Chapter 5

Effect of Unemployment and Governance Quality on Income Inequality in India

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5.1 Introduction

Reducing income inequality is one of the inevitable goals of sustainable development, which is to be achieved by 2030 (Kanbur, 2021). In recent years, the issue of income inequality has gained widespread recognition as a significant global concern, presenting a formidable challenge to development worldwide (Anyanwu *et al.,* 2016; Anyanwu, 2016). Since 1990, most countries in the world, including India and China, have witnessed an increase in income inequality within them (UN, 2020). The literature on inclusive growth provides evidence that, although the increased GDP in most of the countries, notably the developing economies, has resulted in a decrease in poverty, these countries also experienced a rise in income and wealth disparities at the same time (Aggarwal, 2022). Developing countries such as India also grapple with such an inequality challenge, which is a detrimental issue to the economy (Wicaksono *et al.*, 2017; Huynh & Nguyen, 2019). According to the report by Oxfam India, 2023, the country is home to the largest population living in poverty globally, totaling 228.9 million and concurrently, the number of Indian billionaires has seen a significant increase, rising from 102 in 2020 to 166 in 2022 (Oxfam India, 2023). During the planning period from the 1950s to the 1970s, India experienced a reduction in income inequality, marked by a decrease in the real earnings of the wealthiest individuals, specifically those in the top 1 percent, 0.1 percent, and 0.01 percent income brackets (Basole, 2014; Banerjee & Piketty, 2005). The rise in income inequality in India started in the 1980s, coinciding with the country's initial steps towards liberalization and this period is recognized as the starting point of the widening income inequality in the country (Chancel & Piketty, 2019). Following the period of economic reforms, India experienced rapid economic growth and since then, it has also seen increasing income inequality (Sarkar & Mehta, 2010; Sehrawat & Singh, 2019). When India was on the brink of bankruptcy, to overcome this crisis, India adopted a greater economic policy of export orientation and involvement of the private sector in 1991 with the objectives of allocating the resources efficiently, raising the productivity, boosting the economic growth, and improving the overall well-being of the country (Tiwari *et al.,* 2013;

Arora & Ratnasiri, 2015). Since the post-reform era, the GDP of the Indian economy has been growing at a much faster rate than in the pre-reform era. The GDP at constant prices grew at an excellent annual rate of 5.4 percent in the 1980s, 5.9 percent in the 1990s, and 9.5 percent during the period from 2005–2006 to 2007–2008, but the growth rate dropped to 6.7 percent in 2008-09 due to the adoption of developmental policy by the central government and the Reserve Bank of India (RBI) (Radhakrishna & Mishra, 2020). Then the growth rate rebounded to 8.6 percent in 2009-10 and 8.9 percent in 2010-11, which again sharply declined to 4.5 percent in 2012-13 and 4.7 percent in 2013-14 (Radhakrishna & Mishra, 2020). Still, India maintained its position as the fastest-growing economy in 2018-19, even though GDP growth slightly slipped from 7.2 percent in 2017-18 to 6.8 percent in 2018-19 (Ministry of Finance, Government of India, 2019). But due to lockdown during the COVID-19 pandemic, the growth of real GDP is estimated at 5 percent in 2019-20 (Second Advance Estimates) in comparison to 6.1 percent in 2018-19 (First Revised Estimates) (Ministry of Finance, Department of Economic Affairs, 2020). A consequence of economic growth is that governments that implement reforms pay more attention to inclusiveness and reduce poverty and inequalities, which may also result in better public health, sanitation, education, and access to basic services such as safe drinking water (Arora & Ratnasiri, 2015). But despite an increase in GDP, India encountered an increase in income inequality as the benefits were not being distributed evenly among different classes of people in society (Sehrawat & Singh, 2019). The truth of inequality is that it has a detrimental effect on almost every facet of life and on every expectation for human advancement (Ahmed *et al.*, 2022). Hence, addressing inequality in income is crucial because it has a negative impact on the SDGs and progress towards achieving them; it also impedes institutional development, wastes productive capacity, and makes it more difficult to reduce poverty generally (Anyanwu *et al.,* 2016).

This chapter delves into how unemployment and governance quality influence income inequality in India. It is widely held that rising unemployment rates significantly contribute to the expanding inequality between the affluent and the impoverished (Cardoso *et al.*, 1995; Björklund, 1991; Sheng, 2011; Mocan, 1999; Gimba *et al.*, 2021). Since the early 1960s, India has adopted different strategies, most notably the Rural Landless Employment Guarantee Program and the National Rural Employment Program targeting rural areas, to generate employment prospects (Ang, 2010). However, despite these measures, the issue of unemployment continues to be a significant challenge in the country. During the COVID-19 pandemic and the ensuing lockdowns, the unemployment scenario became worse. In April

2020, the unemployment rate soared to 23.5%, an increase from the 7.6% rate observed in the fiscal year 2019-2020 (Vyas, 2020). As reported by the Centre for Monitoring Indian Economy (CMIE), the unemployment rate in India was recorded at 8.11 percent in the month of April 2023 (CMIE, 2023).

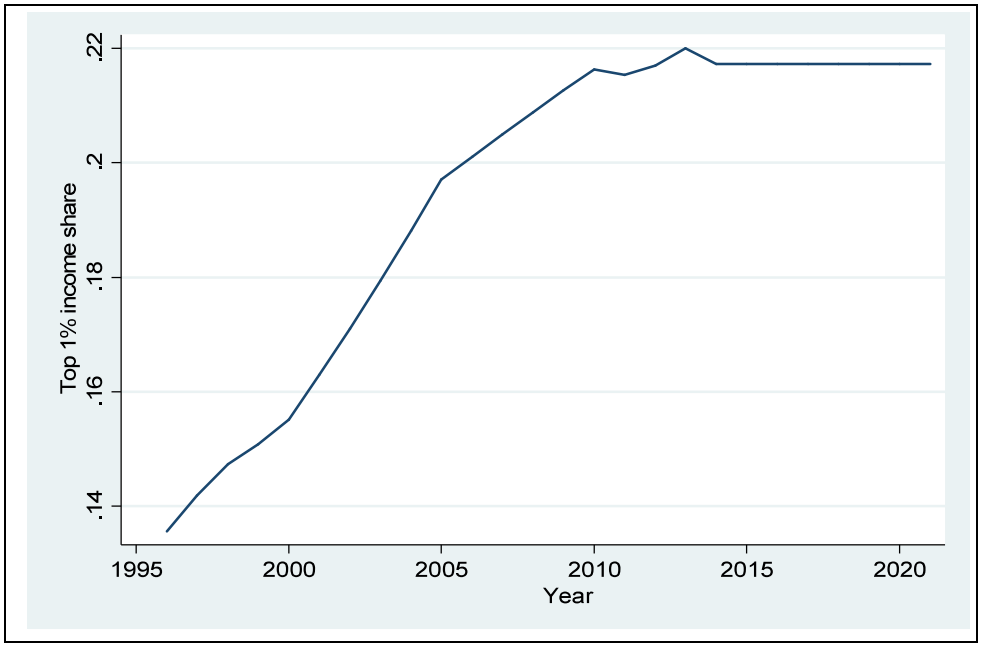
Scholars have explored how the quality of governance affects the distribution of income in a society (e.g., Chong & Calderón, 2000; Andres & Ramlogan-Dobson, 2011; Davis, 2016; Roy-Mukherjee & Udeogu, 2020; Nguyen *et al.*, 2021; Dossou *et al.*, 2022). Good governance quality is required to mitigate the income gap between affluent and disadvantaged; otherwise, it can exacerbate income inequality due to weak governance quality, leading to political unrest and disturbing economic growth (Nguyen *et al.*, 2021; Dossou *et al.*, 2023c). The governance system in India remains weak and its score ranged from 2.51 to 5.00 during 1996 to 2021 (details given in the methodology section).

5.1.1 Some Stylized Facts: Trends of Income Inequality (Top 1% Income Share) in India During 1996-2021

Figure 5.1 shows that over the past 26 years, India's income inequality has shown an upward trend, indicating an increase in income inequality. Income inequality has risen from 13.56% (income capture by the top 1%) in 1996 to a high of 22% (income capture by the top 1%) in 2013 and then throughout the period from 2014 to 2021, income inequality remained at 21.73% (income capture by the top 1%). This suggests that the income distribution became more unequal during this time. During the period 1983-84 onwards, income inequality has almost continuously increased because of the increase in the share of national income to the top 0.1% (Chancel & Piketty, 2019). This is the turning point of the increase in income inequality in India, where several factors like an adjustment in the top marginal tax rate, anticipation of a more business-friendly environment, and a decline in agricultural production in the previous years due to droughts in 1982-83 could have an impact on this turning point (Chancel & Piketty, 2019). This increase in income inequality lasted throughout the introduction of new economic policy in 1991. Another dimension of the increase in income inequality during the 1980s and 1990s could be the crisis in Indian agriculture. Due to the crisis arising from dependence on climate and rainfall, lack of easy access to credit facilities, reduction of import duty on substitute products, reduction in agriculture subsidy, decline in government investment in agriculture, etc., income or profitability derived from agriculture is low or nil or negative (Dhas, 2009). When liberalization was already on the way during the

1980s, industrial sector growth was faster as investment licensing and regulatory regimes were liberalized (Panagariya, 2004; Kotwal *et al.*, 2011). During the post-reform period, the private sector gained much more scope as the controls over industries were removed. It has given Indian industries the freedom to expand their capacity and set up new entities according to their chosen locations (Bajpai, 2002). The share of investment in the private corporate sector increased from 28 percent to 41 percent during 1991-92 to 2007-08, whereas the public sector's share declined from 43 percent to 24 percent during the same period, indicating the dominance of private corporations during the post-reform period (Radhakrishna, 2014). Then from the 2008 global financial crisis, income inequality kept increasing till 2013 with a slight decline from 2014 to 2021 but higher than the 1996 to 2012 period. The increase in inequality from 1990 to 2013 was also stated by the Regional Economic Outlook, Asia and Pacific (2016). According to the Regional Economic Outlook, Asia and Pacific (2016), India's income inequality rose from 45 net Gini in 1990 to 51 net Gini in 2013, caused by the income gap within urban regions and the rural-urban gap. Sehrawat & Singh (2019) added to this data, suggesting that individuals in the lower income group have limited opportunities to educational and employment prospects, which in turn contribute to an increasing income inequality. Bharti *et al.* (2024), analyzing the growth incidence curve concerning wealth and income from 2014 to 2022, showed that the top 1% and supper rich are the real gainers in recent years. They reasoned it for the concentration of wealth at the highest top level.

Figure 5.1: Trends of the income inequality (top 1% income share) of India during the period from 1996 to 2021.



Source: Researcher's construction based on the WID

The chapter is organized as follows: Section 5.2 examines the theoretical connections between income inequality, unemployment, and governance quality; Section 5.3 presents a concise overview of the empirical literature; Section 5.4 is the data collection and methodology employed; Section 5.5 analyzes the empirical findings; and Section 5.6 is the conclusion of this chapter.

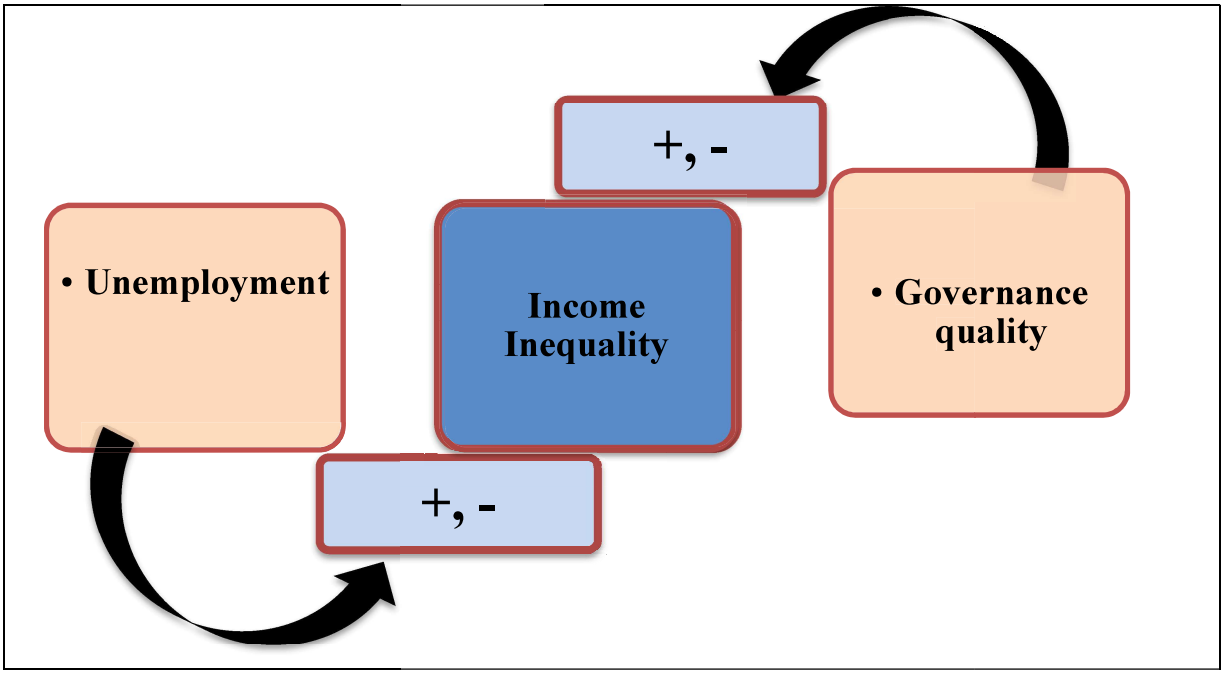
5.2 Conceptual Framework

The conceptual framework for the relationship between income inequality and unemployment, as well as income inequality and governance, has been explained in the following:

Income Inequality and Unemployment

A positive association between unemployment and income inequality is commonly observed. This implies that unemployment increases the income proportion of the highest earners and reduces the income proportion of the lowest earners (Mocan, 1999). Unemployed individuals tend to face a drop in their income level unless they are adequately covered by social protection schemes (Martínez *et al.*, 2001; Deyshappriya, 2017). Different studies have different perspectives on how unemployment affects income inequality. Martínez *et al.* (2001) suggested two views on the impact of unemployment on income inequality. First, income distribution is not only affected by households run by an unemployed head of the family but also by intra-household unemployment distribution, which is a key factor in influencing income distribution. Second, social benefits provided to households run by unemployed people also play an important role in income distribution. However, some literature believes that the increase in income inequality is not due to the increase in the unemployment rate. Muryani *et al.* (2021) argued that a reduction in the unemployment rate does not guarantee a reduction in income inequality. They argued that if the labor market improves employment prospects by boosting labor productivity, then unemployment can have a negative influence on income inequality. Ridhwan (2021) said that local productivity growth could lower income inequality by enhancing labor productivity. Müller *et al.* (1994), in their study, elaborated that most people who reside in households where at least one family member was unemployed saw a decline in their relative income status, while the people who reside in households where all of the members were not employed but are retired saw the greatest improvement in their relative financial status.

Figure 5.2: Conceptual link between income inequality-unemployment and income inequality-governance quality



Source: Researcher's construction

Income Inequality and Governance

Some literature (e.g., Davis, 2016; Roy-Mukherjee & Udeogu, 2020) viewed good governance as a means to reduce income inequality by providing basic services to the needy, promoting inclusive growth, ensuring equitable allocation of public goods and services, improving accountability and transparency, and eliminating corruption and rent-seeking, while other literature (e.g., Nguyen *et al.*, 2021; Ullah *et al.*, 2021) argued that the governance system can raise income inequality. Nguyen *et al.* (2021) suggested that good governance can aggravate income inequality by promoting economic growth and inducing people with larger capital and the ability to start their businesses. Ullah *et al.* (2021) reasoned weak governance behind the increase in income inequality. Some studies suggest that corruption, which is considered a sign of bad or weak governance, can reduce income inequality. In the study of Andres & Ramlogan-Dobson (2011), three reasons are suggested for an inverse relationship between corruption and income inequality. First, the existence of a large informal sector provides jobs to the poorest section of society. Second, corruption may be considered a price worth paying to reduce inequality. The third reason is the possibility of well-organized corruption that smooths the provision of government goods to the poor. Again, poor governance quality can worsen the income inequality situation by creating

political instability and hampering economic growth (Nguyen *et al.,* 2021; Dossou *et al.,* 2023c).

5.3 Literature Review

In the following, a review of previous research has been explained:

Income Inequality and Unemployment

Rice & Lozada (1983) analyzed the impact of unemployment and inflation on income distribution in the regions of the U.S. over the period from 1968 to 1976. The regression results showed that an increase in the unemployment rate tends to worsen the situation of income inequality. Björklund (1991), using the quintile regression method, investigated this relationship in Sweden and found a positive impact of unemployment on income inequality. A study by Cardoso *et al.* (1995) also showed a positive influence of unemployment on income inequality in Brazil in the 1980s. Mocan's (1999) investigation in the U.S. during the period 1948-1994 decomposed unemployment into structural and cyclical unemployment and revealed that income inequality is exacerbated by structural unemployment. Sheng (2011) also analyzed the relationship between unemployment and income inequality in the U.S. during the period from 1941 to 2010. Using wage share (aggregate personal income) as an income inequality measure, the study found a robust tradeoff nexus between the unemployment rate and the wage share. Deyshappriya (2017) analyzed the macroeconomic factors of income inequality in 33 Asian countries from 1990 to 2013. Applying the GMM method, the study found that the unemployment rate leads to an increase in income inequality. An analysis by Siami-Namini & Hudson (2019) in 24 developed countries (DCs) and 66 LDCs during the period from 1990-2014 also found a positive relationship between unemployment and income inequality in both DCs and LDCs. Gimba *et al.* (2021), using the ARDL model for SSA, showed that the unemployment rate in both the short run and the long run has a positive impact on income inequality. Zandi *et al.* (2022), utilizing RE and GMM, also found similar results for 12 Asian developing countries during the period from 2006 to 2020. However, the result of Muryani *et al.* (2021) showed the negative impact of unemployment on income inequality when they investigated Indonesia using the GMM method over the period from 2011 to 2019.

Income Inequality and Governance

Chong & Calderón (2000) conducted a study on the link between institutional quality and income distribution and concluded that institutional quality is positively connected with income inequality in poor countries, but for rich countries, it is negatively connected with income distribution. Adams & Mengistu (2008) used panel data from 1991 to 2002 for 82 developing countries to analyze the effect of privatization on income inequality and economic growth. The study, applying the LSDV method, concluded that good governance has a negative impact on income inequality. Andres & Ramlogan-Dobson (2011) investigated the corruption-income inequality nexus in 19 Latin American countries over the period 1982-2002. The study found an inverse relationship between corruption and income inequality. Dobson & Ramlogan-Dobson (2012) analyzed the corruption-income inequality nexus in Latin America during 2000-2004/5 and showed a trade-off link between corruption and income inequality due to the emergence of the informal sector in the region. Nguyen *et al.* (2021), using PCSE regression results while analyzing the impact of tourism on income inequality in a sample of 97 countries during the period 2002-2014, concluded that in relatively LICs, institutional quality has a positive impact on income inequality, while in HICs it has a negative impact. An investigation by Sarkodie & Adams (2020) in a sample of 46 SSA during 1990-2017 revealed a negative impact of the governance system on income inequality. Nguyen's (2021) study in developed and developing countries over the period from 2005 to 2018 found that in both groups of countries, governance narrows income inequality. Roy-Mukherjee & Udeogu (2020) examined the impact of globalization, institutional quality, labor union density, and economic complexity on income inequality in 39 countries over the period from 1991 to 2017 and the study found a negative impact of institutional quality on income inequality. Dossou *et al.* (2022) investigated the nexus between governance quality and income inequality in 42 SSA countries from 1996 to 2020. The result from GMM revealed a positive impact of governance quality on income inequality. They unveiled the poor quality of governance behind this positive impact. Ofori *et al.* (2022) study showed that governance helps reduce income inequality. Dossou *et al.* (2023b) investigated the moderation effect of governance quality on the tourism and income inequality relationship in 30 Asian countries during the period 1996-2020 and the study found a negative impact of governance quality on income inequality.

5.3.1 Research Gap

Despite the works of literature that have extensively explored the impact of unemployment and governance on income inequality, rare empirical evidence exists on how these factors affect income inequality in India. The literature highlighted the role of different factors affecting income inequality in India; e.g., Ang (2010) found the financial system as a determining factor of income inequality; Sehrawat & Giri (2015) showed economic growth, financial development, inflation, and trade openness as major factors of income inequality in India; Ganaie *et al.* (2018) found that GDP per capita, government expenditure, trade openness, price level, and share of agriculture in GDP are the determinants of income inequality.

Therefore, the purpose of this study is to explore the impact of unemployment and governance quality as determining factors on income inequality in India.

5.4 Data and Methodology

5.4.1 Data Source

This chapter uses time series data on selected variables[11] for India from 1996 to 2021. The selection of the time period is guided by the availability of data. Table 5.1 shows the variables list, proxy, symbol used, description, and data sources in the study.

[11] Due to the small sample size or observation, the investigator has not included other variables like population, urbanization, HDI, inflation, natural resources, etc., which are found to affect income inequality in the literature. For India, two reasons are considered for the selection of the variables. First, there is no study that analyzes the impact of unemployment and governance quality on income inequality in India. Second, the control variables- economic growth, globalization, and liberal democracy are selected because this is the period of new economic policy that the economy of India started to grow at a fast rate and India is considered one of the largest democratic countries.

Table 5.1: Variables list, proxy, symbol used, description, and data sources

Variable	Proxy	Symbol used	Description	Data sources
Income inequality	Top 1% income share[12]	INE	Measures inequality in the distribution of income in an economy (0 indicates perfect equality and 1 indicates perfect inequality).	WID
Unemployment	Unemployment rate (% of total labor force)	UNE	The percentage of the labor force who are unemployed but available for and actively seeking work.	The World Bank
Governance	Governance index	GOV	Six components[13] viz. GE, RL, CC, PV, VA, and RQ (each of the components' score ranges from -2.5 to +2.5).	The World Bank, WGIs
Economic growth	Gross domestic product per capita (GDPPC) dollar ($) constant, 2022	EG	GDPPC expressed in terms of purchasing power parity (PPP).	WID
Globalization	Globalization index	GLOB	Integration of countries in terms of economic, social, and political factors (score ranges from 0 to 100).	KOF Swiss Economic Institute
Liberal democracy	Liberal democracy index	LD	It provides information on free and fair elections, freedom of expression and association, voting rights, equality before the law, safeguarding of civil liberties, and executive constraints. It goes from 0 (lowest) to 1 (highest) democratic level.	Varieties of Democracy (V-Dem), Core v13

Source: Researcher's construction based on secondary sources of data

Note: Governance indicators data (1997, 1999, and 2021) are generated by the method of interpolation using STATA software.

The main variables of this study are income inequality, unemployment, and governance quality. The study includes control variables, viz., economic growth and globalization. In the literature, these variables have a profound impact on income inequality. Economic growth

[12] Due to econometric problem such as unstability of coefficient, Gini coefficient data from WID has not been used in this chapter. Instead, the top 1% income share from the same database has been used as a proxy for income inequality. Berisha *et al.* (2020), Lous & Graafland (2022), and Kang (2022) also used top 1% income share as a proxy of income inequality.

[13] (i) GE- evaluates the capacity of government to implement policies that are effective and preserve its credibility; (ii) RL- probability of crime and violence and the extent to which agents trust and adhere to social norms, especially the quality of the courts, police, and contract enforcement; (iii) CC- the degree to which official power is used for personal benefit; (iv) PV- evaluates how resilient a government is to terrorism and political violence; (v) VA- the extent of the ability of country's citizens to influence political decisions; (vi) RQ- government's ability to develop and implement sound regulations and policies that permit and promote the expansion of the private sector (Kaufmann *et al.* 2006).

has a significant impact on income inequality in the studies of Sehrawat & Giri (2015) and Ullah *et al.* (2021); therefore, this study uses GDPPC as a proxy of economic growth. According to some literature, globalization widens the gap between rich and poor (Roy-Mukherjee & Udeogu, 2020), while some argue that globalization helps to reduce income inequality (Ullah *et al.,* 2021).

The governance quality index is calculated using the method applied by Abbas *et al.* (2021) by taking the averages of all components of governance, adding 2.5 to that average value, and multiplying the resulting value by 2 (the scores lie between 0 to 10; 0 indicates EWG quality and 10 indicates ERG quality). Like Cooray (2009)[14], If governance quality is divided into four parts, i.e., extremely weak (0 - 2.50 score), weak (2.51 - 5.00 score), strong (5.01 - 7.25 score), and extremely robust (7.26 - 10 score), India's governance quality falls under weak governance quality[15] over the period from 1996 to 2021. Blancheton & Chhorn (2021) also classified India in a group of weak governance quality. Overall index is used as a proxy for governance quality because the use of a single indicator may provide misleading and biased results (Kousar *et al.* 2020). Again, as per the World Bank classification method for the year 2021 based on GNI per capita in current US$, India comes under the LMICs (Hamadeh *et al.*, 2021).

5.4.2 Model Specification

To investigate the impact of unemployment and governance quality on income inequality, the model is specified as:

$$INE = f(UNE, GOV, EG, GLOB, LD) \quad (1)$$

Taking log and linearising on both sides of equation (1), the general econometric regression equation in a time-series model can be written as:

$$lnINE_t = \beta_0 + \beta_1 lnUNE_t + \beta_2 lnGOV_t + \beta_3 lnEG_t + \beta_4 lnGLOB_t + \beta_5 lnLD_t + \epsilon_t \quad (2)$$

In equation (2), lnINE is the main dependent variable; lnUNE and lnGOV are the main independent variables; lnEG, lnGLOB, and lnLD are the independent control variables; ln represents log; t represents time period; β_0 is the intercept; $\beta_1, \beta_2, \beta_3, \beta_4, and\ \beta_5$ are the coefficients of $UNE, GOV, EG, GLOB, and\ LD$ respectively; and ϵ_t is the error term.

[14] Cooray (2009) also distinguished governance levels into very low, low, high, and very high governance.

[15] When India's governance quality from the World Bank, WGIs during 1996-2021, is observed, India's governance quality score lies between 4.299 to 4.727.

5.4.3 Estimation Procedure

5.4.3.1 Descriptive Statistics and Bivariate Correlation

Before analyzing the main interpretation of the ARDL results, descriptive statistics and bivariate correlation between dependent and independent variables have been discussed.

5.4.3.2 Unit Root Test

For the unit root test, the Augmented Dickey Fuller (ADF) test developed by Dickey & Fuller (1979) and the Phillips-Perron (PP) test developed by Phillips & Perron (1988) are applied in order to check if the variables contain a unit root.

5.4.3.3 Co-Integration: ARDL Bounds Testing Approach

To investigate the co-integration relationship between the variables used, the ARDL bounds testing approach developed by Pesaran *et al.* (2001) is employed. In contrast to other popular cointegration procedures, this test has the beauty of being used despite whether the variables are I (0) or I (1) and this method can eliminate the problem of endogeneity present in the model. One of the benefits of the ARDL cointegration approach is that it can deal with both dependent and independent variables without worrying about endogeneity problems. It can also incorporate both long-run and short-run dynamics at the same time. The ARDL method produces reliable estimates of the long-run model (Harris & Sollis, 2003). The ARDL error correction form is relatively more efficient. When using the ARDL bounds testing approach, the unrestricted error correction model (UECM) of the ARDL model is estimated as follows:

$$\Delta lnINE = \delta_0 + \delta_1 T + \sigma_1 lnUNE_{t-1} + \sigma_2 lnGOV_{t-1} + \sigma_3 lnEG_{t-1} + \sigma_4 lnGLOB_{t-1} + \sigma_5 lnLD_{t-1} + \sum_{i=1}^{q} \alpha_i \Delta lnINE_{t-i} + \sum_{i=1}^{q} \beta_i \Delta lnUNE_{t-i} + \sum_{i=1}^{q} \gamma_i \Delta lnGOV_{t-i} + \sum_{i=1}^{q} \lambda_i \Delta lnEG_{t-i} + \sum_{i=1}^{q} \rho_i \Delta lnGLOB_{t-i} + \sum_{i=1}^{q} \delta_i \Delta lnLD_{t-i} + \epsilon_t \quad (3)$$

In equation (3), Δ is the first differentiator; T is the time trend, δ_0 is the constant term; σ_is are the long-term parameters; α_i, β_i, γ_i, λ_i, ρ_i and δ_i are the short-term parameters; and ϵ_t is the normality distributed residual term. The H_0 assumes no co-integration among parameters i.e. $\delta_1 = \sigma_1 = \sigma_2 = \sigma_3 = \sigma_4 = \sigma_5 = 0$ and H_a assumes co-integration among the parameters i.e. $\delta_1 \neq \sigma_1 \neq \sigma_2 \neq \sigma_3 \neq \sigma_4 \neq \sigma_5 \neq 0$. Now the condition is that if the calculated F-statistic is below the lower bound critical value, then fail to reject the H_0 i.e., there is no co-integration. However, if the calculated F-statistic is above the upper bound critical value, then reject the

H_0 i.e., there is co-integration. But if the computed F-statistic lies between a lower bound and an upper bound critical value, then the conclusion cannot be drawn (Pesaran *et al.,* 2001).

As soon as co-integration is confirmed, the conditional long-run ARDL for $lnINE_t$ can be computed as:

$$\Delta lnINE_t = \beta_0 + \sum_{i=1}^{p} \delta_1 lnINE_{t-i} + \sum_{i=1}^{q1} \sigma_1 lnUNE_{t-i} + \sum_{i=1}^{q2} \sigma_2 lnGOV_{t-i} + \sum_{i=1}^{q3} \sigma_3 lnEG_{t-i} + \sum_{i=1}^{q4} \sigma_4 lnGLOB_{t-i} + \sum_{i=1}^{q5} \sigma_5 \Delta lnLD_{t-i} + \epsilon_t \quad (4)$$

Now, to obtain the lag length ($p, q_1, q_2, q_3, q_4, q_5$) of ARDL based on Akaike Information Criterion (AIC), Hannan-Quinn Information Criterion (HQIC), and Schwartz Bayesian Information Criterion (SBIC), the vector autoregressive (VAR) model was employed. Next, to estimate short-run dynamic parameters by computing an error correction model (ECM) with the long-run estimates, the equation is as follows:

$$lnINE_t = \rho + \sum_{i=1}^{p} \alpha_i \Delta lnINE_{t-i} + \sum_{i=1}^{q1} \beta_i \Delta lnUNE_{t-i} + \sum_{i=1}^{q2} \gamma_i \Delta lnGOV_{t-i} + \sum_{i=1}^{q3} \lambda_i \Delta lnEG_{t-i} + \sum_{i=1}^{q4} \rho_i \Delta lnGLOB_{t-i} + \sum_{i=1}^{q5} \delta_i \Delta lnLD_{t-i} + \phi ECM_{t-1} + \epsilon_t \quad (5)$$

In equation (5), ECM_{t-1} represents how speedily long-run equilibrium is adjusted following a short-run shock and ϕ is the coefficient of ECM whose value lies between 0 and -1.

5.5 Empirical Results and Discussion

5.5.1 Descriptive Statistics and Bivariate Correlation

Descriptive statistics and bivariate correlation between dependent and independent variables are presented in Table 5.2.

Table 5.2 reports that income inequality has an average value of 0.195 with a standard deviation of 0.029. The average unemployment rate is 8.044, with a standard deviation of 0.66. Governance scores average at 4.538, with a variation of 0.134. Economic growth shows a large mean value of 8389.83 with a very high standard deviation of 2797.033. Globalization is averaged at 55.845, with a considerable standard deviation of 7.716. Liberal democracy has a mean value of 0.515 and a standard deviation of 0.097. The correlation results report that income inequality is positively correlated with unemployment, economic growth, and globalization, while negatively correlated with governance quality and liberal democracy.

Table 5.2: Descriptive statistics and bivariate correlation

Variable	Mean	Std. Dev.	Min	Max	Correlation coefficient
INE	0.195	0.029	0.136	0.22	1.000
UNE	8.044	0.66	6.51	10.195	0.313
GOV	4.538	0.134	4.299	4.727	-0.034
EG	8389.83	2797.033	4769.963	12966.744	0.837
GLOB	55.845	7.176	41.313	62.652	0.996
LD	0.515	0.097	0.31	0.598	-0.619

Source: Researcher's calculation

5.5.2 Unit Root Tests

Table 5.3: Unit root test results

Variables	ADF test		PP test	
	At level	1st difference	At level	1st difference
lnINE	-6.166***	-	-4.428***	-
lnUNE	-4.970***	-	-4.968***	-
lnGOV	-1.275	-3.041**	-1.753	-3.096**
lnEG	-0.756	-3.797***	-0.722	-3.797***
lnGLOB	-5.410***	-	-4.190***	-
lnLD	1.136	-3.597***	1.062	-3.626***

Source: Researcher's calculation

Note: *, **, and *** indicate levels of significance at 10%, 5% and 1%, respectively.

The ADF and PP unit root test results presented in Table 5.3 show that lnINE, lnUNE, and lnGLOB are stationary at level, while lnGOV, lnEG, and lnLD are stationary at the first difference. So, the series are integrated of orders I(0) and I(1).

5.5.3 Optimum Lag Selection

Table 5.4 shows the lag length selection criteria of AIC, HQIC, and SBIC. According to the results from AIC, HQIC, and SBIC, lag 2 is considered appropriate for analysis. The selected appropriate ARDL lag model for the present study is (1, 2, 0, 1, 2, 2).

Table 5.4: Results of optimum lag selection

Lag	AIC	HQIC	SBIC
0	-23.4215	-23.347	-23.1253
1	-29.2686	-28.7471	-27.1951
2	-31.3102*	-30.3417*	-27.4594*

Source: Researcher's calculation

5.5.4 Cointegration Test

The cointegration test displayed in Table 5.5 reported that the F-statistics (10.034) is greater than the upper bound critical value at the 1% level of significance (4.68). This implies that the H_0 of no cointegration is rejected at the 1% significance level, and therefore, this result confirms the existence of a long-run relationship between the variables.

Table 5.5: Results of cointegration test

Test statistics	Value	K
F-statistic	10.034	5
Significance	I(0) lower bound	I(1) upper bound
10%	2.26	3.35
5%	2.62	3.79
1%	3.41	4.68

Source: Researcher's calculation

Note: k represents number of regressors in the model

5.5.5 Long-Run ARDL Estimation

The estimated results of the long-run ARDL model are presented in Table 5.6.

Table 5.6: Long-run ARDL results

Variables	Coefficients
lnUNE	0.501***
	(5.27)
lnGOV	0.302***
	(3.39)
lnEG	-0.474**
	(-2.37)
lnGLOB	0.953***
	(22.73)
lnLD	-0.228**
	(-2.73)
R square=0.97	

Source: Researcher's calculation

Note: *, **, and *** indicate levels of significance at 10%, 5% and 1%, respectively; t-statistics in parentheses

Impact of Unemployment: the coefficient of unemployment is positive and highly significant (reject H_0 of our study). The result is consistent with earlier findings by Shahpari & Davoudi (2014), Monnin (2014), Deyshappriya (2017), Mocan (1999), Prawoto & Cahyani

(2020), Taresh *et al.* (2021), Sheng (2011), Rice & Lozada (1983), Siami-Namini & Hudson (2019), Gimba *et al.* (2021), and Zandi *et al.* (2022). This result indicates that income inequality worsens as more people lose their jobs because the income of these people tends to decline. Due to the rise in unemployment, the income share of the highest earners increases and the income share of the lowest earners reduces (Mocan, 1999). So, unemployed individuals experience a decline in their income level unless they receive adequate social protection benefits (Martínez *et al.*, 2001; Deyshappriya, 2017).

Impact of Governance Quality: The coefficient of governance quality is significantly positive (reject H_0 of our study). This result is consistent with that of Chaudhuri & Ravallion (2006), Dossou *et al.* (2022), Perera & Lee (2013), and Dossou *et al.* (2023c). Several reasons can be attributed. First, weak governance quality of India could be the possible reason for this positive impact. Second, developing nations are considered to be at the initial phase of institutional reform (Perera & Lee, 2013). At the initial phase of institutional development, a country having experienced increased public expenditure tends to have higher income inequality (Blancheton & Chhorn, 2021). Perhaps India is still at the initial stage of institutional reform, that an improvement in institutional or governance quality in the form of institutional reforms, which may involve significant reductions in corruption and red tape, improved tax collection, and more effective training for bureaucrats, imposes higher initial transaction costs on the poorest section of the economy working in the informal or unorganized sector, increasing income inequality (Chong & Calderón, 2000).

Impact of Economic Growth: The coefficient of economic growth is significant and negative (reject H_0), indicating that an increase in economic growth reduces income inequality. This result is consistent with that of Ullah *et al.* (2021), and Wolde *et al.* (2022). Perhaps the growth of the Indian economy is pro-poor, which enables the pro-poor government to increase its expenditure on social sectors, including education, health, infrastructure, and welfare services, through increased tax revenue accrued from high growth rates and helps to increase the income share of the poor (Agrawal, 2015). Economic growth can lead to a larger economic pie when income distributed equitably enhances the living standards of both rich and poor, despite a potential decrease in the income share of the rich (Gyimah-Brempong, 2002).

Impact of Globalization: Globalization is positively associated with income inequality (reject H_0), which expresses that globalization directly influences the increase in income

inequality. This result is consistent with the studies of Munir & Sultan (2017), Dreher & Gaston (2008), Roy-Mukherjee & Udeogu (2020), Sethi *et al.* (2021), Padhan *et al.* (2022), and Park (2017). It may be possible that globalization tends to benefit skilled-labor, who typically belongs to the rich and middle-class background, relative to unskilled-labor who comes from a poor background, thus increasing wages for skilled-labor and widening the income gap between skilled and unskilled labor (Mallick *et al.* 2020).

Impact of Liberal Democracy: The coefficient of liberal democracy is negative and significant (reject H_0). This indicates that liberal democracy helps in the reduction of income inequality in the country. This study is consistent with the studies of Reuveny & Li (2003), Trinugroho *et al.* (2023), and Gossel (2024). A reduction in income inequality is often associated with democracy through progressive taxation and redistributive policy (Reuveny & Li, 2003). In a democracy, the majority of voters whose income is below the decisive voters' income select candidates who support greater taxes and equal distribution of goods (Meltzer & Richard, 1981). It is likely that a democratic region is more responsive to the marginalized people, providing them educational opportunities, which then helps them to earn income (Trinugroho *et al.*, 2023). It also allows the citizens of the country to vote for those political parties that support redistributive platforms (Balcázar, 2015).

5.5.6 Short-Run ARDL Estimation

Table 5.7 presents the short-run ARDL results. The short-run result shows that unemployment exerts a significantly positive impact on income inequality. Governance quality has a significantly positive impact on income inequality. Economic growth is negatively related to income inequality and is found to be statistically significant. The coefficient of globalization is positive and significant, which implies that an increase in globalization leads to an increase in income inequality. Liberal democracy has a significant and negative impact on income inequality. The coefficient of ECM is negative and highly significant at the 1% level. This result establishes that there is a stable long-run relationship between the variables, as suggested by Banerjee *et al.* (1998) and this implies that to achieve long-run equilibrium, short-run disequilibrium should be corrected with a 100.7% speed of adjustment in each period. But in some cases, the values lie between -1 to -2. Under such conditions, it indicates that the process of error correction fluctuates in a damping manner around the long-run value rather than directly monotonically converging to the equilibrium

path (Narayan & Smyth, 2006). However, after the completion of this process, the conversion process to the equilibrium path is rapid (Narayan & Smyth, 2006).

Table 5.7: Short-run ARDL results

Variables	Coefficients
ΔlnUNE	0.390*** (5.76)
ΔlnGOV	0.304** (3.19)
ΔlnEG	-0.178* (-2.09)
ΔlnGLOB	0.418* (2.04)
ΔlnLD	-0.107* (-2.26)
ECM (-1)	-1.007*** (-4.80)
Constant	-6.532*** (-4.85)

Source: Researcher's calculation

Note: *, **, and *** indicate levels of significance at 10%, 5%, and 1%, respectively; t-statistics are in parentheses.

Box 5.1: Regression results of India in equation form

Long-run ARDL

INE = 0.501*** UNE + 0.302*** GOV - 0.474** EG + 0.953*** GLOB - 0.228** LD

R squared: 0.97

Short-run ARDL

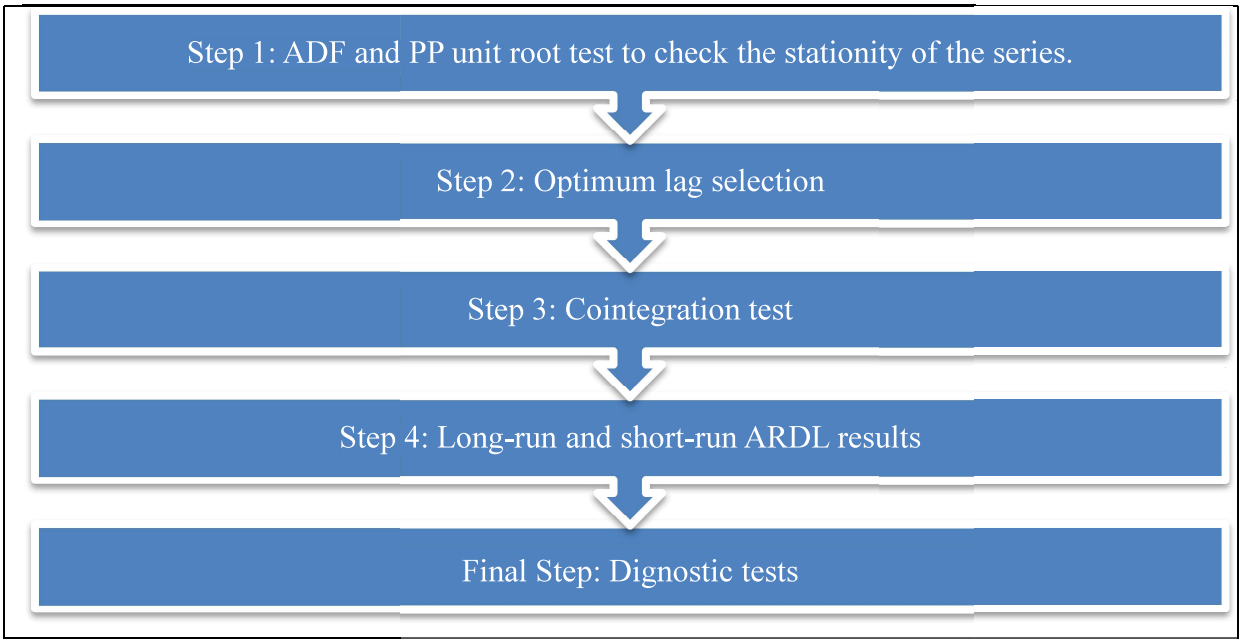
INE = 0.390*** UNE + 0.304** GOV - 0.178* EG + 0.418* GLOB - 0.107* LD

ECM= - 1.007***

Source: Researcher's calculation

Note: *, **, and *** indicate levels of significance at 10%, 5%, and 1%, respectively.

Figure 5.3: Steps to analyze the ARDL regression results



Source: Researcher's construction

5.5.7 Diagnostic Tests

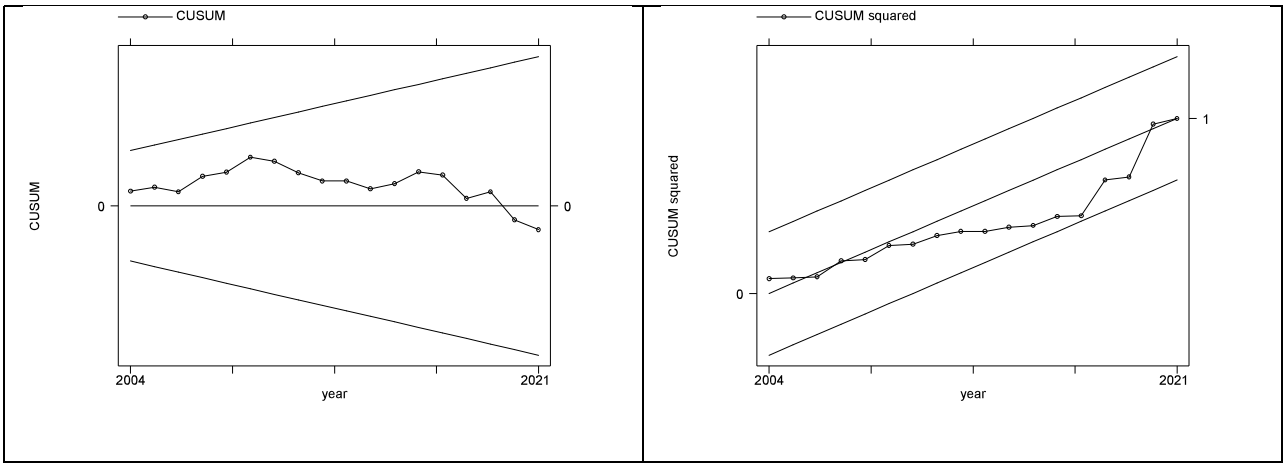
To confirm the results from ARDL are more reliable and robust, this study also carried out a variety of diagnostic tests as shown in Table 5.8 and checked the stability of the regression coefficient using the cumulative sum (CUSUM) and the cumulative sum of squares (CUSUMSQ) developed by Brown *et al.* (1975) as shown in Figure 5.4. The Durbin-Watson d-statistic, Durbin's alternative, and the Breusch-Godfrey LM tests for autocorrelation show that the series are free from autocorrelation. The White's test also indicates that the series have homoskedasticity. The CUSUM and CUSUMSQ stability tests, as shown in Figure 5.4, confirm the stability of the regression coefficients at the 5% level of significance critical boundaries.

Table 5.8: Diagnostic test results

Durbin-Watson d-statistic	1.944
Durbin's alternative test for autocorrelation H_0: no serial correlation	Chi^2= 0.007 p-value = 0.931
Breusch-Godfrey LM test for autocorrelation (H_0: no serial correlation)	Chi^2= 3.124 p-value = 0.210
White's test (H_0: homoskedasticity)	Chi^2= 32.78 p-value= 0.169
CUSUM stability test	Stable
CUSUMSQ stability test	Stable

Source: Researcher's calculation

Figure 5.4: CUSUM and CUSUM squared test results



5.6 Conclusion

This chapter investigates the impact of unemployment and governance quality on income inequality in India over the time span of 1996-2021. The study employs an ARDL bound testing approach and confirms the existence of a long-run relationship among the variables. The empirical results reveal that in the long run, unemployment and governance quality have a significantly positive impact on income inequality. The control variables- economic growth and liberal democracy have a negative impact, while globalization has a positive impact on income inequality in the long run. The short-run result also shows that unemployment and governance quality exert a positive and significant impact on income inequality. Economic growth and liberal democracy are negatively related to income inequality, while globalization is positively related to it in the short run.

The H_0 of unemployment and governance quality is rejected. For control variables, economic growth, globalization, and liberal democracy, the H_0 is also rejected.