Microeconomics: Theory & Applications
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Lecture – 6
Comparative Statics & Marshallian Consumer Theory

Hello welcome back to the lecture series on Microeconomics. So far we have discussed the core theme of microeconomics which is market mechanism, and some basic mathematical tools which are useful for micro economic analysis. Now we are going to look at another analytical method which is very useful in microeconomic analysis. The name of the method is Comparative Statics.

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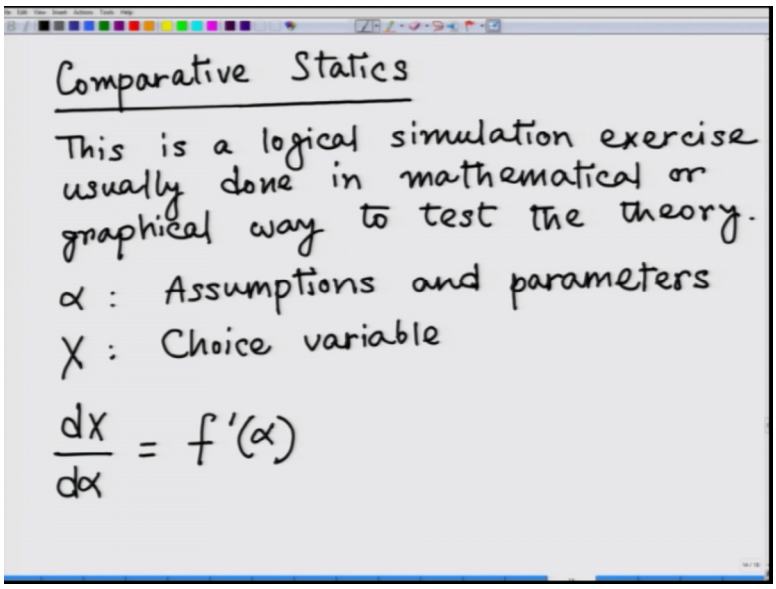

Now, what do we mean by comparative statics. If you remember when we develop a model, and we are looking for the equilibrium values of the decision variables in this model, then obtained values the equilibrium values of the decision variables depend on the assumptions we make and the parameters that we have kept fixed in the model.

So, if there is a change in either of these 2 categories no namely parameters and assumptions then of course, our equilibrium value you know of the decision variable in the model they are going to change. So, that analysis is called a comparative static analysis, where we test different theories by changing the assumptions and the parameter values and see what impact they will have on the equilibrium values of the decision

variables. So, comparative statics is basically a logical simulation exercise usually done in mathematical or graphical way to test the theory.

Now, let us go back to that discussion on theoretical models. So, suppose we have alpha as the set of assumptions made for model building and parameters which are kept fixed and x is my choice variable or decision variable in the model. Then in the comparative statics analysis, we are looking for this derivative. And in a comparative static analysis we are mostly interested in the sine of this derivative.

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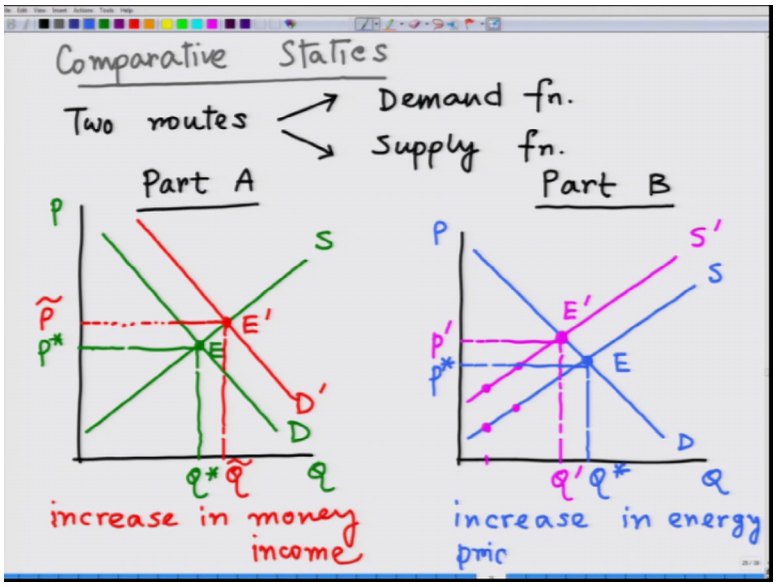

Now, comparative statics is what it is basically you know put in a nutshell, if you change the assumptions and the parameters in the model, how your equilibrium values of the decision variables change the range in the model.

So, from what the assumptions and the parameters can change? Of course, these changes can come from 2 roots. They can come from the demand function, because while we have derived the demand function we have kept certain things fixed. And we assumed certain things and also when we have derived the supply function we have kept, certain things fixed a change may occur they are also.

So, we will show briefly 2 instances. In case number 1, the change will come from the demand side and in the; so, this is part A where the change comes from the demand function. And there is part B where the change will come from the supply function. Let

us first complete the story of part A. So, let us again you know draw our simple demand supply diagram. By the way these demand and supply diagram is basically the invisible hand that was the term that professor Adam Smith coined back in 1776.

So, demand and supply are like 2 invisible hands in the market institution, which basically you know interacts to find out the equilibrium price and the equilibrium quantity brought and sold in the market. Now here we can see that we have drawn the demand and supply functions a simple market and you know this is the equilibrium that these model has. So, we have you know P star and we have U star, oops I forgot to label the axis, never forget to label the axis when you are drawing an economic diagram.

So now that let us assume that there is this case or of increase in money income. So, the consumer all on a sudden finds some extra bit of money in his wallet. So, if that happens we assume nothing else changes. So, the prices and if taste and preferences of the consumer everything remains the same. So, if that happens how the consumer is going to react. The consumer is going to definitely increase it is demand, because in this model you cannot save. So, if you have some extra amount of money, you will spend that money to purchase more units of the commodity. So, the demand function will shift parallely right towards to D prime, how? Because at every price you see now the quantity demanded is higher.

So now this is a case of changing equilibrium. See, now the new equilibrium will be obtained at this intersection point. So, if I denote the previous equilibrium by E, the new equilibrium is E prime. And at this equilibrium a new price say P tilde is obtained with a new quantity equilibrium quantity Q tilde, right. So, this is basically a comparative static analysis where you compare the point E and E prime the journey from E to E prime. Now let us talk about the same comparative static analysis in the case where the change in the model comes from the supply side.

So, let us now draw the demand function, a straight line one as I did last time. And of course, a straight line supply function, this one. Now when we draw a supply function many things are kept fixed. One of them would be like the weather condition; the other thing could be the input prices. Suppose input prices have changed.

There is some rise in say price of energy input. So, if that is the case, then to produce each unit of quantity, now the producer the seller has to incur a higher level of cost. So,

in that case the supply curve will move upward whether to parallely or not that is a different issue, but it will move upward. So, at every level of quantity being produced the cost of production is higher, you know, you remember that each point on these supply functions are basically the marginal costs that we will establish later, but as the cost of production goes up, the minimum price required for profit maximization of the producer will be much higher.

So, the supply curve shifts up for each quantity level the supplier will require higher price. So, the earlier equilibrium was denoted by point E, the new equilibrium where demand will equate the supply is obtained at point E prime, right. So, you can see very well that at this new equilibrium point the price is P prime quantity brought and sold is Q prime. The original equilibrium had price P star and Q star. And comparison between E and E prime will give you the comparative static analysis. So, let me summarize here at the bottom.

So, this case is basically a case of increase in energy price. So, let us first look at comparative statics analysis in the context of a market. Now we are going to discuss the modern consumer theory, which will start with the work of Professor Alfred Marshall. His work could be considered as the first systematic attempt to derive a demand function. So, before we start with his model what is utility?

According to Jeremy Bentham utility is a subjective sensation like pleasure satisfaction etcetera. Now along with the concept of utility there is another concept which is useful in the theory of consumer behavior, namely marginal utility, what is marginal utility? Marginal utility is the additional benefit that a person gets from one-unit extra consumption of a particular commodity. So, let us have the mathematical representation of total utility and marginal utility.

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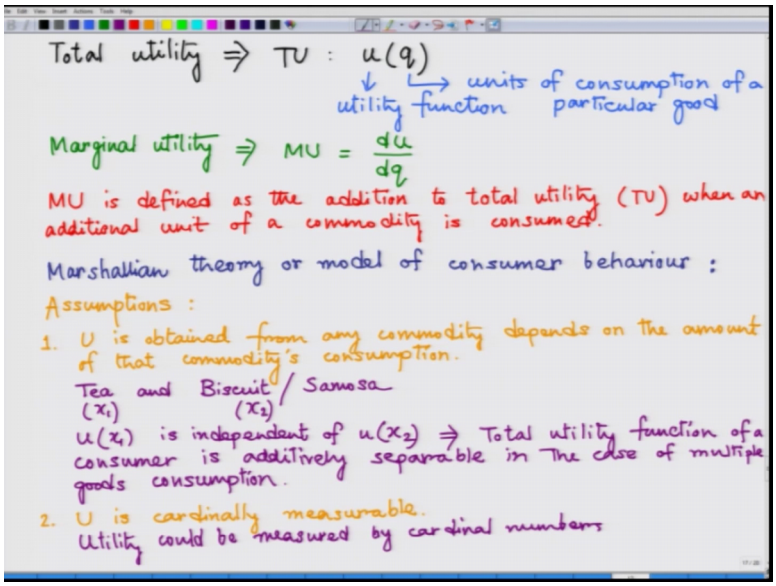

So, I define total utility as TU this is abbreviation and this is defined as a function of the units of a particular commodity consume. So, here U is called utility function. So, it is a mathematical function, which is defined over the units number of units of consumption of a particular good or commodity. Now the concept of marginal utility is very important in economic analysis. Marginal utility is abbreviated as MU and using our knowledge of differential calculus, we can write this as a derivative. So, this is the first order derivative of the utility function that we have just written above. Now in words now we are ready to start with the Marshallian theory of consumer behavior which is also known as the cardinal utility analysis.

So, we will first start with the assumptions. The first assumption is utility I abbreviate this as U big U obtained from any commodity depends on the amount of that commodities consumption. Now this has an implication. So, if we assume that we are dealing with 2 goods, say tea and biscuit or you can also assume [FL] for that matter, then the utility that you derive out of tea and utility that you derive out of this biscuit or [FL].

So, let me denote my first good tea as x 1 and my second good biscuit or [FL] as x 2. And then I assume that the utility that I derive out of my cups of tea is independent of the utility that I derive out of the number of [FL] or biscuits consumed. So, what is the

implication of this? The implication is that the total utility function of a consumer is additively separable in the case, that in the case of multiple goods consumption.

The second assumption is one of the key assumptions of Marshallian analysis. And that is utility is cardinally measurable, what is the implication? The implication is this by this assumption Marshall assumes that total utility could be measured by cardinal numbers.

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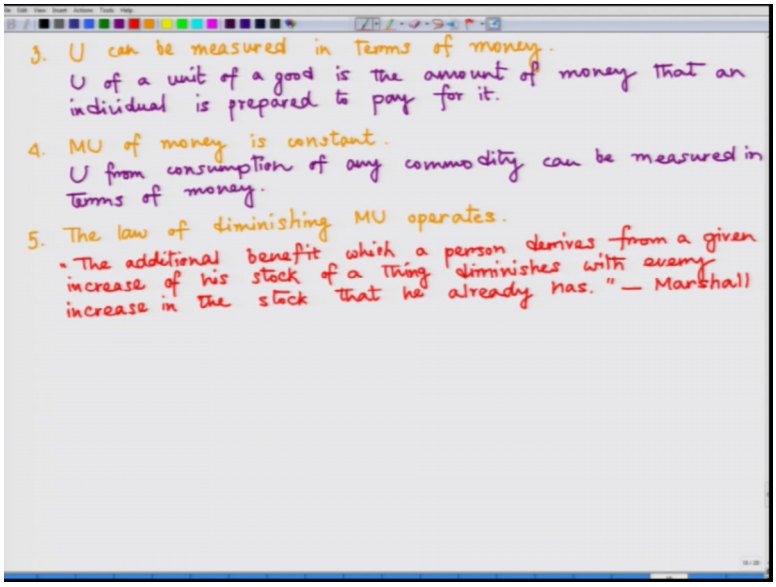

Let us look at the third assumption Marshall also assumed utility can be measured in terms of money. So, what is the implication of that? This means utility of a unit of good is the amount of money that an individual is prepared to pay for it.

Now, let us move to the 4th assumption and a very critical assumption. And that is marginal utility of money is constant what is the implication of this assumption? This is a very critical assumption, because we have just seen that Marshall is using money as a measuring rod of utility. So, it is important to fix that measuring rod. So, virtue by virtue of these assumption utility from consumption of any commodity can be measured in terms of money.

Now, we move on to the fifth in the list of assumptions. And this is also a very critical assumption, and this is stated as the law of diminishing marginal utility operates. What is the implication of this assumption? As the consumer consumes more and more units of a good, the marginal utility of that particular commodity decreases. So, if I quote Marshall

in his own words; now let us now let us explain this concept of total utility and marginal utility through a very simple illustration. We will assume one particular good and we will call this Q, and we will see how total utility and marginality are changing as the consumer is consuming more and more units of Q.

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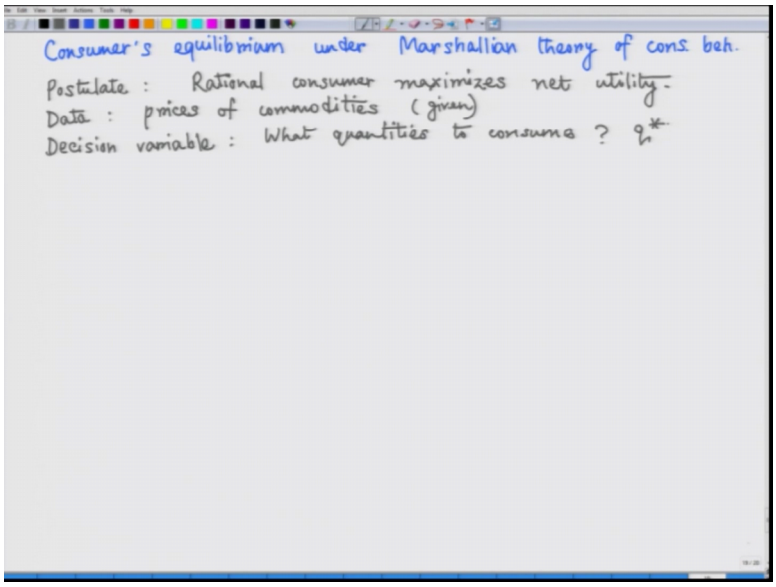

We have already listed down the assumptions of the Marshallian consumer theory.

Let us now talk about the postulate of the Marshallian consumer theory. We say that our consumer is a rational one. And he or she maximizes net utility and then data, another important component of any economic model. So, what is data in Marshallian model? So, these are the prices of the commodities, which are given to the consumer. Now finally, we have these decision variable or control variable. And what are they in marshal analysis? What quantities to consume.

So, if we are assuming a single good word; say, we have this good q, then we are looking for q star the optimal number of units of consumption good q which we will maximize the consumers net utility. Remember that it is net utility not total utility. So far we have discussed the concept of total utility and marginal utility. And the law of diminishing marginal utility we will continue with the Marshall analysis of consumer behavior in the next lecture.