ANALYZING THE RELATIONSHIP BETWEEN PUBLIC DEBT AND POVERTY REDUCTION IN DEVELOPING COUNTRIES: AN EMPIRICAL STUDY

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ABSTRACT

Purpose: The goal of this current research is to investigate the link between public debt and poverty reduction in developing countries. The study aims to examine the influence of public debt on poverty reduction while considering other contributing factors such as economic growth, population, inflation, human development index, and institutional quality.

Theoretical framework: The theoretical framework of this research on the impact of public debt on poverty reduction in developing countries is grounded in two key theories: Debt Overhang Theory and Fiscal Space and Poverty Reduction theories. The first theory posits that high levels of public debt can lead to negative consequences for economic growth and poverty reduction. The second theory emphasizes the importance of fiscal space in poverty reduction efforts. Fiscal space refers to the financial resources available for a government to fund public goods and services without jeopardizing debt sustainability.

Method/design/approach: In this research, a panel data approach is utilized to investigate the correlation between public debt and poverty reduction in developing countries. The panel dataset encompasses a 21-year period, from 2000 to 2021, and includes data from 20 developing countries.

Results and conclusion: The study shows that public debt has a significant and positive correlation with poverty, indicating that high levels of public debt can lead to an increase in poverty in developing countries.

Research implications: Because high levels of public debt can lead to an increase in poverty in developing countries, countries need to exercise caution when taking on debt and prioritize debt sustainability to avoid negative effects on poverty levels. In contrast, economic growth and human development have a significant and negative correlation with poverty, suggesting that these factors can contribute to poverty reduction in developing countries.

Originality/value: The analysis highlights the complex relationship between public debt and poverty reduction in developing countries. Although the results are mixed, they emphasize the need for policymakers to adopt a comprehensive approach to poverty reduction that addresses not only reducing public debt but also promoting economic growth, enhancing institutional quality, and addressing other poverty-contributing factors.

Keywords: Public Debt, Poverty Reduction, Economic Growth, Human Development, Institutional Quality.

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ANALISANDO A RELAÇÃO ENTRE DÍVIDA PÚBLICA E REDUÇÃO DA POBREZA NOS PAÍSES EM DESENVOLVIMENTO: UM ESTUDO EMPÍRICO

RESUMO

Objetivo: O objetivo desta pesquisa atual é investigar a ligação entre a dívida pública e a redução da pobreza nos países em desenvolvimento. O estudo visa examinar a influência da dívida pública na redução da pobreza, considerando outros fatores contribuintes, como crescimento econômico, população, inflação, índice de desenvolvimento humano e qualidade institucional.


Método/projeto/abordagem: Nesta pesquisa, uma abordagem de dados em painel é utilizada para investigar a correlação entre a dívida pública e a redução da pobreza nos países em desenvolvimento. O conjunto de dados do painel abrange um período de 21 anos, de 2000 a 2021, e inclui dados de 20 países em desenvolvimento.

Resultados e conclusão: O estudo mostra que a dívida pública tem uma correlação significativa e positiva com a pobreza, indicando que altos níveis de dívida pública podem levar ao aumento da pobreza nos países em desenvolvimento.

Implicações da pesquisa: Como altos níveis de dívida pública podem levar a um aumento da pobreza nos países em desenvolvimento, os países precisam ter cautela ao assumir dívidas e priorizar a sustentabilidade da dívida para evitar efeitos negativos nos níveis de pobreza. Em contraste, o crescimento econômico e o desenvolvimento humano têm uma correlação significativa e negativa com a pobreza, sugerindo que esses fatores podem contribuir para a redução da pobreza nos países em desenvolvimento.

Originalidade/valor: A análise destaca a complexa relação entre dívida pública e redução da pobreza nos países em desenvolvimento. Embora os resultados sejam mistos, eles enfatizam a necessidade de os formuladores de políticas adotarem uma abordagem abrangente para a redução da pobreza que aborde não apenas a redução da dívida pública, mas também a promoção do crescimento econômico, o aprimoramento da qualidade institucional e a abordagem de outros fatores que contribuem para a pobreza.

Palavras-chave: Dívida Pública, Redução da Pobreza, Crescimento Econômico, Desenvolvimento Humano, Qualidade Institucional.

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1 INTRODUCTION

The dynamic between public debt and poverty reduction in developing nations has grown to be an increasingly pertinent area of research within the fields of economics and development studies. As presented by Easterly (2001), the complex interplay of fiscal policy, economic growth, and social welfare in these countries provides a multifaceted backdrop for investigating these interconnected dynamics.

Public debt is often regarded as a necessary instrument for stimulating economic growth and advancing development, especially in nations with developing economies (Clements et.al, 2003). By financing investments in infrastructure, human capital, and other sectors instrumental
for growth, public debt may offer solutions to resource constraints. However, when public debt grows without a commensurate rise in economic productivity, the situation can turn problematic, potentially leading to a cycle of increasing debt, stunted growth, and persistent poverty (Reinhart and Rogoff, 2010).

Conversely, poverty is among the numerous challenges that countries, as well as international institutions such as the World Bank and the United Nations (UN), are committed to tackling. Developing countries, in collaboration with these global organizations, undertake diverse programs annually to enhance living conditions and combat poverty (Zampier et al., 2022). The World Bank reports a positive decline in the poverty rate from 1985 to 2020, reflecting the concerted efforts of governments, international financial institutions, and NGOs in reducing the number of poor people and improving living standards. However, the COVID-19 pandemic, which began in 2020, has adversely impacted the economic and social life of countries worldwide, leading to an increase in the number of impoverished individuals. Despite the implementation of various poverty reduction programs, extreme poverty continues to persist across developed, developing, and underdeveloped countries (Melo, 2022).

As Ravallion (2001) argues, mitigating poverty can foster a more stable and productive society, benefiting not just individuals lifted out of poverty, but the entire economy. Yet, the task of achieving sustainable poverty reduction is complex and multifaceted, necessitating effective policy-making, efficient resource utilization, and a conducive economic and social environment.

Economists like Stiglitz (2000) posit that sustainable economic growth is a crucial pathway to poverty reduction. However, achieving such growth in a resource-constrained environment may require taking on public debt. Debt-driven investments in sectors like infrastructure, education, and health can potentially stimulate economic growth by increasing productivity and creating jobs. Yet, these investments need to generate sufficient returns to service the debt and ensure financial sustainability (Krugman, 1988).

Conversely, excessive public debt, particularly when financed by external sources, can be detrimental to economic growth and thereby poverty reduction. The ‘debt overhang’ theory advanced by Sachs (1989) postulates that when a country's debt burden becomes so large that it cannot realistically repay it, the prospect of future repayments can discourage investment and slow growth. Moreover, high debt service payments can strain public finances, reducing the resources available for poverty reduction efforts (Cohen, 1993).

The exploration of the relationship between public debt and poverty reduction thus holds crucial importance. Understanding whether an increase in public debt assists or obstructs poverty reduction efforts, under what conditions public debt can drive economic growth that eventually alleviates poverty, and how developing countries can manage their debt effectively for poverty reduction, are critical inquiries.

The primary objective of this ongoing research is to explore the correlation between public debt and poverty reduction in developing countries. The study endeavors to investigate the impact of public debt on poverty alleviation, taking into account various contributing elements such as economic growth, population dynamics, inflation rates, human development index, and institutional quality. To conduct this analysis, a comprehensive dataset has been compiled from reputable sources, including the World Bank’s World Development Indicators and the International Monetary Fund's International Financial Statistics, encompassing the time frame spanning from 2000 to 2021. The selection of countries included in the study was based on criteria such as their developmental stage, geographical representation, and the availability of pertinent data. By incorporating these additional dimensions, the research aims to provide a comprehensive understanding of the intricate relationship between public debt and poverty reduction in the context of developing nations.
2 LITERATURE REVIEW

Research exploring the effects of public debt on poverty reduction in developing countries has primarily been guided by two leading theories, resulting in a range of empirical studies with varied findings.

The Debt Overhang Theory, postulated by Krugman (1988), proposes that excessive public debt may impede economic growth and poverty reduction efforts. This theory suggests that when a country's debt burden becomes so severe that it deters investment and growth, a condition known as 'debt overhang' ensues. This situation can lead to a vicious cycle of deepening poverty, as the economy's growth potential is stifled by the debt burden.

In contrast, the Fiscal Space and Poverty Reduction Theory put forth by Heller (2005) places emphasis on the degree of financial flexibility available to a government. According to this perspective, the capacity to finance public goods and services without endangering debt sustainability, also known as 'fiscal space,' plays a crucial role in poverty reduction. This theory suggests that effective utilization of fiscal space can enable the implementation of policies aimed at poverty alleviation, thereby directly influencing the well-being of the population.

These two contrasting theories provide the theoretical foundation upon which various empirical studies are built. Among these studies, one that stands out is by Azamat et al. (2023), which introduces a different perspective by focusing on the role of entrepreneurship in poverty reduction. This study suggests that promoting entrepreneurship can trigger a chain of positive economic outcomes, including job creation, income growth, and overall socio-economic development, thereby playing a significant role in reducing poverty.

Interestingly, their findings connect back to Heller's theory, emphasizing the importance of fiscal space in nurturing entrepreneurship. According to Azamat et al. (2023), governments need fiscal room to develop and implement policies that stimulate entrepreneurial activities. By doing so, they can foster an environment conducive to job creation and income generation, thereby addressing poverty at its roots. This approach provides a fresh perspective on the issue, shifting the spotlight from public debt management to the potential of entrepreneurship as a potent tool for poverty reduction.

Sattoriy Fayzullokh’s (2022) empirical examination of the relationship between external debt and economic growth in Uzbekistan over the decade from 2010 to 2020 finds strong resonance with Krugman's (1988) Debt Overhang Theory. Their study reveals a significant negative relationship between external debt and economic growth, reinforcing Krugman’s proposition that escalating public debt can be a significant barrier to economic growth and, by extension, poverty reduction. Their findings imply that as external debt rises, GDP growth decreases, signifying that an overhang of debt could indeed hamper economic progress.

However, their study also resonates with the Fiscal Space and Poverty Reduction Theory introduced by Heller (2005). Sattoriy Fayzullokh’s findings suggest a robust capacity for the economy to rebound after debt-induced shocks, a resilience that could be attributed to the effective management of fiscal space. This aligns with Heller's argument about the importance of maintaining financial flexibility to fund public services and goods without jeopardizing debt sustainability. In this context, their work underscores the critical role of prudent debt management in maintaining economic stability and growth.

Informed by the foundational theories discussed earlier, this literature review strives to furnish a detailed overview of the intricate relationship between public debt and poverty reduction in developing nations. Certain studies in the field propose that public debt, when used to finance public investment, can in fact aid poverty reduction in developing economies. They posit that such investments can catalyze economic growth and generate job opportunities, thereby alleviating poverty. Conversely, another body of research argues that elevated levels of public debt may hinder poverty reduction initiatives. Their contention is that high public debt
can limit the fiscal space available for social expenditure and can act as a deterrent to private investment, thus creating an unfavorable environment for poverty reduction.

Reinhart and Rogoff’s paper (2010) sparked a significant discussion in economic circles with their finding of a specific debt threshold (90% of GDP) beyond which economic growth declines. Their assertion ignited debates, drawing the attention of various scholars. Herndon et al. (2014) notably challenged their findings, suggesting that there is no specific debt-to-GDP ratio where growth declines, thus highlighting the need for more nuanced analysis of the public debt-growth relationship.

The role of public debt in investment decisions and growth, as suggested by Krugman’s (1988) debt overhang hypothesis, has found substantial empirical support. Cohen (1993) further asserted that beyond debt levels, the debt service ratio, i.e., the ratio of debt payments to exports, is a crucial factor affecting investment decisions. This perspective introduces the significance of debt management alongside debt levels, with ramifications for poverty outcomes.

The direct link between public debt and poverty outcomes is a multifaceted issue. High external debt can lead to slower economic growth, consequently slowing poverty reduction in developing countries (Pattillo et al., 2002). The study underlines the importance of the management and sustainability of debt levels, which directly or indirectly influence poverty reduction strategies.

Debt relief measures have been recognized as a potential tool for poverty alleviation. According to Hepp (2005), debt relief can directly contribute to poverty reduction by freeing up resources. These resources can be allocated to health and education sectors, which indirectly contribute to poverty reduction. However, Easterly (2002) cautions that while debt relief may provide some short-term fiscal space, it is not a panacea for long-term development challenges and must be accompanied by effective economic policies.

The paper by Naeem and Hamid (2016) investigates the relationship between public debt, economic growth, and poverty reduction in South Asian countries, namely Bangladesh, India, Pakistan, and Sri Lanka, during the period from 1975 to 2010. The study utilizes an empirical model that incorporates public debt into growth equations and extends the analysis to examine its impact on poverty. Panel data estimation methodologies are employed to estimate the model. The findings suggest that public debt has a negative effect on economic growth in the selected South Asian countries, indicating that higher levels of public debt hinder overall economic expansion. However, the study does not find a significant association between public external debt or external debt servicing and income inequality, suggesting that public external debt affects both the rich and the poor similarly. Overall, this research by Naeem and Hamid (2016) contributes valuable insights into the complex dynamics between public debt, economic growth, and poverty reduction in South Asian countries.

A study by Ashraf et al. (2020) examined the relationship between external debt and poverty in Pakistan using data from 1972 to 2018. They found that increased external debt significantly contributes to higher poverty levels in both the short and long term. The authors recommend implementing judicious debt management policies and reducing reliance on external borrowing to alleviate poverty and achieve sustainable development. This research contributes to the existing literature by focusing on a developing country with a high debt burden and multiple poverty measures. It supports the debt overhang hypothesis, emphasizing the need to curb excessive external debt for economic growth and poverty reduction.

2.1 The Relationship Between Population and Poverty

The correlation between population growth and poverty has been a subject of rigorous academic inquiry over the years. Bloom et al. (2004) argue that a high rate of population growth can impede economic development and exacerbate poverty. They contend that rapid population...
growth diverts resources away from investments in physical and human capital, thus constraining economic growth and development.

In a similar vein, Dasgupta (1993) posits that high fertility rates among the poor, who generally lack access to proper healthcare and education, exacerbate poverty. In the face of such rapid population growth, limited resources are strained, thereby resulting in lower capital per worker, diminished productivity, and increased poverty. The relationship between population and poverty is multifaceted, complex, and influenced by various factors such as family planning, access to education and health, and socio-economic policies.

### 2.2 The Relationship Between Economic Growth and Poverty

Understanding the relationship between economic growth and poverty has been a pivotal topic in the field of economics, development studies, and policy-making. Although the general consensus posits that economic growth reduces poverty levels, scholars have contested this notion. They argue that the relationship depends on several other factors, including income distribution and government intervention. The World Bank (2014) asserted that economic growth is a significant factor in poverty reduction, evidenced by their analysis of global poverty trends. They found that in regions where economic growth was substantial, poverty levels decreased. Dollar and Kraay (2002) supported this view, concluding that if the incomes of the poor rise proportionately with average incomes, economic growth will inevitably benefit the poor.

In the study, Roine et. al (2009) confirmed the positive correlation between economic growth and poverty reduction. Their research suggested that the main driver of decreased poverty is economic growth. However, they noted that growth patterns affect poverty levels differently based on countries' economic structures, stressing the importance of structural economic adjustments.

While there is significant literature supporting the positive impact of economic growth on poverty reduction, the relationship is less straightforward when considering income distribution. Alesina and Rodrik (1994) theorized that income inequality could hamper economic growth by increasing social unrest and creating a disincentive for investment. In an empirical study by Ravallion (2001), it was noted that economic growth reduces poverty more effectively in countries with low initial inequality. The work of Lopez and Servén (2006) echoes this sentiment. They suggested that inequality may be harmful to poverty reduction in two ways: by limiting the potential of economic growth to reduce poverty and by reducing the rate of economic growth itself.

### 2.3 The Relationship Between Inflation and Poverty

The connection between inflation and poverty is a contentious issue in economic literature. The focus of this review is to examine the various studies and perspectives that have emerged over time concerning this relationship. According to some scholars, inflation impacts poverty by reducing the purchasing power of individuals, especially those in low-income groups (World Bank, 2022). Essentially, as prices increase, the real income of these individuals declines, pushing them into deeper levels of poverty. Therefore, in the context of this perspective, there is a direct relationship between inflation and poverty.

Conversely, Easterly and Fischer (2001) argue that inflation affects the poor less because they hold fewer monetary assets and often have informal contracts that are flexible to price changes. Hence, their study suggested no clear direct relationship between inflation and poverty.
This argument is further supported by Romer and Romer (1998), who showed that modest levels of inflation do not necessarily lead to an increase in poverty. They, however, pointed out that high levels of inflation, often referred to as hyperinflation, could indeed exacerbate poverty.

Multiple empirical studies have been conducted on the relationship between inflation and poverty. For instance, a study by Blank and Blinder (1985) found that inflation tends to increase poverty rates in the United States. However, their research only considered the direct effect of inflation, without considering other macroeconomic factors.

In contrast, the work by Galindo and Ros (2008) in Latin America suggested that the poor can benefit from inflation to some extent because they tend to hold assets that protect them from inflation, such as real estate. They concluded that the effects of inflation on poverty are highly dependent on the structure of the economy and the type of assets that the poor hold.

A recent study in Sub-Saharan Africa by Chitimira and Ncube (2023) identified a positive correlation between inflation and poverty. They highlighted that inflation leads to an increase in the cost of living, making it difficult for low-income households to afford basic necessities.

2.4 The Relationship Between Human Development and Poverty

There is considerable research underscoring the complex interplay between human development and poverty, often converging on the understanding that these two constructs are inextricably intertwined.

Sen (1999) postulated a capability approach to understanding poverty, suggesting that poverty should not merely be understood in economic terms, but in the scope of a person's capability to function effectively within society. Sen argued that the lack of development leads to capability deprivation, ultimately resulting in poverty.

In line with Sen's understanding, Alkire and Foster (2011) developed the multidimensional poverty index (MPI), which offers a broader perspective on poverty, including dimensions like health, education, and living standards. The MPI provides a more nuanced understanding of poverty, allowing the exploration of how deprivation in one dimension of human development can cascade into overall poverty.

Further solidifying the human development-poverty nexus, the United Nations Development Programme (UNDP) asserts through its Human Development Reports that countries with low human development indices (HDI) typically have high levels of poverty (UNDP, 2020). A direct link between inadequate education, poor health outcomes, and poverty is established, suggesting that improved human development can act as a significant poverty reduction strategy.

Recent empirical studies provide evidence supporting this theoretical understanding. For instance, a study by Dabla-Norris et al. (2015) on income inequality showed that improvements in human development indicators are associated with a decrease in income inequality and poverty. Similarly, Suryadarma and Sumarto's (2013) research in Indonesia confirmed the role of human development factors, like education, in mediating poverty levels.

2.5 The Relationship Between Institutional Quality and Poverty

Institutional quality encompasses the effectiveness and efficiency of a country's formal and informal institutions, including its legal and regulatory frameworks, governance structures, public services, and social norms. The correlation between institutional quality and poverty is intricate and multifaceted.
Acemoglu et al.’s seminal work (2001) asserted that institutional quality, defined as property rights, rule of law, and constraints on the executive, has a significant effect on income per capita, and thus, poverty levels. They propose that the lack of institutional quality is a consequence of colonial policy, and these effects persist even today.

Chong and Calderon (2000) further delved into the issue, examining how institutional quality influences the rate of economic growth and hence poverty reduction. They modeled economic growth as endogenous, meaning that it is influenced by internal factors like the quality of institutions. They found that countries with high-quality institutions tend to experience more rapid economic growth and thus lower poverty rates.

Hall and Jones (1999) demonstrated a link between institutional quality and productivity, which consequently affects poverty levels. They argued that countries with poor institutions had lower productivity and, therefore, higher poverty rates. The researchers posited that this correlation arises because low-quality institutions hamper the ability of workers to fully utilize their skills and resources, thereby reducing productivity and increasing poverty.

Kaufmann et al.’s study (2009) reinforced the relationship between institutional quality and poverty reduction. Using a wide range of governance indicators, they found that improved governance, a reflection of institutional quality, is associated with substantial reductions in poverty levels. This study provides a more comprehensive view of the relationship, incorporating a broader set of institutional quality dimensions.

North’s research (1990) provided a foundational understanding of the role of institutions in economic performance. He highlighted the importance of formal rules and informal constraints, indicating that the quality of these institutions plays a crucial role in shaping economic outcomes, including poverty. North’s work provides a theoretical underpinning for the idea that institutional quality can influence poverty rates.

The primary objective of this research paper is to investigate the correlation between public debt and poverty reduction in developing countries. The study will delve into the influence of public debt on poverty reduction, taking into account various factors such as economic growth, population, inflation, human development index, and institutional quality. To conduct this analysis, extensive data spanning from 2000 to 2021 was collected from reputable sources including the World Bank’s World Development Indicators and the International Monetary Fund’s International Financial Statistics. The selection of countries for this research was based on criteria such as their level of development, geographical location, and the availability of data.

3 METHODOLOGY

This study employs a panel data methodology to explore the relationship between public debt and the mitigation of poverty in developing nations. The panel dataset spans a duration of 21 years, from 2000 to 2021, covering data from 20 underdeveloped nations. The information was collated from a range of sources, such as the World Development Indicators from the World Bank and the International Financial Statistics from the International Monetary Fund. Countries were chosen for inclusion based on criteria including their developmental status, geographical positioning, and the accessibility of data.

This investigation incorporates numerous variables, including poverty, public debt, economic expansion, population size, inflation, the Human Development Index (HDI), and the quality of institutions. Poverty is gauged by the proportion of the populace living below the poverty threshold, whereas public debt is represented as a percentage of the Gross Domestic Product (GDP). The growth of the economy is evaluated by the percent variation in real GDP per capita, population size is quantified in millions, and inflation is determined by the percent alteration in consumer prices. The Human Development Index (HDI) from the United Nations
Development Programme (UNDP) serves as a composite metric for assessing human development, factoring in health, education, and income parameters. Institutional quality is assessed through the Worldwide Governance Indicators (WGI), which consider six dimensions of governance.

The study employs both fixed effects and random effects panel models to establish the coefficients of independent variables and to test the study's hypotheses. The fixed effects model accounts for country-specific aspects that remain unchanged over time, while the random effects model presumes that individual-specific effects have no correlation with independent variables. Both models address heteroscedasticity and autocorrelation present in the error terms. The Hausman test is utilized to choose between the fixed effects and random effects models. The threshold of significance for all tests is established at 5%.

The main model utilized in this study is as follows:

\[
\text{Poverty} = \alpha + \beta_1 \text{Public Debt} + \beta_2 \text{Economic Growth} + \beta_3 \text{Population} + \beta_4 \text{Inflation} + \beta_5 \text{HDI} + \beta_6 \text{Institutional Quality} + \varepsilon
\]

Where:

- Poverty = Percentage of population living below the poverty line from World Bank Open Data
- Public Debt = Public debt as a percentage of GDP from International Monetary Fund
- Economic Growth = Percentage change in real GDP per capita from International Monetary Fund
- Population = Total population in millions from World Bank Open Data
- Inflation = Percentage change in consumer prices from World Bank Open Data
- HDI = Human Development Index obtained from United Nations Development Programme
- Institutional Quality = obtained from Worldwide Governance Indicators

In addition to the main model, this research carries out numerous sensitivity analyses to scrutinize the dependability of the results. These sensitivity assessments involve the inclusion of additional control variables, application of diverse poverty metrics, and the use of alternative estimation methods. Together, the methods used in this study aim to provide a comprehensive and robust analysis of the relationship between public debt and the alleviation of poverty in developing countries.

### 4 RESULTS AND DISCUSSION

**Table 1.** Descriptive statistics

<table>
<thead>
<tr>
<th></th>
<th>Poverty</th>
<th>Public Debt</th>
<th>Economic Growth</th>
<th>Population</th>
<th>Inflation</th>
<th>HDI</th>
<th>Institutional Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean</strong></td>
<td>24.87</td>
<td>43.79</td>
<td>4.17</td>
<td>173.02</td>
<td>11.01</td>
<td>0.66</td>
<td>-0.01</td>
</tr>
<tr>
<td><strong>Std. Deviation</strong></td>
<td>12.66</td>
<td>20.84</td>
<td>3.61</td>
<td>328.74</td>
<td>11.26</td>
<td>0.18</td>
<td>1.10</td>
</tr>
<tr>
<td><strong>Min</strong></td>
<td>2.20</td>
<td>11.10</td>
<td>-6.10</td>
<td>3.30</td>
<td>-3.30</td>
<td>0.32</td>
<td>2.51</td>
</tr>
<tr>
<td><strong>Max</strong></td>
<td>49.20</td>
<td>92.60</td>
<td>16.80</td>
<td>1402.20</td>
<td>31.70</td>
<td>0.93</td>
<td>1.59</td>
</tr>
</tbody>
</table>

**Source:** Prepared by the authors (2023)

**Table 2.** Correlation matrix

<table>
<thead>
<tr>
<th></th>
<th>Poverty</th>
<th>Public Debt</th>
<th>Economic Growth</th>
<th>Population</th>
<th>Inflation</th>
<th>HDI</th>
<th>Institutional Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poverty</td>
<td>1</td>
<td>0.589</td>
<td>-0.394</td>
<td>0.127</td>
<td>0.333</td>
<td>-0.754</td>
<td>-0.705</td>
</tr>
<tr>
<td>Public Debt</td>
<td>0.589</td>
<td>1</td>
<td>-0.271</td>
<td>0.050</td>
<td>0.173</td>
<td>-0.583</td>
<td>-0.603</td>
</tr>
<tr>
<td>Economic Growth</td>
<td>-0.394</td>
<td>-0.271</td>
<td>1</td>
<td>-0.266</td>
<td>-0.477</td>
<td>0.371</td>
<td>0.317</td>
</tr>
<tr>
<td>Population</td>
<td>0.127</td>
<td>0.050</td>
<td>-0.266</td>
<td>1</td>
<td>0.088</td>
<td>-0.298</td>
<td>-0.049</td>
</tr>
<tr>
<td>Inflation</td>
<td>0.333</td>
<td>0.173</td>
<td>-0.477</td>
<td>0.088</td>
<td>1</td>
<td>-0.285</td>
<td>-0.446</td>
</tr>
</tbody>
</table>
Before carrying out the panel regression analysis, it's essential to choose a suitable panel model capable of effectively determining the relationship between poverty and its influencers, such as public debt. The two prevalent panel models are Fixed Effects (FE) and Random Effects (RE).

After performing tests for panel unit root and panel cointegration, we concluded that the Fixed Effects model suits our analysis better. The reason being, it compensates for country-specific effects and takes into account the distinct characteristics of each country within the panel. Moreover, according to the Hausman test, the Fixed Effects model is preferable over the Random Effects model as it addresses the unseen heterogeneity between countries. This heterogeneity is likely to exist given the unique characteristics of each country in the panel.

Following the results of the panel regression analysis with the use of the Fixed Effects model, we arrived at the subsequent conclusions:

Table 3: Fixed Effects Model Results

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>t-value</th>
<th>p-value</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept (β₀)</td>
<td>-53.237</td>
<td>9.346</td>
<td>-5.694</td>
<td>0.000</td>
<td>***</td>
</tr>
<tr>
<td>Public Debt</td>
<td>0.543</td>
<td>0.013</td>
<td>42.386</td>
<td>0.000</td>
<td>***</td>
</tr>
<tr>
<td>Economic Growth</td>
<td>-2.159</td>
<td>1.097</td>
<td>-1.967</td>
<td>0.040</td>
<td>**</td>
</tr>
<tr>
<td>Population</td>
<td>0.016</td>
<td>0.001</td>
<td>14.506</td>
<td>0.000</td>
<td>***</td>
</tr>
<tr>
<td>Inflation</td>
<td>0.115</td>
<td>0.079</td>
<td>1.452</td>
<td>0.147</td>
<td></td>
</tr>
<tr>
<td>Human Development Index</td>
<td>-3.473</td>
<td>1.166</td>
<td>-2.977</td>
<td>0.003</td>
<td>***</td>
</tr>
<tr>
<td>Institutional Quality</td>
<td>-4.782</td>
<td>1.510</td>
<td>-3.168</td>
<td>0.002</td>
<td>***</td>
</tr>
</tbody>
</table>

Note: *** at 1% significance level, ** at 5% significance level, * at 10% significance level
Source: Prepared by the authors (2023)

Our research concludes that public debt significantly influences poverty in a positive manner, which indicates that poverty levels rise as public debt increases. To quantify this, our study suggests that an increment of one percent in public debt corresponds to an average surge of 0.5 percent in poverty.

Contrastingly, we observe a negative correlation between economic growth and poverty. This implies that poverty levels dip as economic growth escalates. Our research highlights that a growth of one percent in the economy corresponds to an average reduction of 2.1 percent in poverty.

The study also found a positive correlation between population and poverty, suggesting that an increase in population corresponds to an increase in poverty levels. To be specific, an augmentation of one percent in population leads to an average 0.016 percent increase in poverty.

However, our research found an interesting, albeit insignificant, correlation between inflation and poverty. The data suggests a rise in inflation might contribute to an increase in poverty levels, albeit the impact is not statistically significant. Specifically, a one percent growth in inflation may result in an average 0.11 percent increase in poverty.

Significantly, we discovered that both the Human Development Index (HDI) and Institutional Quality have a potent and negative correlation with poverty. This indicates that improving HDI and institutional quality effectively reduces poverty levels. To illustrate, a one percent enhancement in HDI or institutional quality corresponds to a decrease in poverty by 3.5 percent and 4.8 percent on average, respectively.
The significant positive impact of public debt on poverty is a noteworthy finding. It suggests that as public debt rises, so do the levels of poverty. This could be attributed to the fact that an increase in public debt often results in higher taxes and lower public spending on social services, which can exacerbate poverty. This finding underscores the need for careful fiscal management and debt control as part of broader poverty reduction strategies in developing countries.

On the other hand, the negative effect of economic growth on poverty emphasizes the crucial role of economic development in poverty reduction. This correlation suggests that as economies grow, wealth creation increases and opportunities for income generation are created, which may lead to a reduction in poverty levels. Therefore, strategies aimed at stimulating economic growth can be effective for poverty alleviation.

The positive correlation between population growth and poverty highlights the strain that rapid population growth can place on resources, potentially leading to increased poverty. This could be due to the fact that rapid population growth may strain resources and services, making it harder for individuals to escape poverty. Therefore, it might be beneficial to incorporate population management strategies in poverty reduction efforts.

Inflation showed a statistically insignificant but positive relationship with poverty. While the relationship is not statistically significant, it implies that an increase in inflation could potentially be linked to an increase in poverty levels. This could be due to the reduced purchasing power of money, which might exacerbate poverty, especially for those with fixed or limited incomes.

Finally, the negative effects of the Human Development Index (HDI) and Institutional Quality on poverty demonstrate the important role of development and governance in poverty reduction. Improvements in HDI reflect advancements in health, education, and income - all factors that can contribute to poverty reduction. Likewise, improvements in institutional quality, which include aspects like control of corruption, rule of law, and government effectiveness, can create an enabling environment for poverty reduction. Hence, enhancing human development and improving governance could be key strategies for reducing poverty.

5 CONCLUSION

The research demonstrates a significant positive relationship between public debt and poverty, suggesting that escalating public debt can induce a rise in poverty levels in developing nations. Consequently, nations should exercise prudence in incurring debt and strive for sustainable debt management to avert detrimental impacts on poverty levels.

In stark contrast, economic growth and human development exhibit a significant negative correlation with poverty, indicating these elements as crucial factors in poverty alleviation. Therefore, policymakers should focus on fortifying economic growth and human development as central strategies to mitigate poverty in developing countries.

The findings shed light on the intricate relationship between public debt and poverty reduction in developing nations. Despite the mixed outcomes, they underscore the necessity for a holistic approach towards poverty reduction that encompasses strategies beyond merely limiting public debt, such as promoting economic growth, refining institutional quality, and addressing other contributory factors to poverty. It is, however, critical to recognize the limitations of the study, which include the use of secondary data and potential omitted variable bias.

In summary, the panel regression analysis supports the significant positive correlation between public debt and poverty in the examined developing nations, a finding that aligns with previous academic research on the subject. This correlation is generally considered detrimental for developing countries. It suggests that as public debt increases, poverty levels also rise.
relationship can lead to a variety of social and economic challenges, as high levels of poverty often accompany issues like increased unemployment, lower levels of education, and poorer health outcomes. Moreover, high public debt could constrain a country's ability to invest in critical areas like infrastructure, education, and healthcare, which are essential for long-term development and poverty reduction. Therefore, it's crucial for these nations to manage and utilize their debt effectively to avoid exacerbating poverty and hindering their own development.

REFERENCES


