

PRINCIPLES OF BEHAVIORAL ECONOMICS

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Week 04

Lecture 04

Hello, and this is Lecture 4 of the course on behavioral economics. In this lecture, we are going to talk about the neoclassical tradition, basically outlining the assumptions of neoclassical economics. What are the main pillars or thoughts of neoclassical economics? Before we can appreciate what behavioral economics is about and what it is trying to achieve,

we need to know enough about the assumptions and principles of neoclassical economics, the theoretical tradition from which it developed or rather the theoretical tradition that was contested by behavioral economics. The mainstream and neoclassical economics approach has a very definite view of the economic agent, which we have already talked about: the homo economicus, or in short, we call it ECON. So, how are these ECONs? In contrast, behavioral economists adopt a different view, one based on flesh-and-blood HUMANS.

It is important to know what behavioral economics is not, and this can only be understood by knowing what neoclassical economics is. Neoclassical economics owes much to the highly influential 1890 book, *Principles of Economics*, by Alfred Marshall. This book came to represent what is meant by academically rigorous and acceptable economics—then as well as now. Not only did Marshall distill the major assumptions and principles of economics at that time, but he also illustrated them with captivating graphs, which allowed visualization of complex mathematical relationships.

This set the tone and provided the analytical template for the years to follow. Marshall's work centered economics around several major concepts: rationality, preferences, and utility maximization. Efficiency has always been at the heart of these processes—that is, getting the most utility out of the allocation of scarce resources. It is utility, and when it comes to firms, it can be the maximum output produced at the minimum cost. That is how efficiency can alternatively be defined.

At its conceptual core, neoclassical economics assumes individuals act on consistent preferences, and it takes the maximization of personal—that is, self-interested—satisfaction or utility of these preferences as its normative criterion. That is the way things should work. Normative principles always emphasize 'should' and 'ought.' It is the combination of these notions that comprises what is meant when you talk about neoclassical economics.

Alfred Marshall may indeed be credited with instilling the desire to base economic theorizing on sound mathematical foundations, but he was sensitive to its limitations as well as its allure. As he stated in a letter to A.L. Bowley in 1906: 1) Use mathematics as shorthand language rather than as an engine of inquiry. 2) Keep to them till you have done. 3) Translate into English, then 4) illustrate by examples that are important in real life, then 5) burn the mathematics.

If you cannot succeed in 4, so basically if you cannot illustrate by examples that are important in real life, then burn 3. This I do often, so basically it is the usage of mathematics. Which is understood to simplify certain understanding. Marshall's view was later reiterated by none other than John Maynard Keynes, who was not himself averse to complex equations. He said, "Too large a proportion of recent mathematical economics are mere concoctions, as imprecise as the initial assumptions they rest on, which allow the author to lose sight of the complexities and interdependencies of the real world in a maze of pretentious and unhelpful symbols." -Keynes in his 1936 book.

Even more recently, the limitations of a too narrowly defined mathematical economics were highlighted by Mervyn King in his 2016 critique of the financial crisis of 2007-2008, since, as the then Governor of the Bank of England, he was in an excellent position to know. Yet, despite Marshall's warning, neoclassical economics developed along very specific mathematical lines, combining algebraic rigor with economic laws to establish a powerful social science with considerable practical implications and applications. As the financial crash revealed, sometimes crucial factors like different types of debt and their levels are left out of economic models to render them mathematically tenable.

The predictive failures of these models even surprised those who held them most dearly. When thinking about preferences and utility maximization, neoclassical economics assumes two entities: The individual, also referred to as the consumer, the idea is that we are always consuming something, and the second is the firm, the second entity. Both the

individual and the firm are said to seek to allocate their scarce resources in the most efficient manner in order to maximize their payoff.

So, we as consumers are maximizing our utility, and firms are maximizing their output at the minimum cost. Payoffs, in the case of individuals, are some form of happiness or utility, and in the case of firms, profit or some other value measures—for example, market share, etc.—are basically payoffs. It is indeed interesting to note that the same analytical machinery of neoclassical economics is applied to these seemingly very different economic entities. It may be for this reason that neoclassical economics appears to contain such a circumscribed vision of the individual human agent.

In any event, to properly understand the neoclassical economic view of the consumer, we need to know something about the firm. Central to Alfred Marshall's neoclassical economics work was the characterization of what is known as the firm. This is the focus of the subfield of microeconomics. In its pure form, the theory of the firm contains several defining features.

First, for certain types of markets, firms are assumed to sell homogeneous products. Homogeneous products are most often identical products, so that the product from one firm is a perfect substitute for the product sold by another firm. Alternatively, we cannot distinguish between the products sold by different firms. In the modern world, though, brand marketing is all about differentiating products. Nevertheless, neoclassical economists begin with such simplistic assumptions.

Second, the firms are said to be price takers, not makers, which means they treat the market price as given. This is precisely the assumption for perfectly competitive markets. Of course, there are questions about whether perfectly competitive markets exist in reality or not. But these are assumptions specifically made for perfectly competitive markets, whether sellers or firms are price takers. Third, it is assumed that there is free entry and exit in the market.

With perfectly mobile factors of production—for example, labor, capital, land, as well as intellectual talent—at least in the long run. In many sectors of our modern-day economy, this is actually far from reality. Finally, both firms and consumers are assumed to have perfect information so that no seller can sell at a higher or lower price compared to its competitors. These assumptions allow the construction of elegant mathematical models that can be used to describe, understand, and predict the future. For example, what would be the consequence on consumer demand of raising the price of petrol by 10%?

The manner in which consumers react to a change in unit price is known as the 'price elasticity of demand'. Marshall's work has been influential. For example, he is famous for introducing into economics the standard supply and demand graph, which is now contained in every economics textbook. The graph relates the supply and demand curves. As you can see, there is one supply curve and one demand curve. The supply curve is upward-sloping, and the demand curve is downward-sloping. Then there is this market equilibrium—how the quantity supplied or demanded is related to the price.

So a downward-sloping demand curve indicates that price and quantity demanded actually move in opposite directions, of course. Whenever there is a change in the price, the quantity demanded moves in the opposite direction. Similarly, an upward-sloping supply curve implies that there is a positive relationship. Whenever price changes, supply also changes in the same direction in which the price has changed. The law of marginal utility and the law of diminishing returns are also present in his works.

This graph, particularly, does not depict the law of marginal utility and the law of diminishing returns. This has become the principal—and the principled—way economists communicate their ideas for a large part in neoclassical economics. All of the above assumptions introduced by Marshall and elaborated by others have been scrutinized and challenged. But before we dismiss the characterization of the firm as unrealistic, even silly and out of step with the modern world, there remains an open question.

Do these assumptions contain a good enough representation of economic reality to make them viable and useful for practical purposes? Few people would say they are a perfect representation, not even neoclassical economists. Ideally, what it means is that nobody would say that this is a perfect representation. This is what Milton Friedman had to say about Marshall's conception of the firm: "Marshall's apparatus turned out to be the most useful for problems in which a group of firms is affected by common stimuli,"

And in which the firms can be treated as if they were perfect competitors. This is the source of the misconception that Marshall 'assumed' perfect competition in some descriptive sense." Now, talking about the consumers, the neoclassical conception of the individual consumer, who are basically our homo economicus or ECON, has a set of definite characteristics that resemble those of the firm. However, instead of seeking to maximize profit,

the individual consumer is said to seek to maximize their satisfaction, happiness, and welfare, which we broadly call utility. The individual consumer is assumed to have a set

of complete and transitive preferences, which means they have a complete ordering of their preferences for various goods and services. For example, do you prefer cream cakes over apples or apples over cream cakes? So this is only two options. This is still easier to answer.

If I have 10 products kept in front of me, what the assumption is all about, that I'll be able to rank each one of them in terms of my preferences. These strict assumptions are often relaxed to deal with reality, but for neoclassical economics to work, it must assume that, to a sufficient extent, people conform to these characterizations, especially when they believe in the market context with 'real money on the table'. This could be actual money or something else of importance to the individual consumer, for example, some romantic attachment.

In this context, it may be said that when people are properly incentivized to optimize choices and maximize their utility, their latent preferences will be revealed in their choice behavior. While there will be gross failures by some individuals, the aggregate behavior of market participants is assumed to conform well to these characteristics. From this idea mentioned above, the theory of revealed preferences came into existence. Otherwise, neoclassical economic models would be descriptively flawed and predictively hopeless, perhaps to a damaging degree.

The fact that these assumptions are not truly a reflection of reality does not trouble neoclassical economists much. They say that less-than-perfect models are better than no models at all. However, such rigorous mathematical models allow deviations from neoclassical predictions to be quickly spotted. Behavioral economists have found this possibility positively inspiring. As we dive deeper into what is meant when we talk about neoclassical assumptions and principles—and especially when we consider the notion of rational behavior—

we will quickly grasp the importance of marginalism, which applies equally to firms and individuals. Marginalism is especially important in economics because it shows that efficiency, a key part of rational decision-making, is always obtained at the margins of activity. And what is meant by margin? Margin, as we know, is always toward the end, toward the side of any paper or anything. So margin is basically what is happening at the end.

This is said to apply to all decision-making situations, for example, relationships, and not just those of an explicit economic nature. To illustrate the principle of marginalism, a firm producing a widget should increase production to the point where the marginal cost of

production, that is, the cost of making one extra widget, say 10 rupees, is equal to the marginal return from selling the additional widget, that is, 10 rupees. When the marginal return is 9 rupees, extra production should cease as a marginal unit loss of 1 rupee is incurred. So basically, at the end, marginal cost should be equal to marginal revenue.

This reasoning provides a useful way to think about how many widgets a firm should produce, and it is a useful way to think about the decision-making of the individual consumer. We should stop consuming when the costs outweigh the benefits. We can even turn this around and say we should stop producing, for example, investing in a relationship, when the marginal return has turned negative, where marginal cost is now greater than marginal benefit.

So this has actually also been talked about in behavioral economics. And a lot of anomalies are observed. So following the neoclassical view, a rational individual would come out of a relationship, the moment the relationship becomes sufficiently sour to continue being there. So what we would do is that if we feel that being in a relationship is

giving more pain compared to the pleasure, then we will come out of the relationship. But it has been observed in reality that people continue being in the relationship for several years. What explains this? Rational thoughts and neoclassical models fail to explain that. But behavioralists have tried to explain that.

We will be talking about it later. In this way, it would be a mistake to average costs and benefits over a longer time frame, which we most certainly do in personal relationships. We forgive but less often forget marginal transgressions. Obviously, there is a time frame over which marginal costs or benefits are considered, and this may well differ from person to person and domain to domain. Marginal utility is a fundamental concept in neoclassical economics, and it is a useful way of thinking about all economic activity—that is, the most efficient allocation of scarce resources.

The law of diminishing marginal utility says something especially important: The more we consume of something—for example, food or talking to friends—the less utility we are likely to derive from each extra unit of consumption. It is actually very common. Every one of us can relate to this. I want to eat ice cream.

I eat one ice cream, and if I'm offered another one, I may still go for another one. But a third one, I would say no. So as we keep on consuming one particular thing at one go, our additional satisfaction or utility generated from further consumption decreases. So there

often comes a point where we have 'had enough', and each additional unit no longer brings pleasure. In the sense that if I am forced to eat another ice cream, then I might get some dissatisfaction, disutility or stress.

Instead of having positive utility or pleasure, I will be in the negatives. Therefore, we would be better off by stopping or reducing one behavior and switching to another that has a higher level of marginal utility. This makes good sense. And we can easily relate it to everyday life. This diagram also depicts something like that.

When we are at the consumption level of 3 to 4, then the increase in utility or happiness measured along the vertical axis is pretty steep, much more compared to when you are increasing it from 28 to 29. It has flattened. I do not want anymore. To put things slightly differently, the doctrine of diminishing marginal utility states that we should continue eating cream cakes.

Until the additional bite does not produce marginal, that is, extra utility or pleasure— A point might even be reached when the marginal utility is negative, that is, disutility—no more pleasure. More formally, we should continue to consume until marginal utility equals marginal cost. So compelling is the idea of diminishing marginal utility that when an individual violates it, we are inclined to say they have a problem. For example, excessive game playing, Twitter use, or pathological behavior like an addiction to gambling.

These are, from the rational perspective, problematic behaviors. But they are abundant around us. So things are not quite straightforward. We may have a very strong preference for something, say cream cakes, and by consuming it, we are maximizing utility. A problem would be identified if we are neglecting other aspects of our life.

For example, job, family, etc. In the exclusive pursuit of this one guilty pleasure. Now, talking about axioms of consumer behavior, neoclassical rationality requires preferences to satisfy, first of all, five broad axioms. First of all, completeness. Consumers can rank all possible choice bundles: for any two options A and B, they prefer A to B, B to A, or they are indifferent between them.

Then we have transitivity. So an example of completeness is that a consumer can definitely state they prefer oranges over apples over lemons. So now I have considered three commodities. In transitivity, what we say is that if oranges are preferred to apples and apples are preferred to lemons, then oranges should be preferred to lemons. Violations imply irrationality.

The third assumption is more is better. *Ceteris paribus* means everything else held constant. Which is again a pervasive concept in economics. More of a good is preferred to less. Exceptions include bads, for example, pollution.

Continuity: small changes in quantity should not cause abrupt preference shifts. Convexity says, Consumers prefer diversified bundles to extreme bundles. For example, a mix of apples and oranges over only apples or only oranges. That is most commonly the preferences that are expressed.

There could be exceptions also. Behavior fulfilling all five axioms can be considered consistent behavior. Consistent behavior based on consistent preferences is a key aspect of neoclassical economists' definition of rational behavior. So, rational behavior and consistent preferences are closely related. The key principles in neoclassical economics are, first of all, marginal analysis.

Decisions are made incrementally; that is, we consider things happening at the margin. For example, a firm produces until marginal cost equals marginal revenue. Sunk Cost Fallacy. Rational agents ignore irrecoverable costs. For example, a non-refundable concert ticket.

However, humans often honor sunk costs due to loss aversion. We will talk about the impact of sunk costs on our decision-making later while discussing behavioral economics. But for now, rational agents are assumed to ignore any such costs which are already incurred and cannot be recovered. It should not impact your future decisions.

That is what neoclassical economists suggest. Number three: Opportunity Cost. Cost-benefit analysis must consider opportunity cost, the cost associated with the next best foregone alternative. So whenever we talk about cost in economics, that is actually economic cost, which consists of two components.

One is the accounting cost, also called explicit cost, the cost that we see, which is recorded in our bookkeeping of costs. And the second component is opportunity cost, which is also called implicit cost because it is not visible. This is only calculated in our minds. Then, the fourth concept is incentive response. Economists respond to incentives.

It aligns with the matching law of behavioral psychology, which shows that even simple animals allocate their behavior among different choice options in a way that maximizes their total reward and thus their utility. So, just as animals respond to incentives, human beings—or rational human beings—are also expected to respond to incentives. All rational

behavior aims to maximize utility. Utility can be conceptualized as satisfaction, happiness, or welfare.

Individuals act as *homo economicus*: self-interested, consistent, and forward-looking. If you are allocating \$100 for a night out, your aim is to maximize your total utility. The way to do this is to apply the principles and procedures of expected utility theory, which is another major workhorse of neoclassical economics. We will now briefly talk about Expected Utility Theory. It was proposed by, or the major proponent was, Von Neumann and Morgenstern, though the initial work was done by Daniel Bernoulli.

It shows that, given a number of axioms, a rational decision-maker faced with risky or uncertain outcomes of different choices should behave in a manner to maximize the expected value of utility. For example, A gamble with a 1.25% chance to win \$100 and a 98.75% chance of \$0 has an expected value of \$1.25. A rational agent should prefer this over a guaranteed \$1. Alternatively, I can state it as follows: one is presented with two options.

The first option, let us call it Option A, is you have a 1.25% chance of winning \$100. And, of course, this implies that there is a 98.75% chance that you will not win anything. And Situation 2 is that you have a sure gain of \$1. So, this has a 100% probability. Now, expected utility theory says that rational individuals should opt for Option A.

Even though the probability is very small, that is because the expected value from this option is 1.25, while this is simply 1. So, since this is greater, the expected value is greater; people would be opting for this one and not this one. The criticisms of EUT are, first of all, it is empirically violated because there are concepts of risk aversion. People prefer certain outcomes over high-EV gambles or expected-value gambles.

For example, taking \$1 instead of a \$1.25 gamble. People prefer sure-shot gains. People portray or display a very strong preference for sure-shot gains. So, it has been observed empirically that chances are higher people would opt for \$1 instead of going for the gamble where the chance of winning \$100 is very slim. Then the second thing is prospect theory by Kahneman and Tversky.

People evaluate losses differently from gains. So, there is, loss aversion is higher —losses pinch more compared to gains. As a result, people would not prefer to dwell much in the arena of losses; rather, where the possibility of gains is higher, they would prefer to go for that. So, this is a major criticism of EUT. With this, I conclude this lecture.

These are the references, and thank you. In the next module, we will continue with certain other psychological aspects that are broadly discussed or used in the field of behavioral economics.