Lecture – 101
Factor Demand Function

So, what we have been doing is that the cost minimization.

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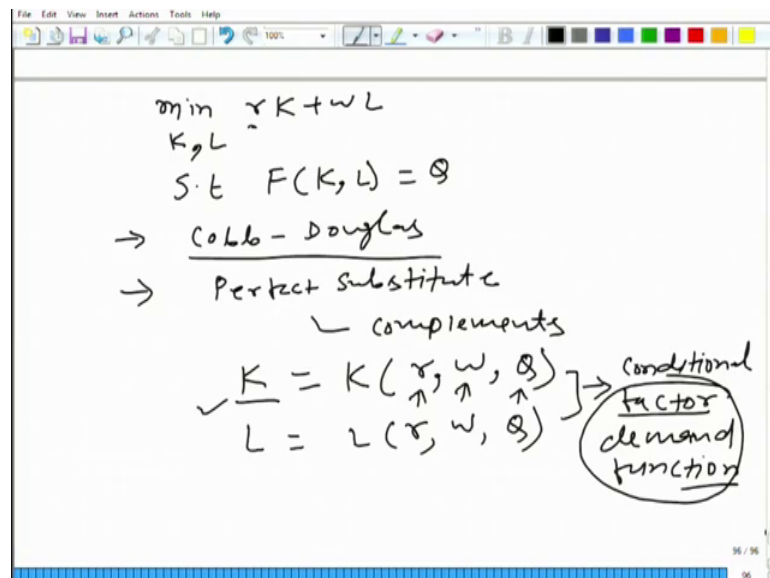
Let me write the problem again that minimize r k plus w l; r is the rent paid to 1 unit of capital per unit of time k is the amount of capital per unit of time. Similarly, w is wage, speed to per unit of labor per unit of time and L is amount of labor employed in per unit of time. And unit of time may vary depending on problem we are not worried about it. And we are minimizing with respect to K that is capital and labor with a constraint. And what is that constraint? That we should be able to produce Q amount of output and we took three examples the one example was Cobb Douglas not necessarily in this order.

Second; where the inputs are perfect substitute of one another perfect substitute. And then perfect complements and we solved these three specific problem. Perfect substitute and perfect complement one in detail, but Cobb Douglas; I just gave you the hint. But the point is when we solve we get capital employed in the production process as function of rent, wage and amount of output ok. And similarly L is again it is going to be another

function of rent, wage and output. And I already told you what is it called? Conditional factor demand function; let me emphasize all these terms.

Why do we call it factor demand function? What are the K and Ls? They are input, they are factor of production to produce this particular output. So, that is why we are talking about here factor, why demand function? This is the amount of capital that, this particular firm demands from the market to produce this particular output form need some capital and labor. And of course, they can of course, different combination of capital and labor can be used to produce this Q amount of output. But they choose a particular combination, a combination that minimizes the cost.

And of course, that amount of capital would depend on the range, wage and amount of output and that is why it is called factor demand function.

Now, why we are calling conditional? Let us look at it.

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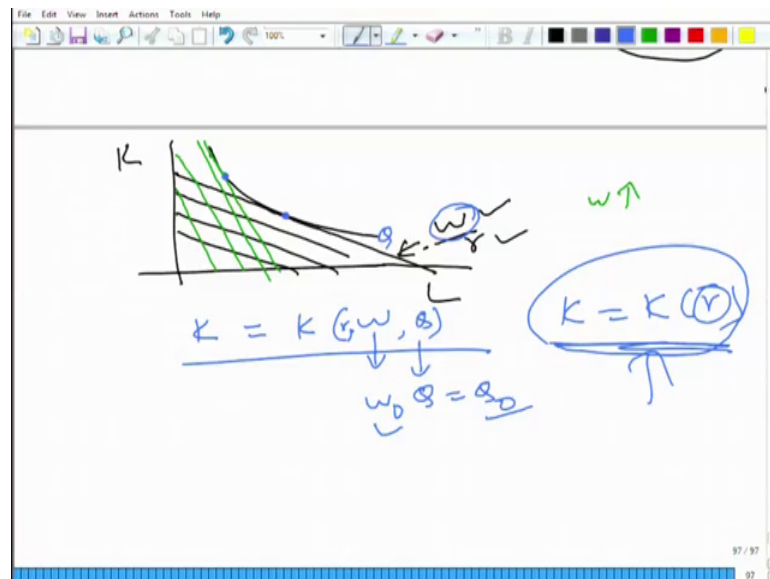
What we are doing here we have isoquant and here we have iso?

Student: Cost.

Cost line ok, the idea is to figure out the combination of inputs that minimizes the cost and also able to produce Q amount of output fine? Here we have K, here we have L. And of course, what is the slope of this iso cost line? It is w by r minus.

Student: Minus.

W by r, so if let us say this w and r cannot be controlled the assumption is that firm is not able to control this w and r. They take w and r given, these are exogenous variable beyond the control of form. So, let us say for some reason w or r changes, what would happen? We no longer have the iso cost line, iso cost map looking like this. Let us say if w goes up and r remains the same what will happen? The new iso cost line will look?

Student: More steeper.

Steeper and we will probably end up here. Earlier we were here and we ended up here at new point ok. So, what is happening? If you remember what we have learned in the consumer theory? There we talked about two different kind of demand Marshallian demand and Hicksian demand. How did we derive the Marshallian demand? That keeping everything else constant and by changing the price of that particular good.

And how Hicksian demand is different from Marshallian demand? That we changed the price, but we kept the utility level fixed.

Student: Fixed.

So, what is happening here? Here we are change, here we are talking about change of labor price that is w, but what we are doing we are keeping the Q naught or Q fixed. We are not changing the Q that is why we are using his word here conditional. It is conditional on amount of output. That is why it is called conditional factor demand function or conditional; if you want to call it conditional input require input demand function fine? Ok. So, when I say when I say K as a function of r comma w comma p Q it gives us conditional factor demand function. What do we mean? We mean that we are keeping Q fixed at Q naught and we are keeping w fixed at some level.

Let us say w naught and we are basically varying K with respect to r. This is what we get as conditional factor demand function fine. This is of course, it depends on the value of Q naught and value of w naught. So when, Q naught or w naught if one of these two changes, what happens? We get shift in the demand function, but if r changes what do we get? we move along that particular demand function. So, never ever forget that.