Does Economic Growth Predict reduction of Multidimensional Poverty?

Introduction

Multidimensional poverty, which extends beyond traditional monetary measures, encapsulates the various deprivations individuals face, such as lack of education, poor health, inadequate living standards, and limited access to essential services. The review synthesizes the findings from key studies on multidimensional poverty, emphasizing diverse methodologies, geographic contexts, and the policy implications arising from works. Understanding these multiple dimensions of poverty is crucial for developing effective policies that address the specific needs of different populations. Admasu et al. (2021) examined the multidimensional poverty of displaced populations across several countries (Admasu et al., 2021). Their research found that displaced individuals are more likely to experience overlapping deprivations, particularly in access to education and healthcare, compared to non-displaced populations. The authors argue that traditional poverty measures fail to capture the complex realities faced by displaced persons, underscoring the need for targeted interventions that address these specific deprivations. Burchi et al. (2021) proposed a unique approach to poverty measurement by developing an individual-based index of multidimensional poverty specifically for low- and middle-income countries Burchi et al., 2021). Unlike household-based measures, this index accounts for intra-household inequalities, providing a more nuanced understanding of poverty at the individual level. The study highlights significant gender disparities, with women and girls often facing higher levels of deprivation compared to their male counterparts.

The 2019 global MPI report by OPHI provides a detailed analysis of poverty across 101 countries, focusing on inequalities within and between countries (Office & Initiative, 2019). The report reveals stark disparities in multidimensional poverty, particularly between urban and rural areas, and among different ethnic groups. The findings highlight the importance of addressing inequalities to reduce poverty, suggesting that targeted interventions are necessary to reach the most deprived populations. The report also emphasizes the need for more granular data to better understand and address the root causes of poverty. Good governance is often linked to poverty reduction, but its impact on multidimensional poverty has received less attention. In their comparative analysis of 71 countries, Jindra and Vaz (2019) explore the relationship between governance quality and multidimensional poverty (Jindra & Vaz, 2019). The study finds a strong correlation between good governance and lower levels of multidimensional poverty, particularly in areas such as education and healthcare.

Alkire et al. (2021) examined multidimensional poverty in six Latin American countries, highlighting the limitations of income-based poverty measures (Alkire et al., 2021). The study finds that while income poverty has declined significantly in the region, multidimensional poverty remains stubbornly high, particularly in rural areas and among indigenous populations. The authors emphasize the need for policies that address the non-monetary dimensions of poverty, such as education, health, and living standards, to achieve meaningful poverty reduction. Alkire and Santos (2010) explored the robustness and scope of the MPI in measuring acute poverty across different contexts. The study finds that the MPI is a reliable tool for capturing acute poverty, particularly in countries with high levels of deprivation (Alkire & Santos, 2014). However, the authors also highlight the need for continuous refinement of the MPI to ensure it remains relevant and accurate in diverse settings. Further, Recent advancements in understanding multidimensional poverty have been significantly informed by systematic reviews and spatial analyses, which highlight the evolution of poverty definitions, measurement tools, and applications. D'Attoma & Matteucci provides a comprehensive analysis of how multidimensional poverty has been defined and measured over time, focusing on the evolution of various tools and frameworks used to capture different aspects of deprivation (D'Attoma & Matteucci, 2024). Similarly, Njong's analysis of spatial poverty comparisons in Cameroon reveals significant regional disparities in multidimensional poverty, illustrating how geographic and contextual factors contribute to varying levels of deprivation (Njong, 2010). The study demonstrates that poverty is not uniformly distributed and that spatial factors play a critical role in shaping the multidimensional poverty experience. Njong (2020) highlights that rural areas in Cameroon face higher levels of deprivation across multiple dimensions compared to urban areas, underscoring the need for geographically targeted poverty alleviation strategies.

Data

The present study used the database of The World Bank (https://data.worldbank.org/), United Nations Development Programme (UNDP) (https://www.undp.org/) and the Oxford Poverty and Human Development Initiative (OPHI) (https://ophi.org.uk/) and collected country level data on multidimensional poverty indices and a set of socio-economic and demographic variables. Two data point were used in the analyses, 2010 (time period 1) and 2021 (time period 2). A total of 55 countries were used for2010 and 69 countries used for 2021.

Method

We begin by using an Ordinary Least Squares (OLS) regression to estimate how economic variables and regional effects contribute to changes in the Multidimensional Poverty Index (MPI) for the periods 2010 and 2021. To address both demographic and economic factors across all World Bank regions, we perform another OLS regression to examine their combined influence on MPI changes for the same periods. However, to tackle the issue of endogeneity in our model, we employ a Two-Stage Least Squares (2SLS) approach, using an instrumental variable such as the infant mortality rate in 2010 (IMR_2010) for female labor force participation in 2010 (LFF_2010). Next, we estimate a change model where the outcome variable is the change in MPI, with the covariates also expressed in their change forms. Additionally, we estimate a model incorporating both the absolute values and change values of the covariates, with the change in MPI as the outcome variable. By including MPI 2010 as an independent variable, the model controls for the initial poverty level, allowing us to assess poverty persistence over time. Overall, this model helps explain how past poverty, economic growth, and regional factors influence current poverty levels.

Results

The correlation matrix table shows that MPI 2010 to be highly positively correlated with MPI 2021 (0.90), Headcount Ratio (0.99) and Intensity of Poverty (0.94) and MPI 2021 is also highly correlated with Headcount Ratio (0.99) and with Intensity of Poverty (0.96). We see that Total fertility rate to be highly correlated with both year MPI scores (0.81 and 0.83). LN of GNI per capita to be found highly negatively correlated with MPI 2010 (-.80) but not with MPI 2021 (-0.41). Percentage children to total population is also found highly correlated with MPI 2010 (0.75) but not with MPI 2021 (0.34).

Table 1 Correlation Matrix of MPI with other variables

Covariates	MPI 2010	MPI 2021
MPI 2010	1.00	0.90
Headcount Ratio	0.99	0.99
Intensity of Poverty	0.94	0.96
GDP growth rate	0.17	0.23
Population Density	-0.03	0.03
Population Growth rate	0.23	0.28
Total Fertility Rate	0.81	0.83
LN of GNI per capita	-0.80	-0.41
Percentage children to total population	0.75	0.34

The other variables like Population growth rate, Population density and GDP growth rate are not found to be highly correlated.

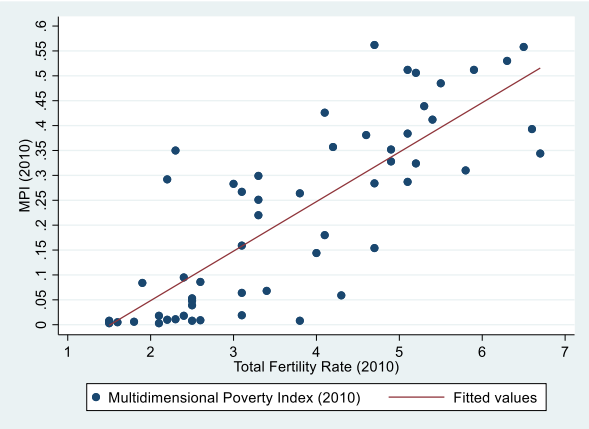

Fig. 1(a)

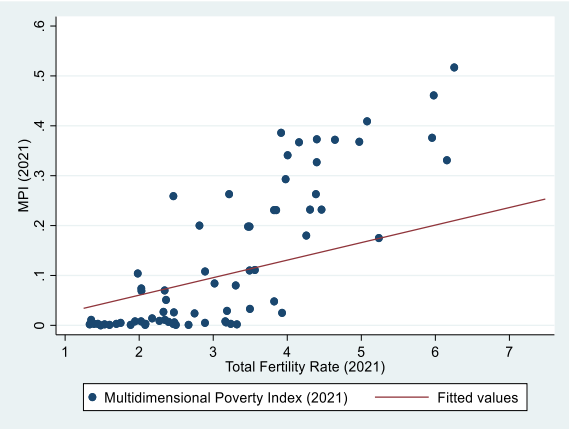

Fig. 1(b)

Fig 1(a) shows Total fertility rate and MPI scores of 56 countries for the period of 2010. The fertility rate increases there is seen to be an upsurge in the MPI scores. This indicates that countries with higher fertility rates tend to have higher MPI scores, suggesting a greater prevalence of multidimensional poverty in these nations. The scatter plot shows a clear pattern where, as the Total Fertility Rate increases, the MPI scores also rise. This trend becomes particularly pronounced after a TFR of 3, where there is a noticeable and consistent increase in poverty levels, as indicated by the MPI. In 2010, Mali was having TFR of 6.5 therefore it's MPI score was 0.558 and Serbia was having TFR of 1.5 and thus was having MPI score of 0.003.

Fig 1(b) shows Total fertility rate and MPI scores for the period of 2021 across 69 countries. The positive slope suggests that countries with more children per woman tend to experience higher levels of multidimensional poverty. Conversely, countries with lower fertility rates generally have lower MPI scores, indicating lower poverty levels. The steepness of the regression line underscores the strength of this relationship, highlighting fertility rate as a significant factor linked to poverty. In 2021, Chad was having a total fertility rate of 6.25 and it's MPI score was found to be 0.517. Similarly, Serbia with a TFR of 1.6 has MPI score close to 0.00A closer examination of the plot shows that as the Total Fertility Rate increases beyond 4 children per woman, there is a corresponding sharp increase in MPI scores. This suggests that in countries with very high fertility rates, the challenges of reducing poverty are more pronounced.

Table 2 Regression estimates of MPI using OLS and 2SLS

	Panel 1 (2021)			Panel 2 (2010)	
Independent Variable	economic variables + region (1)	economic variables + demographic variables + region (2)	instrumental variables (3)	economic variables + region (1)	economic variables + demographic variables + region (2)
Constant	0.2615***	-0.0821	-0.4458	1.0062***	0.9734***
	(2.67)	(0.60)	(-1.61)	(7.12)	(4.64)
MPI 2010	0.6377***	0.4910			
	(5.72)	(4.64)			
GDP growth rate	0.0004	-0.0006	0.0001	-0.0022	-0.0008
	(0.27)	(-0.50)	(0.04)	(-0.59)	(-0.21)
LN GNI per capita	-0.0266**	-0.0174	-0.0317	-0.1116***	-0.1064
	(-2.18)	(-1.31)	(-1.38)	(-6.47)	(-5.25)
LF Female, 2010			0.0165***		
			(3.06)		
Population Density		0.00003	0.0001		-0.00004
		(0.53)	(1.38)		(-0.62)
Population growth		-0.0560*	-0.0681		-0.0047
		(-1.99)	(-1.43)		(-0.24)
Total fertility Rate		**0.0677*** **	**0.0713*** **		**0.0519** **
		(5.59)	(4.66)		(2.35)
Percentage children to total population		0.0051	0.0010		-0.0047*
		(1.55)	(0.18)		(-1.73)
Region					

Europe and Central Asia	-0.0301	-0.0028		-0.1003**	-0.1088**
	(-0.74)	(-0.08)		(-2.33)	(-2.53)
Latin America and Caribbean	-0.0153	0.0320		0.0339	0.0398
	(-0.40)	(1.00)		(0.73)	(0.84)
Middle east and North Africa	-0.0194	-0.0425		-0.0617	-0.0699
	(-0.40)	(-1.04)		(-1.1)	(-1.24)
South Asia	0.0311	0.0680		0.0768	0.1111*
	(0.64)	(1.64)		(1.6)	(1.9)
Sub saharan Africa	0.2083***	0.1097***		0.1244***	0.0747
	(6.53)	(3.48)		(3)	(1.5)
Adjusted R2	0.62	0.75		0.81	0.83
Number of observations	69	69	66	56	56

Table 2 provides cross-country estimates for 2010 and 2021, highlighting the role of economic, demographic, and geographic factors in influencing the Multidimensional Poverty Index (MPI). Total fertility rate (TFR) emerges as a key determinant of MPI in both 2010 and 2021. TFR consistently shows statistical significance, underscoring its strong influence on poverty levels across all years studied.

Table 3 Regression estimates of change in MPI and it's change determinants and base determinants using OLS

Independent Variable	change (economic)+base+economic+region (1)	change (economic)+base+change (demographic)+economic+demographic+region (2)
Constant	0.0682	0.1953
	(0.42)	(0.9)
MPI, 2010	0.6377***	0.4910***
	(5.72)	(4.64)
GDP growth rate, 2010	-0.0020	-0.0027
	(-0.69)	(-1.07)
Change in GDP growth rate	0.0003	0.0008
	(0.24)	(0.82)
LN GNI per capita, 2010	-0.0135	-0.0282
	(-0.7)	(-1.42)
Change in LN GNI per capita	0.0148	0.0190
	(1.58)	(1.65)
Population Density, 2010		-0.00007
		(-1.23)
Change in Population Density		0.00002
		(0.46)
Population Growth, 2010		-0.0176
		(-0.67)
Change in Population Growth		0.0381
		(1.58)
Total fertility Rate, 2010		**0.0461*** **
		(2.9)
Change in Total fertility Rate		**-0.0762*** **
		(-4.21)
Percentage children to total population, 2010		-0.0017
		(-0.51)
Change in percentage children to total population		-0.0027
		(-0.97)
Region		
Europe and Central Asia	0.0465	0.0113
	(1.31)	(0.35)
Latin America and Caribbean	0.0259	0.0302
	(0.72)	(0.92)
Middle east and North Africa	0.0379	-0.0201
	(0.85)	(-0.45)
South Asia	-0.0207	0.0229
	(-0.55)	(0.53)
Sub saharan Africa	0.0747***	0.0422
	(2.14)	(1.15)
Adjusted R2	0.84	0.89
Number of observations	56	56

Table 3 reports the cross-country estimates of both the change and the base values for the period of 2010 – 2021. Columan 1 consists of change in economic variables, base economic variables and region variables. It is clearly seen that MPI of base period is statistically significant at 99% level of significance with the dependent change in MPI variable. Column 2 consists of all the change variables of economic, demographic and regions. Here, MPI of the base period, total fertility rate and the change in total fertility rates are statistically significant at 99% level of significance.

Discussion

Table 4 Exploratory variables and their estimates over the world and in specific parts of the world

Explanatory Variable	World		East Asia		South Asia		Europe and Central Asia	
	2010	2021	2010	2021	2010	2021	2010	2021
MPI	0.22	0.13	0.13	0.05	0.24	0.09	0.02	0.01
GNI per capita	3091	4168	3065	4037	2497	2788	3474	6875
GDP growth rate	2.23	-2.74	3.03	-3.84	4.88	0.21	3.37	-4.06
Population density	147.58	132.04	150.41	134.34	698.02	302.07	59.84	87.60
Population growth rate	1.70	1.73	1.01	1.68	1.59	1.35	0.59	1.45
Percentage children to total population	34.31	34.41	31.62	33.99	31.23	30.02	24.44	32.36
Total fertility rate	3.64	2.69	2.55	1.73	2.68	2.24	2.28	1.87

The disparities in Multidimensional Poverty Index (MPI) between developed and developing countries are significant. Europe and Central Asia exhibit much lower MPI scores compared to South Asia and East Asia, where poverty remains more prevalent. Demographic transitions, such as reduced fertility rates, increased life expectancy, and lower dependency ratios, have clearly impacted MPI. Research by Becker et al. (1990) and Ehrlich and Lui (1991) suggests that these transitions support a virtuous cycle of growth, initially reducing poverty and leading to further improvements in education and health, thereby lowering MPI scores. For instance, global MPI dropped from 0.22 in 2010 to 0.13 in 2021, with East Asia seeing a significant decline from 0.13 to 0.05 and South Asia from 0.24 to 0.09. Europe and Central Asia further reduced their MPI from 0.02 to 0.01. GNI per capita rose globally from $3,091 to $4,168, with the most pronounced increase in Europe and Central Asia. However, GDP growth rates fell globally due to disruptions like the COVID-19 pandemic. Population growth and fertility rates also shifted, reflecting ongoing demographic changes. Despite progress, sustaining economic growth and managing demographic transitions remain challenges for future development.