

## INCLUSIVITY OF STRUCTURAL TRANSFORMATION

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### Abstract

The Inclusivity of Structural Transformation and sustainable growth in developing countries may be explained by investigating income inequality in an economy. The previous studies, deeply examine the distributional effects of structural transformation. This study analysis and highlights how economic growth and structural transformation affect the income inequality that has occurred in Pakistan during the previous decades. Pakistan's structural transformation pattern is quite different from other developing countries. Because the labor resource is transferred from agriculture to the service sector. The objective of this study is to analyze the link between the Inclusivity of structural transformation and inequality. Building on a Kuznets framework. According to Kuznets (1955), income inequality would increase with economic growth in a society's early stages of economic development and decrease in the later stages of that growth. This study aims to analyze whether Kuznets's (1955) hypothesis was valid for Pakistan's structural transformation with the help of the ARDL boundary test approach using data from the 1976-2018 period. As result indicates that Kuznets' Inverted-U hypothesis is valid for the relative employment of the nominal sector. Although the result of the Relative output of the nominal sector is opposite to the relative employment of the service sector. That shows service sector growth is jobless growth and in long run rich get to the richest and the poor become poorer.

**Keywords:** Structural Transformation, Sustainable Growth, Inequality, Kuznets, Jobless Growth.

**JEL Code:** E2, J21, J24, P16.

### INTRODUCTION

The role of structural change is highlighted in the 2030 Agenda for Sustainable Development. The objective of Sustainable Development Goals (SDGs) No. 8's is "Achieve higher levels of economic productivity through diversification, technological upgrading, and innovation, by focusing on high-value added and labor-intensive sectors". The objective of SDGs goal No. 9's includes "building resilient infrastructure, promoting inclusive growth and sustainable infrastructural development, and ensuring decent work for all."

Investigating income inequality in an economy can help to explain how structural transformation is inclusive and how sustainable growth occurs in developing countries. The performance of the developed economies differs from that of many other economies

not only because of the former's high rates of growth but also because of the fast and intensive structural transformation: their employment and output structures have drastically changed; resources were relocated from agriculture to industries and services, which have better value-added and the output has shifted. To understand how modern economies grow, Kaldor<sup>1</sup> addressed the relationships between different economic sectors and suggested that the industry sector is the main engine of economic growth. The Influential study of Simon Kuznets suggested that changes in the structure of production would lead to an inverted-U relationship between inequality and development.

Growth and structural change are closely related since economies do not simply grow by reproducing themselves on a larger scale. Generally speaking until all sectors of the economy developed at the same rates. economies differ as they grow, not just in terms of what they produce but also in terms of how they do it, i.e., by utilizing various inputs and new production methods.

To enhance the quality of economic growth, job creation, sustainability, and inclusive growth, economic transformation is necessary. Low-income and many developing countries are facing economic transformation challenges. That is the moving of resources and labor from the low-productivity sector to the high-productivity sector. In low-income countries, 1 to 3 percent labor force is employed in the manufacturing sector. Labor participation in the high-productivity sector is very low. Madiha (2023) uses econometric models like the Cobb-Douglas production function and ARDL model to analyze the link between employment and economic growth in Pakistan. The study finds a mismatch between output and employment growth, with economic growth alone insufficient to generate jobs. Despite rapid growth, the service sector's reliance on capital-intensive technology limits its impact on employment.

In this research, we discuss the Inclusivity of Structural Transformation and income inequality. Why is economic transformation such an important topic? And how to stimulate economic transformation. How industrial development is important for job creation and elasticity to shock<sup>2</sup>; how service sector development help in job creation<sup>3</sup>. Examining the "jobless growth" of Pakistan's economy, Madiha (2023) focuses on the effects of sectoral transformation on employment and economic development. The study concludes, using sectoral employment elasticity, that military regimes perform better than democratic ones in terms of economic performance. It highlights the decline of the agriculture sector, emphasizing the need for reforms to create jobs and sustain employment.

Job creation is top issue agenda not only for developing counties but also for developed countries like U.S.A and U.K. where governments pay more attention to economic transformation or job creation. Our research in more focusing on Pakistan. Low-income countries face severe deficits in transformation. The pattern of growth and a particular type of growth involves very low structural change<sup>4</sup>. So they need to think about a different type of growth that transform the economy and create a job.

Developing countries take it more seriously and think about industrialization. Economic transformation, structural change, and industrialization also create different questions.

How does that do practically? How government tries to transform the economy? Especially in the case when the economic structure of developing countries is the same in the last 50 to 60 years ago.

The first question is what is economic transformation and its drivers? And next question is how transformation reduces poverty and generates inclusive growth.

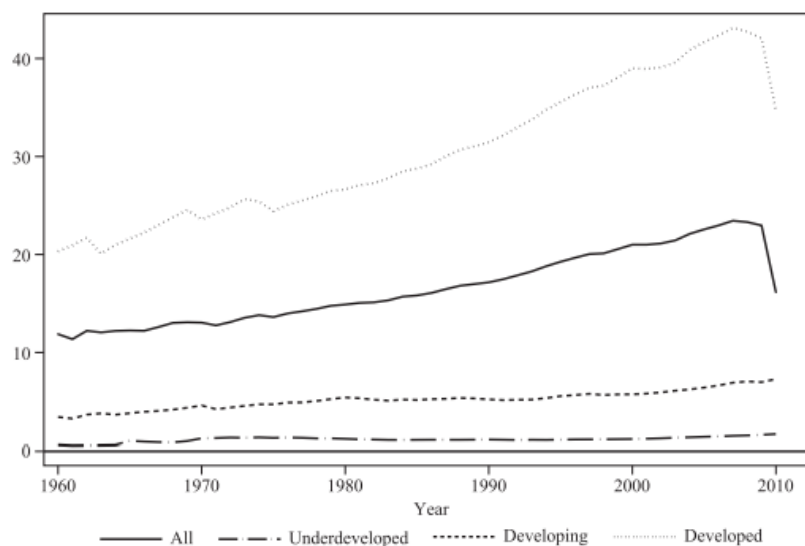
This study first tries to explain what is economic transformation and its drivers. Then document the relationship between economic transformation and income inequality with the help of the Kuznets inverse U-shaped curve. Finally, evaluate how well a mainstream prototype model of inverse U-shaped Kuznets curve developed by Kuznets (1955) explains the patterns of structural transformation impact on income inequality.

### Drivers of Economics Transformation:

As a source of income, a means of increasing productivity, and a way to fulfill the aspirations of hundreds of millions of people, the creation of more and better jobs remains a key top development priority. The secret to providing higher-paying jobs in developing countries depends on economic transformation and inclusive, sustainable growth, which are achieved via deeper structural transformations, market integration, as well as effective methods to address market failures.

According to the analysis of the perspectives on structural transformation, one of the major drivers behind structural transformation has been the differential productivity growth across sectors. To what extent of the identified structural transformation patterns can we attribute to the various patterns of productivity growth across sectors? To answer this, this study first considers how sectoral productivity has changed across all economies.

### Aggregate Productivity



Source: Sen, K. (2019). Structural transformation around the world: Patterns and drivers. Asian Development Review

When looking at a plot of aggregate labor productivity for the three economy groups in Figure.

It is not surprising to see that the aggregate labor productivity of structurally developed economies is significantly higher than that of structurally developing economies, which in turn is higher than that of structurally underdeveloped economies.

**Figure: Sectoral Productivity, Structurally Developing**



Source: Sen, K. (2019). Structural transformation around the world: Patterns and drivers. Asian Development Review

For all structural developing economies, sectoral productivity is the highest in the nonmanufacturing industry, business services, and manufacturing industries. (Figure).

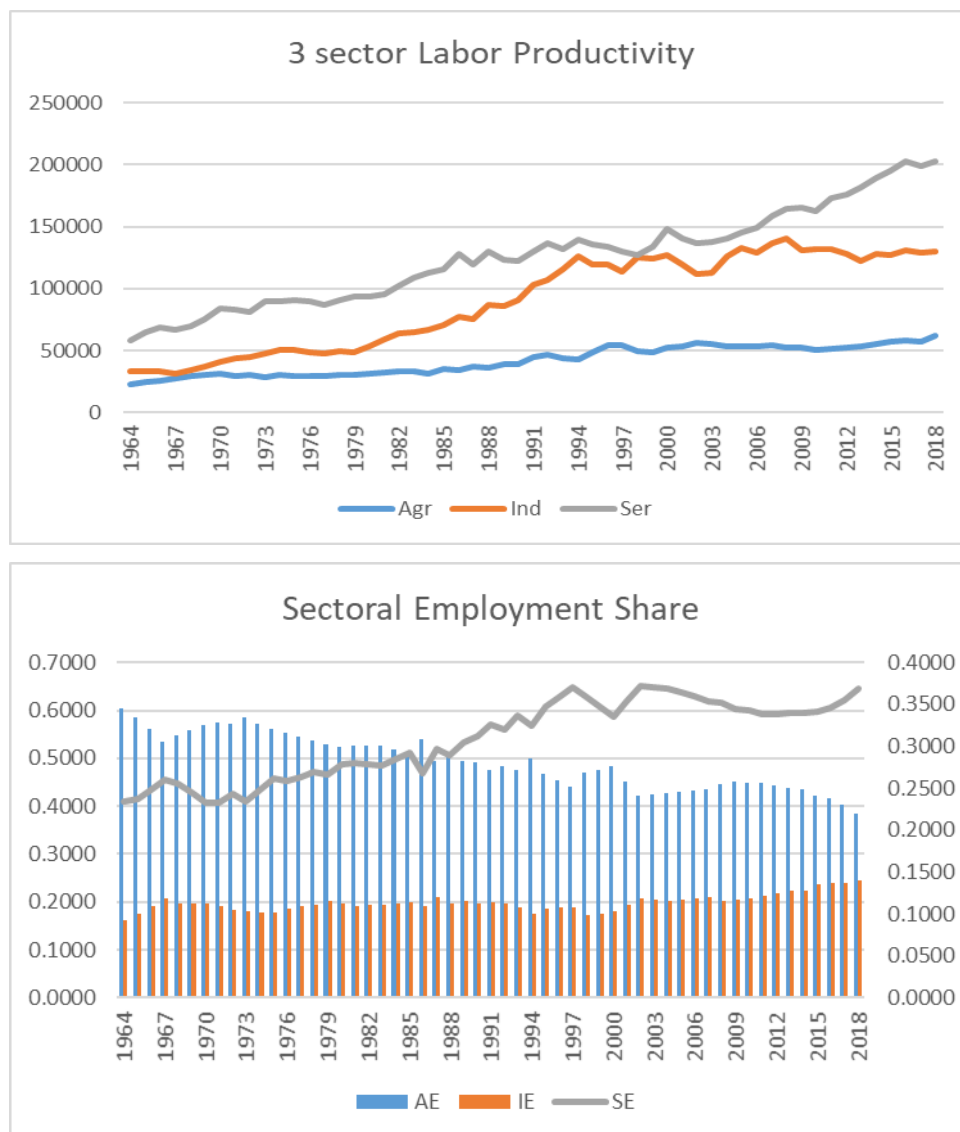
The implications of the conclusions for the theoretical modeling of structural transformation should be addressed whereas differential productivity growth across sectors provides a sufficient explanation for structural transformation in structurally developing countries. The reason there has been a reallocation of labor from manufacturing to services over time may be explained by the faster rate of productivity growth in the nonmanufacturing sector compared to the business services and manufacturing industries.

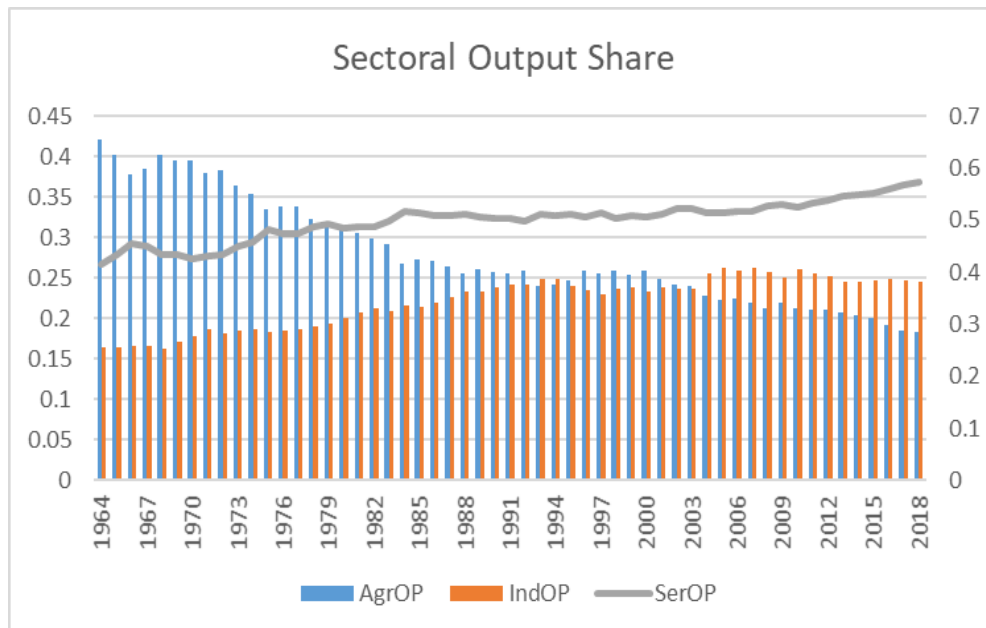
Differential total factor productivity growth in manufacturing cannot be the cause of the "premature deindustrialization<sup>5</sup>" that observes for many low-income economies by using a simple open economy, two-sector model of structural transformation<sup>6</sup>. Researcher also claims that globalization is the driving force behind the deindustrialization of emerging economies, with these countries "importing" deindustrialization from developed countries. The evidence for this claim is not weak. How globalization has affected employment in manufacturing in both positive and negative ways, with the first becoming a result of the scale effect and the second becoming a result of the labor intensity effect<sup>7</sup>. The high-

income elasticity of humans, and business services in particular, can explain why employment in these sectors increased along with economic growth for developing economies that have experienced very high rates of economic growth.

Economic growth depends on human resources, but Pakistan's high unemployment rate is caused by an unskilled work population and a lack of education and training. The relationship between sectoral employment and economic growth is examined by Madiha (2021), with a focus on labor-intensive and capital-intensive subsectors within the service sector. The study demonstrates how the expansion of capital-intensive businesses is causing unemployment by using panel data from 1964 to 2018 using the Cobb-Douglas production function.

### 3.1.2: Economics Transformation in Pakistan:





As data analysis from 1964 to 2018 indicate that agriculture's contribution to GDP has decreased over time, it continues to be the largest sector of the economy in terms of employment. Although the contribution of the services sector has grown significantly, employment has not kept pace. In terms of its output structure, Pakistan is a service economy, but in terms of employment, it is an agricultural economy. Since 1964, both the manufacturing sector's contribution to GDP and employment have been constant. Thus, this sector is Pakistan's economy, Achilles Heel. As opposed to Pakistan's experience, neighboring countries like South Korea and Malaysia have accelerated the structural transformation of their economy to reduce their reliance on traditional sectors.

During this shift, they have moved from the "periphery" of the product space to the "core." Pakistan's exports and manufacturing are still mostly limited to the periphery of the sector. Pakistan faces two main challenges that prevent it from producing high-tech, high-value goods.

First, Pakistan has achieved skills in sectors like leather and textile. Manufacturing of high-tech capital-intensive and consumer durable goods required a specialized skill set, one that is hardly relevant to the production of these products.

Second, government policies like industrial policy, technology policy, innovation policy, etc. have not been used effectively to support the transformation from the peripheral to the core of the product space. The actual barriers to economic development in Pakistan are four lows: low industrial growth, low innovation, and poor competitiveness.

South Korea's per capita income in 1960 was only marginally ahead of Pakistan's. However, in just one generation, Korea had an income that was five times Pakistan's in 1995 on a purchasing power parity basis. South Korea's GDP is more than 7 times higher than Pakistan's GDP. The difference between South Korea and Pakistan is huge because

the type of growth in Pakistan is jobless growth, and the standard of living is more or less the same.

South Korea and Pakistan have experienced very different economic trajectories since 1960. South Korea's GDP per capita was only slightly higher than Pakistan's in 1960, but by 2021, South Korea's income was more than 22 times higher than Pakistan's on a purchasing power parity basis. One of the reasons for this huge gap is that South Korea has invested more in education, health, and innovation, while Pakistan has suffered from political instability, corruption, and low productivity. South Korea's growth has also been more inclusive and job-creating, while Pakistan's growth has been more unequal and jobless.

Moving from low-productivity sectors like garments and agriculture to high-productivity and value-added sectors is known as structural transformation. According to the traditional theory of structural transformation, the industrial sector absorbs the extra labor that agriculture releases while increasing profits and wages.

Technology innovation, innovation, and other forms of "learning by doing," increase productivity. Non-industrialization or premature industrialization hence means a slow speed of structural change and low productivity. The first article ever written in the field of economics was on "pin" manufacture rather than about gold, land, or finance, which indicates the importance of the manufacturing sector for economic development.

In his book "The Wealth of Nations," Adam Smith discusses the metal pin in its first chapter<sup>8</sup>. Economic development is concentrated on manufacturing. All of the countries that are now categorized as developed countries have made the transition from agriculture to manufacturing.

The Solow-Swan model, which by its very nature abstracts from issues of sectoral allocation in the process of economic development and focuses on the role of capital accumulation and technological change in the aggregate, is the workhorse model of economic growth. The one-sector growth model has developed into the basis of modern macroeconomics<sup>9</sup>. At least in part, the one-sector growth model's success can be attributed to the way it simply captures the heart of modern economic growth, which Kuznets defined as the steady increase in productivity and living standards.

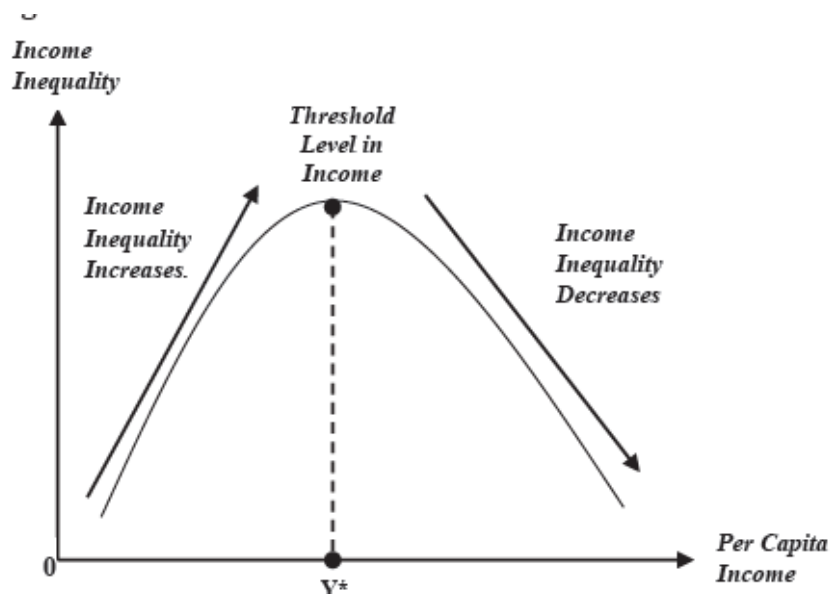
The structure composition of our economy over the last 70 to 75 years since independence was not changed as much. Still, the agriculture sector is dominating. In the early years of independence the manufacturing sector grew but suddenly it declined and today manufacturing sector add less to GDP in the last few decades. The reason for jobless growth is that low-income and middle-income countries can't focus on economic transformation and its drivers.

### **Economics Transformation and Income Inequality:**

Fast and Sustained growth recipes secrete hide in the process of systemic movement of the resources like labor from low productivity sectors to higher productivity sectors. On the base of the structural transformation speed, we can differentiate the countries

between successful from unsuccessful. In the process, researcher observed that in the initial period, structural transformation lead to income inequality. Inequality can increase in the process of the Workforce shifting from the low-productivity sector (agriculture) to the high-productivity sector (manufacturing) because workers try to shift from low-earning jobs to highly-paid jobs. In other words, we can say that transformation may occasion a tradeoff between rapid growth and income inequality, and that's called The Developer's Dilemma.

Kuznets<sup>10</sup> summarized the relationship between income inequality and Economic Growth. After a decade, Kuznets defined the dynamics of income distribution, human capital accumulation (fertility rate), and economic growth. According to the Kuznets theory, during the early stage of structural change, the average fertility rate rises and the distribution of income becomes less equal. This hypothesis of Kuznets is an inverted U curve correlation between income and inequality, called the famous "Kuznets Curve". Why structural change necessarily increases inequality? Let's discuss conceptual and empirical perspectives on this. From a standpoint of conceptual, the analysis of assumption binds the Kuznets theory. Figure 1 shows the inverted U curve, which indicates the relationship between income inequality and economic growth.



Source: (Weil, 2016: 389).

**Figure 1: Kuznets' Inverted-U Curve**

Conceptually saying, it is clear from a depth study of the basic assumptions of the Kuznets process that it is not necessarily accurate that a shift in labor from the agricultural to the industry sector results in an increase in inequality. One reason is that many workers have shifted from agriculture to labor-intensive industries, where there is limited wage variation among workers, in countries that have seen a fast structural transformation, like East Asia. However, as the most industrial activity takes place in workplaces, the historical



existence of unions and collective bargaining frequently restricts the level of disparity<sup>11</sup>. Adversely, if workers shift from agriculture to services, inequality may aggravate because services in low-income countries have two types: low-earning informal sectors where most workforce are employed, like roadside fruit and vegetable vendors, and high-earning sectors where some workers are employed, like those in finance and information technology.

This study aims to analyze how economic growth and structural transformation affect income inequality. Whether Kuznets' inverted-U hypothesis is valid in Pakistan's economy in the period 1976-2018. In the second section of the study, an empirical literature review on the relationship between economic growth, structural transformation, and income inequality in the context of Kuznets's inverted-U theory is reviewed. In the third section, the data, model, method, and analysis findings are included, and in the fourth section, the study is concluded with a summary of the obtained results, evaluation, and recommendations.

## LITERATURE REVIEW

The results of the several studies that have sought to explore the relationship between Economic growth, structural transformation, and income distribution are still inconclusive, and there is no agreement on how these variables interact.

Long-term changes in the structure of output and employment in the economy that have an impact on income distribution are referred to as structural change. (Kuznets and Murphy, 1966; Timmer, 1988, 2007). The reallocation of agricultural labor in the developing world, especially in Southeast Asia and Latin America, was one of the key structural changes in the second half of the 20th century. (Ocampo et al., 2009).

There are two primary approaches in the theoretical works describing the inequality-growth link, the classic, and the political economy, according to Caraballo et al. (2017). According to several authors, the traditional or classic approach, inequality, and growth have a good relationship. (Bénabou 1996; Forbes 2000; Kaldor 1955; Saint-Paul and Verdier 1993; Stiglitz 1969; Galor and Tsiddon 1997; According to these studies, the significant impact of inequality on some development variables including the saving rate, technical progress, and capital accumulation may be attributed.

A tentative consensus exists beyond this theoretical and empirical dispute. As demonstrated by Kanbur (2012), UNDP (2013), and Royuela, Veneri, and Ramos (2014), the structure of economic growth matter more than its quantity in explaining changes in the income distribution within the economy. Additionally, an augmented Kuznets curve with increasing inequality in the last segment of the curve was suggested by Beddoes (2012) and Galbraith (2009). The highest income sections of the economy are seen to be responsible for this growing component of the curve, according to Galbraith (2011), as they gain disproportionately from economic booms.

(Mehic 2018) finds the Western world has seen the loss of millions of relatively well-paid manufacturing jobs over the past few decades. Industrial employment has a negative

distributional effect in high- and middle-income countries. On the other hand, a lot of employment in the service sector has created jobs to be relatively low-wage, like those in fast food and retail. The findings also imply that the middle class has been disproportionately impacted by the rise in inequality.

According to Wan et al. (2022), well-managed urbanization lowers income inequality in developing economies. Focusing upon fiscal policies to reduce inequality is impractical given that the majority of these economies have structural fiscal deficits and the limited effect that fiscal policy has on income redistribution. Therefore, in addition to its effects on economic development rates, rising urbanization rates will be important in lowering the income gap between rural and urban areas.

(Wu 2016 & İşcan 2022) Recent research has indicated that changes in the relative importance of agriculture to GDP and trade openness can help to explain variations in income inequality that have taken place in many economies.

(Ali 2022) In many nations with diverse income levels, the effects of industrialization and urbanization on income inequality have been studied. It has been shown that different income levels have diverse effects on income inequality.

(Blotevogel 2022) does not discover a stable and unique structural relation between inequality and the channels of transmission.

Various studies are available on the income distribution of Pakistan, including Bergen (1967); Naseem (1973); Chaudry (1982); Ahmed & Ludlow (1989), and Malik (1992), but these studies face data limitation issues. That is why better-quality analyses are inhibited. In the 1990s HIES primary data are published and many authors calculate income and consumption inequality by using microdata. Anwar (1997), FBS (2001), World Bank (2003), and Anwar (2003,2005). According to an analysis of these studies, income inequality in Pakistan decreased in the late 1960s after initially rising rapidly in 1966–1967.

A comprehensive analysis of Pakistan's income distribution was provided by Kemal in 2003. Table 1 (Inequality Trends in Pakistan from 1963-64 to 1998-98) lists numerous inequality indexes calculated by different studies.

There have been several attempts to determine and close the analysis of the level of income inequality in Pakistan. Khundkar (1973) used the Gini coefficient for income inequality in Pakistan. His results show an increasing trend in income inequality in urban areas and a declining trend in rural areas. Subsistence wage rates in the industrial sector were a major contributor to the rise in income inequality in urban areas. On the other hand, rural area workers were getting benefits from higher earnings as a result of the agriculture sector's rising yield. This was a "Green Revolution" effect.

(Kemal 1994) investigates the effects of Pakistan's structural adjustment program and how they affected inequality and production efficiency. In this study, empirical outcomes suggest how Pakistan's structural adjustment program reduces production efficiency and drives a trend in income inequality. Because reducing subsidies hurt rural assets and

employment, income inequality in rural regions grew more than it did in urban areas. According to the study, Pakistan's structural adjustment program is driving income inequality greater.

(Alderson 1995) analyzed the variables that lead to income inequality in the context of particular emerging economies. They point out that one of the key reasons for increasing inequality in emerging economies is the rising population. The level of income inequality decreases if these economies boost labor force participation in the industrial sector.

(Sahn 2003) examine how urbanization affects income inequality in African countries. When compared to urban areas, they observe that the standard of living in rural areas is worse and that inequality of income makes it worse.

(Okidi et al. 2003) use data from household surveys to analyze income inequality in the rural sector of Uganda. The findings show that remittances and education caused the inequality in the agriculture sector to decrease between 1992 and 2000 and that changes in the sector's income had a direct impact on who owned the land.

Using data from the 2004–2005 PSLM survey, (Farooq 2010) evaluates the effect of Pakistan's education on income inequality. The findings of this research indicate that one of the important causes of total income inequality is gender-based income inequality. The research also found that there is less income inequality in rural areas than in urban areas and that in Pakistan, education has a positive impact on fair income distribution.

(Asad 2011) use HIES to investigate the relationship between economic growth and consumption inequality in the context of Pakistan. They use several measures of inequality, such as the Theil index, the Declies Dispersion Ratio, Atkinson, Mean Log Deviation, Gini-coefficient, and Coefficient of Variation for consumption inequality in Pakistan. The findings of this study show that consumption among the middle-class 60 percent and 20 percent of the poorest people is associated. In Pakistan, the amount of income inequality decreases when the richest 20 percent increase their consumption.

(Cheema 2012) uses data from eight family income and expenditure surveys conducted between 1992–1993 and 2007–2008 to examine the relationship between poverty, income inequality, and economic growth in the case of Pakistan. According to the study's estimated findings, poverty reduction in Pakistan is significantly influenced by both economic growth and income inequality. However, compared to gross growth, net growth on poverty is smaller in absolute terms, and some of the impacts of growth on poverty are partially countered by increasing income inequality. He contends that to reduce poverty, the government should emphasize growth while keeping improved income distribution policies in view.

(A. Ali 2018) the study's results suggest that macroeconomic instability has a significant impact on income inequality in Pakistan. As a result, Pakistan needs to stabilize its macroeconomic environment to achieve the desired level of the income distribution.

**Table 1: inequality Trends in Pakistan from 1963-64 to 1998-98**

Authors	Unit of Measurement	Region	Inequality Trends (Gini Coefficients)							
			63-64	66-67	68-69	70-71	71-72	1979	84-85	87-88
Bergan (1967)	Household income	Rural	.357	–	–	–	–	–	–	–
		Urban	.430	–	–	–	–	–	–	–
		Overall	.381	–	–	–	–	–	–	–
Khundkar (1973)	Household income	Rural	.350	.321	.294	–	–	–	–	–
		Urban	.366	.384	.364	–	–	–	–	–
Naseem (1973)	Real consumption expenditure of Household	Rural	.299	.299	.262	.262	–	–	–	–
		Urban	.331	.371	.361	.352	–	–	–	–
Alauddin (1975)	Real income of Household	Rural	.349	.330	.293	.291	.310	–	–	–
		Urban	.374	.393	.380	.363	.382	–	–	–
Chaudhry (1982)	Household income	Rural	.348	.319	–	.219	.308	–	–	–
		Per capita income	Rural	.223	.186	–	.146	.164	–	–
Mahmood (1984)	Household income	Rural	.350	.318	.300	.303	.295	.307	–	–
		Urban	.381	.380	.374	.360	.363	.414	–	–
	(Other measures of inequality based on household income)									
	Coeff. of Var	Rural	.694	.634	.577	.567	.611	.658	–	–
		Urban	.769	.815	.813	.757	.786	.927	–	–
	Atkinson's index $\epsilon=0.5$	Rural	.098	.081	.072	.069	.075	.085	–	–
		Urban	.116	.117	.115	.105	.107	.141	–	–
	Atkinson's index $\epsilon=3.0$	Rural	.427	.357	.339	.320	.332	.354	–	–
		Urban	.452	.426	.414	.400	.377	.473	–	–
	Theil's Index	Rural	.204	.172	.147	.143	.159	.179	–	–
Urban		.246	.257	.253	.227	.237	.315	–	–	
S.D. of logs	Rural	.632	.562	.540	.523	.540	.565	–	–	
	Urban	.674	.648	.636	.619	.606	.699	–	–	
Ahmed and Ludlow (1989)	Household expenditure	Rural	–	–	–	–	–	.312	.328	–
		Urban	–	–	–	–	–	.404	.392	–
Malik (1992a)	Household expenditure	Rural	–	–	–	–	–	–	.305	.325
		Urban	–	–	–	–	–	–	.394	.451
		Overall	–	–	–	–	–	–	.302	.338
<b>Inequality Trends (Gini Coefficients)</b>								<b>87-88</b>	<b>92-93</b>	<b>98-99</b>
FBS (2001)	Rural	–	–	–	–	–	–	.239	.252	
	Urban	–	–	–	–	–	–	.317	.359	
	Overall	–	–	–	–	–	–	.269	.302	
World Bank (2003)	Rural	–	–	–	–	–	.240	.252	.251	
	Urban	–	–	–	–	–	.316	.316	.353	
	Overall	–	–	–	–	–	.270	.276	.296	

Sources: as cited above

## METHODOLOGY

### Theoretical Background:

This research seeks to evaluate the distributional effect of structural transformation on economic development policies applied in Pakistan during the period from 1976 to 2018. As explained previously, to enhance the quality of economic growth, job creation, sustainability, and inclusive growth, Structural transformation is necessary. A structural transformation is expressed by pursuing what occurred in both the real sector and the nominal sector in Pakistan. The initial econometric specification can be expressed as follows:

$$GINI_t = \beta_0 + \beta_1 REN_t + \beta_2 REN_t^2 + \beta_3 DevEx + \mu_t \text{-----}(1)$$

$$GINI_t = \beta_0 + \beta_1 REN_t + \beta_2 REN_t^2 + \beta_3 DevEx + \beta_4 GFCF_t + \mu_t \text{-----}(2)$$

$$GINI_t = \beta_0 + \beta_1 RON_t + \beta_2 RON_t^2 + \beta_3 DevEx + \mu_t \text{-----}(3)$$

$$GINI_t = \beta_0 + \beta_1 RON_t + \beta_2 RON_t^2 + \beta_3 DevEx + \beta_4 GFCF_t + \mu_t \text{-----}(4)$$

Where  $\beta_0$  refers to the constant and  $\mu_t$  refers to the white noise error term. The GINI coefficient (GINI) as a measure of income inequality concerning the Relative output of the nominal sector (RON), Relative employment of the nominal sector (REN), Relative output of the nominal sector squared ( $RON^2$ ), Relative employment of nominal sector squared ( $REN^2$ ), Development Expenditure (DeveEx), Gross fixed capital formation (GFCF) in time t. Table 1 provides descriptions of the data variables and their sources.

The Kuznets inequality inverted U-shape curve hypothesis is ceremonially introduced by Simon Kuznets (1955). This hypothesis explains the economic development stages of income inequality. The Kuznets hypothesis suggests that in the early stages of development, economic development, and income inequality increased, and then decreased gradually after industrialization. Hence Kuznet's income inequality hypothesis will be satisfied if  $\beta_1 > 0$  in equations 1 to 4 and  $\beta_2 < 0$  in equations 1 to 4. A strong theoretical and empirical roots of the Kuznets hypothesis. According to Kuznets's hypothesis, the relationship between Per capita income and degree of income equality are inverted U- curve (Shafik 1994; Grossman and Krueger, 1995; Moomaw and Unruh, 1997; McConnell, 1997; Rothman, 1998; De Bruyn et al., 1998 and Suri and Chapman 1998).

Our research covers a period from 1976 to 2018. And try to capture the structural transformation that has taken place in Pakistan's real sector and nominal sector. The study of structural transformation's impact on income inequality remains a multidimensional issue in the case of a developing economy. According to (Syrquin M 1989) the shifting of resources from a traditional sector (agriculture) to modern sectors (manufacturing and service). As a result, the economic sectors' contributions to value added will alter, reflecting the structural transformation that goes along with the process of economic development. Structural transformation explains the transfer of resources, like labor, from a traditional sector (agriculture Sector) to a modern Sector (Industry and Service Sector) leading to the economic growth of cities and enhancing the urban areas

within the country (McGowan and Vasi Lakis 2019). Different studies used different ratios to express the structural transformation like the value added of the industrial sector to GDP and the progress of the population percentage living in urban areas.

We assume that integrating both urbanization and industrialization into the estimable model helps us understand the distributional effects of economic structural change. Several empirical and theoretical studies explored how industrialization affected distribution (e.g. Dumke 1991; Koo 1984; Rozel 1994; Yao 1997; Foster and Rosenzweig 2003; Wang 2019). Recently some studies analyze the impact of industrialization and urbanization on income inequality in different countries. (Ali et al. 2022). Most of the studies divide the economy into three sectors (agriculture, industry, and service) and use the value added of their sectors in GDP to estimate the impact on income inequality (Cheng and Wu 2017; Iscan and Lim 2022; I. M. Ali 2022).

But in this study, we divide the economy into two sectors, the real sector, and the nominal sector. The real sector is agriculture plus the industry sector and the nominal sector is the service sector. Thus we used nominal & real sector output ratios for value added to GDP. Nominal & real sector employment ratio to analyze the relationship between employment and income inequality in Pakistan.

### Econometric Methodology

One of the most critical parts of quantitative economic analysis is the application of econometric techniques to macroeconomic models. Because of the presence of time trends in the majority of macroeconomic data, time series data are nonstationary, which can lead to spurious regression conclusions. According to Nelson and Plosser (1982), the unit root problem affects the majority of time series data for macroeconomic variables. They get to the conclusion that whether a unit root exists or not can be used to verify the validity of the data generation process. For investigating the stationarity of the time series data, there are several unit root tests accessible in the literature. The Augmented Dickey-Fuller (ADF) unit root test is used in this study. The Augmented Dickey-Fuller (ADF) Model is suggested by Dickey and Fuller in 1981. The ADF's general forms can be expressed in writing:

$$\Delta X_t = \delta X_{t-1} + \sum \omega_j \Delta X_{i-j} + e_{1t} \text{ -----(i)}$$

$$\Delta X_t = \alpha + \delta X_{t-1} + \sum \omega_j \Delta X_{i-j} + e_{1t} \text{ -----(ii)}$$

$$\Delta X_t = \alpha + \beta_t + \delta X_{t-1} + \sum \omega_j \Delta X_{i-j} + e_{1t} \text{ -----(iii)}$$

If the computed value of  $\tau$  statistic is higher than the critical value, then the data is stationary. This may be determined by using OLS, computing  $\tau$  statistic of the estimated coefficient of  $X_{t-1}$ , and comparing it with the Dickey-Fuller (1981) critical values. On the other hand, if vice-versa the series is non-stationary.

### Data and Summary Statistics:

The study interprets the basic properties of the data by using the following statistics. The research uses Pakistan data covering the period 1976 to 2018. Data variables description

and data sources are shown in table 1. Table 2 show the maximum and minimum representing the upper and lower limit values. For monitoring and analyzing the effect of structural transformation e divide the economy into the real sector and the nominal sector. The agriculture and industry sectors are considered the real sector and the service sector consider a nominal sector. REN shows the Relative employment of the nominal sector and RON shows the Relative output of the nominal sector. By using these ratios we can study, how employment and output transfer from one sector to another sector.

It also shows some statistical characteristics of the variables respectively and the evolution of time series paths over the time from 1976 to 2018. In these more than five decades, we can analyze the behavior of long-run economic growth and its relationship with income inequality to capture any asymmetric behavior. According to the statistical summary, the mean of the GINI coefficient reached 37.65376, and the higher and lowest value are reached between 42.7300 and 30.600265.

**Table 1: Data Description and Source**

Variables	Symbol	Description	Source
inequality	GINI	The GINI index/coefficient/ratio was developed by Corrado Gini to assess the statistical dispersion for explaining the to explain the wealth or income inequality within an economy. The index varies within the range of 0 to 1. Zero shows perfect equality—everyone has the same level of income in an economy, whereas the value one reflects the opposite extreme i.e., perfect income inequality.	World Bank
Real sector employment	RSEMP	In literature, the good-producing sector i.e. agriculture and industry sector are treated as the real sector. The combination of employment in agriculture and industry is the real sector employment.	
Nominal sector employment	NSEMP	The service sector is recognized as a nominal sector in the literature. NSEMP variable shows nominal sector employment	
Relative employment of the nominal sector	REN	An increase in REN implies structural transformation from the real sector to the nominal sector or vice versa. RES is the ratio of NSEMP and RSEMP (NSEMP/RSEMP).	<ul style="list-style-type: none"> <li>• Labour Force Survey's (LFS)</li> <li>• Pakistan Economic Survey is published annually by the Government of Pakistan, Ministry of Finance.</li> </ul>
Real sector output	RSOP	The real sector output variable represents the share of output in the real sector.	
Nominal Sector Output	NSOP	NSOP shows the output of the nominal sector	
Relative output of a	ROS	This ratio describes the relative increase or decrease in output of the nominal sector to	various issues and the Pakistan Economic

nominal sector		the goods-producing sector. Additionally, the ratio's overall growth will indicate a relative increase in the output of the nominal sector. i.e., the output of the goods-producing sector about the service sector $ROS = NSOP/RSOP$	Survey which is published on the annual basis by the Federal Bureau of Statistics, the government of Pakistan
Gross Fixed Capital formation	GFCF % of GDP	Gross fixed capital formation is the value of both tangible and intangible assets purchased by resident-producing units for non-military uses that will be used for at least a year in the process of production, and also the value of services included in fixed capital goods.	Pakistan Economic Survey, handbook of statistics on Pakistan economy.
Development Expenditure	DevEx % of GDP	The term "developmental expenditure" refers to government expenditure that helps to grow the economy by raising national production and real income. Developmental expenditure on revenue is further divided into capital account expenditure and revenue account expenditure.	handbook of statistics on Pakistan's economy.

### Autoregressive Distributive Lag (ARDL) Approach to Cointegration

There are several cointegration tests for macroeconomic analysis in the literature. The Johansen-Juselius (1990), Maximum Likelihood based on Johansen (1991/1992), and residual-based Engle-Granger (1987) tests are the most well-known and traditional cointegration tests. These tests all have one thing in common: their analysis requires the same order of integration. When the model's variables have different degrees of integration, these cointegration tests are invalid and inefficient.

In comparison to conventional cointegration techniques, the ARDL bound testing approach proposed by Pesaran and Pesaran (1997), Pesaran and Shin (1999), and Pesaran et al. (2001) provide several advantages. First of all, ARDL is appropriate regardless of the integration order. Second, the cointegration ARDL bounds testing technique can be used with small samples (Mah, 2000). Thirdly, this technique helps the use of a sufficient number of lags to capture the process of data generation in a general to specialized modeling framework (Laurenceson et al., 2003). Last but not least, ARDL provides accurate, thorough information regarding data structural breaks. This approach is based on the Unrestricted Vector Error Correction Model (UVECM), which, especially compared to traditional methods, offers better qualities for short- and long-run equilibrium (Pattichis, 1999). Pesaran and Shin (1997) and Pesaran et al. (2001) highlight that the Autoregressive Distributive Lag Model may be used to find long-run correlations among macroeconomic variables in certain environments (ARDL). After choosing the lag order for the ARDL technique, identification and estimate may be done with just OLS. The existence of a particular long-run alliance, which is essential for cointegration, allows for the creation of estimation and conclusions.

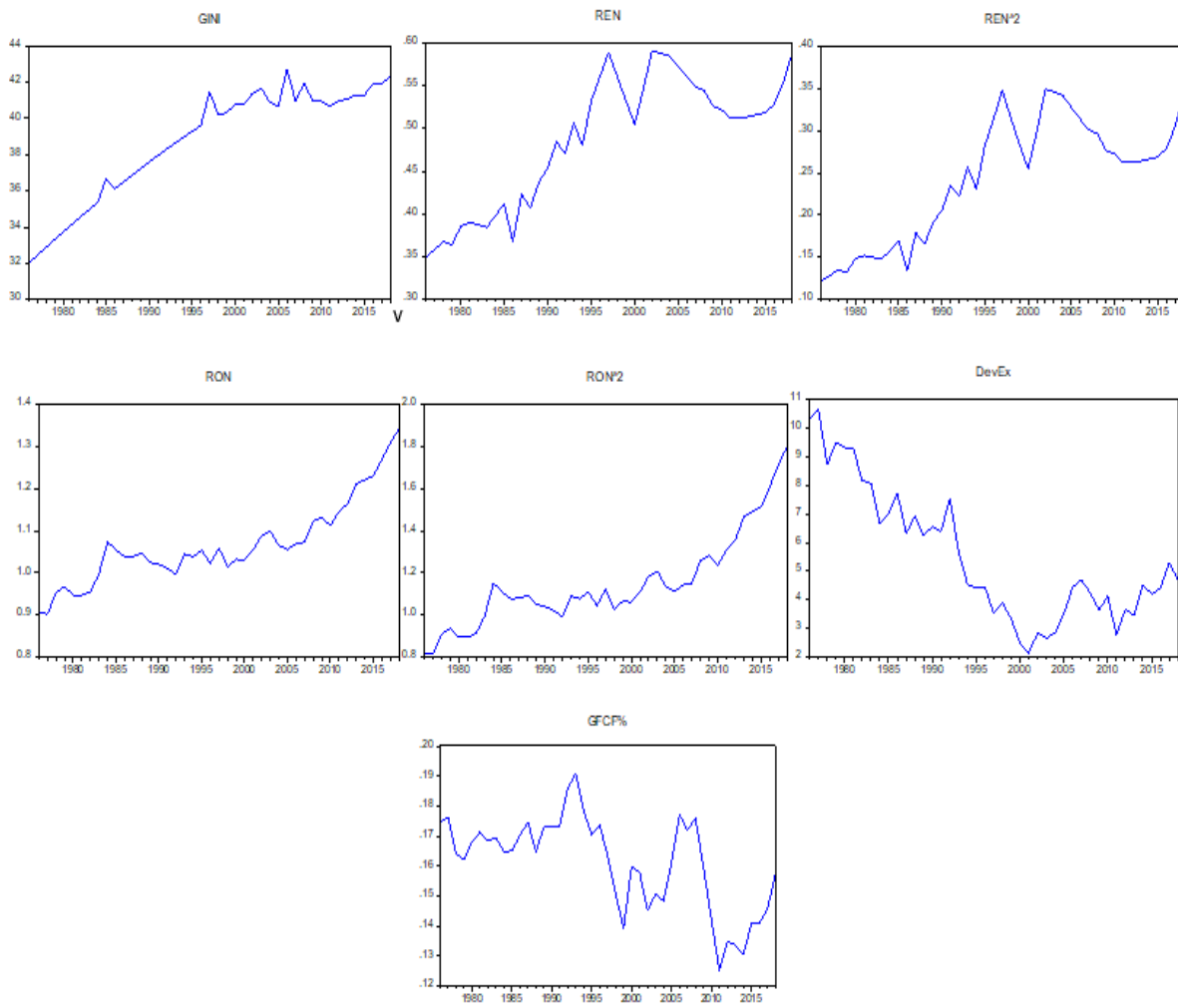


## Empirical Results and Discussions

Descriptive statistics are present in Table 1 to review the temporal characteristics of the data. Through the use of the model's Mean, Median, Maximum, Minimum, and Standard Deviation values, we have analyzed the variables. The normality of the variables is also explained by descriptive statistics. The table-1 reports the descriptive statistic of all variables including income inequality, Relative employment of the nominal sector, and the relative output of the nominal sector, Development expenditure, and Gross Fixed Capital formation. The lower part of the table-1 reports the correlation matrix among variables of the model. The results show that income inequality has a positive and significant correlation with the Relative employment of the nominal sector, Relative output of the nominal sector, and Gross Fixed Capital formation. The results indicate that income inequality has a negative and significant correlation with development expenditure and Gross fixed capital formation in Pakistan. Overall estimated statistics indicate that all variables are significant and that all of the model's variables have positive correlations with one another.

**Table 2: Descriptive Statistics**

Variables	GINI	REN	NSEMP/RSEM ^2	RON	RON^2	GFCF	DEVEX
Mean	38.71235	0.486650	0.242630	1.068114	1.150512	0.161057	5.484083
Median	40.23840	0.512745	0.262907	1.052978	1.108762	0.164744	4.542187
Maximum	42.73000	0.590837	0.349088	1.340318	1.796453	0.191123	10.65657
Minimum	32.00620	0.349012	0.121809	0.903005	0.815417	0.125206	2.133081
Std. Dev.	3.122483	0.077073	0.072798	0.099372	0.221413	0.015713	2.315434
Skewness	-0.716748	-0.402108	-0.252790	0.895270	1.136144	-0.512974	0.615487
Kurtosis	2.209480	1.767959	1.719714	3.635646	4.081103	2.446318	2.306369
Correlation Probability							
GINI	1.000000						
REN	0.939124 17.50209 (0.0000)	1.000000					
REN_2	0.924985 15.58618 (0.0000)	0.998027 101.7714 (0.0000)	1.000000				
RON	0.746560 7.185018 (0.0000)	0.597027 4.765319 (0.0000)	0.583529 4.600961 (0.0000)	1.000000			
RON^2	0.719908 6.641492 (0.0000)	0.573853 4.486739 (0.0001)	0.561746 4.347742 (0.0001)	0.998217 107.0746 (0.0000)	1.000000		
GFCF	-0.478231 -3.486735 (0.0012)	-0.390627 -2.717109 (0.00096)	-0.387252 -2.689469 (0.0103)	-0.611320 -4.946216 (0.0000)	-0.604914 -4.864233 (0.0000)	1.000000	
DEVEX	-0.919197 -14.94610 (0.0000)	-0.896175 -12.93288 (0.0000)	-0.882481 -12.01373 (0.0000)	-0.585427 -4.209874 (0.0000)	-0.549370 -4.209874 (0.0001)	0.531009 4.012574 (0.0002)	1.000000



Normally, time series data have unit root or non-stationarity problems which makes regression results spurious. Moreover, for investigating the co-integration among the variables stationarity is a necessary and sufficient condition. There are several unit root tests available but we choose Augmented Dickey-Fuller (ADF) test because of its unique properties.

The results of unit root tests are presented in table-2. The estimated results of ADF show that income inequality, Relative employment of the nominal sector, Relative output of the nominal sector, development expenditure, and Gross Fixed Capital formation is not stationary at the level but at first, the different results show that income inequality, Relative employment of nominal sector, Relative output of nominal sector, development expenditure and Gross Fixed Capital formation are stationary.

Overall results show that this model has mixed order of integration which is a suitable condition for applying the ARDL co-integration approach.

**Table 2: Results of Panel Unit Root Test of All Variables at Level**

variables	Level Without Trend P	Level With Trend P	1 <sup>st</sup> Diff. Without Trend P	1 <sup>st</sup> Diff. With Trend P
<b>GINI</b>	-2.677677 (0.0865)*	-1.392320 (0.8485)	-10.65266 (0.0000)***	-11.43152 (0.0000)***
<b>REN</b>	-1.415201 (0.5658)	-1.798501 (0.6877)	-6.853984 (0.0000)***	-4.362223 (0.0068)**
<b>REN<sup>2</sup></b>	-1.267269 0.6359)	-1.779102 0.6970)	-4.708790 (0.0005)***	-4.703123 (0.0028)***
<b>RON</b>	-0.626496 (0.9889)	-0.787765 (0.9587)	-6.314087 (0.0000)****	-6.403722 (0.0000)****
<b>RON<sup>2</sup></b>	1.238735 (0.9979)	-0.178564 (0.9915)	-6.009859 (0.0000)***	-6.243194 (0.0000)***
<b>GFCF</b>	-2.057628 (0.2622)	-2.475810 (0.3379)	-5.602814 (0.0000)	-5.536059 (0.0003)
<b>DevEx</b>	-2.139864 (0.2308)	-1.690772 (0.7378)	-8.533934 (0.0000)	-9.286576 (0.0000)

Note: Significant at%1, 5%, and 10% levels are denoted by the asterisks \*\*\*, \*\*, and \*, respectively. The Schwarz Bayesian Criterion determines the optimal lag structure for the ADF unit root test, as shown in the figure.

Source: Authors' Estimation

Therefore, it is concluded that the issue of spurious regressions associated with the time series variables is minimized therefore these variables can be used for further estimations. These findings lead us to a logical use of co-integration to examine whether or not there is a long-term relationship between them.

#### ARDL bounds test:

In the null hypothesis, regardless of the integration order of the regressors, the series shows no level relationship, and the asymptotic distribution for the Bounds F test statistic is non-standard. For a variety of combinations of I(0) and I(1) variables, the exact critical values for the bounds F test are not available (Orhunbilge and Tas, 2014). Pesaran et al. (2001), on the other hand, determined the bounds on the critical values for the asymptotic distribution of the F statistic under various scenarios for the number of regressors (k), sample size, various model specifications, and for each standard levels of significance. The upper bound is based on the assumption that all variables are first difference stationary, I, while the lower bound is based on the assumption that all variables are level stationary, I(0) (1). In the case when the computed F test statistic is less than the lower bound, the variables are I(0), and no cointegration exists. Cointegration is present by definition if the F test statistic is higher than the upper bound.

The test is inconclusive when the bounds F test statistic lies between the lower and upper bounds. The ARDL bounds test is the first step for the relevant model's prediction outcomes. The results of the bounds testing are shown in Table 4. The calculated F statistic value in model 2 and model 4 was found to be 6.883814 and 10.15898. The calculated F statistic value was compared with the table crucial values to determine the

bounds testing's significance. The results suggest that, at all probability levels, the estimated F statistic value is greater than the upper values in the table. At this point, the H1 hypothesis was accepted, and it was shown that there existed a cointegration relationship between the variables. With this result, it was found that the variables being investigated were cointegrated in the long run.

**Table 4: ARDL bounds test**

**Model 2**

ARDL Bounds Test		
Significance	I0 Bound	I1 Bound
10%	3.03	4.06
5%	3.47	4.57
2.5%	3.89	5.07
1%	4.4	5.72
Calculated F Statistic Value	6.883814	

**Model 4**

ARDL Bounds Test		
Significance	I0 Bound	I1 Bound
10%	3.03	4.06
5%	3.47	4.57
2.5%	3.89	5.07
1%	4.4	5.72
Calculated F Statistic Value	10.15898	

**Table 5: Long Run ARDL**

The dependent variable is GINI				
Variables	1	2	3	4
<b>Selected Model: ARDL</b>	<b>(1, 1, 4, 3)</b>	<b>(1, 5, 5, 3,0)</b>	<b>(1, 0, 1, 3)</b>	<b>(1, 0, 0, 3,2)</b>
E	75.28 (0.0080)	91.05 (0.0646)		
E <sup>2</sup>	-59.82 (0.0316)	-81.00 (0.0838)		
Y			-27.40 (0.6236)	-37.35 (0.0338)
Y <sup>2</sup>			13.14 (0.5900)	18.43 (0.0190)
DevExp	-0.29 (0.0146)	-0.32 (0.0970)	-0.99 (0.0009)	-0.97 (0.0000)
GFCF		18.76 (0.0569)		49.71 (0.0000)
C	17.18 (0.0146)	11.37 (0.3262)	58.23 (0.0819)	53.28 (0.0000)
Trend	0.06 (0.0010)	0.08 (0.0066)	0.022 (0.7764)	0.07 (0.0015)

### Long Run Equilibrium Relationship ARDL:

The long-run equilibrium of variables is a fundamental concept of macroeconomic analysis. From ARDL, a dynamic error correction model (ECM) can be constructed that integrates short-run dynamics with the long-run equilibrium while preserving long-run information (Banerjee et al. 1993).

This section describes the result that was empirically evaluated using ARDL analysis. Initially, Table 5 presents a summary of the impacts of relative employment of the nominal sector, the relative output of nominal factors, development expenditure, and capital formation on income inequality. Model 1, as illustrated in Table 5, quantifies the relationship between income inequality and relative employment of the nominal sector, relative employment of nominal sector square factors, and development expenditure, whereas Model 2, takes the impacts of development expenditure and capital formation factors on inequality along with the relative employment of nominal sector & relative employment of nominal sector square. Models 3 & 4 analyze the relationship between inequality and structural transformation in terms of output along with development expenditure and capital formation.

Finally, we investigate how co-integration presentations of the structural transformation in terms of employment and the structural transformation in terms of output impact income inequality (GINI). This indicates that we make an effort to empirically evaluate our basic theoretical results from Equations 1 to 4 above. We apply an ARDL regression to determine the direction, magnitude, and significance of the responsiveness of income inequality to each of the four independent variables after satisfying the conditions for fitting a regression. The Akaike Information Criterion (AIC) with maximum lags of the dynamic repressors was the basis for the model selection. The long-run regression outcomes are shown in the respective Tables.

The long-term coefficients of the variables state that the relationship between the relative employment of the nominal sector, the Relative output of the nominal sector, and the Gini coefficient, which indicates income inequality, is statistically significant. When the signs of these coefficients are evaluated, it is seen that the sign of the relative employment of the nominal sector variable is positive (+) and the sign of the square of relative employment of the nominal sector is negative (-). This is validating that Kuznets' inverted U-shaped hypothesis for relative employment of the nominal sector. Its shows that the relative increase in employment of the nominal sector initially increases the income inequality in Pakistan. But in the case of the long run REN square show that service sector employment concerning goods-producing sector employment increase but it reduces the income inequality in the economy. Although the result of the Relative output of the nominal sector is opposite to the relative employment of the service sector. It is seen that the sign of the Relative output of the nominal sector variable is negative (-) and the sign of the square of the RON is positive (+). This indicates that Kuznets' inverted-U hypothesis isn't valid for the Relative output of the nominal sector. According to Kuznets's result, structural transformation in term of output increase income inequality, which shows the adverse impact on the punching power of low-income group than their high-income group

counterparts, which increases the income gap between the two groups. The structural transformation in terms of output is significantly more prominent rather in terms of employment.

The development expenditure variable is negative and significantly related to inequality. In addition, the research found that development expenditure is a negative but statistically significant effect on inequality. That shows Government's expenditure on development projects will improve real income distribution in an economy by decreasing the overall cost of living. Capital formation (GFCF) has a positive and statistically significant impact on income inequality. GFCF in an economy indicates that the production technology is leading towards capital-intensive technology which will ultimately increase the share of capital in production or income.

### Short-Run Causality: Error correction models (ECM)

Table- 5 reports the short-run dynamic by using Vector Error-Correction Model. The short-run results show that the relative employment of the nominal sector has a positive and significant relationship with income inequality in Pakistan. The relative output of the nominal sector has a negative and significant relationship with income inequality. The negative and significant value of ECM shows the speed of adjustment from short-run to long-run equilibrium. According to the ECM estimations, the short run is corrected within a year. Moreover, for Pakistan, short-run variances from the prior period are adjusted by (-1.042) for model 2 and (-1.237) for model 4 percent in the future.

Though the inequality will decrease in the long run in the case of Pakistan long run gets prolonged i.e the last 40 years predict therefore PM has reinforced this pattern in the short run the time of adjustment.

**Table 5: Short Run ARDL**

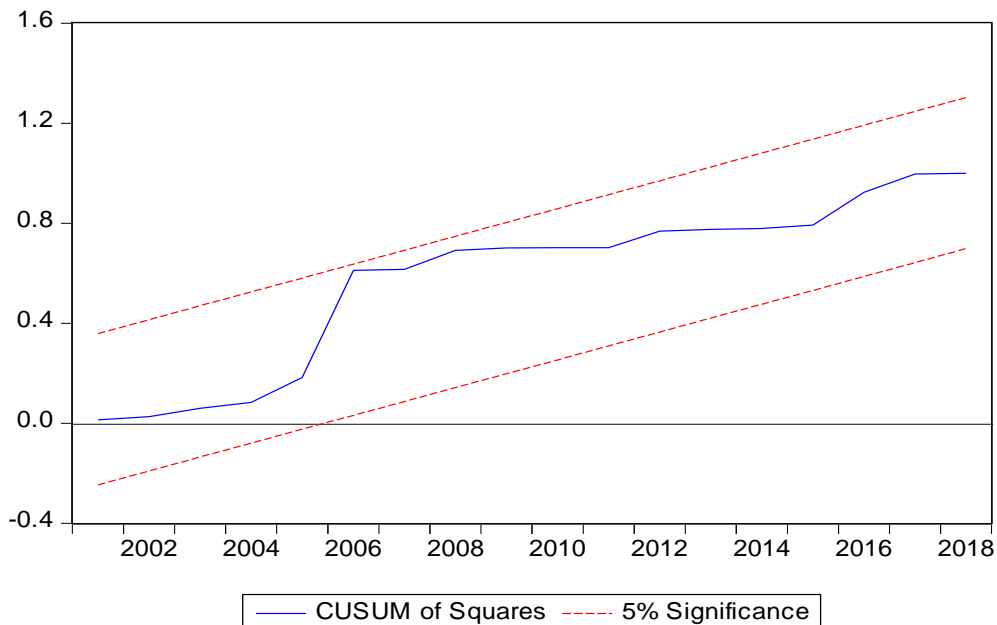
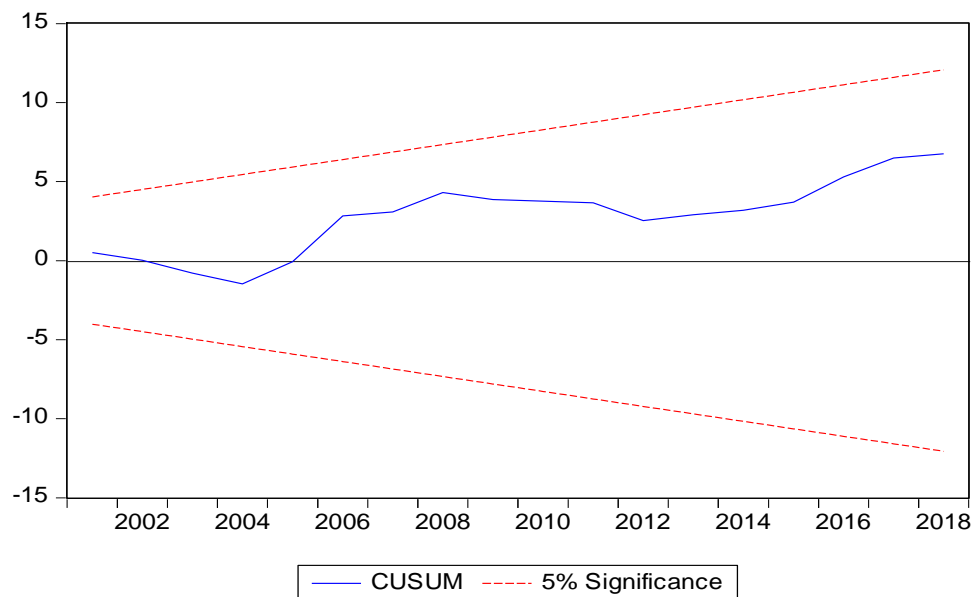
Co-integrating Form								
Model	2				4			
Variables	Coefficient	Std Error	t-Stat	Prob	Coefficient	Std Error	t-Stat	Prob
REN	-75.88(4)	34.53	-2.19	0.0413				
REN^2	80.34(4)	33.74	2.38	0.0285				
RON					-46.22	22.24	-2.07	0.0470
RON^2					22.81	9.88	2.30	0.0286
DevEx	-0.09	0.15	-0.62	0.53	-0.25	0.10	-2.38	0.0286
GFCF	19.55	10.29	1.89	0.0736	25.02	9.31	2.68	0.0120
Trend	0.08	10.29	1.89	0.0736	0.097	0.03	2.90	0.0071
Error Correct Term (ECT)	-1.042	0.16	-6.21	0.0000	-1.237	0.17	-7.26	0.0000

### Model stability/ Stability test:

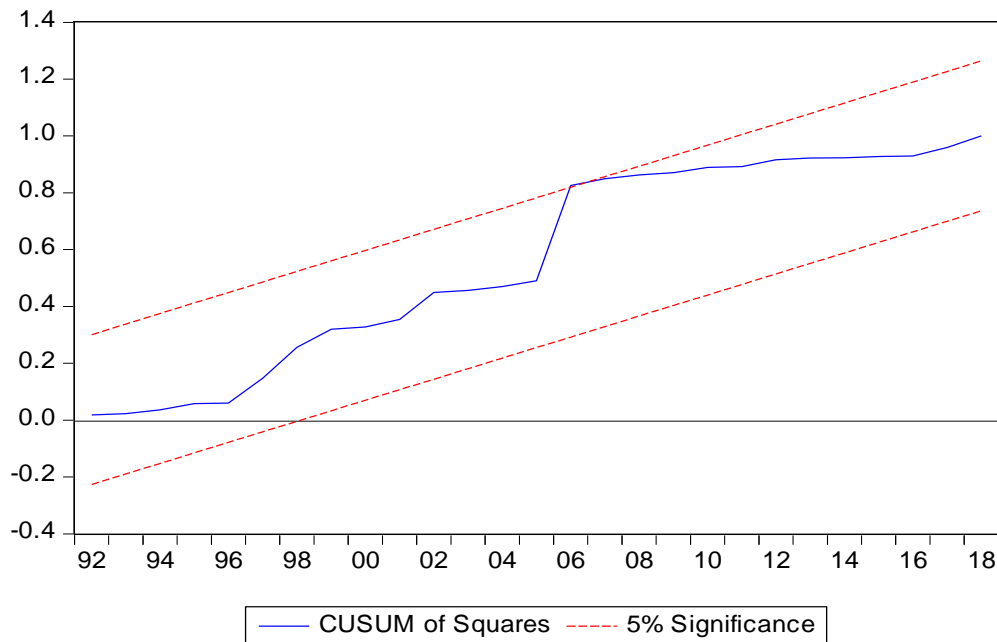
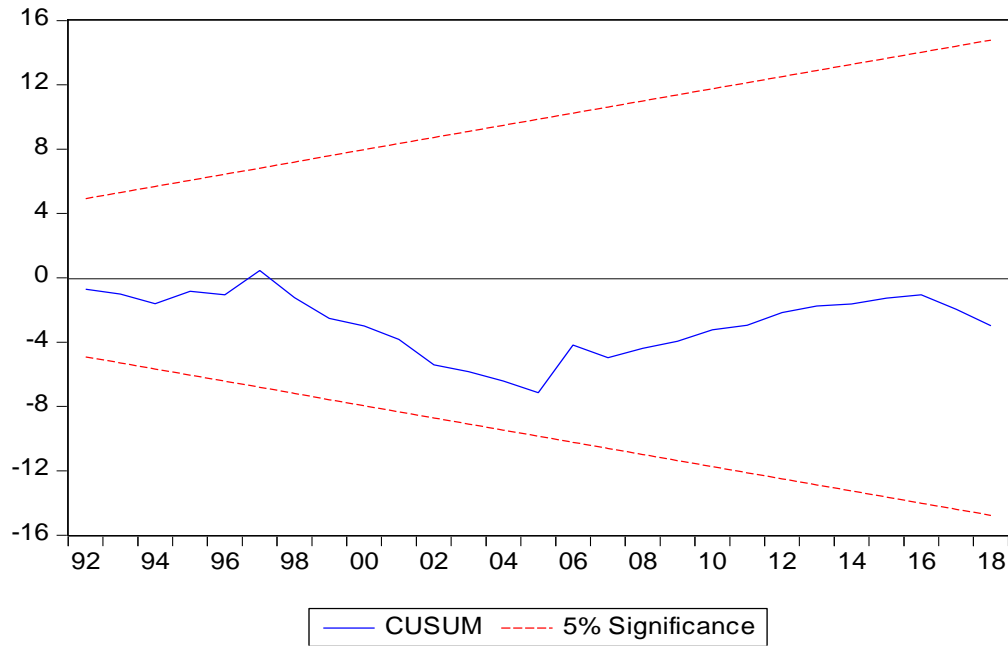
The stability test given by Brown et al., (1975) for the ARDL model grounded on the error correction model by employing the cumulative sum of recursive residuals (CUSUM) and cumulative sum of squares of recursive residuals (CUSUMSQ), the test for both real sector and the nominal sector is under the critical bounds at 5% significance level, which concludes that the model is stable structurally. Normally, the regression analysis of time

series data is based on the assumption that the regression relationship is persistent over some time. Specifically, for social and economic analysis; it validates the sample size taken for the analysis (Brown et al., 1975). The outcome of cumulative Sum (CUSUM) and the Cumulative Sum of Squares (CUSUM Sq) test results are shown in figure 1 & figure 2. The critical lines and the critical boundaries are not crossed by the cumulative sum (CUSUM) or the cumulative sum of the squares (CUSUM sq). The results of the Cumulative Sum (CUSUM) and Cumulative Sum of the Squares (CUSUM sq) analysis suggest that the selected model is correctly specified.

### Model 2



### Model 4



### Granger Causality Test:

Here Table 6 explained the result of Granger causality. Dumitrescu & Hurlin (2012) Granger non-causality test results. To investigate the causal relationship between Models 2 and 4 (GINI & relative employment of nominal sector and GINI & relative output of nominal sector) we have further applied the causality test. To discover the causation and the direction between two variables standard Granger causality (Granger, 1969) have



been utilized. Jones (1989) expresses that if we compare the selection method of optimal lag length, the ad hoc selection in Granger causality is better than any statistical method for determining optimal lag. Consequently, for granger causality analysis we found Uni-directional results for the models of relative employment of the service sector, relative employment of service sector square, the relative output of the service sector, and relative output of the service sector square on GINI. The Bi-causal relationship found development expenditure and inequality. No causal result was found for the models of gross fixed capital formation on GINI.

**Table 4.6: Granger Causality Test Results**

NULL HYPOTHESIS	Lags	F-Statistic	Prob	Results
<b>REN</b> does not Granger Cause <b>GINI</b>	4	3.15927	0.0279**	Uni-directional
<b>GINI</b> does not Granger Cause <b>REN</b>		0.87235	0.4920	
<b>REN_2</b> does not Granger Cause <b>GINI</b>	4	3.33040	0.0227**	Uni-directional
<b>GINI</b> does not Granger Cause <b>REN_2</b>		0.95189	0.4480	
<b>RON</b> does not Granger Cause <b>GINI</b>	5	0.36913	0.8652	Uni-directional
<b>GINI</b> does not Granger Cause <b>RON</b>		2.32930	0.0699	
<b>RON^2</b> does not Granger Cause <b>GINI</b>	6	0.39137	0.8503	Uni-directional
<b>GINI</b> does not Granger Cause <b>RON^2</b>		0.02573	0.0606	
<b>DevEx</b> does not Granger Cause <b>GINI</b>	1	2.99835	0.0913	Bi-causal relationship
<b>GINI</b> does not Granger Cause <b>DevEx</b>		3.61165	0.0648	
<b>GFCF</b> does not Granger Cause <b>GINI</b>	1	0.36601	0.5487	No causal relationship
<b>GINI</b> does not Granger Cause <b>GFCF</b>		1.62692	0.2097	

**The structural transformation in terms of output will lead to increased income inequality.**

**The structural transformation in terms of output is significantly more prominent rather in terms of employment.**

## CONCLUSION AND DISCUSSION

The secret to fast and sustained growth is in the systematic transfer of resources, such as labor and output, from low- to high-productivity sectors. On the base of the structural transformation speed, we can differentiate the countries between successful from unsuccessful.

All countrywide production strategies are primarily focused on promoting economic growth. A fair distribution of the income generated by economic growth among individuals or factors of production is its secondary objective, which occurs after economic growth (labor, capital, natural resources, and entrepreneur). To achieve socioeconomic equilibrium, a fair income distribution that is carried out in a way that is driven by economic growth is necessary. When studying the causes of income inequality, much empirical research neglected to consider structural changes. To capture a more complete picture of the factors determining income inequality in Pakistan, the current study emphasizes the need of enhancing the structural changes that are accompanied by economic growth strategies. This significance has led to a long period of study of the relationship between income distribution and economic growth. The relationship between income inequality

and economic growth in Pakistan was analyzed to contribute to these investigations using Kuznets' inverted U-shaped hypothesis. The long-term coefficients of the variables state that the relationship between the relative employment of the service sector, the Relative output of the nominal sector, and the Gini coefficient, which indicates income inequality, is statistically significant. The analysis's results suggested that there was a positive relationship between income inequality and the relative employment of the service sector variable and a negative relationship between income inequality and the square of relative employment of the nominal sector variable. Although the result of the Relative output of the nominal sector is opposite to the relative employment of the service sector. As it is observed, the variable's sign for the Relative output of the nominal sector is negative (-), whereas the sign for the square of that variable's relative output is positive (+).

These results show that service sector employment growth helped to reduce long-run income inequality. Or we said the structural transformation of labor from the goods-producing sector to service reduces long-run income inequality. But in the case of structural output transformation (Relative output of nominal sector) increase income inequality in long run. That shows service sector growth is jobless growth and in long run richer are the richest and the poor become poorer.

According to the result, Pakistan's service sector growing rapidly and generating huge tax revenue from this sector. However, in case of the long run, it's a negative effect on income inequality and the majority of service sector employment employees in the wholesale and retail sector in Pakistan. Pakistan suffers from falling labor absorption as the absorption capacity of the service sector is not enough to compensate for the falling capacity of agriculture and the stagnation of industry. The service sector is the technology absorber sector so in the initial stage, Employment is transferred from the goods-producing sector to the service sector the income inequality was reduced but in long run, technology replace human capital, and income inequality increased.

Capital formation (GFCF) in an economy indicates that the production technology is leading towards capital-intensive technology which will ultimately increase the share of capital in production or income.

### **Policy Recommendation:**

- The quantitative research provides valuable insights into potential policy areas that Pakistani policy-makers should consider to understand the relationship between structural change and the underlying sustainability of a high growth rate.
- To boost economic growth, Pakistan must focus on reducing income inequality. Its fiscal policy must be used to adopt specific income redistribution programs to achieve this.
- Due to the weak financing capabilities and the continuing, structural budget deficits in developing countries like Pakistan (Wan et al. 2022), it is not feasible to depend on fiscal policies to redistribute income and decrease inequality there. Rather,

urbanization rates are accelerating, which is the best strategy for accomplishing this goal.

- Pakistan has achieved a fair level of economic stability even through effective economic management and liberalization, which has also enabled the country to structural reform and industrial development.
- As Pakistan needs to increase investment levels, diversify and develop its industrial base, and reduce its dependence on imports, this dependency seems inevitable. Pakistan should plan to boost its investment in infrastructure and human resources going forward, as these sectors are now affecting Pakistan's competitiveness in the export and industry sectors.
- Government and policymakers must emphasize accelerating the structural transformation process by developing linkages between all economic sectors. Developing clusters, selecting strategic sectors and products for industrial policy intervention, identifying nearby products for product space identification, focusing on SMEs and RNFE for rural structural transformation, and should focusing public policies on fostering national competitiveness, innovation, and productivity.

#### **Data Availability Statement:**

The data for the Labour Force Survey is collected from the Handbook of statistics on Pakistan economy ([https://www.sbp.org.pk/departments/stats/PakEconomy\\_HandBook/index.htm](https://www.sbp.org.pk/departments/stats/PakEconomy_HandBook/index.htm)).

The remaining data are provided by the Economic survey of Pakistan.

([https://www.finance.gov.pk/survey\\_2022.html](https://www.finance.gov.pk/survey_2022.html))

#### **Declarations**

##### **Ethical Approval**

There are no human subject in this article and informed consent in not applicable.

##### **Availability of data and material**

The datasets generated and/or analysed during the current study are available in the Handbook of Statistics on Pakistan Economy and Pakistan Economic Survey.

##### **Consent to Publish and competing interests**

The text and any pictures or videos published in the article will be used only in educational publications intended for professionals.

Authors declare that there are no competing interests.

##### **Funding:**

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

##### **Acknowledgements:**

We would like to thank family friends and teachers for their constant help and support to conduct this research.

### Footnotes

- 1) Kaldor (1966, 1967, 1968)
- 2) see Ansu et al. (2016b) and Balchin et al. (2016b);
- 3) see Khanna et al. (2016) and Hoekman and te Velde (2017).
- 4) McMillan et al. (2017).
- 5) Developing countries are turning into service economies without having gone through a proper experience of industrialization
- 6) Rodrik (2016)
- 7) Sen (2019)
- 8) It is considered first book of economics. Its complete title was 'An inquiry into the Nature and causes of the Wealth of Nations' (1776).
- 9) noted by Herrendorf, Rogerson, and Valentinyi (2014).
- 10) Kuznets (1955), (1967)
- 11) Lyubimov 2017

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