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Macroeconomic determinants of inclusive growth in South Africa: An application of the autoregressive distributed model

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ABSTRACT

Despite South Africa's economy being more advanced than most emerging African economies, it remains the most inequitable country in the world, revealing that regardless of the growth strides, the benefits of growth are barely equitably distributed among the different society groups in the country. Literature indicates that while economic growth is essential, it is insufficient for improving living standards for many South Africans. Against this background, the study examines the factors driving inclusive economic growth in the country using macro data from 1991-2020. A model based on the Social Opportunity Function was estimated to link the measure of inclusive growth and its determinants in the study. The ARDL bounds testing approach to cointegration was employed to evaluate the effect of the different variables employed in the study on inclusive growth. The results show a long-term positive impact of initial income levels, foreign direct investment (FDI), population growth, and trade on inclusive growth, while gross fixed capital formation and inflation negatively affect inclusivity. These findings imply that the government must continue to address the challenges of unequal access to opportunity and skewed income distribution in the country. Moreover, authorities should pursue policies to improve macroeconomic stability to increase FDI inflow and eliminate barriers that prevent it. This will foster inclusiveness in economic growth.

Contribution/ Originality: This study advances the literature by shifting the focus from cross-country analyses to a country-specific investigation of South Africa, the world's most unequal economy. While existing studies overlook unique structural and policy challenges, this research employs the ARDL model to capture both short- and long-run macroeconomic determinants of inclusive growth within South Africa's distinct context. The findings offer nuanced insights for policymakers to design targeted strategies that foster sustainable, broad-based economic growth.

1. INTRODUCTION

Achieving growth is one thing, while achieving shared prosperity is another (Ofori & Asongu, 2021). In other words, a country's economic growth may be high but may not necessarily achieve inclusive economic development. Despite South Africa's more developed economy than most emerging nations, its low overall Inclusive Development Index is driven by low employment levels, subpar health conditions, and excessive inequality (Fourie, 2014; Hausmann et al., 2023). In addition, according to the World Economic Forum's Inclusive Growth and Development

Report, South Africa ranks 69th place amongst developing economies on the inclusive development index; the report also mentions that South Africa suffers from extremely high income and wealth inequality despite having 20th highest Growth Domestic Product per capita in this group (WEF, 2018). It remains the most inequitable country in the world by race, gender, and class as well, with a Gini index of 63 in the years 2014/15 (Sulla, 2020). Inequality is alarmingly high and persistent and has continued to increase since 1994 (Sulla, 2020). South Africa's inclusivity has declined since 1996. Its index has climbed from 0.74 in 1996 to 0.77 in 2006 amid high GDP growth rates (van Niekerk, 2020). During this period, the only positive component was the decline of the poverty ratio. However, rising inequality and a declining employment-to-population ratio dominated this period (van Niekerk, 2020). For economic growth as such to be deemed inclusive, it is imperative that such growth result in enhancements across all three inclusivity indicators, or at the very least improvements in one or two indicators while the remaining indicator(s) remain stable or do not deteriorate (Ramos, Miller, Brandão, Teixeira, & Silva, 2013; van Niekerk, 2020).

A considerable degree of racialized poverty and inequality had been socially engineered when South Africa entered the post-apartheid period. Compared to Black Africans, white people now have higher levels of education, make more money in the job market, and are less likely to be impoverished or unemployed (Stats SA, 2018). Wealth inequality is also higher, while intergenerational mobility is lower, meaning inequalities do not differ from one generation to the next and change over time is significantly small (World Bank Group, 2021). The South African nature of inequality is multidimensional, and it was discovered that Black South Africans residing in peri-urban, informal, and rural settlements had been impacted more severely by the pandemic, worsening the inequalities they were already experiencing, this being within the context of inflation rising (Futshane, 2021).

Furthermore, most developing nations, including South Africa, lag behind developed nations in achieving gender equality (van Rensburg, 2021). In South Africa, women continue to be underrepresented in the workforce, and their career trajectories are encumbered compared to men's; as a result, fewer women advance within the workplace (Moalusi & Jones, 2019). As a result of the poor not being able to take advantage of the current growth path, the country's poverty and income inequality have persisted due to high unemployment rates, skills shortages, employers' ongoing capital intensification, and the concentration of ownership by powerful business interests (Bhorat, Lilenstein, Oosthuizen, & Thornton, 2020).

Addressing the policies that led to the above-mentioned conditions, in 1994, the elected party, referred to as the African National Congress (ANC), put in place a strategy of development called the Reconstruction and Development Program (RDP) (Bhorat et al., 2020). The RDP was a transformative plan seeking to promote sustainable growth and development (Bhorat et al., 2020). In addressing inequality, unemployment, and poverty, key strategies that involve industrialization, land reform, and provision of essential social services like housing, health care, and education were outlined in the plan (Moyo & Mamobolo, 2014). In 2013, the National Development Plan (NDP) was adopted and implemented. The NDP creates a long-term, all-inclusive vision for South Africa (Bhorat et al., 2020).

To specifically address the racial inequalities, the post-apartheid government, in 2013, also implemented the Broad-Based Black Economic Empowerment legislation as a principal component to bring historically disadvantaged persons into the country's economic mainstream while addressing the misdeeds of the past (Broad-Based Black Economic Empowerment Amendment Act No. 46 of 2013 583 Government Gazette 1, 2014). The legislation is an intervention that aims to redistribute opportunities and assets and to pursue an economy illustrative of South Africa's racial demographics.

The Industrial Policy Action Plan (IPAP) was also put in place as part of policies shaping inequality, economic growth, and inclusive growth (Bhorat et al., 2020). The plan outlines several policy interventions seeking to achieve structural changes using the manufacturing sector's growth and development (Bhorat et al., 2020). Government grants are also made available in South Africa; these include the Old Age Grant, the Disability Grant, and the Child Support Grant (SA National Treasury, 2020). Similarly, fiscal policy has been an effective tool in reducing inequality.

At present, a moderately progressive tax structure, coupled with an effective social safety net, mitigates overall inequality in relation to market income (IMF, 2020).

Even though there have been some improvements in macroeconomic variables, other empirical data proved that South Africans have a healthy life expectancy of just 54 years, among the lowest of nations with a GDP per capita of at least $5,000. Income (57.7) and wealth (86.7) are the primary drivers of inequality.Concurrently, almost 36% of the population is poor and lives with a median consumption level of roughly $5 per day (WEF, 2018). This indicates that the South African economy's growth has failed to translate precisely into social inclusion and that many citizens do not participate in and benefit from growth (Makgetla, 2020). Moreover, relatively strong Gross Domestic Product (GDP) growth cannot solely be relied on to generate inclusive socioeconomic progress and broad-based improvement in living standards. South Africa has yet to develop a more inclusive growth model, providing better employment opportunities to a larger share of its population (WEF, 2018).

Some researchers have explored the determinants of inclusive growth. Most studies, both time-series and cross-country, have shown that the poor could benefit. Growth is fostered through several channels, including financial inclusion (Afolabi, 2020; Ehiedu, Onuorah, & Chigbo, 2022; Maku, Lawal, Soyemi, & Adenaike, 2022) FDI (Ofori & Asongu, 2021) urbanisation (Ngounou, Tekam Oumbe, Ongo Nkoa, & Noubissi Domguia, 2024), human capital (Oyinlola & Adedeji, 2019), and adequate levels of government transfer schemes. Social protection has been identified as a key policy tool that has led to alleviating poverty and inequality and furthering inclusive economic growth (Clément, 2017) globalization, institutional quality, trade openness (Anand, Mishra, & Peiris, 2013), infrastructure développent (Kouladoum, 2023), fiscal conditions (Katuka, Mudzingiri, & Ozili, 2023; Whajah, Bokpin, & Kuttu, 2019) Inflation (Kouladoum, 2023), Expenditure on education and health (Raheem, Isah, & Adedeji, 2018), and Population growth (Adeosun, Olomola, Adedokun, & Ayodele, 2020).

The current literature lacks a clear view of the main determinants of inclusive growth. Different studies present different findings in different cases. In addition, most available studies that seek to determine the drivers of inclusive growth in South Africa are cross-country studies, which may isolate the impact of specific actions, treatments, and general policies. Building on previous research, this study aims to empirically analyze the relationship between inclusive growth and its drivers, focusing mainly on the case of South Africa, as studies in this area using similar indicators of interest are limited; moreover, given the worrisome state of inclusive growth in the country and its concomitant benefits in alleviating income inequality and poverty, the study seeks to examine the condition, causes, and drivers of inclusive growth in South Africa, as this would be a prerequisite to recognizing the crucial areas to direct accessible resources, further advancing policy and other existing and potential remedial measures. Economic growth will not automatically translate into broadly, equally shared opportunities and benefits (International Labour Organization, 2012), but policy choices matter to drive this agenda accordingly.

The subsequent sections are organized as follows: The second section examines the theoretical framework, concentrating on the factors influencing inclusive economic growth and the relevant empirical literature. The third section details the data and estimation methods used. The fourth section outlines the results, and the fifth section summarizes the study with conclusions and policy suggestions.

2. LITERATURE REVIEW

Although there has been considerable recent focus on the concept of inclusive growth, the research on its determinants and effective policies to adequately promote it in South Africa remains limited. A significant amount of literature has sought to determine the drivers of growth. However, seemingly, in varying cases, the growth has not been inclusive, as it has failed to translate into less inequality, reduced poverty, improved economic diversity, job creation, and structural transformation. This negative aspect of growth performance is evidence of a deficiency in a critical element of structural transformation. Growth that fails to induce structural change is unlikely to be sustainable. Therefore, it is essential to investigate the factors that influence inclusive economic growth.

The current literature lacks a clear view of the main determinants of inclusive growth. Different studies are presenting different findings in varying cases. According to Tella and Alimi (2016) the term "inclusive" in growth literature originates from the work of Kakwani and Pernia (2000), who used it to describe pro-poor growth as a process that allows the poor to participate actively in and benefit from economic growth. This concept includes equity, equal opportunities, market production, and employment transitions (Asian Development Bank, 2012; IMF, 2020).

Pertaining to the World Bank Approach, it is vital that growth be paced rapidly and broad-based on all the economic sectors, and it should be inclusive and representative of a significant part of the country's labor force (Ngepah, 2017). Their approach speaks to the definition of pro-poor growth, and their methodology links the micro as well as the macro determinants of growth and inequality to reflect the distribution and the pace of income growth (Anand et al., 2013). The definition of inclusive growth by the African Development Bank is somewhat similar to that of the World Bank. However, under this approach, pro-poor growth limitations are recognized, and interventions that involve the inclusion of broader segments of society and the economy at large are proposed for inclusive growth (Ngepah, 2017). The approach is built on four pillars: economic, political, social, and spatial inclusions. The African Development Bank developed an inclusive growth index based on these pillars. The index accounts for inequality in economic growth. The index incorporates views on education, infrastructure, health, economic diversification, gender, and governance (Asian Development Bank, 2012).

The OECD's outlook on inclusive growth rests on "multidimensionality, distributional considerations, and policy impact" (OECD, 2016). The multidimensionality concept advocates that those other vital aspects of people's well-being, including people being part of the economy's productivity, should be considered and embraced. This should be done by avoiding focusing on GDP and per capita-based measures of economic growth (Ngepah, 2017). The distributional concept advocates for reviewing distribution to not just focus on per capita income but rather regard the distributions of multidimensional well-being (OECD, 2016).

In addition, Ali and Zhuang (2007) elaborated more on inclusive growth based on two strategic pillars: (i) investing in creating opportunities to support high and sustainable growth and (ii) investing in broadening access to opportunities to support social inclusion in developing Asia. Therefore, the thematic priorities include institutions, good governance, knowledge management, and gender equality. In line with inclusive growth, from the ADB's perspective, the goal of development is to increase the economy's size and growth rate while leveling the playing field for investment, creating more possibilities for productive employment, and ensuring that everyone has equitable access to them (Asian Development Bank, 2012).

Several studies have demonstrated that infrastructure development is critical in fostering inclusive growth, with most highlighting the positive impact of enhancing digital infrastructure to achieve shared growth. Kouladoum (2023) finds that developing digital infrastructure significantly improved inclusive growth in Sub-Saharan Africa. Moreover, Information and communication technology (ICT) enhances shared growth levels irrespective of the economies' income groups (Kouladoum, 2023). A similar finding is that ICT diffusion induces inclusive growth in SSA, and compared to its direct effect, it is pre-eminent in fostering inclusive growth in the presence of FDI (Ofori & Asongu, 2021). Some authors also provide evidence that ICT infrastructure positively and significantly impacts inclusive growth in Africa, generally and specifically across sub-regions (Nchake & Shuaibu, 2022).

These findings support the notion that digitalization can enhance shared growth (Adeleye, Adedoyin, & Nathaniel, 2021; Kusairi, Wong, Wahyuningtyas, & Sukemi, 2023; OECD, 2018). However, the IMF (2020) has partially countered this argument, presenting empirical evidence that the advent of new technologies may exacerbate disparities between wealthy and impoverished nations by directing investments toward developed countries where automation is already prevalent. Consequently, this trend may adversely affect employment prospects in developing economies by threatening the growing labor force rather than complementing it, which has previously benefited these less developed nations (IMF, 2020). Anand et al. (2013) observed that technology has a less noticeable effect on inclusive growth in developing economies and low-income countries. Similarly, Zhuang, Kanbur, and Rhee (2014)

noted that technological advancement, globalization, and market-oriented reforms have contributed to rising inequality in developing countries in Asia while promoting economic growth.

Among the empirical studies conducted on the drivers of inclusive economic growth is that of Tella and Alimi (2016), who conducted a study investigating the role of health and population growth in selected African countries. The author's findings confirm that adequate health sector financing is fundamental to improving pro-poor growth in Africa. Tella and Alimi (2016) further reveal that the growth in population in the African economies deteriorates the achievement of inclusiveness in growth. Various studies confirm this finding, as the economic development-population growth nexus has been a frequently visited subject in economic analysis. However, some evidence shows that population growth matters for inclusivity in growth (Adeosun et al., 2020; Ayinde & Yinusa, 2016; Oluseye & Gabriel, 2017), validating Simon (1987) hypothesis regarding the population-size-growth nexus.

From the literature reviewed, the majority of related studies have found that Foreign Direct Investment plays a crucial role in advancing inclusive economic growth; however, its significant effectiveness relies on specific circumstances. These pre-conditions include a developed financial sector (Nkoro & Uko, 2022) energy efficiency and economic infrastructure (Ofori, Figari, & Ojong, 2023), and ICT diffusion (Kouladoum, 2023).

A large body of evidence indicates that Africa requires inclusive economic policies that foster sustainable growth and effectively address poverty and inequality, as growth does not guarantee inclusion (Economic Commission for Africa, 2023; van Niekerk, 2020). Studies have also found poverty rates falling despite poor economic growth records (de la Fuente, 2016; Ferreira, 2012). Therefore, it is apparent that policy priorities for inclusive growth in the African context should be re-examined.

In this context, van Niekerk (2020) identifies six essential components of inclusive growth that should be implemented together in economies: optimal productivity that supports pro-poor growth, broad-based growth, shared growth, authentic economic advancement, and green growth. The author also emphasizes key characteristics necessary for making the growth process inclusive: it must be explicitly non-discriminatory to enhance participation and actively work to reduce disadvantages to improve benefit-sharing (van Niekerk, 2020). These modifications to the growth process will significantly contribute to achieving inclusive development.

3. METHODOLOGY

3.1. Model Development

Sustainable economic growth should be inclusive, implicitly, in that it is rapid, stable, and equitable for all stakeholders. It must also reduce poverty and distribute prosperity. Anand et al. (2013) argue that inclusive growth is influenced by various macroeconomic structural factors, a view supported by Barro (2000) and Dollar and Kraay (2003). Lower initial income levels often facilitate more inclusive growth through a process known as conditional convergence. Brueckner and Lederman (2018) analysed the relationship between inequality and GDP growth in a panel model, finding that the inequality-GDP growth nexus weakens as initial income levels rise. Their instrumental variables regressions showed that inequality fosters growth in low-income countries, while income inequality hurts growth in high-income countries.

Foreign Direct Investment (FDI) is a key driver of economic growth, especially in developing countries (Nyasulu, 2018). However, its impact on inclusive growth, benefiting all segments of society, particularly the poorest, depends on specific conditions within the host country, including infrastructure, human capital, and governance (Wentworth, Murphy, Benedict, Bangs, & Collett Jr, 2016), with various studies finding that in poverty- and inequality-entranced regions, the advantages of FDI may not reach lower-income groups as effectively (Berman, 2000; Kang & Martinez-Vazquez, 2022).

In addition, the importance of capital formation for sustained growth has been well-documented in development literature, especially since the emergence of the endogenous growth model in the 1960s (Bal et al., 2016). Gross fixed capital formation is a key domestic investment component for long-term economic growth (Meyer & Sanusi, 2019).

Ncanywa and Makhenyane (2016) confirmed that capital formation positively impacts long-term economic growth in South Africa. Moreover, while studies often focus on the direct effect of capital formation on growth, Akobeng (2017) emphasizes its role in poverty reduction in Sub-Saharan Africa, consistent with Senhadji (2000). Institutional factors such as democracy, corruption levels, and bureaucratic quality can enhance the poverty-reducing effects of capital formation, fostering more inclusive growth. Therefore, capital formation is expected to impact inclusive growth positively.

Moreover, several studies have shown that certain public spending items, such as welfare transfers, healthcare, and education, are more effective in reducing income inequality than others (Hur, 2015; Martínez-Vázquez et al., 2012). Hur (2015) found that public spending on education and health significantly reduces income inequality in developing economies, suggesting that fiscal expenditure policies can play a vital role in promoting inclusive growth. Consequently, specific government spending items are expected to affect income inequality positively, thereby fostering more inclusive growth.

According to Dollar and Kraay (2003); Anand et al. (2013); Barro (2000), and Raheem et al. (2018), trade openness has facilitated inclusive growth and reduced income inequality. A positive relationship between inclusive growth and trade openness is expected. Theoretical frameworks like Stolper-Samuelson and Heckscher-Ohlin suggest that greater trade openness increases demand and wages for unskilled labour in low-skill-abundant economies while exacerbating wage inequality in skill-abundant economies (Anyanwu, 2016).

The other determinants of inclusive growth are population growth and inflation. Empirical studies on the relationship between population and inclusive growth have yielded mixed results. Tella and Alimi (2016) and Anyanwu (2013) found that population growth negatively affected inclusive growth in African countries, while (Oluseye & Gabriel, 2017) found a positive effect in the short run, turning negative in the long run. Theoretical arguments support both perspectives: population growth may hinder per capita output growth (Malthus, 1993) or stimulate economic activity through increased labour and consumption (Kuznets, 1960). While some neoclassical economists argue that inflation may be positively related to growth (Mundell, 1963; Tobin, 1965) suggest that inflation reduces resources available for domestic investment. Inflation diverts savings from productive investments toward inventory accumulation and luxury housing, thereby hindering inclusive growth. Empirical evidence from Anand et al. (2013) and Oluseye and Gabriel (2017) confirms that inflation negatively affects inclusive growth.

3.2. Definition of Variables and a Priori Expectations

3.2.1. Inclusive Growth

Inclusive growth is measured by GDP per person employed, which is the dependent variable. It refers to economic growth that reduces poverty and ensures that the poor and the rich benefit somewhat from prosperity (Amuka, Asogwa, Agu, & Ugwu, 2019). Emerging consensus suggests that sustainable economic growth, remarkably rapid growth, must be equitable to reduce poverty effectively (Stuart-Hamilton, 2011).

3.2.2. Initial Level of Income

GDP per capita represents the initial level of income, calculated by dividing a country's GDP by its population (Brueckner & Lederman, 2018). Anand et al. (2013) argue that inclusive growth is influenced by various macroeconomic structural factors, a view supported by Barro (2000) and Dollar and Kraay (2003). Lower initial income levels often facilitate more inclusive growth through a process known as conditional convergence.

3.2.3. Foreign Direct Investment (FDI)

FDI is measured as a ratio of GDP and refers to investments made by entities in one country into businesses in another, intending to establish lasting interests (OECD, 2016). As FDI increases, economic growth increases, implying Inclusive growth through increased income.

3.2.4. Capital Formation

Capital formation is measured as a ratio of GDP. It refers to the portion of a country's imports and output that is not consumed or exported but instead invested in capital goods (Department of Economic and Statistical Analysis, 2021). It represents the increase in real capital within the economy (Corporate Finance Institute, 2021). Capital formation positively impacts long-term economic growth and consequently reduces poverty.

3.2.5. Government Consumption Expenditure

Government consumption expenditure is a GDP ratio representing public sector spending on goods and services such as healthcare, education, defense, and social protection (Corporate Finance Institute, 2021). Consequently, specific government spending items are expected to affect income inequality positively, fostering more inclusive growth.

3.2.6. Trade Openness

Trade openness, measured as a ratio of GDP, reflects a country's integration into the global trading system (Golley & Hendrie, 2014). Trade openness has facilitated inclusive growth and reduced income inequality.

3.2.7. Population Growth and Inflation

Population growth and inflation refer to the rise in population size and the general price increase, respectively (Anyanwu, 2016). Both variables are measured as annual percentages. Population growth and inflation could negatively or positively affect inclusive growth.

3.3. Data and Sources

Macroeconomic theory has pointed out several factors that impact inclusive growth (Oluseye & Gabriel, 2017). Scholars such as Anand et al. (2013); Tella and Alimi (2016); Alekhina and Ganelli (2023) and Sarpong and Nketiah-Amponsah (2022) These factors include foreign direct investment, inflation, trade openness, population, government consumption, infrastructure quality, digital development, financial inclusion, digitalization, and ICT.

The data underpinning the study is entirely macro and spans 1991-2020. The selection period is based on the availability of data and the minimum sample size. Information about inclusive growth is not available in databases, so the study uses the Social Opportunity function, which looks at the average opportunities available to people and how they are shared, shown by GDP per person employed. The GDP per person employed data is sourced from Global economy, while the other variables of interest, including GDP Per Capita, FDI, Government consumption, Gross Fixed Capital Formation, Inflation, Population Growth and Trade Openness, are from the World Bank Development Indicators.

3.4. Estimation Technique

The analysis of the factor determinants of inclusive economic growth is a relatively new phenomenon that still requires a well-developed modelling framework (Tella & Alimi, 2016). The study is based on the Social Opportunity Function framework, which is similar to a social welfare function and is considered the best way to measure fairness in opportunities, according to various theories discussed in the literature (Ali & Son, 2007).

The concept of the social welfare function was established in 1938, and Samuelson (1947) subsequently developed it, while Ali and Son (2007) made an empirical application (Son, 2011). According to the Social Opportunity Function framework, growth is inclusive if it will lead to the social opportunity function increasing, and this increase will depend on the following factors: (a) the average opportunities that are accessible to the population and (b) how these opportunities are distributed among the population (Ali & Son, 2007). The Social Opportunity Function states that opportunities that are distributed to and enjoyed by the poor weigh more or are of more importance in comparison

to those created for the nonpoor, meaning if the opportunities afforded to an individual are transferred to a relatively disadvantaged member of society, social opportunity must consequently increase, leading to a more inclusive form of growth (Ali & Son, 2007).

The model presented below is based on the work of Anand et al. (2013) and has been subsequently modified by Ayinde and Yinusa (2016) and Oluseye and Gabriel (2017), which is based on the social opportunity function.

$$Y_t^* = \alpha_0 + \beta_t y_t + \beta_2 x_t + \varepsilon_t \quad (1)$$

In Equation 1, Y_t^*stands for inclusive growth, GDP per person employed (measuring productive employment), is the preferred measure of inclusiveness in growth (Adeosun et al., 2020; Kouton, 2019; Oyinlola & Adedeji, 2019; Raheem et al., 2018; Tella & Alimi, 2016) y_t represents the initial income level, x_t denotes the vector of control variables, and εt signifies the error term. Based on data availability, this study analysed the determinants of inclusive growth in South Africa, including initial income per capita, foreign direct investment (FDI), government consumption, Investment, inflation, population growth, and trade.

The equation is reformulated below:

$$GDPPPE_t = \alpha_0 + \beta_1 GDPPC_t + \beta_2 FDI_t + \beta_3 GGFCE_t + \beta_4 GFCF_t + \beta_5 INFL_t + \beta_6 POPG_t + \beta_7 TOP_t + \varepsilon_t \quad (2)$$

In Equation 2, inclusive growth is measured by GDP per person employed, while the initial income level is measured by gross domestic product per capita. Foreign direct investment is shown as a ratio of GDP, similar to capital formation, government consumption expenditure, and trade openness. Observations on population growth and inflation are measured as annual percentages.

The Autoregressive Distributed Lag cointegration model is applied to empirically analyse the short-run and long-run interactions among the variables. A two-step procedure is used to evaluate the long-run relationship. The ARDL approach was preferable in the current study as it offers several advantages. The advantage of the ARDL modelling approach is that it is particularly effective in small sample study contexts and when dealing with variables of differing orders of integration. It also provides unbiased estimations of the long-run model; this is also the case where some of the variables are endogenous, and it does not depend on the properties of the unit root dataset (Khobai & Le Roux, 2017). Its ability to provide reliable estimates without extensive pre-testing further enhances its applicability in this research context. Having no prior information about the relationship direction, in the instance that the first step predicts an occurrence of a long-run relationship between the variables, the ARDL framework error correction version proposed by Pesaran and Shin (1999) relating to the variables depicted in Equation 2 is formulated as follows:

$$\Delta lnGDPPPE_t = \propto_o + \sum_{i=1}^{n} \beta_1 \Delta lnGDPPPE_{t-i} + \sum_{i=1}^{n} \beta_2 \Delta lnGDPPC_{t-i} + \sum_{i=1}^{n} \beta_3 \Delta FDI_{t-i} + \sum_{i=1}^{n} \beta_4 \Delta GGFCE_{t-i} + \sum_{i=1}^{n} \beta_5 \Delta GFCF_{t-i} + \sum_{i=1}^{n} \beta_6 \Delta INF_{t-i} + \sum_{i=1}^{n} \beta_7 \Delta POPG_{t-i} + \sum_{i=1}^{n} \beta_8 \Delta TOP_{t-i} + \phi_1 lnGDPPPE_{t-1} + \phi_2 lnGDPPC_{t-1} + \phi_3 FDI_{t-1} + \phi_4 GGFCE_{t-1} + \phi_5 GFCF_{t-1} + \phi_6 INF_{t-1} + \phi_7 POPG_{t-1} + \phi_8 TOP_{t-1} + \varepsilon_t \quad (3)$$

Where, ln depicts natural logarithms, Δ the first difference operator, while $\propto_o$ represents the drift component. $(\beta_1 - \beta_8)$ signifies the model's short-run dynamics, the long-run relationship is represented by $(\phi_1 - \phi_8$ and ε_t depicts serially uncorrelated disturbance that consists of a constant variance and zero mean.

We employ the bounds-testing approach to examine the existence of a long-run relationship among the variables. This methodology utilizes the F-statistic, which adheres to a non-standard distribution. If the F-statistic falls below the lower bound critical value $(\phi_1 = \phi_2 = \phi_3 = \phi_4 = \phi_5 = \phi_6 = \phi_7 = \phi_8 = 0)$ We accept the null hypothesis, indicating the absence of cointegration.

If the F-statistic is higher than the upper bound critical value, we reject the null hypothesis, which means there is cointegration. We have an inconclusive result when the F-statistic falls between the upper and lower bound critical values.

The long-run model for economic growth presented below can be estimated after confirming the existence of cointegration among the variables.

$$lnGDPPPE_t = \phi_1\, lnGDPPP_{t-1} + \phi_2\, lnGDPPC_{t-1} + \phi_3\, FDI_{t-1} + \phi_4\, GGFCE_{t-1} + \phi_5\, GFCF_{t-1} + \phi_6\, INF_{t-1} + \phi_7\, POPG_{t-1} + \phi_8\, TOP_{t-1} + \varepsilon_t \quad (4)$$

The lag orders are set using the Akaike Information Criterion (AIC) or the Schwarz Bayesian Criterion (SBC) to find the best setup for the Autoregressive Distributed Lag (ARDL) model. After estimating the ARDL specification and calculating the long-run multipliers, the error correction model shown below has been created to assess short-term changes.

$$\Delta lnGDPPPE_t = \propto_o + \sum_{i=1}^{n} \beta_1\ \Delta lnGDPPPE_{t-i} + \sum_{i=1}^{n} \beta_2\ \Delta lnGDPPC_{t-i} + \sum_{i=1}^{n} \beta_3\ \Delta FDI_{t-i} + \sum_{i=1}^{n} \beta_4\ \Delta GGFCE_{t-i} + \sum_{i=1}^{n} \beta_5\ \Delta GFCF_{t-i} + \sum_{i=1}^{n} \beta_6\ \Delta INF_{t-i} + \sum_{i=1}^{n} \beta_7\ \Delta POPG_{t-i} + \sum_{i=1}^{n} \beta_8\ \Delta TOP_{t-i} + \lambda ECM_{t-1} + \varepsilon_t \quad (5)$$

Where: $(\beta_1 - \beta_8)$ represents short-run parameters while λ signifies that the adjustment speed parameter is likely to be lower than zero. The lagged error correction term from Equation 3 and 5 cointegration model that is estimated is the Error Correction Model (ECM). It is a model used to analyze the dynamic relationship between time series variables, particularly when they are cointegrated (share a long-run equilibrium), by incorporating the "error" or deviation from that equilibrium in the short-run dynamics, mainly figuring how quickly a variable adjusts to return to its long-run equilibrium after a shock; it allows for the study of both short-term fluctuations and long-term relationships within a single model.

4. EMPIRICAL RESULTS AND DISCUSSION

This section presents the results of the model estimates. Theory suggests that the selected independent variables are key to promoting inclusive economic growth. Thus, this section aims to analyze the impact of these variables on inclusive growth.

4.1. Descriptive Statistics

To avoid complexities in modeling and effectively linearize the exponential trend, logs of some variables were taken, as the study covered time series data (Asteriou & Hall, 2007). Table 1 presents the summary statistics for all variables utilized in this study.

Table 1. Descriptive statistics.

Statistics	LGDPPPE	LGDPPC	FDI	GGFCE	GFCF	INF	POPG	TOP
Mean	10.643	8.442	1.289	19.598	18.454	6.458	1.591	54.027
Median	10.653	8.553	0.984	19.385	18.391	5.750	1.464	55.420
Maximum	10.725	8.988	5.983	22.566	23.150	15.335	2.497	72.870
Minimum	10.561	7.825	0.003	17.814	12.426	-0.692	1.218	37.490
Std. dev.	0.057	0.340	1.270	1.125	2.145	3.232	0.394	8.941
Skewness	-0.224	-0.164	1.937	0.593	-0.422	0.712	1.304	-0.246
Kurtosis	1.586	1.676	7.509	2.857	3.761	4.248	3.416	2.383
Jarque-bera	2.751	2.327	42.690	1.784	1.612	4.480	8.714	0.753
Probability	0.253	0.313	0.000	0.410	0.447	0.107	0.013	0.687
Sum	319.293	253.244	37.372	587.933	553.627	193.742	47.724	1566.770
Sum sq. dev.	0.093	3.3611	45.183	36.693	133.364	302.887	4.504	2238.237
Observations	30	30	30	30	30	30	30	30

The descriptive statistics presented in the table indicate that the growth rates for GDP per person employed and initial income are 10.64 and 8.44, respectively. The average values for FDI, government consumption, gross capital formation, and trade openness are 1.29, 19.60, 18.45, and 54.03, respectively. The average value for population growth is 1.59, while inflation is 6.46.

Table 2. Correlation matrix.

Correlation								
Probability	**LGDPPPE**	**LGDPPC**	**FDI**	**GGFCE**	**GFCF**	**INF**	**POPG**	**TOP**
LGDPPPE	1.000							

LGDPPC	0.852	1.000						
	0.000	-----						
FDI	0.101	0.037	1.000					
	0.603	0.848	-----					
GGFCE	0.561	0.578	-0.079	1.000				
	0.002	0.001	0.685	-----				
GFCF	0.596	0.725	0.134	0.140	1.000			
	0.001	0.000	0.490	0.470	-----			
INF	-0.386	-0.445	-0.103	-0.260	-0.106	1.000		
	0.039	0.016	0.594	0.174	0.584	-----		
POPG	-0.505	-0.364	-0.401	-0.098	-0.245	0.748	1.000	
	0.005	0.052	0.031	0.613	0.201	0.000	-----	
TOP	0.770	0.660	0.417	0.313	0.646	-0.447	-0.751	1.000
	0.000	0.000	0.025	0.098	0.001	0.015	0.000	-----

The skewness statistics, which measure how uneven the data is compared to the average, showed positive skewness for variables like FDI, GGFCE, INFL, and POPG. The result suggests these distributions possess a long right tail, with higher values than the sample mean. Conversely, the remaining variables exhibited negative skewness, indicating a long-left tail with values predominantly lower than the sample mean.

Additionally, the kurtosis, which shows how flat or peaked the distribution of the series is, indicated that the kurtosis value of LGDPPPE, LGDPPC, GGFCE, and TOP is platykurtic, meaning their distribution is flatter than normal. In contrast, the other variables are leptokurtic, indicating a more peaked distribution. At the same time, the remainder of the variables are leptokurtic, suggesting a peaked distribution. None of the variables are perfectly normally distributed (mesokurtic—kurtosis = 3).

The Jarque-Bera statistic, which looks at how much the kurtosis and skewness of each variable differ from what we expect in a normal distribution, indicated that we should reject the idea of normal distribution only for FDI, since the probability values for this variable are very significant, unlike LGDPPPE, LGDPPC, GGFCE, GFCF, INFL, TOP, and POPG, which are normally distributed.

The correlation matrix illustrated in Table 2 details the statistical correlation coefficients between the variables. The diagonal in the plot depicts how the variable behaves with itself, and the off-diagonal values demonstrate the relationship between the variable and other variables. The results in the table show that LGDPPC, GGFCE, GFCF, and TOP are significantly positively related to the dependent variable (LGDPPPE), while POPG and INF suggest a significantly negative relationship.

It is noteworthy that LGDPPC demonstrates the highest correlation, exceeding 80%. This suggests that initial income per capita plays a significant role in explaining the variation in LGDPPPE for the data under review. On the other hand, the correlation between inclusivity and population growth is negative, though significant, and INF has the same outcome. Variables such as FDI depict low correlation coefficients, suggesting a relationship between the variable and LGDPPPE, although weak and insignificant.

4.2. Stationarity, Lag Length and Bound Test

Before estimating equations, the variables employed in this study were assessed for unit root presence using the Augmented Dickey-Fuller and Phillips-Perron tests.

Table 3 presents results of the unit root test at the level series, which examine whether the time series data are stationary in their original form. If the test accepts the presence of a unit root, it suggests that differencing is required to achieve stationarity for reliable econometric analysis.

Table 3. Unit root tests: Level series.

Variables	ADF			PP		
	C	C & T	N	C	C & T	N
LGDPPPE	-0.924	-2.859	0.471	-0.909	-2.859	0.503
LGDPPC	-1.559	-1.953	0.187	-1.222	-1.135	0.503
FDI	-4.812***	-4.801**	-0.545	-4.831***	-4.809***	-2.627**
GGFCE	-0.446	-1.794	1.122	0.050	-1.432	2.188
GFCF	-1.060	-0.560	-0.877	-1.060	-0.794	-0.857
INF	-3.741***	-4.114**	-2.029**	-3.989***	-3.885**	-2.365**
POPG	-2.338	-3.398*	-0.444	-2.232	-1.585	-2.055**
TOP	-2.026	-2.622	0.490	-2.036	-2.447	1.240

Note: *** indicates significance at the 1% level; ** denotes significance at the 5% level; and * represents significance at the 10% level.

Table 4 presents the results of the unit root test at the first difference, which assess whether the time series becomes stationary after differencing. Stationarity at first difference means that the series is integrated of order (1), which follows a random process but becomes stable after differencing, making it appropriate for econometric analysis.

Table 4. Unit root tests: First difference series.

Variables	ADF			PP		
	C	C & T	N	C	C & T	N
LGDPPPE	-5.186***	-5.096***	-5.013***	-7.342***	-7.933***	-4.827***
LGDPPC	-3.356**	-3.398*	-3.424***	-3.134**	-3.088	-3.309***
FDI	-6.385***	-6.483***	-6.498***	-20.657***	-25.140***	-18.404***
GGFCE	-5.115***	-5.016***	-4.994***	-5.233***	-9.529***	-4.948***
GFCF	-3.721***	-3.908**	-3.756***	-3.677**	-3.732**	-3.703***
INF	-5.135***	-5.347***	-4.885***	-5.981***	-7.810***	-5.104***
POPG	-2.298	-1.833	-2.960***	-1.832	-2.368	-1.484
TOP	-5.971***	-5.559***	-5.899***	-7.022***	-9.612***	-6.137***

Note: *** indicates significance at the 1% level; ** denotes significance at the 5% level; and * represents significance at the 10% level.

Table 5 presents the bounds test results, which assess the presence of a long-run relationship among the variables. The test determines whether the dependent and independent variables are cointegrated.

Table 5. Bounds test: LGDP_PPE.

Model test		Level of significance	Critical values	
			Lower bound	Upper bound
F-statistic	7.89*	10%	2.38	3.45
		5%	2.69	3.83
		2.5%	2.98	4.16
		1%	3.31	4.63

Note: * represents significance at the 10% level.

4.2. Cointegration Test

The calculated F statistic of 7.89 in the bounds test exceeds the upper and lower critical values. This finding necessitates rejecting the null hypothesis of no cointegration, indicating the presence of a cointegrating relationship among the variables.

Table 6. ARDL estimation: The dependent variable is LGDP_PPE.

Regressor	Coefficient	Standard error	T-statistics
LGDPPC	0.101**	0.046	2.219
FDI	0.024*	0.014	1.699
GGFCE	-0.012	0.013	-0.899
GFCF	-0.022***	0.008	-2.961
INF	-0.017**	0.007	-2.384
POPG	0.181**	0.073	2.474
TOP	0.007**	0.003	2.348

Note: *** indicates significance at the 1% level; ** denotes significance at the 5% level; and * represents significance at the 10% level.

The numbers shown in Table 6 show how much the dependent variable changes in percentage when the independent variables change. Specifically, the coefficient for GDP per capita is 0.10, indicating that a rise in the initial income level is associated with a 10% increase in inclusive growth over the long term. The result is consistent with (Alimi, 2016; Oluseye & Gabriel, 2017).

Moreover, consistent with Xu, Han, Dossou, and Bekun (2021); Munir and Fatima (2020); and Ofori and Asongu (2021), the long-run results for FDI and trade also suggest a positive and significant impact on inclusive growth. Inflation hurts inclusive growth in South Africa; this outcome also follows a priori expectations and is in line with the findings of numerous literature. Gross fixed capital information also depicts a negative and significant impact. Interestingly, the long-run estimates indicate that population growth has a significantly positive impact on inclusive growth in South Africa, contrary to Anyanwu, Kayizzi-mugerwa, and John (2013) and Tella and Alimi (2016) findings, which suggest that population growth in the African countries studied weakens the achievement of inclusive growth. In economic theory, the population growth-economic development nexus is controversial, as contradictory models support both opposing findings.

Table 7. Short-run results.

Regressor	Coefficient	Standard error	T-statistics
C	0.004	0.004	0.994
D(LGDPPPE (-1))	0.960***	0.214	4.497
D(LGDPPC(-1))	-0.038	0.035	-1.101
D(FDI (-1))	0.006***	0.002	3.271
D(GGFCE(-1))	0.003	0.006	0.528
D(GFCF(-1))	0.001	0.003	0.240
D(INF(-1))	-0.007***	0.002	-3.246
D(POPG(-1))	0.072	0.043	1.672
D(TOP(-1))	-0.001	0.001	-0.840
ECM(-1)	-1.144***	0.330	-3.473
R-squared	0.624		
Adjusted R-squared	0.436		

Note: *** indicates significance at the 1% level.

Table 7 presents the short-run coefficients and the ECM model (long-run representation) constructed from the residuals of the long-term model.

The initial levels of income, government consumption, gross fixed capital formation, trade openness, and population growth demonstrate no significant short-term impact on inclusive growth. In contrast, foreign direct investment is associated with a substantially positive contribution, while inflation reflects a notably negative influence, consistent with long-run estimates. The table also observes that, as opposed to the long run, although insignificant, trade openness harms inclusive growth in the short run.

The error correction coefficient is -1.14. This suggests a more incredible speed of adjustment to equilibrium, as the subsequent period corrected the previous errors. It is also statistically significant at a 1% level.

Table 8 depicts the model diagnostic test results for classical assumptions. The results confirm that the short-run models' error terms are normally distributed, free of heteroscedasticity, and have no serial correlation. The Durbin-Watson statistic is greater than the R-squared, implying that the models (short-run) are not spurious.

Table 8. Model diagnostics.

Test	F-statistic	P-value	H0	Conclusion
Normality	1.89	0.39	Residuals are normally distributed	Errors are normally distributed
Heteroskedasticity	1.08	0.44	The residuals are homoscedastic.	No Heteroscedasticity
Serial correlation	0.135	0.71	There is no serial Correlation in the residuals.	No 2nd-order autocorrelation

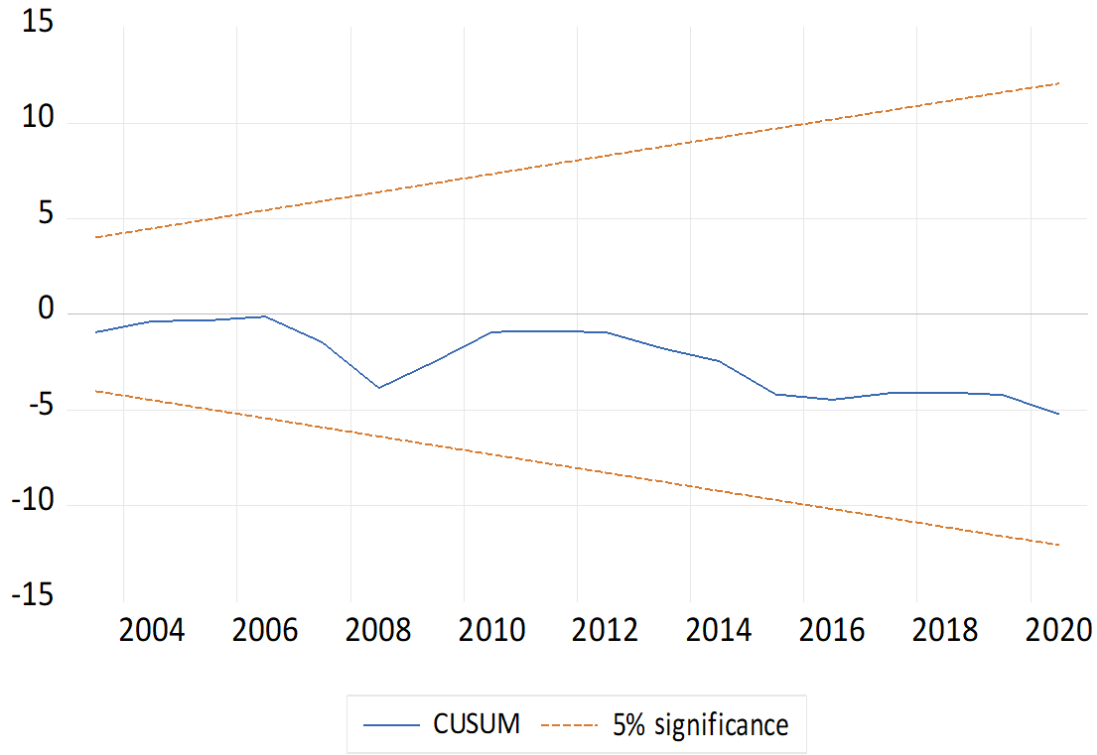

Figure 1. Illustration of cumulative sum of recursive residual (CUSUM) at 5% significance level.

4.3. Stability Tests

The Cumulative Sum of Recursive Residuals (CUSUM) and the Cumulative Sum of Squares of Recursive Residuals (CUSUMQ) are used to check how stable the models are.

The plots of both the CUSUM and the CUSUMSQ (Figure 1 and Figure 2, respectively) are within the boundaries (blue lines are within the range of critical bounds). Therefore, these statistics prove the stability of the long-run coefficients of the repressors that influence inclusive growth in South Africa.

The model demonstrates stability and is adequately specified, as both test statistics remain within the bounds of the 5 per cent significance level.

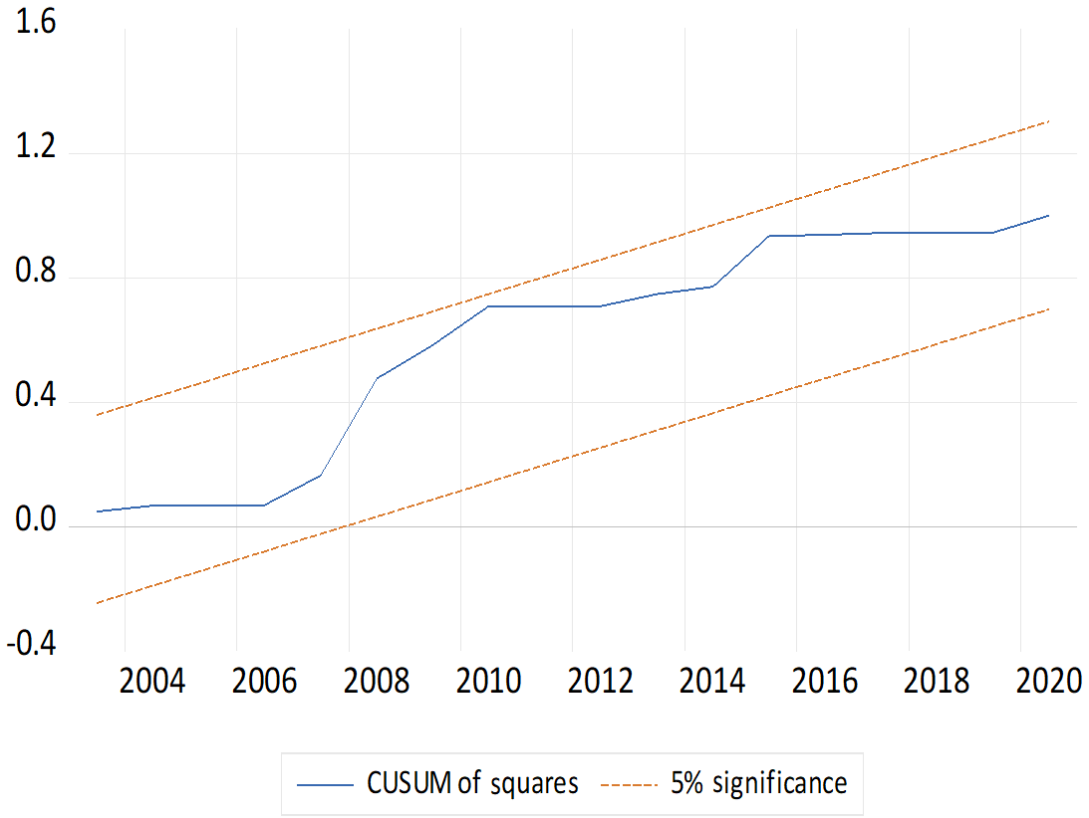

Figure 2. Illustration of cumulative sum of recursive residual (CUSUM) at 5% level of significance.

5. CONCLUSION, POLICY IMPLICATIONS, AND RECOMMENDATIONS

The long-run cointegrating equation indicated that all the variables employed in the model are significant. The results confirm a positive relationship between inclusive growth and initial income per capita, an observation consistent with available literature and theoretical predictions. In the short run, however, a negative insignificant relation was observed. We also observed a significant positive relationship between inclusive growth and foreign direct investment (FDI), both in the long and short run. Available studies also support this, aligning with prior expectations. The results also interestingly indicated that population growth significantly positively influences inclusive growth in South Africa. Even though this result contradicts several available studies, it does correspond with a few other theoretical predictions.

Another intriguing finding was the negative relationship between gross fixed capital formation (a vital component of domestic investment) and inclusive growth in the long run and a positive, insignificant impact on inclusive economic growth in the short run. The result does not align with a priori expectations but is consistent with several recent available studies. The long-run results further confirm that foreign direct investment (FDI) and Trade Openness (TOP) promote inclusive growth in South Africa while inflation negatively influences inclusive economic growth, both in the long and the short run. These outcomes are also in line with a priori expectations. Lastly, Government consumption (G) was found to have no noticeable influence on inclusive growth in the long or short run. Moreover, the R-squared for the study's models ranges from 62 to 84 percent, indicating that the variables of interest in this research give a reasonably good fit to explain the dependent variable of inequality.

The policy implications of these findings thus add to the growing evidence that the government must continue to improve the challenges of unequal access to opportunity and skewed income distribution in the country. In the long run, such improvements will foster significant inclusiveness in economic growth. Moreover, authorities should pursue policies to improve macroeconomic stability to increase foreign direct investment (FDI) inflow while eliminating barriers that prevent FDI from fostering social progress. Competitiveness in the industrial environment

should also encourage greater trade openness. This would increase the relative prices and demand for unskilled labor, leading to an increment in the equal distribution of wages, as South Africa is a low-skilled labor-abundant country. In addition, the government should prioritize enhancing the population's quality by matching education and training with industry needs to effectively leverage the benefits of population growth within the country.

A key challenge faced by previous researchers has been the availability of data. In this context, insufficient data may have led to the exclusion of some variables from the analysis. The absence of data for South Africa also reduced the number of observations in the regression models. However, these issues do not significantly impact the study's results, as they align with theoretical frameworks and empirical evidence regarding the relationship between inclusive growth and the determinants discussed. Areas of further research arising from this study focus on the microeconomic factors influencing inclusive economic growth, as there is increasing evidence that these issues largely drive the constraints on South African economic growth.

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