

What levels of informality tackle poverty in Africa? Evidence from dynamic panel threshold analysis

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Abstract

Purpose – The paper validates the threshold argument in the informality–poverty nexus. Recent literature and policy have argued the existence of a threshold in the relationship.

Design/methodology/approach – The study adopts dynamic panel threshold analysis, estimated within the framework of system Generalized Method of Moments (SGMM) to control for endogeneity and simultaneity. Data from 40 selected sub-Saharan African countries between 1991 and 2018 are used for the study.

Findings – Empirical results confirm the existence of an average threshold of 31% share of informality in GDP. Also, the paper finds that threshold of informality that addresses mild and severe poverty varies between 24.32 and 36.75%.

Research limitations/implications – The work is limited to African economies. Evidence from other emerging and developed economies is suggested for further research.

Practical implications – Overall, the empirical results indicate a threshold in the informality–poverty nexus. Therefore, an excessive informality level does not benefit the African growth process. Policymakers and governments are advised to operate within the bounds of the threshold of informality that reduces poverty and improve the African economic growth process.

Originality/value – The paper is the first study to provide empirical findings on the nonlinear and threshold argument in the informality–poverty nexus, as far as the authors know.

Keywords Poverty, Informality, Africa, Threshold

Paper type Research paper

1. Introduction

The poverty–informality nexus is an important conversation examined in the economic development discourse in developed and developing countries. Despite various theoretical predictions that the informal sector should shrink as economies grow and develop, evidence shows that the informal sector comprises a significant proportion of GDP and employment. For



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instance, the International Labour Organization shows that between 60 and 70% of the global labour force is informal (OECD/ILO, 2019; ILO, 2018). In addition, it is estimated that the informal sector makes up about 35% of the GDP in low- and middle-income countries (IMF, 2021). Despite the role of informality in the economy continues to attract contradicting views.

On the one hand, informality is seen as undesirable. Those with this view suggest that the informal sector is negative, often referred to as a shadow or undisclosed economy, thereby underlining the fact that it lies outside formal rules and regulations. Some, like Farrell (2004), argue that the presence of the informal sector is deleterious to the economy and must therefore be eliminated. They argue that firms' substantial cost advantages in the informal economy crowd out the formal sector. If left unchecked, the informal economy can be self-reinforcing, leading to increased inefficiency and low productivity and therefore reduced economic growth. Economies with large informal sectors tend to be associated with low productivity, low tax returns and a lack of social insurance and labour law protections for employees (ILO, 2021; la Porta and Shleifer, 2014).

An alternative view suggests that the informal economy is an important source of livelihood, especially for the poor. de Soto (1989, 2000) argues that the informal economy provides a pool of entrepreneurs who can bring economic growth if the business environment is unburdened with government regulations. Moreover, evidence also shows that the informal economy is a source of employment for those whose skills and characteristics do not allow them opportunities for employment in the formal sector. As a result, the informal economy provides an income buffer and, therefore, an important social safety net for the poor.

Finding an appropriate balance between the benefits and challenges of the informal economy requires the knowledge of an appropriate threshold of informality that guarantees economic development. The discussion of a threshold is emerging in academic development discourse and policymaking. Surdej (2017) refers to a threshold of 30% share of informality in GDP as the gravity centre at which the economy becomes formal. In the same vein, Wu and Schneider (2019) also identify nonlinearities in the relationship between the informal sector and economic development and show a U-shaped relationship between the size of the informal economy and GDP per capita. Finally, Yu and Ohnsorge (2019) suggest that an informal economy of about 35% of the GDP can allow an economy to harness the positive effects of informality.

In line with these studies, recent empirical studies suggest that the level of GDP can moderate the effects of informality on poverty and vice versa (Bolarinwa and Simatele, 2022; Pham, 2022). These studies imply that the prospects of informality for benefitting the economy are associated with the growth process and the ability of the economy to sustain economic growth over time. Thus, countries that experience and sustain the growth process tend to have a thriving informal sector and thus report low poverty. These economies have informal sectors that create better employment and pay above survival wage rate, report high contributions to exports, generate innovations and encourage transitioning to the formal sector.

Following these arguments, it makes sense to deduce that there exists a threshold of informality that benefits economic growth, reduces poverty and minimizes the associated adverse effects. Most current policy approaches lean on sanitizing the informal sector through formalization efforts. However, the literature suggests that these efforts have not been very successful (Florida *et al.*, 2020; Ulysses, 2020). This paper proposes that a size threshold, as identified in this paper, can assist policymakers in focusing on maximising the benefits of informality and mitigating the associated negative efficiency and welfare effects. We show that a threshold of informality as a share of GDP can be identified for African countries based on its effect on poverty.

The paper uses data from 40 selected sub-Saharan African countries to investigate the possibility of an informality threshold. The United Nations' economic classifications of countries are used to categorise the sample countries into low- and middle-income countries. The paper asks three main questions. What thresholds of informality reduce poverty in African countries? Are these thresholds different for mild and severe poverty scenarios? Given the high

shares of the informal economy in African countries relative to the rest of the world, how comparable are these thresholds to those of [Surdej \(2017\)](#) and [Yu and Ohnsorge \(2019\)](#)?

The need to investigate the possibility of a threshold for African countries is clear. The continent has higher shares of informality than elsewhere. The share of informality in employment is as high as 92.4% in Western Africa ([ILO, 2018](#)). The share in GDP is also higher at 55% and as high as 65% in some West African countries ([Lupi, 2018](#)). These levels are much higher than the ratios implied in the works of [Surdej \(2017\)](#) and [Yu and Ohnsorge \(2019\)](#). Furthermore, the poverty levels in the continent are relatively higher than elsewhere. The rest of the paper is structured as follows. Following the introduction, Section Two presents a brief literature review, while Section Three addresses methodology. Findings are discussed in Section Four, and the last section concludes the paper.

2. Brief literature review

Three theoretical perspectives dominate the perceptions of the causes and effects of informality in the literature. The first group of theories include [Boeke \(1953\)](#), [Lewis \(1954\)](#) and [Hart \(1973\)](#), which constitute the dualistic views on informality. The fundamental idea of the dualist theories is that the economy is divided into two separate sectors: the imperial higher capitalist and native economies ([Boeke, 1953](#)) and the modern and traditional sectors ([Lewis, 1954](#)) or as more commonly used in the literature the formal and informal sectors ([Hart, 1973](#)). The central tenet of these theories is that there is a wedge between the formal and informal sectors, which are distinct, with very little interaction between them. In this view, the production methods are quite different, with the informal sector using less advanced methods and therefore, lower productivity. The sector lies outside government rules and regulations with little or no social protection for workers. Nevertheless, the informal sector is seen as a good source of employment providing a safety net for the unemployed and underemployed.

A related view is the parasitic view. The proponents of this theory argue that the informal sector is a parasite which feeds off the formal sector. Therefore, the parasitic view advances that although the formal and informal sectors are distinct, the informal sector firms can compete with the informal sector. The view proposes that staying in the informal sector is a rational choice by informal firms to avoid regulation and to benefit from the low business costs associated with operating in the informal sector ([Farrell, 2004](#); [Maloney, 2004](#)). Moreover, because the informal economy competes with the formal economy, it can divert resources away from the formal economy resulting in stagnated growth.

The third view is the legislative view of informality which is mainly attributed to the work of [de Soto \(1989, 2000\)](#) and [Portes and Benton \(1989\)](#). The central proposition is that informal firms can be very productive. However, their productivity is limited by burdensome government regulations and rent-seeking. Furthermore, other institutional barriers, such as credit rationing and lack of secure property rights, present significant barriers to participation in the formal sector. Because firms in the informal sector are deprived of access to enabling infrastructure, have poor access to credit and have no social protection, they have low productivity. Nevertheless, the sector provides a source of employment and a safety net for the poor and can be harnessed for growth.

Therefore, the theoretical literature suggests tensions between the potential benefits of formality and its negative effect, which suggests that this is an empirical question. However, the empirical literature shows similar results. The evidence indicates that problems associated with informality exist alongside its benefits of providing employment and safety nets for the poor. For instance, evidence shows that formal and informal firms within similar industries have overlapping productivity distribution ([Allen et al., 2018](#); [Ulysees, 2020](#)). There is also evidence that provides implicit support for the role of regulation. For instance, [Cisneros-Acevedo \(2022\)](#) shows that as firms grow, their share of informal employees declines. Similarly, substantial literature suggests the existence of a substantial formal–informal wage gap ([Cisneros-Acevedo,](#)

2022; Kahyalar *et al.*, 2018; Busso *et al.*, 2021). Better access to credit markets for formal firms relative to informal firms is confirmed (Lopez-Martin, 2019; D’erasmo, 2016).

Few studies have investigated whether informality can reduce poverty, conditional on the growth level and the ability of the economy to sustain economic growth over time (Bolarinwa and Simatele, 2022; Pham, 2022). Notably, Pham (2022) reported that informality reduces poverty in middle-income economies and increases poverty in developing economies. Supporting this evidence, Bolarinwa and Simatele (2022) show that informality reduces poverty in middle-income African countries and increases poverty in low-income African countries. These studies show that the ability of informality to influence poverty depends on the economic growth process and institutional performance.

The theoretical and empirical results seem to suggest the inevitability of the informal sector and the tension of its benefits and challenges, it is natural to raise the question of a threshold. Empirical work on the poverty–informality threshold is limited. Wu and Schneider (2019) use data from 158 countries to investigate the nonlinearities between the size of the informal sector and economic development. Although the study does not directly investigate the interaction with poverty, the finding of a U-shaped relationship between GDP per capita and the size of the informal sector underscores the presence of a threshold that shows a point at which the relationship between informality and economic development changes. The authors do not identify the threshold but show that the relationship between informality and GDP per capita is positive beyond this threshold.

Related work by Yu and Ohnsorge (2019) shows that when the share of the informal economy in GDP averages around 35%, the informal economy has positive effects on GDP and economic development. According to the dual labour market theory, the identified thresholds of informality ensure the balancing of the formal and informal sectors. These studies argue that this threshold ensures that the informal sector controls small trade and light manufacturing, guarantees smooth informal–formal business transitions, ensures an adequate tax bracket and promises a living wage for the employees in the informal sector. More importantly, the threshold is expected to be the point that ensures that the informal sector does not drag the macroeconomic performance (Surdej, 2017). Overall, these studies suggest that identifying the thresholds of informality is important for development outcomes policy formulation, particularly poverty inherent in African economies.

3. Methodology

3.1 Method of analysis and empirical model

The paper adopts the dynamic panel threshold model of Seo *et al.* (2019). The method simultaneously documents the threshold level levels in the nonlinear models while addressing the inherent simultaneity and endogeneity in the model. The model relies on the Generalized Method of Moments (GMM) framework since it yields more robust estimates than other estimators. Following Seo *et al.* (2019), the threshold level of the informality–poverty nexus in Africa is specified as follows:

$$POV_{it} = (\alpha_1 POV_{it-1} + \theta_{11} INFR_{it} + \theta_{12} INCOME_{it}) 1 \{q_{it} \leq Y\} + (\alpha_2 POV_{it-1} + \theta_{21} INFR_{it} + \theta_{22} INCOME_{it}) 1 \{q_{it} > Y\} + \mu_i + \varepsilon_{it} \text{ for } i = 1, \dots, n; t = 1, \dots, T \quad (1)$$

where POV, INFR and INCOME are Poverty, Informality and Income, respectively. Details on the measurement of variables are provided in Table 1. The work adopts two measures of informality: the Dynamic general equilibrium model-based (DGE) estimates of informal output and the Multiple indicators multiple causes model-based (MIMIC) estimates of informal output. In equation (1), $1\{\cdot\}$ is the indicator function, q_{it} is the transition variable and Y is the threshold parameter in the model. Equation (1) is estimated with SGMM, allowing for both regressors and

Indicators	Measurement	Source	A priori expectation
Informality 1	Based on dynamic general equilibrium model-based (DGE) estimates of informal output (% of official GDP)	World Bank Informality Database (WBID), 2022	+/-
Informality 2	Based on multiple indicators multiple causes model-based (MIMIC) estimates of informal output (% of official GDP)	WBID	+/-
Poverty 1	The poverty gap at \$1.90 a day (2011 PPP) is the mean shortfall in income or consumption from the poverty line of \$1.90 a day, expressed as a percentage of the total population	World Bank Poverty Database (WBPD), 2022	
Poverty 2	The national poverty headcount ratio is the percentage of the population living below the national poverty line of \$1.90 per day (2011 PPP)	WBPD	
Poverty 3	The poverty gap at \$3.20 a day (2011 PPP) is the mean shortfall in income or consumption from the poverty line of \$3.20 a day, expressed as a percentage of the total population	WBPD	
Poverty 4	The national poverty headcount ratio is the percentage of the population living below the national poverty line of \$3.20 per day (2011 PPP)	WBPD	
Economic Growth	The natural logarithm of GDP per capita is gross domestic product divided by population, expressed in constant 2015 US dollars	WBPD	+

Source(s): Authors (2023)

Table 1.
Data, measurement
and sources

transition variables to be endogenous. This method is appropriate considering the incidence of endogeneity and simultaneity reported in the informality–poverty nexus. Issues of the business cycle and missing data are addressed by adopting a 4-year cumulative non-overlapping average model following the literature on poverty (Bolarinwa *et al.*, 2021; Olaoye, 2022). Overall, each variable has seven observations. Also, the paper controls for heterogeneity by running two different models from middle- and low-income countries.

3.2 Data, measurement and sources

The paper relies on the World Bank Database for all variables. Four measures of poverty are sourced from the poverty database, while two reputable informality measures are adopted in the paper. See Table 1 for details. Issues of the business cycle and missing data are addressed by adopting a 4-year cumulative non-overlapping average model following the literature on poverty (Bolarinwa *et al.*, 2021; Olaoye, 2022). Following international convention, poverty is captured by the inability to meet up to \$1.90 a day and mild poverty is represented by the inability to meet up to \$3.20 a day (Ferreira *et al.*, 2015; Schoch *et al.*, 2020) [1]. Using the United Nations income classification, the 40 countries in the study were selected from upper-middle, lower-middle and low-income countries in sub-Saharan Africa between 1991 and 2018. The upper-middle and lower-middle income countries are grouped so that only two groups are used in the estimation. The list is shown in Table 2. The split allows us to estimate the empirical models and analyse the thresholds according to income levels.

A previous study (Bolarinwa and Simatele, 2022) showed that the relationship between poverty and informality is negative for low-income countries but positive for middle-income countries. Similarly, Wu and Schneider (2019) find a U-shaped relationship between the informal economy and GDP. Given these results, we expect that the benefits of informality

increase below the threshold and decrease above the threshold. Moreover, due to the sensitive nature of dynamic panel threshold models, only income is introduced into the models. Other important variables such as institutional quality, government expenditure, inequality, trade openness, corruption and inflation that play important roles in the models are introduced as instrumental, exogenous and control variables.

4. Empirical results and discussions

4.1 Descriptive and correlation analysis

The section presents the descriptive statistics, empirical results and interpretations. The descriptive statistics are presented in Table 3. As noted earlier, the international poverty lines of \$1.90 and \$3.20 are used to capture the severity of poverty, with the former capturing severe poverty and the latter capturing mild poverty for the headcount and poverty gap measures. About 44% proportion of the population falls below the severe poverty line. The country with the lowest population below the poverty line is Gabon, with only 3.4% of its population below the poverty line. Comparatively, 94% of Congo D.R.'s population falls below the severe poverty line. Using the poverty gap measure, about 17% of the population falls below the severe poverty line. With this measure, Congo D.R. still has the poorest population, with 64% falling below the poverty line. Gabon has the lowest depth of poverty, with only 0.8% of the population considered poor.

For the mild poverty indicators, the Poverty Headcount at \$3.20 shows that, on average, about 67% of the population falls below the poverty line. However, Botswana only reports that 8.7% of its population falls below this line compared to Congo D.R. with about 99% of its population below this mild poverty line. Comparatively, the Poverty Gap at \$3.20 has a mean of 33%. The economy with the lowest poverty depth is Gabon with 3.2% of its population below the poverty. The Congo D.R. reports 77% population below this poverty line using this indicator. Overall, the paper reports a high standard deviation for all poverty measures, indicating significant income gaps in Africa.

For the informality measures, the paper adopts two measures. The first measure using the DGE modelling shows that economic activities by workers and economic units that are not covered or insufficiently covered by formal arrangements or formal sectors of the economy

Middle-income countries (\$996 - \$12,055)	Lower-income countries (\$996 or lower)
Seychelles, Equatorial Guinea, Botswana, Gabon, Mauritius, Namibia and South Africa. Angola, Cameroon, Cape Verde, Congo, Cote d'Ivoire, Ghana, Kenya, Lesotho, Mauritania, Nigeria, Sao Tome and Principe, Swaziland and Zambia	Benin, Burkina Faso, Central African Republic, Chad, Democratic Republic of Congo, Eritrea, Ethiopia, Gambia, Liberia, Malawi, Mali, Mozambique, Niger, Rwanda, Senegal, Tanzania, Togo, Sierra Leone, Uganda and Zimbabwe

Source(s): Authors (2023)

Table 2.
List of countries

Variables	Mean	Standard dev	Minimum	Maximum
Poverty Gap at \$1.90	17.1169	10.7839	0.8	63.6
Poverty Gap at \$3.20	33.2854	13.5919	3.2	77.1
Poverty Headcount at \$1.90	43.5967	19.0252	3.4	94.1
Poverty Headcount at \$3.20	67.4116	17.8410	8.7	98.5
GDP Per Capita	2144.7870	3087.5120	193.87	18654.2
Informality Measure 1	41.0501	8.5199	23.73	64.5
Informality Measure 2	42.4157	8.0908	27.06	62.1

Source(s): Authors (2023)

Table 3.
Descriptive statistics of
the variables

account for 41% of GDP in African countries on average with ranges between 24 and 64%. These levels of informality are high compared to developed countries such as the USA and Canada, which report an average of 15% during the same period. The MIMIC measure of informality shows similar levels, with 42% of the economic activities passing through the informal sector channels. Country ranges are also similar, with the informal economy's share in GDP between 27 and 62%. The standard deviation for both measures is below nine showing no significant differences in the shares of informality between countries. The informal economy makes up a large chunk of economic activities in African countries and is an important macroeconomic indicator for influencing unemployment and other economic policies in Africa.

Following the descriptive statistics, [Table 4](#) presents the results of the correlation analysis. The data show a high correlation among poverty measures. Similarly, informality measures show a high correlation, implying that the measures are essentially the same. These measures are used interchangeably in the analysis. There is a positive association between poverty indicators and informality measures. None of the coefficients is higher than 50%. Therefore, no inherent multicollinearity is expected in the models. As expected, the correlation coefficient between informality and per capita income shows a negative association. Lastly, the coefficient of association between poverty and per capita income is negative. Overall, the coefficients of association for all the indicators are statistically significant.

4.2 Nonlinear evidence from the threshold models

[Tables 5 and 6](#) present the results of the threshold models. [Table 5](#) shows the main results using the DGE-based measure for informality. In these Tables, four thresholds are estimated using four measures of poverty: poverty headcount and poverty gap at \$1.90 represent severe poverty, while poverty headcount and poverty gap at \$3.20 capture mild poverty. Moreover, [Table 6](#) presents the robustness check using the MIMIC informality measure. The dynamic panel threshold is sensitive to the number of variables. Therefore, it is important to keep it to a minimum number ([Seo et al., 2019](#)). Hence, only per capita income is adopted as a threshold variable. Other variables of informality, institutional quality, Government expenditure, Inequality, Trade Openness, Corruption and inflation that influence the models enter the analysis as instrumental, exogenous and control variables following the literature.

Furthermore, since the dynamic panel threshold method is built on the framework of the Generalized Method of Moments (GMM), it is appropriate to examine the appropriateness of instrumental variables. Our results show stable estimates. The Sargan test for the models under the null hypothesis that over-identifying restrictions that the instruments are not correlated with the error term are validated. Furthermore, the second-order autocorrelation (AR2) shows that the models do not suffer from autocorrelation ([Arellano and Bover, 1995](#)).

The estimation results are presented in four parts. The first and second rows present the disaggregated estimations for the two groups: the low-income group and the middle-income group. The third row presents the result for the aggregate model. Lastly, the fourth row presents the threshold estimates and associated post-estimation tests. In all the threshold models, income is adopted as the transitional variable. An examination of the threshold models shows that informality positively affects poverty levels among low-income countries. Therefore, informality increases the rate of poverty in low-income countries. The low wages, lack of social protection, poor financial access and inadequate skills typical of the informal sector in low-income countries could explain the result. The result is statistically significant and verified for severe and mild poverty status. Overall, the findings agree with the general view in the literature that the magnitude of economic activities in the informal sector increase poverty ([Canelas, 2019](#); [Pham, 2022](#); [Bolarinwa and Simatele, 2022](#)).

	Income share by 20%	Poverty gap at \$1.90	Poverty gap at \$3.20	Poverty headc. at \$1.90	Poverty headc. at \$3.20	Per capita income	Informality 1	Informality 2
Income Share by Lowest 20%	1.0000							
Poverty Gap at \$1.90	0.0413**	1.0000						
Poverty Gap at \$3.20	0.2067***	0.9664***	1.0000					
Poverty Headcount at \$1.90	0.2192***	0.9503***	0.9962***	1.0000				
Poverty Headcount at \$3.20	0.4227***	0.8176***	0.9365***	0.9437***	1.0000			
GDP Per Capita	-0.4948***	-0.2439***	-0.3284***	-0.3194***	-0.4280***	1.0000		
Informality Measure 1	0.3305***	0.2413***	0.2684***	0.2615***	0.2892***	-0.316***	1.0000	
Informality Measure 2	0.2140**	0.2225***	0.2292***	0.2168**	0.2293***	-0.299***	0.8335***	1.0000

Note(s): *** and ** denotes 1 and 5% significant levels respectively
Source(s): Authors (2023)

Table 4.
Correlation matrix of
the variables

	Poverty headcount \$1.90 Lower Regime	Poverty headcount \$3.20 Lower Regime	Poverty gap \$1.90 Lower Regime	Poverty gap \$3.20 Lower Regime
Lag of Poverty	-0.7083* (0.4280)	-0.2842 (0.2633)	-0.1254 (0.3248)	-0.2361 (0.4619)
Income	-0.0052 (0.0065)	-0.0037*** (0.0012)	-0.0065** (0.00271)	0.0057 (0.0095)
Informality	7.1476*** (1.8824)	3.9502*** (1.2644)	2.6133** (1.0219)	4.8093** (1.9386)
Constant	178.0958*** (66.0849)	34.3558 (26.1138)	58.1655* (31.7729)	126.3303 (89.7982)
	Upper Regime	Upper Regime	Upper Regime	Upper Regime
Lag of Poverty	-0.2636 (0.5368)	0.1758 (0.1895)	-0.5205 (0.3645)	-0.3418 (0.4883)
Income	0.0030 (0.0149)	-0.0021 (0.0034)	0.0017 (0.0032)	-0.0099 (0.0092)
Informality	-4.4104** (1.8474)	-1.3609** (0.6647)	-1.5088* (0.8205)	-3.1068 (2.5780)
	Aggregate Model	Aggregate Model	Aggregate Model	Aggregate Model
Lag of Poverty	-0.3139** (0.1342)	-0.1497*** (0.1497)	-0.2123** (0.1051)	-0.2442** (0.2088)
Income	-0.00087 (0.0010)	-0.0008 (0.007)	-0.0040*** (0.0007)	-0.00004 (0.0009)
Informality	5.6912*** (1.1877)	0.5335 (0.4337)	2.6617*** (0.4423)	3.0236*** (0.6254)
Threshold Level (Stand E.)	36.75**% (6.3343)	24.32***% (11.0696)	24.61% (17.7255)	21.46***% (9.1687)
Threshold Bounds	(33.13–57.96)	(2.63–46.02)	(10–59.35)	(3.49–39.43)
Kink Slope	-0.2494*** (0.0846)	-0.3053*** (0.0837)	0.4603*** (0.2720)	-0.2176*** (0.0717)
Linearity Test	0.0000***	0.0000***	0.0000***	0.0000***
No of Countries	20	20	20	20
No of Groups	18	19	19	18
No of Instruments	4	5	4	5
Sargan (Prob.)	11.2139 (0.4255)	19.4200 (0.3670)	8.5400 (0.4300)	29.1300 (0.1520)
AR1 (Prob.)	-3.7341 (0.0000)	-4.4651 (0.0031)	-3.8641 (0.0001)	-2.9754 (0.0003)
AR2 (Prob.)	-1.3240 (0.2302)	-1.7563 (0.3248)	-0.9455 (0.2984)	-2.452 (0.1936)

Note(s): ***, ** and * indicates 1%, 5% and 10% respectively. The standard error is indicated in the parenthesis

Table 5.

Threshold models of the relationship between poverty and informality (1) in Africa

In running the models, the variables of other measures of informality, institutional quality, Government expenditure, Inequality, Trade Openness, Corruption and inflation are used as instrumental, exogenous and control variables

Source(s): Authors (2023)

In middle-income countries, informality hurts poverty. This result is in line with studies in the literature on developing economies (Bolarinwa and Simatele, 2022; Pham, 2022). Overall, our finding is a different narrative on the role of informality in poverty reduction: informality reduces poverty in middle-income sub-Saharan African countries and increases poverty in low-income sub-Saharan African countries. The findings are verified in severe and mild poverty indicators. The heterogeneity of informality in African countries can explain these differences. African informality is heterogeneous. Both demand and supply factors drive informality spurred on by varying levels of institutional development and economic growth (Bolarinwa and Simatele, 2022).

Overall, the results justify the use of a threshold model. The kink slope is significant for three out of the four models. The linearity test also further attests that a nonlinear relationship exists between informality and poverty, rather than the linear relationship popular in the literature. Table 6 shows results for the robustness test where informality is measured using the MIMIC measure. The results of the threshold variable (income) show a complex structure which is dependent both on the level of poverty and the development of the country. Generally, income level has the expected negative relationship with poverty across the different levels of income groups. In the low-income group, the variable is significant in the mild headcount and severe poverty gap models. It is not significant in any of

	Poverty headcount \$1.90 Lower Regime	Poverty headcount \$3.20 Lower Regime	Poverty gap \$1.90 Lower Regime	Poverty gap \$3.20 Lower Regime
Lag of Poverty	-0.6614 (0.4957)	-0.4137** (0.2149)	0.1201 (0.3371)	-0.2396 (0.2957)
Income	0.0058 (0.0099)	-0.0073** (0.0035)	-0.0005 (0.0026)	-0.0029 (0.0051)
Informality	7.4938*** (2.2903)	1.4057 (1.3412)	2.3540* (1.3539)	4.6763*** (1.4906)
Constant	194.9561** (97.6351)	-53.7461* (28.5013)	18.9143 (47.5449)	44.9319 (48.7018)
	Upper Regime	Upper Regime	Upper Regime	Upper Regime
Lag of Poverty	-0.7008 (0.7382)	0.4620 (0.3507)	-0.4485 (0.3326)	-0.1192 (0.3504)
Income	0.00005 (0.0120)	-0.0010 (0.0031)	0.0031 (0.0027)	0.0049*** (0.0017)
Informality	-4.0982*** (1.5094)	0.3192 (0.7111)	-0.7523 (1.0050)	-1.3937 (1.0472)
	Aggregate Model	Aggregate Model	Aggregate Model	Aggregate Model
Lag of Poverty	-0.1694* (0.0891)	-0.1384 (0.1043)	-0.1640** (0.0840)	-0.2208** (0.1151)
Income	0.0031 (0.0042)	0.0033 (0.0026)	0.00002 (0.0014)	0.0055 (0.0027)
Informality	4.4310*** (0.9797)	0.1961 (0.5957)	2.1347*** (0.2971)	3.5342*** (0.8023)
Threshold Level (Stand E.)	35.51** (36.05)	30.35* (17.7902)	25.8974*** (4.2663)	24.832*** (3.2413)
Threshold Bounds	2.96-45.69	4.52-65.21	23.61-73.40	17.97-30.68
Kink Slope	-0.2770* (0.1549)	-0.5211*** (0.1383)	0.6072** (0.2971)	-0.3613*** (0.1050)
Linearity Test	0.0000***	0.0000***	0.0000***	0.0000***
No of Countries	20	20	20	20
No of Groups	19	18	17	19
No of	5	4	5	4
Instruments				
Sargan (Prob.)	19.9000 (0.3390)	10.9662 (0.2780)	19.9500 (0.2770)	10.8616 (0.4549)
AR1(Prob.)	-4.6431 (0.0000)	-4.6432 (0.0000)	4.2947 (0.0000)	3.9741 (0.0000)
AR2 (Prob.)	-1.1474 (0.2674)	-1.0745 (0.3042)	-0.9342 (0.3247)	0.9943 (0.3184)

Source(s): Authors (2023)

Table 6.
Threshold models of
the relationship
between poverty and
informality (2) in Africa

the middle-income country models. Overall, the results support the *a priori* expectation that income increases reduce poverty at all levels. A one percent increase in income is associated with a 0.4% reduction in mild poverty and a 0.7% reduction in the severity of poverty. The average effect across the countries is a 0.4% reduction in poverty for a one percent increase in per capita income.

The results show a threshold level of between 24.6 and 36.8% for severe poverty and a threshold of 21.5% of GDP for mild poverty. The insignificance of the income variable in middle-income countries suggests that low-income country data drive the threshold. These thresholds indicate shares of informality in GD which will not cause a drag on the economy. Informality only has a positive effect on poverty in low-income countries. These countries also exhibit high levels of informality. The estimated thresholds support the implication of these results; that low-income countries need to reduce the share of informality in GDP significantly before the benefits of informality can outweigh its adverse effects. The midpoint of the estimated threshold (30.7) for severe poverty is similar to the 30% threshold suggested by Surdej (2017). The upper threshold is very close to the 35% shown in the study by Yu and Ohnsorge (2019). Therefore, informality is a good tool to deal with poverty at least once a given threshold is attained. Informality is unlikely to disappear.

5. Conclusion and recommendations

The paper examines the existence of a threshold where the informality–poverty relationship changes. Our paper is influenced by [Bolarinwa and Simatele \(2022\)](#)'s study, which documents the adverse effects of informality in middle-income countries and the negative effects in low-income countries. The paper adopts 40 countries selected from low- and middle-income countries between 1991 and 2018. Overall, the present study confirms a negative effect of informality in middle-income countries and a positive effect of informality in low-income countries. A threshold of the share of informality in GDP between 25 and 37% is identified for severe poverty levels. The threshold for mild poverty is estimated at 21% share of informality in GDP.

The results suggest two main implications. First, informality is necessary to drive economic growth and development. Informality harms poverty in middle-income countries. As a buffer for those that cannot find employment in the formal sector, the informal economy provides a necessary safety net for the poor. Second, informality only enhances welfare in a way that is accompanied by economic growth below the threshold. The prevalence of low wages, unskilled labour and low productivity in the informal sector is likely to result in poverty traps if shares of informality in GDP are sustained higher than the threshold. The resulting inequalities can drag productivity down and be self-reinforcing by limiting investment in human and physical capital.

Many African countries have relatively high levels of informality as a share of GDP. To achieve sustained and inclusive growth, these levels of informality need to be reduced. Often the approach taken in African countries is to enforce formalisation. The problem is that forcing informal firms, for instance, to formalise through registration does not necessarily address the underlying challenges and drivers of informality. An increasing amount of research is confirming the heterogeneity of informality and pointing not only to the lack of skills as a driver but also the existence of burdensome regulations in the formal economy.

Therefore, to effectively reduce the share of informality in GDP to levels that enhance growth and development, countries must design more comprehensive strategies that address the underlying drivers of informality. For example, targeted skills development programs can address low skill levels. [Docquier et al. \(2017\)](#)'s model suggests that education subsidies and related policies which reduce wage and skills inequality are the most effective way of minimising the crippling effects of informality. Related, [Moyo \(2022\)](#) demonstrates that education is positively correlated with the probability of formalisation. Given this, more studies that explore the micro drivers of informality in Africa are needed to provide policymakers with information that can help to address formalisation in more sustainable ways.

Note

1. In September 2022, the World Bank revised the international poverty lines up from \$1.90 to \$2.15.

References

- Allen, J., Nataraj, S. and Schipper, T.C. (2018), "Strict duality and overlapping productivity distributions between formal and informal firms", *Journal of Development Economics*, Vol. 135, pp. 534-554, doi: [10.1016/J.JDEVCO.2018.08.011](https://doi.org/10.1016/J.JDEVCO.2018.08.011).
- Arellano, M. and Bover, O. (1995), "Another look at the instrumental variable estimation of error-components models", *Journal of Econometrics*, Vol. 68 No. 1, pp. 29-51.
- Boeke, J. (1953), *Economics and Economic Policy of Dual Societies as Exemplified by Indonesia*, Institute of Pacific Relations. International Secretariat, New York.
- Bolarinwa, S.T. and Simatele, M. (2022), "Informality and poverty in Africa: which comes first? A paper awaiting publication in sustainable development", Online First, 2022.

- Bolarinwa, S.T., Adegboye, A.A. and Vo, X., V. (2021), "Is there a nonlinear relationship between financial development and poverty: evidence from Africa", *Journal of Economic Studies*, Vol. 48 No. 7, pp. 1245-1266, doi: [10.1108/JES-10-2019-0486](https://doi.org/10.1108/JES-10-2019-0486).
- Busso, M., Camacho, J., Messina, J. and Montenegro, G. (2021), "Social protection and informality in Latin America during the COVID-19 pandemic", *PloS One*, Vol. 16 No. 11, p. e0259050.
- Canelas, C. (2019), "Informality and poverty in Ecuador", *Small Business Economics*, Vol. 53 No. 1, pp. 1097-1115.
- Cisneros-Acevedo, C. (2022), "Unfolding trade effect in two margins of informality. The Peruvian case", *The World Bank Economic Review*, Vol. 36 No. 1, pp. 141-170, doi: [10.1093/wber](https://doi.org/10.1093/wber).
- Docquier, F., Müller, T. and Naval, J. (2017), "Informality and long-run growth", *Scandinavian Journal of Economics*, Vol. 119 No. 4, pp. 1040-1085, doi: [10.1111/sjoe.12185](https://doi.org/10.1111/sjoe.12185).
- de Soto, H. (1989), "The informals pose an answer to marx", *Washington Quarterly*, Vol. 12 No. 1, pp. 165-172.
- de Soto, H. (2000), *The Mystery of Capital: Why Capitalism Triumphs in the West and Fails Everywhere Else*, Bantam Press.
- D'erasmo, P.N. (2016), "Access to credit and the size of the formal sector", Vol. 16 No. 2, pp. 143-199, available at: <https://muse.jhu.edu/article/616971>
- Farrell, D. (2004), "The hidden dangers of the informal economy", *McKinsey Quarterly*, Vol. 3, pp. 27-37.
- Ferreira, F., Jolliffe, D.M. and Prydz, E.B. (2015), "The international poverty line has just been raised to \$1.90 a day, but global poverty is basically unchanged. How is that even possible?", *World Bank Blogs*, available at: <https://blogs.worldbank.org/developmenttalk/international-poverty-line-has-just-been-raised-190-day-global-poverty-basically-unchanged-how-even>
- Floridi, A., Demena, B.A. and Wagner, N. (2020), "Shedding light on the shadows of informality: a meta-analysis of formalization interventions targeted at informal firms", *Labour Economics*, Vol. 67, doi: [10.1016/j.labeco.2020.101925](https://doi.org/10.1016/j.labeco.2020.101925).
- Hart, K. (1973), "Informal income opportunities and urban employment in Ghana", *Source: The Journal of Modern African Studies*, Vol. 11 No. 1, pp. 61-89, available at: <https://www.jstor.org/stable/159873>
- ILO (2018), *Informality and Non-standard Forms of Employment*, International Labour Organization, Geneva.
- ILO (2021), "Informal economy (Employment promotion)", available at: <https://www.ilo.org/global/topics/employment-promotion/informal-economy/lang-en/index.htm>
- IMF (2021), "Five things to know about the informal economy", *Country Focus*, available at: <https://www.imf.org/en/News/Articles/2021/07/28/na-072821-five-things-to-know-about-the-informal-economy>
- Kahyalar, N., Fethi, S., Katircioglu, S. and Ouattara, B. (2018), "The service industries journal formal and informal sectors: is there any wage differential? Formal and informal sectors: is there any wage differential?", *The Service Industries Journal*, Vol. 38 Nos 11-12, pp. 789-823.
- La Porta and Shleifer, R. (2014), "Informality and development", *Journal of Economic Perspectives*, Vol. 28 No. 3, pp. 109-126.
- Lewis, W.A. (1954), "Economic development with unlimited supplies of labour", *The Manchester School*, Vol. 22 No. 2, pp. 139-191, doi: [10.1111/j.1467-9957.1954.tb00021.x](https://doi.org/10.1111/j.1467-9957.1954.tb00021.x).
- Lopez-Martin, B. (2019), "Informal sector misallocation", *Macroeconomic Dynamics*, Vol. 23, pp. 3065-3098, doi: [10.1017/S1365100517001055](https://doi.org/10.1017/S1365100517001055).
- Lupi, A. (2018), "Contribution of the informal economy to GDP", *EU Capacity4Dev*, European Union.
- Maloney, W.F. (2004), "Informality revisited", *World Development*, Vol. 32 No. 7, pp. 1159-1178, doi: [10.1016/j.worlddev.2004.01.008](https://doi.org/10.1016/j.worlddev.2004.01.008).
- Moyo, B. (2022), "Factors affecting the probability of formalizing informal sector activities in Sub Saharan Africa: evidence from World Bank enterprise surveys", *African Journal of Economic and Management Studies*, Vol. ahead-of-print No. ahead-of-print.

- OECD/ILO (2019), *Tackling Vulnerability in the Informal Economy*, Development Centre Studies, OECD Publishing, Paris. doi: [10.1787/939b7bcd-en](https://doi.org/10.1787/939b7bcd-en).
- Olaoye, O.O. (2022), "Sub-Saharan Africa's debt-financed growth: How sustainable and inclusive?", *African Development Review*.
- Pham, T.H.H. (2022), "Shadow economy and poverty: what causes what?", *The Journal of Economic Inequality*, Vol. 20 No. 1, pp. 1-31.
- Portes, A. and Benton, L.A. (1989), *The Informal Economy: Studies in Advanced and Less Developed Countries*, in Portes, A., Castells, M. and Benton, L.A. (Eds), John Hopkins University Press.
- Schoch, M., Lakne, C. and Freije-Rodriguez, S. (2020), "Monitoring poverty at the US\$3.20 and US\$5.50 lines: differences and similarities with extreme poverty trends", *World Bank Blogs*, available at: <https://blogs.worldbank.org/opendata/monitoring-poverty-us320-and-us550-lines-differences-and-similarities-extreme-poverty>
- Seo, M.H., Kim, S. and Kim, Y.J. (2019), "Estimation of dynamic panel threshold model using Stata", *The Stata Journal*, Vol. 19 No. 3, pp. 685-697.
- Surdej (2017), "Excessive informal sector: a drag on productivity", Published online on OECD Development Matters, downloaded on 20/06/2022, available at: <https://oecd-development-matters.org/2017/08/30/excessive-informal-sector-a-drag-on-productivity/>
- Ulysea, G. (2020), "Informality: causes and consequences for development", *Annual Review of Economics*, Vol. 12 No. 1, pp. 525-546.
- Wu, D.F. and Schneider, F. (2019), "Nonlinearity between the shadow economy and level of development", No. 12385; AZA Discussion Papers, available at: <http://hdl.handle.net/10419/202731>
- Yu, S. and Ohnsorge, F. (2019), "The challenges of informality", Published on the World Bank Blogs, available at: <https://blogs.worldbank.org/developmenttalk/challenges-informality> (accessed 20 June 2022).

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