



Nonlinear Threshold Effect of Governance Quality on Poverty Reduction in South Asia and Sub-Saharan Africa: a Dynamic Panel Threshold Specification

Anis Ochi¹ · Yosra Saidi¹ · Mohamed Ali Labidi²

Received: 5 February 2022 / Accepted: 24 February 2023

© The Author(s), under exclusive licence to Springer Science+Business Media, LLC, part of Springer Nature 2023

Abstract

This paper explores whether there exist nonlinear threshold effects of governance quality on poverty rate. The study data consist of 57 South Asian and sub-Saharan African countries for the period 2010–2019. The dynamic panel threshold model was applied to determine the optimal level of governance index, which once attained, will make the different levels of poverty decrease with governance quality. We found that the nexus between governance quality and poverty is nonlinear. Besides, results show that there exists a statistically negative relationship between governance quality and extreme poverty above the threshold level of 0.2, above which governance quality decreases extreme poverty in South Asian and sub-Saharan African countries. The findings revealed, too, that poverty headcount ratio at \$3.20 and \$5.50 starts decreasing once governance index reaches a threshold level of 0.62 and 0.70, respectively. The findings are robust and provide circumstantial support for governance to promote economic growth and reduce poverty.

Keywords Governance · Poverty · Dynamic threshold panel data · Nonlinear dependence · Sub-Saharan Africa · South Asia

JEL Classification G30 · I32 · C24 · O55 · O53

✉ Anis Ochi
ochi.anis@live.fr

Yosra Saidi
saidiyosra@outlook.fr

Mohamed Ali Labidi
mohamedali.labidi@fsjegj.rnu.tn

¹ Faculty of Law, Economics and Management Sciences of Jendouba, University of Jendouba, Jendouba, Tunisia

² Carthage High Commercial Studies Institute, University of Carthage, Tunis, Tunisia

Introduction

The World Bank sets a target of reducing global extreme poverty to less than 3 percent by 2030 and to ensure continued focus and steady progress toward this goal. In 2018, extreme poverty mainly refers to an income below the international poverty line of \$1.90 per day (in 2011 prices, equivalent to \$2.19 in 2020), set by the World Bank. The vast majority of those in extreme poverty reside in South Asia and sub-Saharan Africa, where the causes of poverty cannot be narrowed down to one single source. However, poor governance is one of the main causes of poverty in these two regions and involves various malpractices by the state and its workers. Good governance can enhance capacity building in government for implementing poverty reduction strategies. In sub-Saharan Africa, almost 220 million people, half the population, live in poverty. More than half of the world's poor lived in sub-Saharan Africa, and it was in this region and in South Asia that 85% of the poor were concentrated. The remaining 15%, or about 106 millions poor people, lived in the other four regions of the world (World Bank 2018).

Poverty can be manifested in multiple ways: by low or no income, by precarious housing, by poor health, by insufficient education, and by malnutrition or a degraded environment. These factors vary from one region to another, from one group of people to another, which complicates the quantification of the phenomenon, nevertheless it is clear that poverty is multidimensional. Poverty is not a universal condition, and its definition attaches to the different characteristics that compose it. The poverty line for a given individual can be defined as the money the individual needs to achieve the minimum level of 'welfare' to not be deemed 'poor,' given its circumstances (Ravallion 1998). For the World Bank and the UNDP (United Nations Development Programme) poverty is the result of "lack of (access to) assets, insufficient or inappropriate economic growth, and poor governance."

The UNDP specifically defines three notions: the first concept is extreme poverty or absolute poverty, a person lives in a condition of extreme poverty if they do not have the necessary income to meet their essential food needs defined on the basis of minimum caloric needs (1800 calories per day and per person (WHO¹)). The second concept is general poverty or relative poverty, a person lives in a condition of general poverty if he does not have sufficient income to meet his essential non-food needs: clothing, energy, housing, and food. The third concept is human poverty which is considered as the absence of basic human capacities: illiteracy, malnutrition, reduced longevity, poor maternal health, and disease that can be prevented. As for the approach used by the World Bank, it is a monetary approach to poverty which consists of "being based on a criterion of income or consumption, then combining different areas which are reinforced or worsened in order to reduce or to increase the level of indigence of the poor" (UNDP Poverty Report, 2000).

Despite the positive narrative around the significant decline in extreme poverty around the world, not all the news is good. Still today more than 700 million people

¹ World Health Organization

live with less than \$1.90 a day, more than 85 percent of them in sub-Saharan Africa and in South Asia. Worryingly, the COVID-19 pandemic could push a further 71 million people into extreme poverty under the baseline scenario, and 100 millions under the downside scenario—wiping out progress made in poverty reduction since 2017. At the same time, income inequality is on the rise in most developing countries. South Asia accounted for 29% of the people living in extreme poverty worldwide (216 millions extreme poor in South Asia out of the estimated 736 million extreme poor worldwide) (World Bank, 2018).

Sub-Saharan Africa has the third highest regional growth in the world. According to the latest South Asia Economic Focus *Reshaping Norms: A New Way Forward* the region is projected to grow by 6.6 percent in 2022 and by 6.3 percent in 2023 (World Bank, 2022). But this acceleration in economic growth in sub-Saharan Africa and South Asia has not translated into poverty reduction compared to other regions of the world. While Western countries continue to show uneven economic performance, the sub-Saharan African economy grew by 4.6% since the mid-1990s, outpacing Europe and Central Asia, Latin America, and the Middle East. However, despite this growth, it is in Africa and South Asia that the concentration of the poor remains the highest in the world. These two regions attach great importance to solving the problem of acute poverty, adopting a variety of measures to help the poorest and most vulnerable groups within their territories escape the poverty trap. Improving the quality of governance is one of the measures that helps to solve this issue.

The purpose of this study is to examine the nonlinear association between governance quality and income poverty lines. The main objective of this paper is to determine the optimal level of global governance index, which once attained, will make income poverty lines decrease with governance quality in South Asian and sub-Saharan African countries. In this regard, our main problem is the following: what is the optimal level of governance index, which once attained, will reduce the poverty rate?

To the best of our acknowledgement, the nonlinear relationship between governance quality and poverty rate for the South Asian and sub-Saharan African countries has not been previously studied. Thus, to fill this gap, we propose to investigate the potential threshold effects in the relationship between governance quality and poverty rate. Different from previous studies, we use the dynamic panel threshold regression model suggested by Kremer et al. (2013). The contribution of the current research study to the empirical literature of poverty and governance is its focus on sub-Saharan African and South Asian countries together with the determination of their specific threshold of governance quality and which countries have reached or exceeded this threshold.

The rest of the paper is structured as follows. “Theory and Literature Review” presents empirical and theoretical literature review. “Data and Model Specification” presents the data and the model specification. “Model Estimation and Results” shows the model estimation and results and “Conclusion” concludes.

Theory and Literature Review

Most theories of poverty can be classified into three main families of theories: political, structural, and behavioral. Political theories argue that poverty is a political outcome driven by power relations and collective choices about how to distribute resources (Brady et al. 2016). Political theories argue that power and institutions drive policies, which cause poverty and moderate the relationship between behavior and poverty. Structural theories focus on the demographic and labor market context, which underlie both poverty and behavior (Rank, 2005, 2011; Tomaskovic-Devey, 1991; Wilson, 1987, 1996). Behavioral theories focus on individual behaviors based on incentives and culture (Cruz and Ahmed, 2018; Kaida, 2015; Ku et al. 2018; Milazzo and Van de Walle, 2017; Sawhill 2003).

The relationship between governance quality and poverty reduction is complex, and it has received a great deal of attention from researchers and policy-makers. While much of the literature focuses on the nexus between governance quality and poverty rate, relatively little attention has been given to the potential threshold effects in this relationship. Jamil et al. (2022) investigated the relationship between determinants of governance and poverty reduction in 29 countries between 2004 and 2016. They also find that robust governance reduces poverty. Acheampong et al. (2022) analyze the effects of governance quality and income inequality on energy poverty 43 sub-Saharan African countries from 1990 to 2017. They found that reducing energy poverty requires an effective governance system to close the income inequality gap. Deng et al. (2022) present the China's anti-poverty approach which provided a model for global poverty reduction governance. Their results confirm that grassroot mobilization, life improvement, rural households' development conditions, and livelihood support have made the poverty alleviation outcomes more remarkable.

Nunan et al. (2021) identify the role that the quality of governance plays in the relationship between ecosystem services and poverty alleviation. They show that appropriate and adequate incentives are required for governance to mediate positive links between ecosystem services and poverty reduction. They found that locally owned and inclusive governance increases the potential for ecosystem services to deliver on poverty alleviation. Aracil et al. (2022) analyze the impact of the quality of institutional governance on the relationship between financial inclusion and poverty reduction in 75 developing countries between 2014 and 2017. They found that the quality of institutional governance intensifies the beneficial effects of financial inclusion on poverty rates. Workneh (2020) applied a maximum likelihood estimation of random effect models to study the relation between gender inequality and governance on poverty for a sample of 34 countries in sub-Saharan Africa. The results notify a positive association between good governance and poverty reduction. It also finds that the net effect from the interaction of gender inequality and poor governance increases poverty. Nguyen et al. (2019) examine the effects of governance and public administration quality on poverty, per capita income, and income inequality in Vietnam. Their results confirm the existence of a positive and nonlinear association between good governance and

poverty reduction. They find that better performance of governance and public administration improve income distribution. Jindra and Vaz (2019) examine the relationship between governance quality and poverty. Their results suggest that good governance can play a role in reducing multidimensional poverty. De Matteis (2013) examined the aid–growth–poverty–governance nexus. Results show that aid is more effective—both for poverty reduction and for growth—when its allocation is inspired by a poverty-focused perspective and, to a certain extent, by a conducive environment in the recipient country. In general, in a conducive policy environment good governance has multiple possible manifestations, ranging from civil and political liberties, to sound economic policy, lack of corruption, and solidity of institutions. Most aid–growth regressions include an index of trade openness as a specific aspect of policy.

Akanbi (2014) adopted the two-stage least-squares estimation techniques to investigate 19 panels of sub-Saharan African countries over the period 1990–2010 and confirmed that the governance quality and infrastructure are significant determinants of poverty in the region. Kwon and Kim (2014) examine the relationship between good governance and poverty reduction in 98 countries over the period of 1996–2018. The findings do not support the hypothesis that good governance leads to poverty reduction. Good governance does not reduce poverty in least developed countries. On the contrary, it alleviates it in middle-income countries. Hannan (2014) examines the links between co-operative governance and poverty reduction in developing countries. He found that a balance in co-operative governance can generate spillover which reduces poverty and co-operative governance influences how social capital is used to reduce poverty. Minogue (2008) analyzes the connections between regulatory governance and poverty reduction, in the context of dominant economic assumptions about the relationships between competition, regulation, economic growth, and poverty. He found a positive relationship between regulatory governance, institutional and political factors, and poverty reduction. Asra et al. (2005) find that more openness helps accelerate poverty reduction. Burnside and Dollar (2000) find strong evidence that institutional quality is a determinant for aid effectiveness. Verschoor and Kalwij (2006) argue that aid can contribute not just to growth but also to pro-poor growth, suggesting that both aid itself and a recipient government's budget share allocated to social services tend to increase the income elasticity of poverty, and that, moreover, aid tends to increase this budget share. Asra et al. (2005) suggest that the impact of aid is not contingent upon the quality of governance and macroeconomic policy, although the latter is relevant for poverty reduction.

Data and Model Specification

Data

In this study, we use a balanced annual data of 570 observations for 57 South Asian and sub-Saharan African countries (Table 2). We choose these two regions because

sub-Saharan Africa and South Asia concentrate 85% of the world's poor population during this last decade. The remaining 15 percent of the global poor, or about 106 million poor people, lived in the other four regions (World Bank 2018). The World Bank has set an ambitious target to eradicate extreme poverty globally by 2030. In the last two decades many African and Asian countries have experienced phases of economic expansion during which the increase in inequalities was such that growth was accompanied by an increase in poverty. Economic difficulties and social inequalities have led to renew the debate on about the mechanisms of poverty alleviation. Overall, the increasing income inequalities in developing countries have made the notion of monetary poverty difficult to pinpoint. Thus, in the context of our study we consider the poverty lines as an economic tool to measure the effect of socio-economic reforms in the fight against poverty. The period of the study spans from 2010 to 2019. We take this time period, because since 2010 progress in governance has been made by different governments in Africa and South Asia. Sixty percent of Africans live in countries with better governance in 2019 than in 2010.

All variables are collected from the World Bank Development Indicators (WDI) database, worldwide governance indicators (WGI), and macro-trends economic data. It is widely accepted that poverty is a multidimensional phenomenon and that, therefore, the explanatory variables of poverty can be multiple. It is difficult to specify the variables that can reduce poverty. Thus, the explanatory variables are selected in accordance with robustness results highlighted in influential past studies and the state of development of South Asia and sub-Saharan African countries. The endogenous variable used in this study is poverty rate. The explicative variables include economic growth, foreign direct investment, domestic investment, governance Index, unemployment rate, inequality, added value of agriculture, and official development assistance. To capture inequality, we use the Gini coefficient based on net inequality, which is calculated by taking into account taxes and transfers. The measures and sources of the variables are presented in Table 1.

Global governance index (GGI) represents the level of authority exercised in a country (Kaufmann et al. 2005), and is measured by the average of the first component (estimate) of six indicators developed by Kaufmann et al. (2010):

- Control of corruption: captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as “capture” of the state by the elite and private interests.
- Government effectiveness: captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.
- Political stability and absence of violence: measures the perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including domestic violence and terrorism.
- Regulatory quality: captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.

Table 1 The measures and data sources of the variables

Symbol	Measures	Source
GGI	Global governance index: ranging from - 2.5 to 2.5 (- 2.5 = bad governance to 2.5 = good governance)	-World Wide Governance Indicators database (2021)
P1	Extreme poverty: overtly headcount ratio at \$1.90 a day (2011 PPP) (% of population) : is the percentage of the population living on less than \$1.90 a day at 2011 international prices	-World Bank Development Indicators (WDI) Database
P2	Poverty headcount ratio at \$3.20 a day (2011 PPP) (% of population): is the percentage of the population living on less than \$3.20 a day at 2011 international prices	-Macrotrends economic data.
P3	Poverty headcount ratio at \$5.50 a day (2011 PPP) (% of population): is the percentage of the population living on less than \$5.50 a day at 2011 international prices	
UR	Unemployment rate is the percent of the labor force that is jobless. The unemployment rate is calculated as: $(\text{Unemployed} \div \text{Labor Force}) \times 100$.	
GI	Income inequality is measured by Gini index (World Bank estimate): (on a scale of 0–100) (0 = inequality to 100 = equality)	
GDP	The annual GDP per capita growth rate (%)	
FDI	The net FDI inflow as a share of GDP (%)	
DI	Gross capital formation (GCF) in % of GDP	
AVA	Agriculture, forestry, and fishing, value added (% of GDP)	
Ln NODAR	Neperian logarithm of net official development assistance received (constant 2018 US\$)	

- Rule of law: captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.
- Voice and accountability: captures perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.

Democracy today designates any political system in which the people are sovereign. By extension, democracy can also qualify a form of society, the way of governing itself adopted by an organization or even a system of values. These measures are in contrast with those suggested by Globerman and Shapiro (2003) who aggregated the indicators. If this is applied for the selected countries, it might be found that the aggregate would exceed the range (-2.5 to 2.5) used by Kauffman et al. (2005) as measuring yardstick. According to the global governance index (GGI), poor governance means democratic backsliding, political instability, government ineffectiveness, high corruption, the decline of the rule of law and institutions, and deteriorating business climate. Thus, transparency, access to information, the rule of law, the fight against corruption, democracy, accountability, and the management (size) of the public sector are all characteristics linked to good governance. The measures of GGI of South Asian and sub-Saharan African countries are reported in Table 2.

The main limitations and criticisms of "global governance indicators" come from four recent articles Arndt and Oman (2006), Knac (2006), Kurtz and Shrank (2007), and Thomas (2010). They concern three major points: the aggregative method (more precisely the difficulty of making meaningful comparisons over time and between countries, in terms of governance), the independence of the governance assessments from which these indicators are derived, and the lack of impartiality in the treatment of national situations (the "global indicators of governance" would be strongly influenced by the level of development of each country). Table 3 synthesizes averages, standard deviations, and the minimal and the maximal values of dependent and explanatory variables.

Before proceeding to estimate the model, we should verify the existence of multicollinearity problem in the data. Multicollinearity refers to a situation in which two or more explanatory variables in a multiple regression model are highly linearly related. A strong correlation leads to poor estimation of the coefficients. We have perfect multicollinearity if the correlation between two independent variables is equal to 1 or -1 . According to the limits traced by Kervin (1992), if the correlation coefficient is greater than 0.7 in absolute value we can confirm the existence of the multicollinearity problem. Table 4 states the various correlation coefficients for the explanatory variables of poverty. It appears that the levels of correlation are very small and lower which justifies the absence of multicollinearity.

According to the definition given in the paper for domestic investment (DI), since an increase in domestic investment may induce an increase in GDP, we can suspect a certain correlation between domestic investment and GDP growth. So, we reinforce Table 4 with VIF (variance inflation factor) multicollinearity test, which assesses how much the variance of an estimated regression coefficient increases if

Table 2 Global governance index: the average of the study period 2010–2019

Countries	GGI
Afghanistan	– 1.579
Angola	– 0.993
Bangladesh	– 0.837
Benin	– 0.307
<i>Bhutan</i>	0.349
<i>Botswana</i>	0.648
Burkina Faso	– 0.424
Burundi	– 1.264
<i>Cabo Verde</i>	0.518
Cameroon	– 0.982
Central African Republic	– 1.494
Chad	– 1.329
Comoros	– 0.873
Congo. Dem. Rep.	– 1.605
Congo. Rep.	– 1.071
Cote d'Ivoire	– 0.758
Djibouti	– 0.779
Equatorial Guinea	– 1.319
Eritrea	– 1.538
Eswatini	– 0.605
Ethiopia	– 0.906
Gabon	– 0.626
Gambia. The	– 0.560
Ghana	0.059
Guinea	– 1.031
Guinea-Bissau	– 1.158
Kenya	– 0.610
India	– 0.230
Lesotho	– 0.203
Liberia	– 0.759
Madagascar	– 1.641
Malawi	– 0.7534
Maldives	– 0.368
Mali	– 0.411
Mauritania	– 0.778
<i>Mauritius</i>	0.803
Mozambique	– 0.818
<i>Namibia</i>	0.3168
Nepal	– 0.742
Niger	– 0.687
Nigeria	– 1.093
Pakistan	– 1.055
Rwanda	– 0.106

Table 2 (continued)

Countries	GGI
Sao Tome and Principe	- 0.303
Senegal	- 0.155
<i>Seychelles</i>	0.281
Sierra Leone	- 0.661
Somalia	- 2.183
<i>South Africa</i>	0.204
South Sudan	- 1.593
Sudan	- 1.593
Sri Lanka	- 0.225
Tanzania	- 0.456
Togo	- 0.811
Uganda	- 0.590
Zambia	- 0.301
Zimbabwe	- 1.286

The values in bold indicate the GGI values of the countries that have an global governance index above the estimated threshold of 0.20 for the extreme poverty rate

Table 3 Descriptive statistics

Variable	Obs	Mean	Std. Dev	Min	Max
P1	570	35.668	23.096	0	82.6
P2	570	59.002	25.599	0.1	92.9
P3	570	77.418	22.831	3	98.7
GGI	570	- 0.680	0.636	- 2.313	0.853
GPD	570	1.649	5.379	- 47.590	18.065
UR	570	7.348	6.286	0.32	28.18
GI	570	41.956	8.880	4.9	65.9
FDI	570	4.609	9.126	- 11.624	103.337
DI	570	23.623	10.225	2.458	79.461
AVA	570	20.049	13.769	- 4.972	132.113
LnNODAR	570	19.672	2.853	0.024	22.612

your predictors are correlated. If no factors are correlated, the VIFs will all be 1 (Dodge, 2008). If the VIF is equal to 1, there is no multicollinearity among factors, but if the VIF is greater than 1, the predictors may be moderately correlated. A VIF between 5 and 10 indicates high correlation that may be problematic. And if the VIF goes above 10, you can assume that the regression coefficients are poorly estimated due to multicollinearity.

As shown in Table 5, none of the variables of interest for our model exhibit a very high degree of correlation, putting aside inference problems because of multicollinearity. The output shows that the VIF for the publication and years factors are about 1.25. None of the variables had VIFs greater than 10 and tolerance levels less than 0.1, which are generally accepted thresholds to identify multicollinearity problems.

Table 4 Correlation matrix for 57 South Asian and sub-Saharan African countries (2010–2019)

	P1	P2	P3	GGI	GDP	UR	GI	FDI	DI	AVA	LnNODAR
GGI	-0.233	-0.247	-0.241	1.000							
GDP	-0.234	-0.169	-0.119	0.084	1.000						
UR	-0.264	-0.279	-0.259	-0.002	-0.145	1.000					
GI	0.188	0.098	0.035	-0.022	-0.180	0.343	1.000				
FDI	-0.006	-0.013	-0.050	0.149	0.051	-0.071	-0.005	1.000			
DI	-0.330	-0.324	-0.290	0.256	0.211	-0.030	0.019	0.191	1.000		
AVA	0.417	0.477	0.498	-0.095	0.024	-0.493	-0.268	0.055	-0.247	1.000	
LnNODAR	0.230	0.220	0.248	-0.055	-0.021	-0.179	-0.183	-0.065	-0.131	0.308	1.000

Table 5 Variance inflation factor VIF and tolerance (1/VIF)

Variable	VIF	Tolerance
AVA	1.57	0.638
UR	1.46	0.682
GI	1.19	0.837
GGI	1.09	0.919
DI	1.25	0.799
GDP	1.10	0.912
LnNODAR	1.13	0.883
FDI	1.07	0.934
Mean VIF	1.23	

The “rule of thumb” in the econometric literature is that a VIF > 10 or a tolerance level < 0.1 is a sign of a severe multicollinearity problem. Age variable is mean adjusted

Thus, multicollinearity tests based on variance inflation factors (VIFs) and tolerance levels (presented in Table 5) illustrate that relying on the variables in equation (1) is justified.

Dynamic Panel Threshold Model

To detect the potential nonlinear relationship between governance quality and poverty, we apply the dynamic panel threshold regression approach suggested by Kremer et al. (2013) extended the Hansen (1999) original static panel threshold estimation and the Caner and Hansen (2004) cross-sectional instrumental variable (IV) threshold model, where generalized methods of moments (GMM) type estimators are used to deal with endogeneity problem. The model, based on threshold regression, takes the following form:

$$y_{it} = \mu_{it} + \alpha'_1 x_{it} I(q_{it} \leq \gamma) + \alpha'_2 x_{it} I(q_{it} > \gamma) + \varepsilon_{it} \quad (1)$$

where $i = 1, \dots, N$ represents the country and $t = 1, \dots, T$, indexes time. The dependent variable y_{it} is a scalar, x_{it} is an m -dimensional vector of time-varying control variables for individual i at time t . μ_{it} represents the country specific fixed effect and ε_{it} is the classical error terms. $I(\cdot)$ is the indicator function; indicating the regime defined by the threshold variable q_{it} and the threshold level γ . x_{it} is a m -dimensional vector of explanatory regressors which may include lagged values of y and other endogenous variables. The vector of explanatory variables is partitioned into a subset x_{1it} , of exogenous variables uncorrelated with ε_{it} , and a subset of endogenous variables x_{2it} , correlated with ε_{it} . Besides, the model requires a suitable set of $k \geq m$ instrumental variables z_{1it} including x_{1it} .

In the first step of the model estimation in Eq. (1), the individual effects (μ_{it}) have to be eliminated via a fixed-effects transformation. Therefore, we apply the forward orthogonal deviation method suggested by Arellano and Bover (1995) which is given by:

$$\varepsilon_{it}^* = \sqrt{\frac{T-1}{T-t-1}} \left[\varepsilon_{it} - \frac{1}{T-1} (\varepsilon_{i(t-1)} + \dots + \varepsilon_{iT}) \right] \quad (2)$$

The feature of this method is that it can avoid the serial correlation of the transformed error terms. This feature allows for applying the estimation procedure derived for a cross-sectional model to dynamic panel data models.

The estimation procedure involves determining and selecting the threshold value γ with the smallest sum of squared residuals. Once $\hat{\delta}$ is determined, the slope coefficients can be estimated by the generalized method of moment (GMM) for the previously used instruments and the previous estimated threshold $\hat{\delta}$. Applying the dynamic panel threshold model to the analysis of the impact of governance quality on poverty rate in South Asian and sub-Saharan African countries, we specify the following threshold model:

$$P_{it} = \mu_{it} + \alpha_1' \text{GGI}_{it} I(\text{GGI}_{it} \leq \gamma) + \delta_1 I(\text{GGI}_{it} \leq \gamma) + \alpha_2' \text{GGI}_{it} I(\text{GGI}_{it} > \gamma) + \theta x_{it} + \varepsilon_{it} \quad (3)$$

GGI_{it} is both the threshold variable and the regime-dependent regressors in our application. x_{it} donates the vector of partly endogenous control variables, where slope coefficients are assumed to be regime independent. Following Kremer et al. (2013), we allow for differences in the regime intercept δ_1 . Initial poverty rate is considered as endogenous variable, $x_{2it} = \text{Initial} = P_{it-1}$ while x_{1it} contains the remaining control variables which for our application are economic growth (GDP), foreign direct investment (FDI), domestic investment (DI), governance index (GGI), unemployment rate (UR), inequality (GI), added value of agriculture (AVA), and official development assistance (NODAR).

We use lags of the dependent variable ($dP_{it-1}, \dots, dP_{it-p}$) as instruments following Arellano and Bover (1995) and Kremer et al. (2013). There is a bias/efficiency trade-off in finite samples when it comes to choice of the number (p) of instruments. On the one hand, using all the available lags of the instrument variable ($p = t$) may increase efficiency, while on the other hand, reducing the instrument count to 1 ($p = 1$) may avoid an overfit of instrumented variables that might lead to biased coefficient estimates.

Model Estimation and Results

Panel Unit Root Tests

All the asymptotic theory for panel threshold models proposed by Hansen (1999) and Kremer et al. (2013) are for stationary regressors. Therefore, the procedures of dynamic panel threshold specification rely on the assumption that all variables in Eq. (1) are $I(0)$ stationary in level. Results of panel unit root tests are reported in Table 6. From this table, it can be noted that panel unit root tests, namely, LLC test (Levin et al. 2002), IPS test (Im et al. 2003), ADF test, Fisher-PP test (Fisher 1992), Breitung test (Breitung, 2001), and Hamis-Tzavalis (Harris and Tzavalis,

Table 6 Panel data unit root tests (the first-generation tests)

Variable	Levin–Lin–Chi (LLC test)		Hamis–Tzavalis		Breitung	
	Level		Level		Level	
	Statistic	<i>p</i> value	Statistic	<i>p</i> value	Statistic	<i>p</i> value
P1	0.073	0.005***	0.525	0.000***	– 0.377	0.003***
P2	0.246	0.005***	0.563	0.000***	11.099	0.000***
P3	1.051	0.008***	0.329	0.000***	11.047	0.000***
GGI	– 6.993	0.000***	0.753	0.076*	2.004	0.009***
GDP	– 13.461	0.000***	– 0.016	0.000***	– 3.818	0.000***
UR	– 4.884	0.000***	0.651	0.018**	4.282	0.000***
GI	3.761	0.099*	0.374	0.000**	5.779	0.000***
FDI	– 13.099	0.000***	0.551	0.000***	– 3.571	0.000***
DI	85.946	0.000***	0.627	0.003***	– 0.329	0.037**
AVA	0.329	0.000***	0.074	0.000***	– 0.707	0.002***
LnNODAR	– 10.334	0.000***	0.455	0.000***	– 2.425	0.007***
Variable	Im–Pesaran–Shin (IPS test)		Fisher type (ADF ¹ +PP ²)		Hadri LM stationarity	
	Level		Level		Level	
	Statistic	<i>p</i> value	Statistic	<i>p</i> value	Statistic	<i>p</i> value
P1	– 2.753	0.0029***	12.352	0.000***	21.008	0.000***
P2	8.096	0.000***	5.212	0.000***	21.553	0.000***
P3	7.291	0.000***	14.239	0.000***	15.252	0.000***
GGI	1.767	0.009***	– 1.412	0.009***	27.374	0.000***
GDP	– 5.352	0.000***	12.331	0.000***	0.614	0.026**
UR	1.218	0.088*	18.978	0.000***	22.105	0.000***
GI	2.919	0.099*	4.330	0.000***	16.480	0.000***
FDI	– 5.887	0.000***	– 10.578	0.000***	22.986	0.000***
DI	2.928	0.005***	6.140	0.042***	16.504	0.000***
AVA	1.775	0.096*	3.224	0.000***	4.459	0.000***
LnNODAR	– 1.856	0.031**	5.525	0.000***	12.742	0.000***

p value in parenthesis: **p* < 0.1, ***p* < 0.05, and ****p* < 0.01

¹Conduct augmented Dickey–Fuller unit root tests on each panel

²Conduct Phillips–Perron unit root tests on each panel

1999) and Hadri LM stationarity test (Hadri 2000) reject the null hypothesis at the 1%, 5%, and 10% level of significance for all panel time series taken in level. In general, we can conclude that all variables in equation “(1)” are I (0) process.

The Linearity Test

The failures of structural adjustment policies and more generally the insufficient results produced by trade liberalization have shown that growth is a necessary condition for increasing the financial resources of individuals in developing countries. However, it is clear that it does not always spread to the entire population in an equitable manner. Economic growth, resulting from market forces, generally benefits the

rich more than the poor. This is because the rich have a human and financial capital advantage that allows them to better capture the economic opportunities that growth offers. Thus, the consensus that has been established at the international level is on the importance not only of the content of economic policies but also of the way in which they are implemented. Governance is the most important factor that is placed at the heart of development programs. It is therefore important to analyze the interplay between at least three dimensions: poverty, economic growth, and governance. From a theoretical point of view, this interaction is rooted in work on the poverty-growth-inequality triangle.

The existence of nonlinear relationships between poverty and governance quality can be modeled using threshold models. Indeed, piecewise linearization is often a correct approximation of the nonlinear dynamics of a process. Thus, in threshold models, the latter is represented by different linear dynamics depending on the situation of the system. The change in dynamics takes place according to the sign of the difference between the transition variable and the threshold value. Below a certain governance index value, nothing happens for the poverty rate. Above, an effect begins. Therefore, it is important to find nonlinear relationships between poverty and governance quality to determine the optimal level of governance index, which once attained, will lead to a decrease in the poverty rate. Figure 1 shows that the three poverty levels variables have changed (median bands in the y-axis). The threshold model allows to look for these changes in a statistically informed way.

The goal is to demonstrate that the relation between governance quality and poverty rate is nonlinear. To this end, we conduct a test of linearity against the dynamic threshold panel model. We use Wald test expressed as follows:

$$\text{Wald LM test} = LM_{\omega} = \frac{NT(SSR_0 - SSR_1)}{SSR_0} \tag{4}$$

where SSR_0 and SSR_1 are the panel sum of square residuals under H_0 (linear dynamic panel model) and the panel sum of square residual under H_1 (dynamic threshold panel model) respectively. For small sample, González et al. (2005) suggest to use the Fisher test defined as follows:

$$\text{Fischer LM test} = LM_F = \frac{NT(SSR_0 - SSR_1)/k}{SSR_0/TN - N - k} \tag{5}$$

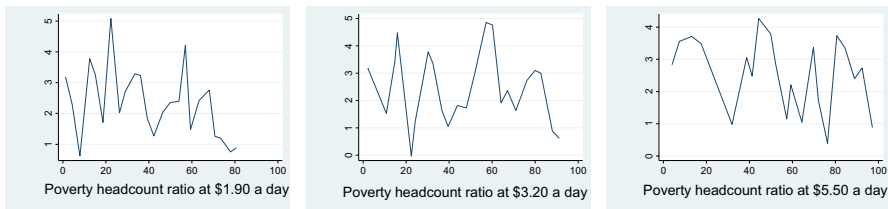


Fig. 1 Poverty and growth trends in South Asian and sub-Saharan African countries. Source: produced by the authors

Table 7 Linearity tests

Variables	P1		P2		P3	
	Statistic	<i>p</i> value	Statistic	<i>p</i> value	Statistic	<i>p</i> value
Lagrange multiplier (LM _W)	12.276	0.019**	16.475	0.0575*	20.342	0.015**
Fisher Test (LM _F)	604.295	0.000***	810.939	0.000***	1001.281	0.000***
Likelihood-ratio test (LR)	12.427	0.0190**	16.747	0.0528*	20.759	0.013**
Transition variable GGI _{it}						

p* < 0.1*p* < 0.05****p* < 0.01

With k the number of explanatory variables. LM_F follows a Fisher distribution with k and $TN - N - k$ degrees of freedom ($F(mk, TN - N - k)$). All these linearity tests are distributed $\chi^2(k)$ under the null hypothesis. Results of linearity tests are reported in Table 7. From this table, it can be noted that the hypothesis of linearity of the model is rejected at 1% and 10% significance level. The results imply that there exists nonlinear relationship between governance quality and poverty rate in South Asian and sub-Saharan African countries.

Dynamic Panel Threshold Estimation

The results of dynamic panel threshold estimations are reported in Table 8.

The upper part of the table displays the estimated governance quality GGI threshold and the corresponding 95% confidence interval. The middle part shows the regime-dependent coefficients of governance quality GGI on poverty rate. Specifically, $\hat{\alpha}_1$ and $\hat{\alpha}_2$ denote the marginal effect of governance quality (GGI) on poverty rate in the low and high regime, respectively.

The estimated GGI threshold is 0.20 for the extreme poverty rate P1 (poverty headcount ratio at \$1.90) which is contained in the confidence interval. Hence, the low regime corresponds to the value of the transition variable GGI that is below the threshold parameter (0.20), while the high regime corresponds to the value of the transition variable GGI that is above the threshold parameter (0.20). Below the threshold ($\hat{\alpha}_1 = -0.123$) results indicate that there is no significant impact of governance quality on extreme poverty rate in the South Asian and sub-Saharan African countries. However, above the threshold ($\hat{\alpha}_2 = 0.171$), GGI is negatively and significantly correlated with extreme poverty rate, and an increase of 1% of governance quality decreases extreme poverty rate in high regime by 17.19%. For P2 (the poverty headcount ratio at \$3.20), the estimated GGI threshold is 0.62, which is contained in the confidence interval. Therefore, below the threshold ($\hat{\alpha}_1 = -0.998$), governance quality is negatively but not significantly correlated with poverty rate. Nevertheless, above the threshold ($\hat{\alpha}_2 = -0.114$), governance quality is negatively correlated with poverty rate, and an increase of 1% of GGI decreases poverty rate by 11.48%. However, for P3 (the poverty headcount ratio at \$5.5), the estimated GGI threshold

Table 8 Dynamic panel threshold estimation

	P1 (poverty headcount ratio at \$1.90)		P2 (poverty headcount ratio at \$3.20)		P3 (poverty headcount ratio at \$5.50)	
$\hat{\gamma}$	0.2000	0.6285	0.7069			
95% confidence interval	[0.2000406, 0.2006858]	[0.5426422, 0.8158584]	[0.2105658, 0.8172329]			
	Coefficient	Coefficient	Coefficient	Prob.	Prob.	Prob.
$\hat{\alpha}_1$	-0.123	-0.998	0.271	0.220	0.220	0.220
$\hat{\alpha}_2$	-0.171	-0.114	-0.199	0.000***	0.000***	0.000***
Initial	0.011	4.163e - 03	4.108e - 03	0.287	0.626	0.626
GDP	-0.127	-2.234e - 02	-4.741e - 02	0.148	0.137	0.137
UR	0.000	2.304e - 04	2.330e - 04	0.061*	0.014**	0.014**
GI	0.005	1.443e - 03	6.165e - 03	0.009***	0.021**	0.021**
FDI	-0.074	2.403e - 02	-2.438e - 02	0.000***	0.294	0.294
DI	-0.169	-8.470e - 03	-1.692e - 02	0.538	0.349	0.349
AVA	-0.080	-4.095e - 03	-2.990e - 02	0.051*	0.098*	0.098*
Ln NODAR	-5.335	-1.160e + 00	-9.968e - 01	0.000***	0.000***	0.000***
$\hat{\delta}$	-2.286	3.830	4.390	0.000***	0.000***	0.000***
Observations	570	570	570			
Number of countries	57	57	57			

* $p < 0.1$

** $p < 0.05$

*** $p < 0.01$

The values in bold indicate that the quality of governance has a significant impact on poverty if GGI is above the estimated threshold

is 0.70, which is contained in the confidence interval. Therefore, below the threshold ($\hat{\alpha}_1 = 0.271$), results indicate that there is no significant impact of governance quality on poverty rate. Therefore, above the threshold ($\hat{\alpha}_2 = -0.199$), governance quality is negatively correlated with poverty rate. More specifically, an increase of 1% of governance quality, decreases poverty rate in high regime by 19.99%.

Generally, when GGI is above threshold, the three poverty levels P1, P2, and P3 decrease with governance quality. In the results, we find different behaviors depending on the poverty line used. The economic sense of this result is that: the more a country improves its quality of governance, the more it is able to reduce the rate of total monetary poverty. Specifically, in sub-Saharan Africa and South Asian countries, good governance is seen as a critical factor for bringing down the poverty figures as it is for encouraging development. The effects of the improvement of governance on the reduction of the phenomenon of poverty are transmitted mainly through two channels, namely, the improvement of the pace of growth and the effectiveness of public policies aimed at building the capacities of poor populations to access to factors of production and basic social services. Economic growth is necessary to counteract poverty. Indeed, it improves the income of households, including those who are poor, and also allows the state to strengthen its revenues which it can possibly allocate to basic social services and infrastructure from which the poor could benefit. In this context, good governance is a vital element for accelerating the pace of economic growth and therefore for the fight against poverty. Good governance implies the establishment of an appropriate institutional framework for the promotion of the private sector as an engine for the creation of wealth and employment. Good governance calls on the State to focus its efforts on the poor. The strengthening of their human capacities is essential to facilitate their integration into the process of creation and distribution of wealth. This requires the implementation of pro-poor policies that combine employment policies, micro-credits, and social development strategies such as education, health, housing, water, and electricity. The findings are in line with the results presented by Meo et al. (2020) and Grindle (2004), who found a nonlinear relationship exists between poverty and governance quality and they claimed that good governance can significantly reduce poverty.

The normalized likelihood ratio sequence LRn (γ) statistic as a function of our threshold variable is also illustrated in Fig. 2.

For P1, the least-squares estimate of γ is the value that minimizes the function LRn (γ) which occurs at $\hat{\gamma} = 0.200$ for P1 (0.628 for P2 and 0.706 for P3). The asymptotic 95% critical value for the threshold estimates is shown by the portion of the curve in the graph that lies below the dotted line drawn at the critical value. As illustrated in the graph, the 95% confidence set is [0.200, 0.201] for P1 ([0.542, 0.815] for P2 and [0.210, 0.817] for P3).

Besides, the present study selected unemployment and income inequalities as major factors of poverty. For the three levels of poverty P1, P2, and P3, unemployment rate (UR) has a positive and a significant effect on the poverty rate. The findings are in line with the results presented by Meo et al. (2018), Oduwale (2015), Gallie et al. (2003), Meo et al. (2018), Ukpere and Slabbert (2009), Saunders (2002), and Martínez et al. (2001), who conclude that unemployment is one of the major underlying factors behind poverty and they found the positive and significant

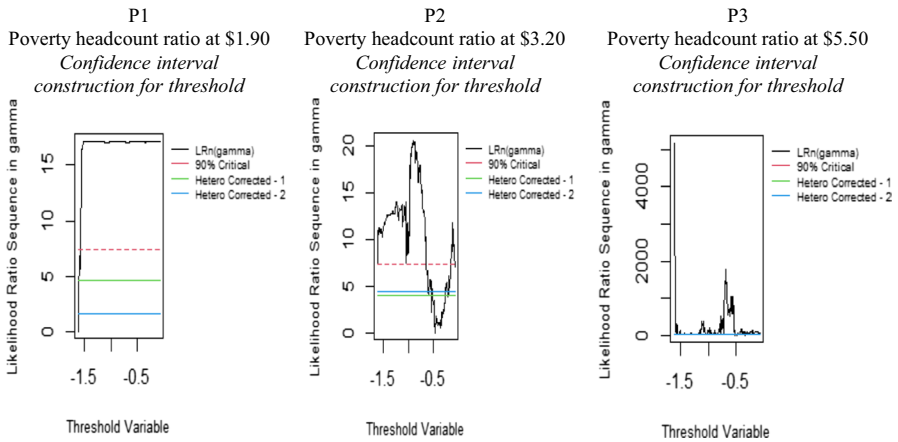


Fig. 2 Construction of the confidence interval in the threshold model. Source: produced by the authors

association between them, while our result contradicts the results of Gustafsson and Johansson (1999) where poverty had no relationship with unemployment. According to International Labor Organization (ILO), nearly 90% of workers living in extreme poverty are in sub-Saharan African countries. In 2019, nearly 34 million people were unemployed in Africa, including 12.2 million young people aged 15 to 24. The unemployment rate (UR) in the region (6.8%) is significantly above average world (5%), which means that unemployment is a major problem in Africa which increases the levels of poverty.

In addition, the results indicate that income inequalities have adverse effects on the magnitude of poverty reduction. More precisely, an increase of gini index (GI) increases poverty rate in the South Asian and sub-Saharan African countries. Regardless of the decline, levels of income inequality remain high and greater compared to other developing regions in the world. The gini index (GI) for the period 2010–2019 in Africa, the second most unequal region in the world, is 44%, compared to 52% for Latin America and the Caribbean. Empirical studies on the relationship between growth and poverty have often taken into account the role of inequalities and poor governance in this analysis (Fosu, 2008; Kalwij and Werschoor, 2007; Ravallion, 1997). The very high inequalities and poor governance in most sub-Saharan African and South Asian countries weaken the effect of strong economic growth on poverty. The impact is sometimes completely neutralized when inequalities and poor governance increase with growth.

Moreover, findings indicate that an increase of added value of agriculture (AVA) and official development assistance (NODAR) decrease poverty rate in the South Asian and sub-Saharan African countries. In sub-Saharan Africa, 76% of extremely poor people and 66% of moderately poor people work in agriculture. To reduce poverty sufficiently, South Asian and sub-Saharan African countries must reduce or eliminate corruption. In countries rich in natural resources and basic products, this requires transparent management of agricultural, mining and oil rents, and their reorientation towards the financing of infrastructure, the development of R&D, and

the acquisition of technology. This will help small farmers, who dominate the African agricultural sector, to increase their technological consumption and hence their productivity and income. This income effect will stimulate demand for goods and services and therefore the development of other sectors such as the manufacturing sector with high potential for creating better quality jobs.

Results show also that there is no significant impact of economic growth (GDP) on poverty rate in the South Asian and sub-Saharan African countries. However, economic growth alone is not enough to reduce poverty if the poor do not benefit from it. Therefore, the low level of governance quality influences the expected impacts of economic growth on poverty rate. Consequently, poor governance in most countries of sub-Saharan Africa and South Asia limits the expected positive effects of economic growth on poverty reduction. The main results show that the initial level of income inequalities in sub-Saharan Africa and South Asia and its evolution have an adverse effect on poverty reduction and penalize the magnitude of growth to poverty reduction. This result confirms that the growth–poverty relationship is not linear. The effectiveness of the results in terms of combating poverty depends on how the gains of economic growth are distributed to the whole population. The gains from economic growth have not been equitably distributed in most South Asian and sub-Saharan African countries. The poor governance explains the weak results in terms of poverty reduction despite the good performance of economic growth over the millennium development goals period. The no relationship between poverty and economic growth is due to the “inequality” present in the rate of economic growth. Thus, most South Asian and sub-Saharan African countries may have experienced phases of economic expansion during which the increase in inequality was such that growth did not contribute to poverty reduction but was sometimes accompanied by an increase in poverty. The findings are, indeed, in line with the results presented by some recent empirical literature that tend to show the role or importance of redistributing the fruits of growth to effectively fight poverty. Indeed, strong economic growth can induce mixed results in terms of poverty reduction in a context of high income inequality (Addison and Cornia, 2001). This interesting evidence immediately calls into question the Kaldorian theory (Kaldor 1956), according to which high inequality is useful for economic growth, because the richest have a greater propensity to save than the poor, which is essential for the economy. Investment in physical capital and therefore for poverty reduction. Thus, growth accompanied by increasing inequalities does not sufficiently benefit the poor. Strong inequalities negatively affect the growth of the product per capita (Benabou, 1996; Perotti, 1996). To reduce poverty, growth must be accompanied by the implementation of policies to reduce present and future inequalities (Bourguignon, 2002; Cling et al., 2002). The redistribution of income and wealth therefore plays a crucial role in the growth-poverty relationship. However, the impact of economic growth on poverty depends on how growth acts on inequalities.

Results show also that there is no significant impact of domestic investment (DI) and foreign direct investment (FDI) on poverty rate in the South Asian and sub-Saharan African countries. Sub-Saharan African and South Asian countries have particular characteristics both in terms of their business climate (informal sector, institutional weaknesses, embryonic industry, etc.) and in terms of FDI (mainly in

the extractive industries). FDI flows to sub-Saharan Africa accounted for only 5.2% of global FDI. These FDIs are highly dependent on the export of natural resources (about 82% of total FDI). Most of these minerals are energetic. Admittedly, the extractive industry with low added value remains the first source of attractiveness of FDI for Sub-Saharan Africa and South Asia. Also, domestic investments in sub-Saharan Africa and South Asia are mainly distributed in the extractive and public sectors (services) with low added value. The positive effects of these investments (the sum of local investments and foreign investments) on poverty reduction are, however, limited. FDI affects poverty through their effects on both growth and inequality. The extractive FDI promotes growth but increases inequality. This leads to not reducing and sometimes to an increase of poverty.

According to Table 1 and the annual data from the world Bank, we notice that the values of the global governance index IGG of most South Asian and sub-Saharan African countries (50 countries) are below the threshold of 0.2. The poor quality of governance plays a negative role in the reduction of poverty rate. Indeed, Bhutan is the only country among the eight south asian countries that has a global governance index above the threshold of 0.2. The findings are in line with the results presented by poverty and shared prosperity report (world bank 2018), where Bhutan is considered a development success story where extreme poverty has become rare, although a large share of the population subsists on slightly more than the extreme poverty line. While only 06 in 49 sub-Saharan African countries have a global governance

Table 9 Fixed-effect panel threshold model (PTR) estimation

	P1 (poverty headcount ratio at \$1.90)		P2 (poverty headcount ratio at \$3.20)		P3 (poverty headcount ratio at \$5.50)	
$\hat{\gamma}$	0.245		0.605		0.694	
95% confidence interval	[0.228, 0.247]		[0.586, 0.657]		[0.507, 0.717]	
	Coefficient	<i>t</i> -statistic	Coefficient	<i>t</i> -statistic	Coefficient	<i>t</i> -statistic
$\hat{\alpha}_1$	- 0.009	0.98	- 0.005	0.68	0.006	1.36
$\hat{\alpha}_2$	- 0.021	10.66***	- 0.095	5.88***	- 0.202	15.86***
Initial	0.061	0.86	0.006	0.79	0.002	0.55
GDP	- 0.011	1.20	- 0.003	0.39	- 0.001	0.24
UR	0.016	1.69*	0.018	1.78*	0.019	2.54**
GI	0.019	1.99**	0.032	7.23***	0.008	2.03**
FDI	- 0.004	0.80	0.007	2.88***	- 0.004	1.50
DI	- 0.025	0.26	- 0.037	0.49	- 0.014	0.31
AVA	- 0.155	2.40**	- 0.035	10.80***	- 0.014	5.35***
Ln NODAR	- 0.046	10.91***	- 0.320	7.19***	- 0.238	17.51***
Observations	570		570		570	
Number of countries	57		57		57	

***, **, and * indicate statistical significance at 1, 5, and 10 percent level of significance, respectively

The values in bold indicate that the quality of governance has a significant impact on poverty if GGI is above the estimated threshold

index above the threshold of 0.2, these countries are South Africa, Seychelles, Mauritius, Botswana Namibia, and Cabo Verde. Results show also that there is only two countries: Mauritius and Botswana that have a level of governance above the threshold of 0.62 that is able to reduce the poverty rate P2 (poverty headcount ratio at \$3.20). Finally, Mauritius the only country in our sample has a level of governance above the the threshold of 0.70, which once attained, will induce the negative impact of governance quality on poverty rate P3 ((poverty headcount ratio at \$5.50).

In order to check the robustness of our estimation, we use a specification with time fixed effects, that is why apply the fixed-effect panel threshold model (PTR). The estimated results are reported in Table 9.

Conclusion

This paper explores the relationship between governance quality and poverty rate for South Asian and sub-Saharan African countries over the period 2010–2019. Results from dynamic panel threshold estimates reveal that governance quality has a negative and significant effect on poverty rate above the threshold level of 0.2 for poverty headcount ratio at \$1.90, 0.62 for poverty headcount ratio at \$3.20 and 0.70 for poverty headcount ratio at \$5.50. However, below the estimated threshold governance quality enhance poverty rate in sub-Saharan African countries. Moreover, findings indicate that there is no significant impact of economic growth (GDP), domestic investment (DI), and foreign direct investment (FDI) on poverty rate in the South Asian and sub-Saharan African countries. Moreover, findings indicate that both unemployment rate (UR), and Gini index (GI) positively impact the poverty rate. Besides, results show that there is no significant impact of economic growth (GDP), domestic investment (DI), and foreign direct investment (FDI) on poverty rate in the South Asian and sub-Saharan African countries.

The findings of this study assert that governance quality decreases poverty rate in high regime and enhance poverty rate in in the South Asian and sub-Saharan African countries in low regime. However, poor governance, political instability, and corruption increase resources misallocation and increase poverty rate. Our results show that the most South Asian and sub-Saharan African countries are below the optimal level of global governance index, which once attained, will induce the positive impact of governance quality on economic growth.

Finally, this study have some relevant policy implications. South Asian and sub-Saharan African countries should pay attention to governance quality, domestic investment, economic growth, and the revenue distribution which theoretically have a negative significant impact on poverty rate. Also, those countries should reveal a strong will to fight corruption and poor governance which limit FDI, growth and increase poverty indicators, and social inequity. Thus, to improve the living conditions in economic and social terms of the populations of sub-Saharan Africa and South Asia, poverty must be significantly reduced by putting the issue of reducing inequalities at the heart of public authorities' strategies and so make it a priority.

The main shortcoming of this study include ignoring the heterogeneity among the South Asian and sub-Saharan African countries. Thus, a possible extension of this investigation may be to segment the entire sample of countries into different subsamples depending on the economic communities. Another possible extensions of this study is to present, as an example, the simulation of a situation in which all countries in the sample go above the threshold. And to study how many people would leave poverty in South Asia and sub-Saharan Africa if all countries had the same governance level of the country with the highest governance level in the sample? Poverty reduction is one of the great challenges of tomorrow. If a constructive approach is associated with an unflinching determination, the latter is not inaccessible.

Data Availability Please contact corresponding author for data requests.

Declarations

Ethics Approval and Consent to Participate This is not applicable.

Consent for Publication This is not applicable.

Competing Interests The authors declare that they have no competing interests.

References

- Acheampong, A. O., Shahbaz, M., Dzator, J., & Jiao, Z. (2022). Effects of income inequality and governance on energy poverty alleviation: Implications for sustainable development policy. *Utilities Policy*, 78. <https://doi.org/10.1016/J.JUP.2022.101403>
- Addison, T., & Cornia, G. A. (2001). *Income distribution policies for faster poverty reduction discussion paper no. 2001/93*. World Institute for Development Economics Research; UN University.
- Akanbi, O. A. (2014). Structural and institutional determinants of poverty in sub-Saharan African countries. *Journal of Human Development and Capabilities*, 16(1), 122–141. <https://doi.org/10.1080/19452829.2014.985197>
- Aracil, E., Gómez-Bengochea, G., & Moreno-de-Tejada, O. (2022). Institutional quality and the financial inclusion-poverty alleviation link: Empirical evidence across countries. *Borsa Istanbul Review*, 22(1), 179–188. <https://doi.org/10.1016/j.bir.2021.03.006>
- Arellano, M., & Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. *Journal of Econometrics*, 68(1), 29–51.
- Arnd, C., & Oman, C. (2006). *Uses and Abuses of Governance indicators*. OECD Development Center Study.
- Asra, A., Estrada, G., Kim, Y., & Quibria, M. G. (2005). Poverty and foreign aid. Evidence from recent cross-country data. In *ERD Working Paper N. 65*. Asian Development Bank.
- Benabou, R. (1996). Inequality and growth. CEPR discussion papers 1450, C.E.P.R. Discussion Papers
- Bourguignon, F. (2002). The growth elasticity of poverty reduction : Explaining heterogeneity across countries and time periods. In *DELTA Working Papers 2002-03, DELTA*.
- Burnside, C., & Dollar, D. (2000). Aid, policies, and growth. *The American Economic Review*, 90(4), 847–868.
- Brady, D., Blome, A., & Kleider, H. (2016). How politics and institutions shape poverty and inequality. In D. Brady & L. M. Burton (Eds.), *The Oxford handbook of the social science of poverty* (pp. 117–140). Oxford University Press.
- Breitung, J. (2001). Rank test for nonlinear cointegration. *Journal of Business and Economic Statistics*, 19(3), 331–340. <https://doi.org/10.1198/073500101681019981>

- Caner, M., & Hansen, B. E. (2004). Instrumental variable estimation of a threshold model. *Econometric Theory*, 20(5), 813–843.
- Cling, J. P., Razafindrakoto, M., & Roubaud, F. (2002). *La Banque mondiale et la lutte contre la pauvreté : tout changer pour que tout reste pareil ?* Working Papers DT/2002/09, DIAL (Développement, Institutions et Mondialisation).
- Cruz, M. S., & Ahmed, A. (2018). On the impact of demographic change on economic growth and poverty. *World Development*, 105, 95–106.
- De Matteis, A. (2013). Relevance of poverty and governance for aid allocation. *Review of Development Finance*, 3(2), 51–60.
- Dodge, Y. (2008). *The concise encyclopedia of statistics*. Springer-Verlag.
- Fisher, R. A. (1992). Statistical methods for research workers. In S. Kotz & N. L. Johnson (Eds.), *Break throughs in statistics. Springer series in statistics (perspectives in statistics)*. Springer. https://doi.org/10.1007/978-1-4612-4380-9_6
- Fosu, A. K. (2008). Inequality and the growth–poverty nexus: specification empirics using African data. *Applied Economics Letters*, 15(7), 563–566.
- Gallie, D., Paugam, S., & Jacobs, S. (2003). Unemployment, poverty and social isolation: Is there a vicious circle of social exclusion? *European Societies*, 5(1), 1–32.
- Globerman, S., & Shapiro, D. (2003). Governance infrastructure and U.S. foreign direct investment. *Journal of International Business Studies*, 34(1), 19–39.
- González, A., Teräsvirta, T., van Dijk, D., and Yang, Y. (2005). Panel smooth transition regression models. SSE/EFI working paper series in economics and finance 604, Stockholm School of Economics, revised 11 Oct 2017.
- Gustafsson, B., & Johansson, M. (1999). In search of smoking guns: What makes income inequality vary over time in different countries? *American Sociological Review*, 64(4), 585–605.
- Grindle, M. S. (2004). Good enough governance: Poverty reduction and reform in developing countries. *Governance*, 17(4), 525–548.
- Hadri, K. (2000). Testing for unit roots in heterogeneous panel data. *Econometrics Journal*, 3, 148–161.
- Hannan, R. (2014). The institution of co-operation: A pathway from governance to spillover and poverty reduction. *Journal of Co-operative Organization and Management*, 2(1), 34–42.
- Hansen, B. E. (1999). Threshold effects in non-dynamic panels: estimation, testing, and inference. *Journal of Econometrics*, 93(2), 345–368.
- Harris, R. D. F., & Tzavalis, E. (1999). Inference for unit roots in dynamic panels where the time dimension is fixed. *Journal of Econometrics*, 91, 201–226.
- Im, K. S., Pesaran, M. H., & Shin, Y. (2003). Testing for unit roots in heterogeneous panels. *Journal of Econometrics*, 115(1), 53–74.
- Jamil, B., Yaping, S., Din, N. U. D., & Nazneen, S. (2022). Do effective public governance and gender (in)equality matter for poverty? *Economic Research-Ekonomska Istraživanja*, 35(1), 158–174. <https://doi.org/10.1080/1331677X.2021.1889391>
- Jindra, C., & Vaz, A. (2019). Good governance and multidimensional poverty: A comparative analysis of 71 countries. *Governance*, 32(4), 657–675.
- Kaldor, N. (1956). Alternative theories of distribution. *Review of Economic Studies*, 23, 83–100.
- Kalwij, A., & Werschoor, A. (2007). Not by growth alone: The role of the distribution of income in regional diversity in poverty reduction. *European Economic Review*, 51(4), 805–829.
- Kaida, L. (2015). Ethnic variations in immigrant poverty exit and female employment: The missing link. *Demography*, 52, 485–511.
- Kaufmann, D., Kraay, A., & Mastruzzi, M. (2010). The world governance indicators: A summary of methodology, data and analytical issues. In *World Bank Policy Research Paper. No. 5430*.
- Kaufmann, D., Kraay, A., & Mastruzzi, M. (2005). Governance matters IV :Governance indicators for 1996- 2004. *World Bank Policy Research Paper*, 3630, 1–60.
- Kervin, J.B. (1992). *Methods for business research*.
- Knack, S. (2006). Measuring corruption in Eastern Europe and Central Asia : a critique of the cross-country indicators. In *World Bank Policy Research Department Working Paper n° 3968*.
- Ku, I., Lee, W., Lee, S., & Han, K. (2018). The role of family behaviors in determining income distribution: The case of South Korea. *Demography*, 55, 877–899.

- Kurtz, M., & Shrank, A. (2007). Growth and governance : Models, measures, and mechanism. *The Journal of Politics*, 69(2), 538–554.
- Kremer, S., Bick, A., & Nautz, D. (2013). Inflation and growth: New evidence from a dynamic panel threshold analysis. *Empirical Economics*, 44(2), 861–878.
- Levin, A., Lin, C.-F., & Chu, C.-S. J. (2002). Unit root tests in panel data: Asymptotic and finite-sample properties. *Journal of Econometrics*, 108(1), 1–24.
- Martínez, R., Ayala, L., & Ruiz-Huerta, J. (2001). The impact of unemployment on inequality and poverty in OECD countries. *Economics of Transition*, 9(2), 417–447.
- Meo, M. S., Khan, V. J., Ibrahim, T. O., Khan, S., Ali, S., & Noor, K. (2018). Asymmetric impact of inflation and unemployment on poverty in Pakistan: New evidence from asymmetric ARDL cointegration. *Asia Pacific Journal of Social Work and Development*, 28(4), 295–310.
- Meo, M. S., Kumar, B., Chughtai, S., Khan, V. J., Dost M, K. B., & Nisar, Q. A. (2020). Impact of unemployment and governance on poverty in Pakistan: A fresh insight from non-linear ARDL co-integration approach. *Global Business Review*, 28(4), 01–18.
- Milazzo, A., & van de Walle, D. (2017). Women left behind? Poverty and headship in Africa. *Demography*, 54, 1119–1145.
- Minogue, M. (2008). What connects regulatory governance to poverty? *The Quarterly Review of Economics and Finance*, 48(2), 189–201.
- Nunan, F., Menton, M., McDermott, C. L., Huxham, M., & Schreckenber, K. (2021). How does governance mediate links between ecosystem services and poverty alleviation? Results from a systematic mapping and thematic synthesis of literature. *World Development*, 146, 105595. <https://doi.org/10.1016/j.worlddev.2021.105595>
- Nguyen, C. V., Giang, L. T., Tran, A. N., & Do, H. T. (2019). Do good governance and public administration improve economic growth and poverty reduction? The case of Vietnam. *International Public Management Journal*, 24(1), 131–161. <https://doi.org/10.1080/10967494.2019.1592793>
- Oduwale, T. A. (2015). Youth unemployment and poverty in Nigeria. *International Journal of Sociology and Anthropology Research*, 1(2), 23–39.
- Perotti, R. (1996). Growth, income distribution, and democracy: What the data say. *Journal of Economic Growth*, 1, 149–187. <https://doi.org/10.1007/BF00138861>
- Saunders, P. (2002). The direct and indirect effects of unemployment on poverty and inequality. *Australian Journal of Labour Economics*, 5(4), 507.
- Sawhill, I. (2003). The behavioral aspects of poverty. *Public Interest*, 153(Fall), 79–93.
- Rank, M. R. (2011). Rethinking American poverty. *Contexts*, 10, 16–21.
- Rank, M. R. (2005). *One nation, underprivileged*. Oxford University Press.
- Ravallion, M. (1997). Can high inequality in developing countries escape absolute poverty? *Economics Letters*, 56(1), 51–57.
- Ravallion, M. (1998). *Poverty lines in theory and practice*. <https://doi.org/10.1596/0-8213-4226-6>
- Thomas, M. A. (2010). What do the worldwide governance indicators measure? *European Journal of Development Research*, 22(1), 31–54. <https://doi.org/10.1057/ejdr.2009.32>
- Tomaskovic-Devey, D. (1991). A structural model of poverty creation and change: Political economy, local opportunity, and U.S. poverty, 1959–1979. *Research in Social Stratification and Mobility*, 10, 289–322.
- Ukper, W. I., & Slabbert, A. D. (2009). A relationship between current globalization, unemployment, inequality and poverty. *International Journal of Social Economic*, 36(1/2), 37–46.
- UNDP. (2000). *UNDP poverty report, 2000: overcoming human poverty*. UNDP.
- Verschoor, A., & Kalwij, A. (2006). Aid, social policies and pro-poor growth. *Journal of International Development*, 18(4), 519–532.
- Wilson, W. J. (1996). *When work disappears*. Knopf.
- Wilson, W. J. (1987). *The truly disadvantaged*. University of Chicago Press.
- Workneh, M. A. (2020). Gender inequality, governance, and poverty in sub-Saharan Africa. *Poverty & Public Policy*, 12(2), 150–174. <https://doi.org/10.1002/pop4.278>
- World Bank. (2018). *Poverty and shared prosperity 2018: Piecing together the poverty puzzle*. World Bank. <https://doi.org/10.1596/978-1-4648-1330-6>
- World Bank. (2022). *Reshaping norms : A new way forward*. *South Asia Economic Focus, Spring 2022*. World Bank © World Bank. <https://openknowledge.worldbank.org/handle/10986/37121>
License: CC BY 3.0 IGO

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Springer Nature or its licensor (e.g. a society or other partner) holds exclusive rights to this article under a publishing agreement with the author(s) or other rightsholder(s); author self-archiving of the accepted manuscript version of this article is solely governed by the terms of such publishing agreement and applicable law.