Environmental & Resource Economics
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Economic Valuation of Environmental Goods and Services - Different Valuation Approaches Part - 11

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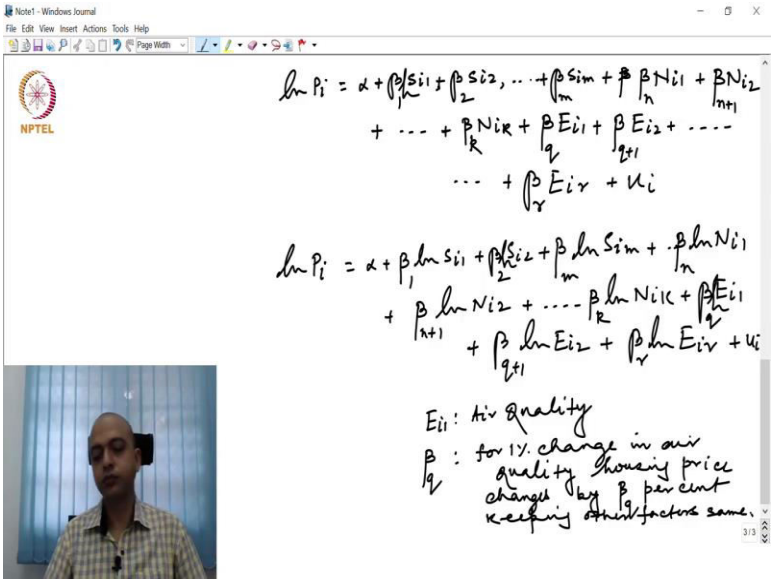

That is the interpretation. So, that means for estimating this type of function what we need to collect information on housing price from several locations information on site specific factors information on neighbourhood specific factors and information on environmental factors then we have to apply a regression technique to estimate and the estimated beta coefficients will tell you the responsiveness of housing price with regard with respect to locational factors, site specific factor as well as environmental factor.

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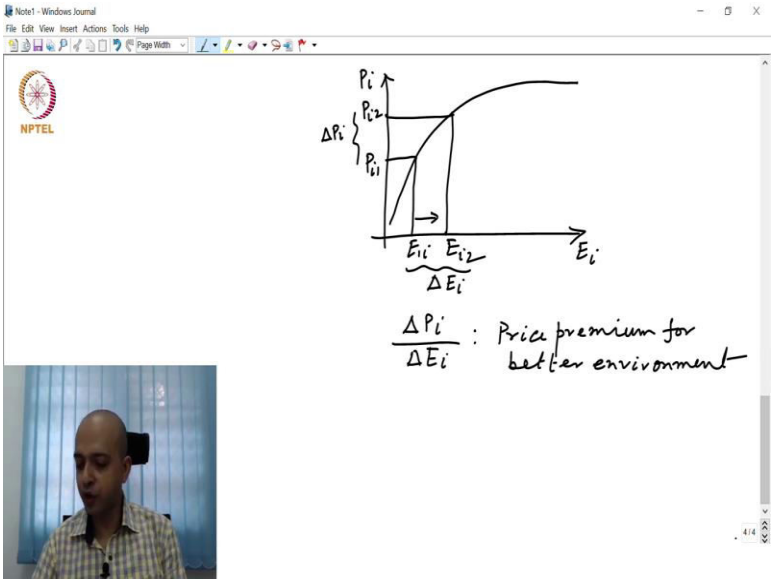

In a simple diagram we can understand let us say that this is a simple diagram in the x axis we are measuring let us say environmental quality Ei and here this is the housing price Pi. So, the curve will look like this. So, let us say initially environmental quality is Ei1 housing prices Pi1 and some then environmental quality improves from Ei1 to Ei2 for which this is Pi2. So, that means this is basically delta Pi and this is delta Ei. For delta Ei amount of change in environmental quality what is the change in price.

So, delta Pi by delta Ei is basically the price premium for better environment. So, this is a simplistic measure very easy to estimate with simple regression technique only thing is that we have to collect the data, housing price data from several locations as well as site specific neighbourhood specific and environment specific factors. Now, even though hedonic pricing is easy to understand and easy to estimate, there are several limitations of this hedonic pricing for estimating the value of environment, what are those?

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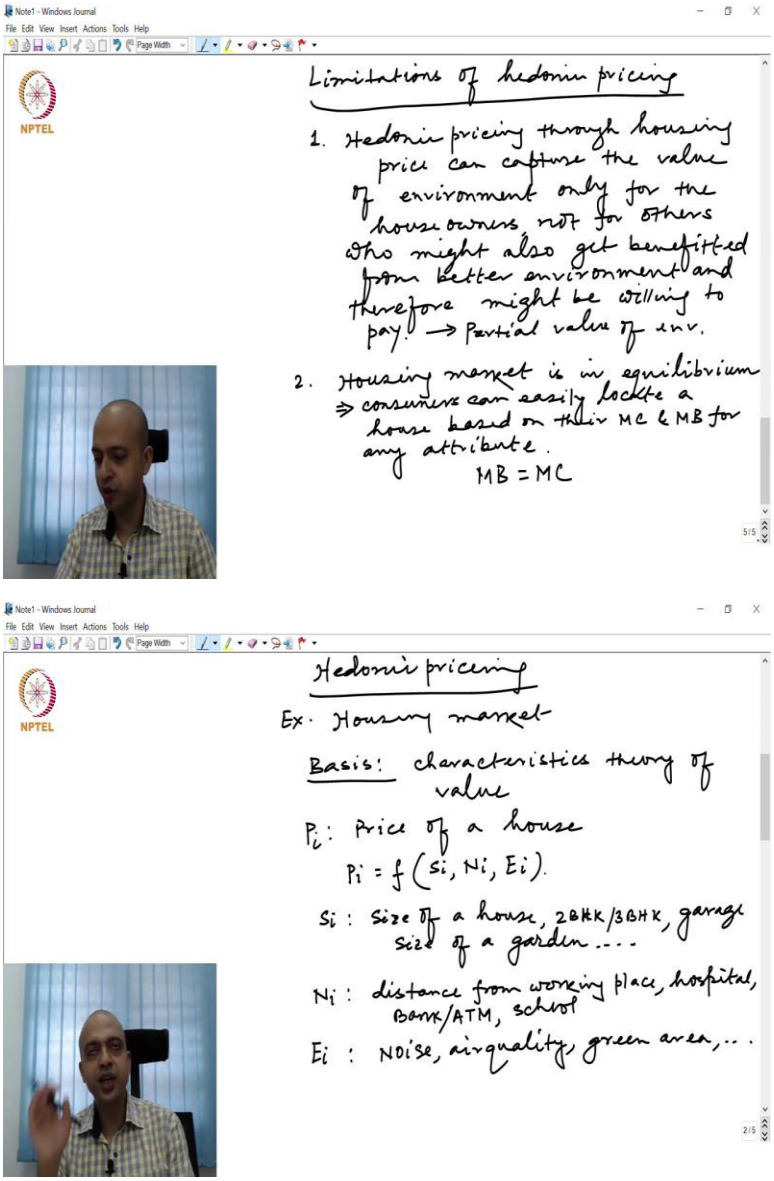

Let us, discuss about the limitation, limitations of hedonic pricing. First and foremost, in hedonic pricing, what we are trying to capture the value of better environment through a price premium for the house. That means we assume that when environmental quality improves, it is only the house owner who are going to be benefited. That is why value for a better environment is captured only through the house owners extra willingness to pay.

However, when environmental quality improves in a particular locality it is not only the house owner but several others who will also get benefited. For example, if somebody is going to office in that locality, if somebody is going to school, if somebody is simply commuting in that area for

shopping or other purposes, there are many others who do not have a house there that is why their willingness to pay their benefits is actually not captured.

So, that means through housing prizes this hedonic price sink can capture only a part of the total value of for the environment that is the biggest limitation. So, that means, what we can say that hedonic pricing through housing price can capture the value of environment only for the house owners, not for others who might also get benefited from better environment and therefore, might be willing to pay, this is the biggest limitation.

We assume it is only the house owners in that locality who are going to be benefited that is why a sum total of the house owner's willingness to pay is the value of environment. However, there are others who might also get benefited from environmental quality improvement, this approach cannot capture their value that is why we can say that it is a partial value of environment.

Secondly, we assume that a housing market is in equilibrium. What does it mean? It means, see in this function, we say that housing price is a function of several factors related to site specific, neighbourhood specific and environment specific. Now, if we assume this hedonic pricing particularly assumes that housing market is equilibrium that means, consumers can locate a particular house based on the marginal cost and benefit of this specific attribute. For example, I am a customer I want to buy a house and my preference is for air quality and a school.

So, I you will be immediately find a house based on my preference for this by equating marginal cost and benefit of air quality and having a school. But in reality, housing market may not always be in equilibrium. That is why the price what we get is not equilibrium price, but that is the assumption we make in this hedonic pricing.

So, that means, the second limitation is that housing market is in equilibrium. Therefore, this implies consumers can easily locate a house based on their marginal cost and marginal benefit for any attribute. So, how much price I will pay. So, this demand is always theoretically derived from an equilibrium condition.

So, I will be my willingness to pay maximum willingness to pay is always determined by equating MB and MC of a particular attribute. If it is air quality there a marginal benefit and marginal cost that means, what is the additional price I need to pay for the air quality that is also the assumption what we make in hedonic pricing that housing market is always in equilibrium.

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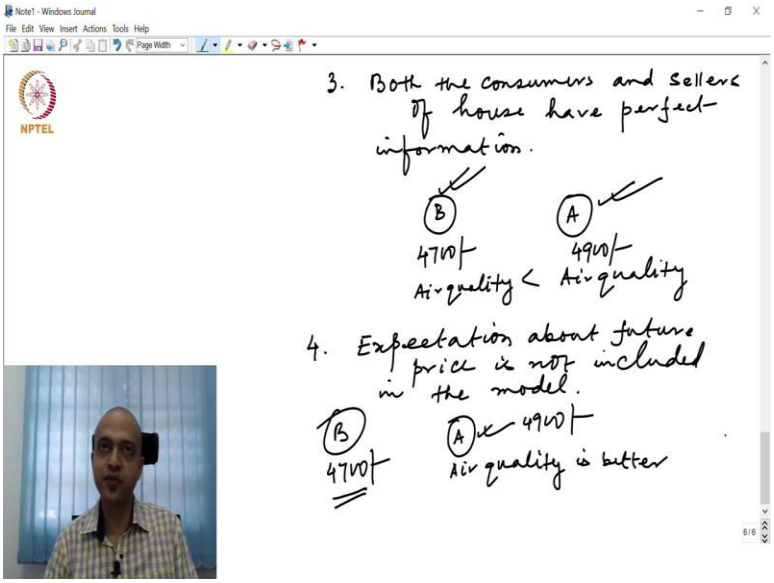

Thirdly, we also assume that both the consumers and sellers of house have perfect information, that means when I am buying a house in a particular locality how I will buy a house I might be a consumer who have a preference I like better environmental quality but still I purchased a house in an area where the air quality is not that great. Apparently, you might be thinking that I do not have preference for environmental quality.

However, in reality, it is not for my preference rather I purchased the house in locality B where environment is not that great because I do not have any information that such a beautiful house in almost in the same price range is available in locality A. I will repeat let us say that there are two location A and B. Here the housing price is 4700 per square feet, here it is 4900 per square feet. This area is air quality is less than air quality in A.

But the price difference is only 200, I am ready to pay the 200-rupees but still I bought my house here. Apparently, you may think that I am not ready to pay the 200-price premium for better air quality. But actual reason may not be like that actual reason might be the fact that the house owner or the consumer does not have proper information about availability of such a house in locality A.

So, that is why it assumes this as hedonic pricing assume both the sellers and consumers they have perfect information. Similarly, from the sellers point of view sellers also does not know that

there is a consumer who is buying a house here and he is ready to pay he or she is ready to pay extra 200 rupees.

If the sellers can identify this buyer, he can also approach this buyer and offered this price to motivate this consumer who is buying the house here instead of buying the house in locality B he can influence or motivate the house owner or the consumer to buy the same house at locality B just by paying only 200 rupees extra per square feet.

So, information matters. So, in hedonic pricing, we assume that information is perfect for both the sellers and the buyers. That is why when I am paying extra premium or when I am not paying extra premium, I know with perfect information in which location what type of houses are available, but that is not the case in reality.

So, that is also another biggest limitation of this hedonic pricing method. Limitation number 4 in housing in hedonic pricing mechanism expectation about future price is not included. What does it mean? When I am buying a house in a locality A, yes, air quality is better. Apparently, you might be thinking I am buying the house in locality A just because air quality is better in locality A. But in reality, when the individuals when the consumer they buy house, housing is basically an investment a long-term investment. So, keeping in mind what is going to be the future price consumers many times they want to enjoy some kind of capital gain.

So, consumers might be thinking 10 years or 15 years down the line, this particular location might be full of IT hub, industry hub or something else for which there is be a boom in housing face. So, I am buying the house in locality A not only because of its environmental quality is better, but also expecting that there would be a huge price gain capital gain, if I invest in locality A by buying a house because there is an IT hub that is coming in place 10 years 15 years down the line. So, that means the premium what I am paying, let us s ay here it is 4900 here it is 4700 these 200 extra what I am paying by buying a house in locality A it cannot be fully explained by is air quality.

Because within that 200 rupees my expectation about future price rise is also there. But this hedonic pricing model cannot include that expectation about the future price rise. Because when I collect the data, it is only realized when consumers they have already purchased the house and I am collecting the wealth 20 lacks, 25 lacks, 30 lacks I am not asking the respondents you have

purchased the house what kind of calculation expectation you had in your mind that means, for a better approximation these housing price data should be modified by collecting this type of information from the field.

So, I need to first collect the housing price information and then I need to go to each and every individual and ask them okay Mr. x I see that you have purchased a house in locality A paid 4900, whereas, the similar type of house is available in locality B at 4700 why you have paid this 200 rupees extra, is it because of these air quality or did you have anything in your mind then the house owner might be responding saying, yes, I expected that IT hub will come up in this area that is why I will enjoy a capital gain by buying the house in locality A not in B.

So, these are the major limitations of hedonic pricing approach even though it is widely used because of its simplicity. So, this is the first approach within the category of revealed preference approach wherein consumer's preference for environment is already revealed through a related market which is housing in this example. So, we estimate the demand for house by collecting the price of houses from several locations and we also collect site specific, neighbourhood specific and environment specific factors.

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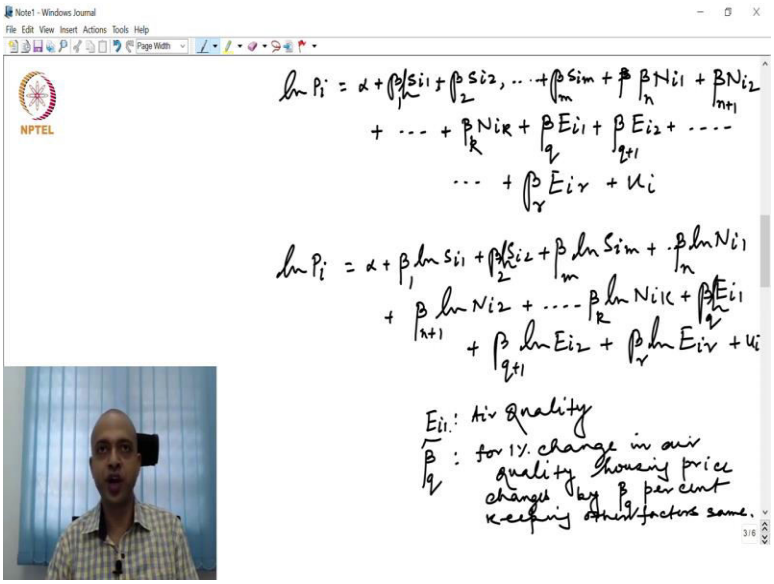

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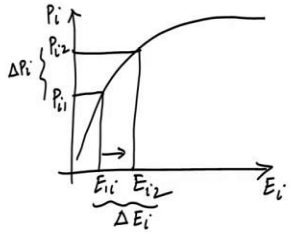

$\frac{\Delta P_i}{\Delta E_i}$: Price premium for better environment

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Note1 - Windows Journal

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Limitations of hedonic pricing

1. Hedonic pricing through housing price can capture the value of environment only for the house owners, not for others who might also get benefitted from better environment and therefore might be willing to pay. → Partial value of env.

2. Housing market is in equilibrium ⇒ consumers can easily locate a house based on their MC & MB for any attribute.

$$MB = MC$$

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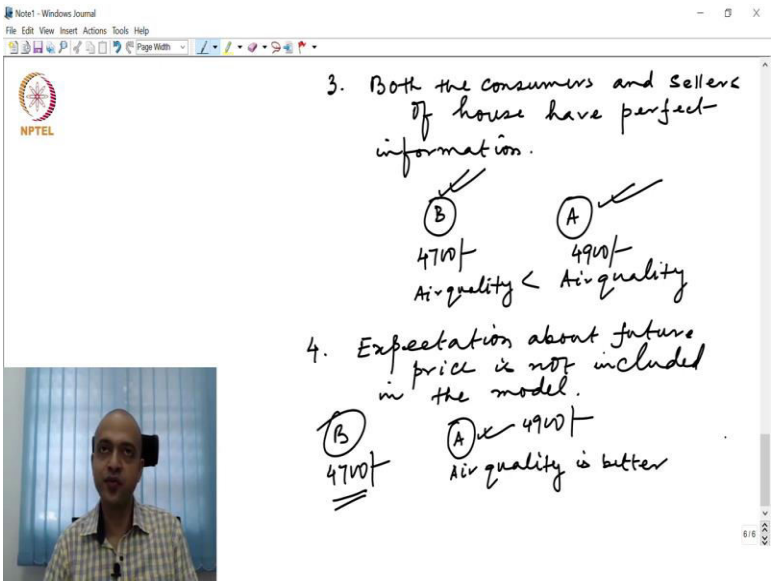

Then we run a regression simple regression in logarithmic form both the site. Why you have taken logarithm? So, that we can interpret this estimated coefficient in elasticity as elasticity. For percentage change in air quality, what is the percentage change in housing price very easy to estimate very easy to interpret, but it has several limitations.

As I mentioned, I repeat once again quickly, it can capture the value of better environmental quality only for the house owners. But when environmental quality improves, it is not only the house owners, but several others who will also get benefited and for which they will be also linked to pay something but this approach cannot capture their willingness to pay. Secondly, we assume that housing market is always in equilibrium. That means, the consumer can easily locate a house based on by equating marginal benefit and marginal cost of any attributes.

Thirdly, we assume that there is perfect information for both the buyers and sellers in reality it may not be the case, many a times consumers even though they like better environmental quality still buy a house in not so better environmental quality area because they do not know that same type of house is available in a better environment with a slightly higher price. And lastly, housing purchase when individual purchase a house. It is not like housing expenditure is not like any other expenditure that we make in our day to day life. Housing expenditure most of the cases it is kind of a long-term investment.

So, that means individuals they keep in their mind about the capital gain. So, when I am paying 200 rupees extra by investing in a locality that is not purely based on its environmental quality or

neighbourhood specific factor. Rather, I expect that this area might be growing very fast in terms of infrastructure, IT industry so on and so forth.

So, 10 years 15 years down the line, I will enjoy a huge capital. So that means the additional price premium what I pay, it is not only for the environmental quality, but also for this expected capital gain but hedonic pricing method, it assumes that this premium is only for better environmental quality. So, with this, let us close our discussion on the first approach of reveal preference method, which is hedonic pricing and travel cost method I will discuss in tomorrow's class. Thank you.