

Health Economics

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Week – 02

Lecture 10- Grossman model and Health disparities

Welcome, friends, to our NPTEL MOOC module on Health Economics. This course is unique in that it explains all mathematical theories and healthcare as well as its applications, and you may consider this as your credit course in IITs and even in university models. As per the New Education Policy (NEP), I think it is required to go for 40 percent of the content. From the online module, we cover all perspectives, and from our lecture, you will be free to appear and answer 50 percent of the questions. I am sure you will enjoy the course.

In this lecture, we will emphasize Grossman's model and health disparities. Why Grossman's model? As we discussed in our previous lecture, We discussed the Grossman model of healthcare demand. We also discussed utility and health and the demand for healthcare. What is there in this chapter? This chapter has a distinct perspective when compared with the Grossman model.

However, let us recap what we did. We discussed the Grossman model of demand for health and explained the differences in the efficiency of producing health with education and aging within Grossman's settings. Here, we emphasize the Wagstaff 1986 paper and explain healthcare disparities in the context of socioeconomic differences or disparities. And while comparing it with Grossman's model. We will also summarize the entire week since this is our 10th lecture, and that is the end of the week, unit number 2. We will also be summarizing the entire week's lectures.

Here, it is the Wagstaff model of demand for health. We will be explaining four quadrants, comparing each of the categories. We have taken four aspects, consumption, health, and health inputs, in fact, three variables, but we are connecting each of their relationships. We start with the production possibility frontier with the relationship between consumption; that is, we refer to X commodity, other commodities we have already discussed, and X here, we emphasize health as the commodity. If an economy emphasizes these two, how much maximum consumption of a commodity or health commodity is possible?

This is what is discussed in the one diagram. The maximization point is satiated or explained with the indifference curve, and we have emphasized here through the

indifference map and then we discussed its equivalent production structure and which requires of course its health inputs. Health as a product, as a function of its inputs, health inputs which we have already discussed. Hence it is upward sloping and it is attached with diminishing returns to scale principle as well. Hence, there is a backward bending direction.

On the third one, we explain how far the budget is allocated between health inputs and consumption goods to maximize our satisfaction or maximize our utility through maximum production. Here we present the relationship between consumptions of this for an individual income point of view as we know that this is a 45 degree line. We discussed all those possible points and its mapping. You can just have an idea. The first diagram is on welfare possibility frontier since we are emphasizing in terms of the maximum possibility of X against health. The second one is health production function, the third is our budget constant, and the fourth is just relations between these two in terms of our income.

And more of this possible with higher combination of these two. We are clarifying all those things one by one. We just said that income of the individual if decreases then what will happen? The budget line goes inward, there will be a backward shift. And what are the implications of this backward shift? The welfare possibility frontier changes its shape and position. This is what happens.

There is a backward shift as well. And this leads to lower income that means the feasible combination of H and X available to the individual. Hence it will have a lower combination of H and X. Hence the low income that leads to less spending available for health inputs and hence low health. Basically, we just wanted to draw that health inputs if you have low health outcomes are also considered to be less.

This suggests supplementing income to the poor people since they usually carry poor health, and hence, health inputs are lower. Eventually, there will be a health trap. We are explaining another context effect of change in prices. The price of the inputs if any are there. Like if health inputs are very expensive what really happens? Our choice function is compromised in terms of healthcare. Yes, these have implications on our choice function as well.

That leads to reduction in our overall choice. What really happens? If the rise in the prices of health input leads to demand for health inputs declines and this leads to health of individuals also declines. This is what is mentioned. You can just have a check. We are actually learning on another point in all the cases.

Hence this requires subsidization. This requires subsidies on health inputs is very required since we have started with if any higher prices of health are there some subsidies are warranted. Let us have some understanding on change in technology. If technology increases what really happens? This is explained over here. Our production function will be

shifted rightward.

This is what is explained. And yes, since it has been positively changed, it has implications as well. Health production function shifts upward. This will have welfare possibility frontier and hence its shape will also be different and we have higher possibilities. And our welfare is expected to be higher.

One such example is through education. If education enhances the skill and technological operation is also possible. Spending on education is very efficient and it is very good that leads to efficient producers of health. Hence the production function goes upward, leading to income spending on health inputs also increasing. This is what is health inputs also increases and eventually the demand for health also increases.

You can just have a check. And the third one we have just emphasized in terms of technology, we have explained in the context of education and this is in fact the key where we started discussing with the Grossman model as well. But Wagstaff key predictions are explained through three directions which we discussed. One is increase in price of health inputs that should lead to a deterioration of health status, a reduction in income will cause larger deterioration in health at lower levels of income than at higher levels of income and third one in terms of education technology that is precisely mentioned as better educated should utilize fewer health inputs and yet been better health than poorly educated. The disparities are discussed in terms of income, education, etc.

In Wagstaff model we found that health and socioeconomic status are very relevant, they have causal relationship. Yes, other factors are also affecting these two as well. We are discussing all those explanation of socioeconomic disparities and healthcare implications through different hypotheses. We have here seven hypotheses starting with efficient producer hypothesis and different literature, different experts have emphasized in different context. This might be useful for your research.

One is called efficient producers hypothesis. This simply says even in the first five are emphasizing on socioeconomic status that has implication on healthcare and other two are little different, they start with like productive time hypothesis emphasizes the role of health, how it has connection with socioeconomic status, how health implies different socioeconomic status. Whereas the Fuchs hypothesis is large on time discounting, we also discussed to some extent in our earlier lecture and that is basically emphasizing on the discounting method and they have discussed the role of other variables, how other variables implied or has implications on socioeconomic status as well as on healthcare. We will be discussing each of them one by one.

Here are the details. We start with efficient producers hypothesis. This is precisely mentioned as better educated individuals or more efficient producers of health than the

less educated individuals. There are different mechanisms by which this is attained. If education is available, then there will be better self-care, and education is available through schooling. If any, that have long-term investment in healthcare and that led to more patient approach because schooling gives the quality education to the individuals and that will have a long-term implications, hence it is discussed long-term investment.

Similarly, there are implications such as adherence to treatment, regimens, then better ability to navigate complex treatment plans through education. Grossman's model largely predicts the same as people with higher education have higher health investment or higher production capacity. Hence, the socioeconomic disparity in health between educated and non-educated individuals is noted. To Grossman we can also interpret these two as well, socioeconomic disparities. We are emphasizing another hypothesis called thrifty phenotype hypothesis.

This means that there may be genetic reasons why people are less efficient producers of health even with the same resources. The early depreciation if any, even if we are quite rational in terms of our spending, economical spending because of early deprivation etc., this has thrifty genes activation and because of the thrifty approach what really happens there will be negative adult health outcomes and it has a long consequence with its early deprivation. But the emphasis here is through thriftiness. People with activated thrifty genes may not be acclimatized to abundant conditions.

Condition and men develop diabetes, obesity and other disorders. And this was in fact proposed by Hales and Barker in 2001 in their article with the same title that is thrifty phenotype hypothesis. And this is also largely referred to as Barker hypothesis. And randomized experiment like RAND health insurance experiment which we have already cited in another lecture that this is not possible when we are referring to the thrifty phenotype context. It is impossible to check causality due to ethical reasons, so we need to go for a neutral experiment.

Randomized experiment like RAND health insurance experiment is not possible to check causality due to ethical reason, use natural experiment such as other factors which are not through these thrifty approaches. Third one is called direct income hypothesis. Yes, the word direct is written that means it is related to your direct incomes. Health disparities arise because the rich people have more resources to invest in health. This is also referred to absolute income hypothesis which states positive relations with income and health.

In this figure we can easily see that the rich against the poor, the rich people has more money to spend on H. H here we have taken H and other consumption goods we have taken as X. So, rich we have identified this and utility of the rich people and poor people and they have different possibilities as well. And hence their choice for health as against other commodities are different and it clearly differentiates their socioeconomic status. Next one

is called allostatic load hypothesis.

This is attributed to McEwen and Stellar in 1993. This emphasizes stress as the mechanism linking socioeconomic status and health and an individual with prolonged or repeated stress faces a higher depreciation rate and chooses a lower optimal health level. So, Whitehall 2 study by Michael Marmot, stress and health study are actually emphasized, we will be discussing in a short while. As I already mentioned, this was done by these two authors during the period 1993. So we are now clarifying this with example Whitehall 2 study by Michael Marmot and emphasizing short versus long term stress and its implications on disparities.

In 1985, Professor Sir Michael Marmot led the group of epidemiologists who started a stress and health study, also known as Whitehall 2, which was established to investigate the causes of social inequalities in health among civil servants. The study is named after the Whitehall area of London. That is due to the area is named with Whitehall 2. The Whitehall 2 study has shown the importance of psychosocial factors such as work stress and we are emphasizing at this moment on psychosocial issues such as stress and work family conflicts in heart disease and diabetes etc. are emphasized.

This study is still in progress and recently it completed its phase 13 in the latest year 2023. Hence, it is relevant for research. You can think of as I already mentioned through their work that stress has short term and long term consequences specially it will be our choice function will be suboptimal in the long run. Short term stress especially may be like exam stress that releases hormone to increase metabolism and efficiency. Whereas in long term like stress in office etc., this has prolonged consequences and this long term stress is considered to be prolonged and this is usually repetitive. And hence, unhealthy exposure leads to memory loss, strokes and neuron deaths etc. There are different interpretations for short term and for the long term. Yes, in the short term might be efficient to some extent, but in the long run might be creating problem. In their work they emphasize on long term issues largely.

Another one is called access to care hypothesis. We have already mentioned that we are linking ACS to health in all these directions. Difference in access to healthcare leads to health disparities, more income, more generous health insurance that led to more lavish healthcare.

Like we referred the work Bindman et al. in 1995. People who self-reported low access to care have higher hospitalization rate for chronic conditions such as asthma, hypertension, congestive heart failure etc. These cases are preventable with increasing access to care. Oregon medical study emphasizes this aspect and discusses access to care if it is increasing. Early diagnosis of diabetes etc.

medications also cases are expected to be higher. And will actually deal with the issue. So we can check with this example in our search and you will find that how care is emphasized. Next one is related to productive time hypothesis and where worsening health diminishes productive time and hence the ability to effective in your work and that may reduce your income if your productive time is compromised. We start with anemia, if any, due to iron deficiency resulting in lethargy and inability to concentrate. Hence it has consequences in terms of capacity to work.

There will be lower capacity to work, higher health, and better productive hours, as we already discussed earlier in this diagram. This is also called production function of the productive time. Then last one is Fuchs hypothesis. We discussed in our chapter, previous chapter, and previous unit lecture.

We mentioned about time discounting. Individuals with a lower rate of time discounting who have more patience invest more in both health and education. Utility functions we defined over time we are discounted. Later on our additions to our utility diminished. And hence we also discussed this in Grossman's multi-period model, which was actually discussed with the title as multi-period Grossman's model and discussed in this unit's fourth lecture. This hypothesis was first discussed by Victor Fuchs in 1982.

In his paper, Fuchs observed a correlation between socioeconomic status and health that is largely caused by patience. Patience is responsible for discounting usually. What are the conclusions of our discussion? Here, each theory we discussed in this lecture aligns with the principles of Grossman's model. Each theory is backed by evidence from various sources, and as in clarifying reasons behind the difference in health-related outcomes and factored in through socioeconomic issues or vice versa, researchers striving to study health disparities ought to examine these hypotheses as they may encounter unintended outcomes in their study of health disparities. Whitehall's study is also relevant for research and you can find out this is what I discussed.

Whitehall study, Whitehall 2, as I already mentioned, phase 13, this is still continued till it is phase 13, you may please have a check if you read Whitehall's work in the context of allostatic load hypothesis that might be relevant for your research as well. And now we need to also explain to you what we have done in unit number 2. Before we finish unit number 2, let us have a complete discussion complete summarization. We discussed about health as a stock variable in our chapter on health and utility. The concept of health state dependence was emphasized if you remember well.

And a model of consumption and health was discussed, lifestyle choices and health was also emphasized. Then we discussed about price responsiveness of demand for healthcare with evidence through randomized experiments. We discussed the RAND health insurance experiment and Oregon's Medicaid study and compared these two in the context of

demand for healthcare. So Grossman's model of demand for health, we also emphasize on single period and multi-period context and time as a constraint in your model we emphasize by taking 24 hours how it is allocated and the production function with health as a product and other than health that is X is a product. We discussed health as a consumption good and input in the production function and a form of capital.

In this lecture, Wagstaff's idea of demand for health and its variations with price, income and technology. Socioeconomic disparities are largely emphasized. So these are all for better reading, we will suggest this and the original reading is here. We even tried our best to refer to the latest books, and chapter number 4 was emphasized.

So that is all that is there in the next lecture. In unit number 3, we will discuss the supply side of the health issues, especially healthcare, and the nuances of the supply side will be emphasized largely. I hope you have understood the entire demand module on healthcare. If you have any queries, please do not hesitate to contact us. We will be happy to address your queries. Thank you.