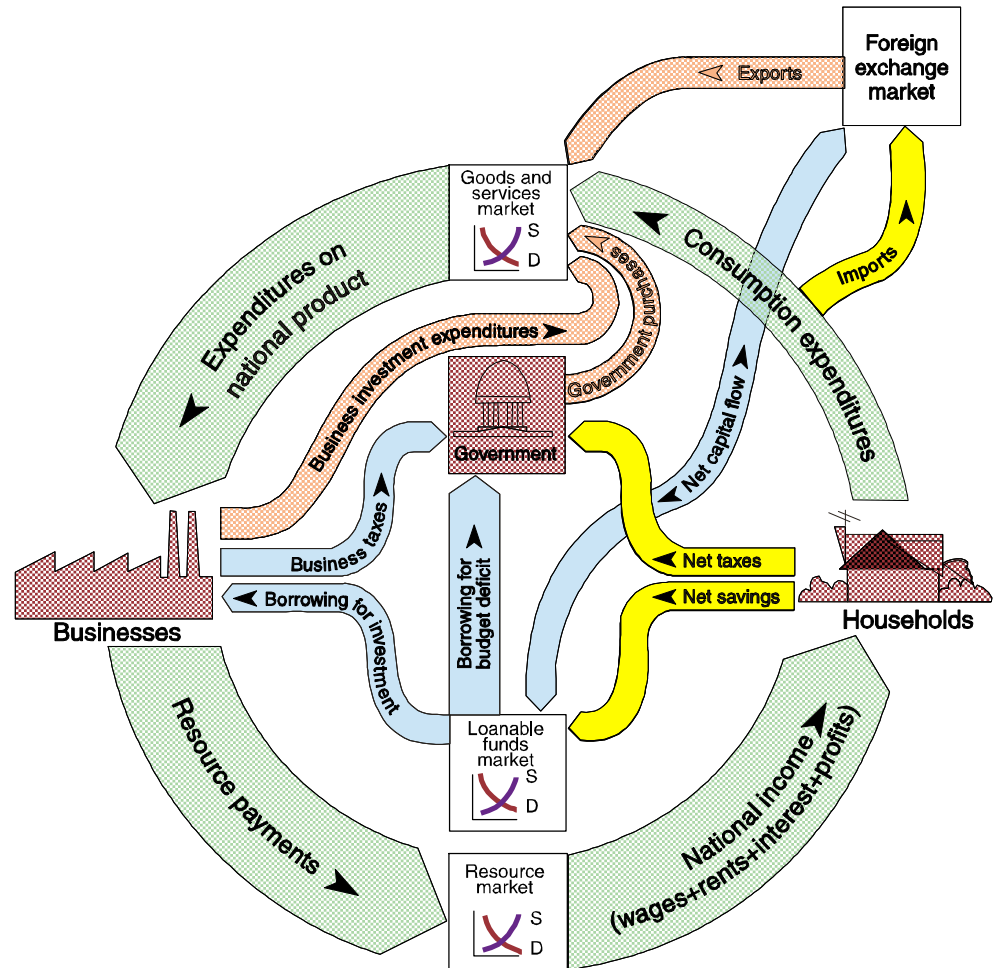
The Economy

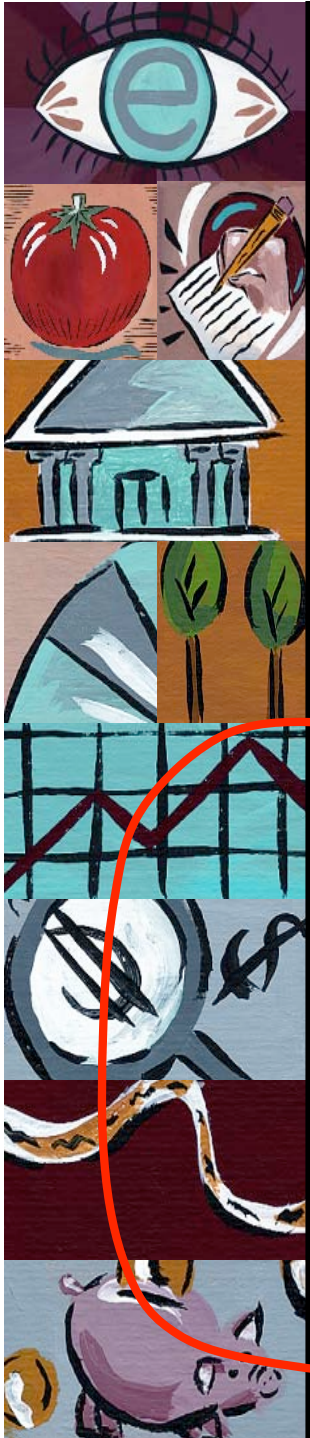
Circular Flow



The Circular Flow Diagram

- Macro equilibrium will be present when the flow of expenditures on goods & services (**top loop**) is equal the flow of income to resources owners (**bottom loop**).
- This condition will be present when the **injections** (*investment, government purchases, & exports*) into the circular flow ... equal the **leakages** (*saving, taxes, and imports*) from it.
- Hence, when equilibrium is present in the loanable funds and foreign exchange markets, injections equal leakages and Macro equilibrium will be present.





Leakages and Injections from the Circular Flow of Income

- Given the following exchange market relationship:

$$\text{Imports} + \text{Capital Outflow} = \text{Exports} + \text{Capital Inflow}$$

- Since *net capital inflow* is (*capital inflow* - *capital outflow*) the equation may be re-written as:

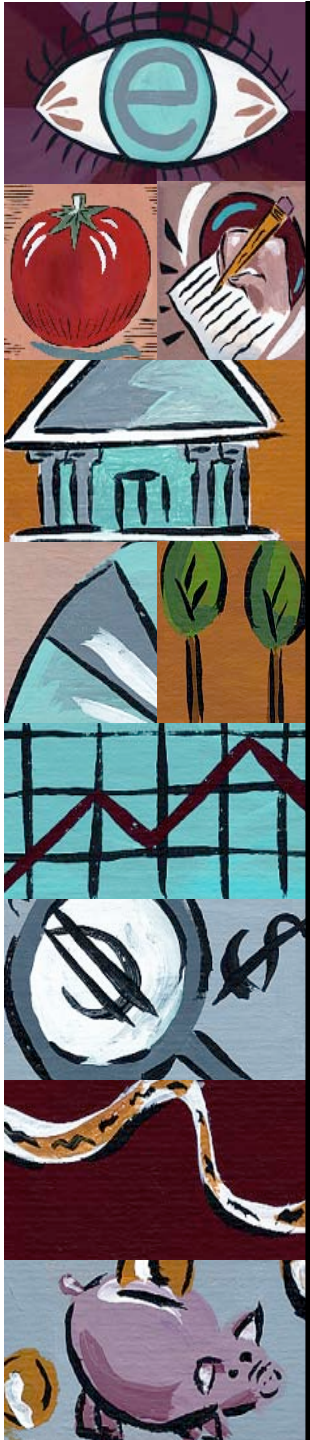
$$\text{Imports} - \text{Exports} = \text{Net Capital Inflow}$$

- Equilibrium in the *loanable funds market* implies:

$$\text{Net Saving} + \text{Net Capital Inflow} = \text{Investment} + \text{Budget Deficit}$$

- Substituting for *net capital inflow* from above:

$$\text{Net Saving} + \text{Imports} - \text{Exports} = \text{Investment} + \text{Budget Deficit}$$



Leakages and Injections from the Circular Flow of Income

$$\text{Net Saving} + \text{Imports} - \text{Exports} = \text{Investment} + \text{Budget Deficit}$$

- $\text{Budget deficit} = (\text{government purchases} - \text{taxes})$:

$$\text{Net Saving} + \text{Imports} - \text{Exports} = \text{Investment} + \text{Government Purchases} - \text{Taxes}$$

- Which may be re-written as:

$$\text{Net Saving} + \text{Taxes} + \text{Imports} = \text{Investment} + \text{Government Purchases} + \text{Exports}$$

Leakages

Injections

- Therefore, when the loanable funds and foreign exchange markets are in equilibrium, *leakages* from the circular flow of income (savings + taxes + imports) are equal to *injections* into it (investment + government purchases + exports).