Health Economics

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Week – 04

Lecture 18- Equity in Health Financing

Welcome, friends, once again to our NPTEL MOOC module on health economics; this is a 12-week module covering different nuances of health economics. This is our third sequence of this particular week. We are emphasizing equity in health financing. In the previous lectures, we started discussing distributive justice; then, we emphasized three theories of distributive justice, especially utilitarian models, egalitarianism, and maximin theory, as proposed by John Rawls. Now, we also discuss the health frontier and trade-off and social welfare function for health.

So, in this lecture, we will be clarifying the aspect called vertical equity and other important directions in the concept of equity called concentration curve, concentration index, Kakwani's Progressivity Index, and horizontal equity. So, in the introduction, we want to mention once again that health equity is very important. Analysis of equity has both positive and normative aspects. Positive means which is considered to be relevant in the present period and are evaluated by the person.

Whereas normative means it stands for a specified level or as prescribed by the norm. Hence, positive analysis is commonly undertaken to describe or measure the distribution of health and of healthcare use and of the way in which payments for healthcare are shared between different people in society. Normative is indeed based on judgments about which equalities define equity and which inequalities define inequity. So, for example, are inequalities in payments for healthcare, healthcare use, or health across income groups inequitable? So equity in the finance of healthcare really matters, as we have already discussed.

Different levels of income pay different proportions, or different levels of income make appropriately different payments. So, if it is then different, and there is a possible explanation for vertical equity and the extent to which people with the same income make the same payment, it is called horizontal equity. So vertical equity, so far as the clarifications are concerned, is the extent to which payments vary by income and can be measured by progressivity. So, the progressivity of the healthcare financing system is called vertical equity. So, we are just taking a hypothetical example and explaining these

things: vertical equity from the progressivity context, regressive context, or proportional spending context as a function of income.

That is why we have classified the entire data into ten groups, also called ten deciles, and the mean income is presented here for your reference. The mean income of different groups, the different income decile groups, and their mean income are different at different levels. So far as the first decile is concerned, you can just see their income and the amount spent. So you can see that with the rise in income, in this case, the rise in income is actually with the rise in income, we are just comparing these, what is the percentage they are actually spending. So, in this bracket, we have percentages and the spending, the annual amounts spent for paying healthcare; this is what we have mentioned: out of the income that is 160 divided by 2000, 160 divided by 2000 is nothing but 8%. Similarly, in the next income group or decile, it is 450 divided by 5000, it is 9%.

Income decile	Mean Annual Income	Annual amount spent paying for healthcare (%)		
		Progressive (↑ %)	Regressive (↓ %)	Proportional (12%)
1	2000	160 (8)	340 (17)	240
2	5000	450 (9)	800 (16)	600
3	9000	900 (10)	1350 (15)	1080
4	14000	1540 (11)	1960 (14)	1680
5	20000	2400 (12)	2600 (13)	2400
6	27000	3510 (13)	β240 (12)	3240
7	35000	4900 (14)	3850 (11)	4200
8	45000	6750 (15)	4500 (10)	5400
9	65000	10400 (16)	5850 (9)	7800
10	100000	17000 (17)	8000 (8)	12000

It clearly suggests that with the rise in income, your percentage of healthcare spending and annual healthcare spending is actually rising. You can see 9%, 10%, 11%, 12% and so on. Hence, it is called progressive. Another interpretation so far as financing is concerned is the poorest 10%, that is 1, at 1 decile, is 10% of people. The poorest 10% of the population spend 8% on healthcare.

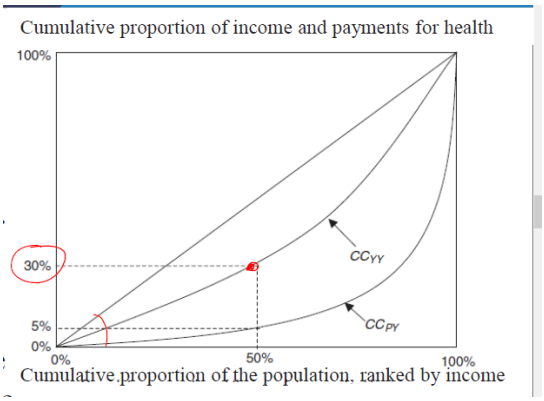
And the topmost richest 10% are spending 70% of their income on healthcare. Hence, it is progressive. So, in a progressive finance system, the proportion of income used to pay for healthcare increases as income increases. Just the reverse happens in the case of regressive healthcare spending. To compare income and healthcare spending, you will just see the regressive trend, and you will find that as income increases, their percentage of spending for healthcare declines. So, initially, then, 340 divided by 2000, then 800 divided by 5000, or 1350 divided by 9000, etc.

Initially, we derived 17%, then 16%, then 15%, and so on. You can see that the topmost income earners, the richest most income group, or the top 10 income group spend comparatively very little, only 8% of their income on healthcare. At the same time, the bottoms are incurring or bearing more costs for healthcare. Hence, this is called regressive. Whereas in the case of a proportional one, every time, it is considered to be a fixed proportion.

So, you can see 240 divided by 2000, then 600 divided by 5000, and 1080 by 9000, etc. This boils down to only 12%. So, irrespective of the change in income, we know that income is actually rising. However, the percentage spent on healthcare is actually still constant. So indirectly, though, as per the percentage of spending is constant, but indirectly we have already witnessed a rise in income.

So, a proportional rise is not necessarily good as far as distribution or equity is concerned. The progressive one is considered to be more vertically defining equity. One of the approaches to measuring equity is through Kakwani's Progressivity Index. So, the progressivity of healthcare financing can be measured through Kakwani's Progressivity Index, as mentioned in the 1977 paper. This measures the extent to which healthcare finance departs from proportionality and; therefore, we say their percentage is rising as against income.

And the figure below, which we have cited, you can just guess from the diagram that this presents a Lorenz curve explanation and where the Gini coefficient is to be calculated, and that really measures the distance from the 45-degree line, farthest the distance of that income line or the spending percentage that will clarify the extent of inequality. So this figure shows the concentration cost for income and for payments on healthcare. We will also clarify what each of these directions is, and here, we are presenting the cumulative proportion of income and the payments for health as against their cumulative proportion of population ranked by income. So the payment income concentration curve, which we are referring to as a Lorenz curve and the shape that is CC_{YY}, stands for the degree of inequality in the distribution of income. So initially, we started by presenting the 45-degree line that basically precisely gives equity in the structure, but when we present the income inequalities index, and we derive their value as a proportion of the distribution of the population by their income, we see their inequalities.



So, CC_{YY} presents the degree of inequality in the distribution of income where if income changes or is equally distributed throughout the population, then CC_{YY} will overlap with the 45-degree line, which means there will be no inequality or inequity. So, CC_{YY} refers to the poorest 50 percent of the population where we have been actually indicating this point. So, this refers to the poorest 50 percent of the population earning only 30 percent of the total income. Now, we are counting for the CC_{PY}; this is the payment concentration curve, and this plots the cumulative proportion of the population ranked according to prepayment income against the cumulative proportion of healthcare payments. We will see in reality also in different papers they highlight that this is, in fact, deviating from the 45-degree line and highlighting inequality.

This CC_{YY} measures inequality in the distribution of healthcare payments. Again, if it is equally distributed, then this will also overlap with the 45-degree line. This indicates a point if you just mark with the 50 percent of the population or the poorest or 50 percent of the bottom population or poorest population, which contributes to only 5 percent of the total payments for healthcare. This indicates that actually, in reality, that is true in our society, especially in Indian society, where more populations at the bottom section of income are not able to afford healthcare. Therefore, their total payment for healthcare is much less.

Therefore, somewhere is reflected as only 5 percent. So, this is all about the directions for Kakwani's Progressivity Index. We are going to clarify one by one again. So, we are just mentioning that payments as a proportion of income is constant in the constant curve, and sources of healthcare finance will be proportional, then both the lines are, all three lines are coinciding each other in that case. So, basically, if you are referring to income, if it is constant, then if the source of healthcare finance is proportional that is constant, then these two are going to be equal.

These two are the same. So, we are not actually when I am saying that is actually inequality perfectly the same, and in both cases, then that will be coinciding with the 45-degree line. Otherwise, in this case, we are saying if the change is proportional and the income proportion is also constant, then these two lines are coinciding. With the rise in income,

that is basically the progressive changes in income, and the sources of healthcare finance are also progressive. In that case, then CC_{PY} that is on the healthcare spending lies below the CC_{YY}, and if that is just the reverse regressive, then CC_{PY} lies above the CC_{YY}, even CC_{PY} will be higher than that of the CC_{YY}. So, in figure CC_{PY} lies, we are saying the CC_{PY} lies below just to clarify that inequality is also very high health-wise.

So, the financing system is progressive. So far, when CC_{PY} lies below CC_{YY}, the finance system is progressive. The poorest 50 percent of the population earn 30 percent of income but contribute only 5 percent of payment for healthcare. The richest 50 percent of the population earn 70 percent of the total income and contribute 90 percent of the payments for healthcare. Therefore, this indicates that the payment is progressive.

So, we are now explaining the concentration index. The concentration index for income is CI_{YY}, which is measured through the Gini coefficient and is used to be twice the area between CC_{YY} and the 45-degree line. So, when we measure in terms of the index value, it is estimated that the value is twice the area between CC_{YY}, which means these two areas, the first range area, and the value of the concentration is just double. So, the range of this is 0 to 1. If all income is earned by one person only, then the concentration index value would be plus 1, and income would be equally distributed. Then that means if income is properly distributed, then CC_{YY}, as I already mentioned, coincides with the 45-degree line. Hence, there will be no inequality. Hence, the CI_{YY} index or the concentration value in terms of income is equal to 0. So, the concentration index in indices is calculated using either a convenient covariance formula or a convenient regression method, as mentioned in O'Donnell et al. 2008.

And so far as the concentration index for the healthcare payments is concerned, it is again similarly twice the area between CC_{PY} and the 45-degree line; this area and the value would be just twice. So, the range is minus 1 to plus 1, which means that all healthcare is paid for by the poorest person; that means it will be at the extreme end. That is, the CI_{PY} (concentration index) of the payment for healthcare will be minus 1, and if payments are equally distributed throughout the population, then of course, it will coincide with the 45-degree line, and hence, the CI concentration index of PY is equal to 0.

So, Kakwani's Progressivity Index K measures the difference between CI_{PY} and CI_{YY}. So, these two differences, these two curve lines, and their gap is nothing but called the Kakwani's Progressivity Index. So, that is precisely twice the area between this two gap. So, values of K range from minus 2 to plus 1, and there are a number of calculations made. Based on the different authors and their reports, we are just here presenting you the range that is minus 2 to plus 1. As I already mentioned, when K tends to, or K is equal to minus 2, that means the extreme inequalities context, all payments for healthcare are paid by the poorest person, and all income is earned by a single person.

Where in the plus 1 case, both the two curve lines will be similar. Isn't it that all payments for healthcare are paid by the richest person, and the income is equally distributed? And this is how it is explained. So far as the sources of healthcare financing are concerned, they will either be progressive or regressive. In the progressive case, the type of curve or the nature of the curve, we have already mentioned that the CC_{PY} lies below that of the CC_{YY} and, in that case, Kakwani's K index value.

Hence, it will be just higher in the case of CI_{PY}, which should be greater than that of CI_{YY}; this is what is mentioned. Hence, K should be positive. In the regressive case, just the reverse is noted. You can just follow up if you have any clarification required. We will be happy to address it in the clarification class or in the interaction class live interaction session. Otherwise, in the proportional case, K would be 0. So, one case study was presented to you just to understand the concept of progressive or regressive structure, and you can also understand which countries they have and which type of financing methods are followed.

Wagstaff et al. 1999 paper based on 13 countries' estimations is presented below, and data they have collected on prepayment income, direct out-of-pocket payments on healthcare, and payments for private health insurance, and primarily these are taken from household surveys. So, data on social health insurance payments and tax bet payments either obtained from the same surveys or computed using data on the incidence of social health insurance payments are important and also taken. Direct and indirect taxes, such as tax files combined with household survey data and income, are all taken into account in the calculation. So, progressivity indices for total payments for healthcare in 12 of the countries combining tax payments, social health insurance payments, private health insurance, and direct out-of-pocket payments are explained. These are given in the table. You can see that Kakwani's index value is also presented for all the countries.

Country	K
Switzerland	-0.1402
US	- 0.1303
Netherlands	- 0.0703
Germany	- 0.0452
Portugal	- 0.0445
Sweden	- 0.0158
Denmark	- 0.0047
Spain	0.0004
France	0.0012
Finland	0.0181
Italy	0.0413
UK	0.0518

You can just see from the result that based on positive and negative we already said, positive we have already said, and other values we have just interpreted, and accordingly, we will further clarify. From the result, you can see France, Germany, Netherlands,

especially France, Germany, and the Netherlands, the value is very close to zero. France, Germany, and the Netherlands are very close to zero. Hence, that is considered to be a regressive structure. They have a financing structure that is predominantly via social health insurance because individual income owners are not paying much.

Hence, it is regressive in those countries, such as France, Germany, and the Netherlands. Whereas in the tax-based system, wherever had followed, such as in countries like Denmark, Finland, Spain, Sweden, and the UK, you find the structure is largely proportional or even progressive. So in those countries, you can see their values. You can just see Denmark's value is minus 0.0047, and in Spain, it is actually 0.0004, and so on. So, wherever in Switzerland and the USA, there is greater reliance on private health insurance, and since the government functions as the government, the public policy intervention in the insurance market is very little. Hence, the financing system overall is highly regressive since it is the private parties that actually bear the burden. So, reliance largely on private health insurance. However, there are some exceptions, especially in Portugal, where total payments are regressive due to a large proportion of direct out-of-pocket payments.

Hence, it is regressive. Italy's healthcare system is financed by an equal mix of taxation as well as their social health insurance structure, and hence, total payments are progressive. So far as horizontal equity is concerned, it is defined by comparing what people could pay for healthcare with what they pay, and in the case of horizontal inequity, if people have the same ability to pay for healthcare but pay different amounts for it, then it is actually called inequity horizontally. They are capable of paying, but actually paying differently, capable of paying equally, but paying differently. That is, therefore, called horizontal inequity. The reason for this is that it depends upon the financing structure, which we already cited in the case of different countries. Maybe it is due to the direct taxation structure that varies from state to state or region to region, and this also arises due to the indirect tax structure if people in the same income group consume different amounts of taxable goods.

Hence, the Social health insurance structure is very important. In the case of horizontal inequity, if households with similar income are members of different social health insurance schemes with different payment schedules, then horizontal inequity has resulted. This might arise because they are in different occupation groups as well. Now, coming to private health insurance, horizontal inequity occurs because it is not compulsory, and people with the same income may make unequal payments as well if they choose to buy different levels of insurance coverage. People with the same income will pay different private insurance premiums if they have different risk status.

Hence, that is, to a large extent, defined as inequity, horizontal inequity. Direct out-of-pocket payments are also explaining the context of horizontal inequity. This arises because of the fact that individuals are different in terms of their incidence of cases of health, they

might be ill, and their preference for use of health services across people with the same income. Since this varies, so out-of-pocket payments are different even with the same income level. Various measures of horizontal inequity in finance have been developed in their approach.

Horizontal inequity is measured by the variation in healthcare payments among groups of people or households with the same prepayment income. If there is no variation within each group, then there is horizontal equity, and if there is variation, then, of course, it is considered horizontal inequity. So, variation in payments is measured using the concentration index for payments; we have already mentioned Kakwani's index, which is through the CC_{PY} in the diagram. So, an overall index of horizontal inequity by taking a weighted sum of these concentration indices across all groups is important. However, little empirical work is made to investigate horizontal inequity in healthcare financing, and this is because this requires many concentration indices for payments, one for each income group, as mentioned in Wagstaff and Doorslaer's 1997 work.

So, that is all I think we have dealt with regarding various aspects of equity and vertical equity, and we have even clarified different contexts and the possibility of horizontal inequity. So, in the next lecture, we will give you further details on horizontal inequity, and their case study will also be discussed. So that is all for today. We will also be emphasizing in the next lecture on horizontal equity and its distribution, etc. So, with this I must stop here. Thank you.