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INEQUALITY AND INFORMAL ECONOMY: THE MODERATING ROLE OF FINANCIAL TECHNOLOGY

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ABSTRACT

Increasing income distribution gaps have become a global socio-economic problem accentuating economic and social exclusion with a potential of generating declining social cohesion and political stability. This study examines the relationship between the informal economy and income inequality, alongside the moderating effect of financial technology (fintech). The persistent prevalence of informal economies in emerging markets and developing economies (EMDE) is often associated with elevated income inequalities. Utilizing data from 2012 to 2022 across 18 African countries, this study employs the two-step system Generalized Method of Moments (GMM) to address potential endogeneity biases and to robustly estimate the relationship between the size of the informal economy and income distribution. The results indicate that a larger informal economy correlates with reduced income inequalities, acting as a buffer for marginalized communities by providing economic opportunities. Conversely, fintech initially indicates an increase in income disparities due to skill and access discrepancies. However, when functioning as a moderating factor between informal economies and income inequality, fintech demonstrates a potential to reduce the inequality gap. This study suggests that policy interventions geared towards economic formalisation need to account for the dual role of financial technologies. Further research is required to explore other socio-economic factors, including political dynamics and labour market policies, which influence income inequalities. Prominent policy decision confronting African governments is the role of the informal economy. The findings of the study advocate for a nuanced approach to addressing structural reforms within informal sectors and carefully utilise fintech as a tool for promoting equitable income distribution

Keywords: *inequality, income distribution, informal economy, financial technology, shadow economy, institutional quality*

1. INTRODUCTION

Informality and unequal income distribution are challenges in the global South (Medina and Schneider, 2018). The existence of a large infomal economy has a twin dirverging repurcussions for the global South as it is viewed as a curse for development and in other instances as an engine for economic growth (Medina and Schneider, 2018; David, Diallo, and Nilsson, 2023). Inferior working conditions are regularly associated with poverty, inequality and discrimination

and these conditions are mainly prevalent in informal sector environment (International Monetary Fund, 2020). In emerging markets and developing economies (EMDEs), the informal economy is highly prevalent and persistent such that it is an impediment to sustainable development as the extend of the informal sector contribution to the tax base is not fully known or understood (Canh and Thanh, 2020; IMF, 2020). Additionally, in countries with larger informal sector, unequal income distribution is predominant and it is a bottleneck to achieving inclusive growth and sustainable development. Informal labour can be locked into informal occupations, thus reducing their social mobility which is essential for reducing income inequalities (Dell'Anno, 2021; Magwedere and Marozva, 2022).

There is no clear definition of an informal economy or shadow economy and in many instances several terms are used in reference to the same scenario such as, informal economy, grey economy and underground economy among others (see Dell'Anno, 2022; IMF, 2020). For the purpose of this study the terms shadow economy (SE) or the informal economy (IE) are used interchangeably. Furthermore the study will follow the definition of Medina and Schneider (2018), where informal economy is defined as "all economic activities which are hidden from official authorities for monetary, regulatory, and institutional reasons". In most economies the shadow economy acts as an alternative to the formal economy with heterogeneity of the major role players (Ulyssea, 2020). The informal sector has limited access to financial services hence they remain small with very low productivity levels (IMF, 2020). Due to the heterogeneous nature of the role players, most are excluded from access and use of formal finance. Digitalisation is a key driver for better financial inclusion from electronic retail payment systems to insurance, savings and credit services (IOA, 2023).

Rising inequality to little or no intergenerational mobility of income in most countries renewed interest on drivers of income inequality. This has also been compounded by the persistent nature of informal economy in most EMDEs whereby more people are in vulnerable employment settings (United Nations, 2020; Ohnsorge and Yu, 2022). Goal 8 of the Sustainable Development Goals (SDGs) advocates for decent work and economic growth which is argued to play a role in poverty reduction and fair income distribution (United Nations, 2015; International Labour Organisation (ILO), 2015). Hailemariam & Dzhumashev (2020) opined that shadow economy activities have transmission mechanism to income distribution; financial sector development, tax revenue and economic growth among others. Hence most EMDEs have a vibrant shadow economy, more often unskilled and low skilled labour is in the shadow economy and this can be a source for generating income inequalities. Furthermore these economies lack sustainable fiscal instruments to distribute income (Bourguignon, 2018). Scant literature is available on the links between shadow economy and income distribution, yet the existence of a vibrant shadow economy can hinder the effectiveness of growth enhancing policies argued Brueckner and Lederman (2018).

There is consensus that the informal economy (IE) is the most important source of employment in developing countries and it also has a significant role in providing employment and income for marginalized people in developed economies (IMF, 2020; David et al., 2023). On the other hand prevalence of informal work is associated with higher income inequalities. The International Labour Organization (ILO, 2018) asserted that 61.2 percent of global employment (about two billion people) devotes their time in the informal economy.. Eighty-five percent of Sub-Saharan Africa jobs are in the informal sector and it is estimated that 50 percent of gross domestic product of the region is from the informal economy (Kiaga and Leung, 2020). Despite the importance of the contribution from shadow economy to EMDE access to finance in the sector is often a challenge (Canh and Thanh, 2020; Ohnsorge and Yu, 2022). The existence of larger shadow economy and higher income inequalities has several causes and socio-economic

consequences. The dual divergence roles of the informal sector i.e being viewed as a curse for development and an engine for economic grown has motivated this study to examine the relationship between inequality, informal economy and the mediating role of financial technology. Hence the aim of the study is to examine two main issues: (i) does inequality worsen with the size of the informal economy and (ii) can financial technology have a role in moderating the relationship between inequality and the shadow economy. To the best of the authors' knowledge literature on the moderating role of financial technology on the relationship between informal economy and inequality is scarce.

The paper is organised as follows: section 2 presents a comprehensive analysis of the theoretical and empirical literature; data and methodology are discussed in section 3 whilst section 4 presents the results with a discussion thereof in section 5 Section 6 is comprised of the conclusion policy implications and future research recommendations future research.

2. LITERATURE REVIEW

There are diverse schools of thought on the concept of shadow economy/informal economy to which the theories are inconsistent and inconclusive on the existence of shadow economy or informal economy. There is no general theory on informal economy, but arguments are that informality is as a result of low economic development (ILO, 1972; Hart, 1973; Sen, Danquah, Schotte, 2022). Bashlakova and Bashlakov (2021) argued that the challenge of shadow economy is the over or under-statement of a country's gross domestic product. In the modernisation theory, shadow economy is vibrant in economies with lower economic development. The theory suggests that the emergence of shadow economy is attributed to low rates of economic development; high unemployment including the ineffectiveness of government policies (Geertz, 1963; Lewis, 1954; Rostow, 1960; Sen et al., 2022). In other words informal economy is a consequence of economic underdevelopment and it disappears with economic development. However, in most EMDEs economic growth is not accompanied by reduced size of the informal sector (see Ulyssea, 2020; Sen et al. 2022; David et al., 2023). Rather, the growing share of informality is a consequence of ineffective government policies (Hart, 1972; Zolkover and Kovalenko, 2020; Dell'Anno, 2022). Additionally, the modernization" theory assumed subordination between the traditional/subsistence (i.e., informal) and the modern/industrialized (i.e., formal) sectors, for Hart (1973) and the ILO (1972), the informal sector was too large, persistent and, in some places pro-cyclical, to predict its natural disappearing with economic development.

Neoclassical theory asserts that informal economy is a rational economic solution for economic entities that face a burdensome regulatory environment (Rauch, 1991; Zolkover and Kovalenko, 2020; Dell'Anno, 2022). The theory thus suggests that the informal economy is the result of excessive regulation, high taxes, and excessive government intervention. Stigler (1971) argued that regulation aids politically influential clusters rather than progressing public interest thereby increasing income inequalities. This was further argued by the neoliberal theory, stating that shadow economy is vibrant in economies where there is centralisation of power (Esaku, 2021). Government involvement in the free-market forces entrepreneurs to move to the shadow economy (Berdiev, Saunoris and Schneider, 2018, Chen and Carré, 2020). Burdensome regulatory environment forces entities to move to the shadow economy and these include result of excessive regulation, high taxes, and excessive government intervention (Etim and Daramola, 2020, Magwedere and Marozva, 2023). Thus, in a cost benefit assessment, economic agents at the lower tail of the income distribution resort to the informal economy to circumvent the costs of regulation among others (Rauch, 1991; Loayza 1996; Dessy and Pallage, 2003, Sen et al, 2022). Additional traditional banking requires a minimum level of formality for accessing the banking services to which most of businesses in the informal sector lacks (Beck, 2020). There is no conclusive

literature on the relationship between inequality and informal economy. In other studies, greater inequality reduces human and physical capital accumulation, which may increase informality suggesting a reverse causality between income inequality and the informal economy.

The IMF (2020) observed that in Latin America the reduction of the size of the informal economy was associated with reduced inequalities. In other economies informality is a choice to some and a solution to unemployment challenges for others (David et al., 2023). Furthermore, Esaku (2021) findings suggested that larger shadow economy in Uganda worsened income inequalities. Wilson (2010) purported that there is generally a positive association between the informal sector and marginalisation. Dell'Anno (2022) argues that the existence of the shadow economy is a survival strategy to circumvent unemployment and poverty. This further supported the previous assertion by the same author that there is a positive association between informality and income inequalities. Few studies that have argued for a positive relationship between informal economy and income inequality includes (Rosser et al. 2003; Ahmed et al., 2007; Chong and Gradstein, 2007; Dell'Anno, 2022). These studies have argued on how inequality is a determinant of informal economy but they fell short of arguments of the role of the informal economy on income distribution analysing the mediating role of financial technology in this relationship. In other arguments economic growth influences the size of the informal economy and its relationship with income distribution (see for example Baklouti and Boujelbene, 2019).

However, it was observed that economic growth in regions or countries with large informal sectors remains below potential and a vibrant informal economy has pertinent repercussions on socio-economic aspects of a country (Berdiev and Saunoris, 2019). Yet the informal sector creates opportunities for low-skilled and marginalised individuals by providing sources of income (Dell'Anno, 2021). However, the International Labour Organisation (2018) argued that there are lot of deficits that are associated with informal economy which include unequal income distribution and lack of formal financial access among others. Extensive informality can lead to austere challenges for public finances and decrease the resource availability for redistributive policies, possibly resulting in less effective redistribution (IMF, 2020). Inequality and informal economy (shadow economy) are essential components for policy making since they affect economic growth and the size of tax revenue (IMF, 2020; Esaku, 2021). Instead of reducing income inequalities some public policies aimed at reducing informality can actually result in higher inequalities.

Eilat and Zinnes (2002) and Dell'Anno (2022) argued that the relationship between inequality and the informal economy remains unsettled as in some cases informality reduces income inequality and in other scenarios it amplifies income inequalities. The informal sector operates in an imperfect market where access to credit can be a challenge. Thus, financial innovations through fintech have a potential of enhancing the inclusion of the informal economy to access and use of formal finance. Mishra and Ray (2010) argued that the inequality aids the emergence of a shadow economy as the higher degree of inequality leads to a larger informal economy. Berdiev and Saunoris (2019) argued for a bidirectional relationship between income inequality and the informal economy. In other studies, it is argued that corruption is a significant determinant of informality and higher inequalities, however these studies did not link the role of financial technology in the relationship between inequalities and informal economy.

The emergence of financial technology is argued as the panacea for the informal sector (IMF, 2020). This is at the backdrop of financial innovations which facilitate the digital use of financial services by formally excluded segments of the economy (Ozili, 2018; Canh and Thanh, 2020; Ohnsorge and Yu, 2022). Although this evolution has been impactful for small businesses and previously unbanked low-and medium-income households, the present digital divide will however widen due to infrastr ucture and skills gaps (In on Africa, 2023).

3. METHODOLOGY

The aim of this study is to examine the relationship between inequality and the informal economy taking into account the mediating role of financial technology. The study used panel data from 2012-2022. The selection of the study period and the countries included in the panel was mainly guided by data availability. Restricting the study sample to include only countries that didn't have missing data gaps for the financial technology proxy, the study ended up with a balanced panel of 18 countries in Africa. The data for the proxy of income inequality (Gini coefficient) was obtained from the SWIID database and for independent and control variables were obtained from standard macroeconomic databases of the World Bank. Summary for the definition of variables and data sources is outlined in Table 1.

Table 1: Definition of variables

Variable	Definition of variables	Data Source	Expected Sign
GINI coefficient (INEQ)	Uneven distribution of income across the entire household. The measure of inequality is derived from the Lorenz curve.	SWIID (2022)	
Informal (shadow) economy (INFECO)	estimates of informal output (% of official GDP)	World Bank	-
Fintech (FINTEC)	Number of registered mobile money accounts per 1,000 adults	Financial Access survey (FAS)	+ / -ve
Education (EDUC)	School enrolment, primary and secondary (gross), gender parity index (GPI)	World Bank	-
Unemployment (UNEMP)	The total number of the unemployed labour force as a percentage of the total labour force.	World Development Indicators	+
Institutional quality (INSTQUAL)	A principal component analysis was performed on six governance measures (control of corruption government effectiveness political stability, regulation quality rule of law and voice of accountability)	World Governance Indicators	-
Economic development (ecodev)	Per capita income	World Development Indicators	-

Source: Authors' compilation

Guided by the previous literature the informal economy output as a percentage of GDP is used as explanatory variable and control variables include financial technology, education, unemployment, institutional quality and economic development. The informal economy is argued to act as a buffer for income opportunities for the marginalised population groups. Additionally, it is argued that countries with larger informal sector have higher income disparities (Aspachs et al., 2022). Level of economic development further determines the inequality gaps and the size of the informal sector (Hacibedel et al., 2024). This was also previously observed by the International Monetary Fund (2020) that the level of a country's economic development determines the size of the informal economy. That is in emerging and developing economies EMDEs the informal sector accounts for a third of a country's economic activity compared to 15 percent in high income countries. Piketty argued that other dimensions than economic dimensions influence the level of inequality gaps in the economy hence institutional quality was also used as a control variable in this study.

3. 1. ECONOMETRIC MODEL

The main aim of the study is to examine the link between inequality and the shadow economy, examining the moderating role of financial technology. IOA (2023) argued that the digitalisation of the informal sector improves financial inclusion which is essential to reducing income inequalities.

The two-step system GMM developed by Blundell and Bond (1998) which relies on using instrumental variables is employed in this study to determine the relationship between inequality and the informal economy. The GMM is the preferred method of estimation as estimating the model using the ordinary least square (OLS) carries significant problems of endogeneity bias. Additionally, in both the fixed and random settings, the lagged dependent variable is correlated with the error term, even if the disturbances are not auto-correlated (Blundell and Bond, 1998). The problems of possible endogeneity bias due to interaction between the historical inequality and the informal economy, autocorrelation, individual specific heteroscedasticity and omitted variable bias are overcome by applying the System GMM. The aim of the GMM estimator is to address potential endogeneity bias.

Inequality in developing countries is persistent and can pose problems of autocorrelation and unobserved heterogeneity (see Wintoki et al., 2012). Furthermore, the System GMM technique yields an asymptotically unbiased estimation of the t-statistics without requiring the heteroscedastic structure of the regression equation (Blundell and Bond, 1998; Hansen, 1982). The GMM estimation method addresses these problems, and it is argued to be more efficient on short panels (see Arellano and Bond, 1991); thus, it is the preferred technique to determine the relationship between finance and inequality. The generic dynamic panel model that is estimated in this study is therefore parameterised as in Equation 1.

$$Y_{it} = \alpha Y\beta_{it-1} + X'_{i\,t-l}\beta + \mu_i + \varepsilon_{it} \qquad (1)$$

where Y_{it} represents inequality, X_t, t−1 represents a vector of inequality determinants including informal economy, financial technology, education, unemployment, institutional quality, economic development and μ_i are country fixed effects, ε is the error term, i and t indicate the country and time dimensions respectively. The baseline model estimated is therefore a two-step System GMM:

$$\Delta INEQ_{i,t} = (\alpha\text{-}1)\,\Delta INQ_{i,t-1} + \beta_2 \Delta INFECO_{i,t} + \beta_3 \Delta INFECOFINTEC_{i,t} + \beta_j \Delta X_{j,it} + \Delta\varepsilon_{i,t} \qquad (2)$$

Where INEQ is inequality, α, β, are parameters to be estimated and the X is a vector of control variables that includes fintech (FINT), education (EDU), unemployment (UNEMP), Institutional quality (INSTQUAL) and economic development (ECODEV). The interaction variable between informal economy and fintech is captured by the term (INFECOFINTEC). Given that inequality is persistent this requires estimation using a dynamic model such as GMM. System GMM estimator was employed as it solves the problems associated with the ordinary least squares, fixed and a random effect in Equation 2, is therefore used for examining the relationships. The consistency of GMM estimators hinges on the validity of lagged values of explanatory variables as instruments in the inequality regression. Arellano and Bond (1991) and Arellano and Bover (1995) proposed two specification tests for dynamic models.

Firstly, the Sargan test of over-identifying restrictions assesses the overall validity of instruments by scrutinizing the sample analogy of moment conditions employed in the estimation process (Sargan, 1958; Batuo et al., 2018). Failure to reject the null hypothesis lends support to the model. Secondly, a diagnostic test examines whether the error term is serially correlated, with model specification being supported by not rejecting the null hypothesis. In the System

GMM specification, a test determines if the differenced error term (i.e., the residual of the regression in differences) exhibits second-order serial correlation. While the differenced error term is expected to display first-order serial correlation AR(1) even if the original error term (in levels) is uncorrelated, unless the latter follows a random walk (Arellano and Bond, 1991; Batuo et al., 2018). Second-order serial correlation AR(2) of the differenced residual suggests that the original error term is serially correlated and follows a moving average process of at least order one. This would challenge the suitability of the proposed instruments and advocate for higher-order lags to be utilized as instruments. The System GMM model has found application in recent financial development literature (see Bittencourt, 2019; Čihák and Sahay, 2020).

4. RESULTS

This section presents the results of the study. To have the institutional quality index the study carried out a principle component analysis (PCA). Six governance measures from the World Governance Indicators database of the World Bank were used. These governance measures are the control of corruption (estimate) government effectiveness, political stability, regulation quality (estimate), rule of law and voice of accountability. The results from the principal component analysis are presented in Table 2

Table 2: Principal components

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	4.5401	3.8322	0.7567	0.7567
Comp2	.707902	.265552	0.1180	0.8747
Comp3	.44235	.298158	0.0737	0.9484
Comp4	.144192	.0502388	0.0240	0.9724
Comp5	.0939529	.0224821	0.0157	0.9881
Comp6	.0714708	.	0.0119	1.0000

Source Authors own estimations using Stata 15

The eigenvalue from Table 2 explains the variance in the data. Therefore, the first component (Comp1) with an eigenvalue of 4.54013 captures a significant portion of the variance in the data. Additionally Component 1 explains approximately 75.67% of the total variance with the subsequent components explaining less variance. The PCA results indicate that most of the variance in your data can be captured by the first two components, which together explain about 87.47% of the total variance

Table 3: Principal components (eigenvectors)

Variable	Comp1	Comp2	Comp3	Comp4	Comp5	Comp6
ccorrupt	0.4336	-0.1965	0.1925	**-0.8282**	-0.1033	0.1993
goveff	0.4306	-0.3043	-0.2789	0.4082	-0.0824	**0.6861**
polstab	0.3821	0.1534	**0.8248**	0.3280	0.2063	-0.0068
regq	0.4352	-0.2125	-0.3403	0.0106	**0.6815**	-0.4302
rol	0.4515	-0.0314	-0.1063	0.1776	**-0.6877**	**-0.5287**
voa	0.2956	**0.8939**	-0.2788	-0.0906	0.0517	0.1578

Source: Authors own Estimations using Stata 15

From Table 3 results the correlations that are deemed significant are with an absolute value of 0.5 and above. None of the variables have any significant correlation with component 1. The second component (Comp2) is strongly correlated with the original voice of accountability with

a correlation of 0.8939, whilst component 3 is correlated with political stability. A correlation of -0.8282 is reported on component 4 and the estimate on the control of corruption. Component 5 is correlated with the original regulation quality and rule of law with the correlations of 0.6815 and -0.6877 respectively. The sixth component (Component 6) increases with increasing government effectiveness and decreases with decreasing rule of law.

The descriptive statistics of the study is summarised in Table 2.

Table 4: Descriptive Statistics

Variable	Mean	Maximum	Minimum	SD	Obs.
ineq	0.4704	0.6425	0.3780	0.0678	198
infeco	34.0494	50.4964	23.27975	7.1210	198
fintech	804.5659	2973.4070	8.280853	656.0084	198
infecofintec	26722.3500	100036.7000	287.1082	22395.3000	198
unemp	9.2019	25.1060	0.6000	7.5289	198
ecodev	4.7821	86.8268	-50.3385	8.9378	198
educ	103.5634	149.2714	48.9873	21.2868	198
INSTIQUAL	-0.0000	2.2340	-1.7361	1.0000	198

Notes: The descriptive statistics is based on the data from Solt (2023) and World Bank (2023)

Source: Authors own Estimations using Stata 15

The summary shows that the sample of the study has high levels of income inequality as measure by the Gini Coefficient with the highest level of inequality is 0.64 with a minimum of 0.378. The maximum output of the informal economy as a percent of gross domestic product is 50.496 with a minimum of 23.2797. There is moderate variability of the informal economy output as indicated by a standard deviation of 7.12098. The informal output averaged about 35 percent of gross domestic product in 2012-2022 for the countries in the sample. The minimum economic development as measured by the per capita income of -50.338 was recorded in Liberia in 2016. Years of negative external terms of trade, high debt burden and decelerating economic growth retarded the per capita income in Liberia (African Development Bank ((AfDB), 2023). There are moderate variations in the level of economic development for the countries in the sample as shown by a standard deviation of 8.937757. The mean of financial technology (fintech) is 804.5659 with a standard deviation of 656.0 showing a high level of variability of financial technology from the mean for the countries in our study.

Table 5 shows the results of the deterministic relationship between inequality and informal economy. Generalised Method of Moments (GMM) was used to examine the relationship between the variables.

Table 5: Relationship between the income inequality (Gini coefficient) and the informal economy

Variables	Pooled Effects ineq	Fixed Effects ineq	Random Effects ineq	2-Step System GMM ineq	FGLS ineq
L.ineq				0.933***	
				(0.0230)	
infeco	-0.823	-0.792	-0.823	-0.789***	-1.698**
	(0.501)	(0.505)	(0.501)	(0.156)	(0.648)
fintech	0.0019	0.0037	0.0020	0.0712*	0.0863***
	(0.0052)	(0.0052)	(0.0052)	(0.0294)	(0.0225)
infecofintec	-0.0001	-0.0002	-0.0001	-0.0021*	-0.0029***
	(0.0002)	(0.0002)	(0.0002)	(0.0009)	(0.0007)
unemp	1.339*	0.604	1.339*	0.915*	5.153***
	(0.621)	(0.645)	(0.621)	(0.443)	(0.489)
ecodev	0.0336	0.0295	0.0336	-0.135*	0.229
	(0.0502)	(0.0489)	(0.0502)	(0.0570)	(0.343)
educ	0.226**	0.234***	0.226**	0.245	0.0536
	(0.0708)	(0.0695)	(0.0708)	(0.149)	(0.165)
INSTQUAL	-3.933	-4.714*	-3.933	-7.078***	-18.28***
	(2.249)	(2.223)	(2.249)	(2.343)	(3.703)
_cons	464.6***	469.3***	464.6***	226.4*	366.6***
	(24.50)	(21.03)	(24.50)	(99.55)	(26.15)
N	197	197	197	161	197
Groups	18	18	18	18	18
Instruments				14	
AR (1)				-1.46	
Prob > z				0.145	
AR (2)				0.98	
Prob > z				0.328	
Sargan test				63.95	
Prob > Chi2				0.98	
Hansen test				4.96	
Prob > Chi2				0.99	

Notes: Robust standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: Authors own calculations using Stata 15

Table 3 shows the results of the deterministic relationship between inequality and the informal economy. Additionally, the Table shows the results of the moderating role of financial technology on the inequality-informal economy nexus. That is the results presented show the moderating role of financial technology on informal economy in the relationship. Since inequality is persistent GMM efficiently models the relationship and the other Models in form of pooled effects, fixed effects, random effects and FGLS are presented for comparison purposes only and to gather some diagnostic statistics. For the countries in the sample of this study, the relationship between income inequality and the informal economy is negative and statistically significant at 0.1 percent. For every unit increase in the informal sector ceteris paribus, inequality is reduced by about 0.789.

5. DISCUSSION

The deterministic relationship between inequality and the informal economy shows reduced inequalities as the size of the informal economy increases. This relationship was expected as the informal economy acts as a buffer to the marginalised groups for income earning and reduces income inequalities. However, in other arguments a large informal sector is detrimental to the economy as it distorts the effective tax revenue collection ultimately aggravating the income inequality (World Bank, 2022). The inverse relationship between inequality and the informal sector findings of this study are similar to the findings of Ohnsorge and Yu (2022) who argued that the prevalence of informal sector employment can serve as a buffer against job and income losses. Thus, people with low or no incomes partake in the informal economy, guaranteeing the rise in their disposable income and reducing the income gap (David et al., 2023).

The findings concur with the United Nations (2020) comments which suggested that the informal economy in Africa is crucial for absorbing many employment seekers. There are contrasting finding on the informal sector role of the income inequality gap in emerging and developing economies (see Dell'Anno 2021 and Davidescu, Nae and Florescu, 2022). The differences in the findings can be attributed to variations across countries or country groups. Furthermore, the World Bank (2022) argued informality can be dual that is informality in output and informality in employment, the differences of the measurement used in the analysis can explain the differences in the findings. Further differences of these studies and the findings of this study is the inclusion of the financial technology as a control variable in examining the relationship between the informal sector and inequality

A positive and statistically significant relationship between financial technology and income inequality was observed for this study. Although the a priori expectations on the relationship between fintech and inequality were either negative or positive the findings suggests that the introduction of fintech increases income inequality which is a divergence to most policy initiatives of mobilizing the use of financial innovations in marginalised communities. Fintech especially use of mobile phones is regarded as the enable of achieving the SDG 10 of reduced inequalities. However, the finding is in line with the arguments postulated by Davidescu et al. (2022). Use and access of financial technology requires skills which might render income advantages to those familiar with information technology in accessing and using formal financial products using technological innovations. This further creates income inequalities.

However, when fintech acts as a moderating role in explaining the dynamics of the relationship, the relationship between the informal economy inequalities is negative and significant. The findings support the indirect effect of FinTech on income inequality through informal economy in reducing income inequalities. In this case fintech can be a transmission channel in which the size of the informal economy sector reduces income inequalities for the countries in this study. The emergence of fintech firms has provided products and services to the previously excluded segments of the population. Through financial technology, financial products and services that were previously accessible by the formal economy such as bill payments and access to credit became accessible to the informal sector (Ozili, 2018, Demir et al., 2022). This access to financial products and services using tech firms potentially reduces the inequalities (Esaku, 2021).

For a better understanding of the relationship between inequality and the informal sector, unemployment was included as a control variable for the relationship between income inequality and the informal economy. The study found a positive and statistically significant relationship. This finding is a priori expected as an increase in unemployment is expected to increase the income disparity gap. Aspachs et al. (2022) argued the importance of the unemployment channel in transmitting growth shocks to inequality. Although the informal economy is thought to be a

buffer to earn income for marginalised groups, the quality of jobs created in the informal sector and the labour market policies may not be sufficient to close the inequality gap. It is therefore prudent for policy makers to have structural reforms in place which may be essential to addressing the features of labour markets which tend to exacerbate income disparities.

Acemoglu and Robinson (2015) argued the importance on institutional quality in reducing income inequalities. The institutional quality index used in this study is negative and statistically significant at 0.1 percent level on the examined relationship with income inequality. The results from the study suggest that improvements in the control of corruption, regulation quality, government effectiveness, rule of law, and voice and accountability reduce income inequality. Piketty (2015) argued that in some instances the patterns of income inequality are driven by political factors and choices rather than economic factors only. The negative and statistically significant relationship between inequality and institutional quality supports this notion. The effective of government improves economic activity and reduces inequality. Institutions and ideologies can either reinforce inequality gaps or how income disparities can be alleviated (Piketty, 2020, Magwedere, 2023). For this study, institutions reduce inequality gaps reinforcing the Piketty (2020) arguments that other factors than economic factors play a role in addressing inequality gaps. In most counties in these studies there are government interventions through so factors plays reducing inequality gaps, it is noteworthy that the inequality gaps in these economies might have been worse if there were no redistributive interventions that are outside the economic systems. According to Piketty (2020) legal system, the educational system and the fiscal system can maintain a certain level of equality or inequality.

6. CONCLUSION

Income inequalities if unresolved have can have social and economic consequences. This research elucidates the complex dynamics between the informal economy, financial technology, and income inequality. The size of the informal sector reduces income inequalities whilst financial technology increases inequalities. However, when financial technology has a moderating role between inequality and the informal economy the level of income inequalities for the countries in this study is reduced. The findings reveal that a more extensive informal sector serves to decrease income disparities, providing crucial economic opportunities for marginalized groups. Conversely, the initial introduction of financial technology appears to exacerbate income inequality due to disparities in access and digital literacy. However, when financial technology is leveraged as an intermediary between the informal economy and income inequality, it shows an inverse relationship with inequality possibly by levelling the financial playing field through enhanced inclusion.

Given these complexities, future studies should investigate how the informal economy influences the relationship between income inequality and fiscal policies, focusing on tax revenue dynamics. It is also know how the informal sector influences the monetary policy transmission channels, hence future studies should also examine the informal sector and monetary policy shocks. Additionally, further research is recommended to assess the impact of labour market earnings on income disparities, which could offer insights into how wage inequalities contribute to broader socio-economic divides. It is recommended to examine the relationship between the mediating role of the shadow economy on the relationship between income inequality and tax revenue.

In studying the determinants on income inequality for policy considerations other factors such as political factors and the role of innovations in the financial sector should be considered in addressing the widening inequality gaps in emerging and developing economies. This study recommends that policy approaches should also consider political factors alongside economic

indicators to comprehensively address income inequality in emerging and developing economies. This is guided by the inverse relationship between income inequality and the institutional quality index. Historically, the policy narratives in developing economies seem to either disregard informal economies or even view this sector as potentially threatening to the sustainability of the formal economies. It is therefore recommended that careful attention is paid to this sector to tap into the innovative strategies from this sector and create pathways to formality for optimal contribution by the informal sector to the income distribution dynamics. If reducing income inequality is among the objectives of governments, policies aiming to reduce the size of the informal sector, such as increasing the cost of operating informally, might not be helpful in terms of reaching the target as they might deprive the most vulnerable of their means of subsistence in a context of extremely limited social protection. Policy makers should apply due diligence in their quest to reduce the size of the informal sector. In most cases especially in developing economies participation in the informal sector is usually driven by necessity than choice. Policy makers need to understand the factors that are increasing the size of the informal sector and therefore address these challenges for possible formalization of informal businesses,

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