The Key Concepts in Microeconomics and some Implications

(*An Introduction to Introduction to Microeconomics*)

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1 Introduction

So this is an Introductory class for non-majors, that means that I cannot expect you to live a fulfilling and happy life. After all you made the fundamental mistake of not choosing Economics for a major. So what can I do for you poor, unfortunate souls? I can teach you how economists think. I hope this will last with you for a long time, and in the future you'll be able to use it as a module of understanding the world. It is, in all honesty, not the only way to understand events, but part of being an enlightened thinker is knowing different ways to think, different ways to understand things. Being an enlightened thinker is always an asset.

1.1 What is economics?

The dreaded question... like with any discipline drawing a dividing line between it and everything else is extremely hard. For example, phase changes in matter. You might reasonably think that has nothing to do with economics but it does. Apparently atoms like to spin in the same direction as nearby atoms, and if enough of them spin in the same direction you have a solid. In other words, the particles are optimizing and like to be in alignment with others. This uses economics tools for something that seems as far from economics as you possibly can get. On a more pedestrian level, a leaky faucet has nothing to do with economics. But should you get it fixed? Why did you buy such a cheap faucet in the first place? All of a sudden you are surrounded by questions that you need economics to answer.

So... any definition is by its very nature going to be wrong. I mean, if you're talking about economics you probably will talk about a market sooner or later. You'll probably want to characterize what the equilibrium of that market looks like, but these are just likely, not certain. I think possibly the best definition I have seen is:

Definition 1 *The study of choices people make to attain their goals, given their scarce resources*

From Hubbad & O'brien[1], that is an awfully big box, probably too large, but it captures most of what we will analyze. Notice I am not saying, here or anywhere, that everything in this box is economics nor am I saying that you cannot use other methods to analyze these phenomena.

[1] Hubbard, Garnett, Lewis, O'Brien (2013) Essentials of economics. *Pearson*

On the other hand, perhaps a better method of defining the discipline would be to state our fundamental assumptions and go from there. The problem being that—of course—one can find many papers in economics that rejects either one or the other of these axioms. Like any good discipline, economists will and should analyze whether their fundamental assumptions are true and what happens if they are not. But the two fundamental axioms of economics are:

Definition 2 *Rationality—people optimize. Given their preferences they choose an optimal outcome among any set of choices.*

Definition 3 *Equilibrium—the world is in a stable state, or to be more precise it is a state that will not change even if people know that state will occur.*

We will go into depth about these assumptions below, but for now a couple of quick words. First of all, rationality is essentially unverifiable based on simple—one time—observations. An economists first and best reaction to anything should be "well, they're rational so it must be optimal." It does place internal consistency requirements on behavior, and especially in the lab one can test whether it is true, but empirically it is simply an attitude—and a good one. I also doubt that most economists would really argue that the world is perfectly in equilibrium. "Close to", "in the neighborhood of", "unlikely to be too far from" is what most theorists and empiricists in economics would say. After all, econometrics depends on a system being "nearly" in equilibrium in order to estimate it. On the other hand, econometrics and the entire science depends on it being nearly in equilibrium to be able to produce precise predictions.

2 Rationality and some implications

So what is rationality? On the face of it, it is simplicity itself.

Definition 4 *A decision maker is* rational *if they are making an optimal choice given their preferences. These preferences will reflect primitive desires, social expectations, personal goals, and etcetera.*

Notice what it does *not* mean. It does not mean that people are "rationalizable" or "logical" or "sensible" by your personal definition. I mean we live in a world where a large number of people think pounding themselves on the head with a sword is a good thing to do. Even more people who are already at a medically acceptable weight *still* go on diets—essentially starving themselves. I would not tell these people they are not rational. In both cases I'd like to talk about things with them, but I would and should start from the basis of sometimes sensible people do things that I disagree with.

This is, intentionally, an essentially vacuous definition. After all, even soap bubbles optimize. And while I expect you are a little more complex than a soap bubble I expect you at least think you are doing the best for yourself you can. Do

you know anyone who really tries to do badly for themself? Who intentionally tries to do things that will make themself unhappy? If so, please send them to a psychologist. Personally I'd just say that part of their preferences is to make themselves unhappy.

Indeed, the most important thing about rationality is not what it means, but what it tells us about how we should approach our analysis.

Motivation We assume people are rational because we respect our subjects. We recognize that they—who might actually have life or death riding on the outcome of an interaction—probably know more about it than we do. Probably they are making optimal or nearly optimal decisions, and if we think differently then we are probably in the wrong.

History is littered with academics in their ivory towers seeking to preach the truth to the common man. After all, as we all know, the common man was not good enough to get into academia and therefore is not... well how shall we say it... as clever as we are?

If you look at something you have done, something you have written, and realize that *from a certain light* what you have done could be interpreted as you preaching from the ivory tower... well I recommend you throw it out. Think passionately and for hours about how little you actually know, and then come back to the project.

At this point its best to give you a couple of examples to make this point. For my first one I would like to recount the astonishing and disturbing work of Steckel (1986)[2]. He noticed that while it was true that mature slaves were larger than the average American at the time (based on height and weight) in childhood these people were much smaller than the average. Height and weight are a good indicator of the overall health of a population, and were measured each time slaves were sold or shipped from one location to another. After investigation he found out that slave owners and managed to discover an astonishing method that even modern nutritionists could not say would work. Essentially during childhood slaves were fed a very poor diet, resulting in malnutrition and low height/weight. Then sometime around when they were eleven or twelve and could start working in the fields they were switched to a high nutrition diet. The result was that by the time they were 16 the average was above that of the average American at the time. That this diet would work—and any other affects it might have—cannot be verified by modern nutritionists, but by experimentation they found that it did. Now notice these slave owners would not admit to what they were doing. Since American slaves were from a different ethnic group the owners convinced themselves that signs of malnutrition (a shiny skin and a fat belly) were actually signs that these children were healthy. I cannot say how much this upsets me. Because Steckel was a firm believer in rationality, he was able to piece together yet another dimension of the tragedy that was American slavery.

[2]Steckel, Richard H. (1986) A Peculiar Population: The Nutrition, Health, and Mortality of American Slaves from Childhood to Maturity. *Journal of Economic History* 46:721-741

Another example is one first told me by my professor of Development economics—the person that convinced me of the empirical importance of rationality. Apparently in S.E. Asia it was quite common for factories to have a hard time finding workers. Despite the fact that they were offering a higher and more stable wage than farming, rural farmers would not come to the cities and work in the factories. Thus it became common wisdom that they just thought different, and would not work in factories. Development, this reasoning went, had to be a purely urban process and depend on people who already lived in cities. Fortunately one lunatic opened a factory in the countryside. Common wisdom would suggest the factory should fail, but in contrast he was flooded with workers eager to earn the higher wage. The truth of the matter was probably that it was too risky to relocate for the *potential* of getting a job in a factory. When relocation was not required they were eager to work. Notice that in this case the common wisdom *did* claim that the rural people were "rational," just that they had weird preferences.

2.1 Some Key Insights of Rationality

Now I will go over some of the key insights and implications of rationality. In truth, of course, everything we cover will be about rationality and equilibrium, but these are core insights that you will see all over the place in what we are doing. Almost all of them will be talked about more in the future. The point of this handout is to give you an introductory understanding of them, and how they affect our thinking.

2.1.1 Everything's relative

This is not the deep insight of Albert Einstein, it is rather a more pedestrian insight that is used every day. Say, for example, that I told you a cup of coffee cost around 150. Would that matter to you? Your first question, of course, should be which currency I am talking about. For example in Japan that would be about $1, a bargain. In Turkey that would be about $3.50 these days, and that is approximately the current price. However the *real* reason it wouldn't matter to me is because my income (in Turkish lira) is over a million. What really matters to me is the *real price* or price/Income. But this is just one element of relativity. When choosing between x and y the first thing I care about is the relative price, p_x/p_y. Or, on a more abstract level—how far is it to Istanbul from Bilkent University? The simple answer is 454 kilometers, but you have to realize how unimportant that is. Assuming you are driving it could be anything from 4 to 8 hours depending on the time you arrive in Istanbul. If you fly it will take 1.25 hours, but you have to add in the time to get to the airport, check in, wait for your bags on the other end. For most of us, it the important answer to "how far is it to Istanbul" is a combination of how much time it will use and how much it will cost. Now say, for example, that you don't have a car. You could take a bus, but if you can't afford that it will take about four days to walk. Now imagine that the year is 1900. You don't have a car, and even if

you did have a car the "road" is going to be little more than some well worn ruts for most of the way. You see? In each of the situations the answer of 454 kilometers is irrelevant, the amount of time and energy we need to expend on the trip is what matters. Heck, if you are retired you might even make it take longer so you can take in some sights on the way, have a relaxing lunch at a favorite restaurant, and etcetera.

Everything's relative, the absolute value of a price does not matter, it is the price relative to your income and the price of other goods.

2.1.2 It's the Margin, not the Average

In economics we use margin to mean "the last." For example marginal cost is the cost of the last unit. Mathematically it is essentially the same as the first derivative of a function, but it is used more casually. When you are making a decision on *how much* of an input to use one should refer to the *margin*, not the average. The average is only important when you are deciding whether to produce at all, how much to produce is a marginal decision. In general for unconstrained choices in Economics we think of them in terms of Benefit minus cost. Thus the optimal plan is to have the marginal benefit be the same as the marginal cost. For example for a competitive firm the marginal benefit is the price, so we want $p = mc$, or price equal to marginal cost. When deciding how much of an input to use (with a unit price of w) we want $\Delta\pi = w$, where $\Delta\pi$ is the marginal profit of using that input.

But the importance of the margin goes beyond that, margins often set prices. For example a colleague of mine was hired by the Mexican government to explain why the price of oil was so high in Mexico. At the time Mexico exported a lot of oil, and the oil companies were making fabulous profits, so some ministers thought they were being ripped off. My friends answer was straight from the textbook, "where is the marginal barrel of oil being sold?" The answer, of course, was that it was being sold on the world markets. And therefore the price of a barrel of oil in Mexico had to be the world price, because otherwise the companies would do better to export the oil. It was not corrupt executives, merely simple market forces at work.

Another example of this goes back to Adam Smith (1776)[3]. In the diamond/water paradox he asks why the price of diamonds is so much higher than the price of water. After all, we can only live about three days without water[4], and diamonds—while beautiful—are just something nice.[5] On the other hand water is essentially free while diamonds are and were fabulously expensive. The answer is marginal cost, the marginal cost of producing another diamond is extremely high while water is essentially free—especially back then when they didn't know about germs.

[3] While originally published in 1776 the proper citation for it is:
Smith, Adam (2000) The Wealth of Nations. *New York :Modern Library.*

[4] https://www.medicalnewstoday.com/articles/325174#how-long-can-you-live-without-water

[5] In my relentless search to be thorough, I do want to mention that they have a high industrial value as one of the hardest materials on the planet.

I do have to take Adam Smith to task for one thing. Many of you probably think that diamonds are expensive because they are rare. This is not true, the primary reason is because they cost so much to produce. Understanding this is easier if we consider another reportedly rare good, gold.[6] According to livescience[7] we have extracted about 200 thousand tons of the metal, but the earth's total reserves are estimated to be about 400 million tons. "But wait!" (you say, having done a bit of research) "most of that is in seawater and minute particles in the planet's crust!" You got me there, as livescience says it is not "economically" relevant. Did you notice? The only thing stopping you from having a gold plated toilet is cost, not scarcity. Personally I want a gold plated jet airplane, if I'm going to have unrealistic dreams I might as well make them really unrealistic. Like with anything, being "rare" or "scarce" is a code word for "its too expensive." In other words, were back to the marginal cost of extracting more—not its supposed scarcity.

Much better than gold or silver, the best type of unregulated money would be something with a standard production method and therefore a fixed marginal cost. People used to make fun of the original Americans for using beads as money. These beads were made out of seashells with a standard production method and therefore a natural price. Again, the price was set by the marginal cost of production.

2.1.3 Sunk Costs and the Sunk Cost fallacy

Decision making is all about the future, when making decisions one should only consider the future impact and implications. I am not suggesting that you should ignore history, but rather that you should recognize it for what it is: a data set for predicting what the outcome of your strategy will be.

This, of course, leads to the realization that *sunk costs* should be ignored.

Definition 5 Sunk costs *are non-recoverable costs. Like recovering the Titanic the cost would vastly outweigh the benefit.*

The classic example of a sunk cost is a half built bridge or house. No one is going to pay you much money for the half built building, any money you have spent on it cannot be recovered—thus it is sunk. Another simple example is a debt. You have legally incurred that debt and you can't get out of it, so it should not affect your decision making. Going back to the example of housing, a counter example can prove the point. In the mid 2000's when I started working in Turkey there were half finished summer houses all over the coast, students would always bring this up when I discussed sunk costs. However the reason there were all these half built summer houses was because *demand* had collapsed. Turkey had a financial crisis in the early 2000's, resulting in demand collapsing

[6] I should mention that Gold is also a bad example because most of its current value is based on it being used as a type of money. I.e. it is only valuable because we think it is. It has little industrial value, the only reason it is so expensive is because we believe it is worth it. However, this still gives rise to the question of why the supply has not dramatically increased.

[7] https://www.livescience.com/planet-earth/geology/how-much-gold-is-there-in-the-world

and since a summer house is a luxury good the price of summer houses bottomed out. Now all of those houses have been finished and sold.

The worst thing about sunk costs is that people sometimes (at least) claim that they should pay attention to them. This is the *sunk cost fallacy.*

Definition 6 *The* sunk cost fallacy *is treating sunk costs as if they matter.*

My favorite example of people falling for the sunk cost fallacy is the regret people express when they have bought tickets and then do not want to use them. A friend of mine buys the season passes to a symphony every single year, and then once or twice every single year he begs me to go in his stead. "I've paid the money, it seems a shame not to use them." Hey fine, sounds like a guilt trip to me, and I appreciate wallowing in guilt as much as the next guy—but it is a totally specious argument. To be frank his choice has changed, now the cost of going to the concert is merely his time and (possibly) negative pleasure, but the fact he has bought the tickets is irrelevant.

On the other hand, an example where I know you have handled sunk costs properly is waiting in line. You know how it is, when you want to check out the lines are all incredibly long. Then you sit there... waiting... for—has it been a half hour? I think its been a half hour.[8] And **then** disaster strikes. The person in front of you has about twenty items that need to be price checked, needs to get this from over there... you've been there. We have all been. Do you switch lines? Almost always the answer is no, because switching a line means you'll have to restart and no matter how upset you are this jerk is probably not going to take that long. The time you have already spent in line is a *sunk cost* what matters to your decision is how to minimize the time you will have to spend from now on.

2.1.4 Opportunity Cost

So if economists ignore sunk costs what do they think you should pay attention to? We call these *opportunity costs*:

Definition 7 *An* opportunity cost *of a good is the value of the second best option. This is at least the market value of the second best option, but usually includes a personal component.*

I like to break opportunity costs into two different types. *Empirical* is the market value of a good or service, the *Personal* is anything else. The empirical is often the part that you will overlook, so for students the empirical is probably the most important.

Perhaps the most important example of an opportunity cost is the cost of a unit of capital in our analysis, r. Most firms own their factories and machines, so how do we estimate this? We ask the counter-factual of how much they would get if they rented this factory out. An accountant would (and should) list this

[8] Personally I set a timer in a situation like this. I always find that I overestimate the time.

as profits, but to economist it is simply the fair wage that should be paid to the capital the firm invested in.

To give an example where the personal significantly outweighed the empirical. Consider the dean of Bilkent's faculty of economics and social sciences, Refet Gurkaynak. When he became an assistant professor at Bilkent he was working at the Federal Reserve in the United States. It goes without saying that his total lifetime income would have been higher if he had stayed there, but he chose to come back to Bilkent university. The opportunity cost of working at the Fed was dwarfed by the value of being a faculty member at Bilkent. I should mention, by the by, that this is true for most faculty. Most of us at one time or another had an excellent chance to make more money than we are right now and choose to be an academic. Think about this when you ask them for financial advice.

Another excellent example is living in an apartment that you own. Many who do this will claim "but rent is free." No, please don't bother, that is a fallacious argument. You could always rent out the apartment and live in a cheaper apartment and make more money. For example I myself did this for about fifteen years. I owned an apartment in Ankara and rented it to others because Bilkent gives me an apartment on campus. The campus apartment was not as nice but the extra cash was worth it. If you want to look cool you call this "buying for investment" but it is simple opportunity cost. Owning the apartment you live in is nice for many reasons, but the rent is not free.

2.1.5 Utility maximization 101—maximizing the bang for the buck.

Utility maximization is fundamentally different from a firm's maximization problem because we have a fixed budget to spend. When you recognize that savings is also a type of consumption, you realize that you will always end up spending all of your income. How does this change things? Since you are going to spend all of your income you now want to maximize the return (*marginal utility*) per unit of money you spend, or the *bang for the buck.*

Definition 8 *The* bang for the buck *is the ratio of the marginal utility from purchasing more of each good per unit of money spent, or:*

$$BfB_x = \frac{MU_x}{p_x}$$

And (as long as your preferences are convex) utility maximization boils down to nothing more than maximizing the bang for the buck. Of course you might ask me how to estimate the marginal utilities, and all I can say is that's a personal issue. However you don't need to worry if your estimates are "empirically correct" because however you do it the result will work out.

Then the insight is very simple: if $BfB_y = \frac{MU_y}{p_y} > \frac{MU_x}{p_x} = BfB_x$ you should buy a unit of y. This is especially useful if, for example, you have to choose how to spend your allowance at a shopping mall. As long as each choice you make maximizes your bang for the buck, in the end you will achieve a

(nearly) optimal decision. It makes what otherwise could be a very complex problem much simpler—though of course constantly re-estimating the marginal utilities would be a pain.

3 Equilibrium and related concepts.

As mentioned above, I doubt many believe that we are actually in equilibrium.

Definition 9 *An* equilibrium *is a potential steady state of a system. I.e. if we are in this state then we will remain there. In a* social *equilibrium this means that even though everyone knows what they state is it will not change. In an* economics *equilibrium it will not change because everyone is behaving rationally, even though they know the state.*

Let me be clear this does not mean that there is no uncertainty in the outcome. For example, no one knows the unemployment rate for the next quarter but that does not mean we are out of equilibrium. A more exact example is the game of rock/paper/scissors. Everyone knows that in this game your goals are to predict what the other is doing while being unpredictable yourself. In an equilibrium of this system these goals should be realized, and there is such an equilibrium.

However rock/paper/scissors is an excellent example of how we are not *exactly* in equilibrium. In equilibrium you would have to give up on predicting your opponent because they would be truly unpredictable—indeed champions try to make sure they are behaving in an unpredictable manner. In contrast we constantly try to predict what others will do and sometimes succeed (especially if they are young, snort snort).

On the other hand if the equilibrium in our model is too far from what we observe, we should throw the model out. Likewise, when making a prediction of what is going to happen the best one should be "nearly" at the equilibrium. In most interactions if we are too far from equilibrium then basically anything can happen. Thus it provides a disciplining device both for modeling and estimation.

For example, consider the side of the road game. We all know that it has two equilibria. In Cyprus, for example, you are supposed to drive on the left hand side. In Bulgaria, the right. In 1967 Sweden switched from the left to the right. Thus we expect (and will observe) that in some countries almost everyone will drive on the left and in others almost all will drive on the right. Do you occasionally see people driving on the wrong side? Sure, especially, for instance, if the road is very narrow and twisting through the mountains with cliffs on one side. Trust me, you'll drive on the opposite side from the cliff and just pray a car isn't coming the other way.[9]

[9] When this happens don't stress too much, just go slow and keep an eye out. After all everyone knows how behavior is going to change in this situation. A local equilibrium takes over the national equilibrium.

The *really* stressful bit is when you have to drive on the cliff side to pass a car coming the other way. I have had locals volunteer to drive on the left because they could see how scared I was.

One thing I do want to mention. Take a bowl, turn it upside down, and now *carefully* balance a ball on top of it. That is an equilibrium, ask anyone. But—you say—its not stable. And I say to you... so what? Especially in Economics where—to be frank—out of equilibrium dynamics are not well understood. What is stability? That is an excellent source of discussion and argument, frankly speaking we don't have a clear answer. In short, while stability is an appealing concept it is very hard to define and measure.

3.1 Markets as a "Natural Lifeform."

The hardest task for a government to achieve is to shut down trade. Trade is one of the most primitives of social organisms, not a "lifeform" but something similar. I mean I have something you want, you have something I want, we exchange them. It is also natural for these markets to grow and become more and more complex, and quite often they'll invent this thing called government to make themselves run better. Most of us aren't aware of it, but these days even the most humble market is wrapped up in all sort of complex interactions. Consider what I am doing right now, teaching. You paid money to my university to have a *chance* to get an undergraduate degree. As a point of fact, the degree would be worth less if it was given to you no matter what. You paid money for the chance to fail. Then they paid me money to teach you, again trusting me not to just hand out grades willy nilly—even though its in my short term best interest to give everyone an A.

But, you say, the government came first. Did it? Really? Have you heard of smuggling? Have you ever really thought about what organized crime does? I don't want to live in a world where someone can have their legs broken if they don't repay a loan. But you and I both know some people would be happy to sign such a contract. Who writes the contract? Who enforces it? Lets say that someone needs to smuggle an illegal drug across the globe. Who is going to hire the pilots? Who is going to make sure that they don't just take the drugs and run? The answer in both cases is organized crime, now did organized crime come before these trades or did the trades create a need for organized crime?[10]

3.1.1 The Competitive Market and the Invisible Hand

Let's be honest. Big business is not your friend. They are not out to make you happy and healthy... wait, scratch that, if you give them a big pile of money to be happy and healthy they're all for that. No, I am not criticizing big business, it is simply not their job and shouldn't be. Their job is to make the largest pile of cash they can, their stockholders are counting on them for it. And likewise when you go to the market you don't care about whether a business is offering too low a price, whether they might go bankrupt. You just want to pay as little

[10] I would like to admit that this is not really a "chicken or the egg" question. Markets clearly came first, but they benefit from governments. At the same time governments do serve other purposes. Only a slightly loony economist would claim they only exist to serve markets.

as possible for the goods you want. Selfishness, or rather self interest, is the rule.

But then we all face competition. Say, for example, a firm is offering a good for a high price, that encourages others to come along and offer the same good for a lower price. Competition, oftentimes cutthroat, drives prices down as low as they sustainably can go. Likewise, if you make a really low offer on some real estate, odds are very high that someone else will come along and make a better offer. You are taking a risk, and the more active the market (the more competitive) the bigger that risk is. This competition hems us in, forces us to make decent offers, forces firms to offer us the best price they can.

And what happens if some market does not have enough competition? What happens when there is something people need but it isn't available? Clever business people enter these industries because they can make a big pile of money. But, at the same time, they are fulfilling our needs.

It is as if there was an "invisible hand" (Adam Smith, 1776) floating over the market.[11] Even though each and every individual behaves like a selfish jerk, in the end the needs of society are met with a minimum of fuss.

It is rather beautiful. That beautiful construction is an organic, self-organizing one, assisted but not dependent on government.

3.1.2 Pareto Efficiency

The way an economist expresses the beauty of the market is with a concept called *Pareto efficiency*. Now, as I will make clear, it is not the only welfare concept nor is it necessarily the best, but it is a beautiful thing to be able to say about competitive markets.

Definition 10 *An* allocation *(usually denoted A, B, etcetera) is a list of what everyone in society gets. A complete list of what each person receives.*

Definition 11 *An allocation A* Pareto dominates *an allocation B if everyone prefers A to B and some strictly do so.*

This is also referred to as a *Pareto improvement*, we would say *A Pareto improves* on *B*. I have to admit that is a truly appealing concept. It is kind of hard to argue with if you take people's happiness as the basis of welfare. But it would be unfair if I didn't point out that basing welfare on happiness is not always correct. I mean, for example, say that there was a magic substance that turned us all into vegetables but made us supremely happy. Should it be legal to buy and sell? You all know that such substances exist, and governments generally make them illegal.[12] The people backing such legislation would argue that they are maximizing welfare, and to be frank I would agree with them. I would not want to live in a world where babies could buy alcohol, or anybody

[11] I looked for a direct quote on this and learned that Adam Smith doesn't write great quotes.

[12] Probably because they want organized crime to make a killing. ;)

could freely take heroine. But if you think about it, clearly that would Pareto dominate, wouldn't it?

Definition 12 *An allocation A is* Pareto efficient *if it is not Pareto Dominated.*
(or) An allocation is Pareto efficient *if any changes that makes some happier makes others strictly worse off.*

Pardon me while I get on my soapbox. Some refer to this concept as "Pareto Optimal" and that angers me. "Optimal" suggests "good" and it is very easy to see that something can be Pareto efficient and not good. For example, suicide bombings are Pareto efficient. These are morally repugnant, but clearly Pareto efficient. I believe most use Pareto efficiency because of this. The reason a suicide bombing is "efficient" is because at the cost of (possibly) many innocent people's lives the suicide bomber gets their best possible outcome—one worth dying for. That is "efficient" in the sense that there is no social waste, but personally I would never describe it as optimal.

A truly amazing fact is that the natural lifeform that is called a competitive market achieves Pareto efficiency.

Theorem 13 (First Welfare) *The equilibrium in a competitive market is Pareto efficient.*

I should be clear that this requires many assumptions that are not met in the real world, thus it is only a descriptive result. What is clear is that (monitored) competitive markets are awfully good at allocating goods. Take, for example, East and West Germany. When they were split up they were on essentially the same level, but when they reunified West Germany was substantially more developed and I think most would agree a better place to live. Or consider North and South Korea, at the time the nation was split in two the North was wear all the industry was. It was substantially better developed, the South was all farms and vacation spots. But now? While we can not be sure how North Korea is doing South Korea is one of the worlds most powerful nations with an extremely high GDP per capita. Competitive Markets work, I have never seen any other economic organization that works as well. That is a simple empirical fact. That does not mean I am a "capitalist." Every government monitors and intervenes in markets, redistributing wealth from the well off to the poor, taking care of their citizens when disasters strike. Some do it less, others do it more. Keep your labels off of me.

Those fools who like to frame competitive markets as anti-communism often like to think that in a competitive economy you "get what you deserve." I.e. if you are rich you are rich because you deserve it, and of course if you are poor the reverse is true.[13] This has never been and never will be true. Am I worth less than a Wall street analyst? Am I worth more than some medical doctors? I have no idea, but I'm not going to refer to my salary to justify it either way. Did Refet Gurkaynak loose value when he decided to come teach at Bilkent university?

[13] For some reason the rich seem to claim this the most.

Let me give you a couple of examples. Mrs. Smith was my fourth grade teacher, when she retired a horde of students descended on her house to thank her personally. She was amazing, so kind that you were good just because, and such a great teacher. I know she had a much larger impact in my life than I will ever have in yours, but at the same time I make more money (in real terms) than she did. As another example, during COVID19 I would suggest some of the most important people were cleaning staff. Without their daily efforts the epidemic would have been so much worse. But frankly cleaning staff never makes real money.

To be frank you should realize this is a ridiculous question to ask. After all "what you deserve" is based on your total contribution, while market prices are based on margins—marginal benefit or marginal cost. If this was something the competitive market did then water would cost more than diamonds, would it not?

4 Conclusion

You should keep this handout close at hand throughout the semester. I encourage you, at any time, to ask me how a particular topic relates to something in this handout. In a sense, everything I teach should boil down to rationality and equilibrium, and if you feel like I'm off topic let me know and I will be eager to discuss it.

Of course there are more insights than this handout that are generated in economics. These are simply the most general, the most critical to our way of thought. We will return to each of these topics throughout the semester, and if you feel like I've been overly vague here then hopefully when we return to the topic I will be able to be more precise.

I hope this handout has been a fun read that gives you an overview of economics and our way of thinking. If you have any feedback I would greatly appreciate it.