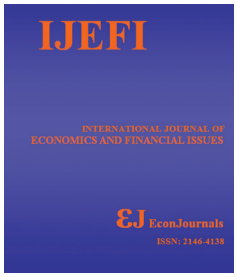

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The Impact of Informality on Inclusive Growth in Developing Countries: Does Institutional Quality Matter?

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ABSTRACT

Inclusive growth, a critical measure of national progress, has gained significant attention from policymakers due to the persistent issues of income inequality and poverty despite economic growth. This paper explores the impact of informality on inclusive growth in developing countries and mediating role of institutional quality on inclusive growth-informality nexus. For empirical analysis, the study employs the system GMM approach to examine how informality affect inclusive growth over the period 2008-2020. An inclusive growth index is constructed using the social opportunity function, and since inclusive growth is a multidimensional concept, multiple variables are used to better capture its different facets of inclusive growth. These variables include the Human Development Index (HDI), the Gender Inequality Index (GII), carbon emissions, income growth of the bottom 40% (Growth 40), and real GDP per person employed. The empirical findings revealed that informality, such as vulnerable, dynamic general based measure of informal economy and MMIC-based measure of informal economy, negatively affects inclusive growth, with self-employment showing an insignificant impact. Importantly, institutional quality plays a crucial mediating role in the relationship between informality and inclusive growth. Further the study also construct indifference curves for selected developing countries to show their growth inclusiveness. Finally, the study suggests policies to promote innovative activities, improve the institutional framework, and encourage formalization to enhance inclusive growth in developing countries.

Keywords: Inclusive Growth, Informality, Institutional Quality, Developing Countries
JEL Classification: O43

1. INTRODUCTION

Countries exhibit different growth paths, with some achieving significant rates of economic expansion compared to others. Likewise, the evidence suggests that there can be different outcomes of poverty reduction and income distribution for the same growth rate (Ali and Son, 2007; Bassier and Woolard, 2021). The current growth trends in the developing regions have reshaped the economies resulting in widespread poverty across many countries. Developing nations made some progress in reducing poverty as part of meeting the 2015 Millennium Development Goals (MDGs) target. However, by the end of 2015, this reduction was not satisfactory (World Bank, 2018), making Asia and Sub-Saharan Africa (SSA) the areas to fall short of the 2015 target (Amponsah et al., 2021; World Bank, 2016). The proponent of pro-poor growth argues that although growth is an important factor for poverty reduction it doesn't always lead to poverty reduction (Dollar and Kraay, 2004; Samsan, et al., 2015). The fruits of growth disproportionately favor the top income bracket, exacerbating income inequality (Campos-Vazquez et al., 2017) and health inequality (Naik et al., 2020; Keetile and Yaya, 2023). This undermined the idea that the benefits of economic

growth will ultimately trickle down to the poorer population of developing societies, leading to concerns about the distributional effects of economic growth. Similarly, it has long been discussed that the process of economic growth generates several social and environmental problems which separate the concept of well-being from material prosperity. Besides this, Elson et al. (2019) considered that economic growth is essentially a gendered process and it results in gender-based inequalities and gender-based inequalities serve as a barrier to shared prosperity more commonly in developing countries.

Considering this, Policy priorities have been shifted towards fostering inclusive growth. Thus, the idea of inclusive growth is very important to consider which not only takes into account the increase in quantities but also defines the concept of well-being in a very broader term (Anand et al., 2013; Mlachila et al., 2017). In many countries, inclusive growth has become a major focus in both, development studies and policymaking. Inclusive growth refers to an approach to economic development that aims to ensure the benefits of growth are shared equitably across all segments of society. It focuses on creating opportunities for marginalized and vulnerable groups to participate in and take benefits from the economic growth process. Inclusive growth involves reducing income inequality, improving access to education and healthcare, and the promotion of social inclusion. It also emphasizes sustainable development practices that protect the environment and foster long-term prosperity for all (Ali and Son, 2007; Anand et al., 2013).

1.1. Poverty Inequality and Inclusive Growth in Developing Countries

High-income economies have the highest average score of inclusiveness, more than twice that of low-income economies and about 50% higher than lower-middle-income economies (Figure 1). Upper-middle income economies have somewhat stronger inclusiveness performance on average. Furthermore, low- and lower-middle-income economies outperform the global average in terms of sustainability-aligned growth. This is attributed to lower resource use, notwithstanding their poor performance in green finance and technology. Robust growth refers to an economy's ability to endure and recover from shocks. High-income countries have the best robust growth performance, followed by upper-middle-income and lower-middle-income countries. Low-income countries have the least resilient growth

Over the last two decades, global poverty has shown a significant reduction, the poverty headcount ratio. In 2017 PPP, the poverty headcount ratio decreased from 59.3% in 2002 to 44.5% in 2017, marking a substantial decline to the 2.15/day poverty threshold (Figure 2). However, at 6.85/day, poverty remained stagnant in low-income countries. In addition, in lower-middle-income and upper-middle-income countries, the poverty headcount ratio at 2.15/day in 2017 PPP has experienced a significant decline. Specifically, in lower-middle-income countries, the poverty headcount ratio has decreased from 36.2% in 2002 to 12% in 2022. In upper-middle-income countries over the last two decades poverty has reduced from 25.2 to 1.4%, this remarkable reduction underscores substantial progress in poverty alleviation efforts within lower-middle-income countries over the past two decades.

In lower-middle-income countries, the bottom 20% of the population holds only 4% of the income share, whereas the top 20% holds 43%. In upper-middle-income countries, the income share is slightly more evenly distributed, with the bottom 20% holding 4% of the income share and the top 20% holding 41%. Finally, in high-income countries, the income share of the bottom 20% is 6%, while the top 20% holds 36% of the total income. These disparities underscore the persistent challenge of income inequality across different income categories, despite variations in overall economic development. Addressing these disparities requires targeted policies aimed at redistributing wealth, promoting inclusive economic growth, and ensuring equitable access to opportunities and resources for all segments of society (Figure 3).

Achieving inclusive growth is considered a key policy goal to improve income distribution, decrease poverty, and address the issue of gender, health, and educational disparities in developing and emerging economies (OECD, 2015; World Bank, 2019; IMF 2021). Although in developing countries the fundamental components for inclusive growth are available yet major issue is to align the components of inclusive growth into an integrated framework for policymaking and policy-shaping (OECD, 2015). The empirical literature is quite well in finding the determinants of inclusive growth (Aoyagi and Ganelli, 2015; Agyei and Idan, 2022; Kolawole, 2016; Munir and Ullah, 2018). However, the findings on inclusive growth found to be inconclusive since the measurement carried out of inclusive growth is complex (Anand et al., 2013; Amponsah et al., 2021).

In addition to this, another challenge in developing countries, is the large size of the informal economy, The informal sector is a widespread phenomenon that has taken center stage in national initiatives for social and economic development (Sultana et al., 2022a; ILO, 2018). According to the World Economic Forum report on Inclusive Growth 2018. It is extremely challenging to establish distinct property rights in developing nations, and even more difficult to take benefits. The underlying institutional weakness limits the economy's potential for production which discourages more people from participating in the formal economy. Resultantly, it promotes development that enriches certain groups at the expense of the majority (Singh, 2014). On the other hand, meanwhile, a sizable informal sector might be seen as the source of potential growth inside the legal economy. But activating the virtuous circle of inclusive growth will require them to strengthen the institutions and structural features (Amponsah et al., 2021). Similarly, focusing on the importance of institutions Elgin and Oztunali (2014) demonstrated that a greater GDP per capita is linked to a larger informal sector in the presence of lower-level institutions. Finally, Effective institutions can mitigate widespread informality in labor markets, improve access to education, health, and reduce inequality (OECD, 2014).

Institutions play an important and mediating role in inclusive growth-informal economy nexus (Singh, 2014). According to the author, most economic activity takes place in the informal economy in many developing nations, where enterprises are not recognized by the law and property rights are unstable. This nonexistence of formal recognition stops businesses from accessing credit and

expanding. He further argued that the formation of institutions is key factor for potential and sustained growth that contained within the formal sector. There is no systematic empirical work on the role of institutions in inclusive growth-informal economy nexus.

The direct relationship between the informal economy and growth is mixed and divided. Afonso et al. (2020) argued that the relationship between informality and economic growth may differ from country to country. Researchers like Elgin and Birinci (2016), Meghir et al. (2012), and Njoya et al. (2023) find negative relation, Duarte (2017), and Elgin et al. (2021) find no relation, Khuong et al. (2021) find bi-directional relation Yelwa and Adam (2017), and Ghose (2017) find positive relation and Sultana et al. (2024), Berdiev et al. (2020), and Bhattacharya (2011) find Non-linear relationship. Thus, this paper investigates the impact of the informal economy and institutions on inclusive growth and the mediating role of institutions in informality-inclusive growth nexus.

2. LITERATURE REVIEW

2.1. Informality and Inclusive Growth

Since the late 2000s, there has been a considerable amount of literature aimed at measuring inclusive growth. Because different measurement techniques were carried out, the results provided mixed outcomes. The relationship between informality and inclusive growth is also complex due lack of standard definitions and measurements of both concepts.

According to de Soto (2000) a substantial portion of economic activity takes place in the informal sector outside of the official regulatory framework in many developing nations. Small enterprises and informal employment are part of this informal sector, but the absence of formal property rights limits its expansion and potential. Without ownership rights, Participants in the informal sector have difficulties such as limited access to credit and legal protections which increases poverty and impedes inclusive economic progress.

The population engaged in the informal sector may not achieve the non-income welfare benefit of the formalized system which leads to poor development outcomes and exclusive growth (Fedesarrollo, 2015). Additionally, a sizable informal economy restricts the ability of the county in policy-making, which may impede the establishment of institutions. This, in turn, discourages the formal sector's expansion and restricts the benefits of a formal economy to a small number of participants, thus impeding potential economic growth and economic opportunities (Singh, 2014).

Amponsah et al. (2021) used the system GMM model to show that informality is one of the main factors of inclusive growth in the case of Sub-Saharan Africa. According to their empirical research, metrics of informality and inclusiveness are important in determining how informality influences inclusive growth. Using vulnerable employment, self-employment, and contributing family workers as informality indicators demonstrated a negative relationship with inclusive growth. Finally, they demonstrate that creating an efficient regulatory framework in the informal sector can play a key role in increasing inclusion. However, the study used GDP per person employed as proxy to measure inclusive growth which may not capture the inclusive growth fully.

Further, Njoya et al. (2023) investigated the impact of informality and inclusive growth in 43 African countries and found that informal sectors positively reduce inclusive growth. Moreover, the results also confirm a U-shaped association between informal economy and inclusive growth in Africa. They further suggest that the informal sector initially reduces inclusive growth because it emerges because of failures in the formal sector. And after the turning point informality improves inclusive growth because both formal and informal sectors have positive relationships over time. Ohnsorge and Shu (2022) argued that the informal economy itself comes from the exclusion due to a lack of economic opportunities, lack of access to formal employment, few economic resources, and poverty.

2.2. Informality and Economic Growth

Given the limited literature on inclusive growth and informality, the review also incorporates key components that are central to inclusive growth, such as poverty, income inequality, economic growth, and other important factors.

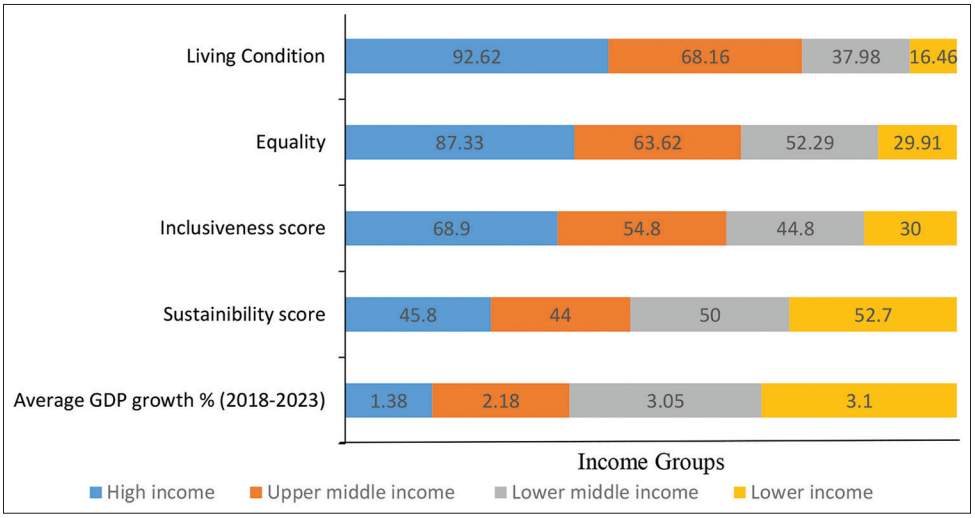
The association of economic growth and informal economy is an old debate. The nexus of informality and economic growth can be traced back to dualistic models. These models predicted that due to industrialization informal sector would shrink as more jobs were created in the formal economy (Lewis, 1954). However, due to different measures of the informal economy, the relationship and direction of informal economy-economic growth are mixed in the empirical literature.

According to Oviedo et al. (2009) Informal economic activity is a complex and widespread phenomenon involving a diverse range of actors. It is more helpful to view informality as a spectrum of compliance rather than as a binary distinction between formal and informal. The nature of informal activities varies by country development levels. Frank Wu and Schneider (2019) scrutinized the effect of the shadow economy on the level of development in 158 countries from 1996 to 2015. The relationship is negative for the economies in the initial development phase, but when GDP per capita reaches a threshold level, the shadow economy increases as GDP per capita increases. Deléchat and Medina (2021) show that the non-linearity between GDP and shadow economy does not co-exist in the long run.

Sultana et al. (2022) studied the connection of informal sector employment and economic growth in 20 developing nations. The findings showed that informal employment has a linear and positive association with economic growth. Similarly, Islam and Alam (2019) discovered a linear and positive association between the information economy and economic growth in South Asian countries. Khuong et al. (2021) observed similar and bidirectional results in Pakistan, as did Yelwa and Adam (2017) in Nigeria.

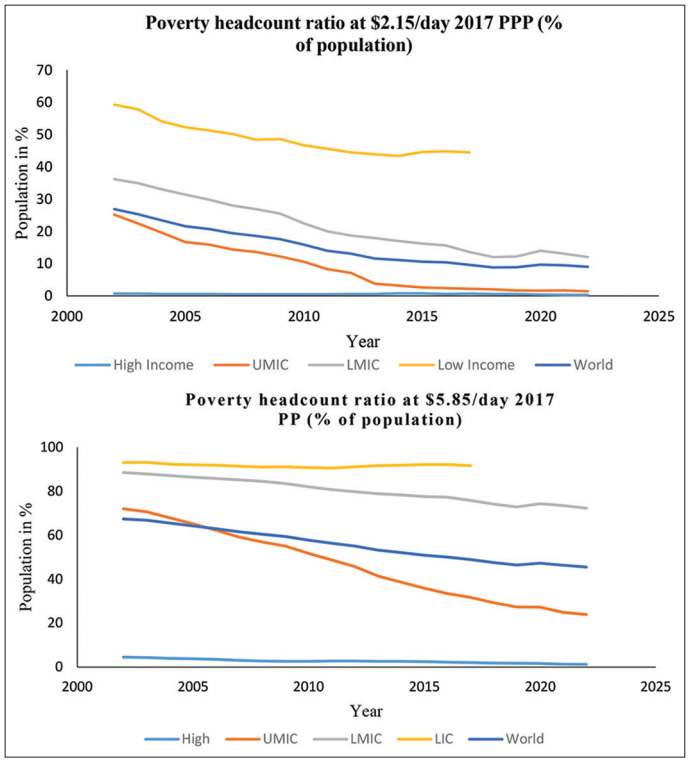
However, Fotié and Mbratana (2024) investigated the nexus of informality and GDP per capita from 1996 to 2017 in 150

Figure 1: Poverty, inequality and growth in developing countries



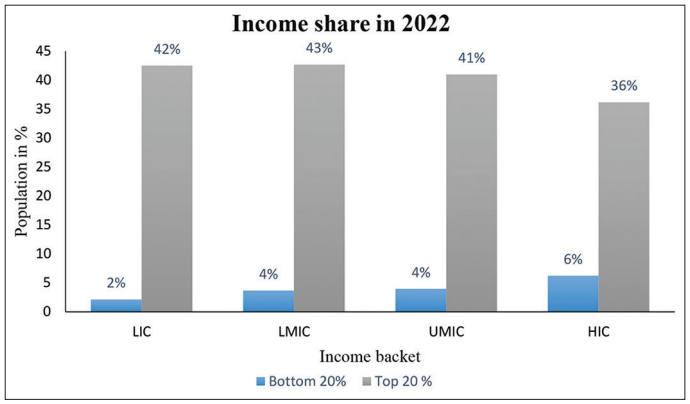
Source: UNCTAD

Figure 2: Poverty headcount ratio at 2.15 and 5.86/day in 2017 PPP across income groups



Data source: Word Development Indicator (WDI), World Bank

Figure 3: Income share of the bottom 20% and top 20% across income groups in 2022



Source: The World Income Inequality Database (WIID), UNU WIDER

countries. The study revealed that GDP per capita and informality follow an inverted N pattern. Further, they argued that due to technological advancement and financial services, productivity and skill improve in the informal sector.

2.3. Informality and Poverty

Some studies focus on the effect of informality on poverty Canelas (2019) and Hieu et al. (2013) while others focus on the effect of poverty on informality (Berdiev et al., 2020; Kanbur, 2017). Some studies argued that tax cut and deregulation shrinks the informal economy Ulyssea (2022) the others found tax and deregulations have little or null impact in reducing the size of the formal economy (Maiti and Bhattacharyya, 2020; Singh, 2014; Williams, 2014). Ohnsorge et al. (2022) show that change in informality (formalization) reduces poverty. Additionally, Mishchuk et al. (2020) argued that the shadow economy has a considerable adverse impact on the main component of safety including the spread of poverty and low living standards in the case of Ukraine. Pham (2022) stated that, despite an abundance of literature on the link between poverty and the shadow economy, their bidirectional relationship has been largely overlooked.

2.4. Informality and Inequality

The empirical literature found mixed results due to the lack of different measures of the informal economy. For example, Krstic and Sanfey (2011) analyzed the relationship between informality and inequality in the Serbian labor market and used living standard measurement surveys. They argued that despite strong economic growth and market-oriented reforms, informal employment has significantly increased. Further, the results show that the growing employment between formal and informal employment is one of the reasons why inequality is increasing.

Table 1: Data and variables

Variable	Description	Source
Inclusive growth index	Real income per capita adjusted for equity	Authors calculation using the World Bank, PovcalNet and WIID database
Real GDP per person employed	Real GDP per person employed (constant, 2017 PPP $)	World Bank
Global inequality index		UNI-WIDER, WIID
Human Development Index		UNI-WIDER, WIID
CO_2		UNI-WIDER, WIID
Shared prosperity/Growth of bottom 40%	Annual growth rate in the average consumption or income per capita of the bottom 40 of the population	Authors calculation using WIID and PovcalNet database
Institutional quality	The average of six indicators	World Bank
Informal economy	DGE, MIMIC) Vulnerable employment and self-employed.	World Bank, ILO
Inflation	Consumer prices (annual %)	World Bank
Investment	Gross fixed capital formation (annual % growth)	World Bank
Government spending	General government final consumption expenditure (% of GDP)	World Bank
FDI	Foreign direct investment net inflows (% of GDP)	World Bank

However, Gutiérrez-Romero (2021) empirically re-examined the dualistic model predictions for the panel of 138 countries. Results revealed that there is a positive and strong relationship between inequality and the size of the formal economy in the long run. Further, the convergence test shows that the informal economy is not converging to a common steady-state, but rather to different steady states across various countries.

Aside from economic growth, poverty, and inequality, the informal economy is associated with other important aspects of inclusive growth. For example, countries with more informality among female workers had larger gender inequalities in education (Malta et al., 2019). Informal employment for women is related with poorer health outcomes, particularly in infant nutritional status and prenatal health Aronsson et al. (2023), and workers in the informal sector are more likely to be unwell (Albertini et al., 2021a). Furthermore, the informal sector has a negative impact on sustainability Sultana et al. (2022b) as a larger informal sector adds significantly to environmental harm because enterprises operating in this sector can avoid environmental restrictions. On the other hand, it is suggested that the informal sector plays a beneficial role because of its ability to reuse waste materials generated by the official sector (Chirisa and Bobo, 2018).

Albertini et al. (2021b) scrutinizes the effect of health shocks on labor market trajectories, consumption, and wealth accumulation in South Africa. The study uses a heterogeneous agent's model to explore how health issues affect wealth and consumption over the life cycle, emphasizing the role of formal and informal employment. Health shocks reduce labor efficiency for formal workers, leading to lower earnings, while informal workers and the non-employed face reduced job finding rates and higher separation, creating a vicious cycle of non-employment and poor health.

3. DATA AND METHODOLOGY

3.1. Measurement of Inclusive Growth

Inclusive growth is the dependent variable. Which is defined as a pattern of economic growth that is broad-based and sustainable, benefiting all segments of society. Three aggregate proxies are used to measure inclusive growth. First, inclusive growth is measured using the inclusive growth index proposed by Anand et al. (2013). Ali and Son (2007) and Anand et al. (2013) used this index to measure inclusive growth. The reason for choosing this indicator for inclusive growth is because it combines measures of economic growth with considerations of income distribution and provides a unified framework to assess both equity and efficiency. Which captures economic expansion and the distribution of growth benefits across society, reflecting how growth impacts the well-being of diverse population groups.

Following Ali and Son (2007) and Anand et al. (2013) we can express a social welfare function based on the distribution of income for population of size . Individuals are indexed according to their income levels, ranging from the poorest individual, denoted as x_1, to the richest individual, denoted as x_n. The social welfare function is as follows;

$$W = W(x_1, x_2, x_3, \ldots\ldots x_n) \quad (1)$$

Which is an increasing function of its argument and redefined as social opportunity function;

$$O = O(y_1, y_2, y_3 \ldots\ldots y_n) \quad (2)$$

Where, y_i represents the opportunities available to the *ith* person, with income x_i

The concept of an opportunity function increasing in its argument implies that as the income (opportunity) of any individual increases, the overall opportunity function increases as well. This suggests that when income opportunities are distributed more equally, indicating pro-poor redistribution, inclusiveness is enhanced. To quantify inclusiveness in this context, we can utilize a measure based on the concept of a generalized concentration curve. Ali and Son (2007) introduced the idea of a generalized concentration curve, also known as a social mobility curve (SMC), denoted as *Sc*:

$$Sc \approx \left[y_1, \frac{y_1 + y_2}{2}, \ldots\ldots\ldots, \frac{y_1 + y_2 + \ldots y_n}{n} \right] \quad (3)$$

Where n is the number of persons in the population with incomes $y_1 y_2 y_3 \ldots\ldots y_n$, where y_1 is the poorest person and y_n the richest person

Ali and Son (2007) proposed the income equity index (IEI):

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

Which ranges from 0 to 1. Where 1 indicates the perfect equal distribution and 0 indicates the perfect unequal distribution: by rearranging equation (4) we obtain

$$\bar{y}^* = \omega * \bar{y}_i \quad (5)$$

To obtain an inclusive growth equation, differentiate equation (5):

$$d\bar{y}^* = \omega * d\bar{y} + d\omega * \bar{y} \quad (6)$$

Where, $d\bar{y}^*$ is a change in inclusive growth, if $d\bar{y}^*$ >0 growth is considered inclusive and vice versa. Inclusive growth decomposes into two terms, change in income growth and change in equity growth. The first term represents the impact of increasing average income while keeping income distribution unchanged. The second term represents the impact of changes in income distribution while keeping the average income unchanged.

Rearrange equation (6)

$$\frac{d\bar{y}^*}{\bar{y}^*} = \frac{d\bar{y}}{\bar{y}} + \frac{d\omega}{\omega} \quad (7)$$

Equation (7) is the equation that combines GDP per capita growth with equity index growth to create a single measure of inclusive growth that can be tracked over time. Inclusive growth can be achieved by: (i) boosting average income growth, (ii) increasing income equity index growth, or (iii) combining the two. Further, the equity index is derived from GINI. The GINI coefficient is a value that ranges from 0 to 1, where 0 represents perfect equality and 1 signifies complete inequality. However, the model requires a certain level of equality, so the inequality measure is adjusted and transformed into a measure of equality in this case it can be written as GINI subtract 1 (Riti et al., 2021).

Further, since inclusive growth is a multidimensional concept, using a single index to measure inclusive growth may provide insufficient empirical results. To further enhance the robustness of empirical findings, we use a separate set of different variables that capture important aspects of inclusive growth. This not only improves the empirical findings but also helps to expand the areas of inclusive growth by adding more important factors. Besides the inclusive growth index, the study uses real GDP per person employed (constant 2017 PPP $) to measure inclusive growth because GDP per person employed is a critical indicator for tracking progress toward achieving Sustainable Development Goal 8.2.1, which aims to promote inclusive and sustainable economic growth, full and productive employment, and decent work for all (World Bank, 2023). Second, the study also uses shared prosperity as a proxy for inclusive growth. Growth of bottom 40% is a measure which focuses on the annual growth in income of consumption of bottom 40% poorest population compared to overall population. This concept is linked with 10th sustainable development goal (SDG), particularly 10.1.1, which focus on promoting shared prosperity. This indicator shows that how the benefit of economic growth are being translated to poorest portion of the population (Sabatino and Bonilla, 2022; World Bank, 2022).

Table 2: The impact of informality on inclusive growth (inclusive growth index is dependent variable)

Variables	Model 1	Model 2	Model 3	Model 4
IG (−1)	0.128**	0.132**	0.133**	0.165
	(0.051)	(0.051)	(0.051)	(0.145)
MMIC	−0.057***			
	(0.020)			
DGE		−0.056***		
		(0.020)		
Self-Employed			−0.004	
			(0.008)	
Vulnerable employment				−0.063*
				(0.032)
Constant	5.959***	7.085***	5.841***	9.690***
	(1.085)	(1.261)	(0.909)	(3.251)
Controls				
FDI	0.0932*	0.090*	0.086	0.141**
	(0.048)	(0.049)	(0.053)	(0.053)
CPI	−0.074**	−0.075**	−0.066**	−0.107**
	(0033)	(0.032)	(0.035)	(0.043)
GS	−0.112***	−0.110***	−0.104***	−0.164
	(0.029)	(0.029)	(0.035)	(0.116)
Diagnostics				
AR (1)	−3.77	−3.75	−3.76	−2.57
	[0.000]	[0.000]	[0.000]	[0.010]
AR (2)	−0.89	−0.86	−0.88	−0.42
	[0.372]	[0.388]	[0.380]	[0.674]
Hansen J.	12.74	12.82	13.35	40.75
	[0.311]	[0.305]	[0.271]	[0.569]
Hansen	3.22	3.30	3.98	6.17
Difference	[0.073]	[0.069]	[0.046]	[0.628]
Prob>F	0.000	0.000	0.000	0.000
Dummy	Yes	Yes	Yes	Yes
Instrument	28	28	28	60
Observation	944	944	944	944
Groups	80	80	80	80
Impact of informality on inclusive growth by income groups				
Income groups	**LIC**	**LMIC**	**UMIC**	
MMIC	−0.075	−0.857**	−0.847**	
	(0.577)	(0.347)	(0.353)	
DGE	−0.062***	−0.034*	−0.042*	
	(0.021)	(0.020)	(0.021)	
Self−employed	−0.042	−0.062	0.015	
	(0.064)	(0.054)	(0.052)	
Vulnerable employment	−0.005	0.014**	0.011	
	(0.005)	(0.007)	(0.009)	

All values in () are robust standard and values in [] are probability values. One-step differenced GMM is applied to all models, (−1) represents the lagged dependent variable. MMIC is multiple indicators multiple causes modeled measure of informality; DGE is dynamic general equilibrium modeled measure of informality; FDI is foreign direct investment; CPI is consumer price index and GS is government final consumption expenditure. ***, ** and * shows level of significance at 1%, 5% and 10% respectively

Third, the HDI combines the advantages of the GDP measure while also addressing economic and social factors that GDP misses, by incorporating health and education components. Unlike GDP, which focuses solely on economic growth, the HDI emphasizes people and their opportunities. Together, these three dimensions offer a broader understanding of a person's capabilities and well-being. They present a more comprehensive view of progress than GDP, which reflects a country's wealth, or GDP per capita, which

Table 3: The impact of informality (MMIC-based) in inclusive growth (using a set of indicators)

Variables	Model 1 HDI	Model 2 GII	Model 3 Growth 40	Model 4 CO_2	Model 5 GDM
HDI (−1)	0.874***				
	(0.074)				
GII (−1)		0.774**			
		(0.065)			
Growth40 (−1)			0.215***		
			(0.096)		
CO_2 (−1)				0.989***	
				(0.038)	
GDM (−1)					0.760***
					(0.150)
MMIC	−0.001**	0.002*	0.004	−0.004	−0.039***
	(0.0007)	(0.001)	(0.020)	(0.005)	(0.012)
Control					
Credit to	0.001***	−0.002***	0.236*	0.024**	0.006*
private	(0.0005)	(0.0006)	(0.130)	(0.011)	(0.003)
TRD	0.048**	−0.056***	−0.184	−0.073	0.122
	(0.020)	(0.022)	(0.450)	(0.097)	(0.074)
FDI	0.00003	0.00006	0.044	0.043***	0.001
	(0.0002)	(0.0003)	(0.040)	(0.013)	(0.002)
Constant	−0.061	0.287***	2.512	0.268	3.318*
	(0.088)	(0.108)	(2.024)	(0.365)	(1.739)
Diagnostics					
AR (1)	−1.49	−3.43	−5.36	−2.25	−2.52
	[0.135]	[0.001]	[0.000]	[0.024]	[0.012]
AR (2)	−0.28	0.55	−0.39	−0.71	−0.67
	[0.779]	[0.579]	[0.689]	[0.478]	[0.504]
Hansen	44.87	47.75	51.62	12.19	14.80
	[0.275]	[0.187]	[0.103]	[0.350]	[0.192]
Hansen	16.02	18.93	18.82	11.56	10.71
Difference	[0.141]	[0.062]	[0.278]	[0.315]	[0.001]
Prob >F	0.000	0.000	0.000	0.000	0.000
Dummy	Yes	Yes	Yes	Yes	Yes
Observations	805	805	805	805	805
Instruments	57	57	57	28	28
Groups	69	69	69	69	69

All values in () are robust standard and values in [] are probability values. One-step system GMM is applied to all models, (−1) represents the lagged dependent variable. MMIC is multiple indicators multiple causes modeled measure of informality; HDI is human development index, Growth40 is shared prosperity, GII is gender inequality index, GDM is real GDP per person employed, CO_2 is carbon emission, FDI is foreign direct investment; and TRD is trade. ***, ** and * shows level of significance at 1%, 5% and 10% respectively

speaks to an individual's financial resources but says little about their life outcomes. The HDI offers a straightforward snapshot of development that can be further analyzed to track progress toward the SDGs (UNDP, 2024).

Finally, Gender equality and environmental sustainability are two other crucial factors that contribute to more equitable and inclusive growth. Promoting gender equality ensures equal opportunities for all individuals, regardless of gender, while environmental sustainability safeguards resources for future generations, supporting long-term economic stability. Both are essential for fostering inclusive growth that benefits everyone and ensures fairness across different segments of society (UNCTAD, 2024).

3.2. Informality

The informal economy refers to economic activities and transactions that occur outside the formal regulatory frameworks and are not monitored or taxed by the government. These activities are often characterized by the absence of legal protections for workers, lack of social security benefits, and limited access to formal financial services (International Labour Organization, 2018; Lewis, 1955). We use four different indicators to measure the informal economy such as The Multiple Indicators Multiple Causes (MIMIC) model, Dynamic General Equilibrium (DGE) model, vulnerable employment, and self-employment.

Econometric models

$$IG_{it} = \beta_0 + \beta_1 INFO_{it} + \beta_2 FDI_{it} + \beta_3 CPI_{it} + \beta_4 GS_{it} + \mu_{it}$$

$$IGI_{it} = \beta_0 + \beta_1 INFO \times IQ_{it} + \beta_2 GFC_{it} + \beta_3 FDI_{it} + \beta_4 GS_{it} + \beta_5 CPI_{it} + \mu_{it}$$

3.3. GMM

To address the problem of endogeneity several approaches and methods can be used. But in case of dynamic panel settings and N is greater than T, the generalized method of moment (GMM), particularly system GMM is most effective (Roodman, 2009). GMM uses lagged values as instruments and uses moment conditions to estimate parameters and control for unobserved heterogeneity. The system GMM estimator is preferred over the difference GMM for several reasons: it allows for more instruments, improves efficiency, handles unbalanced panels better,

and retains fixed effects. These estimators are robust and do not rely on distributional assumptions like normality, making them flexible and suitable for various types of data. For detail (Greene, 2002; Piper, 2014; Roodman, 2009).

4. RESULTS AND DISCUSSION

This section investigates the impact of the informal economy on inclusive growth. We use four different measures of informality. Table 2 presents the empirical results of the impact of informality on inclusive growth. Overall, based on findings informality inversely affects inclusive growth as three out of four measures of informality have negative and statistically significant signs. The lagged dependent variables are statistically significant at 5% level except model 4, which indicates the models are dynamic and system GMM works well. This is because Workers with informal employment have poverty rates that are, on average, twice as high as those with formal employment. Because of low productivity, low incomes, and limited access to government benefits. Informality leads to lower tax revenue which makes it more difficult for the government to finance investment and social programs. This implies that social programs and public infrastructure may not reach the people who need them the most (Fedesarrollo, 2015; IMF, 2017).

We also check the impact of informality based on MMIC and dynamics measure of informality on inclusive growth on separate dimensions of inclusive growth (Table 3 and 4). The majority of the coefficients support the hypothesis that informality hampers inclusive growth. Specifically, informality is found to have a negative and statistically significant impact on both the Human Development Index (HDI) and GDP per person employed, while it is associated with an increase in gender inequality.

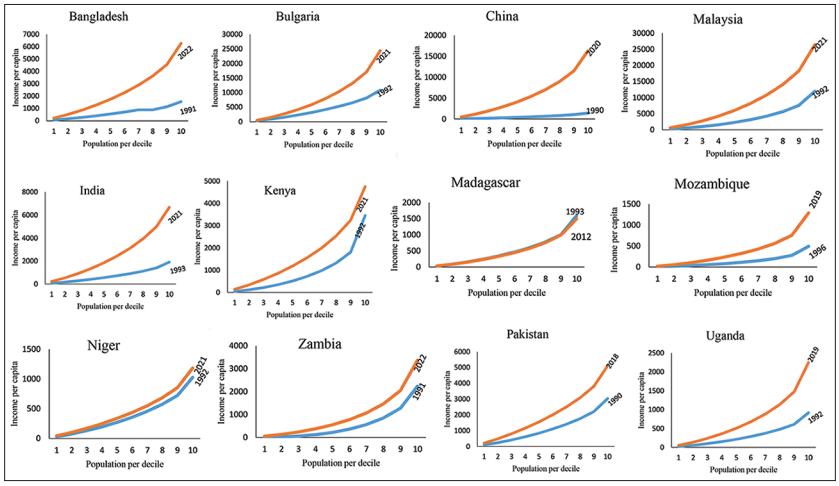
Finally, the positive coefficients of the interaction term between informality and institutions indicate that the relationship between informality and inclusive growth varies depending on the quality of institutions. Specifically, when institutional quality is high, the adverse impact of informality on inclusive growth is mitigated or even reversed. This suggests that the negative effects of informality on inclusive growth are less pronounced in environments with better institutional quality. High-quality institutions may provide

Table 4: The impact of informality (DGE-based) in inclusive growth (using a set of indicators)

Variables	Model 1 HDI	Model 2 GII	Model 3 Growth 40	Model 4 CO_2	Model 5 GDM
HDI (−1)	0.789				
	(0.111)				
GII (−1)		0.769***			
		(0.067)			
Growth40 (−1)			0.215**		
			(0.096)		
CO_2 (−1)				0.974***	
				(0.032)	
GDM (−1)					0.417**
					(0.187)
DGE	−0.049**	0.077*	0.002	−0.159	−0.130***
	(0.024)	(0.040)	(0.021)	(0.163)	(0.048)
Control					
Credit to GDP	0.001***	−0.002***	0.235*	0.022*	0.011***
	(0.0004)	(0.0007)	(0.129)	(0.012)	(0.003)
TRD	0.043**	−0.062***	−0.187	−0.059	0.092
	(0.021)	(0.022)	(0.453)	(0.096)	(0.062)
FDI	0.001	0.0001	0.045	0.043***	−0.003**
	(0.002)	(0.0003)	(0.040)	(0.013)	(0.001)
Constant	0.124	0.090	2.590	0.663	9.929***
	(0.129)	(0.163)	(1.974)		(1.578)
Diagnostics					
AR (1)	−1.18	−3.50	−5.36	−2.22	2.05
	[0.236]	[0.000]	[0.000]	[0.026]	[0.040]
AR (2)	−0.78	0.56	−0.39	−0.71	1.67
	[0.436]	[0.578]	[0.698]	[0.475]	[0.095]+++
Hansen	44.94	48.35	51.57	12.75	11.26
	[0.273]	[0.171]	[0.104]	[0.323]	[0.421]
Hansen Difference	20.74	23.81	18.74	12.22	2.73
	[0.145]	[0.068]	[0.277]	[0.271]	[0.098]
Prob >F	0.000	0.000	0.000	0.000	0.000
Dummy	Yes	Yes	Yes	Yes	Yes
Observations	805	805	805	805	805
Instruments	57	57	57	28	28
Groups	69	69	69	69	69

All values in () are robust standard and values in [] are probability values. One-step system GMM is applied to all models, (−1) represents the lagged dependent variable. DGE is a dynamic general equilibrium modeled measure of informality; HID is human development index, Growth40 is shared prosperity, GII is gender inequality index, FDI is foreign direct investment; and TRD is trade. ***, ** and * shows level of significance at 1%, 5% and 10% respectively

Figure 4: Indifference curves of selected developing countries.



Source: Author's calculation using World Bank, PovcalNet database

Table 5: The moderating role of institutional quality on inclusive growth-informality nexus

System GMM results, $\Delta\bar{y}^*$ inclusive growth is the dependent variable				
Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**
IG (−1)	0.340**	0.364**	0.351**	0.357**
	(0.165)	(0.162)	(0.170)	(0.170)
MMIC×IQ	0.024**			
	(0.009)			
DGE×IQ		0.023**		
		(0.009)		
Self-employed×IQ			0.011**	
			(0.005)	
Vulnerable employment×IQ				0.011**
				(0.005)
Controls				
FDI	0.056	0.056	0.055	0.054
	(0.035)	(0.035)	(0.036)	(0.037)
CPI	−0.041	−0.043	−0.048*	−0.049*
	(0.027)	(0.027)	(0.029)	(0.028)
GFCF	0.046*	0.044	0.049*	0.048*
	(0.027)	(0.027)	(0.028)	(0.028)
GS	−0.116***	−0.110***	−0.113***	−0.111***
	(0.035)	(0.034)	(0.036)	(0.035)
Constant	5.091***	5.029***	4.942***	4.900***
	(1.017)	(1.010)	(1.028)	(1.024)
Diagnostics				
AR (1)	−2.64	−2.68	−2.60	−2.62
	[0.008]	[0.000]	[0.000]	[0.000]
AR (2)	−0.01	0.05	0.02	0.03
	[0.996]	[0.963]	[0.988]	[0.975]
Hansen J.	26.07	26.38	26.84	26.89
	[0.459]	[0.442]	[0.418]	[0.415]
Hansen	8.56	8.80	9.31	9.35
Difference	[0.200]	[0.185]	[0.157]	[0.155]
Prob >F	0.000	0.000	0.000	0.000
Dummy	Yes	Yes	Yes	Yes
Instruments	44	44	44	44
Observation	944	944	944	944
Groups	80	80	80	80

All values in () are robust standard and values in [] are probability values. One-step system GMM is applied to all models, (−1) represents the lagged dependent variable. MMIC is multiple indicators of multiple causes modeled measure of informality; FDI is foreign direct investment; CPI is consumer price index and GS is government final consumption expenditure; GFCF is gross fixed capital formation; IQ is institutional quality. Multiplication shows the interaction term. ***, ** and * shows level of significance at 1%, 5% and 10% respectively

better governance, enforce regulations fairly, and support formal economic activities, which can offset the negative impacts of informality on inclusive growth.

Moreover, the positive interaction coefficient could also imply several factors. For example, strong institutions may facilitate access to formal markets, credit, and legal protections, thereby encouraging informal businesses to transition to the formal sector. Additionally, robust institutions may reduce corruption and increase trust in the economy, fostering investment and economic development. Similarly, Effective institutions can mitigate widespread informality in labor markets, improve access to education, and health, and reduce inequality (OECD, 2014).

4.1. Indifference Curves for Selected Developing Countries

Figure 4 shows the indifference curves of selected developing countries. The indifference curves are calculated using the social mobility curve as proposed by Ali and Son (2007) and Anand et al. (2013) equation 8. Cumulative average GDP per capita per population decile on the y-axis and population deciles in ascending order from 1 to 10 on the x-axis. The average income per decile is calculated by multiplying the income share with the GDP per capita, PPP (constant 2017 international $), and then dividing this product by the population share.

Different inclusiveness in growth can be seen. Due to higher economic growth over time, the indifference curves of almost all countries have shifted upward but the magnitude of inclusiveness in growth is different among these countries. For example, in the case of China the growth has benefited everyone though, the benefit of growth is much greater for top-income holders than the bottom deciles. On the contrary, in the case of Kenya, over time the curvature of the indifference curve becomes flatter for the top 20% of income holders, indicating that income growth has benefited the poor more than the rich.

The inclusiveness in growth in Sri Lanka, India, and Uganda is closer to China, where high growth has been experienced in these countries, but the benefits of growth are greater for top-income

holders. In Zambia, and Niger, there is inclusiveness, but their growth is slower compared to others, as evidenced by the slight shift of the indifference curve over time. Finally, In the case of Madagascar growth and equity both has not changed over time.

5. CONCLUSION AND RECOMMENDATION

The study investigated the impact of informality on inclusive growth by using data from 2008 to 2020. We used four different measures of informality: such as multiple indicators multiple causes model-based (MIMIC) estimates of informal output (% of official GDP), Dynamic General Equilibrium (DGE) model-based estimates of informal output (% of official GDP), self-employed and vulnerable employment. The data for the measures of informality are gathered from the World Development Indicator (WDI), the World Bank, and the International Labor Organization ILO. The study used the system GMM to test this relationship empirically. In general, the empirical findings revealed a negative association between informality and inclusive growth.

The empirical findings of the paper have revealed significant insights into the relationship between various forms of informality and the inclusive growth index. Specifically, it was observed that DGE, MIMIC, and vulnerable employment exhibit an inverse correlation with the inclusive growth index. Interestingly, the measure of informality represented by self-employment was found to be statistically insignificant. Furthermore, the impact of informality on inclusive growth was analyzed across different income groups. It was noted that MIMIC, representing a particular form of informality, has a more pronounced adverse effect on the inclusive growth index in upper-middle-income countries. Conversely, DGE was found to have a greater adverse impact in the case of low-income countries.

Similarly, the empirical findings underline that informality doesn't merely impact the distributional measure of inclusive growth, as measured by the inclusive growth index, but also exerts significant influence on other vital sides of inclusive growth, as measured through a comprehensive set of variables. The study reveals that informality adversely affects key indicators such as HDI (Human Development Index) and GDP per person employed, indicating a negative impact on dimensions including health, education, income per capita, productivity, and employment within the framework of inclusive growth. Likewise, the study sheds light on how informality exacerbates gender inequality, as a positive association between informality and the gender inequality index is found. This implies that higher levels of informal economic activity correspond to increased gender disparities. These findings explain the multifaceted impacts of informality on inclusive growth.

Furthermore, institutional quality is an important factor in informality-inclusive growth. We add the interaction term of institutional quality with informality measures to check the moderating role of institutional quality in informality-inclusive growth nexus. The findings show that when institutions are effective and fair, the negative impact of informality on inclusive growth becomes positive. This suggests that strong institutions make sure rules are followed and support formal jobs, which can help offset the harm caused by informality on the overall progress that includes everyone.

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