Notes on Principles of Macroeconomics

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INTRODUCTION AND BASIC CONCEPTS

ECONOMICS

Economics is about making efficient uses of scarce resources. This is about learning how people in their daily lives make decisions of allocating scarce amount of resources – time and budget – they possess, to meet their numerous desires.

At occasions many of you may have wished you had more income and more time. For example, during finals students wish they had more time to prepare for exams. Unfortunately, income and time are not plenty, they are scarce. But, the number of wants that one seeks to satisfy from his/her limited income or time are numerous or unlimited. The scarcity of resources, therefore, forces everyone to make choices from their long list of wants.

MICROECONOMICS versus MACROECONOMICS

Microeconomics is a study of the behavior of individual households and firms as to how such economic entities choose to allocate scarce resources among different alternative wants.

Macroeconomics is a study of the behavior of economic aggregates like inflation, unemployment rate, and the total output of a country. These economic aggregates are the outcomes of the choices individual households and firms make in an economy.

The difference between microeconomics and macroeconomics lies in the difference between the words ‘micro’ and ‘macro.’ In microeconomics the focus is on small economic entities, like an individual or household or firm, whereas in macroeconomics the focus is on the whole economy.

RESOURCES

A fundamental premise in economics is that ‘resources are scarce.’ Resources are those goods and services that can be used to produce other goods and services. Mostly cited examples are labor and human resources (time, skill, and knowledge of labor), capital resources (physical capital and technology), and land and natural resources. Very often firms combine these three forms of resources to produce a good or service. If you accept that resources are scarce, then you must also accept that all goods and services that are produced by using the scarce resources must also be scarce.

SCARCITY

How does one know whether something – a good, service, or resource – is scarce?

If the quantity or amount of something actually available to you (the supply) is less than the quantity or amount that you like to have of this thing if made available free-of-cost (demand), then this thing is ‘scarce’ for you. On the level of a society or economy, if the naturally available quantity of a resource falls short of the quantity of this resource the people in this society or economy like to have at free-of-cost, then this resource is scarce. Forests are scarce resources. If they were not scarce, we would not have been concerned with deforestation. Because non-scarcity implies that there are sufficient numbers of trees to satisfy everybody's wish of having trees (for different purposes).

If you find that people are willing to pay a price for having a good or resource, that is clearly a signal that the good or resource is scarce. When something is not plenty to meet everyone's demand, a mechanism needs to be implemented to ration the scarce good among the competing users of the good. In a market economy, money price functions as a rationing mechanism. For some scarce goods, there could be other forms of rationing mechanism. For example, A-grade in an academic course is a scarce commodity; it is rationed based on performances of students in exams, homeworks, and possibly a bunch of other criteria. To have Stanley cup (a scarce commodity, there is only one cup available in a year), hockey teams have to play and win a long series of games.

Do you agree with one or both of the following statements? Why?

(I) A pound of fertilizer is a scarce good.

(II) A public school education is not a scarce good.

OPPORTUNITY COST

Every individual, rich or poor, and every country, developing or developed, faces scarcity of resources. Developed countries or rich individuals may command relatively higher amount of resources than their counterparts, but their desires or uses of resources too are greater than their counterparts, creating a situation of scarcity. There is no individual or nation which is satisfied with what it has. Desires exceed the current capabilities. Therefore, it is imperative that a choice be made, which among a long list of desires could or should be fulfilled, and thereby which ones would remain unfulfilled. If a homeowner chooses to spend two hours on mowing the front and backyard lawns on any given Sunday (time is a scarce resource), those two hours obviously could not be spent on watching a movie or visiting a friend. Choosing to spend a scarce resource on an activity comes at the expense or sacrifice of not being able to use that resource for another purpose. Such a sacrifice or cost is called *opportunity cost*.

Precisely speaking, opportunity cost of choosing to spend resources on an alternative is defined as the value of the best alternative foregone. The opportunity cost of spending two hours on mowing lawns in the above cited example is the level of enjoyment the homeowner could have obtained from using those two hours on his/her next best alternative use of time.

OPPORTUNITY COST OF ATTENDING A LECTURE

When you attend a lecture, you use scarce time which you could have utilized for other purposes. What is the next best thing you could have done during this time: workout, watching a movie, or earning money at your job? The value of that next best alternative that you had to sacrifice for attending the lecture would be the opportunity cost of attending the lecture. For some, working out for improving health could have been the next best alternative, whereas for some others, working and earning money could have been the next best use of time. Accordingly, opportunity cost of the same activity (attending a lecture) could be different for different individuals, but the fact remains that there is an opportunity cost attached to each activity.

High school education of kids is free to their parents in the U.S. It may therefore appear to some parents that there is no opportunity cost of educating kids (up to high school). From their individual perspective this may be true. But, if you consider from the society's perspective, there is an opportunity cost associated with this. Imparting education to kids requires resources (teachers, instructional equipment, property, etc.), which could have been used elsewhere. Parents do not bear the opportunity costs of these resources, but taxpayers do.

ECONOMIC WAY OF THINKING OR ECONOMIZING BEHAVIOR
Since resources are scarce, they must be used efficiently. Any resource owner therefore tries to obtain maximum possible return from use of resources. Acting in a manner to fulfill this objective is called "economizing" or "rational" behavior. According to economizing behavior, benefits of an activity must at least exceed its costs for scarce resources to be spent on the activity. And, if a choice has to be made from among a number of alternatives, the decision maker has to compare the expected net benefit (benefit net of cost) of each alternative and then choose the alternative that yields potentially the highest amount of net benefit.

MARGINAL ANALYSIS
The word 'marginal' means 'additional.' In real life when an economic agent faces a decision problem, the agent has to evaluate how the decision changes the agent's current situation or status quo. What additional (marginal) benefits are likely to accrue to the decision maker and what additional (marginal) costs have to be incurred? Marginal benefit from drinking a can of cold drink in hot weather is likely to be higher than the marginal benefit of the same drink if weather is cold. Do you see the importance of current situation (in this example, the kind of weather)?

Consider another example. Suppose you are currently employed and earn $30,000 a year. You receive a new job offer of $40,0000 a year, but the new job requires additional 8 hours of work every week. Would you accept this job offer?
The marginal benefit of new job is $10,000 of earnings ($40,000 minus $30,000) against its marginal cost of 8 additional hours of work every week. The marginal cost may also include any additional tax burden associated with higher earning, but for simplification assume there are no additional taxes involved. Whether you would accept the new job offer, according to the economizing behavior, depends on whether the marginal benefit at least exceeds the marginal cost. That is, is the annual additional amount of earnings of $10,000 worth putting 8 additional hours of work every week? This kind of analysis (the comparison of marginal benefit of an action with its marginal cost) is called 'marginal analysis.'

LAW OF DIMINISHING MARGINAL RETURNS
The amount of marginal benefit associated with an activity or good is generally a function of the existing level of activity or good. Consider the worth or marginal benefit associated with one additional dollar of income to a poor (measured as the amount of satisfaction or utility the person is likely to derive from the use of the dollar) with the marginal benefit of one additional dollar of income to a rich person. Since the earning level of a rich person is higher than that of a poor, the value of an additional dollar is lower to the rich than to the poor. The more you have of something, the less valuable it becomes.

When you are hungry, the marginal benefit (measured by the level of satisfaction) from eating an apple could be high. But having eaten an apple, the marginal benefit from the second apple is likely to be lower than that of the first apple. Similarly, the marginal benefit of the third apple (after having eaten two apples) would even be lower. The more apples you eat, the less tasty the next apple is. This is called the 'law of diminishing marginal returns,' which is stated as:

> *As you do more of the same activity or consume more of the same good, its marginal benefit progressively diminishes.*

CALCULATION OF MARGINAL BENEFIT

Below is a table that presents the estimates of benefits of hiring security guards at a large department store, measured in terms of the value of theft deterred every month. What is the marginal benefit of hiring the second, third, and fourth security guard?

Total number of guards	Total benefit, $
1	4,300
2	7,100
3	9,000
4	10,000

Hiring one guard is likely to reduce theft worth $4,300. Therefore, the marginal benefit of first guard is $4,300. Adding one more guard increases the benefit to $7,100. That is, the marginal benefit or additional theft deterred by the second guard is $2,800 ($7,100 minus $4,300). Below are the estimates of marginal benefits of each additional guard, calculated by using the following formula: $MB_n = TB_n - TB_{n-1}$, where MB_n denotes the marginal benefit of the n^{th} guard, TB_n stands for total benefit from n number of guards, and TB_{n-1} stands for total benefit from (n – 1) number of guards.

Total number of guards	Marginal benefit, $
1	4,300
2	7,100 – 4,300 = 2,800
3	9,000 – 7,100 = 1,900
4	10,000 – 9,000 = 1,000

What happens to marginal benefit as more guards are hired? The marginal benefit progressively diminishes. In other words, the estimates above exhibit the law of diminishing marginal returns.

RULE OF ECONOMIZING BEHAVIOR

As we explained earlier, economizing behavior is an attempt to derive maximum possible amount of net benefits from use of scarce resources. In the above example of hiring security guards, how many guards should the department store hire if a guard has to be paid a monthly wage of $2,400?

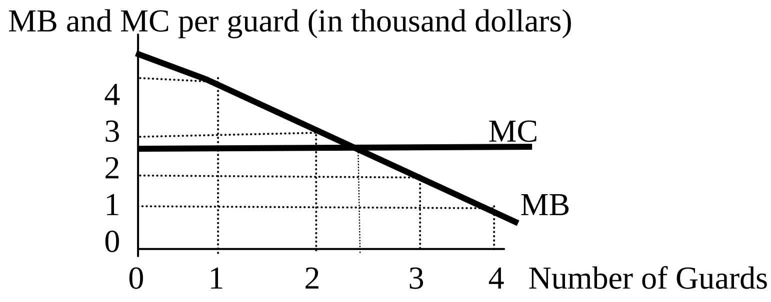
Should a guard be hired? The answer would be yes, because the marginal benefit ($4,300) exceeds the marginal cost ($2,400). Actually, the department should evaluate whether it should hire two guards.
Should two guards be hired? The answer again is yes, because the marginal benefit of the second guard is $2,800 and the marginal cost is $2,400 (the second guard also has to be paid the same wages).
Should three guards be hired? The answer is now no, because the marginal benefit of the third guard is $1,900, whereas the marginal cost is $2,400. The third guard does not deter enough theft to justify paying $2,400 to the guard. Thus, two guards are the optimal number of guards to be hired; *optimal*, because the total net benefit is maximum. The amount of total net benefit from hiring only one guard or from hiring more than two guards is lower (see the table below).

Total number of guards	Total benefit, $	Marginal benefit, $	Total cost, $	Marginal cost, $	Total net benefit (total benefit – total cost), $
1	4,300	4,300	2,400	2,400	1,900
2	**7,100**	**2,800**	**4,800**	**2,400**	**2,300**
3	9,000	1,900	7,200	2,400	1,800
4	10,000	1,000	9,600	2,400	400

If for some reason the department store had employed three guards, the above analysis suggests that it should lay off one guard. On the other hand, if the store had only one guard, it should employ more guards. In other words, the store needs to keep hiring guards until marginal benefit does not drop below marginal cost. Based on this example, the rule of economizing behavior (the rule of maximizing total net benefit) can be stated as:

Do more of an activity if its marginal benefit exceeds marginal cost.
Do less of an activity if its marginal cost exceeds marginal benefit.
Choose the level of activity where marginal benefit equals marginal cost.

Graphically, the above decision problem can be represented as:



If guards can be hired part-time, the above graph suggests that additional net benefits can be obtained by hiring a third guard part-time, where MB intersects (becomes equal to) MC. Note that the MB curve is downward-sloping because of diminishing marginal returns.

MORE ON OPPORTUNITY COST

You should not confuse opportunity cost of an activity with out-of-pocket costs of the activity. Many out-of-pocket costs may be a component of opportunity cost, but some out-of-pocket costs may not be a part of opportunity cost and/or there may be other costs that are included in the opportunity cost. For clarification, consider the following breakdown of out-of-pocket expenses generally incurred for completion of 4-year college education:

Tuition and fees	$56,000
Books, stationary, and supplies	4,800
Transportation to and from school	4,400
Room and board	28,000
Personal expenses	5,600

Among the above cost items, room and board and personal expenses do not constitute a part of opportunity cost of college education, because these costs would have been incurred any way, irrespective of whether one is taking education in college or is employed at a work and is not going to college. On the other hand, the remaining items in the above list are not the only components of opportunity cost. When a person chooses to go to college for four years, she forgoes potential income that could have been made during those four years. Therefore, foregone income is also a component, generally the largest component of opportunity cost. The list below presents the different components of the opportunity cost:

Tuition and fees	$56,000
Books, stationary, and supplies	4,800
Transportation to and from school	4,400
Forgone income ($16,000 a year)	64,000
TOTAL	129,200

A flight is almost due for departure from Denver to Seattle and is only 60 percent booked. A passenger offers $120 to the airlines for a seat in that flight, when the regular airfare is $230. What do you think is the airlines' opportunity cost of flying this passenger to Seattle? Should the airlines accept the passenger's offer, if there remains sufficient time to board the passenger without delaying the flight's departure schedule?

I hesitate to visit my doctor unless very necessary, because I need to take half-day off from work, which pays me $20 an hour. What is the opportunity cost of my time to visit doctor? Besides spending time, I also have to pay $35 insurance co-payment. What is the full opportunity cost (monetary cost plus time cost) of a doctor visit?

MORE ON ECONOMIZING BEHAVIOR

Answer the following questions:

1. The price of an airline ticket from Denver to Washington D.C. is $600. A bus ride costs $200. Traveling by plane takes six hours, compared with 46 hours by bus. Other things constant, an individual who is a rational decision maker, chooses air travel, if and only if, her time were valued at more than:

(a) $5 an hour
(b) $8 an hour
(c) $9 an hour
(d) $10 an hour

2. The table below shows total costs and marginal costs associated with different levels of output of a competitive firm. The output of the firm sells at $7 per unit; that is, revenue per unit of output or the marginal benefit to the firm is $7 at any level of output. What level of output will maximize profit or net benefit of the firm?

Output, units	MB, $ per unit	Total cost $	MC, $ per unit
1	7.00	8.50	-
2	7.00	15.00	6.50
3	7.00	18.00	3.00
4	7.00	23.00	5.00
5	7.00	30.00	7.00
6	7.00	45.00	15.00
7	7.00	70.00	25.00

3. Sally enjoys ice cream. In the table below she has expressed her enjoyment of ice cream in equivalent dollar terms.

Number of scoops of ice cream	Total benefit, $	Marginal benefit $ per scoop
1	2.00	
2	3.75	
3	5.10	
4	5.95	
5	6.20	

Answer the following:

1. Calculate and fill in the correct numbers for the marginal benefit schedule in the above table.
2. Does the marginal benefit schedule suggest diminishing marginal returns of ice cream?

3. What is the optimal number of scoops that maximizes Sally's enjoyment, if ice cream costs $0.50 a scoop?
4. What is the total dollar value of enjoyment Sally derives from buying the optimal number of scoops of ice cream?

4. People often donate money, goods, or services to charities. Is this behavior consistent with economizing behavior?

5. There are numerous instances of people who have sacrificed precious years of their life for freedom struggles to liberate their countries from colonial rulers or dictators. In the process many of them got imprisoned, tortured, and even killed, when in fact they could have led a more comfortable life and might have even been rewarded handsomely by dictators if they chose to embrace dictatorial regimes. Is economizing behavior consistent with the choice of such individuals to engage in freedom struggle? Before answering this question, read the following:

> *A press reporter asked a freedom fighter, in whose leadership his country had just successfully overthrown the dictatorial regime of a monarch, "Why did you choose to remain imprisoned for 12 long years, when you could have secured a comfortable life outside prison by accepting the dictatorial regime of the monarch?"*
>
> *The freedom fighter replied, "If I had submitted to the dictatorial regime of the monarch, I would have definitely been released from imprisonment. But, I couldn't have slept during nights having known that I betrayed the faith of my people and my own deeply-held beliefs in democracy and human rights. It was better for me to live in prison and be at peace with myself."*

6. A news piece appeared in the Rocky Mountain News of July 4, 2006 that Arizona was considering boosting voter turnout by awarding a $1 million prize to one randomly selected voter; Arizona Voter Rewards Initiative is up for voting in November 2006 in Arizona. Is this plan likely to boost voter turnout? What are the marginal benefit and marginal cost of voting from an individual voter's perspective? (Registered voters in 2002 in Arizona: 2,229,180; actual voting 1,255,615 or 56.33% in 2002; the national average voter participation 49.2%)

7. Do animals exhibit economizing behavior? Read the following article published in the Economist of March 1, 2001.

The cost of fur

FUR coats have fallen from grace in many parts of the world, but chilly northern nations continue to farm millions of mink for their pelts. The animals are housed in barren cages that provoke controversy and protest from animal lovers, but fur farmers insist that mink are completely adapted to life behind bars. What do the animals themselves feel about their surroundings?

To answer this, Georgia Mason of Oxford University and her colleagues have applied a little economic theory. Animals, like human consumers, have to make the most of limited resources. Instead of money, they trade physical exertion and time. The things they want depend on the environment they evolved in. Wild mink swim, roam, delve into tunnels and hunt, so their commodities presumably include water, space, tunnels and prey. Caged mink, claim animal advocates, are frustrated without these resources, and suffer as a result. Fur supporters contend that such "wild" urges have been bred out.

To settle the debate, Dr Mason and her colleagues treated their animals to life with a water bath, tunnel, chewable toys and an extra straw-lined bed in addition to their normal cage. They regarded the mink as consumers, recording how often they visited the extra cages containing each of the "treats". The mink had to pay for their treats by pushing against heavy doors to gain access. By varying the weights of the doors, the researchers could measure microeconomic variables such as consumer surplus and reservation price, which reveal how much consumers value a commodity. Their results are published in this week's *Nature*.

Water, it turned out, matters the most to mink—and not merely to drink. They refused to be thwarted by increasingly heavy weights, and continued to force doors open in order to swim. In human terms, the mink deemed the water bath to be a staple such as bread, for which consumers continue to pay the asking price even when the cost goes up. By contrast, the tunnel was more readily forsaken by the mink when the going got tough, much as a person might forgo restaurant meals when prices rise. The other treats were intermediate in the value placed on them.

Dr Mason believes that knowing an animal's willingness to pay costs is as close as science is likely to come to an accurate estimate of an animal's own view of the situation. It provides a direct insight into what gives it pleasure, she says, since pleasure has probably evolved to motivate cost-benefit decisions in the way that fear evolved to motivate animals to flee, and hunger to keep them fed. Indeed, depriving the mink of their swims caused as much physiological stress as denying them food. When the door to the water bath was locked for a day, the mink's urine was collected and analysed for cortisol, a hormone associated with stress. Cortisol rocketed to the same level as when food was withheld for 24 hours.

Fur farmers with a conscience have one idea still to cling to. Meaningful economic decisions are possible only when consumers are familiar with the available commodities. Exposure to the treats may have activated desires in the experimental mink that would otherwise have lain dormant. Farmed mink, on the other hand, never know any alternative. For them, swimming may be "out of sight, out of mind".

THREE ECONOMIC QUESTIONS

Every society has to answer three economic questions. What (which goods) will be produced? This is a *consumption decision*. How will goods be produced? This is a *production decision* asking for which resources should be used in what proportions in the production of goods. For whom will goods be produced? This is a *distribution decision* as to who shares how much in the outputs produced.

TYPES OF ECONOMIC ORGANIZATIONS

There are three alternative types of economic organizations seen in the world, which attempt to answer these questions differently.

Market mechanism or Market economy

This type of economic organization allows a decentralized process of decision making. Each individual household and firm in the economy is allowed to decide independently what they like to consume or produce and how to do produce. Market coordinates these independent decisions of households and firms through market prices. Consumers or households look at market prices and decide what goods to consume in what quantities. Producers or firms also look at market prices of outputs and resources and decide what goods to produce in what quantities and what kinds of resources to use in production processes. It so happens in a market mechanism that producers produce those goods that consumers like to buy, and generally there are no shortages or surpluses of goods. If any shortage or surplus is observed, market price adjusts to eliminate the shortage or surplus. Market price acts as the rationing mechanism to allocate goods and services among competing demanders. Adam Smith, the father of economics, called this *the invisible hand of market*, which coordinates independent consumption and production decisions of households and firms.

Government plays a role of a neutral referee in this system, who sets the rules of the game, like protection of private property rights, law and order, etc. It does not interfere in the consumption or production decisions of households and firms. Most Western economies are close to this type of economic organization. Hong Kong is considered the freest market economy in the world.

Regarding the above-mentioned distribution decision in a market mechanism, persons who are able and willing to pay the market price of a good get to enjoy the good. Those who cannot afford to pay are denied the good. Thus in a market mechanism, rich people are likely to have more access to goods and services than poor people. Some policy makers consider this feature of market mechanism "unfair" to poor, which may form the basis or rationale of government intervention in the market.

Centralized planning mechanism or Centrally planned economy

In this type of organization, there is a central authority that plans, commands, and coordinates what, how, and for whom to produce goods and services. The central authority pursues certain social objectives, like equitable distribution of wealth, in formulating its plans and policies. All productive assets are owned by the government; there is no private ownership of productive assets. Unlike in a market mechanism in which cost of production is generally a factor that influences market price, market price in a centrally planned economy may have no relation to cost of production and may be set to affect distribution of goods. If bread is considered a basic necessity by the government, the central authority is likely to price it sufficiently cheap to make it accessible to poor people, no matter what the cost of production. Thus, not the market price, but government dictates are the mechanism to ration goods among competing demanders. It is then not unusual to observe shortages or surpluses of goods in a centrally planned economy. For example, a too cheap price may create a situation of shortage, as demand may exceed the supply of goods.

The previous Soviet Union, Cuba, and China are the best examples of this type of economic organization; however, China is now experimenting with market mechanism.

Mixed system or economy

This system is a combination of the above two types of organizations. Some sectors of the economy are centralized or subject to government intervention, whereas other sectors are left to the market. Most of the economies in the world fall in this category, including the United States. For example, there is a quota restriction on imports of sugar to the United States. Similarly, some other agricultural products also are subject to government regulations that influence farmers' production decisions. Most countries of the world are mixed economies, but they differ in the extent of government intervention in economic activities.

Is economic prosperity of a country related to the extent of economic freedom (less government intervention)? We will learn more in the next chapter.