Method Article

Literature review on income inequality and economic growth

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**Abstract**

This paper provides a comprehensive literature review of the relationship between income inequality and economic growth. In the theoretical literature, we identified various models in which income inequality is linked to economic growth. They include (i) The level of economic development, (ii) The level of technological development, (iii) Social-political unrest, (iv) The savings rate, (v) The imperfection of credit markets, (vi) The political economy, (vii) Institutions and (viii) The fertility rate. Based on the transmission mechanisms of these models, we found that the relationship between income inequality and growth can be negative, positive or inconclusive. The first three models demonstrate that the relationship is inconclusive, the fourth shows that it is positive, while the remainder indicate that the relationship should be negative. In the face of theoretical ambiguity, we also noted that the empirical findings on the relationship between income inequality and growth are highly debatable. These findings can be broadly classified into four categories, namely negative, positive, inconclusive and no relationship. Based on these findings, we provide a critical survey on methodology issues employed in the prior studies and propose a better methodology to researchers for future studies.

- Theoretical and empirical literature is reviewed and synthesis is done to understand the income inequality-growth nexus

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**Overview**

Across countries, the unequal distribution of income and resources among the population is the defining challenge of our time. In both developed and developing economies, the income inequality gap (as measured by the decile ratios and the Gini coefficient based on the Lorenz curve) between rich and poor is at high levels, and continues to rise [24]. When income inequality becomes extremely high, it fuels social dissatisfaction and raises the threat of social and political unrest [13]. In similar vein, Alesina and Perotti [8]:1 argue that high income inequality, “by increasing the probability of coups, revolutions, mass violence or, more generally, by increasing policy uncertainty and threatening property rights, has a negative effect on investment and, as a consequence, reduces growth”.

Given the already high level of income inequality and rising trends in many countries, along with the potentially negative consequences for economies, we found that a significant body of literature examines the causes of income inequality and its consequences for economic development. Among them were theoretical analyses of the inequality–growth nexus, which identified various transmission mechanisms linking income inequality to economic growth. These include (i) The level of economic development, (ii) The level of technological development, (iii) Social–political unrest, (iv) The savings rate, (v) The imperfection of credit markets, (vi) The political economy, (vii) Institutions and (viii) The fertility rate. Based on these models, we found that the relationship between income inequality and growth can be negative, positive or inconclusive. Theories on the level of economic development (see [7,31,38,54]) and technological development (see [6,29,33]) demonstrate that the relationship between inequality and growth changes from positive to negative as the level of development increases. Inconclusive results are also echoed by the social–political unrest model, which argues that the socio-political unrest stemming from high income inequality can either inhibit or benefit growth (see [13,14,56,62]). In addition, theories on the political economy (see [9,11,13,46,48,50]), the imperfection of credit markets (see [5,12,30,51]; Panniza, [46]), institutions (see [22,34,61]) and the fertility rate (see [26]) demonstrate that income inequality is negatively related to growth. The only theory which supports the positive relationship between income inequality and growth is the theory on the savings rate (see [3,17,42,53]).

Given such theoretical ambiguity, it is little wonder that the empirical findings on the relationship between income inequality and growth are strongly debated. Early empirical studies by Alesina and Rodrik [9], Persson and Tabellini [50] and Perotti [49] reported that inequality exerted a negative impact on growth. That negative relationship has been confirmed by numerous subsequent studies (see, for example, Panniza, [18,19,46,55,64]). Evidence of a negative relationship has, however, been challenged by studies which reported positive results on the inequality–growth nexus (see, for example, [28,39,57,58]). In addition, several studies have yielded inconclusive findings, with most reporting that the relationship is positive in high-income and negative in low-income countries (see, for example, [13,20,25,27]). A few studies found no relationship between inequality and growth (see [15,44]).

Given the above background, the aim here is to provide a comprehensive literature review of the relationship between income inequality and economic growth, both in theory and empirically. While Section 2 critically analyses the theoretical framework of the income inequality–growth nexus, Section 3 reviews empirical studies on this relationship. Section 4 provides a critical survey on...
methodology issues employed in the prior studies and proposes a better methodology that can help reconcile the literature. Section 5 concludes the study.

**Income inequality and economic growth: Theoretical framework**

A theoretical analysis of the inequality–growth nexus has identified various transmission mechanisms in which income inequality is linked to economic growth. These mechanisms are discussed in detail in this section.

The level of economic development

Early researchers explored the link between income inequality and growth through the lens of the developmental stage of the economy. Kuznets [38] documented that the relationship between the two variables relies on the level of economic development of a country, meaning there is a differential relationship between income inequality and growth, with a positive relationship during the early stage of economic development and a negative relationship during the mature stage. This may be attributed to shifts of labor, from one sector to other, developed sectors. For example, when labor moves from the agricultural sector to other sectors of the economy, the per capita income of those individuals increases, as their skills are in demand in those sectors. Individuals who remain in the agricultural sector keep earning a low income, thus income inequality increases during this stage. As the economy develops, with labor continuing to move from agriculture to other sectors, individuals who remain in the agricultural sector will earn higher incomes due to the low supply of labour in that sector. Income inequality thus declines during this stage. Kuznets [38] describes the relationship as an inverted U-hypothesis, which advocates that inequality tends to increase during early stages of economic development and decrease during later stages. This argument is supported by Ahluwalia [7], Robinson [54] and Gupta and Singh [31].

The level of technological development

In addition to sectoral change, Galor and Tsiddon [29], Helpman [33] and Aghion et al. [6] explored the link by connecting income inequality to the developmental stage of technology. During the early stages of technological development, innovative ideas in the economic sector result in increases in income inequality. This is due to the fact that new technology requires highly skilled labor and training, which raises wages in these sectors compared to those sectors which use old technology. As a result, employees in the new sector earn high per-capita incomes, while those working in the sector with old machines continue earning lower incomes. Therefore, income inequality increases during the early stages of technological improvements. However, as the economy moves to the more mature stage of technological development, income inequality decreases, the reason being that as more labour shifts to the sector using new technology, the incomes of those who remained in the sector with old technology also increase due to the low supply in labor in that sector. Therefore, the wage differential gap between them declines, leading to a decrease in income inequality.

The role of technology was probed further by researchers who focused on the Fourth Industrial Revolution (4IR). By implementing modern technologies, 4IR will lead to the continuing automation of traditional manufacturing and industrial processes. As Krueger [37] documented, improvements in technology widen the income inequality gap in the labor market between skilled and lowly skilled labour, because the income of highly skilled labor increases (as those individuals are in demand), while lowly skilled laborers continue earning low incomes. In similar vein, 4IR is skills-biased, which leads to a widening of the income inequality gap [1]. Based on this argument, technological improvements can be harmful to growth, due to concerns about growing inequality and unemployment.

**Social-political unrest**

Some studies argue that the rise of socio-political unrest, stemming from high income inequality, may dampen growth (see [13,14,62]). In countries with extreme wealth and income inequality,
there are high levels of social unrest that cause people to engage in strikes, criminality and other unproductive activities. This often results in wastage of government resources and disruptions that threaten the political stability of the country. It causes uncertainty in government and slows down productivity in the economy, while discouraging investment.

By contrast, high income inequality due to the rise of socio-political unrest can promote growth. To reduce the number of strikes, criminal activity, uncertainty and political unrest, politicians and leaders favor redistribution – from the rich to the poor – in the form of a transfer of payments. In turn, this creates a safety net for the population and government to restore society’s trust in government. As a result, levels of uncertainty decline and investment increases, prompting an increase in the growth rate in the long run \[13,14,62\]. Similarly, Saint-Paul and Verdier \[56\] demonstrate that, in the presence of high income inequality, the median voter favors a transfer of payments by means of public expenditure, such as financing education. This, in turn, increases human capital for the poor to access education, thereby promoting growth.

The political economy

Political economy models demonstrate that high income inequality may hinder growth (see \[9,13,48\]). The law and government play crucial roles in the economy, with government in charge of the redistribution of income and resources among the population. These models reveal that when the mean income is greater than that of the median voter, people support the redistribution of income and resources (from the rich to the poor). Redistribution takes place through a transfer of payments and public expenditure, such as the establishment of health facilities and the building of schools, among others. This kind of redistribution reduces growth in the long run, however, by discouraging innovation and investment, and causing low productivity \[9,13,48\]. In addition, when there is high income inequality, the population demands equal distribution. That sometimes results in riots and other unproductive activities which retard economic growth. Furthermore, factors such as lobbying and rent-seeking, which often occur during the political process, also discourage growth. This happens when those in the upper decile of income distribution prevent the redistribution of income and resources to the poor, resulting in a wastage of government funds and corruption, both of which hamper economic growth in the long run \[11,46,48,50\].

The imperfection of credit markets

The imperfect credit markets model demonstrates that income inequality is negatively associated with growth through credit markets (see \[4,12,30,51\]; Panniza, \[46\]). In an imperfect credit market, a high degree of income inequality limits the poor from accessing credit. Asymmetric information – where the lender and borrower have limited information about each other – inhibits the ability to make well-informed decisions. This limits the ability to borrow and returns on investment. In addition, imperfect laws make it difficult for creditors to collect defaulted loans, because the law might protect the assets of the borrower from being repossessed as collateral. Such laws constrain the collection of debt, leading to the hard terms and conditions faced by potential creditors. This prohibits access to credit for some individuals, in particular the poor. Given that investment depends on how much income and how many assets an individual has, the poor (who only have income for basic necessities) are unable to afford investment opportunities with high returns (for instance, to invest in human capital or property, among others). For this reason, extremely high income inequality reduces investment opportunities, leading to declining growth in the long run.

Savings

Existing studies report that income inequality exerts a positive impact on economic growth through savings rates (see \[3,13,17\]). According to these studies, savings are a function of income. As income earned increases, so the savings rate rises, and vice versa. In the presence of high income inequality, rich people earn high incomes which help them to save more, because their marginal propensity to save is relatively high. This increases the aggregate savings, leading to a rise in capital
accumulation, thereby enhancing economic growth in the long run (see [3,17,42,53,66]). Following on this argument, Shin [59] demonstrates that the redistribution of income and resources from rich to poor is harmful to growth. Such action reduces the income, wealth and other resources of the rich, leading to a decline in the marginal propensity to save. As a result, aggregate savings and investments decline.

**Institutions**

Several studies illustrate that income inequality inhibits growth through institutions (see [22,34,61]). Institutions play a vital role in the wellbeing of a country, because they are the key drivers of economic growth and development in the long run [2,60,65]. The quality of institutions is important for distribution and growth outcomes. High income inequality creates fertile ground for bad institutions, and exacerbates inequality and inefficiency, which leads to low growth rates in the long run. In the case of high income inequality, political decisions tend to be biased towards enriching the already rich minority, at the expense of the poor. This results in poor policies, leading to a high level of inefficiency, wastage of state resources, social dissatisfaction and political instability. It further perpetuates inequality and inhibits growth in the long run [34,61]. Based on this argument, bad institutions tend to associate with extreme records of inequality, inefficiency and sluggish growth. By contrast, good institutions tend to associate with low inequality, productivity and economic growth.

**The fertility rate**

Income inequality has been found to negatively affect growth through differences in fertility (see [26]). This study documented that a widening income inequality gap raises differences in fertility between the rich and the poor in a population. The low-income group usually have many children, and tend to invest less in their children’s education due to a lack of financial resources. By contrast, those in the high-income group usually have fewer children and invest more in their education. Therefore, in the case of extreme income inequality, the high fertility differential has a negative impact on human capital, leading to a decline in economic growth.

**Income inequality and economic growth: Empirical evidence**

Given such theoretical ambiguity, the empirical findings on the relationship between income inequality and growth are also highly debatable. These findings can broadly be classified into four categories, namely negative, positive, inconclusive and no relationship.

**Studies with negative results on the relationship between income inequality and economic growth**

The earliest empirical studies examining the inequality–growth nexus were conducted in the 1990s, and employed the ordinary least squares (OLS) and two-stage least squares (2SLS) estimation techniques (see [9,49,50]). Alesina and Rodrik [9] examined the relationship between distributive politics and economic growth in 46 countries, for the period 1960–1985. They found that higher income inequality was accompanied by low growth. Similarly, Persson and Tabellini [50] examined the impact of inequality on growth in 56 countries, for the period 1960–1985, and found that inequality exerted a negative impact on growth. Using similar estimating techniques, Perotti [49] analysed the relationship between income distribution, democratic institutions and growth in 67 countries, and found that countries with a low level of inequality tended to have high investments in human capital, which then led to economic growth.

Studies in the 2000s developed different estimation techniques to solve the problem at hand. For example, Panizza [46] employed the standard fixed effect (FE) and generalised method of moments (GMM) to reassess the relationship between income inequality and economic growth in the United States for the period 1940–1980. The results of that study documented that income inequality negatively affected economic growth. Another single-country study was conducted on China, where Wan et al. [64] investigated the short- and long-run relationship between inequality
and economic growth during the period 1987–2001. By using three-stage least squares, they found that the relationship was nonlinear and negative for China. Recently, lyke and Ho [35] studied income inequality and growth in Italy, from 1967–2012, using the autoregressive distributed lag (ARDL) estimation technique. Their study found that income inequality affected growth both in the short and long run. That is, income inequality slowed down growth in the country.

In multiple-country studies, Knowles [36] re-examined the relationship between inequality and growth in 40 countries using comparable data and OLS from 1960–1990. That investigation found a negative relationship between inequality and economic growth for the full sample. When the countries were divided according to the income level, he found a significant negative relationship in the low-income countries but an insignificant relationship in high- and middle-income countries. Malinen [41] investigated a sample comprising 60 countries (developed and developing economies) using the Gini index as a measure of income inequality. Panel cointegration methods were used, employing panel dynamic OLS and panel dynamic seemingly unrelated regression (SUR) to analyze the steady state correlation between income inequality and economic development. During the period under study, the findings revealed a negative steady-state correlation between income distribution and economic development. In addition, in developed countries, income inequality was associated with low economic growth in the long run. Another study focused on developed countries: Cingano [23], for instance, examined the impact of income inequality and economic growth in OECD (Organisation for Economic Co-operation and Development) countries between 1980 and 2012. Employed GMM, the researcher found that in those countries income inequality negatively affected economic growth. Furthermore, the study confirmed human capital as the transmission channel through which income inequality affects growth. Research by Braun et al. [18], tested the main prediction of their model with respect to the impact of income inequality on growth at different levels of financial development. By using pooled OLS, dynamic panel and instrumental variables (IV) estimations on 150 countries during the period between 1978 and 2012, they found that greater income inequality is associated with lower economic growth. In addition, they also found that such an effect is significantly attenuated when the level of financial development increases in economies. Another study by Royuela et al. [55] tested the income inequality-growth nexus for over 200 comparable regions in 15 OECD countries during 2003–2013. By using the similar estimation techniques of Bruan et al. [18], they showed a general negative association between inequality and growth in OECD regions. Recently, Breunig and Majeed [19] re-investigated the impact of inequality and economic growth in 152 countries. The study used GMM for the period 1956 to 2011 and found that inequality had a negative effect on growth. They further found that when both poverty and inequality were considered, the negative impact of inequality on growth was concentrated on countries with high rates of poverty.

Studies with positive results on the relationship between income inequality and economic growth

A study which found a positive relationship is that of Partridge [47], who investigated whether inequality benefited or hindered growth in the United States between 1960 and 1990. That study, which employed OLS, yielded the following results: first, during the period of the study, a positive relationship was found between inequality and economic growth. That is, American states with high inequality grew faster. Second, the study reported that the wellbeing of the median voter had a positive impact on growth. This implies that the unequal distribution of income and resources among the population encouraged economic activity and, in turn, grew the economy. In another single-country study, Rangel et al. [52] focused on growth and income inequality by investigating the linear correlation and inverted-U shape hypothesis in Brazil, from 1991–2000. They found that, in the long run, income inequality and growth tended to move together. The results also confirmed the existence of the inverted-U hypothesis between income inequality and economic growth.

Bhorat and Van der Westhuizen [16] investigated the relationship between economic growth, poverty and inequality in South Africa, for the period 1995–2005. The study employed a distribution-neutral measure, poverty inequality elasticity estimates, and the marginal proportional rate of substitution. During the period under study, the researchers found a shift in the distribution of income and resources during periods of growth, and hence income inequality tended to increase with increases in economic growth. Later, Shahbaz [58] and Majeed [40] both employed the ARDL technique
to study the income inequality–growth nexus in Pakistan, with the first investigation spanning the years 1971–2005, and the second, 1975–2013. Both studies identified a positive correlation between income inequality and economic growth in Pakistan during the period under investigation. Majeed [40] further argued that because the poor population did not participate in the growth process, growth became unsustainable.

Studies on multiple countries also reported positive results. For example, Li and Zou [39] re-examined the relation between inequality and growth from 1947–1994 for a group of developed and developing countries. Using FE and RE methods and expanded data, they found that high income inequality resulted in an increase in economic growth. Later, Forbes [28] also re-assessed the inequality–growth relationship in 45 countries, from 1966–1995. With the use of FE and RE, Chamberlain’s $N$ matrix procedure and Arellano and Bond’s GMM, the findings showed that as income increased in the short to medium term, economic growth tended to increase. A recent study by Scholl and Klasen [57] revisited the inequality–growth relationship, paying special attention to the role of transition (post-Soviet) countries. The study was based on the specification used by Forbes [28] on a sample of 122 countries over the period of 1961–2012. By using FE, GMM and IV estimation techniques, they found a positive association between inequality and growth in the overall sample which was driven by transition countries.

**Studies with inconclusive results on the relationship between income inequality and economic growth**

A number of studies yielded inconclusive findings on the inequality–growth nexus. In particular, most reported that the relationship was positive in high-income countries and negative in the low-income countries. For example, Deininger and Squire [25] employed cross-country samples from 1960–1992 to analyse the influence of inequality (income and distribution of assets) on economic growth, and also studied the effect it exerts on reducing poverty. Using OLS and panel data, that study found that income inequality had a negative effect on future growth. In addition, Deininger and Squire [25] reported that high income inequality reduced the income of the poor and boosted the income of the rich. Barro [13] used 2SLS to study the inequality–growth relationship in a panel of countries for the period 1965–1995. The results showed that, in rich countries, inequality positively affected economic growth, while in poor countries it negatively affected growth during the period under study. This means that, for rich countries, as inequality increased, the economy (as measured by Gross Domestic Product [GDP] per capita) tended to increase as well, while in poor countries, the economy tended to decline as inequality increased.

Studies using GMM methods reached similar results. For example, Voitchovsky [63] analysed the link between income distribution and economic growth in 21 developing countries, from 1975–2000. The findings showed that income inequality had a positive effect on growth at the upper decile of income distribution, while inequality negatively affected growth at the lower decile. Similarly, Castelló-Climent [21] confirmed that the relationship between income and growth was positive in high-income countries and negative in low- and middle-income countries. That study examined the correlation between income and human capital and economic growth across countries during the period 1992–2000. The results further indicated that both income and human capital inequality constrained economic growth for low- and middle-income countries. However, in high-income countries, income and human capital inequality encouraged economic growth during the period under study. In yet another investigation, Fawaz et al. [27] studied the income inequality–growth nexus, focusing on its link to credit constraints in high- and low-income developing countries from 1960–2010. The study found similar results, namely that in low-income developing countries, income inequality is negatively related to economic growth. For high-income developing countries, income inequality was positively related to economic growth.

Halter et al. [32] reported that this relationship changed over time, having studied the relationship across countries from 1965–2005, using GMM. The findings showed that, in the short run, high inequality encouraged economic growth, but over the long run, high inequality slowed down the economy and impeded growth. Likewise, Ostry et al. [45] investigated the link between redistribution, inequality and growth in various countries, and found that net inequality was positively correlated to economic performance during the early stage of economic development, but turned negative
during the mature stage. Research by Brueckner and Lederman [20] studied the relationship between inequality and GDP per capita growth. Using panel data from 1970 to 2010, the findings documented that in low income countries transitional growth was positively affected by higher income inequality while such effect turned negative in high income countries.

**Studies with evidence of no relationship between income inequality and economic growth**

Some studies reported no relationship between income inequality and economic growth. For example, research by Niyimbanira [44] focused on how economic growth affected income inequality from 1996–2014. That study employed the FE method and the pooled regression model, using data from 18 municipalities across the provinces of South Africa. The findings confirmed that economic growth reduced poverty, but had no effect on income inequality, which implies that there was no relationship between income inequality and economic growth. Benos and Karagiannis [15] examined the relationship between top income inequality and growth under the influence of physical and human capital accumulation in the U.S. By using 2SLS and GMM on the annual panel of U.S. state-level data during 1929 to 2013, they concluded that changes in inequality do not have an impact on growth. Table 1 shows the summary of empirical studies discussed in this section.

**Methodology**

As we have discussed in the previous section, the empirical findings on income inequality and growth are highly inconclusive. In this section, by providing a critical survey on methodology issues employed in the prior studies, we offer possible explanations on the disparity found in the empirical findings, particularly on multiple-countries studies. The early multiple-countries studies [9,49,50] in general reached a consensus on the negative impact of inequality on growth. Although they used different measures of inequality and samples, they all employed the Ordinary Least Squares (OLS) and Two-Stage Least Squares (2SLS) estimation techniques on cross-section data to estimate the coefficient on the inequality variable.

By the late 1990s, however, the general consensus on the negative relationship between income inequality and growth was challenged by concerns over data quality and the methodological procedures used (see Neves and [Silva, 43]). With regard to the data quality, some studies argued that the dataset used in the previous studies, which lacked comparability due to the use of different income definitions (gross income versus expenditures) can lead to different results (see [10,36]). According to Knowles [36], European countries, the U.S. and most of the Latin American countries use gross income data whereas most of the African and Asian countries use expenditure data. Since expenditure is more equally distributed than gross income, such difference in income distribution may lead to a difference in the final results.

Concerning the methodological procedures, there has been a shift on the usage of panel data instead of cross-sectional data in the later studies. Forbes [28] argues that the use of panel data is desirable as it can specifically estimate how a change in a country’s level of inequality within a given country will affect growth in that country. In addition, panel data can remove bias from the correlation between time-variant, observable country characteristics and the explanatory variables by controlling for differences in these characteristics. Due to these considerations, many studies started to use panel data (see [13,28,39]; among others). However, the use of panel data in the studies may lead to more diverse results. One of the possible explanations is the diversity of estimators employed in the panel studies. While most of the cross-section studies use OLS, panel studies use a wide variety of estimators such as fixed effects, random effects, GMM, etc. Given that these estimators have different underlying assumptions, they are likely to produce different results among the panel studies [43]. Another possible explanation is that, unlike the cross-section data, panel data controls for time-variant, observable country characteristics. Given that the impact of inequality on growth tends to differ across countries and regions, the inter-continental variation contribute a substantial part of the effect. Therefore, the usage of panel data analysis may lead to different results when different samples are used in the studies. With the wider usage of various panel data estimation techniques in the later studies, it is not surprising that we found more diverse results in the inequality-growth literature.
Table 1
Summary of empirical studies on the association between income inequality and economic growth

| Author(s)            | Region/country                  | Measures of income inequality | Method(s) used | Results* |
|----------------------|---------------------------------|------------------------------|----------------|----------|
| **Negative findings**|                                 |                              |                |          |
| Alesina and Rodrik [9]| 46 countries, 1960–1985         | Gini coefficient             | OLS            | -        |
| Persson and Tabellini [50]| 56 countries, 1960–1985     | Share of the fourth quintile | OLS            | -        |
| Perotti [49]          | 67 countries, 1960–1985         | Share of third and fourth quintiles | 2SLS | -        |
| Panniza (2002)        | U.S., 1920–1980                 | Gini index                   | FE             | -        |
| Knowles [36]          | 40 countries, 1960–1990         | Gini coefficient             | OLS            | -        |
| Malinen [41]          | 60 countries, 1971–2000         | Gini index                   | Panel dynamic OLS | -        |
| Cingano [23]          | OECD countries, 1980–2012       | Gini index                   | GMM            | -        |
| Iyke and Ho [35]      | Italy, 1967–2012                | Gini coefficient             | ARDL           | -        |
| Braun et al. [18]     | 150 countries, 1978–2012        | Gini coefficient             | Dynamic OLS    | -        |
| Royuela et al. [55]   | 15 OECD countries, 2003–2013    | Gini coefficient             | Pooled OLS     | -        |
| Breunig and Majeed [19]| 152 countries, 1956–2011        | Gini coefficient             | GMM            | -        |
| **Positive findings**|                                 |                              |                |          |
| Partridge [47]        | U.S., 1960–1990                 | Gini coefficient             | Open pooled OLS | +        |
| Li and Zou [39]       | 46 countries, 1947–1994         | Gini coefficient             | FE             | +        |
| Forbes [28]           | 45 mid- to high-income countries, 1966–1995 | Gini coefficient | First-difference GMM | +        |
| Rangel et al. [52]    | Brazilian minimum comparable areas, 1991–2000 | Gini index | Various estimated regressions | +        |
| Bhorat and Van der Westhuizen [16] | South Africa, 1995–2005       | Gini coefficient             | Distribution neutral measure | +        |
| Shahbaz [58]          | Pakistan, 1971–2005             | Gini coefficient             | ARDL           | +        |
| Majeed [40]           | Pakistan, 1975–2013             | Gini coefficient             | ARDL           | +        |
| Scholl and Klasen [57]| 122 countries, 1961–2012        | Gini coefficient             | FE             | +        |
| **Inconclusive findings**|                                 |                              |                |          |
| Deininger and Squire [25]| 66/87 countries, 1960–1992    | Gini index                   | OLS            | Poor: - |
| Barro [13]            | 84 countries, 1965–1995         | Gini coefficient             | 2SLS           | Rich: + |
| Voitchovsky [63]      | 21 developed countries, 1975–2000 | Gini coefficient | System GMM | Poor: - |
| Castelló-Climent [21] | 102 countries, 1960–2000        | Gini coefficient             | System GMM    | Rich: + |
|                      |                                 | Distribution of education by quintiles | (continued on next page) |          |
Based on the above considerations, researchers should be more cautious when identifying a general global pattern regarding the inequality-growth relationship. Instead, we propose that more emphasis should be placed on identifying the inequality-growth relationship on a national or regional level. Such an approach will provide a better understanding of the inequality-growth process on the study area by overcoming data comparability constraints and possible methodological challenges.

**Conclusion**

This paper presented a comprehensive literature review of the relationship between income inequality and economic growth. In the theoretical literature, various transmission mechanisms were identified in which income inequality is linked to economic growth, namely the level of economic development, the level of technological development, social-political unrest, the political economy, the imperfection of credit markets, the savings rate, institutions, and the fertility rate. Based on these models, we found that the relationship between income inequality and growth can be negative, positive or inconclusive. For example, based on the level of economic and technological development, the relationship between inequality and growth is positive and becomes negative as the level of development progresses. Inconclusive results were reported by the social-political unrest model, showing that the rise in socio-political unrest stemming from high-income inequality could either dampen or promote growth. In addition, theories on the political economy, the imperfection of credit markets, institutions and the fertility rate, reported that income inequality was negatively related to growth. The only theory which supported the positive relationship between income inequality and growth was the theory of savings rates.

On the empirical front, we found that numerous studies joined the debate by testing the relationship between income inequality and economic growth. Some found a positive relationship, while others identified a negative impact. Some studies yielded inconclusive findings. In particular, most found that the relationship was positive in high-income countries and negative in low-income countries. Several studies documented no relationship between income inequality and economic growth. In the methodology section, we provided a critical survey on methodology issues employed in the prior studies. We argued that the varying results obtained by these studies can be attributed to empirical aspects such as the data comparability and methodological procedures used. We, therefore, suggest that future studies should place more emphasis on identifying the inequality-growth relationship on a national or regional level to better understand the inequality-growth process.
on the study area. In addition, we conjecture that as the study countries and time span differed in the empirical studies, the impacts of the various theoretical channels we identified previously could also play a uniquely important role in affecting the relationship of the inequality–growth nexus in those studies. It would be prudent for future studies to apply the theoretical models to provide an in-depth analysis of the existing empirical findings. Such findings, with reference to the social, political and economic structure, would provide more relevant policy recommendations to the countries under study.

Declaration of Competing Interest

The authors of this paper certify that there is no financial or personal interest that influenced the presentation of the paper.

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