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Econometric Analysis of Personal Income Disparity in Pakistan

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Abstract

The prime objective of this research paper is to present econometric analysis of income distribution pattern of Pakistan in three folds like overall, provincial and regional. This empirical paper present trends and then compare it with two different micro level data sets that either inequality is decreasing or increasing. We are not interested that either inequality increasing or decreasing. However, our focused to identify economic and social factors are important in which inequality is increasing or decreasing. For this purpose, we have taken some characteristics like Education level of the household, Family size and different income groups. In this descriptive study, we decomposed the data into different level like provincial and regional. Later on, Education of the household was divided into different level of classes and check it whether in which class inequality more or less exist. Similarly, family size was sub divide into three groups, lower, middle and high composition family members. Lastly, overall income was divided into decile and measure disparity. In empirical analysis, we used three different indices for inequality determine i.e. Gini, Atkinson and Generalized Entropy. Latest rounds of Pakistan Social Living Measurement (PSLM/HIES) data 2015-16 and 2018-19 was undertaken. The basic theme of this study to contribute in planning and policy level studies of Pakistan wherein social and economic condition of the citizen improved.

Keywords: Income, Inequality, Indices, Gini, Atkinson, Entropy, Education, Family Size, Province, PSLM, STATA, DASP.

1. Introduction

Real GDP or real per capita income are the indicators used to measure economic growth, which is crucial to any society. In any case, both of these do not ensure social government assistance. Social government assistance has a lot of significance in our regular routines no matter what the societal position of people. Inequality and poverty must be addressed for any society's welfare. Income inequality has been a major problem since the improvement of countries. Income inequality and its effects have been the subject of extensive discussion, from ancient Greek philosophers to our current politicians. "Widening income inequality is the defining challenge of our time," reads a report from the IMF. The gap between the wealthy and the poor is at its highest level in decades in advanced economies, according to the IMF (2015). Some Western nations have experienced a steady rise in inequality in their own backyards despite being highly developed. In particular, this is evident in the United States. America, according to Alesina and Glaeser (2004), is relatively unequal for a developed nation. Piketty and Saez's (2003) investigation into the actual wealth of the richest one percent in the United States make this even clearer. Their findings show that the richest one percent's share of income increased by almost fourteen percent only between 1979 and 2007.

The current study is motivated by the fact that Pakistan has tried it best to conduct this type of research in the area. The researcher has tried this time to express this income inequality in new perspective and different point of view. Pay imbalance has been a major problem since the improvement of countries. From old Greek savants to our now current legislators, pay imbalance and its effect has been generally discussed. "Widening income inequality is the defining challenge of our time," reads a report from the IMF. In cutting edge economies, the gap between the rich and poor is at its most significant level in many years" (IMF 2015). Regardless of being exceptionally grown, a few Western countries have seen a consistent expansion in disparity in their own patios. This is particularly apparent in the US. As Alesina and Glaeser (2004) have found, America is somewhat inconsistent for a created country. Piketty and Saez (2003) feature this further by exploring how well off the most extravagant 1% really are in America; discoveries introduced the 1%'s portion of pay rose by very nearly 14% just somewhere in the range of 1979 and 2007. Extreme wealth and extreme poverty coexist worldwide. Despite the fact that pay disparity has diminished in country-explicit cases, the information arising beginning around 2020 recommends that worldwide imbalance might have expanded lately (Christensen et al., 2023). In 2021, worldwide riches and pay were significant, yet these totals conceal huge aberrations. To get a handle on the degree of worldwide imbalance, we can think about the dissemination of pay. Only 2% of the world's wealth is owned by the 50 percent of low-income earners. On the other hand, the wealthiest individuals own a staggering 76% of the total (Chance et al., 2022). Individual inequality within countries is at an all-time high, and even though the emerging world is catching up in terms of growth, inequality between countries remains high. Chancel et al., (2022) express that there is a misleading case

those unfortunate nations are poor since they utilize capital assets wastefully. All things being equal, it is accepted that unfortunate nations are moderately proficient in their utilization of capital, yet they have next to no money to begin with. In addition, the authors state that there is no apparent trade-off between higher levels of inequality and higher income levels. However, having a high average income does not mean that inequality is lower. Further, Chancel et al., (2022) contend that the level of disparity inside a public is a consequence of political decisions and how a nation chooses to coordinate their economy. Complex and is dependent upon different translations. This study perceives elective points of view and addresses these contentions all through the review. A prominent commitment to the investigation of pay imbalance and its connection to monetary development can be certify to Robert J. Barro. When analyzing the effects of income inequality, Barro (2000) introduced a perspective that considers development levels. Barro proposes that pay imbalance is reliant upon the particular setting and that despite the fact that there is minimal in general connection between pay disparity and development rates, the effect changes relying upon a nation's degree of improvement. This supports that the impacts of pay imbalance on financial development are not uniform, but instead founded on the monetary setting of every country. His exploration reasons that there means that disparity could frustrate development in less evolved countries and could animate financial extension in additional created countries. Experimental investigations on pay imbalance have been resolving two issues: distinguishing proof of variables liable for a noticed example and size of disparity and the bearing whether negative or positive of the impact of imbalance on financial development. Notwithstanding, inconsistent discoveries have frequently been accounted for, incompletely because of restricted direction given by the hypothesis. Likewise, the vast majority of such examinations have been founded on cross-country (in some cases, board) information for a specific locale or for all nations with accessible information. However, since of predetermined number of pay dispersion data of interest for African nations, scarcely any examinations have been accounted for only for Africa and, in those situations where all nations with accessible information are incorporated, the quantity of African nations covered frequently is an irrelevant part of the aggregate. There is a need not exclusively to reveal more insight into the current inconsistency inclined proof, yet additionally to inspect the subject according to an African viewpoint. African-specific evidence is immediately relevant to anti-poverty policies due to the recent revival in the fight against poverty and the relatively low level of development and high poverty in the region, both of which support the use of African data. The current review addresses the previously mentioned two viewpoints, viz: factors representing the noticed pay imbalance and the immediate and roundabout impacts of the disparity on financial development and it depends on cross-country (or, rather, semi board) information for 35 African nations traversing the 1960s to 1990s. The remainder of the paper is coordinated into six areas.

Chancel et al (2022) explored that total proportions of circulation might conceal developments of pay in various gatherings, for example, the perception that general imbalance might stay stable after some time and can be predictable with extensive change in the portions of absolute pay got by individual gatherings. Exact work shows that there might be a negative connection between introductory disparity and future development.

Roth (2018) explored that inequality is necessary for a nation to grow, according to classical economic theory. Inside conventional monetary examination, the inquiry with respect to financial development, estimated as the expansion in a country's creation of labor and products (Gross domestic product), and pay disparity, has led to a progression of hypothetical and experimental examinations in which imbalance has both a negative and positive impact on development. Traditional financial hypothesis contends for the harmony between imbalance and effectiveness. A broadly utilized contention is that people will generally be driven by high imbalance, as it expands the contrast between the arrival of good and terrible outcomes. In principle, large pay contrasts increment the motivations for individual commitment, which thus increments efficiency and long haul development (Roth, 2018). Additionally, higher inequality encourages collective savings and, as a result, capital accumulation. Thus, the rich have a lower penchant to consume (Kaldor, 1955).

According to an examination conducted by the OECD (2014), widespread increases in income disparities have raised concerns regarding the potential effects on economies and societies. Economic growth slows down when income inequality rises, according to new research. The fact that people with lower incomes are less able to put money into their education is a major factor in this phenomenon. Pay imbalance is clear in the broadening hole among top and base pay workers. The greatest variable for the effect of pay disparity on development is the hole between lower-pay families and the remainder of the populace. The examination shows that it is not sufficient to just handle destitution, yet more largely location lower pay. Particularly, the evidence demonstrates that inequality impedes human capital accumulation, which in turn reduces growth. Education and opportunities for disadvantaged people are harmed by income inequality, which also hinders social mobility and skill development.

Eeckhout et al. (2014) examined the larger cities draw a disproportionate number of households from the middle and upper income ranges. In one of his later papers, Glaeser further this conviction by zeroing in on the convergence of the poor in American urban areas. His investigation discovers that the poor live nearer to the downtown area than the rich, fundamentally because of simple admittance to public transportation (Glaeser 2011). In the United States, central cities had 19% of the population in poverty, while suburbs had around 7.5%. An essential justification behind this huge distinction is because of the enormous monetary expenses of cars, which make it ugly to bring down pay residents. Behrens et al. (2014) centers around the highest point of the pay dissemination by speculating huge urban communities draw in rich families in view of the more significant yields to abilities. In "superstar cities," this is referred to as the "superstar effect." In cities, there is a rigorous selection process that raises inequality in earnings and returns to skills. The commitment of better return motivations metropolitan movement, causing an expansion in additional useful firms prompting enormous pieces of the pie and the capacity to pay higher wages. While this appears as though a positive event, there is a negative side to the 'whiz impact' that copies natural selection. Urban areas excessively reward the most talented individuals while bombing the most un-gifted. This occurs when cities provide incentives to those who are most able to self-select high-

paying employment options, increasing the risk of failure as workers begin to compete with not only more but also superior rivals. This inconsistent award frameworks drives pay imbalance (Behrens et al. 2014.)

Stiglitz (2012) contends imbalance eases back monetary development. Stiglitz claims that inequality reduces aggregate demand for those at the bottom, causing them to spend more of their income than those at the top. This makes intuitive sense because the poor frequently have to spend all of their earnings in order to meet basic needs. Moreover, Stiglitz contends the approach reactions to battle frail interest can harm the economy. Bubbles that, when they burst, have the potential to trigger a recession may be fueled by interest rate reductions by monetary authorities. Disparity of results is connected with imbalance of chance, in this manner-keeping people from low financial foundations to arrive at their maximum capacity. This shows that pay disparity has an adverse consequence even on future financial development, endangering groups of winding up in a destitution trap. Stiglitz focuses to lease chasing, when the rich try to expand their own abundance as opposed to making new abundance, as one more significant component on how disparity can hurt development. A large part of the hypothetical writing on disparity's impact on development presents defective capital business sectors, strain for reallocation, and socio-political shakiness as conceivable foundations for a negative relationship between pay imbalance and monetary development.

Various studies have been conducted on Income distribution pattern of Pakistan. Some have determined trends and polarization of income pattern however it must to determine the characteristics in which inequality exist. Bergan, 1967; Azfar, 1973; Kruijk & Leuwen, 1985; Jafri & Khattak, 1995; Haq, 1998; Nasir & Mahmood, 1998; Ahmed, 2000; Jamal, 2003; Idress, 2008, Cheema & Sial, 2010, Rehman et al. 2015 tried to determine the trends, one or more attributes effect and also focused on polarization. However,

some identified factors at household level like Education of the head, Family size, Housing status, Employment status, different income groups, Occupational groups, Age groups, Industrial classification were partially studies in literature review has showed significant impact on income disparity. In this study we have taken three attributes like Education, Family size and different income groups of the household and check it through empirical analysis that either income disparity exist in these aspects. In next study we will thoroughly examine all above identified attributes. From our analysis where we have used three indices like Gini, Atkinson and Generalized entropy (Lugo, 2005; Nilson, 2010; Aristei & Bracalente, 2011; Decancq & Lugo, 2012; Justino, 2012; Rohde & Guest, 2013) which were scarcely used in literature review at the same time in a study. Each index has its different dimension and approach. Pakistan Social Living Measurement (PSLM/HIES) for the year 2015-16 and 2018-19 was undertaken.

2. FRAMEWORK OF ANALYSIS

This section will present the framework of analysis covering methodology of research which consist on data selection, Income measurement procedure, and usage of different indices for inequality measurement.

2.1. DATA

Two latest rounds data Pakistan Social Living Measurement (PSLM/HIES) 2015-16 and 2018-19 conducted and published by Pakistan Bureau of Statistics, Government of Pakistan, Islamabad. These two micro sets cross sectional data help us to understand income pattern of the citizen of Pakistan. It provides detail information about each household head and its family members. The data was collected from unrestricted areas of Pakistan. The sample size varied from year to year. Two stage stratified sampling technique was used in area frame of Pakistan. At first Primary sample unit like Blocks was selected randomly from area frame. Each block consists 200-220 population in rural areas while 200-250 population in urban areas of Pakistan. In second stage, twelve to sixteen households were selected randomly from primary sample unit. In urban area, twelve households are undertaken for enumeration while sixteen random households are undertaken for enumeration. The detail report of Primary Sampling Unit (PSU) and Secondary Sampling Unit (SSU) in the Surveys are as under.

Table1 (Household Sample Size in PSLM/HIES Data)

Region	2015-16		2018-19	
	PSU	SSU	PSU	SSU
Pakistan	1605	24238	1820	24809
Rural Areas	1087	16155	1025	15269
Urban Areas	518	8083	795	9540
Khuber Pakhtukhawa	346	5209	320	4485
Punjab	697	10508	850	11781
Sindh	410	6176	470	6216
Balochistan	152	2345	180	2327

2.2 INCOME MEASUREMENT PROCEDURE

Income file was prepared from Income and Expenditure Section of the questionnaire PSLM/HIES 2018-19. From detail analysis of the questionnaire we have concluded Section 6,8 and 9 are relevant for income distribution measurement. Income consists on the following components. $\text{Income} = \text{Regular Income} + \text{Primary Occupation} + \text{Secondary Occupation} + \text{Other Work} + \text{Income in Kinds} + \text{Pensions etc}$

In section 6 of questionnaire yearly income calculated from different questions i.e $(Q8*Q9+Q10+Q15+Q17+Q19+Q21)$. The Second income was counted from Expenditure data Part A, B, C, D and E. Part A& B are computed from female questionnaire whereas rest parts calculated from Male questionnaire: V3 Own Produce and consumed, V4 receipt from Assistance, gift and dowry etc are component of income. Similarly, third major portion of income, transfer received and

payments from section 8, Part A & B. Net income received from different classification of codes. In Section 9, Part-A Building and Land Owned by Household members while in Part-B Financial Assets and Liabilities. We summaries net income from different code where Rent out in Q4 which is deducted from Q5 major improvement and renovation of building. Net Saving computed from different codes like Assets and Liabilities of the household.

2.3 MEASUREMENT OF INEQUALITY.

In our study we have used Distributive Analysis Strata Package, DASP version 3.02. This software first version (2021) was introduced by two Professors Abdelkrim and Jean-Yves Ducles, Department of Economics, Universite of Laval, Canada. It is designed to assist researchers and policy maker interested in conducting distributive analysis with Stata. The main features of this Menu is as under.

- Evaluate the most popular statistics (indices, curves) used for the analysis of poverty, inequality, social welfare, and equity.
- Assess the differences in such statistics.
- Estimate standard errors and confidence intervals by taking full account of survey design.
- Support distributive analysis on more than one database.
- Perform the most popular poverty and decomposition procedures.
- Check for the ethical robustness of distributive comparisons.
- Unify syntax and parameter use across various estimation procedures for distributive analysis.

Three indices Gini, Atkinson and Generalized Entropy were used for measurement of income disparity. Each index has its own approach and different views about inequality. Fortunately, we have calculated all results through DASP Menu however these indices mathematical expression is as under.

DASP and inequality indices

Inequality indices (*ineq*)

The *ineq* module is used to estimate the different inequality indices and their standard errors. The user must add the index option (index name) to estimate the desired index.

<i>Index name</i>	<i>Inequality index</i>
gini	Gini index
atk	Atkinson index
entropy	Generalized entropy index

The user can select more than one variable of interest at a time. For example, inequality can be estimated by simultaneously using *per capita* consumption and *per capita* income.

- A group variable can be used to estimate inequality at the level of a categorical group. If a group variable is selected, only the first variable of interest is then used.
- Standard errors and confidence intervals with a confidence level of 95% are provided. Both the type of confidence interval and the level of confidence can be changed.
- The results are displayed with 6 decimals; this can be changed. The Gini index is estimated as

The Gini index is estimated as

$$\begin{aligned}
 & \text{where} \\
 & \hat{I} = 1 - \frac{\sum_{i=1}^n \mu_i^2}{\mu^2} \\
 & \mu_i = \frac{y_i}{n} \\
 & \mu = \frac{\sum_{i=1}^n y_i}{n}
 \end{aligned}$$

and

$$y_{i+1} \dots y_i \cdot i = 1 \quad [V_1] 2 \quad i \quad i \quad h=i \quad 1 \geq$$

The absolute Gini index is estimated as

$$= \mu - \hat{\xi}$$

When the ranking variable is Y , the concentration index for the variable T is estimated as

$$\hat{\xi} = \frac{\sum_{i=1}^n (V_i)^2 - (V_{i+1})^2}{2 \sum_{i=1}^n V_i \mu_T}$$

where μ_T is the average of variable T

$$\hat{\xi} = \frac{\sum_{i=1}^n (V_i)^2 - (V_{i+1})^2}{2 \sum_{i=1}^n V_i \mu_T}$$

where $V_i = \sum_{j=i}^n y_j$

$$V_i = \sum_{j=i}^n y_j$$

$$y_1 \geq y_2 \geq \dots \geq y_n$$

$$y_i \geq y_{i+1} \quad [V_i] \geq [V_{i+1}]$$

Generalized entropy index

The generalized entropy index is estimated as

$$i(\theta) = \frac{1}{(\theta - 1) \sum_{i=1}^n w_i y_i^\theta}$$

if $\theta \neq 0, 1$

$$i(\theta) = \frac{1}{\sum_{i=1}^n w_i y_i}$$

$$i(\theta) = \frac{1}{\sum_{i=1}^n w_i y_i} \quad \text{if } \theta = 0$$

$$i(\theta) = \frac{1}{\sum_{i=1}^n w_i \log(y_i / \mu)} \quad \text{if } \theta = 1$$

$$i=1 \quad i \quad i$$

Atkinson index

The Atkinson index of inequality for the group k is denoted by $I(\epsilon)$. It can be expressed as:

$$\hat{I}(\epsilon) = \frac{\hat{\mu} - \hat{\xi}(\epsilon)}{\hat{\mu}} \quad \text{where} \quad \hat{\mu} = \frac{\sum_{i=1}^n w_i y_i}{\sum_{i=1}^n w_i}$$

The Atkinson index of social welfare is expressed as:

$$I(\epsilon) = \frac{1 - \left(\sum_{i=1}^n w_i (y_i)^{\epsilon} \right)^{1/\epsilon}}{1 - \left(\sum_{i=1}^n w_i \right)^{1/\epsilon}} \quad \text{if } \epsilon \neq 1 \quad \text{and } \epsilon \geq 0$$

$$\lim_{\epsilon \rightarrow 0} I(\epsilon) = \frac{\sum_{i=1}^n w_i \ln(y_i)}{\sum_{i=1}^n w_i} \rightarrow \epsilon = 1 \quad i=1^i \quad i=1$$

3. Results and Discussions

3.1 INCOME INEQUALITY BASED ON EDUCATION

The Gini index measures the extent to which the distribution of income or consumption among individuals or households within an economy deviates from an equal distribution. A Gini index of zero represents perfect equality, while an index of 100 implies perfect inequality. The Atkinson index (also known as the Atkinson measure or Atkinson inequality measure) is a measure of income inequality developed by British economist Anthony Barnes Atkinson. The measure is useful in determining which end of the distribution contributed most to the observed inequality.

Table 3.1 (Researcher’s own contribution)

2015-16				2018-19			
Education Level	Gini	Atkinson	Entropy	Education Level	Gini	Atkinson	Entropy
Uneducated	0.372187	0.114743	0.262302	Uneducated	0.467076	0.194745	0.523831
Primary	0.377642	0.122064	0.295219	Primary	0.461016	0.180531	0.438133
Middle	0.377643	0.122742	0.297102	Middle	0.458191	0.178290	0.423669
Matric	0.409102	0.143151	0.353273	Matric	0.481437	0.201981	0.520979

Intermediate	0.504688	0.240314	0.751886	Intermediate	0.472952	0.199191	0.541292
Graduation	0.459110	0.183361	0.480689	Graduation	0.462263	0.182166	0.435872
Post –Grad	0.448754	0.166370	0.393329	Post –Grad	0.410085	0.139545	0.300914
Professional	0.465049	0.175475	0.383879	Professional	0.434557	0.158545	0.354339

The Generalized Entropy Index (GE) is a measure of inequality. A value of zero represents perfect equality and higher values denote increasing levels of inequality, within a mapped administrative unit.

We have used three indices to evaluate the income inequality based on education. We can see from the table that how many categories of education have been considered to understand the pattern of inequality with reference to education attained by the household heads. Indices include Gini, Atkinson and Generalized Entropy. These three indices will be incorporated to evaluate the difference of income inequalities of household based on education. We can see the table above that we have different type of education levels based on year 2015-16 that would further determine the inequalities around this education pattern also comparing with next year 2018-19. We would compare the results of both years and try to observe the difference whether how this affects the income inequality during the difference of time span.

We can observe from above table 4.2 that first category of education is uneducated and its Gini Coefficient value is 0.370. It represents that 37% inequality exists in the class of people who have no education. Similarly, if we perceive the Gini value 0.4670 for the same category of year 2018-

19. This value indicates that 46% inequality exists in the people who have primary education in the said year. We can see and conclude that 26 % inequality increased during the year 2015-16 to 2018-19. We will also test this category with other index Atkinson having its value is 0.11. It shows that if the wealth was equally distributed, the same level of social welfare could be achieved with remaining 89 % of the total income or wealth distributed. Same value for the same level of category for the year 2018-19 is 0.1947. It indicates that it rose from 11% to 19% with the difference of 8% and now social welfare can only be achieved with only 81% of the total income distributed in the year 2018-19. It highlights that Atkinson index is also alarming by examining the increase in income inequality. We can examine the Generalized entropy index also gives the same meaning in respect of unequal distribution of income but from different perspective. In the same way, we have this index measuring income inequality. This index will also determine the mean deviation from the ideal point that how much value is away from the ideal position. Its value is 0.26 that means that this value is 26% is away from the ideal equally distribution point of equality in the year 2015-16. Same value of this index for this category is 0.5238 in the year 2018-19. It shadows that income inequity in the society from this index increased 100% during the year 2015 to 2019.

Next category of household is primary level education that will determine the pattern of income inequality considering three indices discussed earlier. This category possess the value of Gini coefficient with 0.3776 for the year 2015-16. It indicates that 37% inequality exists in the families who lie in the orbit of primary education or who have attained the education up to primary level. We can similarly examine this situation in the year 2018-19. It expresses that Gini coefficient for the primary education is 0.4610. This value opens the secret that that 46% inequality exists in the people who have primary education for the year 2018-19. This result infers that 9% inequality has jumped from 2015 to 2019. The next two indices Atkinson and generalized entropy will also show this difference of social income inequality in the given period .Atkinson shows difference for the primary education has exceeded 6% and it reveals that social welfare that could be achieved in the year 2015-16 and now has decreased 6% for the total income distributed in the year 2018-19.

Next category for the education variable is education is middle level. We will here throw light on the different indices to evaluate the impact of income inequalities prevailed in people of such category who are just possess middle level education. Gini coefficient for this category of year 2015-16 is 0.377643. It represents that 37% inequality exists in the class who have middle education. Similarly, we can observe from the table that this inequality for those households who have middle education is 45% for the year 2018-19. It signifies that 8% inequality or income discrimination has up surged during this period. Now if we examine this category based on Atkinson index then it shows that this social discrimination based on income inequality has jumped from 12% to 18%. If we use generalized entropy index for this category or class of households, then we can scrutinize this social unfairness in term of income inequity has increased from 30% to 42%. We can conclude that we can explain all the remaining categories based on this principal. We can see the difference that matric level based on Gini coefficient has increased from 40% to 48%. Same for the Atkinson has jumped from 14% to 20% and for the entropy index has done the same from 35% to 52%. If we take the class of households, who have just intermediate education will show different type of results based on such income indices. Gini result for this this category discloses that income inequality in this type of households has decreased from 50% to 47% during the year 2015 to 2019. Atkinson and Entropy indices for the same year has lowered down from 24% to 19% and 75% to 54% respectively. If we examine the next category that belongs to those households or family heads who have graduation level of education. Gini results for the period of 2015 to 2019 shows that income inequality in this class has sustained from 46% to 46%, attained no difference. it shows, and can be observed that in case of higher education from lower to higher level, the difference of income inequity is tending to come down. The next category for Gini value is post-graduation and its value is 0.44 for year 2015-16 and 0.41 for 2018-19. It shows that difference of inequality has decreased to 3%. Atkinson and Entropy indices for the same year has lowered down from 17% to 14% and 39% to 30% respectively. The final category for the education variable is class of households who possess any type of profession education. Like all other categories, this category will also determine that to what extent the income inequality exist in this class or category. The Gini value for this category of year 2015-16 is 0.46 and 0.43 for year 2018-

19. It represents that inequality prevailed in this category of family heads. It ended that 3% discrimination in term of income declined in this category. Atkinson and Entropy indices for the same year has lowered down from 17% to 15% and 38% to 35% respectively.

3.2 INCOME INEQUALITY BASED ON FAMILY SIZE

We have another very distinctive and important variable in analysis that is family size. The researcher would like to test whether income discrimination exists based on family size members or not. As we have earlier discussed the methods and techniques for such type of results interpretation, so it would be no more difficult end to discuss income inequalities prevailed based on family size. We can observe that first category of the family size that comprises only one to three members and have to analyses that what type of pattern exists based on different indices discussed earlier. It can be realized

Table 3.2 (Researcher's own contribution PSLM 2015-16 & 2018-19)

2015-16				2018-19			
Family Size	Gini	Atkinson	Entropy	Family Size	Gini	Atkinson	Entropy
1-3 Members	0.530368	0.240416	0.648218	1-3 Members	0.542739	0.258648	0.659233
4-6 Members	0.479536	0.202183	0.555908	4-6 Members	0.411242	0.144674	0.326584
7-9 Members	0.428901	0.159964	0.416289	7-9 Members	0.383981	0.124426	0.280853
10 or above	0.422593	0.153525	0.385372	10 or above	0.424673	0.155804	0.360926

In above table family size containing one to three member hold the Gini value is 0.53 for the year 2015-16. It signifies that 53% income inequalities prevails in those households who have one to three family members in their houses. We now observe the same family members for Gini value for the year 2018-19. This value of Gini coefficient is 0.54 and it represents that income discrimination has increased one percent 1% during the period from 2015 to 2019. Next two indices named Atkinson, Entropy too discussed earlier, and their pattern as well. We can similarly compare these indices for the year from 2015 to 2019. If we glance over the table then we can indicate that Atkinson value for the year 2015-16 is 0.24 and for the year 2018-19 is 0.26. It shows the social welfare in term of income inequality has jumped from 24% to 26% with incremental value of 2% during the period 2015 to 2019. It is the interpretation but for the different index penalized entropy. We can observe the difference during this mentioned time due to their values inferred. Generalized entropy value for the year 2015-16 is 0.65 and for 2018-19 is 0.66. It can be surveyed that income inequity for this category where family having only one to three members has gone up to 1% more. The next class for this variable family size is where households comprise of only four to six members. We can observe that Gini value for the year 2015-16 is 0.48 and for the 2018-19 is 0.41. It emphasizes those families where four to six members live their inequality in term of income has declined to 7%. We can also assess the same category for the same period for Atkinson and generalized entropy indices. Atkinson index value for the same years is 0.20 and 0.14. It verifies from the table that inequality has decreased up to 6% for the period of 2015 to 2019. Entropy index value for the same period are 0.55 and 0.34. It denotes that inequality for this index has also decreased massively to 21%. We have now third category of the family size where families contain seven to nine members. The Gini value for the year 2015-16 is 0.42. It exposes that 42% inequality exists in the families where seven to nine person live for this period. Now same result of Gini is 0.38 units for the year 2018-19 and expressing the level of inequality up to 38%. It shows that 4 % of income inequality has come down during the period from 2015 to 2019. There may be several reason behind these decreased values as possibility of educated members entering as family in a family. In the same way, we have Atkinson value for the year 2015-16 is 0.16 and for the period 2018-19 is 0.12. It shows the values decreasing or moving to the value of zero represents fair distribution of wealth or income and causes social benefit to the society. Generalized entropy index shows its value as 0.42 for the same category of period 2015-16 and 0.28 for time line of 2018-19. It shows that inequality has decreased to very extent during this time, as 14% inequality seems to be lesser providing social benefit to this class of households. The final category for family size variable is class of those families whose member ranges from ten or more than ten members. Gini value of this category for the year 2015-16 is 0.42 and 0.42 also for the year 2018-19. It shows this category has sustained its trend of income inequality for the period from 2015 to 2019. Atkinson values for the same periods reflect the same trend of same percentage as fifteen. Entropy index calculated shows reduction of two unit in income inequality during this time from 2015-19.

INCOME

3.3.1 INEQUALITY BASED ON PROVINCE

We have third variable in the analysis province that further categorizes into four province mentioned in below table 3.3 we have same indices and period from 2015-19 as discussed above by keeping the same techniques and methods. We can see that province Khyber Pakhtunkhwa has 0.46 Gini value that explains that 46% inequity exists in the households that live in this province for the year 2015-16. It can be interpreted that 42% inequality existed in this province for year 2018-19. It shadows that 4% inequality decreased during this year. It can be similarly interpreted for Atkinson and generalized entropy. It shows that Atkinson index for showing income inequality in society decreased to 4 % for the province KPK and entropy index also disclosing massive decrease in the province up to 19% from years 2015-19. If we overhead the next province Punjab in the table , it emphasizes that Gini value regarding income inequality in this province decreased only one percent that existed in the people or households living in Punjab during 2015-19. We can also examine the same trend for Atkinson that shows that there is no change in inequality in Punjab during the year 2015-19. This table indicates that entropy index measuring the inequality decreased to 2% during the mentioned time. Next is the province Sindh that calculates its Gini value for the year 2015-16 as 0.46 and sustained same inequality 0.46 units in the families belonging to Sindh. Atkinson value shows that 2% income inequality increased in the province Sindh. Entropy index concludes that only one percent inequality lessened during the 2015 to 2019. Upcoming province is Baluchistan that also exhibits inequality trends living the households of this province. Gini value during the period 2015 to 2019 exposed that income inequality decreased one percent for the people living this

territory. Atkinson index showing the same trend of inequality in both the periods and making no difference as can be seen in the table. Entropy index represent this as 2% reduction in the income inequity during the 2015-19.

Table 3.3 (Researcher's own contribution PSLM 2015-16 & 2018-19)

2015-16				2018-19			
Province	Gini	Atkinson	Entropy	Province	Gini	Atkinson	Entropy
Khyber Pakhtunkhwa	0.46136	0.19181	0.54008	Khyber Pakhtunkhwa	0.425355	0.154972	0.355171
Punjab	0.49183	0.20900	0.55585	Punjab	0.486962	0.206226	0.527622
Sindh	0.46305	0.17907	0.44003	Sindh	0.469307	0.198591	0.56746
Baluchistan	0.40808	0.13741	0.31894	Baluchistan	0.397504	0.133669	0.304742

3.4 INCOME INEQUALITY BASED ON INCOME GROUPS

Table 3.4 (Researcher's own contribution PSLM 2015-16 & 2018-19)

2015-16				2018-19			
Income Group (in Rupees)	Gini	Atkinson	Entropy	Income Group	Gini	Atkinson	Entropy
Up to 185000	0.118799	0.014147	0.026265	up to 150000	0.277435	0.083159	0.140657
185000 to 241000	0.044411	0.001488	0.002971	150000 to 204000	0.049729	0.001922	0.003818
241000 to 300000	0.036879	0.001023	0.002046	204000 to 252000	0.036050	0.000978	0.001955
300000 to 360000	0.030899	0.000718	0.001435	252000 to 300000	0.029225	0.000644	0.001286
360000 to 432000	0.030817	0.000714	0.001427	300000 to 360000	0.030189	0.000685	0.001369
432000 to 521000	0.030627	0.000705	0.001410	360000 to 432000	0.029847	0.000669	0.001338
521000 to 646000	0.034778	0.000909	0.001818	432000 to 528000	0.032967	0.000816	0.001632
646000 to 822000	0.040778	0.001249	0.002499	528000 to 685000	0.042753	0.001377	0.002761
822000 to 1233000	0.066591	0.003333	0.006686	685000 to 1006000	0.064376	0.003116	0.006244
> Than 1233000	0.350141	0.120865	0.328659	> than 1006000	0.270601	0.067907	0.160096

We can see from table that this analysis contains ten number of income groups that can easily be observed. First group to last group holds three indices like Gini, Atkinson and Generalized entropy. All such indices emphasizes same trend of inequality based on from 2015 to 2019 and interpret the same tendency. We can observe that first income group that is up to income of 185000 of household has Gini value is 0.11. It means that 11% inequality exists in those households who earn income up to the level of 185000 Rs for the year 2015-16. Same is the answer for the year 2018-19 that explains that 27% inequity exists in the same class in this period of time. It concludes that 16% income inequality has increased during this period. Similar is the result for Atkinson and entropy indices. We can end that 0.07 unit or 7% inequality has jumped and caused social distortion. We have explained the entire variable with their categories in the same way as did for first category of this variable. We can assume that all the categories will produce same trend of income inequality with same methods and techniques. We conclude that all categories will produce the similar result with same interpretation of income inequities prevailed in this class or categories of variable.

4. Summary and Conclusions

As this study incorporates the income inequality through three indices named Gini, Atkinson and generalized entropy across the country. The analysis shows different results based on the nature of variables discussed. It shows different trends of inequality at different level. We can judge the household at their education that if this level increases then the inequality prevailed decreases. It means that we can conclude at this stage that state needs to raise some emergent steps for the promotion of education in Pakistan. We observe that family size inequality prevailed in it then we can see that if family consists of one to three members it perceives a little bit escalation in income disparity. If the family members jumps from four to six and so one then income inequality tends to come down. It shows that if number of member surge up then income disparity seems to decrease. It emphasizes that intensification in family members warns family heads or households to be aware of the income dissimilarity prevailing across the family. The third variable discloses income inequality based on four province. The three province shows the lessening trend of income inequality in three province from 2015-19 but Sind province remains same during this period. It shows that government should take further serious steps and adopt such policies that cause to reduce the income disparity across the country. The fourth variable and looks most important is different income level groups of households. We can see from the table this income level hierarchy of both period from 2015-16 and 2018-19. This variable shows different trends or fluctuations in income disparities during both the periods. It tends to increase in some places and vice versa. It indicates that government of Pakistan or state has no proper policy to control this inequality among the households who have different type of income level. In nutshell, we can conclude that it does not look a proper policy form government side to reduce this income based decimation persistently. It shows better results somewhere and where it seems very serious fluctuations. Researcher recommends that state needs to improve the living standards of the people living across the country without any discrimination. It should adopt those polices that cause to per capita income of the households. It

will cause to reduce this income discrimination from every perspective of people.

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