

INCOME POLARIZATION IN PAKISTAN Measurement and Decomposition

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Abstract. Polarization in context of income distribution refers to the decline of middle class. The empirical analysis of polarization is quite unexplored area in Pakistan. The present paper measures polarization for Pakistan and its rural and urban segments and the novel concept of time-decomposition of polarization has also been applied for the first time in Pakistan for the three latest survey years of 1998-99, 2001-02 and 2004-05. The Bossert-Schworm measure (2006) of polarization has been used whereas the units of measurement include both the aggregate household as well as per adult equivalent household. It has been found that in general, throughout the period of analysis, polarization has followed a declining trend in Pakistan and its rural-urban areas. The time-decomposition of polarization has suggested that the decreasing mean incomes relative to the median of the higher income groups and the decreasing within group inequalities of both higher and lower income groups are among the major factors contributing to the change in polarization overtime in Pakistan.

I. INTRODUCTION

There is no denying the fact that growth rates of real GDP, GNP and Per Capita income of a country are the variables most closely watched to judge the economic performance of that country. In fact, it is true that growth is the pre-requisite for development and without a positive growth rate, a country cannot succeed in its efforts to improve the living standards of its citizens.

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It must, however, be noted that the importance of growth rate should not be over-emphasized. High growth rates do not by any means, ensure that the masses are paving their way towards a better living standard. In case of Pakistan, for example, the real national income has on average increased by more than 6 percent per year from the year 1998-99 to 2005-06 implying 3.9 percent growth in real per capita income. These statistics clearly indicate that real national income in Pakistan has increased by almost 50 percent and the average share of each population member in total output has gone up by more than one-fourth during the past seven years (Government of Pakistan, various issues). Growing at this pace, the standards of living of people of Pakistan and their general welfare should have increased many folds but this is not the observed phenomenon as we can see that still about one fourth (23.94%) of our population lives below the poverty line (Government of Pakistan, 2006-07) and this is an alarmingly high percentage. So where does the additional income go? The answer to this problem lies in the distributional aspects of the income, which are totally ignored by the GDP, GNP, and Per Capita measures.

In order to look at distributional aspects of national income, the most common approach is to work out estimates of income inequality, such as Gini coefficient. Most recently, a new concept has emerged, *i.e.* polarization, which is concerned with the decline of the middle-class in the population. Thus, it concentrates on the strengthening or weakening of middle class. The middle class is an important participant in economic activity as most of the economic agents belong to this class. Hence while judging the economy from various angles regarding income distribution; it is cumbersome to measure polarization in order to have a comprehensive view of the distributional aspects of income. Moreover the concept of polarization is very important from policy perspectives because the increased differences or polarity in income groups can lead to social conflicts and unrest. The importance of such phenomenon multiplies for a developing country like Pakistan, which has to closely watch against the emergence of such a situation that can pose serious threats to economic development. However, the empirical analysis of polarization has been quite ignored rather un-explored through out the world, especially in Pakistan. In Pakistan, Arshad and Idrees (2008) is the only study that has estimated the trends in polarization. Their study analyzes trends in polarization in Pakistan from 1992-93 to 2001-02. The study finds that in general polarization declined during 1992-93 to 1996-97 and 1998-99 to 2001-02, while it has risen during 1996-97 to 1998-99. Moreover, 1998-99 is the period of maximum polarization. The analysis further shows higher

degree of polarization in urban areas as compare to rural areas throughout the period of analysis.

The present study is an extension of the earlier work done by Arshad and Idrees (2008) as it is updating it by adding latest surveyed year 2004-05. Moreover the study presents the time decomposition of polarization, which is an entirely new concept and has never been worked upon for Pakistan. In time decomposition, the changes in polarization over time are decomposed to find the contributions of movement in different variables in producing the total change in polarization. It has a particular significance from policy perspectives. In order to compare the trends in polarizations with changes in overall income distribution the present study shall also present the estimates of income inequality.

In specific following are the objectives of the present study:

- To measure the extent of polarization in Pakistan, its rural and urban segments at micro level for the years 1998-99 to 2004-05.
- To decompose the changes in polarization over time for Pakistan and its Rural and Urban segments, between the periods 1998-99 to 2001-02, 2001-02 to 2004-05 and 1998-99 to 2004-05.

This paper is planned as follows. Section II presents the discussion on data and variables. Section III covers the methodological issues in the measurement and decomposition of polarization. Results and discussions are given in Section IV, while the paper is concluded in Section V.

II. DATA AND VARIABLES

This section will deal with the issues like data selection, choice of unit of measurement and the selection of household income.

DATA SELECTION

The data used in our analysis has been obtained from the Household Integrated Economic Surveys (HIES) released by the Federal Bureau of Statistics, Government of Pakistan. It is available in two formats: grouped data and micro data. The published data of HIES is grouped data so suffers from the limitation that it fails to give information about the household size, composition, and other specifications. To avoid these shortcomings, we have used the micro data for our study because it is detailed and it leads to results that are more reliable.

The study has been conducted for the latest three surveyed years 1998-99, 2001-02 and 2004-05.¹ The region of analysis considered is Pakistan as a whole and its rural and urban segments.²

CHOICE OF UNIT OF MEASUREMENT

It is well established that three units of measurement can be employed to conduct the analysis; aggregate household, per capita household and per adult equivalent household. A household is defined as a set of individuals with common cooking arrangements. Aggregate household is a commonly used measure but the problem with it is that it does not incorporate household size in the analysis. Whether there is a single member or a number of members, the household is given the same weight.

To deal with this issue the per capita household unit has been developed which is obtained by dividing the household income or expenditure on the number of members of the household. This incorporates the size of the household but the problem with this unit is that it gives equal weight to all members of the household which is not appropriate as the consumption requirements differ with the differences in age, gender, region etc. Thus it still ignores the composition of household.

The third, and by far the best, unit is the per adult equivalent household in which all the members of the household are expressed in terms of number of adults by taking any standard benchmark as an adult. It incorporates both the household size as well as composition. There exists huge literature on the concept of adult equivalence. Jafri (2002) has given a summary of different adult equivalence scales used in different studies for Pakistan. Among them, the most common and acceptable is the calorie intake approach. This is the one used in our analysis. The calorie intake chart is used in which the calorie requirements of specific groups of people on the basis of age, gender and region of residence are reported. Then the calorie intake of an adult is defined and all the people are expressed in terms of that adult. In this way

¹Although the HIES surveys are available for 1992-93, as anonymous referee mentioned, but we use only latest three surveys. Because the inclusion of more HIES surveys will not change the result due to their independent nature.

²The sample size varies from year to year. For the year 1998-99 the HIES data is available for 14679 households out of which 62% are rural and 38% are urban households. For 2001-02, the sample size is 14536 households where percentage of rural households is 63% and that of urban households is 37%. In 2004-05, the total households are 14708 composed of 61% rural and 39% urban households.

numbers of adult-equivalents in a household are found. The following Calorie intake chart has been used in this study:

TABLE 1
Per Day Minimum Calories Requirement Chart

Age Group	Males	Equivalent Factor	Females	Equivalent Factor
Less than a year	1010	0.4297872340	1010	0.4297872340
01 – 04	1304	0.5548936170	1304	0.5548936170
05 – 09	1768	0.7523404255	1768	0.7523404255
10 – 14	2816	1.1982978723	2464	1.0485106383
15 – 19	3087	1.3136170213	2322	0.9880851064
20 – 39	2760	1.1744680851	2080	0.8851063830
40 – 49	2640	1.1234042553	1976	0.8408510638
50 – 59	2460	1.0468085106	1872	0.7965957447
60 and above	2146	0.9131914894	1632	0.6944680851
National Average	2350	1.0000000000		

Source: Government of Pakistan (2003).

HOUSEHOLD INCOME

In this study household income is calculated by using the balance sheets for income and expenditure given in questionnaire of each survey with some minor adjustments. In specific, following yearly earnings of regular and recurring nature are considered:

- Individual income: It includes income earned from all occupations, wages converted from in-kind income, pensions, social securities, etc.
- Income received from remittances, zakat, usher, insurance claims, gifts, grants etc.
- Net rent received from land / building
- Profit earned on savings and deposits

- Amount received in dividend / interest or profit earned through securities, etc.
- Profit earned on granted loan
- Amount received on behalf of group insurance / benevolent fund
- Share / rent received from agricultural land / crop
- Value of livestock and poultry sold or slaughtered for domestic purpose
- Rent earned on agricultural equipments
- Amount earned on lease of non-agricultural establishments
- Amount earned on lease of equipments of non-agricultural establishments
- Value of self-produced and consumed items

III. METHODOLOGY

In this section the various issues related to the measurement and time-decomposition of polarization will be discussed. First, we shall focus on the measurement of polarization and then its time-decomposition is discussed.

MEASUREMENT OF POLARIZATION

In the context of income distribution estimation of polarization is a relatively new concept introduced in early nineties. However a significant literature exists on the measurement of polarization. The major efforts in this regard are of Foster and Wolfson (1992), Wolfson (1994), Esteban *et.al.* (1994), Zhang and Kanbur (2001), Wang and Tsui (2000) and Bossert and Schworm (2006). Each of the measure has its own merits and demerits.

For the selection of polarization measure we have to look at the certain desirable properties that a good polarization measure should satisfy. These include ***Increased Spread***, which states that polarization increases with the increase in distance between the below median and above median group and vice-versa. ***Increased Bipolarity*** is the second property which states that a rank-preserving equalizing transfer between two individuals on the same side of the median increases polarization, since rank-preserving transfer reduces inequality, therefore the property states that decrease in within group(s) inequality increases polarization. The next property is ***Symmetry***, which states that polarization is independent of personal identity. Another desirable

property that a good polarization measure should satisfy is the **Principle of Population**; it states that merging identical populations does not change the degree of polarization of population. Lastly, the property of **normalization** requires that zero polarization be attached to a perfectly equal income distribution.³

The measure employed in the present study is Bossert and Schworm (2006) measure of polarization that satisfies the above-mentioned properties and is time decomposable. It can be written as:

$$P_L = \frac{1}{2\bar{Y}} [v^1(1 - I_1) + v^2(1 - I_2)]$$

where

$$v^1 = (\tilde{Y} - \bar{Y}_1), \quad v^2 = (\bar{Y}_2 - \tilde{Y})$$

$$\bar{Y} = \text{Mean income, such that } \bar{Y} = \frac{\sum_{i=1}^n Y_i}{n}$$

$$\tilde{Y} = \text{Median income, such that } \tilde{Y} = \left(\frac{n+1}{2}\right)\text{th income}$$

$$\bar{Y}_1 = \text{Mean income of units which are lower to the median, such that}$$

$$\bar{Y}_1 = \frac{\sum_{i=1}^m Y_i}{m},$$

$$\bar{Y}_2 = \text{Mean income of units which are higher to the median, such that}$$

$$\bar{Y}_2 = \frac{\sum_{i=m+2}^n Y_i}{n - (m + 1)}, \text{ such that } m \text{ income units are lower to the}$$

median and $n - (m + 1)$ income units are higher to the median

$$I_1 = \text{Inequality Index for units which are lower to the median,}$$

$$I_2 = \text{Inequality Index for units which are higher to the median.}$$

³The discussion on the desirable properties of a good polarization measure is extracted from Awoyemi (2007).

Any normalized inequality measure can be used to find inequality within groups. Bossert and Schworm (2006) have used both the Gini coefficient as well as Atkinson indices.⁴

TIME DECOMPOSITION OF POLARIZATION

The time decomposition of polarization refers to the phenomenon whereby the changes in polarization over time are decomposed into different components to look at the contribution of various factors in bringing the changes in polarization. According to Doiron and Schorm (2006), changes between any two periods t and s can be written as:

$$P_{L(t)} - P_{L(s)} = \underbrace{\left\{ \frac{v_{(t)}^1}{2\bar{Y}_{(t)}} - \frac{v_{(s)}^1}{2\bar{Y}_{(s)}} \right\} (1 - I_{(t)}^1)}_{\text{Effect of Change in Mean Income of Group1 away from Median}} + \underbrace{\left\{ \frac{v_{(t)}^2}{2\bar{Y}_{(t)}} - \frac{v_{(s)}^2}{2\bar{Y}_{(s)}} \right\} (1 - I_{(t)}^2)}_{\text{Effect of Change in Mean Income of Group2 away from Median}} + \underbrace{\{I_{(s)}^1 - I_{(t)}^1\} \left(\frac{v_{(s)}^1}{2\bar{Y}_{(s)}} \right)}_{\text{Effect of Change in Income Distribution of Group1}} + \underbrace{\{I_{(s)}^2 - I_{(t)}^2\} \left(\frac{v_{(s)}^2}{2\bar{Y}_{(s)}} \right)}_{\text{Effect of Change in Income Distribution of Group2}}$$

Here group 1 refers to the units whose income is less than the overall median income while group 2 is composed of units whose income is greater than the overall median income. The formula indicates that the first two terms collectively reflect the “*mean effect*” that is the effect of movements in mean incomes of the two groups relative to the median. The last two terms measure the “*inequality effect*” that is the effect of changes in income distributions of the two groups. The mean effect and inequality effect add to give the total change in polarization over the two periods. This decomposition uses period ‘ t ’ to evaluate effects from changes in the group means and period ‘ s ’ to evaluate changes in the groups’ inequality indices.

IV. RESULTS AND DISCUSSIONS

This section will focus on the results of our analysis and the relevant discussions related to them. First, we shall focus on the trends in polarization in Pakistan and its rural-urban areas. Then the results of the time-decomposition of polarization shall be explained.

⁴The present study shall employ Gini coefficient for this purpose. There are many ways to define Gini coefficient. We have followed Rao (1969) approach to calculate Gini coefficient:

$G = \sum_{i=1}^{n-1} (P_i q_{i+1} - P_{i+1} q_i)$ where, P_i is the cumulative population share and q_i is the cumulative income share corresponding to i^{th} income unit, when all income units are arranged in ascending order of income.

TRENDS IN POLARIZATION

The analysis of polarization has been conducted by taking two units of measurement, *i.e.* aggregate household as well as per adult equivalent household. Moreover, the regions considered are Pakistan and its rural urban areas. The estimates of polarization as well as income inequalities are presented in Table 2. To proceed in our discussion in a comprehensive way, we shall first concentrate on the issue of polarization and then income inequalities will be discussed.

TABLE 2

Polarization in Pakistan and its Rural-Urban Areas

Years	Polarization in Household Incomes			Polarization in Incomes Per Adult-Equivalent		
	Pakistan	Rural Pakistan	Urban Pakistan	Pakistan	Rural Pakistan	Urban Pakistan
1998-99	0.38397 (0.41)	0.37581 (0.39)	0.39068 (0.43)	0.35823 (0.38)	0.34574 (0.33)	0.37115 (0.42)
2001-02	0.37505 (0.40)	0.35335 (0.35)	0.37790 (0.41)	0.34738 (0.37)	0.32007 (0.30)	0.36094 (0.41)
2004-05	0.35724 (0.39)	0.33020 (0.32)	0.37638 (0.42)	0.34149 (0.38)	0.31173 (0.29)	0.36336 (0.44)
Changes in Polarization						
1998-99 to 2001-02	-0.00892	-0.02245	-0.01278	-0.01086	-0.02567	-0.01021
2001-02 to 2004-05	-0.01781	-0.02315	-0.00152	-0.00589	-0.00834	0.00243
1998-99 to 2004-05	-0.02673	-0.04561	-0.01431	-0.01674	-0.03401	-0.00778

Note: (Estimates of income inequality are reported in parenthesis. Estimates of Polarization are based on Bossert-Schworm measure and estimates of income inequality are based on Gini Coefficient)

Regarding polarization, the results in general show that polarization has shown a declining trend in all areas of Pakistan throughout the period of analysis.⁵ This decline in polarization suggests that overall the middle-class

⁵It is important to mention that the present study, according to the best of our knowledge, is the first study based on the last three surveys. Therefore, the results are not comparable with any other study based on the Pakistani data. However, Arshad and Idrees (2007) presented only the trend of income polarization and presented study is quite in line with Arshad and Idrees (2007). Moreover, recently, Gasparini *et al.* (2008) have done the same analysis for the Latin American countries. Their study documents that the middle class is going strengthen over the period of 1989 to 2004.

in Pakistan as well as in its rural and urban areas, has strengthened in the period that we have considered for our analysis.

To be more specific, when aggregate household is considered as a unit of measurement, throughout the period from 1998-99 to 2004-05, polarization has declined in rural, urban as well as overall Pakistan. There can be several reasons explaining these results. First, it is worth noting that in the period after the incidence of 9/11 in 2001, the economy of Pakistan has undergone substantial changes. The increased foreign remittances have contributed more towards increasing the income levels of the people especially middle-income groups, as the general trend of emigration is more in middle-income groups. The increased prosperity of the middle-income groups has generated externalities, boosting the economic activity and thus benefiting the lower income-classes. Moreover, as in the aftermath of 9/11 incidence Pakistan has become an ally in the war against terrorism and has not only got successful in getting its loans rescheduled but has also attracted much foreign investment in the consequence. This has generated employment opportunities especially for lower and middle-income groups.

In addition the monetary policy in the period from 2002 onwards has been quite easy and interest rate environment not only remained investor-friendly but middle-class borrowers also benefited from such environment (Ministry of Finance, Government of Pakistan 2004). Moreover the increased credit to private sector boosted private investment generating a lot of employment opportunities. A very remarkable development in this period has been in the construction sector that has a very high growth rate throughout the period of analysis owing, along with other factors, to the reconstruction projects in Afghanistan. Moreover, the real-estate developments in Pakistan also increased the incomes of the middle-class, though in an unnatural way.

The salaries of Government employees have also undergone substantial increase since 1999 and this has helped in increasing the mean incomes of salaried class. It is worth noting that in the HIES data of 2004-05; the paid employees are almost 40% out of which around 15% are Government employees while the remaining 25% are private employees. As the salaries of the Government employees increase, the private sector has to follow suit and thus there is observed a generally rising trend in salaries and wages. The paid employed people belong mainly to the middle and lower middle-income groups. This step has helped to strengthen middle-class.

The economy of Pakistan also witnessed the impressive Foreign Direct Investment (FDI) inflow the first half of present decade. The FDI reached

from USD 1 billion in 1999 to USD 4 billion in 2005. This investment, in the different sector of the economy, further boosted the growth and strengthened the middle class. Furthermore, the historic increase in the foreign remittances is another reason for the consumption smoothening of the middle class. The economy witnessed sustainable foreign exchange remittances inflows from the Middle East during present decade. Most of the Pakistani workers in the Middle East belong to the middle class or poor families and they transfer money to Pakistan instead of holding in their foreign accounts. Therefore, the increase in remittances strengthened the middle class and this ultimately led the decline in polarization.

It should moreover be noted that a very important role has been played by the micro-finance industry, which has been developed at a fast pace from 1999 onwards. These schemes have helped in generating not only employment but have also contributed to strengthening of local businesses and thus have helped to place the economy on a sound footing. The beneficiaries of these schemes fulfil not just their basic needs but are able to enjoy a respectable standard of living. Moreover the successful poverty alleviation programmes initiated in this period, as is evident from the declining trend in poverty indices, have helped to shift people from lower income groups to relatively higher income groups. The mean incomes of the lower classes, too, have thus increased. The upper class also has gained much in this scenario but the relative gain of the middle-income groups has been more pronounced. In this way due to greater increase in the incomes of lower income groups as compared to the relative incomes of upper class, polarization has decreased.

Finally it should be noted that the political scenario in this period was relatively more stable showing consistency in the policies of the Government and may account for the consistency found in the results. The governance got the time to pursue its policies without any hindrance and thus the economy bore the fruit through their implementation.

The rural-urban comparison of polarization measure reveals that the values of polarization measure are greater for urban areas as compared to rural areas in each period of analysis. For example, the aggregate household polarization in case of rural Pakistan as indicated by Bossert and Schorm's measure ranges from 0.3302 to 0.3758 in our period of analysis. The urban aggregate household polarization values however range from 0.3764 to 0.3907. It must however be noted that the urban polarization has been measured using urban median income and rural has been measured by using rural median income so there is not a common bench-mark for both these

segments. The explanation for the difference in polarization measures across the rural-urban sectors does not thus lie in their relative income differentials. The probable reason for the observed difference in polarization is that generally there is much dispersion in incomes of people in the urban areas because of the diversity in their works; from a daily wage earner to a big businessman, all classes live in urban areas.⁶ Apart from this, there is more or less similarity in the sources of income in rural areas and the gulf in incomes is thus not so wide.

The results based on the per adult equivalent household also in general show the same declining trend in polarization for rural and urban Pakistan as well as Pakistan as a whole except for a single case in urban areas for the period of 2001-02 to 2004-05 whereby polarization has increased. This is quite an unexpected and strange result as the aggregate household polarization has been found to be declining in this period. The only possible explanation for this result can be the effect of the incorporation of adult equivalents in our analysis.

The results show that for each period and each region, the values are always greater in case when aggregate household is considered as the unit of measurement than when per adult equivalent household measure is used. The possible explanation for this kind of phenomenon lies in the family size of the households. As when the family size is incorporated, polarization is decreased, it means that either rich class has a larger family size or poor class has smaller or both. By far, per adult equivalent household is the most appropriate unit of measurement encompassing various characteristics of the household and so the estimates based on it are more reliable. To be more precise if household size is not incorporated the polarization is overestimated, as is evident from the estimates based on aggregate household.

Now we shall concentrate on the results obtained for income inequalities. The estimates of Gini coefficient for income inequality have been given in parenthesis in Table 2. There must not, however, be any doubt that there is a wide difference between the concept of polarization and income inequality. Income inequality looks at the distribution of income among all income units, while polarization focuses on the strengthening or weakening of middle class. So the magnitudes of these measures are not comparable at all. The only significance is of their mutual trends.

⁶The estimates of income inequality are reported in parenthesis (Table 2) and are discussed later on.

In case of rural Pakistan and for Pakistan as a whole, when aggregate household is considered as a unit of measurement, the inequalities as shown by the Gini coefficient have decreased throughout from 1998-99 to 2004-05. As it has already been stated, polarization has also decreased over this period. It suggests that the dispersion in incomes have decreased in a way to ensure that both the rich and the poor classes are diminishing while the middle class has strengthened that is there is a movement towards the overall median income. In case of urban Pakistan, the results for the aggregate household income inequality shows that inequality has decreased from 1998-99 to 2001-02 but it has increased from 2001-02 to 2004-05. The polarization measures however show that polarization has declined throughout the period. This is, thus, evidence that decreasing inequalities do not ensure decreasing polarization. Though inequalities have increased from 2001-02 to 2004-05 still the proportion of middle class has increased. The dispersion in incomes even in the middle-income groups can increase or there may be a wider gulf in the incomes of the lesser than before proportion of people at the poles.

The results for per adult equivalent household show the same trends as for aggregate household except in case of overall Pakistan where incorporation of family size has led to an increase in income inequalities from 2001-02 to 2004-05. The reason behind this increase is that the rise in per adult household income inequality in urban Pakistan in this period has been strong enough to overcome the effect of decline in inequalities in rural areas, which has led to an increase in overall inequality in Pakistan. The rise in urban inequality when aggregate household is considered as a unit of measurement is not strong enough to produce an increase in overall inequality in Pakistan. It should be kept in mind that throughout the period, per adult equivalent household income polarization followed a declining trend in rural Pakistan and Pakistan as a whole but has increased in urban Pakistan from 2001-02 to 2004-05.

The similar trends of polarization and inequality are easy to explain. The declining trends just mean that the inequalities have decreased such that the distribution has changed to reduce population at the poles strengthening the middle class and decreasing polarization.

The explanation, however, of the differing trends of polarization and inequalities possibly lie in the opposing trends of poverty and inequality estimates. As from 2001-02 to 2004-05, poverty has decreased (Government of Pakistan, 2006-07) while inequality has risen it means that declining poverty has moved people from lower income-classes to middle-income

groups thus strengthening the middle class and decreasing polarization but at the same time the inequalities have been generated due to increase in the relative incomes of the rich class. The HIES data also advocates this argument as the share of the richest 20% population increased to 44% in 2004-05 from 41% during 2001-02. Hence, both the rich and the middle-class have increased in proportion but the strengthening of middle class is greater than that of rich class.

TIME DECOMPOSITION OF POLARIZATION

In the previous section, the focus of our analysis was the trends in polarization. We have found that in general there has been a declining trend in the coefficient of polarization for Pakistan and its rural, urban areas. Now we shall look into the time-decomposition of polarization so as to see how changes in the mean incomes of each group relative to the median and the inequalities within each group are related to overall changes in polarization. This is made possible by conducting the time decomposition of polarization across different time periods.

TABLE 3
Time Decomposition of Polarization in
Pakistan and its Rural-Urban Areas

Decomposition	Polarization in Household Incomes			Polarization in Incomes Per Adult-Equivalent		
	Pakistan	Rural Pakistan	Urban Pakistan	Pakistan	Rural Pakistan	Urban Pakistan
1998-99 to 2001-02						
Mean Effect	-0.01177 (132.0%)	-0.03615 (161.0%)	-0.01866 (146.0%)	-0.00885 (81.5%)	-0.03593 (140.0%)	-0.01080 (105.7%)
Group 1	-0.00232 (26.0%)	-0.00063 (2.8%)	-0.00472 (36.9%)	-0.00566 (52.1%)	-0.00550 (21.4%)	-0.00337 (33.0%)
Group 2	-0.00946 (106.0%)	-0.03552 (158.2%)	-0.01394 (109.1%)	-0.00320 (29.5%)	-0.03043 (118.5%)	-0.00742 (72.7%)
Inequality Effect	0.00285 (-32.0%)	0.01370 (-61.0%)	0.00588 (-46.0%)	-0.00201 (18.5%)	0.01026 (-40.0%)	0.00059 (-5.7%)
Group 1	0.00088 (-9.9%)	0.00157 (-7.0%)	0.00104 (-8.1%)	0.00129 (-11.8%)	0.00218 (-8.5%)	0.00097 (-9.5%)
Group 2	0.00197 (-22.1%)	0.01213 (-54.0%)	0.00484 (-37.8%)	-0.00329 (30.3%)	0.00808 (-31.5%)	-0.00039 (3.8%)
Total Effect	-0.00892	-0.02245	-0.01278	-0.01086	-0.02567	-0.01021

2001-02 to 2004-05						
Mean Effect	-0.01737 (97.6%)	-0.03207 (138.5%)	0.00570 (-373.7%)	-0.00168 (28.6%)	-0.00951 (114.0%)	0.01200 (494.4%)
Group 1	-0.00739 (41.5%)	-0.00292 (12.6%)	-0.00655 (429.4%)	-0.00497 (84.5%)	-0.00104 (12.4%)	-0.00247 (-101.7%)
Group 2	-0.00999 (56.1%)	-0.02915 (125.9%)	0.01225 (-803.0%)	0.00329 (-55.9%)	-0.00847 (101.6%)	0.01447 (596.1%)
Inequality Effect	-0.00043 (2.4%)	0.00892 (-38.5%)	-0.00722 (473.7%)	-0.00420 (71.4%)	0.00117 (-14.0%)	-0.00957 (-394.4%)
Group 1	0.00229 (12.9%)	0.00206 (-8.9%)	0.00163 (-106.7%)	0.00056 (-9.5%)	0.00020 (-2.4%)	0.00017 (7.1%)
Group 2	-0.00273 (15.3%)	0.00685 (-29.6%)	-0.00885 (580.4%)	-0.00476 (80.9%)	0.00097 (-11.6%)	-0.00975 (-401.5%)
Total Effect	-0.01781	-0.02315	-0.00152	-0.00589	-0.00834	0.00243
1998-99 to 2004-05						
Mean Effect	-0.02910 (108.9%)	-0.06922 (151.8%)	-0.01259 (88.0%)	-0.01051 (62.8%)	-0.04559 (134.0%)	0.00146 (-18.8%)
Group 1	-0.00976 (36.5%)	-0.00356 (7.8%)	-0.01134 (79.3%)	-0.01066 (63.7%)	-0.00655 (19.3%)	-0.00585 (75.1%)
Group 2	-0.01935 (72.4%)	-0.06566 (144.0%)	-0.00125 (8.7%)	0.00015 (-0.9%)	-0.03904 (114.8%)	0.00731 (-93.9%)
Inequality Effect	0.00237 (-8.9%)	0.02361 (-51.8%)	-0.00171 (12.0%)	-0.00624 (37.2%)	0.01158 (-34.0%)	-0.00925 (118.8%)
Group 1	0.00323 (-12.1%)	0.00364 (-8.0%)	0.00274 (-19.2%)	0.00188 (-11.2%)	0.00239 (-7.0%)	0.00115 (-14.8%)
Group 2	-0.00085 (3.2%)	0.01997 (-43.8%)	-0.00446 (31.2%)	-0.00811 (48.5%)	0.00918 (-27.0%)	-0.01040 (133.6%)
Total Effect	-0.02673	-0.04561	-0.01431	-0.01674	-0.03401	-0.00778

Note: (Group 1 refers to those whose income is below median and Group 2 constitutes of those whose income is greater than median)

The results have been presented in Table 3. The decomposition of changes over time has been done between the periods 1998-99 and 2001-02, 1998-99 and 2004-05 and 2001-02 and 2004-05. It has been done both for the polarization calculated using aggregate households as well as adult equivalent households as the units of measurement. The results of decomposition show that in case of rural Pakistan, for all the three

decompositions over time, whether aggregate household or per adult equivalent household is considered, the greatest factor contributing to the decline in polarization has been the second term whose contribution has been overwhelming in all the periods of analysis. It means that the mean income of group 2 has decreased relative to the median. Moreover the contribution of the last two terms have been negative throughout which implies that the decreasing inequalities among upper and lower income groups in rural areas have served to increase polarization. The overall effect however has been a decline in polarization throughout in rural areas.

In case of urban Pakistan, both for aggregate household as well as per adult equivalent household, the decomposition of polarization over the period 1998-99 to 2001-02 reveals the largest contribution to be that of the second term. For the period from 2001-02 to 2004-05, in case of aggregate household polarization, each term has a very large contribution, with the greatest factor having negative contribution being that of increase in group 2's mean income relative to median. This factor is countered by the substantially high positive contribution of the first and the fourth terms resulting in a decline in polarization overall. In case of per adult equivalent households, however the polarization has increased over this period; the increase in group 2's mean income (2nd term) being the largest factor responsible for it. In case of the decomposition over 1998-99 to 2004-05, decomposition of aggregate household polarization shows the biggest contribution as that of the first term that is the mean incomes of lower income groups have increased. However, for per adult equivalent households, the greatest contribution in reducing polarization has been that of the fourth term, *i.e.* the increasing inequalities among higher income groups.

For Pakistan, as a whole, when aggregate household polarization is decomposed, the greatest contribution has been found to be that of the second term in reducing polarization, in all periods. However when per adult equivalent household is considered, the increasing mean incomes of lower income groups have been found to have the greatest contribution while the increasing inequalities in higher income groups having substantially large contributions in reducing polarization as shown by the decompositions between 2001-02 to 2004-05 as well as 1998-99 to 2004-05.

V. SUMMARY AND CONCLUSIONS

In the context of income distribution polarization refers to the decline of middle class. Its empirical analysis is quite an unexplored in case of

Pakistan. The present study is an attempt to present the empirical estimates of Polarization for Pakistan, its rural and urban areas. Moreover, it has also given the time-decomposition of the estimates of polarization. The analysis has been conducted for the years 1998-99, 2001-02 and 2004-05. The study uses both the aggregate household as well as per adult equivalent household as the units of analysis.

The estimates show that for both the units of measurement, polarization has declined in Pakistan as well as its rural and urban areas except for a single case whereby per adult equivalent household polarization in urban Pakistan increased between the years 2001-02 to 2004-05. The coefficient of polarization has been found to have a greater value when aggregate household is considered as compared to the case when per adult equivalent household is considered as a unit of measurement. As per adult equivalent household estimates are more reliable, the polarization is over-estimated when household size is not incorporated in the analysis.

The decrease in polarization over the time period considered is attributed to various factors; the important ones being the modifications in the Pakistan economy in the aftermath of 9/11 incidence and the alliance of Pakistan with world powers in the war against terrorism. Moreover the successful poverty alleviation programmes and micro finance schemes as well as the miraculous development in the construction sector have paved the way towards the strengthening of the middle class in the economy.

The results show that in general income inequality also continue to decline till 2001-02. The mutual declining trends in income inequality and polarization indicate that the income distribution has changed to reduce population at the poles strengthening the middle class and decreasing polarization. However, for the year 2004-05, rise in income inequality and decline in polarization indicates that declining poverty has moved people from lower income-classes to middle-income groups, thus, strengthening the middle class and decreasing the polarization but at the same time the inequalities have been generated due to increase in the relative incomes of the rich class.

The changes in polarization over time have also been decomposed in the present study. The results of these time-decompositions reveal that the greatest factors contributing to the changes in polarization have been the decrease in mean income of higher income groups relative to the median and the decreasing income inequalities in both the below-median and above-median income groups.

The present study is meant to be a milestone in the journey towards advanced research on this issue. There is a wide scope for the detailed analysis of polarization in Pakistan and its decompositions can be done in other ways too proving to be helpful for various policy decisions.

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