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Income Inequality measurement in Pakistan and its four provinces by Lorenz curve

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Abstract

The purpose of this research is to measure the income inequality firstly in four Provinces of Pakistan individually and eventually in the overall country. There is inequality among the income of people who constitute the nation; there is also inequality among the per capita income of different provinces. Overall inequality in Pakistan appears to be almost exclusively due to inequalities within provinces. Cross section data taken from Household economic survey (HIES) 1998-1999 was used for this purpose. Most appropriate method Lorenz Curve was used to measure income inequality between the provinces of Pakistan. Lorenz curve shows a quantitative relationship between the percentage of income recipients and the percentage of total income. After using the data of Average monthly income and number of sampled household, the column of total income (TY),total population(TP)and per capita income(PCY) Same population, income, population share (PS),income share(YS),cumulative population share percentage(CPS%)and cumulative income share percentage(CYS%)were obtained. Finally the tables which contained the values of CPS% and CYS% were used to draw the Lorenz curve which illustrated the situation of income inequality in four provinces (Punjab, Sindh, Khyber Pakhtunkhua, Baluchistan) of Pakistan. The higher the distance of Lorenz curve from perfect equality line shows the more inequality and lower the distance of Lorenz curve from perfect equality line shows less inequality. In this research Lorenz curve of one province of Pakistan e.g. Baluchistan is showing low distance from the perfect equality line, so the findings of this research paper is the income inequality is less in one province like Baluchistan because its curve is near to the 45 degree of perfect equality line than other provinces.

Introduction

The main objective of this study is to understand the situation of unequal distribution of income in four provinces and Pakistan separately. The purpose of this study is to know why some people have more income than others. In Pakistan, some people have extra income in relation to their needs and some people have not as much income that they can fulfill their basic food requirements. There are three types of social classes in our society.

1. **Lower class**
2. **Middle class**
3. **upper class**

Lower class is receiving extremely low income so that they are unable to fulfill even the minimum amount of basic needs. Middle class is receiving sufficient income but upper class is receiving too much income that they are enjoying all the luxuries of life and still left with money. So, rich are getting richer and poor getting poorer. The proportions of such people are different in four provinces of Pakistan. So the situation of unequal distribution of income is different in Punjab, Sindh, Khyber Pakhtunkhwa. The results of this report show there is less unequal distribution of income in Baluchistan than other provinces.This has been investigated by using graphs and tables.
Kemal(1994) concluded of three factors contributed to rising income inequality.

First, employment declining, second, Implementation of taxes on the poor has increased and it has declined on the rich third, subsides have been withdrawn with effected the poor and the rich alike while increase in prices of output of agricultural goods has mainly benefited the rich.

According to Haqq (1998), in Pakistan, most of the recent literature on income inequality and economic is apparent. Increase inequality that occurred during the last two decades. After the deep study on income distribution this paper found that income inequality is greater than expenditure inequality because the life cycle hypothesis suggests that people smooth their consumption over their life times. The time period of

this study was from 1979 to 1992-93 using the data from household income and expenditure surveys (HIES). It also describes the contribution of different expenditure categories. Adams and Jane (1995) also examines why do some people receive higher incomes than others with same talents and capabilities, which type of steps can be taken to minimize the wide differences in income earned, so that the number of people living below the poverty line can be reduced.

Review of Literature

Concept of income distribution is inherently misleading in one fundamental respect. Income is not distributed, it is earned. This fact, while obvious, is often overlooked. High-income is routinely derived as "the rich" as though they typically achieved their status by clipping coupons. Within this both Politicians and Journals often seen to thin that the rich are at best lucky, and at worst criminal. So after this discussion the implicit message is that upper-income citizen should be grateful that the government allows them to keep some of their money. According to Richard's Gephardt s reference to people, who earn good income as "winners in the lottery of life" is one infamous example of this attitude.

Measurement of Income Inequality:

Different researchers have used various techniques to analyze the sources of unequal distribution of income in developing countries. Results of different studies help policy makers to understand the root causes of income inequality within their societies. It helps the policymakers to improve income distribution and the potentials of income-earning of different groups of people.

In their research report 102, Jrand Jane and Richerd H. Adams describe these issues by analyzing longitudinal data from 727 household in four districts in Pakistan. Previous studies of unequal distribution of income and other issues poverty have been based on one year of household interviewing, these data set 12 rounds of household interviews over a three year time period1986-89, for this purpose data was collected on income expenditure, education migration, land owning. Total income was broken down into 5 sources of income, in order to analyze the contribution of each of these sources to income inequality.

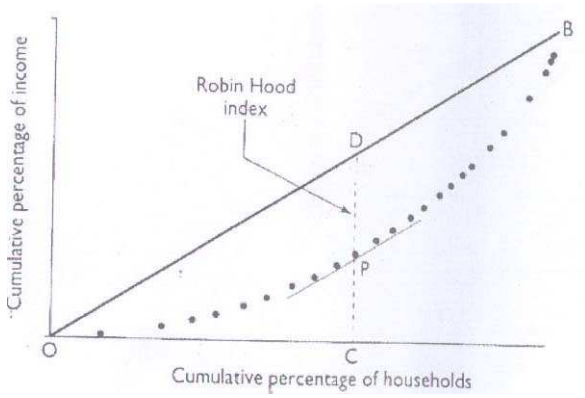
Measurement Approaches:
(Gini Coefficient)

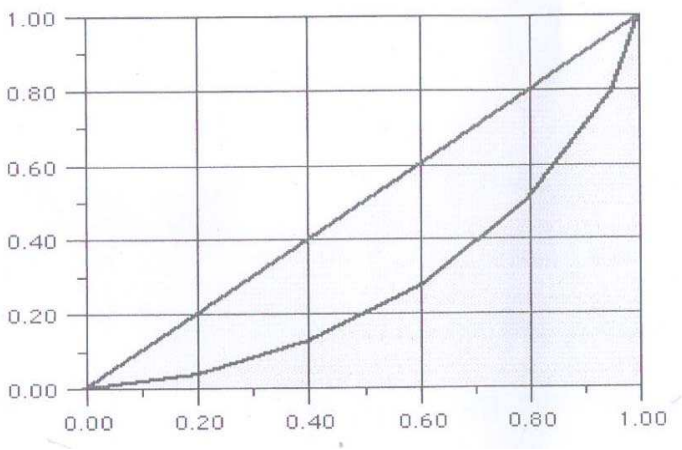
There are several approaches exists for the measurement of income inequality. The most commonly used measures include Gini Coefficient in which decile ratio, by the bottom 50%, 60%, 70% of household the proportions of total income earned.

The Gini is also derived from the Lorenz Curve, in which cumulative share of total income earned by household ranked from bottom to top. The ration of the area between the Lorenz Curve and 45* line to the whole area below the 45* line is calculated as the Gini Coefficient.

The **Roben Hood** Index is also one of the most commonly used indicators of income inequality. In figure 1, the Roben Hood Index is equivalent to the maximum vertical distance between the Lorenz Curve and the line of equal incomes. The value of the index estimates the share of total income that has to be shifted from household above the mean to those below the mean to achieve equality in the distribution of incomes.
Some other approaches are also mentioned over here such as Atrinson's Index and Theil's entropy measure Lorenz Curve.

Lorenz Curve construction of Lorenz Curve gives us a measurement of the amount of inequality in the income distribution.





Methodology

The main purpose of report is to analyze the income inequality in order to serve the purpose, the data has been taken from "THE HIES". This data is about four provinces i.e. Baluchistan, Sindh, Khyber Pakhtunkhwa, Punjab and Pakistan overall. This work has been started with the data of Pakistan which contained the column of same "HH", Pakistan (Overall) and average monthly income of Pakistan Overall. Till then, the data collected was available from "THE HIES" and on the base of this data we get the results. After a long process, the results are displayed in the form of Tables and Graphs. After these three columns, the next column that was constructed was "TY"(Total Income), that derived by multiplying the average monthly income with the number of sample household. In the end, the aggregate of next column's" (Total population) was derived by multiplying the member of Pakistan with number of sample household Pakistan overall. Its aggregate was also taken in the next column named as "PCY"(Per Capita Income)". It was derived by dividing the total income with total population. The aggregate of total population was taken and it was divided by the number of sample of total population. Then the figure which was obtained was called same population. Column of same population can be obtained by dragging this column then the next column of income from this column is also derived. So, it is constructed by the column of same population. Here, the 1st, 2nd ,3rd, and 4th figure of total population are added to get the amount of same population equal to that figure obtained by dividing the aggregate of total population by the number of this sample. So, for this purpose, the difference is taken to compensate this. By adding this difference, the required amount is obtained with same process done above. This next column of income is derived by multiplying the component of same population with component of Per Capita Income. According to that, it is derived by multiplying the figure of total population and Per Capita income and then add or subtract the difference of derived and required amount. Next column "PS" (Population Share) was derived by dividing the **I** the value of income with last value of income using sign and after that it is dragged. Next column is "CPS" (Cumulative Population Share). The 1st value is same as the **I** the value of PS (Population Share) and 2nd value id obtained by adding the 2nd value of PS (Population share) and 1st value of CPS, then this column is dragged. Next column is CYS(cumulative income share). It is constructed by taking 1st value same as the **I** the value of YS (Income share) and second value was obtained by taking the 2nd value of YS (Income share) and adding the 1st value of Cumulative population share. After this, this column is dragged. Next column CPS % (Cumulative Population share percentage) was constructed. It was constructed by simply multiplying the 1st figure of CPS (Cumulative population Share) with 100, using the sign* for multiplying. Then this column is also dragged. Now after all this process, in the last the graphs are drawn. For this purpose a table is constructed by the last two columns of CYS% (cumulative income share percentage) and CPS% (Cumulative Population Share Percentage) were used for drawing Lorenz Curve. Two values are needed, one value of CPS% (Cumulative population Share Percentage) which is taken on horizontal axis and second value CYS % (Cumulative income Share Percentage) which is taken on vertical axis. So on the basis of the data of three columns which have been taken from "THE HIES", further more columns are constructed using data of these columns. Another important thing which is necessary to mention here, is that this process is written with the reference of Pakistan. Using the same process, work on the data of other provinces can also be done. In all this work, the main thing is "THE LORENZ CURVE" through which the results are obtained. Because by analyzing the distance of the LORENZ CURVE from the Perfect Equality, the condition of inequality can be interpreted.

DATA

Before applying the analysis tools, the analyst will have to access all available data sources and then plan accordingly for the analytical work to be done. In order to examine the income inequality, *Data source* has been used. The research report is based on the cross section data which is used in this report taken from HIES (Household Integrated Economic Survey 1998-1999). There are two types of data:

1- Primary data
2- Secondary data

This data is secondary because it is coated. It has been taken from other sources. Each data source tends to have particular strength. Here, some variables are defined that are used in this report as household. A household may be either a single person household or a multi person household. A single person household is one where the individual makes provision of their own food and other essential of living without combining with any other person *Household member. Household members* are all such members or group of person in a household who normally live and eat together.

Limitation: In the HIES the literary was calculated neither for the population of 5 years nor for 10 years. It does not give more detailed account of expenditure on education and nor collected information for each individual.

Results and Discussion

Inequality in Pakistan has been measured. Sindh, Baluchistan, Punjab and Khyber Pakhtunkhwa are presented here with table and graph one by one. A comparison of different income distribution structures in different provinces of the same country provide further insight into caused behind overall income inequality in that country.

Pakistan

CPS%	CYS%
18.2	2.55
18.3	7.07
27.3	12.55
36.4	19.54
45.5	27.10
54.5	35.52
63.6	44.73
72.7	54.81
81.8	65.75
90.9	77.35
100.0	100.00

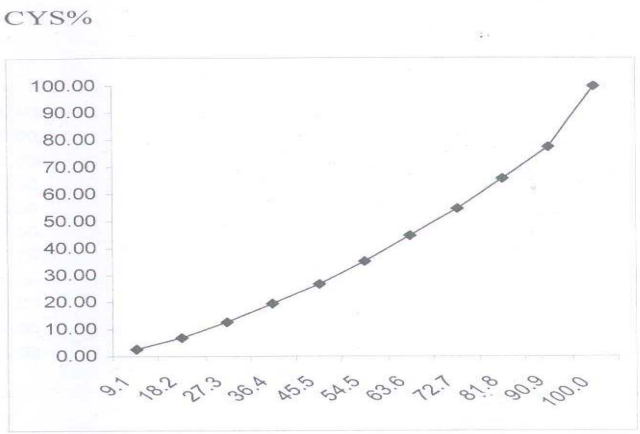


Figure 5.1 Lorenz curve

In this figure 5.1, the Lorenz Curve has been plotted.

To measure the income inequality in Pakistan by using the values contained in table in which both horizontal and vertical axis into 10 equal segments corresponding to each of 10 groups. The percentage of cumulative population share on horizontal axis and percentage of cumulative income share on vertical axis. The results show that in the lowest 9.1% population of Pakistan receive 2.55% of income and higher 9.1% population receives 23% of total income.

Punjab

CPS%	CYS%
9	4.32
18	9.45
27	11.15
36	17.73
45	24.60
55	32.05
64	42.05
73	56.54
82	71.03
91	85.51
100	100.00

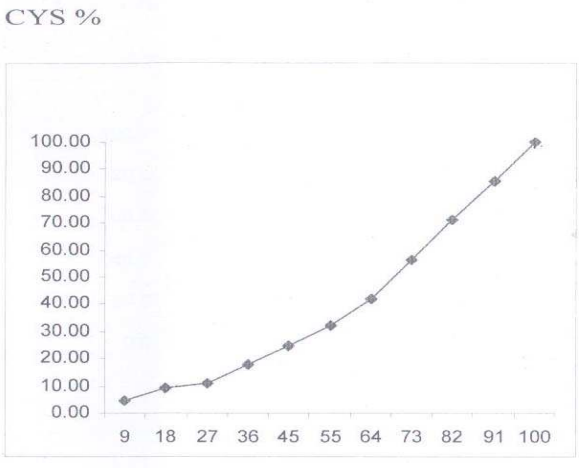


Figure 5.2 Lorenz curve

In this figure 5.2 Lorenz is drawn for the measurement of income inequality in Punjab by using the values contained in the table. In this, also the percentage of cumulative population share is shown at horizontal axis and cumulative income share is taken at the vertical axis. In this lower 27% receives 11.15% of total income and higher 27% of population receives 44% of total income.

Sindh

CPS%	CYS%
9.1	3.8
18.2	8.3
27.3	13.6
36.4	19.2
45.5	25.4
54.5	32.3
63.6	43.8
72.7	57.8
81.8	7 1.9
90.9	85.9
100.0	100.0

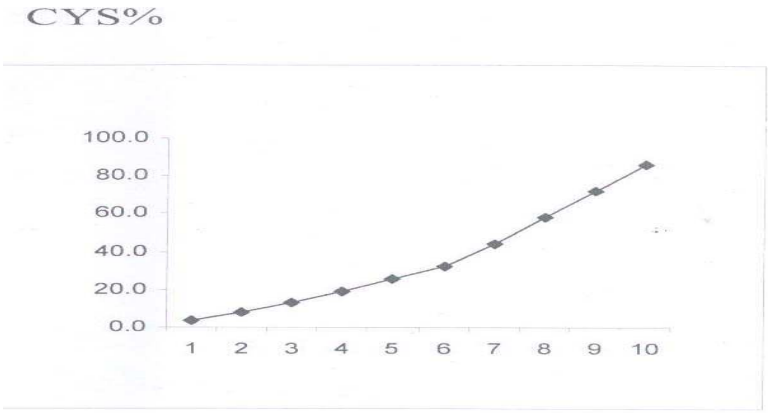


Figure 5.3 Lorenz curve

In this fig 5.3 the situation of income inequality of Sindh is illustrated by the Lorenz curve with the table. The lowest 18.2% of population is receiving 8.3% of total income and the upper 18.2% of population is receiving 28.1% of total income at the halfway point 46% of population is receiving 68% of total income.

Khyber Pakhtunkhwa (Nwfp)

CPS%	CYS%
9.1	4.3
18.2	9.2
27.3	14.6
36.4	20.7
45.5	25.2
54.5	32.0
63.6	40.1
72.7	55.1
81.8	70.1
90.9	85.0
100	100

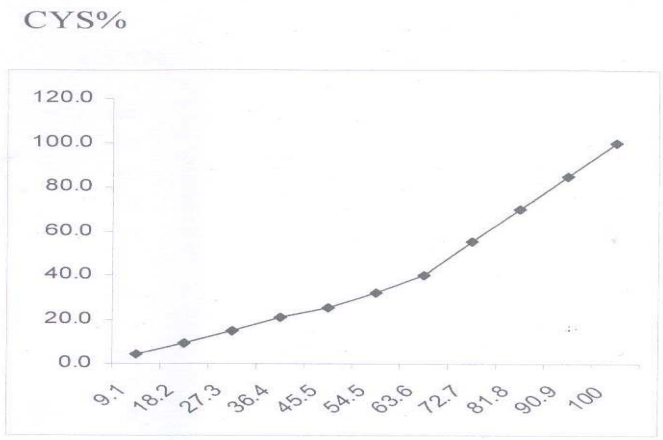


Figure 5.4 Lorenz curve

In this fig 5.4, Lorenz curve is drawn to measure the income inequality in Khyber Pakhtunkhwa by using the values contained in table. The upper 9.1% of the population is receiving 15% of the total income and at the lower point 9.1% of the population is receiving 4.3% of total income.

Baluchistan

CPS%	CYS%
9	5
18	11
27	17
36	24
45	31
55	43
64	54
73	66
82	77
91	89
100	100

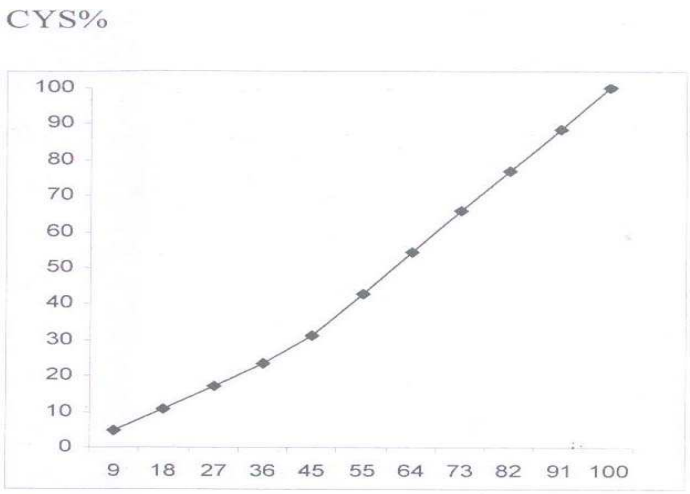
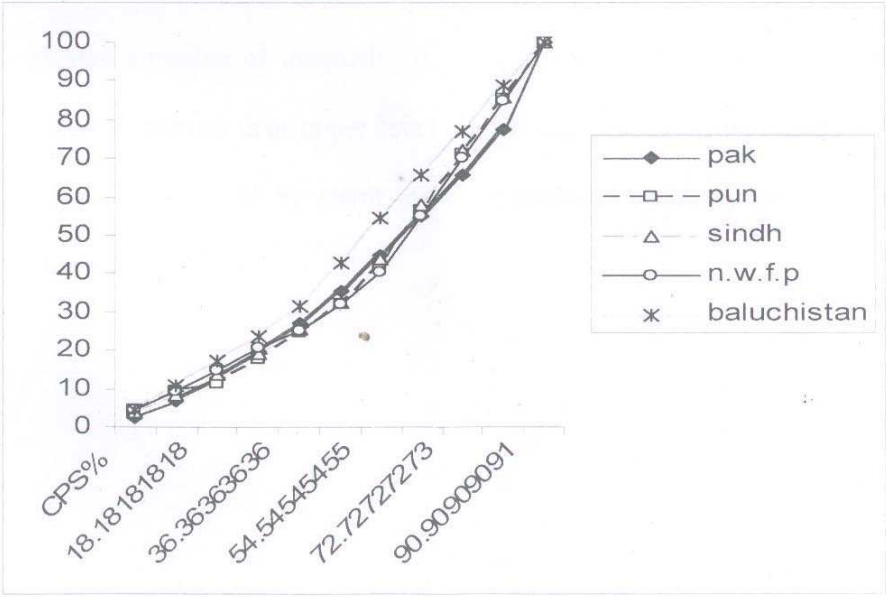


Figure 5.5 Lorenz curve

In this second last fig 5.5 which is about Baluchistan the situation of income inequality is different as comparing with other provinces as Punjab, Sindh and Khyber Pakhtunkhwa because values of table and Lorenz curve shows less inequality in Balochistan than other provinces of Pakistan. The 9% of the total income is lowered. The main difference can be seen at the halfway point that only in Baluchistan 45% of population is receiving 57% of total income.

Over All Pakistan

Cps%	Pak	Pun	Sindh	Kh.P(Nwfp)	Baluchistan
9.090909	2.550492	4.31961	3.758397	4.280459	4.540745
18.18182	7.071051	9.447477	8.333848	9.186221	10.66952
27.27273	12.55379	11.15231	13.59253	14.64823	17.09119
36.36364	19.5431	17.72581	19.21647	20.65777	23.62731
45.45455	27.10146	24.59688	25.40359	25.18736	31.36266
54.54545	35.51515	32.04976	32.29871	32.01945	42.80221
63.63636	44.72976	42.05336	43.79206	40.13968	54.24177
72.72727	54.81355	56.54002	57.84405	55.10476	65.68133
81.81818	**65.74653**	**71.02668**	**71.89603**	**70.06984**	**77.12089**
90.90909	77.35317	85.51334	85.94802	85.03492	88.56044
100	100	100	100	100	100



After illustrating the situation of income inequality in four provinces separately, now in this figure all those are shown by one graph and table. In 1st column of table contained CPS% and 2nd , 3rd, 4th, 5th, and 6th column contained the value of cumulative income share of Pakistan, Punjab, Sindh, Khyber Pakhtunkhwa and Baluchistan. The lowest 9% of population of all provinces is receiving the approximately same percentage of total income. The upper 9 or 10% of population is also receiving the same percentage of total income except Baluchistan at the halfway point we can see main differences of all provinces, only in Baluchistan 45% population is receiving 37% of total income.

Five Lorenz curve in one graph clearly shows the income inequality in provinces by the distance of Lorenz curve from the perfect equality. Greater the distance shows greater the degree of inequality. As distance becomes less there will be equality. Son in the graph distance between the Lorenz curve of Baluchistan and perfect equality is less other than other four provinces as Punjab, Sindh, Baluchistan and Khyber Pakhtunkhwa. Within this, it can be said that except Baluchistan, situation of inequality is same in other provinces. In one province inequality is high at bottom than upper level and in other province inequality is low at bottom than on the upper level. So result shows an analysis of income inequality in four provinces and overall Pakistan.

Conclusion

A convenient representation of inequality is through the use of Lorenz curves relating the Cumulative population share and income share. The main purpose of this report is to measure the income inequality through Lorenz curve in four provinces: Punjab, Sindh, Baluchistan and Khyber Pakhtunkhwa and overall Pakistan. Secondary data is used which is taken from Household Integrated Economic Survey (HIES) 1998-1999. a number of sampled household, I obtained the column of total income (TY), total population (TP), per capita income (PCY), same population , income, population share (PS) Income share (YS), cumulative population share percentage (CPS%). Finally, the tables which contained the values of CPS% and CYS% are used to draw the Lorenz curve through which the situation of income inequality in four provinces is illustrated. The findings of this report are in Baluchistan income inequality is less because its curve is near to the 45 degree of perfect equality line than other provinces.

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Appendix: At the end of the paper

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