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# Econometric Analysis of Education-Based Individual Income Disparity in Pakistan

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**ABSTRACT**
*This study paper's main goal is to provide an econometric analysis of Pakistan's income distribution pattern on three levels called Gini, Atkinson and Generalized Entropy indices. In this empirical study, trends are presented and compared with two distinct micro-level data sets that show either rising or falling inequality in term of education of the households. However, scholar has made efforts to pinpoint the social and economic elements that contribute to rising or falling inequality. Scholar has used a few criteria for this, such as the household's educational attainment. Researcher broke down the data in this descriptive analysis into various levels but considered the education as main tool. Three distinct indices; the Gini, Atkinson, and Generalized Entropy were employed in the empirical investigation to assess inequality. The most recent data rounds for the Pakistan Social Living Measurement (PSLM/HIES) were conducted in 2015–16 and 2018–19. The main goal of this research is to enhance the social and economic circumstances of Pakistani citizens by contributing to planning and policy-level studies.*

***Keywords:*** *Income, Inequality, Indices, Gini, Atkinson, Entropy, Education, PSLM, STATA, DASP.*

## Introduction

The topic of inequality is frequently brought up in relation to its impact on economic growth and its role in reducing poverty. According to cross-national studies on poverty and inequality, greater inequality in these factors typically indicates higher levels of absolute and relative deprivation in these dimensions for a given level of average income, education, land ownership, etc. (McKay, 2002). Therefore, achieving the Millennium Development Goal (MDG) for poverty depends heavily on inequality. Indeed, "at least in Africa, MDGs on poverty reduction cannot be reached without reduction in inequality," according to Hanmer and Naschold (2000). Similarly, there is mounting

evidence that nations with high levels of asset and income inequality typically have slower rates of economic growth. Furthermore, when household incomes are initially divided more fairly, a given rate and pattern of income increase will have a greater influence on reducing poverty.

The metrics used to gauge economic growth that is vital to every society are real GDP or real per capita income. Regardless, neither of these guarantees social government support. Regardless of a person's social standing, social government support plays a significant role in our daily lives. For any society to be healthy, poverty and inequality must be addressed. Since nations have improved, income disparity has been a significant issue. Everyone from modern politicians to ancient Greek philosophers has discussed the repercussions of income disparity extensively. According to an IMF analysis, "Widening income disparity is the defining challenge of our time." The IMF (2015) states that the wealth disparity between rich and poor is at its widest point in decades in advanced economies. Despite being highly industrialized, certain Western countries have seen a continuous increase in inequality in their own backyards. This is especially noticeable in the United States. Alesina and Glaeser (2004) claim that America is comparatively unequal for a developed country. Piketty and Saez's (2003) study of the true wealth of the top 1 percent in the US further demonstrate this. Only between 1979 and 2007 did the wealthiest 1 percent's income share rise by over 14%, according to their results.

Another important contributing reason to crime, social instability, and violent conflict is income and asset inequality. Significant disparities based on geography and ethnicity are likely to result from a skewed income distribution. Political stability may be threatened by several factors. High levels of inequality, which are engrained in the social and economic structures and strengthened by policy measures, foster a sense of unfairness and grievance, discouragement and rage, and societal tensions and instability.

Over the past forty years, a number of scholars have contributed to the empirical study of income disparity in Pakistan. However, because of variations in methodology, the choice of inequality indicators, the presentation of data (individual vs. income groups), and the welfare indicator (income or consumption), these studies cannot be compared. It should be mentioned that two research occasionally came to conflicting conclusions about developments in income inequality for the same time frame. Therefore, it is challenging to draw a clear conclusion regarding developments in income disparity, as stated in Anwar (2005). Anwar (2005) offered a consistent set of Gini coefficients based on a consistent technique and employing grouped family income data, keeping in mind the limitations of the information currently available regarding income distribution. His findings point to a downward trend in the 1960s, an upward trend in the 1970s, a stagnation in inequality in the 1980s, and a sharp rise in the inequality coefficient in the 1990s. Additionally, Kemal (2007) argued "the data reveals the pattern of worsening income distribution continues even in the current decade, and income inequalities in Pakistan have expanded substantially in the 1990s." Anwar's (2005) consistent estimates of income inequality are calculated using publicly available grouped household data. It has been demonstrated that the estimated degree of inequality derived from grouped data is less than that calculated from data at the individual home level. Furthermore, the effect of family size on income distribution is not taken into account in the study (Anwar, 2005).

Pakistan has made every effort to carry out this kind of research in the region, which serves as the driving force behind the current study. This time, the researcher has made an effort to convey this wealth disparity from a fresh angle. Since nations have improved, pay disparity has been a

significant issue. Everyone from ancient Greek savants to our current lawmakers has extensively discussed pay disparity and its effects. According to an IMF analysis, "Widening income disparity is the defining challenge of our time." According to the IMF (2015), the wealth disparity in advanced economies is at its widest point in recent years. Notwithstanding their outstanding growth, certain Western nations have witnessed a steady increase in the gap in their own patios. This is especially noticeable in the United States. America is somewhat uneven for a formed nation, as Alesina and Glaeser (2004) have discovered. By examining the wealth of America's most affluent 1%, Piketty and Saez (2003) go one-step further. They found that between 1979 and 2007, the 1%'s share of income increased by over 14%. Around the world, extreme poverty and extreme prosperity coexist. Even if wage gap has decreased in country-specific cases, data starting to emerge around 2020 suggests that the global imbalance may have recently increased (Christensen et al., 2023). Global wealth and income were substantial in 2021, yet these figures hide enormous distortions. We can consider the distribution of wages in order to gauge the extent of global imbalance. The 50% of people with modest incomes own only 2% of the world's wealth.

However, the wealthiest people (Chance et al., 2022) own a startling 76% of the total. Inequality between nations is still high, despite the emerging world catching up in terms of GDP, and individual inequality inside nations is at an all-time high. According to Chancel et al. (2022), there is a false claim that those poor countries are impoverished because they waste their capital assets. If all else is equal, it is acknowledged that poor countries are only mediocrely adept at using capital, because they have virtually little money in the first place. Furthermore, the authors assert that there is no discernible trade-off between increased income and inequality. Nonetheless, a high average income does not equate to less inequality. Furthermore, according to Chancel et al. (2022), political choices and a country's economic coordination choices have an impact on the degree of inequality within its population intricate and reliant on various translations. Throughout the review, this study considers and responds to alternative points of view. Robert J. Barro has demonstrated a notable dedication to the study of wage disparity and its relationship to financial development. Barro (2000) presented a viewpoint that considers development levels when examining the consequences of income disparity. Although there is little evidence of a general relationship between pay inequality and development rates, Barro suggests that pay imbalance depends on the specific context and that the impact varies depending on upon a nation's degree of improvement.

This demonstrates that the effects of pay disparity on financial development vary depending on the monetary environment of each nation. According to his research, inequalities have the potential to impede progress in less developed nations and stimulate economic growth in more developed nations. Two problems have been addressed by experimental studies on pay imbalance: identifying the factors responsible for a noticeable example and discrepancy size, as well as the influence of the imbalance on financial development, whether it be favorable or bad. However, due to limited guidance provided by the theory, conflicting findings have often been partially explained. Similarly, the great majority of these analyses have been based on cross-country (and occasionally board) data for a particular area or for all countries when data is available. However, very few studies have been conducted specifically for Africa due to the predetermined number of pay dispersion data of interest for African countries. In cases where all countries with available data are included, the number of African countries covered frequently is a non-essential component of the total. 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.

**Review Literature**

According to Asghar et al. (2022), poverty is defined as the absence of numerous essentials for a pleasant and comfortable existence, such as clothing, food, housing, safe and healthy drinking water, improved access to energy, and many more. A more precise definition of poverty is when a nation's citizens lack adequate access to education and employment opportunities. Any nation's greatest asset is thought to be its human capital. It is preferable to expand training sessions and advance the education sector in order to develop human capital, achieve socioeconomic development, and lower the level of poverty in a nation (URT, 2007). Numerous earlier studies demonstrated a clear and substantial correlation between the nation's poverty rate and its educational attainment (Liu et al., 2021). According to studies, education can reduce poverty by boosting skills that increase national productivity (Ngepah et al., 2023).

Chancel et al. (2022) investigated how total proportions of circulation could mask changes in pay across different groups. For instance, the perception that the overall imbalance might remain constant over time and could be predictable given significant fluctuations in the percentages of absolute pay received by different groups. Research indicates that there may be a detrimental relationship between future development and initial disparity.

Roth (2018) investigated how classical economic theory states that inequality is essential for a country to develop. In traditional monetary analysis, the investigation of financial development which is defined as the growth in a nation's production of labor and goods (GDP) and wage inequality has sparked a series of theoretical and experimental studies that show imbalance can affect development in both positive and negative ways. Conventional financial theory argues that effectiveness and imbalance can coexist peacefully. The argument that people are typically motivated by large imbalance is widely used because it broadens the gap between the occurrence of positive and negative outcomes. Large pay disparities, in theory, increase the incentives for personal dedication, which in turn increases productivity and long-term growth (Roth, 2018). Furthermore, greater inequality promotes group savings and, consequently, capital growth. Accordingly, wealthy people are less likely to consume (Kaldor, 1955).

Widespread rises in income gaps have sparked worries about the possible implications on economies and communities, according to an analysis by the OECD (2014). According to recent study, economic development slows down when income inequality increases. One of the main causes of this issue is that those with lower earnings are less able to invest in their education. The growing gap between top and base pay employees is a glaring example of pay disparity. The gap between lower-paid households and the rest of the population is the most significant factor influencing how pay discrepancy affects development. The analysis demonstrates that managing poverty alone is insufficient; it is more important to locate lower pay. In particular, the data shows that inequality hinders the accumulation of human capital, which lowers growth. In addition to

impeding social mobility and skill development, wealth inequality harms education and opportunity for underprivileged individuals.

Causa and Hermansen (2017) demonstrated that progressive taxation, such as corporation and income taxes, as well as more spending on social security and transfer payments, can all help to reduce income inequality. Poverty and economic disparity can be decreased with a wise and sensible fiscal strategy. Bhatti et al. (2015) and Naqvi et al. (2011) also attest to the fact that government transfer payments, particularly taxes on agricultural revenue, lessen poverty and income disparity in the context of Pakistan. However, Papanek and Kyn (1986) demonstrated that if government spending is focused on the political, bureaucratic, and military elites rather than the social sectors that assist the underprivileged elements of society, taxes as policy tools will not significantly affect income distribution.

According to Stiglitz (2012), imbalance slows down monetary progress. According to Stiglitz, inequality makes those at the bottom spend a larger percentage of their income than people at the top because it lowers their aggregate demand. Given that the impoverished usually have to spend all of their income to cover their basic expenses, this makes simple sense. Furthermore, Stiglitz argues that the economy may be harmed by the way reactions are used to combat weak interest. Monetary authorities may lower interest rates, which can create bubbles that could cause a recession when they break. Inequality of outcomes is linked to an imbalance of chance, which prevents individuals from low-income backgrounds from reaching their full potential. This demonstrates that salary inequality has a negative impact on future financial development as well, putting certain groups at risk of becoming impoverished. Stiglitz emphasizes that one other important way that inequality can hinder development is through lease chasing, in which the wealthy attempt to increase their own riches rather of creating new prosperity. Defective capital business sectors, strain for reallocation, and socio-political shakiness are presented as potential bases for a negative association between pay imbalance and monetary development in a significant portion of the theoretical literature on the influence of disparity on development.

**Framework of Analysis**

The framework of analysis including study methods, including data selection, income measurement process, and use of several indices for measuring inequality, will be presented in this section.

**Data**

The Pakistan Bureau of Statistics, Government of Pakistan, Islamabad, conducted and published the two most recent rounds of data from the Pakistan Social Living Measurement (PSLM/HIES) in 2015–16 and 2018–19. The cross-sectional data from these two microsets aids in our comprehension of Pakistani citizens' economic trends. It offers comprehensive details about every household head and their family members. The information was gathered from Pakistan's unregulated regions. Each year's sample size was different. In the Pakistani area frame, a two-stage stratified sampling procedure was employed. Initially, blocks or other primary sample units were chosen at random from the region frame. In Pakistani rural areas, each block has 200–220 people, and in metropolitan areas, there are 200–250 people. Twelve to sixteen homes were chosen at random from the primary sample unit for the second stage. Twelve households are enumerated in urban areas, and sixteen randomly selected households are enumerated. The following is a detailed report of the surveys' Primary Sampling Unit (PSU) and Secondary Sampling Unit (SSU).

**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 |

**2.4 Income Measurement Procedure**

The Income and Expenditure Section of the PSLM/HIES 2018–19 questionnaire was used to create the income file. After carefully examining the questionnaire, we have determined that Sections 6, 8, and 9 are pertinent to measuring income distribution. The following are the components that make up income.

Income = Regular Income+ Primary Occupation+ Secondary Occupation+ Other Work+ Income in Kinds+ Pensions etc

**2.5 Measurement of Inequality**

The Distributive Analysis Strata Package, or DASP, version 3.02, was utilized in our investigation. Professors Abdelkrim and Jean-Yves Ducles of the Department of Economics at the University of Laval in Canada unveiled the initial version of this program in 2021. It is intended to support scholars and decision-makers who wish to use Stata for distributive analysis. The following are this menu's primary features.

Three indices Income disparity was measured using the Gini, Atkinson, and Generalized Entropy measures. Every indicator offers a unique methodology and perspective on inequality. Thankfully, we used the DASP Menu to calculate all of the findings; nonetheless, the mathematical equation for these indices is as follows.

**DASP and inequality indices**

The various inequality indices and associated standard errors are estimated using the ineq module. To estimate the required index, the user must include the index option (index name).

| *Index name* | *Inequality index* |
|---|---|
| **gini** | **Gini index** |
| **atk** | **Atkinson index** |
| **entropy** | **Generalized entropy index** |

- The researcher can select multiple variables of interest simultaneously. For instance, per capita income and consumption might be used to measure inequality at the same time.
- It is possible to estimate inequality at the category group level using a group variable. Only the first variable of interest is used if a group variable is chosen.
- 95% confidence level standard errors and confidence intervals are given. It is possible to alter the type of confidence interval as well as the degree of confidence.

It is possible to modify the six decimals that are used to represent the results.

**Results and Discussions**

**3.1 Inequality Based on Province**

**Table 3.1 (Researcher's own contribution PSLM 2015-16 & 2018-19)**

Using the same indices and the same period from 2015 to 2019 as previously said, Scholar considers the first variable in the study as province that further divides into the four provinces listed in table 3.1 below. As we can see, Khyber Pakhtunkhwa has a 0.46 Gini value, which accounts for 46% of the inequality in households in the province during 2015–16. It can be inferred that during 2018–19, there was 42% inequality in this province. It suggests that inequality fell by 4% this year. For Atkinson and generalized entropy, it can be read identically. The Atkinson index, which measures wealth inequality in society, dropped to 4% for the province of KPK, and the entropy index revealed a significant decline of up to 19% in the province between 2015 and 2019.

| 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 |

If we look at the following province, Punjab, in the table, it highlights that the Gini value for income inequality in this province only dropped by 1% among Punjabi individuals or families during 2015-19. Researchers can also examine the similar pattern for Atkinson, which indicates that inequality in Punjab has not changed between 2015 and 2019. According to this table, during the specified period, the entropy index, which measures inequality, dropped to 2%. Next is the province of Sindh, which determined its 2015–16 Gini value to be 0.46 and maintained the same level of inequality in Sindhi families at 0.46 units. According to the Atkinson value, the province of Sindh saw a 2% increase in income inequality. According to the entropy index, inequality decreased by just 1% between 2015 and 2019. Baluchistan is the next province, and the homes there show signs of inequality. Income inequality among the residents of this territory dropped by 1% between 2015 and 2019, according to the Gini value. As can be seen in the table, the Atkinson index indicates the same pattern of inequality in both periods and makes no distinction. This is represented by the entropy index as a 2% decrease in income inequality from 2015 to 2019.

**Summary and Conclusions**

Three indices the Gini, Atkinson, and generalized entropy are used in this study to account for income inequality nationwide. Depending on the type of variables examined, the study yields varying outcomes. It displays disparate inequality patterns at various levels. Based on the four provinces, we may evaluate the household. The three provinces exhibit a decreasing tendency in income disparity between 2015 and 2019, but Sind province does not change over this time. It demonstrates that the government ought to take action that is more significant and enact laws

that lessen economic inequality nationwide. In summary, we may say that a sustained reduction in this income-based decimation does not appear to be a suitable government policy. There are places where the outcomes are better and places where there appear to be significant variances. According to the researcher, the state should raise the level of living for all citizens without prejudice. It ought to implement policies that raise households' per capita income. It will result in less income discrimination from all points of view.

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