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Government Expenditure and Inclusive Growth: Advanced vs. Developing Economies *

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Abstract This study analyzes the effects of government expenditure composition on economic growth and income inequality in 91 countries from 1990 to 2023, using a Panel Vector Autoregression (PVAR) model. The findings reveal notable differences between advanced and developing economies. In advanced economies, only infrastructure investment consistently promotes growth, while education spending reduces inequality and healthcare expenditures may increase disparities over time. In developing economies, infrastructure investment has a stronger and more persistent impact on growth, but education and healthcare spending exhibit limited redistributive effects. Social transfers show mixed results, with inefficiencies sometimes leading to worsening income inequality. These results highlight the importance of context-specific fiscal policies, ensuring that spending priorities align with national development goals to achieve both economic expansion and equitable distribution.

Keywords Government expenditure, inclusive growth, panel vector autoregression.

JEL Classification E62, H50, O11, O43.

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1. INTRODUCTION

Inclusive growth has become a central policy objective for economies seeking to achieve sustainable development while ensuring equitable income distribution. Unlike conventional growth models that prioritize GDP expansion, inclusive growth emphasizes both the pace and pattern of economic progress, ensuring that the benefits of development are broadly shared across different income groups. In response to widening income inequality and structural economic challenges, fiscal policy has emerged as a key instrument for promoting inclusive growth, with particular attention to the composition and efficiency of public expenditures.

Government spending plays a dual role in shaping economic growth and redistribution. Investments in education and healthcare enhance human capital, social transfers provide direct income support to vulnerable groups, and infrastructure development stimulates productivity and private sector activity. However, the impact of these expenditures varies significantly across different economic contexts. While advanced economies generally have well-established welfare systems and high levels of public investment, developing economies face structural constraints that influence the effectiveness of fiscal interventions. Understanding how different components of government spending affect economic growth and income distribution in diverse economic settings is essential for designing effective policy measures.

This study examines the effects of government expenditure on inclusive growth, focusing on both real GDP per capita growth and income inequality. Using a Panel Vector Autoregression (PVAR) model on a broad sample of countries, public spending is disaggregated into four key components—education, healthcare, social transfers, and public gross fixed capital formation—to assess their distinct macroeconomic effects. A central feature of this analysis is the differentiation between advanced and developing economies, allowing for a nuanced understanding of how fiscal policy operates under different structural and institutional conditions.

The results reveal clear distinctions in the effects of government spending across advanced and developing economies. In advanced economies, public education and healthcare spending reduce real GDP per capita growth in the short run, suggesting that these expenditures may create initial inefficiencies or fiscal pressures. Transfer payments also slightly lower economic growth, though to a lesser extent. Among the expenditure components, only public investment in infrastructure contributes positively to economic growth, reinforcing the notion that capital formation plays a crucial role in productivity expansion. Regarding

income distribution, education spending is the only expenditure that effectively reduces income inequality over time, highlighting its role in fostering social mobility. However, healthcare spending appears to gradually increase income inequality, suggesting that without equitable access, health expenditures may disproportionately benefit certain groups, leading to unintended distributional consequences.

In developing economies, the effects of public spending differ in both magnitude and persistence. Similar to advanced economies, healthcare and education expenditures reduce economic growth in the short run, but the decline is smaller in magnitude. Additionally, both types of expenditures lead to a slight increase in income inequality, possibly reflecting disparities in access to quality education and healthcare services. Public investment in infrastructure, however, generates a stronger and more persistent positive effect on economic growth than in advanced economies, emphasizing its role as a key driver of economic expansion in capital-constrained environments. Yet, its effect on income inequality remains minimal, suggesting that while infrastructure development stimulates aggregate productivity, it does not directly contribute to income redistribution. Transfers in developing economies exhibit a mild positive effect on economic growth but are associated with a slight worsening of income inequality, likely due to inefficiencies in distribution or limited targeting mechanisms.

These findings underscore the importance of tailoring fiscal policies to country-specific economic conditions. While infrastructure and education investments are critical for long-term growth in developing economies, ensuring equitable access to social services remains a key challenge. In advanced economies, where social spending mechanisms are more robust, optimizing the composition of public expenditures is necessary to balance efficiency and equity objectives. The study contributes to the ongoing debate on the role of fiscal policy in fostering inclusive growth by providing empirical evidence on the differential effects of public spending across economic contexts. The results highlight the need for strategic fiscal interventions to maximize economic and social benefits in both advanced and developing economies.

The relationship between fiscal policy and inclusive growth has been widely explored in the literature, with multiple studies analyzing how public expenditures influence economic performance and income distribution. Clements, Gupta and Jalles (2022) emphasize the importance of government investment in education, healthcare, and infrastructure in fostering long-term economic sustainability. Similarly, Semmler *et al.* (2014) argue that the composition of government spending plays a decisive role in shaping economic outcomes, particularly in de-

veloping economies, where investments in human capital tend to generate greater growth benefits than direct income transfers.

Empirical studies suggest that the effectiveness of fiscal policies in fostering inclusive growth is highly dependent on institutional quality and policy design. Clements, Gupta and Jalles (2023) demonstrate that well-structured redistributive fiscal policies can effectively reduce income inequality while preserving macroeconomic stability. However, they caution that inefficient tax structures and poorly designed transfer programs can introduce labor market distortions, which may ultimately hinder long-term growth. Kamran *et al.* (2023) further support this argument, showing that government spending on social programs contributes to economic inclusion, though its effectiveness largely depends on governance quality and institutional transparency. Their findings indicate that countries with stronger public institutions experience greater redistributive effects and sustained economic expansion.

The literature also discusses the heterogeneous impact of public spending across different economic contexts. Amponsah, Agbola and Mahmood (2023) analyze fiscal policy in Sub-Saharan Africa, concluding that while higher levels of social expenditures can alleviate poverty, they do not necessarily lead to a reduction in income inequality unless they are accompanied by broader structural reforms. This aligns with the conclusions of Clements, Gupta and Jalles (2023), who find that while advanced economies primarily rely on progressive taxation and direct redistribution, developing economies benefit more from investments in infrastructure and human capital formation.

The long-term implications of fiscal policies on inclusive growth have also been a major topic of discussion. Semmler *et al.* (2014) emphasize that public infrastructure investment, especially in the transportation and energy sectors, contributes to long-term economic gains by reducing transaction costs and enhancing market access. Kamran *et al.* (2023) reinforce this perspective, asserting that inclusive growth strategies must balance short-term redistribution measures with long-term productivity-enhancing investments to remain effective.

Recent research has examined the specific fiscal mechanisms that contribute to inclusive growth. Aoyagi and Ganelli (2015) highlight that inclusive growth in Asia is shaped by a combination of fiscal redistribution, monetary policies aimed at ensuring macroeconomic stability, and structural reforms. They emphasize that measures such as expanding trade, reducing unemployment, and improving productivity play a crucial role in fostering more equitable and sustainable economic development in the region. They emphasize that expanding fiscal redistribution could significantly enhance economic inclusiveness in emerging Asia,

with estimated improvements in income equality ranging from 1% to 8%. Their findings complement prior research that underscores the importance of combining targeted fiscal redistribution with broader macroeconomic policies to ensure that economic growth translates into shared prosperity.

Furthermore, Abdel-Kader and de Mooij (2020) examine the role of tax policies in shaping inclusive growth. Their analysis underscores that progressive tax structures, if effectively implemented, can enhance income distribution while maintaining economic efficiency. They also emphasize the need for governments to balance tax burdens between labor and capital income, ensuring that fiscal policies do not create disincentives for workforce participation or private investment. This aligns with Aoyagi and Ganelli (2015)'s findings that a well-designed fiscal framework, integrating both tax and expenditure policies, is fundamental to achieving sustainable, inclusive growth.

Despite the extensive literature on government spending and inclusive growth, there are still gaps in understanding how different types of expenditures interact with diverse economic environments. This study builds upon previous research by employing a dynamic panel data approach to analyze the intertemporal effects of government spending on GDP growth and income inequality. Unlike Hur (2014), which focused on OECD and ADB member countries and covered the period from 1990 to 2012, this study incorporates an expanded dataset that reflects structural shifts in the global economy. Specifically, the analysis includes 91 countries, comprising 35 advanced economies and 56 emerging and developing economies, providing a broader representation of global fiscal policy effects. Additionally, the time series has been extended to 1990–2023, allowing for a more comprehensive examination of long-term trends in government expenditure and its economic impacts.

By integrating a dataset covering both OECD and non-OECD economies, this study offers comparative insights into the effectiveness of various fiscal policies. Unlike previous studies that primarily examine total government expenditure, this research considers the heterogeneous effects of specific spending categories, enabling a clearer assessment of their role in fostering inclusive growth.

The remaining parts of this paper are organized as follows: Section 2 introduces the dataset used in this study, describes the variables and the criteria for selecting sample countries, and compares the key characteristics of the time-series data for advanced and developing economies. Section 3 explains the empirical methodology employed in this research. Section 4 presents the results, and finally, Section 5 concludes the study.

2. DATA AND VARIABLES

This study examines the impacts of fiscal policy on both inequality and economic growth. For this analysis, a cross-country panel dataset was constructed by integrating information from the Standardized World Income Inequality Database (SWIID) (Solt, 2014) and the World Development Indicators (WDI) (World Bank, 2013). The SWIID was selected as the source for measuring inequality, following the approach of Hur (2014).

2.1. VARIABLES

Government spending was divided into the following categories based on data from the WDI, with each category expressed as a percentage of GDP:

- Public gross capital formation;
- Public health expenditure;
- Social transfer and subsidy;
- Public education expenditure.

Real Gross Domestic Product (GDP) growth was obtained by extracting real GDP per capita based on Purchasing Power Parity (PPP) from the WDI, taking its natural logarithm, and then first-differencing it. Additionally, two Gini coefficients—Gini_net and Gini_market (also called Gini_gross)—were obtained from the SWIID database. Gini_net reflects income inequality after accounting for taxation and public transfers, while Gini_market measures inequality based on pre-tax and pre-transfer income. For this analysis, Gini_market was selected to prioritize the structural impacts of fiscal policy on pre-distribution income, thereby facilitating an assessment of whether public investments alter underlying market conditions. Additionally, Gini_market exhibits greater time-series variability than Gini_net, providing a more robust basis for identifying shocks within a PVAR framework. Fiscal items such as social subsidies, transfers, and progressive income taxes often have direct and immediate redistributive effects, and the difference between Gini_net and Gini_market primarily captures these influences. Table 1 provides the abbreviations and definitions for these variables.

Abbreviations	Definitions
cap_exp	Gross fixed capital formation, public (% of GDP)
edu_exp	Public spending on education (% of GDP)
expense	Expense (% of GDP)
gini_gross	Gini before taxation and transfers
gini_net	Gini after taxation and transfers
health_exp	Health expenditure, public (% of GDP)
r_gdp_growth	Real GDP growth per capita
transfer_exp	Subsidies and other transfers (% of GDP)

Table 1: Definitions and Abbreviations for Variables. This table provides the definitions and corresponding abbreviations for the key macroeconomic and fiscal variables used in the study, including measures of GDP growth, income inequality (Gini coefficients), and various components of government. expenditure.

2.2. DATA SCOPE

This study categorizes countries into two major groups, advanced economies and emerging and developing economies, following the classification used in the IMF's World Economic Outlook.

Among the 41 advanced economies, six countries with significant missing data for key variables were excluded, resulting in a final sample of 35 advanced economies. For emerging and developing economies, the selection process involved multiple steps. From the 155 economies in this group, the study excluded 44 countries designated as Least Developed Countries (LDCs) by the United Nations, along with eight economies that graduated from LDC status between 1994 and 2024. Additionally, 47 countries with substantial missing data for key variables were omitted. As a result, the final sample includes 56 emerging and developing economies, leading to a total of 91 countries analyzed in this study. The full list of selected countries is presented in Table 2.

The dataset used for cross-country comparisons of real per capita income levels is derived from the WDI, specifically utilizing the real Gross Domestic Product (GDP) per capita based on Purchasing Power Parity (PPP). Since the WDI provides this time series data starting from 1990, the analysis in this study covers the period from 1990 to 2023 for the 91 selected countries.

Given the panel structure of the dataset, missing values in key variables posed potential challenges for estimation. To address intermittent missing values and maintain a balanced panel across 91 countries, linear interpolation was applied

35 Advanced Countries	56 Developing Countries
Australia, Austria, Belgium, Canada, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Japan, Republic of Korea, Latvia, Lithuania, Luxembourg, Malta, Netherlands, New Zealand, Norway, Portugal, Singapore, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, United Kingdom, United States	Albania, Argentina, Armenia, Azerbaijan, Bahamas, Belarus, Belize, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Bulgaria, Cameroon, Chile, Costa Rica, Cote d'Ivoire, Dominican Republic, Arab Republic of Egypt, El Salvador, Fiji, Georgia, Ghana, Guatemala, Honduras, Hungary, India, Indonesia, Islamic Republic of Iran, Jordan, Kazakhstan, Lebanon, Malaysia, Mexico, Moldova, Mongolia, Morocco, Namibia, Nicaragua, North Macedonia, Paraguay, Peru, Philippines, Poland, Romania, Russian Federation, Seychelles, South Africa, Sri Lanka, Tajikistan, Thailand, Trinidad and Tobago, Tunisia, Turkiye, Ukraine, Uruguay, Vanuatu

Table 2: Advanced and Developing Countries. This table lists the 91 countries analyzed in the study, categorized into 35 advanced economies and 56 developing economies based on the IMF's World Economic Outlook classification.

to 16.28% of the total observations. While any imputation entails a trade-off between sample size and data precision, this proportion is within a manageable range to ensure that the study includes a representative group of emerging and developing economies without compromising the overall statistical power. By incorporating these observations, the model avoids potential sample selection bias that would arise from excluding countries with less frequent reporting. Specifically, income inequality measures such as the Gini coefficient reflect structural economic conditions that typically evolve gradually over time. Therefore, linear interpolation serves as a reliable method for bridging intermittent gaps without artificially smoothing underlying trends or distorting the dynamic properties required for PVAR estimation.

2.3. KEY GROUP TRENDS

Comparing the time series data between advanced countries and developing countries from 1991 to 2023 reveals the following differences:

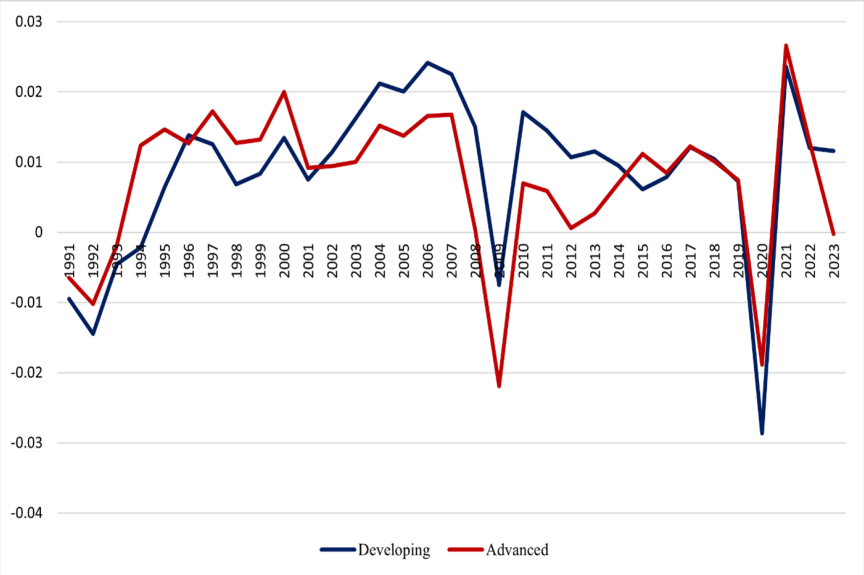

Figure 1: Time Trends of Real GDP per Capita Growth Rate. This figure compares the average real GDP per capita growth rates for advanced and developing economies from 1991 to 2023, illustrating their distinct responses to global shocks such as the 2008–2009 Global Financial Crisis and the COVID-19 pandemic.

First, the trends in real GDP per capita growth between advanced and developing economies, as illustrated in Figure 1, reveal distinct patterns in response to global economic shocks. During the 2008–2009 Global Financial Crisis, advanced economies experienced a steeper and more prolonged contraction compared to developing economies, indicating greater vulnerability to financial market disruptions. In contrast, developing economies exhibited greater resilience, with a less severe decline and a relatively quicker recovery post-crisis. Over the long term, developing countries have generally maintained higher and more stable growth rates, particularly in the early 2000s and after the 2009 recovery, whereas advanced economies have exhibited more modest but steadier growth trends outside of crisis periods.

In contrast, the COVID-19 pandemic in 2020 caused a sharp contraction in both groups, but their recovery patterns differed. As shown in Figure 1 , advanced economies rebounded more quickly in 2021, experiencing a stronger initial recovery than developing economies. However, developing economies faced

a more prolonged post-pandemic slowdown, suggesting differences in economic resilience depending on the nature of the crisis. These trends highlight that while advanced economies were more vulnerable during the 2008–2009 financial crisis, they demonstrated a faster recovery from the COVID-19 shock compared to developing economies. This contrast underscores structural differences in how these economies respond to different types of global disruptions.

Second, the trends in government expenditure as a percentage of GDP for advanced and developing economies, as depicted in Figure 2 , reveal distinct patterns over time. Advanced economies consistently allocate a higher share of GDP to government spending compared to developing economies. Throughout the observed period, the government expenditure-to-GDP ratio in advanced economies fluctuates around a relatively higher level, exceeding 30%, whereas in developing economies, it remains significantly lower, around 20-25%. This disparity suggests structural differences in fiscal policy, welfare systems, and the role of the government in economic activities between the two groups.

Notably, advanced economies exhibit a gradual decline in the government expenditure ratio over time, with occasional spikes during economic crises. For example, a sharp increase is observed around 2009, following the Global Financial Crisis, and again in 2020, in response to the COVID-19 pandemic. These trends indicate that advanced economies tend to implement countercyclical fiscal policies, increasing government spending in times of economic downturns to stabilize their economies. However, the substantial decline after 2021 suggests efforts toward fiscal consolidation after large-scale stimulus measures.

In contrast, developing economies demonstrate a more stable and moderate government expenditure-to-GDP ratio, with fewer pronounced fluctuations. While there is a slight upward trend over the long term, the increase is less dramatic than in advanced economies. This could reflect more constrained fiscal capacity and a smaller public sector relative to GDP in developing economies. Additionally, developing countries may have less room for expansive fiscal policies due to debt sustainability concerns. The relatively stable trajectory in Figure 2 suggests that, unlike advanced economies, developing economies may have limited fiscal space to engage in large-scale government spending during economic downturns.

Lastly, the trends in income inequality, as illustrated in the top panel of Figure 3, reveal notable differences between advanced and developing economies over time. Gini Gross, which measures pre-tax and pre-transfer income inequality, exhibits distinct trajectories for both groups. In the early 1990s, developing economies had higher levels of market inequality compared to advanced

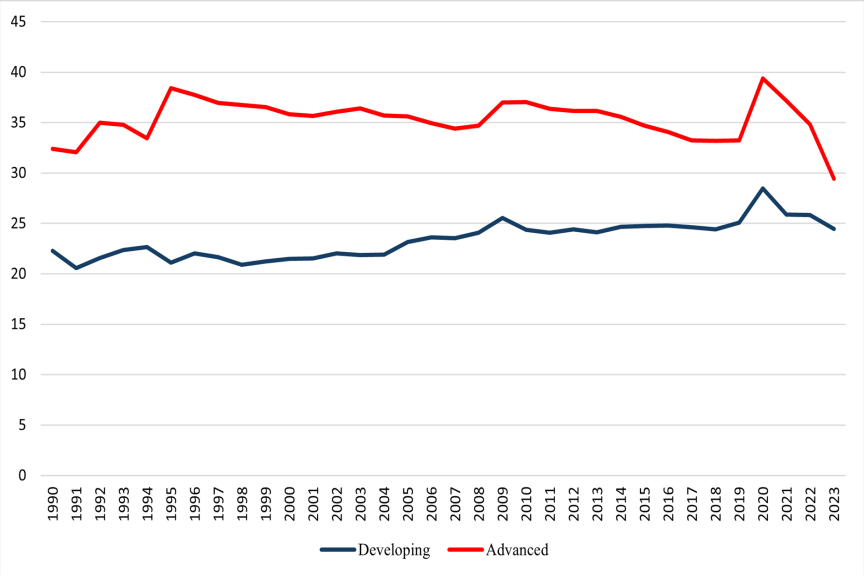

Figure 2: Time Trends of Expense. This figure depicts the trends in government expenditure as a percentage of GDP for advanced and developing economies, highlighting that advanced economies consistently maintain a higher share of spending and utilize more pronounced countercyclical fiscal policies during crises.

economies. However, while inequality in developing economies initially increased and remained elevated until the mid-2000s, it gradually declined after 2010. Conversely, advanced economies experienced a steady rise in market inequality over time, surpassing developing economies around 2010. These trends suggest that structural shifts in labor markets, globalization, and economic policies have had different effects on income distribution across the two groups.

In contrast, Gini Net, which reflects income inequality after taxation and public transfers, shows a more stable trend in both groups. As depicted in the bottom panel of Figure 3, advanced economies exhibit a significantly lower Gini Net compared to Gini Gross, indicating that their fiscal policies and welfare systems play a substantial role in redistributing income. The gap between Gini Gross and Gini Net in advanced economies suggests that tax and transfer mechanisms effectively mitigate market-driven inequality. Meanwhile, in developing economies, the difference between Gini Gross and Gini Net is less pronounced, suggesting that fiscal redistribution is relatively weaker in these countries.

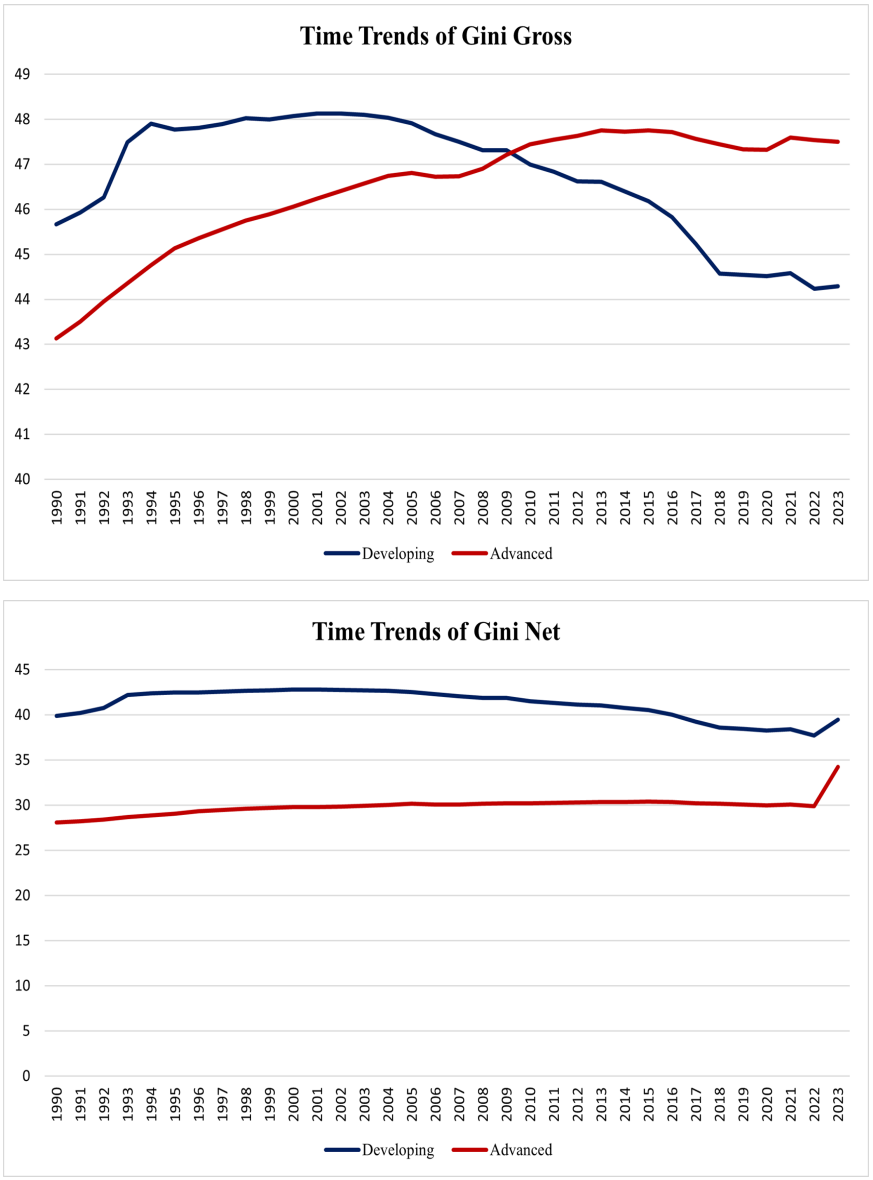

Figure 3: Time Trends of Gini Coefficients. This figure shows the evolution of Gini Gross (pre-tax and pre-transfer) and Gini Net (post-tax and post-transfer) for advanced and developing economies over time. It highlights the significant role of redistributive fiscal policies in advanced economies compared with those in developing economies.

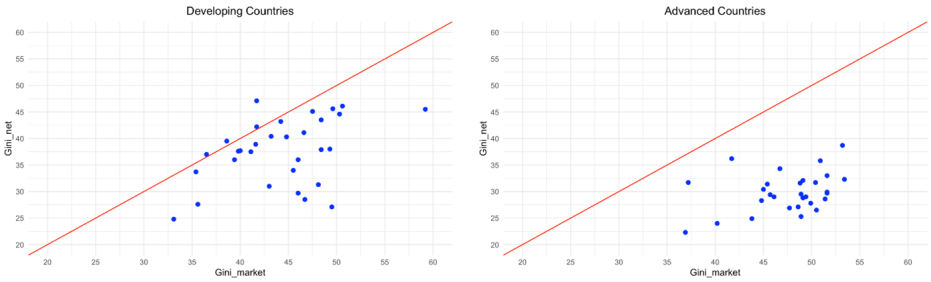

Figure 4: Relationship between Gini Net and Gini Gross Coefficients in 2022. These scatterplots illustrate the relationship between the Gini Gross and Gini Net coefficients for advanced and developing economies in 2022, showing a substantial reduction in income inequality after redistribution in advanced economies, whereas developing economies exhibit a much closer alignment between the two measures.

The scatterplots in Figure 4, which illustrate the relationship between Gini Gross and Gini Net for 2022, further highlight these disparities. In advanced economies, there is a clear reduction in inequality post-redistribution, with Gini Net clustering at significantly lower values than Gini Gross. In contrast, developing economies display a closer correlation between the two measures, implying that fiscal policies have a more limited impact in reducing inequality. This pattern underscores the stronger redistributive role of governments in advanced economies, whereas developing countries may face constraints in implementing effective tax-and-transfer policies.

Overall, these findings indicate that while market inequality has historically been higher in developing economies, redistributive policies in advanced economies play a crucial role in reducing income disparities. The divergence in the effectiveness of fiscal interventions highlights the structural differences in welfare systems and public finance capacity between the two groups.

3. EMPIRICAL METHODOLOGY

This study examines the impact of spending composition on both income distribution and economic growth, with a particular focus on the interactions between these variables. To address the panel structure of the dataset and the dynamic relationships among the variables, a Panel Vector Autoregression (PVAR) model was employed. Unlike traditional VAR, PVAR provides the advantage of leveraging cross-sectional data to compensate for limited time coverage, making it particularly suitable for datasets with varying time spans across economies.

The PVAR model estimates the interactions between GDP growth, the Gini coefficient, and fiscal variables, incorporating four key components. These include the GDP growth rate, the Gini coefficient, overall government spending, and a specific component of fiscal expenditure. This setup allows for the analysis of how changes in a particular fiscal spending item affect the other variables through two distinct channels: (1) the magnitude effect, representing changes in total fiscal spending, and (2) the composition effect, which arises from reallocating shares among different spending components. The composition effect reflects the trade-offs inherent in increasing the share of one fiscal item at the expense of others. The four-variable PVAR framework was specifically designed to disentangle these two effects.

Fiscal variables are expressed as percentages of GDP, enabling a direct comparison of their impacts. Including both overall spending and a specific component in the model allows for an evaluation of whether changes in the composition of fiscal spending exert a stronger influence on GDP growth and income distribution than changes in total spending.

The PVAR framework requires balanced panel data to ensure robust estimation. However, certain fiscal and macroeconomic variables contained intermittent missing observations. To address this, linear interpolation was applied to fill gaps while preserving the underlying structure of the data. This approach ensures that the estimated impulse response functions are based on a consistent dataset, reducing the risk of estimation bias caused by data gaps. Alternative methods, such as forward-filling or deletion of incomplete observations, were considered but deemed unsuitable due to their potential to introduce systematic biases.

The PVAR is structured as follows:

$$X_{it} = A(L)X_{it} + f_i + \varepsilon_{it}, i = \text{ country}, t = \text{ year}, f_i = \text{ fixed effects},$$

$$X_{it} \equiv \begin{bmatrix} \text{growth}_{it} \\ \Delta \text{ gini}_{it} \\ \Delta B_{it} \end{bmatrix}.$$

In this formulation, B_{it} represents a vector or scalar of fiscal items, including expenditures, tax revenues, and fiscal balance (deficit or surplus), all measured as percentages of GDP. Given the variability in time series length across countries, the dimension of X_{it} was kept below five, ensuring computational feasibility. This restriction aligns with the property that the sum of fiscal variables satisfies the following identity:

$$\sum_{j=1}^{n} \Delta B_{it}^{j} = 0, B_{it} \equiv \left(B_{it}^{1}, B_{it}^{2}, \ldots, B_{it}^{j}, \ldots, B_{it}^{n} \right).$$

As Kneller, Bleaney and Gemmell (1999) demonstrated, this constraint allows for a transformation of the model into one with (n-1) fiscal variables, expressed as: $X_{it}^{*} = A^{*}(L)X_{it}^{*} + f_i + \varepsilon_{it}, i = \text{ country}, t = \text{ year},$

$$X_{it} \equiv \begin{bmatrix} \text{growth}_{\ it} \\ \Delta \text{ gini}_{\ it} \\ \Delta E_{it} \end{bmatrix}.$$

Here, E_{it} represents a subset of B_{it}, reduced by one dimension. Substitution effects require interpreting coefficients in $A^{*}(L)$ differently from those in $A(L)$.

Estimation of the model and the generation of impulse response functions followed the methodology of Love and Zicchino (2006). To address potential non-stationarity, Gini coefficients and fiscal variables were differenced.[1] The lag length of the PVAR model was determined to be four years based on the Akaike Information Criterion (AIC) and Schwarz Bayesian Information Criterion (SBIC), which indicated that this structure optimally captures the medium-term dynamic effects of fiscal shocks. A longer lag structure is further justified as it reduces potential misspecification bias and accounts for the delayed structural impacts of functional expenditures such as infrastructure and education. Structural shocks are identified using the Generalized Impulse Response Function (GIRF) approach, following Pesaran and Shin (1998). Unlike the traditional recursive Cholesky decomposition, the GIRF framework is invariant to the ordering of variables in the system and does not impose a contemporaneous zero-restriction on other variables in response to a shock. This approach is particularly suitable for the annual data used in this study, as it allows for the possibility that fiscal authorities and macroeconomic variables respond to economic shocks within the same period. By utilizing GIRF, the results remain robust regardless of the sequence in which the variables are entered into the PVAR model.

4. RESULTS

This section presents and analyzes the Generalized Impulse Response Functions (GIRFs), which illustrate the dynamic effects of shocks to total government expenditure and specific expenditure components on real GDP per capita growth and income inequality. These GIRFs are derived from Monte Carlo simulations

[1] While deterministic time trends can be modeled using high-order polynomials, this study relies on first-differencing to achieve stationarity. In a differenced framework, a linear time trend is effectively captured by the constant term. This parsimonious approach is adopted to preserve degrees of freedom for the primary variables of interest, ensuring robust estimation within the PVAR framework.

conducted with 500 iterations. The regions between the upper and lower bounds represent the 90% confidence interval for the responses over a six-year horizon.

4.1. ESTIMATION OF THE WHOLE SAMPLE

The four-variable PVAR models include government expenditure, a specific component of that expenditure, the Gini coefficient of gross income (Gini_gross), which captures pre-tax and pre-transfer income inequality, and real GDP per capita growth.

Figure 5 shows the responses of real GDP per capita growth and the Gini coefficient to increases in government spending and public education expenditure. As shown in the top-left panel of Figure 5, a shock to total government expenditure initially leads to a negative impact on real GDP per capita growth, which gradually diminishes over time. This suggests that in the short term, an increase in government spending crowds out private consumption and investment. However, as the response trend moves towards zero in later periods, the adverse effect appears to be transitory, with the economy adjusting over time.

Similarly, the top-right panel of Figure 5 examines the impact of education spending on real GDP per capita growth. The initial response is also negative but relatively smaller in magnitude compared to total government expenditure. This finding suggests that while education investments may not yield immediate economic gains, their negative short-term effects are limited. The upward trajectory over time indicates that education spending could contribute to long-term economic stability and growth, albeit with a lagged effect.

The bottom-left panel of Figure 5 presents the impulse response of income inequality (Gini Gross) to changes in government expenditure. The initial response is positive, indicating a short-term increase in inequality following an increase in government spending. However, this effect reverses over time, suggesting that as fiscal policies take full effect—potentially through redistributive mechanisms or economic adjustments—inequality declines in the medium to long run.

In contrast, the bottom-right panel ofFigure 5 explores the impact of education spending on inequality. The impulse response remains close to zero, implying that education-related fiscal policies may not have an immediate effect on income distribution. However, a slight downward trend in later periods suggests that education spending might play a moderating role in inequality reduction over time, though the effect is neither strong nor immediate.

The findings indicate that government spending influences economic growth and inequality through distinct channels and time horizons. While total govern-

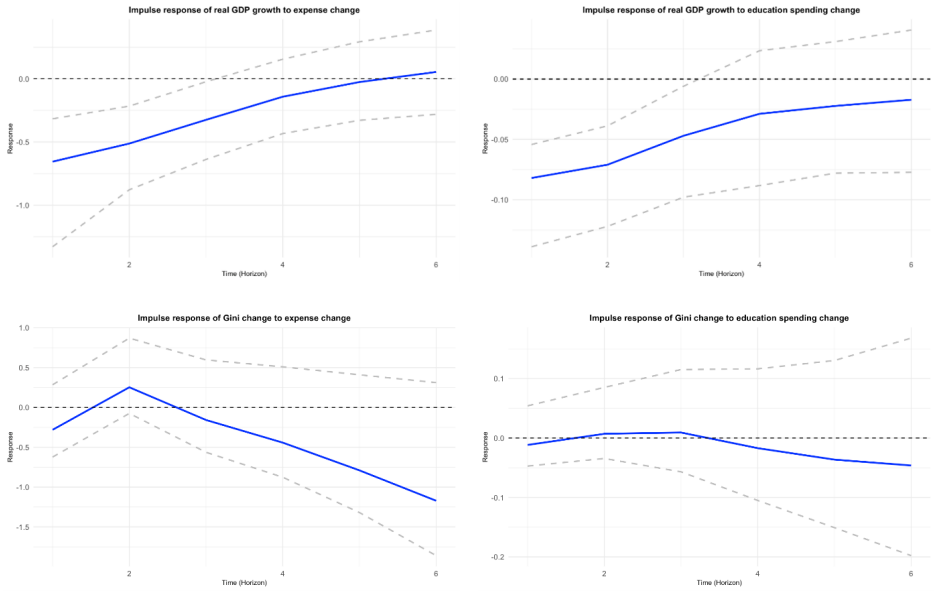

Figure 5: Four-Variable Panel Vector Autoregression for Changes in Expense and Public Education Spending. Real GDP growth = real GDP per capita growth rate, Gini change = change in Gini before taxation and transfers.

ment expenditure initially exerts a contractionary effect on GDP growth and a widening effect on inequality, these effects tend to dissipate over time, potentially due to structural adjustments and policy effectiveness. Education spending, on the other hand, exhibits a relatively weaker short-term impact but may contribute to long-run economic stability and inequality reduction. These results highlight the importance of considering both short-term economic trade-offs and long-term policy effectiveness when designing fiscal interventions.

The findings suggest that well-targeted government expenditure, particularly in education, may serve as a stabilizing force for both economic growth and income distribution in the long run.

Figure 6 illustrates the responses of real GDP per capita growth and the Gini coefficient to increases in government spending and public health expenditure. As shown in Figure 6 (top-left panel), an increase in total government expenditure initially results in a negative response in real GDP per capita growth, with the effect gradually diminishing over time. This suggests that higher government spending may initially crowd out private consumption and investment, but the economy appears to adjust in the medium term. The trajectory of the impulse re-

sponse indicates a trend toward neutrality, implying that the negative short-term effects do not persist in the long run.

Meanwhile, Figure 6 (bottom-left panel) illustrates the impact of government spending on income inequality, measured by the Gini coefficient of gross income. The response initially turns positive, indicating that an increase in government expenditure may contribute to a short-term rise in inequality. However, the response subsequently declines, suggesting that redistribution mechanisms or secondary economic effects help reduce inequality over time. This pattern highlights the complex and time-dependent nature of fiscal policies in shaping income distribution.

The top-right panel of Figure 6 examines the response of real GDP per capita growth to a shock in public health spending. The initial impact is negative but relatively small, suggesting that increased health expenditures may not generate immediate economic gains. However, the trend over time indicates a gradual recovery, potentially reflecting the long-term productivity benefits of improved healthcare access and labor force well-being.

In contrast, the bottom-right panel of Figure 6 illustrates the impact of health spending on income inequality. The response remains close to zero, with a slight downward trend over time. This suggests that public health expenditure may have a limited but gradual effect in reducing income disparities, likely through improvements in human capital and social protection mechanisms. However, the weak response indicates that health spending alone may not be a primary driver of income redistribution, emphasizing the need for complementary fiscal policies.

Overall, the findings suggest that while government spending initially exerts a contractionary effect on GDP growth and may contribute to short-term inequality, these effects tend to dissipate in the medium to long run. Public health expenditure, in particular, appears to have a limited immediate impact on economic growth and inequality but may contribute to long-term stability and social welfare improvements. These results underscore the importance of evaluating the temporal dynamics of fiscal policy, as short-term effects may differ significantly from long-run outcomes.

Figure 7 presents the responses of real GDP per capita growth and the Gini coefficient to increases in government spending and public gross fixed capital formation. As depicted in Figure 7 (top-left panel), an increase in total government expenditure initially leads to a negative response in real GDP per capita growth, which gradually diminishes over time. This suggests that increased government spending may crowd out private consumption and investment in the

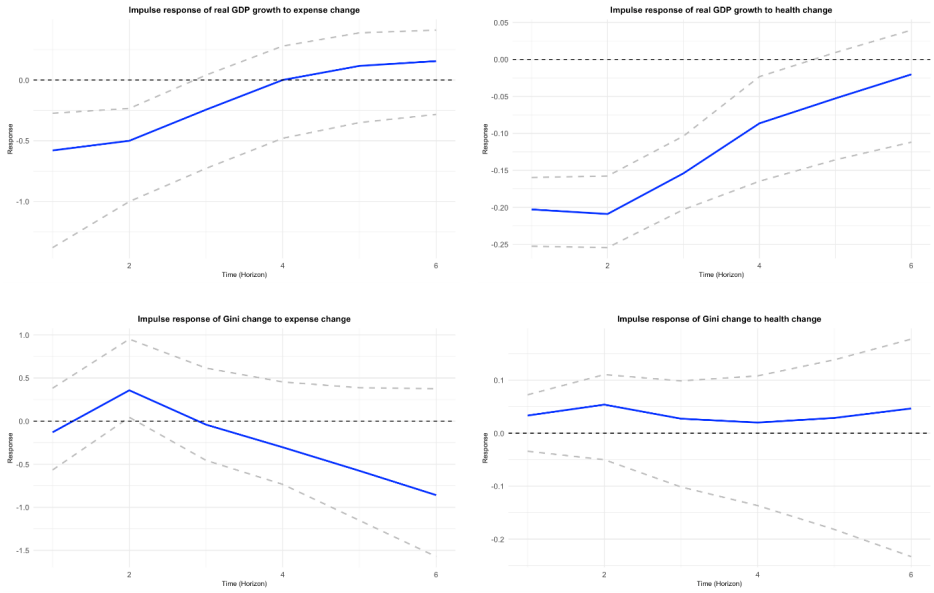

Figure 6: Four-Variable Panel Vector Autoregression for Changes in Expense and Public Health Spending.Real GDP growth = real GDP per capita growth rate, Gini change = change in Gini before taxation and transfers.

short run. However, as the response moves closer to zero, the economy appears to adjust in the medium to long term, mitigating the initial contractionary impact.

The bottom-left panel of Figure 7 illustrates the effect of government spending on income inequality (Gini Gross). The initial response is positive, suggesting that increased government expenditure may contribute to a short-term rise in inequality, possibly due to the uneven distribution of government spending benefits. However, over time, the response turns negative, indicating that redistributive fiscal policies or social transfer programs eventually offset the initial increase in inequality, leading to a more equal income distribution in the long run.

The top-right panel of Figure 7 examines the response of real GDP per capita growth to a shock in public gross capital formation. Unlike general government spending, an increase in public investment in physical infrastructure and productive assets produces an immediate and strong positive impact on GDP growth. The response peaks early and gradually declines, suggesting that government-led infrastructure projects and capital investments serve as an effective stimulus for economic activity, enhancing productivity and long-term development.

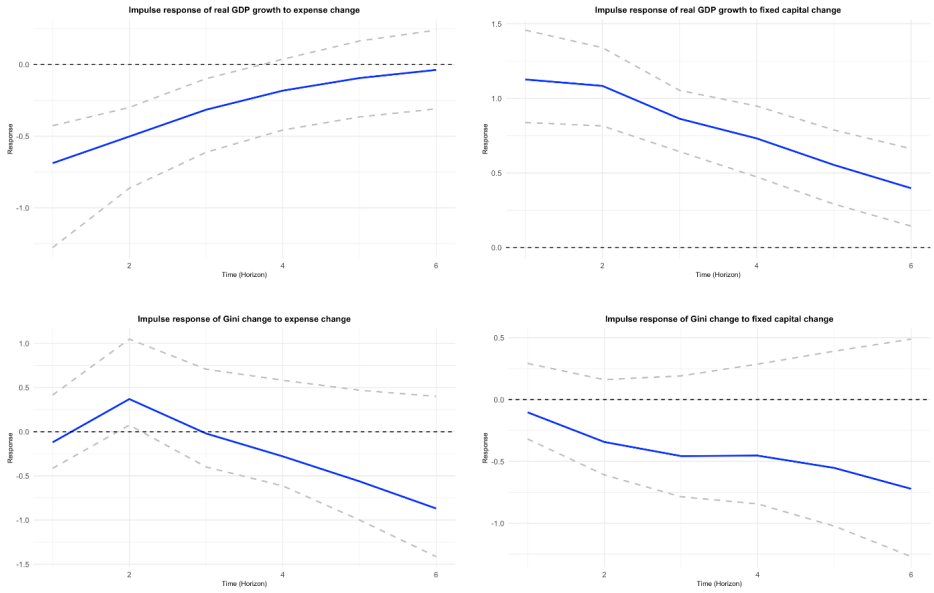

Figure 7: Four-Variable Panel Vector Autoregression for Changes in Expense and Public Gross Fixed Capital Formation.Real GDP growth = real GDP per capita growth rate, Gini change = change in Gini before taxation and transfers.

The bottom-right panel of Figure 7 presents the response of income inequality to public gross capital formation. The initial response is negative, implying that increased public investment is associated with a decline in inequality. This trend suggests that public capital formation contributes to broad-based economic benefits, potentially through job creation, infrastructure development, and improved access to essential services. However, the effect diminishes over time, indicating that sustained investment efforts are necessary to maintain long-term reductions in inequality.

The findings suggest that while government expenditure may initially reduce GDP growth and widen inequality, these effects tend to dissipate over time, likely due to macroeconomic adjustments and redistributive fiscal measures. In contrast, public gross capital formation generates an immediate boost to economic growth and contributes to reducing income inequality in the short term, reinforcing its role as a key driver of inclusive economic development. These results highlight the importance of targeted public investment in infrastructure and productive assets as a means of fostering long-term growth and improving income distribution.

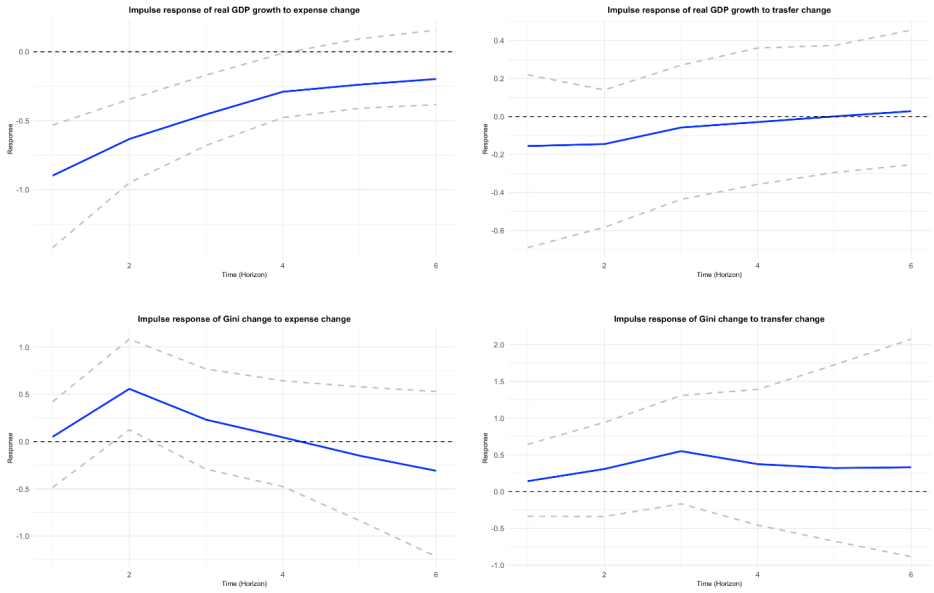

Figure 8: Four-Variable Panel Vector Autoregression for Changes in Expense and Social Subsidies and Transfers. Real GDP growth = real GDP per capita growth rate, Gini change = change in Gini before taxation and transfers.

Figure 8 illustrates the responses of real GDP per capita growth and the Gini coefficient to increases in government spending and transfers. As shown in Figure 9 (top-left panel), an increase in total government expenditure initially leads to a negative response in real GDP per capita growth, which gradually diminishes over time. This suggests that government spending may crowd out private consumption and investment in the short run, possibly due to inefficiencies. However, as the response approaches zero in later periods, the economy appears to adjust in the medium term, reducing the initial negative impact.

The bottom-left panel of Figure 8 examines the response of income inequality (Gini Gross) to government expenditure shocks. The initial effect is positive, indicating a short-term rise in inequality following an increase in government spending. This could be due to unequal distribution of government expenditures across different income groups. However, as time progresses, the response turns negative, suggesting that redistributive fiscal measures, such as social welfare programs, eventually offset the initial increase in inequality.

The top-right panel of Figure 8 illustrates the impact of transfer payments on real GDP per capita growth. The initial response is negative but relatively small,

implying that higher transfers may not lead to immediate economic expansion. Over time, the response trends toward zero, suggesting that transfer payments do not significantly stimulate GDP growth in the short run. This could be due to the nature of transfer payments, which primarily serve redistributive rather than productive functions.

In contrast, the bottom-right panel of Figure 8 presents the response of income inequality to transfer payments. The effect is positive in the short term, indicating a temporary rise in inequality, potentially due to delays in policy implementation or inefficiencies in the distribution of benefits. However, the long-term trend remains stable, implying that transfer payments have a limited but stabilizing effect on income inequality over time.

The findings suggest that government expenditure initially depresses GDP growth but has a neutral effect in the long run, while transfers exhibit minimal impact on economic expansion. In terms of inequality, government spending contributes to short-term disparities, but its redistributive effects eventually reduce inequality over time. Conversely, transfers do not significantly alter income distribution in the long term, emphasizing the importance of complementary policies to enhance their redistributive effectiveness. These results underscore the need for well-targeted fiscal measures to balance growth objectives with equity considerations.

4.2. ESTIMATIONS BY GROUPS

Figure 9, 10, 11, and 12 present the impulse response functions (IRFs) derived from the PVAR analysis, distinguishing between advanced (top row) and developing (bottom row) countries.

Figure 9 illustrates the impulse response functions (IRFs) depicting the effects of health expenditure on real GDP per capita growth and income inequality, with separate estimations for advanced and developing economies. The left panels of Figure 9 represent the response of real GDP per capita growth to an increase in health expenditure, while the right panels display the impact of health spending on income inequality, as measured by the Gini coefficient.

The short-term effects of increased health expenditure on economic growth exhibit notable differences between the two groups. In both advanced and developing economies, the initial response is negative, implying that an increase in health spending may generate short-term fiscal pressures or reallocation effects that could temporarily crowd out other productive investments. However, the persistence of this negative effect differs across country groups. In advanced economies, the decline in real GDP per capita growth is more prolonged, sug-

gesting that factors such as rigid fiscal structures, a higher baseline level of healthcare spending, or slower efficiency adjustments in public expenditure may limit the immediate economic benefits of increased health investment. In contrast, developing economies experience a quicker recovery, with the negative response fading more rapidly over time. This could be attributed to the relatively higher marginal returns of health investments, more flexible budget allocations, or significant improvements in human capital as a result of expanded healthcare access. Over time, the response of real GDP growth stabilizes for both groups, but the economic benefits of health expenditure appear to materialize more quickly in developing economies.

The effects of health spending on income inequality also display significant differences between the two groups. In both advanced and developing economies, the initial response of the Gini coefficient is positive, indicating that increased health expenditure may temporarily widen income inequality. This could be due to unequal access to healthcare services, regional disparities in health infrastructure, or the possibility that higher-income groups benefit more quickly from public health spending. However, the long-term effects diverge between the two groups. In developing economies, the inequality-increasing effect diminishes over time, suggesting that as public health investments expand access and reach lower-income groups, the redistributive benefits of such spending become more pronounced. In contrast, in advanced economies, the response of the Gini coefficient remains persistently positive and even increases over time, implying that health expenditure alone may not be sufficient to address income disparities. This trend indicates that, without strong redistributive policies, increased public health spending may disproportionately benefit higher-income groups, thereby failing to mitigate inequality in the long run.

These findings suggest that while health expenditure does not yield immediate economic growth benefits in either group, the long-term impact differs depending on structural and institutional factors. Advanced economies tend to experience slower returns on health investments, likely due to existing fiscal constraints and inefficiencies, whereas developing economies are better positioned to leverage health spending for more immediate economic gains. Similarly, although health expenditure initially appears to widen inequality in both groups, its long-term redistributive effects are more favorable in developing economies. These results highlight the importance of ensuring efficient and well-targeted health investments, particularly in advanced economies where complementary social policies may be necessary to enhance the equity of public health spending and ensure broad-based benefits.

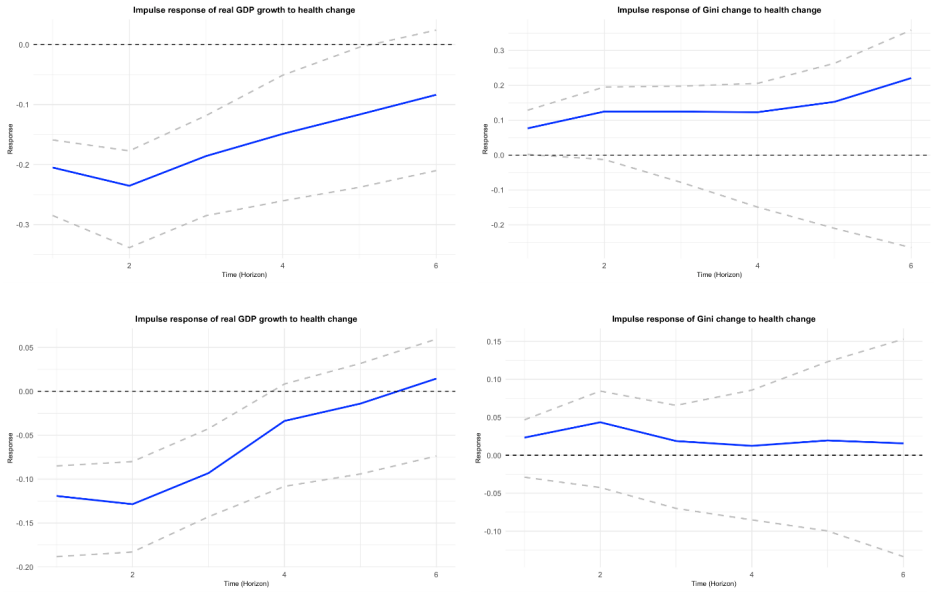

Figure 9: Four-Variable Panel Vector Autoregression for Changes in Expense and Public Health Spending. Real GDP growth = real GDP per capita growth rate, Gini change = change in Gini before taxation and transfers. Top Row: Advanced countries, Bottom Row: Developing countries.

Figure 10 illustrates the impulse response functions (IRFs) that capture the effects of education spending on real GDP per capita growth and income inequality, distinguishing between advanced and developing economies. The top-left and bottom-left panels depict the response of real GDP per capita growth to an increase in education expenditure in advanced and developing economies, respectively. In advanced economies, the initial response is negative, indicating that increased education spending may lead to short-term fiscal pressures or inefficiencies in resource allocation. Over time, however, the response remains subdued, suggesting that the economic returns to additional education investment are limited in the short run. In contrast, developing economies exhibit a more gradual recovery, with the response moving closer to zero over time. This pattern may reflect the relatively higher marginal returns to education investment in these economies, where improvements in human capital accumulation can have a more immediate impact on productivity and economic growth.

The top-right and bottom-right panels of Figure 10 display the response of income inequality, as measured by the Gini coefficient, to changes in education ex-

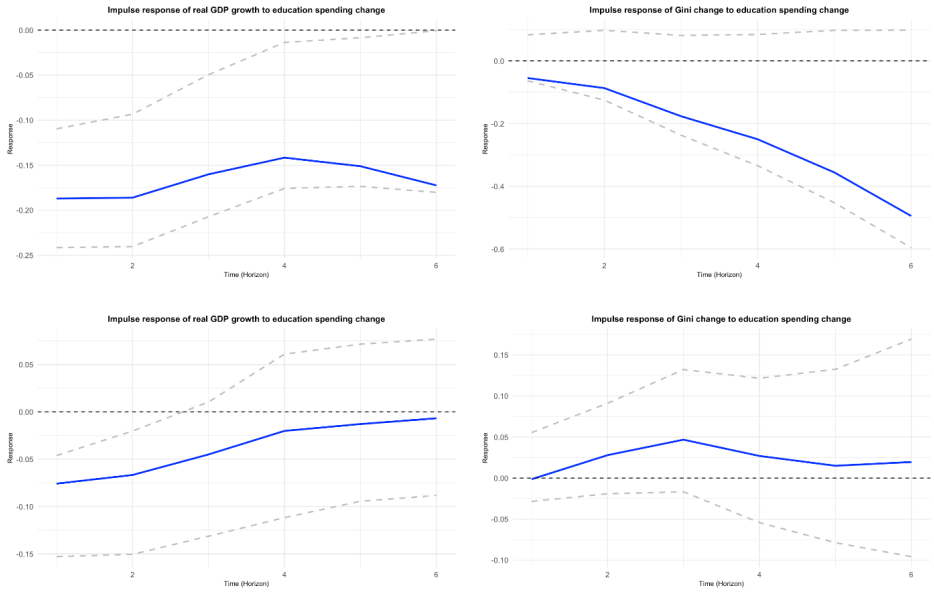

Figure 10: Four-Variable Panel Vector Autoregression for Changes in Expense and Public Education Spending.Real GDP growth = real GDP per capita growth rate, Gini change = change in Gini before taxation and transfers. Top Row: Advanced countries, Bottom Row: Developing countries.

penditure. In advanced economies, the response is consistently negative, showing a clear decline in income inequality following an increase in education expenditure. This suggests that in these economies, public investment in education plays a more direct role in reducing disparities, likely due to its impact on expanding access to schooling and improving economic opportunities for lower-income groups. In developing economies, however, the response is initially positive, implying that increased education spending may initially widen income inequality. This could be attributed to disparities in access to high-quality education or the delayed effects of human capital development. Although the response moderates over time, it remains slightly above zero, indicating that without complementary policies to ensure equitable access, the distributional benefits of education spending may not be fully realized.

These findings underscore the differing roles that education spending plays in advanced and developing economies. In advanced economies, increased education expenditure contributes more directly to reducing income inequality, yet its impact on economic growth remains limited in the short run. This sug-

gests that while well-established education systems can effectively enhance social mobility, additional investments may yield diminishing returns in terms of immediate economic expansion. In contrast, developing economies experience a more dynamic response, with education spending gradually supporting economic growth but initially widening income inequality. This divergence highlights the importance of ensuring equitable access to quality education in developing economies to fully harness the long-term benefits of human capital accumulation. Overall, the effectiveness of education investment depends on the broader structural and institutional context, emphasizing the need for complementary policies that align education spending with labor market needs and social inclusion objectives.

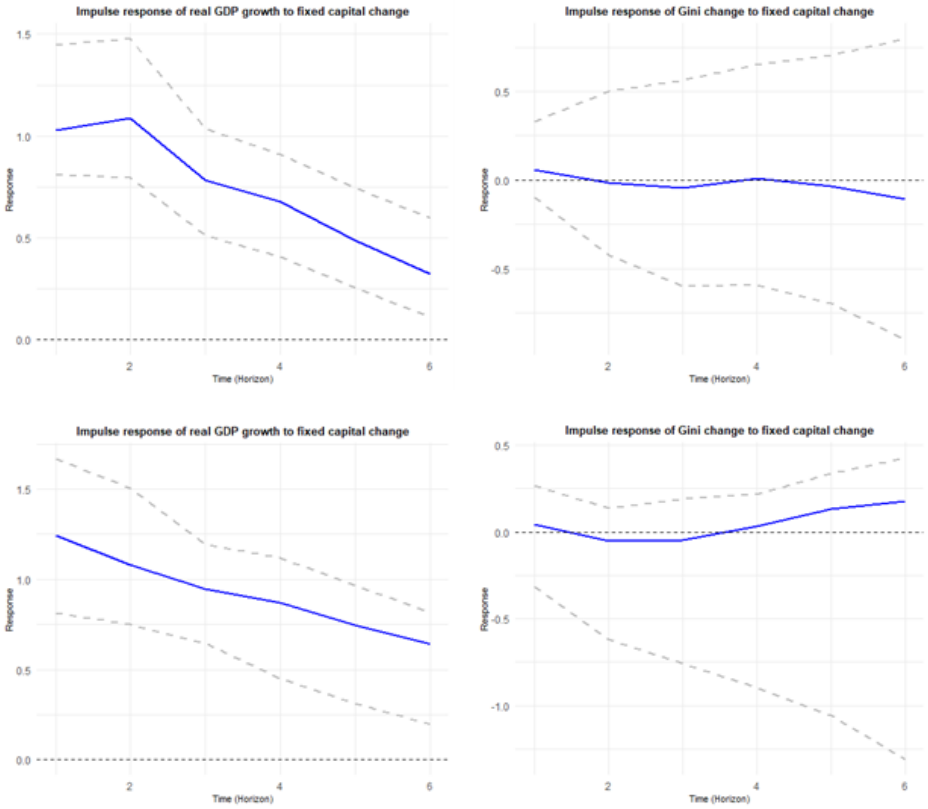

Figure 11: Four-Variable Panel Vector Autoregression for Changes in Expense and Public Gross Fixed Capital Formation.Real GDP growth = real GDP per capita growth rate, Gini change = change in Gini before taxation and transfers. Top Row: Advanced countries, Bottom Row: Developing countries.

The impulse response functions (IRFs) in Figure 11 illustrate the effects of changes in public gross fixed capital formation on real GDP per capita growth and income inequality, differentiating between advanced and developing economies. The top-left and bottom-left panels display the response of real GDP growth, while the top-right and bottom-right panels show the response of the Gini coefficient.

In advanced economies, an increase in public gross fixed capital formation leads to an immediate and positive response in real GDP growth, suggesting that capital investment contributes significantly to economic expansion. However, the effect diminishes over time, indicating that while infrastructure and capital accumulation boost growth in the short term, their long-term impact stabilizes as the economy adjusts. This pattern contrasts with developing economies, where the initial response is not only significantly larger but also more persistent. The stronger immediate effect suggests that public capital formation plays a crucial role in stimulating economic growth in capital-constrained environments. Moreover, the slower decline over time indicates that the growth benefits of infrastructure investments tend to last longer in these economies, possibly due to higher marginal returns and ongoing improvements in productivity and connectivity.

Regarding income inequality, advanced economies exhibit a largely neutral response, with only minor fluctuations around zero. This suggests that public capital investment does not significantly alter the distribution of income in these economies, possibly due to the already well-developed infrastructure and financial systems that limit redistributive effects. In contrast, developing economies show a slightly increasing trend in the Gini coefficient following an increase in public investment. This may reflect the fact that large-scale capital investments often benefit higher-income groups disproportionately, particularly in settings where access to infrastructure and capital-intensive projects is not evenly distributed. Over time, the response indicates a persistent rise in inequality, suggesting that public capital investment alone may disproportionately benefit higher-income groups, especially in contexts where infrastructure projects and capital-intensive industries are less accessible to lower-income populations. Without complementary policies aimed at equitable access to these investments public capital formation may contribute to widening income disparities rather than reducing them.

The contrasting results highlight the different roles that public investment plays in economic and social outcomes across economies at different stages of development. While both advanced and developing economies experience initial growth benefits from capital formation, the effects are more persistent in

developing economies, where infrastructure needs are greater. However, the distributional impact differs, with inequality remaining largely unchanged in advanced economies but showing an increasing trend in developing ones. These findings underscore the importance of complementary policies that ensure equitable access to the benefits of public investment, particularly in economies where disparities in infrastructure and capital access remain significant.

Figure 12 presents the impulse response functions (IRFs) illustrating the effects of transfer payments on real GDP per capita growth and income inequality, comparing advanced and developing economies. The top-left and bottom-left panels depict the response of real GDP per capita growth to an increase in transfers for advanced and developing economies, respectively. In advanced economies, the response is negative throughout the horizon, indicating that an increase in transfers may impose fiscal constraints or reduce labor market incentives, thereby dampening economic growth. This persistent negative response suggests that redistribution through transfers may come at the cost of efficiency losses, potentially due to distortions in labor supply or capital allocation. It is acknowledged that the negative growth response to transfer shocks may partly reflect the counter-cyclical nature of fiscal policy. Since transfers often rise as automatic stabilizers during economic downturns, the observed association may represent this endogenous response rather than a direct efficiency loss. In developing economies, however, the response is initially positive, implying that transfers may support economic activity by stimulating consumption and alleviating liquidity constraints for lower-income households. Over time, this positive effect moderates but remains above zero, suggesting that, in contrast to advanced economies, transfers in developing economies may have a more supportive role in fostering economic growth, possibly due to the higher marginal propensity to consume among recipients.

The top-right and bottom-right panels illustrate the response of income inequality, measured by the Gini coefficient, to changes in transfer payments. In advanced economies, the response is initially positive, indicating that transfers may not immediately lead to a reduction in inequality and, in some cases, could even widen disparities. This could be due to inefficiencies in redistribution mechanisms or the concentration of benefits among specific demographic groups. However, over time, the response declines toward zero, suggesting that while transfers may not have an immediate equalizing effect, their long-term impact on inequality is neutral or mildly progressive, depending on how well they are targeted. In developing economies, the response also begins with a positive trajectory, indicating that transfers may initially contribute to widening income dis-

parities rather than reducing them. This pattern may reflect challenges such as leakages in distribution, administrative inefficiencies, or unequal access to social programs that prevent lower-income groups from fully benefiting from transfer schemes. Over time, the response stabilizes, implying that the redistributive impact of transfers in developing economies depends on the effectiveness of social protection mechanisms and complementary policies that enhance equitable access to resources.

The contrasting patterns between advanced and developing economies suggest that the effectiveness of transfer payments in reducing inequality and promoting growth is highly context-dependent. While transfers in advanced economies may face constraints related to fiscal sustainability and labor market distortions, they appear to have a more neutral long-term effect on inequality. In developing economies, where transfers may initially contribute to inequality, their longer-term impact depends on structural factors such as program design, targeting efficiency, and the capacity of social institutions to deliver equitable redistribution. These findings highlight the importance of designing well-calibrated transfer policies that balance redistributive goals with economic efficiency.

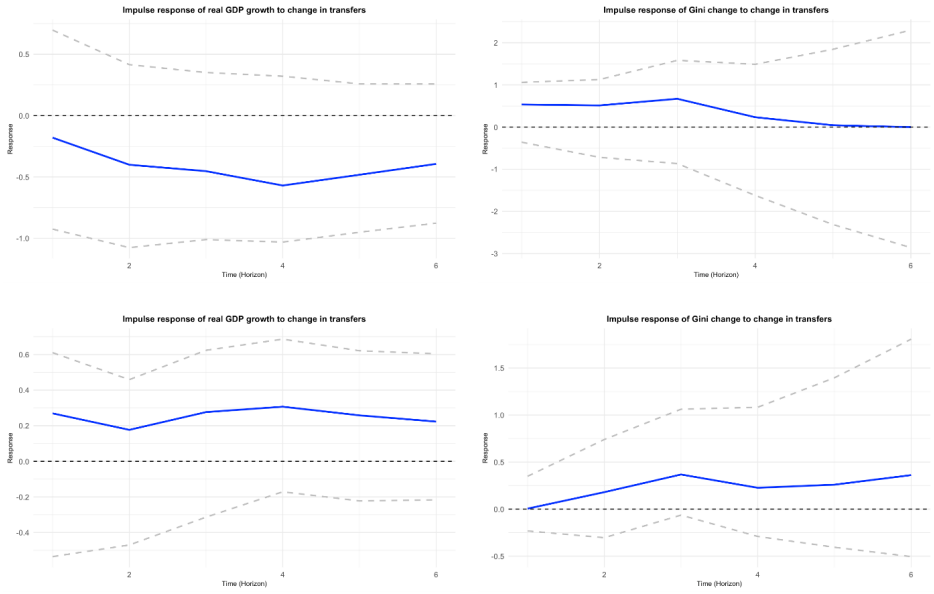

Figure 12: Four-Variable Panel Vector Autoregression for Changes in Expense and Transfers.Real GDP growth = real GDP per capita growth rate, Gini change = change in Gini before taxation and transfers. Top Row: Advanced countries, Bottom Row: Developing countries.

	health_change	**edu_change**	**cap_change**	**transfer_change**
GDP growth	-0.7249	-0.2683	4.7585	-0.3590
Gini_gross	0.2097	-0.0947	-2.6311	2.0310

Table 3: Estimates of Cumulative Impulse Responses over the Next 6 Years(Whole sample, all responses included). health_change = change in public health spending; edu_change = change in public education spending; cap_change = change in gross fixed capital formation; transfer_change = change in social subsidies and transfers; GDP growth = real GDP per capita growth; Gini_gross = Gini before taxation and transfers.

4.3. COMPARISONS

This section compares the PVAR results obtained from the whole sample with those from the advanced and developing economies.[2]

Table 3 and 4 summarize the cumulative impulse responses of government spending components on economic growth and income inequality over a six-year horizon for the entire sample. Table 3 includes all estimated responses, while Table 4 presents a more conservative estimation by summing only statistically significant responses. The results indicate distinct effects of different fiscal policy measures on real GDP per capita growth and pre-tax income inequality (Gini gross). Public investment in infrastructure, measured as gross fixed capital formation, exhibits the strongest positive impact on economic growth, suggesting that capital investments play a crucial role in fostering long-term economic expansion. Conversely, public health and education expenditures are associated with negative cumulative responses for GDP growth, implying potential short-term inefficiencies or crowding-out effects on private sector activity. Transfer payments, which include social subsidies, have a mixed impact, showing a negative effect on economic growth but a strong positive association with rising inequality. These findings highlight the potential trade-offs between growth-enhancing investments and redistributive fiscal policies.

Table 5 and 6 present the cumulative impulse responses separately for developing and advanced economies, allowing for a comparative analysis of fiscal

[2]The figures presented in the tables within this section correspond to one of the following interpretations: (1) The percentage change in GDP over the next six years in response to a one-percentage-point increase in the share of a specific expenditure item relative to GDP. (2) The extent to which Gini_gross (measured on a 0–100 scale) changes over the next six years following a one-percentage-point increase in the share of a given expenditure item in GDP.

	health_change	**edu_change**	**cap_change**	**transfer_change**
GDP growth	-0.7749	-0.5332	4.7585	0
Gini_gross	0	0	0	0

Table 4: Estimates of Cumulative Impulse Responses over the Next 6 Years(Whole sample, significant responses only). health_change = change in public health spending; edu_change = change in public education spending; cap_change = change in gross fixed capital formation; transfer_change = change in social subsidies and transfers; GDP growth = real GDP per capita growth; Gini_gross = Gini before taxation and transfers.

policy effectiveness across different economic contexts. Table 5 includes all estimated responses, while Table 6 considers only statistically significant values, providing a refined interpretation of the results. In developing economies, public investment in infrastructure demonstrates a stronger positive effect on economic growth than in advanced economies, reinforcing the argument that capital formation is a key driver of economic expansion in lower-income countries. In contrast, health and education expenditures exhibit a less negative impact on GDP growth in developing economies compared to advanced economies, suggesting that the marginal returns to these investments may be higher where existing human capital deficits are more pronounced. The impact of transfers diverges between the two groups, with developing economies experiencing a slight positive effect on GDP growth, whereas advanced economies exhibit a negative response, potentially due to distortions in labor market incentives or fiscal sustainability concerns.

Regarding income inequality, the results indicate that fiscal policy effects are highly context-dependent. In advanced economies, public education expenditure is associated with a decline in income inequality, highlighting its role in fostering social mobility. However, in developing economies, education spending initially contributes to rising inequality, likely due to disparities in access to quality education. Similarly, transfer payments show a positive response in both groups, implying that redistributive policies may not always be effective in immediately reducing inequality and, in some cases, could exacerbate disparities if not well-targeted. These findings suggest that while government spending can influence both growth and inequality, the effectiveness of specific fiscal measures depends on institutional quality, labor market conditions, and the broader economic environment.

Gini_gross	**health_change**	**edu_change**	**cap_change**	**transfer_change**
Developing	0.1327	0.1347	0.2803	1.4001
Advanced	0.8234	-1.4181	-0.1410	1.9983
GDP growth	**health_change**	**edu_change**	**cap_change**	**transfer_change**
Developing	-0.3741	-0.2274	5.5259	1.5114
Advanced	-0.9751	-0.9984	4.3889	-2.4783

Table 5: Estimates of Cumulative Impulse Responses over the Next 6 Years (All responses included). health_change = change in public health spending; edu_change = change in public education spending; cap_change = change in gross fixed capital formation; transfer_change = change in social subsidies and transfers; GDP growth = real GDP per capita growth; Gini_gross = Gini before taxation and transfers.

Taken together, these results underscore the importance of tailoring fiscal policy to a country's level of development. Developing economies benefit more from infrastructure investments that directly enhance productivity and economic expansion, while advanced economies may need to balance social spending and economic efficiency to avoid potential negative effects on growth. The findings also emphasize the need for complementary structural policies to maximize the redistributive benefits of social expenditures and ensure equitable access to education and healthcare in developing economies.

5. CONCLUSION

This study examines the effects of government expenditure on inclusive growth, focusing on both real GDP per capita growth and income inequality. By employing a Panel Vector Autoregression (PVAR) model on a dataset covering 91 countries, the analysis provides empirical insights into how different components of public spending—education, healthcare, social transfers, and public gross fixed capital formation—impact economic expansion and income distribution. The results reveal substantial differences between advanced and developing economies, highlighting the importance of a context-specific approach to fiscal policy.

In advanced economies, public spending on education and healthcare exhibits a negative short-term impact on economic growth, suggesting that such expenditures may introduce fiscal inefficiencies or crowd out private consumption and investment. Transfer payments also exert a slight contractionary effect

Gini_gross	health_change	edu_change	cap_change	transfer_change
Developing	0	0	0	0
Advanced	0.0767	0	0	0

GDP growth	health_change	edu_change	cap_change	transfer_change
Developing	-0.3409	-0.1426	5.5259	0
Advanced	-0.8914	-0.9984	4.3889	0

Table 6: Estimates of Cumulative Impulse Responses over the Next 6 Years (Significant responses only). health_change = change in public health spending; edu_change = change in public education spending; cap_change = change in gross fixed capital formation; transfer_change = change in social subsidies and transfers; GDP growth = real GDP per capita growth; Gini_gross = Gini before taxation and transfers.

on growth, though to a lesser extent. Among the different types of government spending, only public investment in infrastructure contributes positively to GDP growth, reinforcing the view that capital formation remains a key driver of economic expansion. In terms of income distribution, education spending emerges as the most effective tool in reducing inequality, reflecting its role in enhancing social mobility. However, healthcare spending appears to contribute to widening inequality over time, suggesting that disparities in access to medical services or inefficiencies in healthcare provision may offset its intended redistributive effects.

The findings for developing economies present a contrasting pattern. Public investment in infrastructure plays a significantly larger role in driving economic growth compared to advanced economies, with both a stronger initial impact and more persistent long-term effects. This suggests that addressing infrastructure gaps remains a crucial priority for stimulating economic activity in these economies. Similar to advanced economies, healthcare and education expenditures reduce short-term GDP growth, but the magnitude of the decline is smaller, indicating that these expenditures may still contribute positively to productivity over the long run. However, their effect on income inequality remains ambiguous, as increased spending does not necessarily lead to a reduction in disparities. Social transfers, while slightly supportive of economic growth, tend to exacerbate income inequality, suggesting that redistribution mechanisms may be inefficient or poorly targeted.

These findings underscore several important policy implications. In advanced economies, while social spending remains essential for economic stability and welfare, its short-term contractionary effects on growth indicate the need for greater efficiency and targeting. Policymakers should ensure that public investments in education and healthcare yield long-term productivity gains rather than serving merely as expanded fiscal commitments. In developing economies, improving access to education and healthcare is a crucial challenge. Without addressing structural inequalities in service delivery, increased social spending may fail to achieve its redistributive goals. Strengthening governance, enhancing public sector efficiency, and ensuring equitable access to services are key measures that can amplify the effectiveness of social expenditures in reducing inequality.

The role of infrastructure investment also differs across economic contexts. The results confirm that public capital formation is the most effective tool for stimulating economic growth, particularly in developing economies, where infrastructure deficits are more pronounced. However, infrastructure spending alone does not significantly reduce income inequality, underscoring the need for complementary policies that ensure equitable access to economic opportunities.

The findings also highlight the need for optimizing the design of transfer programs. In advanced economies, transfers appear to have a neutral to slightly negative effect on both growth and inequality, raising concerns about their fiscal sustainability. To enhance their effectiveness, governments should complement transfer programs with active labor market policies, progressive taxation, and targeted assistance for vulnerable groups. In developing economies, where transfer payments are associated with worsening inequality, a more effective targeting mechanism is essential. Addressing inefficiencies in redistribution, minimizing leakages in benefit allocation, and strengthening administrative capacity are necessary to ensure that transfers contribute meaningfully to reducing disparities.

A long-term perspective on fiscal policy is essential in balancing economic growth and redistribution objectives. The trade-offs between short-term efficiency and long-term equity highlight the need for fiscal strategies that are both sustainable and inclusive. Policymakers must ensure that public investments in education and healthcare lead to sustained productivity gains, even if they do not immediately translate into GDP growth. Similarly, social spending and redistribution policies must be carefully designed to minimize negative labor market distortions while enhancing income security. The alignment of fiscal priorities with national development goals is crucial to maximizing the long-term benefits of public investment.

Finally, several limitations of this study point to avenues for future research.

First, the parsimonious four-variable PVAR model excludes macroeconomic state variables such as inflation and public debt dynamics to maintain degrees of freedom. Future studies could incorporate these factors to examine how fiscal space and price stability mediate the effectiveness of government spending. Second, exploring the heterogeneity of fiscal effects based on other country characteristics—such as institutional quality or trade openness—beyond the advanced/developing dichotomy would provide deeper policy insights.

This study contributes to the ongoing debate on fiscal policy and inclusive growth by providing empirical evidence on the differentiated effects of public spending across economic contexts. The results demonstrate that not all forms of government expenditure contribute equally to economic expansion and income redistribution. Infrastructure investment remains the most effective driver of economic growth, while social spending requires greater efficiency and improved targeting to achieve meaningful redistributive outcomes.

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