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Inclusive growth in Côte d'Ivoire: A welfare-based measure and ARDL analysis of its determinants

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Abstract

This paper examines the inclusiveness of economic growth in Côte d'Ivoire over the period 1996–2023 using a unified measure of inclusive growth that captures both income dynamics and equitable distribution. Drawing on a social welfare function inspired by Anand et al. (2013) and employing an Autoregressive Distributed Lag (ARDL) econometric framework, the study identifies the short- and long-term determinants of inclusive growth. The findings indicate that investment promotes inclusive growth in the short run, while education, trade openness, and quality of governance are the main drivers in the long run. A robustness check based on the Rolling ARDL method confirms the temporal stability of the estimated relationships, underscoring the critical role of institutions in fostering an equitable development path. These results provide valuable policy insights for steering economic strategies toward greater equity.

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1. Introduction

In a global context characterized by persistent inequalities and growing scepticism toward the traditional growth model, the concept of *inclusive growth* has emerged as a central issue in both economic theory and policy debates. This notion goes beyond the mere expansion of national income to examine an economy's ability to generate equitable opportunities and to distribute the benefits of growth across the entire population.

The term inclusive growth gained prominence in international development discourse in the mid-2000s, particularly through the Asian Development Bank's Strategy 2020, and was subsequently formalized by the World Bank (2010), the OECD (2012) and the IMF (2013). It was introduced to move beyond narrow, income-based conceptions of "pro-poor growth" and to emphasize both the pace and the pattern of economic expansion, how growth is generated and how its benefits are shared. Following Anand, Mishra and Peiris (2013), inclusive growth can be defined as a process that unifies economic efficiency and social equity by integrating growth performance and income distribution within a single analytical framework. Formally, it relies on a utilitarian social-welfare function that satisfies two key properties: it must be increasing in income (capturing the growth dimension) and must satisfy the transfer principle, whereby any transfer of income from a poorer to a richer individual reduces social welfare. Growth is therefore inclusive when average income rises and the social mobility curve of income distribution shifts upward across all population segments, indicating that the gains from growth are broadly shared and sustainable. This approach, rooted in the absolute rather than the relative definition of pro-poor growth (Ravallion & Chen, 2003; Dollar & Kraay, 2002), provides the theoretical foundation for the unified measure of inclusiveness adopted in this study.

Building on this conceptual foundation, several empirical studies have emphasized that the sustainability and quality of growth depend critically on its inclusiveness. According to Berg et al. (2011a) and Kraay (2004), sustainable growth requires not only strong economic performance but also a fair distribution of its outcomes across the population. Similarly, the Commission on Growth and Development (2008) stresses the need to integrate equity, equal opportunity, and social protection into growth strategies. In this perspective, inclusive growth represents a paradigm shift in development policy it is not confined to accelerating output but rather seeks to ensure that economic progress translates into tangible welfare improvements for all.

The analytical distinction proposed by Ravallion and Chen (2003) between absolute and relative pro-poor growth, later extended by Anand et al. (2013) through a welfare-based indicator, provides a useful framework for understanding how the pattern of growth affects equity. Subsequent contributions by Ianchovichina and Gable (2011), Aoyagi and Ganelli (2015), and Ali and Son (2007) have empirically explored the determinants of inclusive growth across various country contexts, highlighting the importance of institutional quality, education, and openness in shaping inclusive outcomes.

Building on these theoretical and empirical insights, it becomes essential to examine how these dynamics unfold in specific national contexts where robust economic performance has not always translated into broad-based welfare gains. Côte d'Ivoire provides a particularly relevant case in point. Like many developing economies, the country has experienced sustained economic growth over the past two decades, with an average annual rate exceeding 7 percent during the last decade. Yet this macroeconomic performance has not been accompanied by commensurate social progress. Despite the decline in the monetary poverty rate from 55.01 percent in 2011 to 39.4 percent in 2018 (INS, 2019), inequality remains high, with a Gini index of 41.5 in 2018 (World Bank, PovcalNet),

and substantial disparities persist between urban and rural areas. The Human Development Index (HDI), although slightly improving, remains modest at 0.582 in 2024 (UNDP), reflecting the limited translation of growth gains into human development.

This paradox between sustained economic expansion and persistent social disparities makes Côte d'Ivoire a compelling case for examining the extent to which growth has translated into broad-based welfare gains. Understanding the nature and determinants of this disconnect is therefore crucial for designing policies capable of fostering inclusive and sustainable development.

The period under study (1996–2023) also encompasses major economic and political developments that are likely to have influenced the trajectory of inclusive growth in Côte d'Ivoire. In particular, the country experienced a prolonged phase of political instability and civil conflict between 1999 and 2011, which disrupted economic activity and weakened institutional effectiveness. Since 2012, Côte d'Ivoire has entered a period of strong economic recovery, characterized by sustained growth and increasing integration into global markets. In addition, external shocks such as the 2008 global financial crisis and the COVID-19 pandemic have affected macroeconomic conditions and distributional outcomes. These structural and cyclical dynamics provide an essential background for interpreting the evolution of inclusive growth and its determinants over time.

In this context, the pivotal research question guiding this study is whether the strong economic growth observed in Côte d'Ivoire over the past decades has been inclusive, and what structural and institutional factors explain its degree of inclusiveness. Accordingly, this paper aims to construct a unified measure of inclusive growth and to identify its short- and long-term determinants within a welfare-based analytical framework. Addressing this question provides both an empirical diagnostic of the country's growth pattern and policy-relevant insights into how economic performance can be made more equitable and sustainable.

Against this background, the present study contributes to the literature on inclusive growth in three main ways. First, it provides an integrated assessment of inclusive growth in Côte d'Ivoire by constructing a unified indicator that jointly captures the pace and the pattern of economic expansion. Drawing on the welfare-based framework developed by Anand, Mishra and Peiris (2013), the proposed measure combines both the level and the distributional aspects of income, thereby overcoming the limitations of traditional approaches that analyse growth and inequality separately. This unified perspective allows for a more coherent evaluation of how economic performance translates into shared prosperity. Second, the study empirically investigates the short- and long-term determinants of inclusive growth over the period 1996–2023, using the Autoregressive Distributed Lag (ARDL) methodology. By incorporating variables such as education expenditure, investment, trade openness, governance quality, inflation, and foreign direct investment, it identifies the key structural and institutional factors that influence the inclusiveness of economic growth. This time-series perspective provides dynamic insights into how policy and macroeconomic variables interact to shape inclusiveness over different horizons. Third, the paper adopts a policy-oriented perspective by translating its empirical results into concrete recommendations for achieving more equitable growth. In doing so, it contributes to bridging the gap between academic research and policy design. Overall, this study contributes to the empirical literature on inclusive growth by offering new evidence from Côte d'Ivoire, whose experience illustrates the opportunities and constraints faced by rapidly growing economies in translating growth into equitable welfare outcomes. It further provides useful insights for policymakers seeking to reconcile economic dynamism with social inclusion and sustainable development.

The remainder of the paper is organized as follows: Section 2 outlines the methodological approach used to construct the inclusive growth indicator; Section 3 presents the data and the econometric

strategy adopted; Section 4 analyses the empirical results, including robustness checks; and finally, Section 5 summarizes the main conclusions and offers policy recommendations.

2. Methodology

The methodological approach first establishes the theoretical foundations of the inclusive growth measure used in this paper and then presents the econometric estimation strategy employed.

2.1. Measuring Inclusive Growth

Inspired by Anand et al. (2013), we construct a unified measure of inclusive growth that combines two key components: overall economic growth and income distribution.

Our inclusive growth indicator is based on a utilitarian social welfare function inspired by consumer choice theory. This approach relies on two essential components: (i) income growth and (ii) income distribution. The adopted social welfare function must satisfy two fundamental principles: (i) it must be increasing in its argument, to reflect the growth dimension, and (ii) it must satisfy the transfer principle, meaning that any transfer of income from a poorer to a richer individual reduces the value of the function, thereby highlighting its distributive dimension.

Let us assume a population of size n and let y_i denote the income of individual i , where $i = 1, \dots, n$. Let $\bar{y}_x$ the average income of the poorest x percent of the population, where x ranges from 0 to 100 and $\bar{y}$ is the average income in the population.

Let us define $\bar{y}^* = \int_0^{100} \bar{y}_x dx$. The larger $\bar{y}^*$ is, the higher the income level. In the case of an equitable distribution of income within the population (everyone has the same income), then $\bar{y}^*$ is equal to the average income of the population, that is $\bar{y}^* = \bar{y}$. A measure that $\bar{y}^*$ is lower than $\bar{y}$, which implies that the income distribution within the population is more unequal.

Thus, a measure of income inequality is the gap between $\bar{y}^*$ and the population's average income. The average income in the population $\bar{y}$ which we express as ω is defined as:

$$\omega = \frac{\bar{y}^*}{\bar{y}} \quad (1)$$

In a perfectly equitable society, we have $\omega = 1$. The closer ω is to 1, the more egalitarian the society is, with smaller income disparities between individuals.

By rewriting equation (1), we have:

$$\bar{y}^* = \omega * \bar{y} \quad (2)$$

Inclusive growth will require an increase in the quantity $\bar{y}^*$. In turn, an increase in $\bar{y}^*$ can be decomposed into two sources: an increase in per capita income ($\bar{y}$) and an increase in equity (ω).

Differentiating equation (2) yields equation (3) as follows.

$$d\bar{y}^* = \omega * d\bar{y} + \bar{y} * d\omega \quad (3)$$

In equation (3), $d\bar{y}^*$ represents the variation in $\bar{y}^*$. The more inclusive the growth, the more $d\bar{y}^*$ is positive and high ($d\bar{y}^* > 0$). The first term of the equation, $\omega * d\bar{y}$, represents the contribution of per capita income growth $d\bar{y}$ to inclusive growth, given a fixed level of equity; the second term

$\bar{y} * d\omega$, expresses the contribution of equity growth $d\omega$ to inclusive growth, given a fixed level of per capita income.

When per capita income growth is negative and equity growth is also negative, then unambiguously, the growth is non-inclusive, characterized by $d\bar{y}^* < 0$. However, a trade-off between per capita income and equity arises when the two terms of the equation have opposite signs. Specifically, when per capita income growth is negative ($d\bar{y} < 0$) and equity growth is positive ($d\omega > 0$), then inclusion is achieved through a contraction in per capita income. However, when per capita income growth is positive ($d\bar{y} > 0$) and equity growth is negative ($d\omega < 0$), then inclusion is achieved through a reduction in equity.

We can rewrite equation (3) as:

$$\frac{d\bar{y}^*}{\bar{y}^*} = \frac{d\bar{y}}{\bar{y}} + \frac{d\omega}{\omega} \quad (4)$$

Equation (4) shows that the inclusive growth rate can be decomposed into the sum of the growth rate of per capita income and the growth rate of equity.

In this study, $\frac{d\bar{y}}{\bar{y}}$ represents the growth rate of GDP per capita. We use the Gini income inequality index. Thus, if G denotes the Gini index, the equity index is obtained using the following formula: $\omega = 1 - G$.

2.2. Data and Estimation Method

After computing the inclusive growth rate using the methodology described above, our objective is to analyse its determinants within a time series framework, using data for Côte d'Ivoire over the period 1996 to 2023. The sample period begins in 1996 due to data availability constraints, especially for governance indicators, which are only available from that year onward.

Let I_t denote the inclusive growth rate in year t and let X_t denote a vector of potential explanatory variables for inclusive growth.

The econometric equation is specified as follows:

$$I_t = \gamma'X_t + \varepsilon_t \quad (5).$$

The error terms are denoted by ε_t . The selection of explanatory variables is grounded in both theoretical considerations and empirical evidence from the literature on the determinants of inclusive growth. Human capital accumulation, often proxied by public expenditure on education, is considered a key driver of inclusive growth, as it enhances productivity and expands access to economic opportunities (Barro, 1991; Acemoglu & Autor, 2011; Aoyagi & Ganelli, 2015). Investment, measured by gross fixed capital formation, is another important channel through which productive capacity and employment opportunities are increased, thereby improving income distribution (Kraay, 2004; Berg & Ostry, 2011b). Trade openness is included as a proxy for integration into global markets, which can promote inclusive growth by stimulating exports, attracting technology transfers, and creating new jobs, though its distributional effects depend on complementary domestic policies (Ianchovichina & Gable, 2011; Aizenman, Lee & Park, 2012). Foreign direct investment (FDI) serves as an additional channel for capital inflows and knowledge diffusion, which may foster inclusiveness when accompanied by adequate absorptive capacity (Ali & Son, 2007; Milanovic, 2010). The inclusion of inflation reflects macroeconomic stability considerations, since high and volatile inflation tends to erode real incomes, particularly for low-

income households, thereby undermining inclusiveness (Okun, 1975; IMF, 2007). Finally, governance quality is incorporated as a structural determinant of inclusive growth: good governance ensures that public resources are used efficiently, institutions are accountable, and the benefits of growth reach a broader population segment (Kaufmann, Kraay & Mastruzzi, 2009; Anand et al., 2013; Berg et al., 2011a). Together, these variables capture the main channels, human capital, investment, openness, macroeconomic stability, and institutional quality, through which economic performance translates into equitable welfare improvements.

The estimation strategy involved conducting unit root tests, followed by the estimation of the model using an appropriate econometric approach. The stationarity tests revealed that the dependent variable is integrated of order one ($I(1)$), while the explanatory variables are a mix of $I(0)$ and $I(1)$. Given this mix of integration orders, the analysis follows the Autoregressive Distributed Lag (ARDL) bounds testing procedure developed by Pesaran, Shin, and Smith (2001) to assess the presence of long-run relationships among the variables. The ARDL model offers several advantages that make it particularly appropriate for the objectives of this study. First, it allows for the estimation of both short-run and long-run dynamics within a single equation framework, thereby avoiding the potential loss of long-run information often encountered in first-difference models (Pesaran & Shin, 1999; Pesaran et al., 2001). Second, unlike traditional cointegration techniques such as the Johansen or Engle–Granger approaches, the ARDL bounds testing procedure can be applied irrespective of whether the underlying variables are integrated of order $I(0)$, $I(1)$, or a combination of both, provided that none are $I(2)$. This flexibility is especially useful in small-sample settings such as ours. Third, the estimator corrects for potential endogeneity by incorporating appropriate lags of both the dependent and independent variables, capturing the dynamic adjustments that link current and past values of inclusive growth and its determinants.

Before estimating the long-run coefficients, it is necessary to confirm the existence of a long-run equilibrium relationship among the variables. To this end, the study applies the ARDL bounds testing approach to cointegration proposed by Pesaran, Shin, and Smith (2001). As recommended by Konstantakopoulou (2016) and McNown et al. (2018), this bounds test procedure provides a robust and small-sample-consistent framework for validating long-run equilibrium relationships before deriving the associated short- and long-run dynamics.

Table A-1 (in the appendix) presents the variables, their definitions, and data sources.

3. Results

Table 1 presents the descriptive statistics of the model variables. The analysis of data for Côte d'Ivoire over the period 1996 to 2023 reveals considerable variability across economic indicators. Inclusive growth shows a moderately positive average of 0.016, with noticeable volatility ranging from negative to relatively high values suggesting fluctuations in the distribution of the benefits of economic growth over time. Public spending on education averages 3.11% of GDP and exhibits low dispersion, indicating relative stability in the government's commitment to education, although the level remains modest. The trade openness ratio is relatively high, at 55.55% of GDP, reflecting Côte d'Ivoire's increasing integration into international trade, though the variability suggests periods of greater or lesser openness. Investment averages 18.99% of GDP. Inflation displays significant variation, with an average of 2.52% but ranging from deflation to high inflation, indicating episodes of monetary instability. Governance quality, measured by an average index of -0.836, remains low, which may negatively affect overall economic performance.

Table 1: Descriptive Statistics

Variable	Observation	Mean	Standard Deviation	Min	Max
Inclusive growth	28	0.016	0.047	-0.076	0.090
Education expenditure (% of GDP)	28	3.110	0.419	2.400	3.936
Trade openness (% of GDP)	28	55.553	7.305	41.943	70.301
Investment (% of GDP)	28	18.992	3.799	12.844	27.807
Inflation	28	2.524	1.795	-1.107	6.309
FDI (% of GDP)	28	0.853	0.695	-0.147	2.279
Quality of Governance	28	-0.836	0.360	-1.441	-0.376

Table 2 presents the correlation matrix between the different variables of the model. It shows that inclusive growth in Côte d'Ivoire is significantly and positively correlated with several key variables. In particular, it is strongly associated with education expenditure (0.594 at the 1% significance level), investment (0.629 at 1%), FDI (0.413 at 5%), and governance quality (0.488 at 1%), indicating that increases in these factors promote more inclusive growth.

Table 2: Correlation Matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) Inclusive growth	1.000						
(2) Education expenditure	0.594***	1.000					
(3) Trade openness	-0.179	-0.285	1.000				
(4) Investment	0.629***	0.642***	-0.485***	1.000			
(5) Inflation	-0.333*	-0.349*	0.154	-0.187	1.000		
(6) FDI	0.413**	0.661***	-0.040	0.341*	-0.072	1.000	
(7) Quality of Governance	0.488***	0.244	-0.683***	0.758***	-0.094	-0.012	1.000

Note: *** $p < .01$, ** $p < .05$, * $p < .1$

According to Table 3, which reports the results of the Augmented Dickey-Fuller (ADF) unit root tests, only inflation is stationary at level, with a test statistic of -4.039 and a p-value of 0.001 , significant at the 1% level. The other variables, such as inclusive growth (-2.782 , p-value = 0.060) and governance quality (-0.985 , p-value = 0.759), are not stationary at the 5% level in levels. However, when taken in first differences, all variables become stationary, with p-values below 1%. Overall, at the 5% significance level, the dependent variable is integrated of order one $I(1)$, while the explanatory variables are a mix of $I(0)$ and $I(1)$.

Table 3: ADF Unit Root Test

	Level		First difference	
	Stat.	p-value	Stat.	p-value
Inclusive growth	-2.782*	0.060	-7.606***	0.000
Education expenditure	-1.710	0.426	-6.711***	0.000
Trade openness	-1.417	0.574	-4.978***	0.000
Investment	-0.284	0.928	-4.708***	0.000
Inflation	-4.039***	0.001	-8.015***	0.000
FDI	-2.455	0.127	-5.429***	0.000
Quality of Governance	-0.985	0.759	-3.999***	0.001

Note: *** $p < .01$, ** $p < .05$, * $p < .1$

The ARDL bounds testing procedure developed by Pesaran, Shin, and Smith (2001) was applied to test for the existence of a long-run relationship among the variables. The computed F-statistic (5.368) exceeds the upper critical value at the 5% significance level ($I(1) = 5.071$), while the corresponding t-statistic (-4.915) is more extreme than its upper bound (-4.308). These results lead to the rejection of the null hypothesis of no level relationship, confirming the existence of a long-run equilibrium relationship between inclusive growth and its determinants. Table 4 presents the results of the short-run analysis of the determinants of inclusive growth. According to the estimates, education expenditure has a negative and statistically significant effect at the 5% level on inclusive growth, with a coefficient of -0.074 (standard error = 0.034). This suggests that an increase in education spending may exert downward pressure on inclusive growth in the short term. Conversely, investment has a positive and significant effect at the 5% level, with a coefficient of 0.012 (standard error = 0.005), indicating that higher investment levels may foster inclusive growth in the short run. Other variables, including trade openness, inflation, FDI, and governance quality, do not exhibit statistically significant short-run effects on inclusive growth, as reflected in their respective coefficients and standard errors.

Table 4: Short-term effects of the determinants of inclusive growth

Variable	Coefficient / Std. Error
D(Education Expenditure)	-0.074** (0.034)
D(Trade Openness)	-0.001 (0.002)
D(Investment)	0.012** (0.005)
D(Inflation)	0.006 (0.007)
D(FDI)	-0.002 (0.018)
D(Governance Quality)	-0.034 (0.080)

Note: *** $p < .01$, ** $p < .05$, * $p < .1$; D(X) denotes the first difference of X.

The long-run effects of the determinants of inclusive growth are presented in Table 5. The results reveal several significant variables with noteworthy effects. First, the lagged value of inclusive growth has a negative and statistically significant impact at the 1% level, with a coefficient of -1.127 (standard error = 0.264). This suggests that, in the absence of further policy interventions, inclusive growth tends to stabilize or even decline over time. Regarding other variables, education expenditure exhibits a positive and significant long-run effect at the 5% level, with a coefficient of 0.101 (standard error = 0.046), indicating that increased investment in education fosters long-term inclusive growth. Similarly, trade openness also shows a positive and significant effect at the 5% level, with a coefficient of 0.004 (standard error = 0.002), suggesting that greater economic openness contributes to more inclusive growth in the long run.

In contrast, investment, inflation, and foreign direct investment (FDI) do not exhibit significant long-run effects on inclusive growth. Finally, governance quality has a positive and statistically significant impact at the 5% level, with a coefficient of 0.164 (standard error = 0.059), indicating that improvements in governance can foster inclusive growth over the long term. These findings provide important insights for public policies aimed at promoting sustainable inclusive growth.

Table 5: Long-Run Effects of the Determinants of Inclusive Growth

Variable	Coefficient / Std. Error
Lag (Inclusive Growth)	-1.127*** (0.264)
Education Expenditure	0.101** (0.045)
Trade Openness	0.004** (0.001)
Investment	-0.010 (0.007)
Inflation	-0.009 (0.007)
FDI	0.002 (0.019)
Governance Quality	0.1642** (0.0587)

Note: *** $p < .01$, ** $p < .05$, * $p < .1$; standard errors in parentheses.

4. Discussion of Results

The short-run results (Table 4) reveal heterogeneous effects of the main determinants of inclusive growth in Côte d'Ivoire. Education expenditure exhibits a negative and statistically significant effect at the 5% level (−0.075), which appears paradoxical given its expected role in promoting inclusive growth. This result may reflect several complementary mechanisms. First, the returns to education are inherently delayed, as human capital accumulation takes time to translate into productivity gains (Barro, 1991; Lucas, 1988). Second, short-term inefficiencies in public spending and weak alignment with labor market needs may limit its immediate inclusiveness (Pritchett, 2001; Rajkumar and Swaroop, 2008). Third, fiscal trade-offs may reduce the short-term redistributive impact of education spending (Devarajan et al., 1996). By contrast, governance quality does not exhibit a statistically significant effect in the short run. This finding is consistent with the literature emphasizing the gradual and structural nature of institutional effects. Institutions typically influence economic performance through long-term channels—such as improved policy credibility, stronger property rights, and greater efficiency in public resource allocation—which require time to materialize (North, 1990; Acemoglu et al., 2005). Empirical evidence also shows that governance improvements are more strongly associated with long-term development outcomes than with short-term fluctuations (Kaufmann et al., 2009; Anand et al., 2013). Therefore, the

absence of short-run significance does not contradict theoretical expectations but rather reflects the temporal dynamics of institutional change. In contrast, investment exhibits a positive and significant effect (0.012), consistent with expectations that increased public investment can stimulate job creation and reduce inequalities in the short term. These findings may also reflect the specific historical and institutional context of Côte d'Ivoire over the study period.

The long-run results (Table 5) provide more nuanced insights. A negative effect of past inclusive growth (-1.128) on future growth is observed, suggesting a degree of inertia or path dependence in the growth dynamics, whereby the effects of initial growth may dissipate over time in the absence of new structural reforms. This phenomenon is often seen in developing countries, where growth gains are not always sustainable. By contrast, variables such as governance quality (0.164) and education expenditure (0.102) exhibit positive and statistically significant long-term effects, indicating that investments in better governance and education contribute to sustained inclusive growth. Trade openness, with a positive and significant long-run coefficient (0.0040), substantiates the idea that integration into international trade can positively influence the distribution of growth benefits, particularly in a developing country such as Côte d'Ivoire.

When comparing these findings with the existing literature, several elements are consistent with established economic theories on inclusive growth. For instance, studies such as Barro (1991) and Kaufmann et al. (2009) support the view that governance quality and education expenditure are key factors for achieving sustainable inclusive growth. However, the short-term negative effect of education spending and the long-run inertia observed in inclusive growth appear somewhat controversial. This contrast may stem from contextual factors specific to Côte d'Ivoire, such as economic shocks or political challenges that delay the transmission of education investments and hinder the sustainability of inclusive growth.

In conclusion, while the results of this study confirm the importance of certain variables such as investment and governance in supporting inclusive growth, they also highlight specific dynamics tied to the Ivorian context. The temporary effects of certain variables, such as education, suggest that deep structural reforms and policy adjustments will be necessary to ensure that growth in Côte d'Ivoire becomes genuinely inclusive over the long term.

5. Sensitivity Analysis

To enhance the credibility of the empirical results obtained from the baseline ARDL model, it is paramount to assess their stability over time. In a context such as that of Côte d'Ivoire characterized by successive economic, political, and institutional shocks, economic relationships may be subject to structural breaks or regime changes. The Rolling ARDL approach, inspired by the work of Pesaran and Shin (1999) and Hansen (2001), involves estimating the model over fixed-size rolling windows, allowing for an examination of the robustness of the estimated coefficients by observing their evolution across successive sub-periods. This method offers several advantages. On the one hand, it helps identify periods of stability and instability in the relationship between inclusive growth and its determinants. On the other hand, it is well-suited to small samples, as it does not rely on strict asymptotic assumptions. By capturing the temporal dynamics of the effects, the Rolling ARDL approach provides a complementary and rigorous check on the robustness of the initial results.

The results indicate that the effect of trade openness on inclusive growth is generally positive and relatively stable, confirming its favourable role in spreading the gains of economic growth. In

contrast, the effect of governance appears more variable: it is positive and strong at the beginning and end of the period (1996–2005 and 2010–2019), but weaker and even negative around the 2005–2016 period, likely reflecting episodes of political or institutional instability. The negative coefficients of governance observed during certain sub-periods—particularly those covering the global financial crisis (2008) and the COVID-19 pandemic (2020), warrant further interpretation. While governance quality is generally expected to promote inclusive growth, these results may reflect the greater exposure of more institutionally developed economies to global shocks. Countries with stronger governance are typically more integrated into international trade and financial systems, which can amplify the transmission of external downturns in the short run (Rodrik, 1998; Kose et al., 2009). In such periods of global instability, the adverse effects of external shocks may temporarily outweigh the benefits of institutional quality. This suggests that while governance supports inclusive growth in normal times, its short-term effects may be attenuated or even reversed during major global disruptions. This interpretation is consistent with the temporal variability observed in Table 6 and may be particularly relevant in the case of Côte d’Ivoire, given its increasing integration into global markets. This pattern is consistent with major political and economic episodes observed over the study period.

The effect of education expenditure could not be reliably estimated over these rolling windows, suggesting a long-term impact that is difficult to capture over short time horizons.

Table 6: Estimated Coefficients from Rolling Window (ARDL)

Period	Trade Openness	Governance Quality
1996–2005	0.0354	0.621
1997–2006	0.0057	0.035
1998–2007	0.0094	0.022
1999–2008	0.0061	-0.162
2000–2009	0.0088	-0.039
2001–2010	0.0097	-0.068
2002–2011	0.0100	-0.076
2003–2012	0.0049	-0.176
2004–2013	-0.0027	-0.052
2005–2014	-0.0035	-0.033
2006–2015	-0.0007	-0.103
2007–2016	0.0027	-0.002
2008–2017	0.0205	0.231
2009–2018	0.0060	0.149
2010–2019	0.0080	0.521
2011–2020	-0.0015	-0.346
2012–2021	0.0032	-0.0858
2013–2022	0.0007	-0.327
2014–2023	0.0037	-0.217

This test supports the robustness of the main results while highlighting the importance of accounting for structural breaks and historical context in the analysis of inclusive growth.

6. Conclusion

This study has explored the determinants of inclusive growth in Côte d'Ivoire over the period 1996 to 2023, using an analytical framework that combines a synthetic measure based on a social welfare function with an ARDL econometric model. The results reveal varying effects depending on the time horizon. In the short run, investment emerges as an effective lever for fostering more inclusive growth, whereas education expenditure exhibits a paradoxically negative effect likely due to the time lag between educational investment and its economic returns.

In the long run, the study identifies three key drivers of sustainable inclusive growth: education, trade openness, and governance quality. These findings are consistent with insights from the literature (Barro, 1991; Kaufmann et al., 2009; Anand et al., 2013), which emphasize the importance of institutions and human capital in the structural transformation of economies. By contrast, variables such as investment and foreign direct investment (FDI), while relevant in the short run, do not exhibit robust long-term effects in this specific context.

The robustness checks, particularly the rolling window approach (Rolling ARDL), confirm the stability of the effects of trade openness and governance across most sub-periods, while also revealing temporal heterogeneity that underscores the importance of a context-specific interpretation of empirical results. This dynamic calls for particular caution in the formulation of public policies.

Based on these findings, several policy recommendations emerge. First, education policies should go beyond increasing public spending and focus on improving the efficiency and relevance of the education system. This includes strengthening the alignment between training programs and labor market needs, promoting technical and vocational education, and improving the quality of public expenditure through better governance and accountability mechanisms. Second, enhancing governance quality requires concrete institutional reforms, such as strengthening anti-corruption frameworks, improving public financial management, and increasing transparency in budget execution. These measures are essential to ensure that public resources effectively translate into inclusive outcomes. Third, trade openness should be accompanied by complementary policies aimed at maximizing its inclusive effects. In particular, targeted support for small and medium-sized enterprises (SMEs), investment in infrastructure, and the development of social protection mechanisms can help mitigate potential inequalities associated with globalization. Finally, given the sensitivity of inclusive growth to economic shocks, policymakers should also prioritize macroeconomic resilience by building fiscal buffers and strengthening crisis-response mechanisms. Such measures would help ensure that the benefits of growth are sustained and more evenly distributed over time. These recommendations are particularly relevant in the context of Côte d'Ivoire's ongoing structural transformation and increasing integration into global markets.

This study opens avenues for future research on the microeconomic transmission channels of inclusive growth, as well as on the interaction between tax policies, inequality, and social welfare. The proposed approach could also be extended to other African countries to enable regional comparisons of inclusive growth trajectories.

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Appendix

Tableau A-1: *Variable Definitions*

Variable	Description	Source
Inclusive Growth	Indicator of inclusive economic growth	WDI, author's calculation
Education Expenditure (% of GDP)	Total public education spending as a percentage of GDP	WDI
Trade Openness (% of GDP)	Sum of exports and imports as a percentage of GDP	WDI
Investment (% of GDP)	Gross fixed capital formation as a percentage of GDP	WDI
Inflation	Inflation rate based on the Consumer Price Index (CPI)	WDI
FDI (% of GDP)	Inward foreign direct investment as a percentage of GDP	WDI
Quality of Governance	Average of the six World Bank governance indicators	WGI

Tableau A-2: Results of the ARDL Bounds Cointegration Test

Statistic	Value	5% Critical Bounds [I(0) – I(1)]	Interpretation
F-statistic	5.368	[3.326 – 5.071]	$F > I(1) \rightarrow$ Cointegration confirmed
t-statistic	-4.915	[-2.898 – -4.308]	$t < I(1) \rightarrow$ Cointegration confirmed