Health Economics

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Week – 04

Lecture 19- Equity in Distribution

Welcome, friends, to our NPTEL MOOC module on Health Economics. I hope you are following this course very well. In between, we have already started discussing the aspects of equity and inequality. In the previous lecture, especially, we discussed equity and vertical equity in different contexts. However, in this lecture, we will be emphasizing equity distribution, and especially in the previous lecture, we talk about equity in health financing. We also discuss the extent of vertical and horizontal equity, concentration curve, concentration index, then progressivity index, etc. And especially in the last lecture, we used Kakwani's Progressivity Index to understand equity in the case of health financing. We discussed the concentration curve and concentration index.

In this lecture, again, we will be emphasizing these two, and in addition to that, we will also clarify vertical equity and horizontal equity. These are all important because they specify the equity in the context of distribution. Especially in the previous lecture, we started discussing horizontal equity, where we discussed the ability to pay for healthcare, and we mentioned that one pays different amounts for it if they have the same ability. We also cited the case of social health insurance, and we mentioned whether that leads to better equity or inequity.

Especially in horizontal inequity case, if the households with similar incomes are members of different social health insurance schemes with different payment schedules, then horizontal inequity is a possibility, and this might arise because they are in different occupation groups, but still they are receiving the same social health insurance schemes. In private health insurance schemes, people with the same income will pay different private insurance premiums if they have different statuses. And understanding the tax-based system and its connection with horizontal inequity, we said that when it is of direct taxation, especially when local taxes vary across regions then that is considered to be to some extent progressive. In the indirect taxation system, you will see that if the same income group of people consumes different amounts of taxable goods, then that creates inequity. In direct out-of-pocket payments, horizontal inequity occurs because of individual variation in the incidence of ill events or ill health and preference for the use of healthcare services across people with the same income.

There are different measures of horizontal inequity, especially in finance, mentioned by Aronson et al., and this is commonly used. And the approach horizontal inequity is measured by the variation in healthcare payments among groups of people or households with the same prepayment in income or history or their level in the case of taxes when taxes are paid, but the taxes are different, and variation in healthcare payments are there, and then the healthcare access is again given. Basically, we are comparing their income level with or without taxes, and it is with the same prepayment income or level of income, but the variation in healthcare payments is different, and then there is the possibility of horizontal inequity. If there is no variation within each group, then the person attains horizontal equity, and in case of variation, that results in horizontal inequity. Horizontal, we refer to their same level, same income level or status, etc.

Variations in payments are measured using the concentration index for payments, which we did in the last lecture. So, CC_{PY}, which we discussed payments for, given the income. We are referring to Doorslaer et al. 1999 emphasis and findings. They studied healthcare financing in 12 OECD countries, and they decomposed the overall inequality into three major parts.

One is vertical inequity, then horizontal, and the last one is called the re-ranking component. So that is vertical inequity and horizontal largely we have discussed. However, in the case of the re-ranking component, the change is also emphasized in terms of how the payment system affects whether people have actually moved up or down the income distribution. So, that is called the re-ranking component. In their findings, vertical inequity they find it is important because differences in income where a more significant factor in explaining inequality in healthcare payments compared to other factors, whereas variation by payment type, which identifies as tax-based or social health insurance payment or through private health insurance or direct out-of-pocket payments and tax-based and social health insurance payments are relatively fair and has less horizontal inequity as compared to the private health insurance or direct out-of-pocket payments.

Coming to equity in distribution, healthcare is distributed in an equitable way, which is indeed a concern as we connect to the foundational theory given by Grossman in 1972. We also discussed in unit number 2 that healthcare services are in demand largely because of their effect on health. Hence, equitable distribution is a major concern. So, the obvious question here is whether we should focus on health or on making people happy when deciding how much to spend and how to share healthcare resources. So, it is not just confined to income; it is confined to other aspects such as remaining healthy, being happy, or well-being as part of better utility, which is important.

Some scholars argue these contexts in terms of welfarism, that how people find happiness and extra-welfare, we are not just happy in the context of extra-welfare. Some suggest and argue that it is not just happy; you are also supposed to link with the health so that both are

carrying together. So, if you are healthy, then you will be happy; if you are happy, you are also expected to be healthy. So this is how people present in terms of the issues of distribution. So, equity measurement is mainly presented in two concepts: horizontal or vertical equity or inequity.

The second is more important: how we find empirical evidence and the extent to which inequalities in health vary systematically with socio-economic status. To investigate horizontal and vertical equity in health issues, we refer to positive analysis and sometimes refer to normative analysis. Positive where we are trying to find out the cofactors or the factors determining healthcare services. These help us track the status of people for their healthcare at the given time of their response. Whereas in the case of normative one, it is really defining the core value of the distribution where we are supposed to find out whether it ought to affect or not to affect.

When we say anything like an analysis, it is required to distinguish the factors that are really affected by need or by non-need variables. So, what are the factors that ought to affect the use or the factors that ought not to affect it? So, broadly, this explains need-based and non-need-based variables. Hence, normative analysis helps us decide what reasons are fair for need variables and which are not so far as non-need variables are concerned. Horizontal inequity, the important factors in healthcare might be morbidity, age, gender, income, socio-economic status, ethnicity, availability of healthcare services, etc.

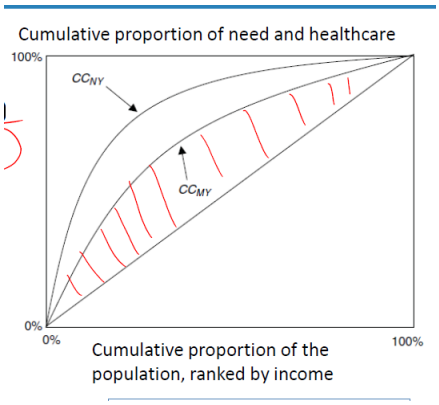
Typically, the regression analysis uses these variables and identifies the factors after controlling other relevant factors. After considering all the factors, Horizontal inequity is if people with the same needs are getting different amounts of healthcare because of unfair reasons like income. It's like saying Hey, everyone who is sick should get the same care regardless of how much money they carry. So, there are two aspects of horizontal inequity again. One is inequity, which is pro-poor, and the other is pro-rich.

So far, a pro-rich is concerned after adjusting for the need. If rich people get more healthcare than poor people, that's called pro-rich horizontal inequity. Yes, adjustments are made based on the factors which we just mentioned. If some adjustments are made, and still it is making the rich more viable or making the rich more advantageous or the rich people are receiving more benefits than the poor that's called pro-rich horizontal inequity. The inequity is skewed towards the rich and just called pro-rich and the reverse is called pro-poor. So, factors like education are given with the hope that all will be receiving equal, but in the case of a universal health education scheme, given the background characteristics, the rich students might perform better.

Similarly, other factors as well. Coming to the identification of the measurement of that inequity, we are supposed to take the concentration indices, and those indices indeed quantify the extent of horizontal equity for actual and needed healthcare. The question here

is how the actual and needed are defined. We will also give you practical handouts and hands-on experience in our next lecture. However, we are just measuring in this diagram the cumulative proportion of the need for healthcare against the cumulative proportion of the population ranked by their income.

That means with the higher income by the population, by quantile groups if we do it, or by percentile groups, till 100 percent, what happens to the proportion of healthcare need? So, when we map it, we find it; we have used this term for MY and NY. The last lecture was on the need out of the income or specifically for healthcare out of the income. So, two diagrams are drawn. The basic idea is the same as explained earlier. So, CC_{MY} measures the healthcare concentration curve, and its shape measures the degree of inequity in the distribution of healthcare across income groups.



If everyone receives the same healthcare, then CC_{MY}, that is, for the healthcare concentration curve, would be coinciding with the 45-degree line if it is equal. That means horizontal equity is maintained. If healthcare is concentrated among the rich or the poor, then it will be deviating from that of the line of equality. So, if it is biased towards the rich, then that line will be above the line of equality. When the concentration or the distribution is biased towards the rich, then it is going to be below the line of equality.

If it is biased toward the poor and that distribution is helping the poor, then it is above the line of equality. So, the concentration index for healthcare, which we measured in the last class and discussed in the last lecture, for the healthcare concentration index it is just twice the size of the area between CC_{MY} and the 45-degree line. You can just see this distance. Isn't it? So, the twice of this area. It is the optimum, or the range of this index will be -1 to +1.

And again, if it is plus 1, all healthcare was received by the richest person in the population. That means all the richest have received the population. And if it is just plus numbers, not plus in near close to 1 or somewhere positive numbers and less than 1, and if it is positive numbers, then it is guaranteeing the fact that the distribution is helping the rich. The richest

people benefit more from the distribution. If it is -1, just the reverse and the poorer are the major beneficiaries.

If it is 0, that means it overlaps the concentration curve or is equally distributed between poor and rich populations throughout the distribution channel. So CC_{MY} and CI_{MY}, which basically one is index and another, indeed provide income-related inequality in healthcare. This gives very little about income-related inequity because they do not account for differences in needs for healthcare. We only discuss healthcare spending largely, but now, when we track their income, we are supposed to calculate the index based on their income with respect to their different level of income. So, if poorer people consumed more healthcare, this is evidence of inequality in healthcare use, but it may not be inequitable if the poor have greater needs.

Wagstaff and van Doorslaer in 2000, proposed measuring horizontal inequity in healthcare. So, horizontal inequity (HI) is precisely the difference between the extent of inequality in actual use and inequality in use if everyone with the same needs are treated equally. So, the difference between CI_{MY} and CI_{NY}. So we discussed these two in the previous lecture.

So, this difference is largely called as identified by Wagstaff and van Doorslaer. The CI_{MY} minus CI_{NY} measures the horizontal inequity. So, CI_{NY} is based on predicted values since that is based on need, and usually, these predicted values are derived through regression analysis. And we calculate maybe sometimes through their predicted values or maybe their expected value. So, the expected amount of healthcare a person would receive if they were, on average, treated as others with the same need characteristics.

So, the concentration curve, that is, CC_{NY}, plots the cumulative percentage of the population ranked by income to the cumulative percentage of where all patients with the same needs receive the same care. So, it is not just proportion; it is the cumulative proportion. Hence, the curve has an increasing trend, and the CC_{NY}, which refers to the need expected or need predicted concentration curve, is the one we have highlighted CC_{NY}. CI_{NY} is the index, and that is based on the need-expected or need-predicted concentration values, that is the index. So, I am just presenting one case of Europe based on the figures of horizontal inequity in healthcare.

So, the study findings are based on the healthcare needs and are then also standardized. In horizontal inequity studies, healthcare needs are controlled using indirect standardizations. This involves a regression model using individual-level data. So, this is how the regression model has taken the need variables as well as non-need variables. This is precisely with the beta coefficient, constant term, and error terms.

Since we are emphasizing the need-based variables. M is precisely called the medical care to individuals of same need and others I think I have already explained. N is a set of J needs indicators, and Z is a set of K non-needs indicators. How do they make it? So, testing for the statistical significance of the non-need variables and testing for horizontal inequity is made. And there is horizontal inequity if that sigma value is none other than zero.

So here we say that delta, which we have already mentioned, like alpha, beta, and delta, are coefficients, and this is what is mentioned. If this delta value is non-zero, then there is horizontal inequity. So, that means these M needs are not completely equalized with this because there are non-zero components here as well. So we will just clarify this indirect standardization for healthcare needs gives the need-expected or need-predicted level of utilization. So, this is what is standardized with the other indicator.

We are just mentioning here that the expected amount is mentioned with its predicted notation that M hat, the expected amount of healthcare a person would receive if he or she was treated in the same way as others with the same need characteristics on the average. Similarly, we have also taken hat in every case and controlled the non-need variables. The effect of non-need variables is neutralized in order to predict the impact of need on healthcare, the need-based requirement for the healthcare axis. I have already mentioned the concentration curve based on $\widehat{M}$, which is the need-expected or need-predicted concentration curve, which is presented in the figure. The regression model can also be used to decompose inequality in healthcare use.

$$M_i = \alpha + \sum_{j=1}^{J} \beta_j N_{ij} + \sum_{k=1}^{K} \delta_k Z_{ik} + \varepsilon_i$$

Where

- i index individuals,
- N is a set of J needs indicators,
- Z is a set of K non-needs indicators,
- α, β, and δ are coefficients to be estimated and
- e is an error term
- M is medical care to individuals of same need

Wagstaff et al. 2003 (given below), decompose by considering these variables; however, they are also just taken as a ratio by dividing the M medical care component. So, when we say the bar is taken, that means mean values of M, N, and G. So CI_{NY} and CI_{ZY} are concentration indices for N and Z, respectively. Gc_e divided by the $\overline{M}$ is indeed called the generalized concentration index for the error term. So, you can get further details from the paper.

$$CI_{MY} = \sum_{j=1}^{J} \left(\frac{\hat{\beta}_j \overline{N}_j}{\overline{M}} \right) CI_{N_j Y} + \sum_{k=1}^{K} \left(\frac{\hat{\delta}_k \overline{Z}_k}{\overline{M}} \right) CI_{Z_k Y} + \frac{GC_\varepsilon}{\overline{M}}$$

And so this is indeed the decomposed indicator of CI_{MY}. So, one deterministic value is that the first two terms on the right-hand side of the decomposition equation equal the weighted sum of income-related inequality in the need and non-need variables with the weights given by the elasticity of healthcare use with respect to each of these variables. Others are random. So, Doorslaer et al. (2004) again investigated the horizontal inequity in this generalized case for this general practitioner as well as for the specialized visits for the 12 European countries. And they derived some interesting facts. They used the individual-level survey data of those European community household panels, and they derived these figures. When we say, these are for the European countries. Here, we say general practitioner, GP visits, and specialized visits. It is observed that so far as horizontal inequity is concerned, you see that the figures are in minus, mostly in minus, except even those that are significant at the 5% level. And when it is minus, that means we have already given the indicator to plus 1 to minus 1; when it is towards minus, that means the distribution is favoring the poor, and when it is plus, that means the healthcare distribution is favoring the rich or the horizontal inequity in a distribution channel helping the poor.

	GP visits		Specialist visits	
Country	CI_{MY}	HI	CI_{MY}	HI
Austria	-0.0499*	0.0146	0.0345	0.0740*
Belgium	-0.1145*	-0.0508*	-0.0269	0.0255
Denmark	-0.0831*	-0.0008	0.0223	0.0844*
Germany	-0.0636*	-0.0268*	0.0158	0.0517*
Greece	-0.1258*	-0.0308*	-0.0418*	0.0492*
Ireland	-0.1323*	-0.0696*	0.0770*	0.1388*
Italy	-0.0649*	-0.0349*	0.0179	0.0537*
Luxembourg	-0.0918*	-0.0406*	-0.0704*	-0.0282
Netherlands	-0.0535*	-0.0113	-0.0178	0.0413*
Portugal	-0.0692*	0.0051	0.0971*	0.1604*
Spain	-0.0906*	-0.0492*	0.0267	0.0714*
UK	-0.1006*	-0.0240*	-0.0234	0.0524*

So, since it is minus for the general practitioner's visit or the general consultations, you see it is negative. That means the distribution is pro-poor. In the case of the super-specialist or the specialist visit, this is positive; that means those who can afford can access it better, and the societal policy is favoring them more to access the specialist visits. So, for the GP visits, the factors might be other socio-economic factors than income, whereas in the case of specialist one, it might be largely due to income.

So, these are all written. I think you can go through. We have already said here that the GP visits, the role of education and retirement, non-participation in the labor force, etc., whereas the specialist visits income may matter much. We have also discussed this in the context of vertical equity. This considers the degree of the individual with their level of income and this considers the degree to which individual with varying healthcare demands utilize resources at suitably at different levels.

And higher levels of need usually represented by more or severe morbidity because they used to have higher need. So, this is necessary but not sufficient test for vertical equity. Authors also worked on vertical inequity like Sutton and Abasolo et al., etc. You can just follow from other papers.

Here are some guidance for you to understand factors of access to healthcare. Some of the works we are just citing like Penchansky and Thomas, they defined through the explanation called the degree of fit between individual and healthcare system. They include some of the important dimensions, five important dimensions based on age, five A's concept, availability, accessibility, accommodation, affordability and acceptability, whereas the author McIntyre et al. in 2009, they mentioned about three dimensions that include availability, affordability and acceptability. However, the availability included other three sub-component like accommodation, accessibility and availability.

And Carrillo et cetera, in 2011 discussed about Healthcare Access Barriers Model. Other modifiable healthcare access barriers are of three types. One is on financial, another structural and cognitive. So that also presents some forms of barriers we have discussed directly and indirectly.

So, you can follow from the readings. If you are stuck somewhere and in the next lecture, we will try to give you hands-on understanding of horizontal equity. So that is all for today. Thank you.