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FISCAL MULTIPLIER AND THE ROLE OF INCOME AND WEALTH INEQUALITY

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ABSTRACT

There is a lack of research concerning the influence of economic inequality on the size of fiscal multipliers. To address this, we apply a VAR methodological framework to assess the magnitude of fiscal multipliers for 47 economies, using a new quarterly dataset spanning the period from 1995 to 2021. We then gauge the impact of the battery of income and wealth inequality measures on the size of government consumption multipliers. To ensure the robustness of the results, a yearly panel data sample was also tested. The key findings of our empirical exercise can be outlined as follows. First, the estimated government consumption multipliers exhibit a generally positive trajectory throughout the forecast horizon in approximately 66% of the countries analysed, while in 19% of the sample, they remain largely negative, and in the remaining 15% of cases, they display a mixed pattern, being positive only during certain periods. Second, in 53% of the countries examined, the fiscal multiplier exceeds the threshold of one at least once during the forecast period, suggesting a greater output effect of fiscal expansion in these countries. Third, the more pronounced the income and wealth inequality in a country, the higher the value of the fiscal multiplier. This research outcome supports the proposition that higher economic inequality, especially income inequality, will generate greater government spending effects.

1. INTRODUCTION

Ensuring economic growth and macroeconomic stability relies on an effective mix of economic policy. In the past 15 years, the global economy has faced a series of economic shocks, initially marked by the most severe recessionary period since the Great Depression. In specific countries, especially within the Eurozone, this evolved into a prolonged period of deflationary-debt stagnation. Despite the application of unprecedented unconventional measures by central banks, fiscal policy did not provide a synchronous response and remained overshadowed by monetary policy until the outbreak of the COVID-19 pandemic. Subsequently, the pandemic and post-pandemic era, with massive but inadequate monetary operations, eventually shifted the focus toward fiscal measures. Although this led to a significantly smaller decline in economic activity than anticipated and a quick economic upturn, the associated impact of the war-related energy crisis soon brought about inflationary pressures and subsequent increases in policy rates by central banks, even though a bit delayed. The last 15 years have thus highlighted the unpredictability of business cycle dynamics, with new aspects of the role of economic policy yet to be discovered. The entire process of operation and the effectiveness of economic policy tools under different circumstances have not been fully elucidated. One of these aspects pertains to the impact of various determinants on the magnitude of fiscal multipliers. Consequently,

the misuse of economic policy tools, combined with the effects of political cycles, leads to inefficiencies that can result in the developmental lag of individual economies.

The aforementioned macroeconomic conditions have sparked a debate in the re-evaluation of the role of fiscal policy and fiscal stimuli in ensuring economic stability and growth. Consequently, with re-estimation of the size of fiscal multipliers, explaining the variability of fiscal multiplier magnitudes has become a crucial research question, with both cyclical (Auerbach & Gorodnichenko, 2011) and structural determinants (Ilzetzki et al., 2013; Koh, 2017) being significant. The impact of income and wealth inequality, particularly in light of current social tensions stemming from the perceived unequal distribution of income and wealth among a significant portion of the population in many countries (Saez & Zucman, 2020; Moll et al., 2022), is an area that remains underexplored. More precisely, the topic was empirically addressed only in Brinca et al. (2016), namely regarding wealth inequality, partially in Brinca et al. (2021), and theoretically in Auerbach et al. (2021). The role of income and wealth distribution in shaping the size of the fiscal multiplier therefore remains largely unexplained and empirically untested. To address this specific research gap, this study investigates the hypothesis that higher levels of economic inequality are associated with increased fiscal multiplier values. Specifically, we aim to determine whether higher income and wealth disparities coincide with larger fiscal multipliers.

Thus, we apply the vector autoregression model to estimate the magnitude of fiscal multipliers for 47 countries based on a new quarterly data sample covering the period from 1995 to 2021 and then regress the obtained sizes of fiscal multipliers against the various income and wealth inequality measures as well as against different income concentration proxies. In addition to this, a yearly panel data sample for the same 47 countries was constructed and used in panel vector autoregression analysis to check for the robustness of the results. To the best of our knowledge, a comprehensive empirical exercise of the relationship between fiscal multipliers and economic inequality has not been conducted before, especially not on such a scale. This paper thus broadens the scope of structural characteristics which influence the magnitude of fiscal multipliers to income and wealth inequality and consequently extends the perspective of understanding the heterogeneity of varying multiplier values across countries. Our results identify a significant relationship between greater economic inequality and higher government expenditures multipliers which is especially valuable for fiscal policymakers in crafting effective fiscal programmes in accordance with the underlying structure of income and wealth distribution in their respective countries.

The rest of this study is structured in the following manner. Chapter 2 reviews the relevant empirical literature, while Chapters 3 and 4 present the methodology and data. The results are stated in Chapter 5, starting with the estimated values of the government consumption multiplier for individual economies, followed by the results of the impact of income inequality, income distribution, and wealth inequality on the size of the fiscal multiplier. Chapter 6 provides the conclusions.

2. EMPIRICAL LITERATURE REVIEW

In this chapter, we provide an overview of key findings from relevant empirical literature, specifically focusing on the examination of how country-specific characteristics impact the size of fiscal multipliers. Notably, Perotti (2002) and Blanchard and Perotti (1999) laid the theoretical and methodological foundations for studying fiscal policy and its effects on GDP and other macroeconomic variables. They employed the vector autoregression methodology. Blanchard and Perotti (1999) observed positive government spending multipliers and negative tax multipliers in the United States while Perotti (2002) highlighted the diminishing effect of fiscal stimuli in the years following 1980 in five developed countries. Subsequent studies, such as Giordano et al. (2007) and Burriel et al. (2019), further support the significant impact of discretionary fiscal policy on output in developed economies.

Further research revealed the importance of distinguishing between different phases of the business cycle. Auerbach and Gorodnichenko (2010, 2011, 2014) conducted separate studies for the United States, OECD countries, and Japan, finding that multiplier values differed between recession and expansion phases, with higher values during recessions. Batini et al., (2012) also confirmed the notion of larger spending multipliers during recessions. On the contrary, Ramey and Zubairy's (2014) findings for the United States did not show a statistically significant difference in multiplier values based on the business cycle phase.

Additionally, some researchers demonstrated that a country's structural characteristics play a role in the dynamic of government spending's impact on output. For example, Ilzetzki et al. (2013) discovered that fiscal stimuli have a greater effect in more developed countries whereas fiscal multipliers are smaller in more open economies compared to closed ones. Their findings also suggest that in countries with elevated levels of public debt, fiscal multipliers tend to be lower and, in some cases, may even turn negative. Silva et al. (2013) reached similar conclusions for a panel of Euro Area countries over a year. Hory (2016), studying 48 emerging and advanced economies, found considerably smaller spending multipliers in emerging market economies compared to advanced ones. Furthermore, the analysis revealed that spending multipliers exhibited a negative relationship with public debt levels, imports, and savings, whereas they were positively associated with unemployment rates and the level of financial development. Koh (2017) reaffirmed these findings and suggested that fiscal multipliers tend to be larger during periods of low public debt, financial crises, economic downturns, and in more developed countries. Contrary to Ilzetzki et al. (2013), Koh (2017) reported that fiscal multipliers are not necessarily smaller in countries with high trade and financial openness. He further highlighted that the magnitude of fiscal multipliers is not inherently determined by the specific exchange-rate regime in place. In addition to this, Borsi (2018) estimated larger fiscal multipliers during credit crunches.

The global financial crisis has limited the scope of countercyclical monetary policy. Auerbach and Gorodnichenko (2017) observed that constraints on monetary policy have coincided with an increased focus on activist fiscal policy. This shift encompasses both a necessity and increasing evidence of the effectiveness of discretionary measures in addressing recessions, replacing the previous reliance on automatic stabilizers.

The economic literature is gradually establishing common ground on the influence of specific determinants on the magnitude of the fiscal multiplier. However, the relationship between the fiscal multiplier's size and income or wealth inequality has received less scrutiny, despite some recent debate in the literature. Nevertheless, there is still no consensus on the results and theoretical foundations.

Brinca et al. (2016) first provided comprehensive insights into the impact of wealth inequality on the size of the fiscal multiplier. Using a VAR approach, they documented a correlation between the size of fiscal multipliers and wealth inequality, as measured by the wealth Gini coefficient. Despite variations in fiscal multiplier estimates and some associated uncertainty, their results suggest a positive relationship between the wealth Gini coefficient and the size of fiscal multipliers, with the wealth Gini coefficient explaining approximately 20% of the variation in the magnitude of fiscal multipliers. This statistical phenomenon can be explained through three channels (Brinca et al., 2016). As the number of wealthier households increases, first, the number of households with liquidity constraints decreases, leading to a lower marginal propensity to consume of these households. Second, the precautionary motive for savings among relatively poorer economic agents who are not liquidityconstrained decreases. Third, a decrease in real interest rates leads to a subsequent reduction in the present value of fiscal incentives. Subsequently, Brinca et al. (2021) examined a Eurozone fiscal consolidation episode with a focus on the role of income inequality. Their research revealed strong empirical evidence for a relationship between income inequality and the impact of fiscal consolidation. Specifically, their findings indicated that greater income inequality was linked to a more pronounced economic downturn resulting from the implementation of austerity measures.

On the contrary, Auerbach et al. (2021) developed a theoretical model introducing the idea that higher income inequality leads to smaller fiscal multipliers. This argument is grounded in the constrained demand of poorer households and the simultaneously low spending propensities of wealthier households. Specifically, the multiplier mechanism in each round of spending generates a smaller increase in income among the poorer portion of the population, leading to reduced spending in subsequent rounds and resulting in a smaller overall multiplier effect. Therefore, the more unequal the society, the more pronounced this effect becomes. This supposition was scrutinized further by considering the possibility of easy access to credit by households. Auerbach et al. (2021) supported their model's implications by referencing the findings of Miranda-Pinto et al. (2020), which is a preliminary version of the eventual research paper by Miranda-Pinto et al. (2023). The latter research takes a somewhat different perspective, focusing on the impact of government spending

on credit markets with income inequality as the determinant of the interest rate response to fiscal stimulus where higher income inequality implies a lower interest rate response. However, Auerbach et al. (2021) argue that higher income inequality results in a smaller fiscal multiplier effect. They suggest that when fiscal stimuli occur, a larger share of the income ends up with wealthier households which tend to have lower spending propensities compared to poorer households. In contrast, Miranda-Pinto et al. (2023) propose a model in which, in the case of higher income inequality, the majority of the income from a fiscal stimulus shock is channelled to poorer households with a smaller propensity to spend. Strangely, their own empirical findings somewhat contradict this theory. Therefore, they suggest the notion that many middle to low-income households may use additional income from fiscal stimulus to reduce their debt obligations. Consequently, government spending may ease credit conditions more in countries with higher inequality, potentially leading to larger fiscal multipliers in cases of higher inequality.

The relationship between economic inequality and fiscal policy has been explored by various authors, although not always in the specific context addressed in this paper. For instance, Heimberger (2020) investigated the connection between fiscal consolidation and income inequality, offering empirical evidence to support the idea that fiscal austerity exacerbates income inequality. Following a fiscal adjustment phase, the Gini coefficient of disposable income increases by 0.4 percentage points in the short run and by 0.6 percentage points in the medium run. This effect is more pronounced with larger and longer fiscal consolidation efforts, particularly when austerity relies more on spending cuts rather than tax hikes, and when fiscal adjustment begins during times of crisis and low economic growth. Similarly, Furceri et al. (2022) examined the impact of fiscal policy actions on income inequality and found that a decrease in government spending by 1% of GDP leads to a 1-percentage-point increase in income inequality.

As evidenced by the review of empirical literature, there has been a gradual consensus on the role of conventional structural (e.g., Combes et al., 2016; Woldu & Szakálné Kanó, 2023) and cyclical (e.g., Barnichon et al., 2022; Berge et al., 2021) determinants in shaping the size of fiscal multipliers. However, the role of economic inequality as one of the important structural characteristics of countries has been overlooked in this exact context in empirical literature so far. This phenomenon has been directly empirically addressed only for wealth inequality in Brinca et al. (2016) and indirectly, based on budget consolidation episodes, for income inequality in Brinca et al. (2021). Some additional theoretical reasoning but without empirical testing was also provided by Auerbach et al. (2021). Our paper addresses this particular literature void in three key ways: firstly, by systematically employing two approaches – time series structural VAR and panel VAR – to evaluate the connection between economic inequality and the values of fiscal multipliers; secondly, by testing the dependence of multiplier values on five different income distribution measures, expanding upon the work of Brinca et al. (2016) who focused solely on wealth inequality; and thirdly, by

incorporating the most extensive data sample possible to obtain a sufficient number of estimated multiplier values for different countries.

3. METHODOLOGY

To gauge the impact of government spending multipliers, we employed the analytical approach outlined by Blanchard and Perotti (1999). This methodology was further extended by Perotti (2002) and tailored for the examination of fiscal policy measures. Following minor adjustments, we applied the specific vector autoregression model to calculate government consumption multipliers. Initially, this was performed on individual time series data and subsequently on a dataset comprising panel data.

Consequently, we adopted the methodology to suit our specific statistical sample and formulated a three-variable system. The identification of this system involved incorporating constraints grounded in economic theory where these constraints are contingent upon distinct observed economic phenomena. Structural shocks can be introduced, and their resulting effects can be analysed using the impulse response function.

Consider a model that includes three key variables: government consumption (g_t), GDP (y_t), and the GDP deflator (p_t), all in logarithmic form. The set of endogenous variables is represented as X_t, while the vector of residuals in its reduced form is denoted as U_t. This leads to a reduced-form VAR framework, which can be formulated as follows:

$$X_t = A(L)X_{t-1} + U_t \tag{1}$$

Here, the vector of endogenous variables is defined as $X_t = [g_t, y_t, p_t]$, while the residuals in reduced form are represented by $U_t = \left[u_t^g, u_t^y, u_t^p\right]$. The operator L denotes the lag operator and term $A(L)$ represents a polynomial of the appropriate degree. The residual component associated with g_t, namely u_t^g, is understood as a shock.

Based on the AB model (Lütkepohl, 2005), we wrote a system of equations in the matrix form represented by the following equation:

$$AU_t = BE_t \tag{2}$$

where U_t is the vector of the VAR residuals and $E_t = \left[e_t^g, e_t^y, e_t^p\right]'$ is a vector of structural shocks or innovations. We can introduce the matrix A and matrix B. Equation (2) can be then expressed in the following form:

$$\begin{bmatrix} 1 & 0 & 0 \\ -\alpha_g^y & 1 & 0 \\ -\alpha_g^p & -\alpha_y^p & 1 \end{bmatrix} \begin{bmatrix} u_t^g \\ u_t^y \\ u_t^p \end{bmatrix} = \begin{bmatrix} \beta_g^g & 0 & 0 \\ 0 & \beta_y^y & 0 \\ 0 & 0 & \beta_p^p \end{bmatrix} \begin{bmatrix} e_t^g \\ e_t^y \\ e_t^p \end{bmatrix} \tag{3}$$

To identify the system, a total of $\left(2k^2 - \frac{1}{2}k[k+1]\right)$ restrictions are required. Here, k denotes the count of endogenous variables, which, in this scenario, equals three. The arrangement of variables defines their causal relationships. Specifically, changes in government consumption lead to immediate effects on both real GDP and the GDP deflator. However, government consumption itself does not respond simultaneously to fluctuations in output or the GDP deflator within the same period. Additionally, GDP deflator has no direct contemporaneous impact on GDP. This system achieves exact identification by satisfying an appropriate set of constraints – in our case 12 restrictions.

Using results from the SVAR analysis, the structural impulse response function captures the dynamic behaviour and strength of individual variables' responses to government consumption shocks. For a vector of three endogenous variables, which can be presented as $X_t = [x_{1t}, x_{2t}, x_{3t}]$,where t represents time and x_{1t}, x_{2t}, and x_{3t} are the variables of government consumption, GDP, and GDP deflator, respectively, impulse response function for variable x_{it} (i denotes the variable index) to a shock in variable x_{jt} (j denotes the variable index) at a time t can be calculated as:

$$IRF_{ij}(h) = \sum_{k=0}^{h} A_{ik}^{(j)} \tag{4}$$

where $IRF_{ij}(h)$ is the response of variable x_{it} to a shock in variable x_{jt} after h periods. $A_{ik}$is the element of the $i-th$ row and $k-th$ column of the matrix A_j , which represents the coefficient matrix for the variable x_j in the VAR model. The impulse response function introduces a shock to a specific variable, scaled to correspond to one standard deviation of that variable. The outcomes are presented alongside a 90% interval of statistical significance. To facilitate comparability, these results underwent standardization, effectively translating the shock scale from one standard deviation to a proportion equivalent to 1% of the GDP. The variable responses are then quantified as multipliers. Employing this refined methodological approach, we proceeded to ascertain distinct government consumption multipliers for each country.

Subsequently, to evaluate the government consumption multiplier using a panel dataset, we adhered to the previously mentioned methodological framework outlined by Blanchard and Perotti (1999) while incorporating panel VAR model refinements as outlined in Ilzetzki et al. (2013) and Koh (2017). Similar to the time series model, the panel VAR model includes three key macroeconomic variables: government consumption ($g_{i,t}$), GDP (yi,t), and GDP deflator (pi,t). The vector of endogenous variables is denoted as $X_{i,t}$, while the vector of residuals is represented by $U_{i,t}$. The reduced form of the panel VAR model is expressed in Equation (5):

$$X_{i,t} = C(K)X_{i,t-1} + U_{i,t} \tag{5}$$

In this model, $X_{i,t} = \left[g_{i,t}, y_{i,t}, p_{i,t}\right]'$ represents the vector of endogenous variables. Similarly, $U_{i,t} = \left[u^g_{i,t}, u^y_{i,t}, u^p_{i,t}\right]'$ denotes the vector of structural shocks. The operator K represents the lag structure, while $C(K)$ is the polynomial associated with the corresponding degrees of the lag structure.

To identify the shocks related to government spending, we employ the Cholesky decomposition technique, where the specific ordering of the variables plays a pivotal role in the analysis. The results derived from this method are based on the system of equations outlined below:

$$AX_{i,t} = \sum_{k=1}^{K} C_k X_{i,t-k} + BE_{i,t} \tag{6}$$

In this model, $X_{i,t}$ represents the vector of endogenous variables for country i and year t. The matrix C_k captures both the own and cross effects for the kth lag of the incorporated variables, while matrix B is diagonal. Consequently, $E_{i,t}$ signifies orthogonal shocks to government consumption (Ilzetzki et al., 2013). The variables in our model are ordered as follows: government consumption, GDP, and GDP deflator. For estimation purposes, the panel vector autoregression package for Stata provided by Abrigo and Love (2016) was utilized. The technique of the generalized method of moments (GMM) was adopted for the estimation process.

The arrangement of the variables within the panel VAR analysis delineates their causal interconnections, mirroring the arrangement in the earlier discussed time series VAR model. Real GDP displays an immediate response to fluctuations in government consumption whereas conversely, government consumption does not exhibit a concurrent reaction to output changes within the identical timeframe. Simultaneously, GDP deflator reacts contemporaneously to shifts in government consumption and GDP. Nonetheless, within the same period, it exerts no influence on either of them.

To examine the relationships between the size of government consumption multipliers and various country characteristics, we utilized a panel VAR approach combined with regression analysis, which was carried out using the ordinary least squares estimation method, as detailed below:

$$FM_i = \beta_0 + \beta_1 X_i + e_i \tag{7}$$

In this equation, FM_i denotes the government consumption multiplier for country i, β_0 is the constant term, β_1 represents the slope coefficient in the regression, X_i is a characteristic unique to country i, and e_i refers to the residuals. We analysed seven country-specific determinants that influence the estimated government consumption multipliers: income Gini coefficient, wealth Gini coefficient measured as average and median value, the income share of the lower 10% group, the income share of the lower 20% group, the income share of top 10% group, and income share of top 20% group.

As a result, a set of individual regression analyses was conducted for each of the seven country-specific determinants.

4. DATA

In our study, the VAR model includes real government consumption, real GDP, and the price level in form of GDP deflator. These variables are measured on a quarterly basis and span from 1995 to 2021 across 47 economies. Included are all countries, for which quarterly data were available for all three included variables. Data for government consumption, GDP, and price levels are collected from the International Monetary Fund, specifically from the International Financial Statistics database (IMF, 2023), in the form of constant national currency units and GDP deflator as a proxy for price level. Each of the three variables is presented in logarithmic form. Following the calculation of government consumption multipliers for each country, we then apply the panel VAR model to the panel data, which is organized on an annual basis. Yearly data for government consumption, GDP, and price level in form of GDP deflator for 47 countries were obtained from the World Bank (2023) database and cover the timespan from 1995 to 2021. For further explanation of the data, see Table 2 in the Appendix.

Additional variables were gathered to explore the influence of country-specific determinants. Thus, we employed the income Gini index as a measure of income inequality (World Bank, 2023), and top 10%, top 20%, lower 10%, and lower 20% income shares as income distribution measures (World Bank, 2023). Regarding wealth inequality, we use data from Credit Suisse Bank (2023). For each country, the average value of a particular determinant is calculated using the available data. Moreover, the median value is calculated for the wealth Gini as well.

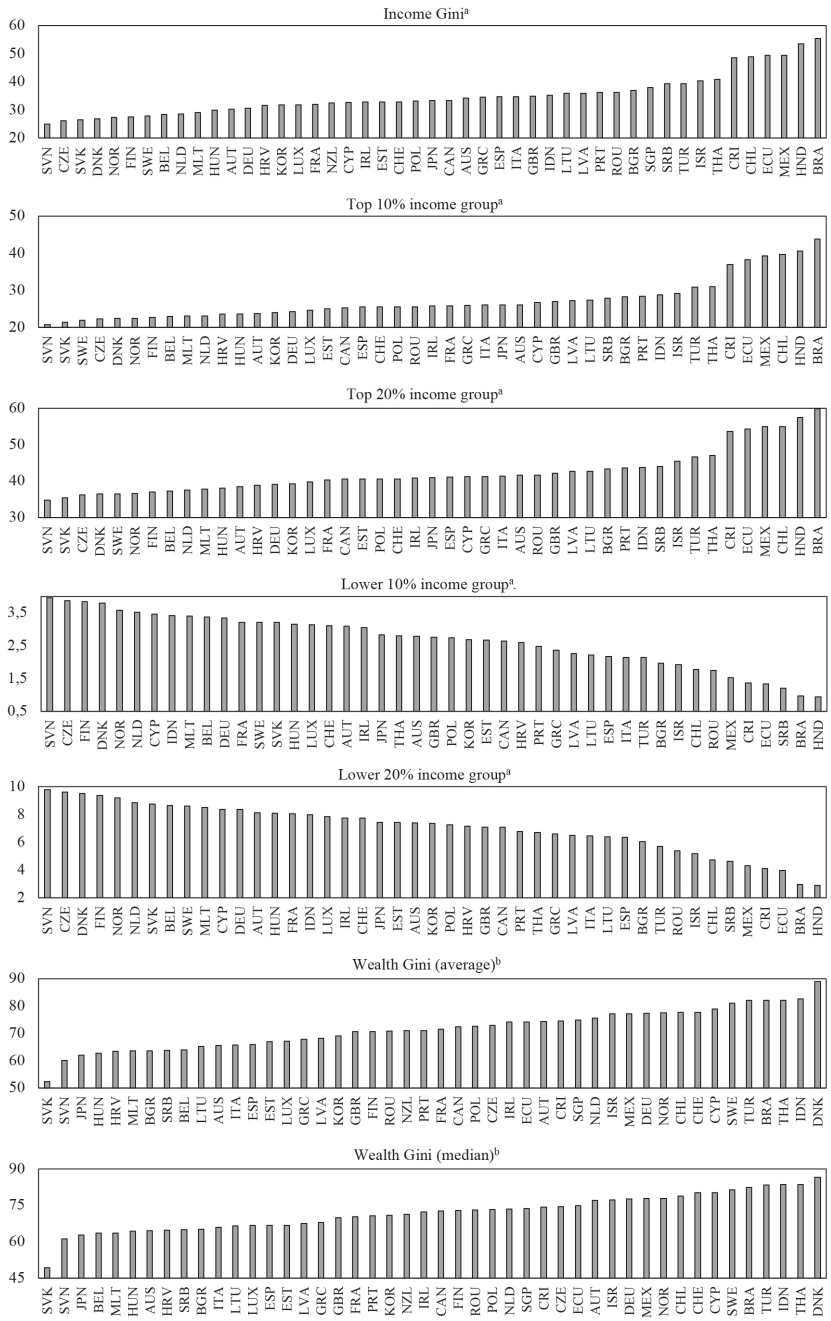
In establishing the relative thresholds for individual income and wealth distribution determinants, this study defines them based on the specific nature of our data sample. To ensure a sufficient quantity of estimates in both groups, economies are ranked according to the median value of a particular determinant. If a country's income Gini index exceeds 33.26, it is classified as having a less equitable income distribution. By measures of the top 10% income group and top 20% income group, countries with values more than 25.74 and 41.03, respectively, are considered countries with a larger income stream than the top earners. Conversely, by measures of the lower 10% income group and lower 20% income group, countries with values more than 2.75 and 7.35, respectively, are considered as countries with a larger income stream to the low earners. To rank countries with regard to wealth inequality, we classify countries with more or less equally distributed wealth. Specifically, the median value of the average wealth Gini is used as the threshold for classification. Likewise, countries are divided into two groups based on the median value of the median wealth Gini, which is 72.43.

Data in Table 1 presents a comprehensive overview of income and wealth distribution in 47 countries and indicates that our sample countries differ according

to income and wealth distribution measures. Income Gini coefficients reflect income inequality, with higher values indicating greater inequality. Brazil stands out with a remarkably high-income Gini of 55.48, indicating significant income disparities. In contrast, countries like Denmark and Slovenia exhibit lower income Gini coefficients, reflecting relatively more equal income distribution. Income share figures illustrate the distribution of income among different segments of the population. Chile and Mexico show substantial income concentration in the top 10% while Denmark and Norway exhibit more equitable income distribution. The income share data underscores varying degrees of income distribution across the surveyed countries.

Wealth Gini coefficients measure wealth inequality, with higher values indicating greater wealth disparities. Denmark, Thailand, and Indonesia display the highest wealth inequality, with Gini coefficients above 80, suggesting significant wealth concentration. Slovenia and Slovakia have comparatively lower wealth Gini coefficients, indicating a more balanced wealth distribution. Overall, the data highlights substantial disparities in both income and wealth distribution across countries. It is important to note that these figures represent average values for specific countries and may change over time due to various economic and policy factors. Nevertheless, variability over time is rather insignificant.

Table 1. Basic statistics of income and wealth distribution



Note: Data are from World Bank (2023)a and Credit Suisse (2023)b.

5. RESULTS

Table 2 depicts estimates of government spending multiplier for sample countries for 20 quarters, ranging from the impact period to the 20th quarter. A multiplier greater than 1 indicates that an increase in government consumption leads to a proportionally larger increase in GDP while a multiplier less than 1 suggests a smaller impact factoring in crowding out of private investment.

The values of estimated multipliers vary significantly across countries, thus emphasizing the heterogeneous nature of the multiplicative effect. Some countries have values of multipliers well above 1 (e.g., Brazil, Chile, Portugal), indicating that increases in government spending have a significant positive impact on their economies. In contrast, some countries have multipliers below 1 (e.g., Austria, Costa Rica, and Singapore), suggesting a smaller impact of government spending increases. In many cases, there is a difference between the short-run and long-run multiplier effects. For example, in Brazil, the multiplier starts high and gradually decreases over time, suggesting that the initial boost from government spending diminishes. This pattern can be seen in other countries as well, indicating that the impact of government spending may be stronger in some countries in the short run although in some other countries (e.g., Mexico, Indonesia, and Czech Republic) the size of fiscal multiplier ascends later.

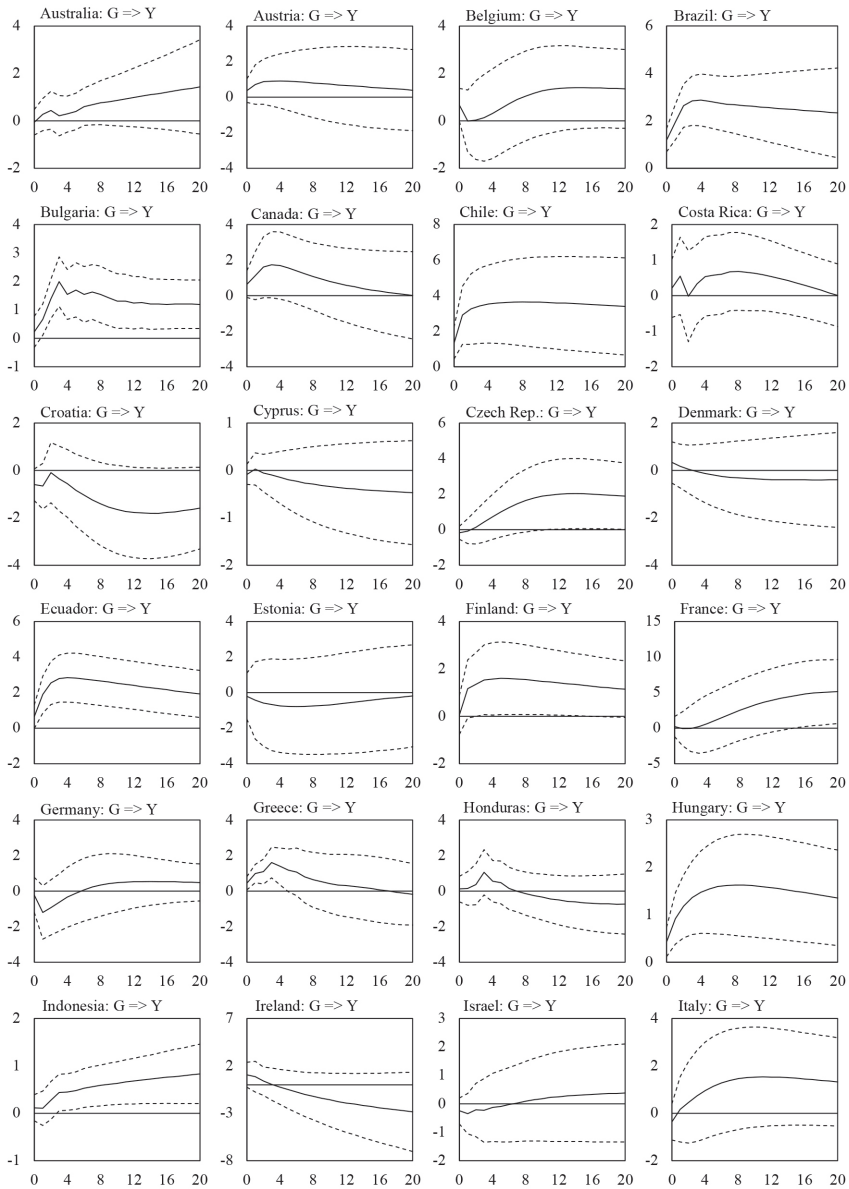
Some economies, such as Chile or Switzerland, consistently have multipliers above 1 almost over the entire 20-quarter period. This suggests that these countries may have a high degree of fiscal policy effectiveness in stimulating economic growth through government spending. Several countries, including Italy, Japan, and South Korea, exhibit mixed results with multipliers fluctuating around 1. These countries may have had various economic and policy factors influencing the impact of government spending changes. On the other hand, few economies record negative values of fiscal multipliers (e.g., Slovenia, Croatia, and Estonia), which implies that fiscal policy does not enable an effective countercyclical stance in these cases.

The implementation of fiscal policy, particularly when using fiscal incentives to promote economic growth, also exerts an influence on inflationary trends. Our findings, as shown in Appendix Table 1, reveal that in 68% of the countries in our sample an increase in government consumption leads to inflationary pressures, suggesting a strong positive relationship between fiscal stimulus and price level changes. Moreover, in 28% of the countries the price level rises at least for part of the forecast horizon, indicating that the effect of government spending on inflation is not limited to a small group of countries but is a more widespread phenomenon. In contrast, only 4% of the countries (2 out of 47) experience a reduction in the price level following increased government consumption, highlighting that deflationary responses are rare in this context. Furthermore, the price response to a positive government consumption shock is statistically significant in 39 out of 47 economies analysed, underscoring the robustness of this inflationary trend across a wide range of national contexts. These

results collectively suggest that, overall, fiscal stimulus tends to exert a primarily inflationary effect on the price level, with only a small number of countries exhibiting the opposite outcome.

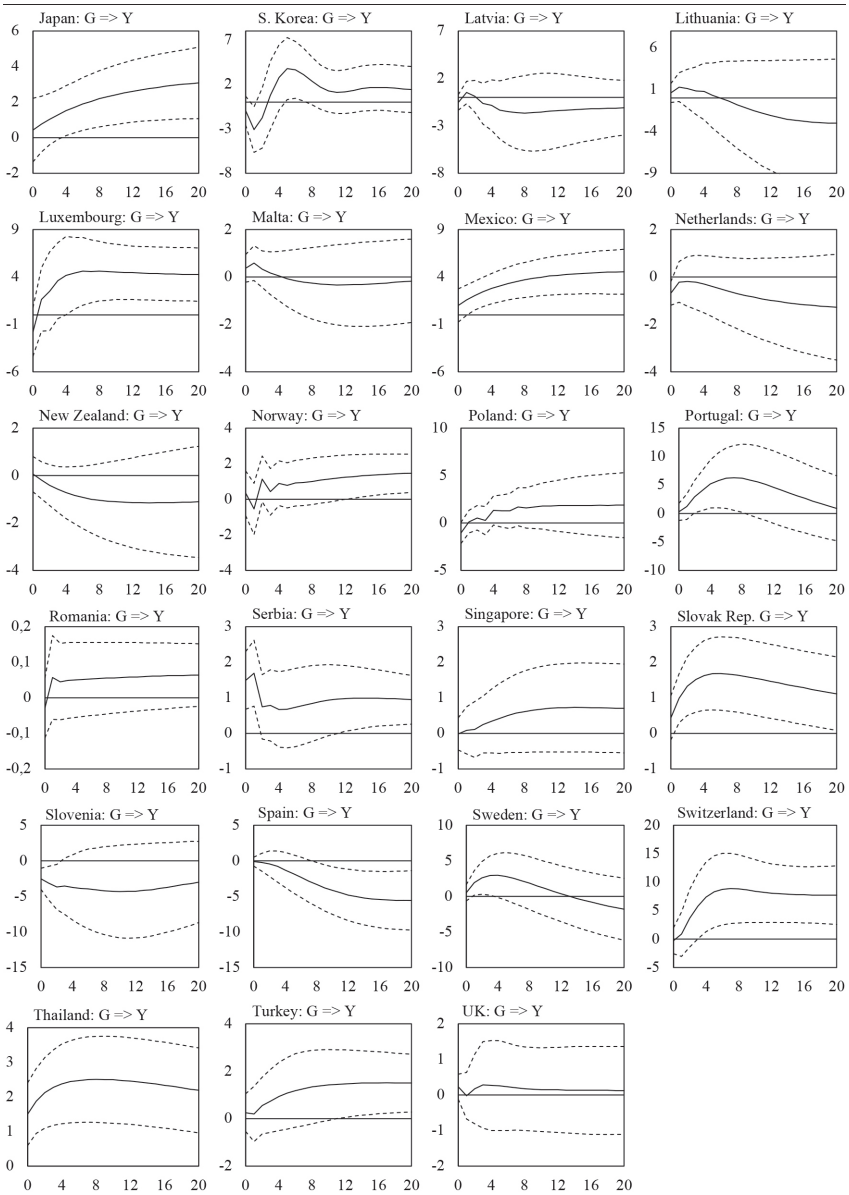
Our estimates can be summarized as follows. Firstly, the government consumption multipliers are generally positive throughout the forecast period for 66% of the countries in our sample (31 out of 47), while they are negative for 19% of the countries (9 out of 47), and only partially positive for 15% of the countries (7 out of 47). Secondly, for 53% of the countries (25 out of 47), the multiplier surpasses the value of one at least at some point during the forecast horizon, indicating a substantial impact of government consumption in these countries. Finally, the estimated multipliers are statistically significant for 51% of the countries (24 out of 47), highlighting the reliability and robustness of the results for a majority of the sample. However, it is important to note that the magnitude of fiscal multipliers can be influenced by various factors, including monetary policy, external shocks, and the cyclical and structural characteristics of the economy. Additionally, results may change over time due to evolving economic conditions and policy changes. Countries with low or negative multipliers may need to consider alternative policy tools to stimulate economic growth while those with high multipliers may have more room for fiscal stimulus.

Table 2. Government consumption multipliers across 47 economies



Notes: The solid line illustrates the impact on GDP resulting from a positive government consumption shock equivalent to 1% of GDP. The 90% confidence interval's upper and lower boundaries are indicated by dashed lines.

Continuation of Table 2. Government consumption multipliers across 47 economies



Notes: The solid line illustrates the impact on GDP resulting from a positive government consumption shock equivalent to 1% of GDP. The 90% confidence interval's upper and lower boundaries are indicated by dashed lines.

The main emphasis of this paper is an assessment of the role of indicators of economic inequality or income distribution on the size of fiscal multipliers. Table 3 presents the results of a regression analysis that investigates the determinants of

the size of government spending multiplier in various countries. The determinants include income and wealth inequality measures, as well as the shares of income held by different groups in the population. The table provides four sets of results: the impact (direct) multiplier, the average of direct multiplier and multiplier in first quarter, the oneyear average multiplier, and the twoyear average multiplier. For each set of results, the table shows the intercept and slope regression coefficient, t statistics and p-values, and R-squared values for each determinant. The primary findings reveal that higher levels of income and wealth inequality are linked to larger government consumption multipliers, as evidenced by the positive coefficients observed for both the income and wealth Gini indices, as well as the income shares held by the wealthiest segments of the population. On the other hand, when a larger portion of income is concentrated among lower-income groups, the multiplier tends to be smaller, as denoted by the negative beta coefficients associated with these income shares. This pattern highlights the influence of income distribution on the effectiveness of government consumption.

Across all four scenarios analysed, the coefficient for the income Gini index remains consistently positive and statistically significant, indicating that economies with higher income inequality experience greater government consumption multipliers. In most cases (three out of four) income inequality accounts for nearly 20% of the variation observed in the size of government consumption multipliers. A similar pattern emerges when examining income distribution among top earners. The coefficients for the income shares of the top 10% and 20% are positive in all scenarios, suggesting that nations where income is more concentrated at the top tend to exhibit larger government consumption multipliers. Conversely, the coefficients for the income shares of the bottom 10% and 20% are negative, implying that economies where a greater portion of income is held by lower-income households generally experience smaller fiscal multipliers. Overall, coefficients related to income concentration reach statistical significance in 88% of the cases, underscoring their substantial role in shaping fiscal multiplier variations. This effect is particularly evident in the impact multiplier, as well as in the average impact and first-quarter multiplier, where R-squared values lingers at approximately 20%, reinforcing the importance of income distribution in fiscal policy outcomes.

The analysis reveals that the coefficients for the wealth Gini index are positive across all cases, though their statistical significance is only marginal in certain instances. This suggests that while wealth inequality may have some influence on the magnitude of government consumption multipliers, it is not necessarily a decisive factor. Nonetheless, the findings indicate a general trend in which economies with higher levels of wealth inequality experience greater government consumption multipliers.

Overall, the results emphasize a key distinction: whereas income inequality and income concentration appear to play a significant role in shaping the size of government consumption multipliers, the effect of wealth inequality is comparatively weaker. This suggests that disparities in income distribution may have a more direct impact on fiscal

policy effectiveness than disparities in wealth, highlighting the relative limitations of wealth inequality in explaining variations in government consumption multipliers.

Empirical studies have found mixed results on this issue, with some suggesting a negative relationship between income inequality and the size of fiscal multipliers (e.g., Auerbach et al., 2021; Miranda-Pinto et al., 2023) while others finding support for a positive relationship (e.g., Brinca et al., 2016; Brinca et al. 2021). Our results are in line with the latter, hence supporting the notion of a positive relationship between income and wealth inequality and the size of the fiscal multiplier.

For a robustness check, Table 4 provides a regression analysis using the same determinants and different point estimates of multipliers across the forecast horizon. Specifically, we use point multipliers estimated for the first four quarters. The results, similar to those in Table 3, indicate that income inequality has a positive effect on the size of the government spending multiplier. In other words, the higher the income Gini coefficient, the larger the fiscal multiplier. Additionally, the share of top-income groups also positively influences the multiplier. This suggests that when a higher share of income goes to the top earners, the government spending multiplier becomes larger. On the contrary, the share of low-income groups has a negative effect on the multiplier, implying that when a larger portion of income is generated by people in the low-income group, the multiplier becomes smaller. The effect of wealth inequality on the multiplier is positive but less empirically robust because it is not statistically significant in four out of eight cases. This is consistent with the uncertainty of results regarding the correlation between wealth inequality and the magnitude of government spending multiplier, as noted in Brinca et al. (2016). In summary, these results also indicate that income inequality and the share of topincome groups have positive effects on the effectiveness of government spending while the share of lowincome groups has a negative effect.

Table 3. Determinants of the magnitude of government consumption multiplier - impact (direct) multiplier and average multipliers

Impact multiplier: $FM_i = \beta_{0,i} + \beta_{1,i}X_i + e_i$				
X_i	β_0	β_1	t-stat (p-value)	R^2
Income GINI	−1.390	0.043	3.10 (0.003)	0.176
Share of top 10% income group	−1.500	0.060	3.14 (0.003)	0.187
Share of top 20% income group	−2.126	0.053	3.06 (0.004)	0.178
Share of low 10% income group	1.047	−0.346	−2.58 (0.013)	0.134
Share of low 20% income group	1.294	−0.166	−2.69 (0.010)	0.144
Wealth GINI (median)	−1.671	0.025	1.67 (0.101)	0.060
Wealth GINI (average)	−1.769	0.026	1.74 (0.089)	0.064
Average impact (direct) and first quarter multiplier: $FM_i = \beta_{0,i} + \beta_{1,i}X_i + e_i$				
X_i	β_0	β_1	t-stat (p-value)	R^2
Income GINI	−1.652	0.055	3.52 (0.001)	0.216
Share of top 10% income group	−1.789	0.076	3.61 (0.001)	0.232
Share of top 20% income group	−2.587	0.068	3.50 (0.001)	0.222
Share of low 10% income group	1.422	−0.428	−2.82 (0.007)	0.156
Share of low 20% income group	1.749	−0.208	−3.00 (0.005)	0.173
Wealth GINI (median)	−1.560	0.026	1.48 (0.145)	0.048
Wealth GINI (average)	−1.661	0.027	1.54 (0.131)	0.051
One-year average multiplier: $FM_i = \beta_{0,i} + \beta_{1,i}X_i + e_i$				
X_i	β_0	β_1	t-stat (p-value)	R^2
Income GINI	−1.574	0.063	2.89 (0.006)	0.156
Share of top 10% income group	−1.759	0.089	3.04 (0.004)	0.177
Share of top 20% income group	−2.662	0.079	2.92 (0.006)	0.166
Share of low 10% income group	1.853	−0.444	−2.11 (0.041)	0.093
Share of low 20% income group	2.261	−0.226	−2.34 (0.024)	0.113
Wealth GINI (median)	−2.393	0.042	1.84 (0.073)	0.071
Wealth GINI (average)	−2.223	0.040	1.69 (0.097)	0.061
Two-year average multiplier: $FM_i = \beta_{0,i} + \beta_{1,i}X_i + e_i$				
X_i	β_0	β_1	t-stat (p-value)	R^2
Income GINI	−1.413	0.064	2.16 (0.036)	0.094
Share of top 10% income group	−1.653	0.093	2.34 (0.024)	0.113
Share of top 20% income group	−2.552	0.081	2.22 (0.032)	0.103
Share of low 10% income group	1.914	−0.390	−1.38 (0.175)	0.042
Share of low 20% income group	2.366	−0.212	−1.63 (0.111)	0.058
Wealth GINI (median)	−3.088	0.055	1.82 (0.075)	0.070
Wealth GINI (average)	−2.739	0.050	1.62 (0.113)	0.056

Notes: FM_i denotes the chosen government consumption multiplier for country i, while X_i denotes the factors influencing the magnitude of the government consumption multiplier in that country. The regression analysis provides intercepts, beta coefficients, t-statistics, p-values, and the R^2 values.

Table 4. Determinants of the magnitude of government consumption multiplier - fiscal multipliers in first four quarters

First quarter multiplier: $FM_i = \beta_{0,i} + \beta_{1,i}X_i + e_i$				
X_i	β_0	β_1	t-stat (p-value)	R^2
Income GINI	−1.914	0.067	3.23 (0.002)	0.189
Share of top 10% income group	−2.078	0.093	3.32 (0.002)	0.204
Share of top 20% income group	−3.047	0.082	3.22 (0.002)	0.194
Share of low 10% income group	1.798	−0.509	−2.58 (0.014)	0.131
Share of low 20% income group	2.205	−0.250	−2.73 (0.009)	0.148
Wealth GINI (median)	−1.449	0.026	1.67 (0.254)	0.029
Wealth GINI (average)	−1.552	0.028	1.20 (0.237)	0.032
Second quarter multiplier: $FM_i = \beta_{0,i} + \beta_{1,i}X_i + e_i$				
X_i	β_0	β_1	t-stat (p-value)	R^2
Income GINI	−1.628	0.066	2.63 (0.012)	0.133
Share of top 10% income group	−1.851	0.095	2.81 (0.008)	0.155
Share of top 20% income group	−2.791	0.083	2.68 (0.010)	0.143
Share of low 10% income group	1.946	−0.455	−1.88 (0.067)	0.076
Share of low 20% income group	2.370	−0.232	−2.09 (0.043)	0.092
Wealth GINI (median)	−2.623	0.046	1.76 (0.085)	0.067
Wealth GINI (average)	−2.486	0.045	1.66 (0.105)	0.059
Third quarter multiplier: $FM_i = \beta_{0,i} + \beta_{1,i}X_i + e_i$				
X_i	β_0	β_1	t-stat (p-value)	R^2
Income GINI	−1.662	0.073	2.45 (0.018)	0.117
Share of top 10% income group	−1.873	0.104	2.58 (0.013)	0.134
Share of top 20% income group	−2.920	0.091	2.48 (0.017)	0.125
Share of low 10% income group	2.276	−0.497	−1.74 (0.089)	0.066
Share of low 20% income group	2.770	−0.258	−1.98 (0.056)	0.083
Wealth GINI (median)	−2.827	0.052	1.68 (0.101)	0.060
Wealth GINI (average)	−2.440	0.047	1.46 (0.150)	0.046
Fourth quarter multiplier: $FM_i = \beta_{0,i} + \beta_{1,i}X_i + e_i$				
X_i	β_0	β_1	t-stat (p-value)	R^2
Income GINI	−1.275	0.066	1.86 (0.069)	0.071
Share of top 10% income group	−1.490	0.095	1.99 (0.054)	0.084
Share of top 20% income group	−2.427	0.083	2.90 (0.064	0.077
Share of low 10% income group	2.199	−0.412	−1.22 (0.228)	0.034
Share of low 20% income group	2.667	−0.222	−1.43 (0.159)	0.046
Wealth GINI (median)	−3.396	0.062	1.73 (0.091)	0.064
Wealth GINI (average)	−2.866	0.055	1.48 (0.113)	0.048

Notes: FM_i denotes the chosen government consumption multiplier for country i, while X_i denotes the factors influencing the magnitude of the government consumption multiplier in that country. The regression analysis provides intercepts, beta coefficients, t-statistics, p-values, and the R^2 values.

The results in Table 5 present the response of the GDP to a positive shock in government consumption over a 10-year horizon based on a panel VAR model. The results are categorized, first, into six scenarios based on different Gini coefficients: lower income Gini, higher income Gini, lower wealth average Gini, higher wealth average Gini, lower wealth median Gini, and higher wealth median Gini, and second,

according to the distribution of income based on four indicators. These scenarios shed light on the effects of income and wealth inequality and income distribution on the output response to positive government spending shocks.

Countries with lower income Gini coefficients exhibit a noteworthy pattern. They start with a higher initial positive response (1.80) but experience a gradual decrease in the output response. In contrast, countries with higher income Gini coefficients begin with a lower initial positive response (1.15) but observe an increase in output response further on. This dichotomy indicates that lower-income Gini countries experience a more immediate output boost from government spending while higher-income Gini show a more persistent and larger output effect of fiscal stimuli.

Countries with lower top 10% income shares demonstrate a moderate initial response that remains stable across shock magnitudes. Conversely, countries with higher top 10% income shares start with a stronger initial response and experience a more significant positive impact as the shock size increases. This pattern extends to the comparison of lower and higher top 20% income shares, reflecting the influence of income concentration on economic responses. Countries with lower low 20% income shares exhibit a moderate initial response that remains stable. In contrast, those with higher low 20% income shares begin with a weaker response but experience a more pronounced impact with larger shocks. A similar pattern holds for low 10% income shares.

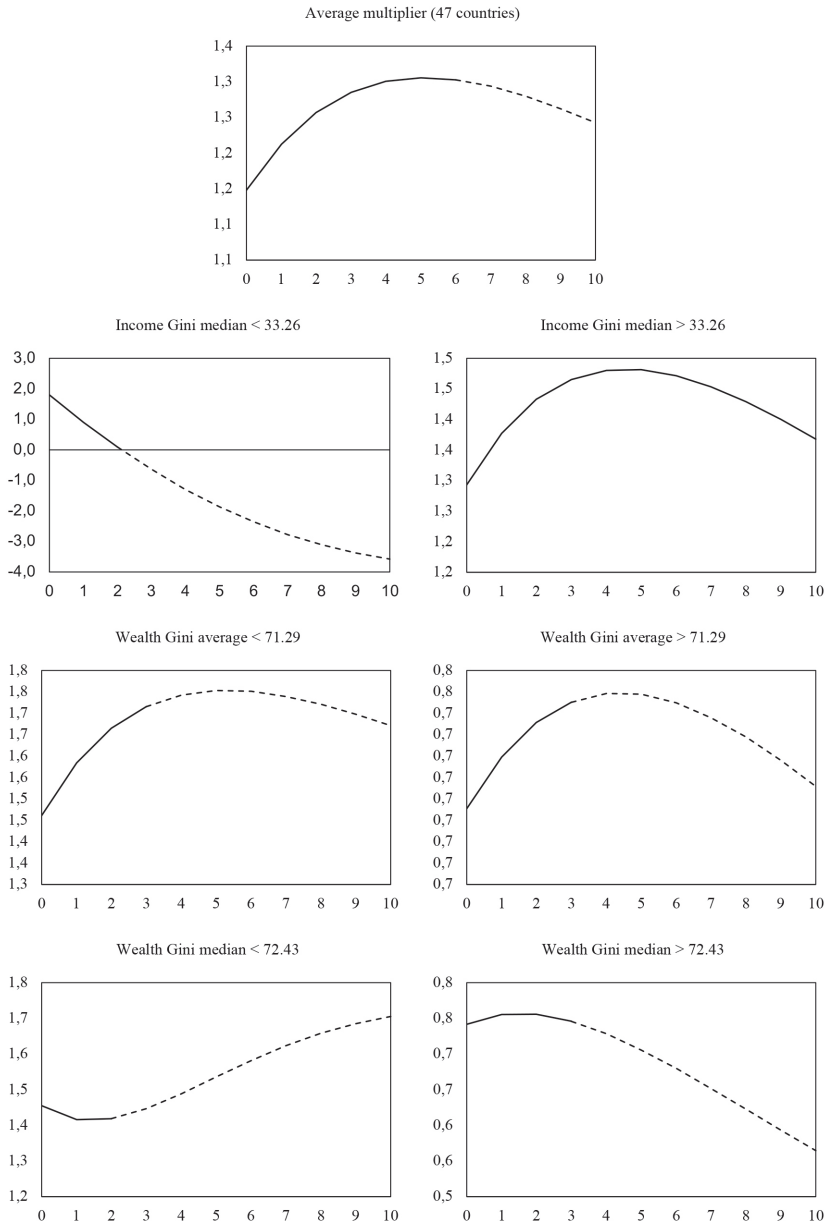
A consistent trend emerges across all scenarios: countries with higher initial income inequality tend to show weaker initial output responses to positive government consumption shocks but experience stronger impacts over the entire horizon. In contrast, countries with lower inequality, whether related to income inequality or income distribution, exhibit stronger initial output effects that quickly diminish. Results for wealth inequality suggest some contradictions to previous results based on regression analysis as they suggest larger fiscal multipliers in the case of more equally distributed wealth. However, regression analysis in the case of wealth inequality provides results on the verge of statistical significance.

The results of the panel VAR model with two lags (as shown in Table 6) also highlight that countries grappling with higher income inequality tend to exhibit a weaker immediate impact but a larger and more persistent long-term output response to a positive government spending shock. Therefore, this panel model also suggests, although not as conclusively as the analysis of fiscal multiplier estimates for individual countries, a positive relationship between larger income inequality and higher fiscal multipliers. The aforementioned positive association is particularly noticeable in countries where the bottom 10% or 20% of the population, as indicated by income distribution, receives a relatively larger share of the aggregate income, resulting in larger fiscal multipliers. Estimates based on this model thus demonstrate the insensitivity of results to the lag structure of a panel VAR model.

Three substantive findings stem from the presented empirical results. First, taking into account the observations in Brinca et al. (2016) and Brinca et al. (2021), we can

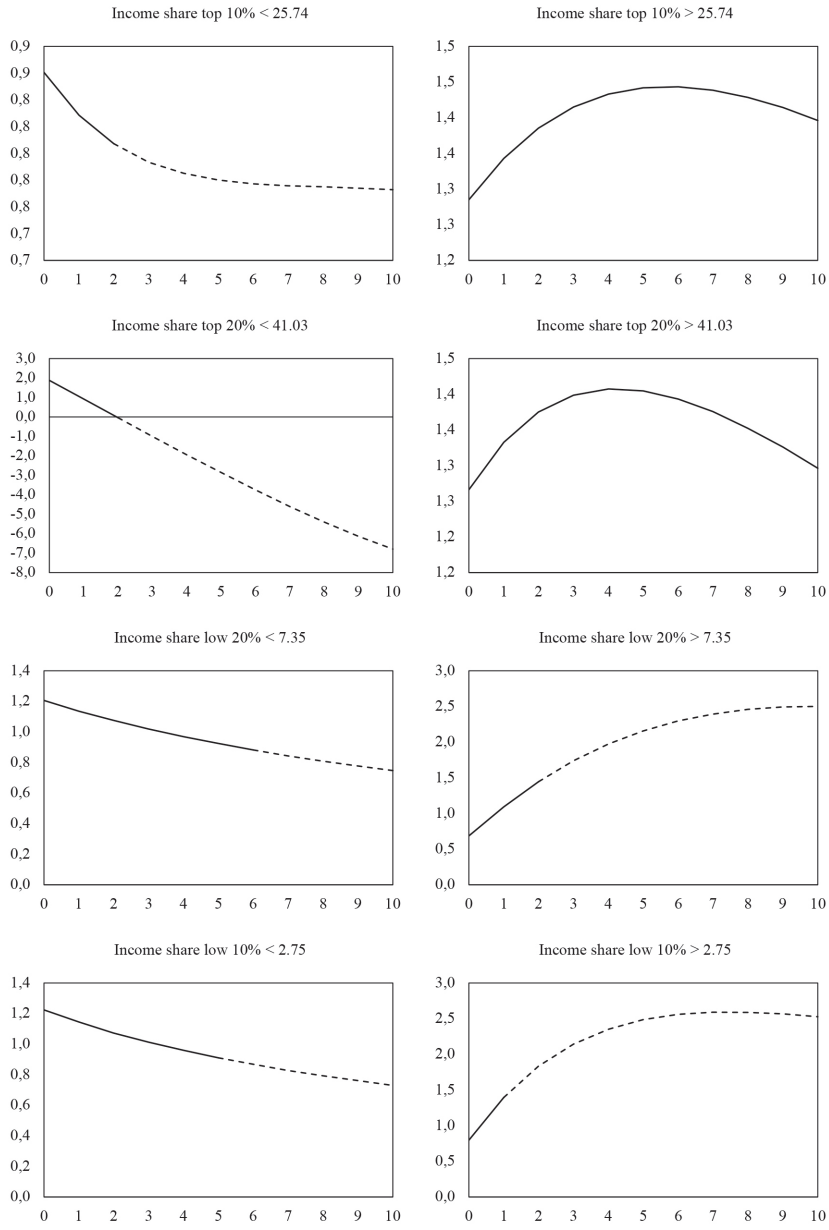
conclude that the reasons why countries with greater income and wealth inequality exhibit more pronounced output effects of government spending can be attributed to the role of economic agents with greater liquidity constraints and relatively lower wealth, both of which demonstrate a higher marginal propensity to consume. Second, in countries with higher income inequality where economic agents respond more strongly to shocks in government spending, these shocks can be utilized as effective countercyclical fiscal instrument during output contractions. It can be inferred that in conditions of more pronounced income inequality, increasing government spending not only triggers a relatively greater output response but greater output growth can also generate more potential for mitigating income disparities and for income redistribution policies. Third, our results also imply that in circumstances of greater income inequality, fiscal policy of reducing government spending may have more pronounced recessionary effects compared to countries with relatively lower income inequality.

Table 5. Determinants of the magnitude of government consumption multiplier - panel vector autoregression model with one lag



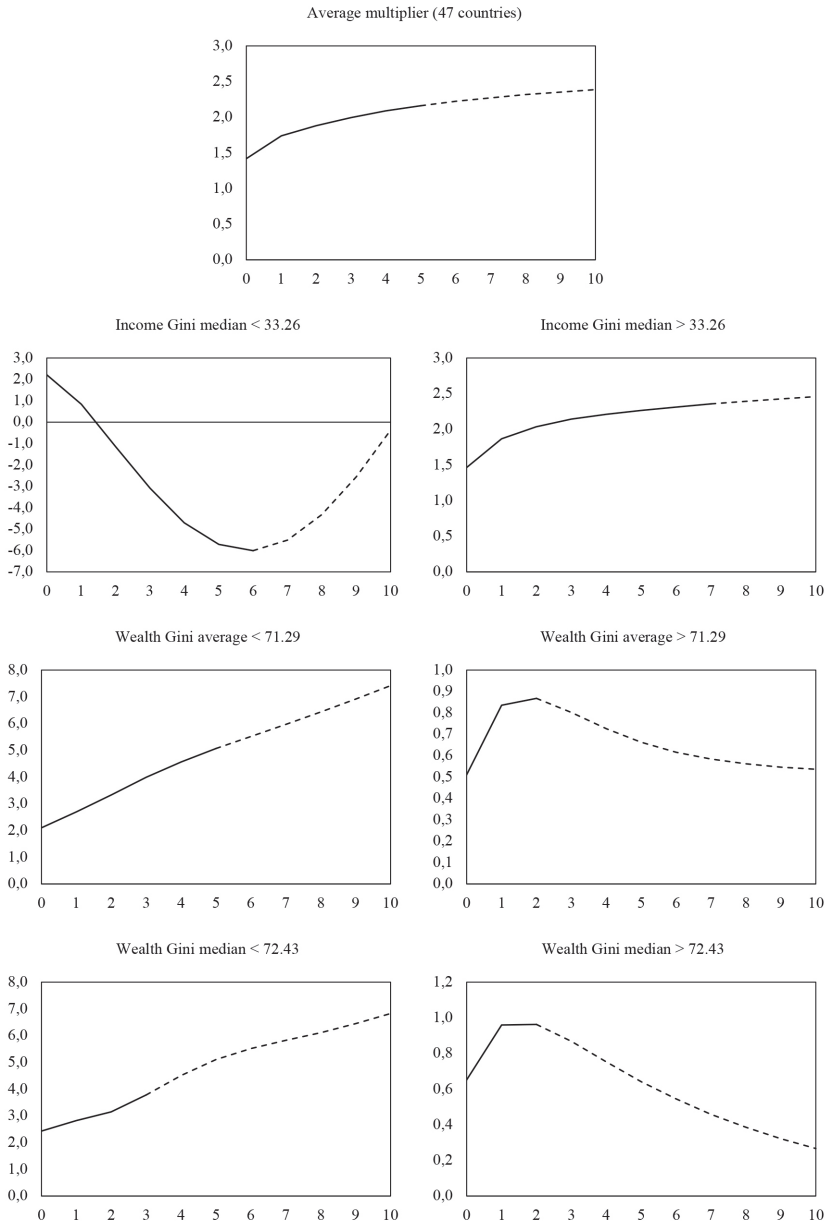
Notes: The line illustrates the impact on GDP resulting from a positive government consumption shock, equal to 1% of GDP. A statistically significant portion of the response is indicated by a solid line.

Continuation of Table 5. Determinants of the magnitude of government consumption multiplier - panel vector autoregression model with one lag



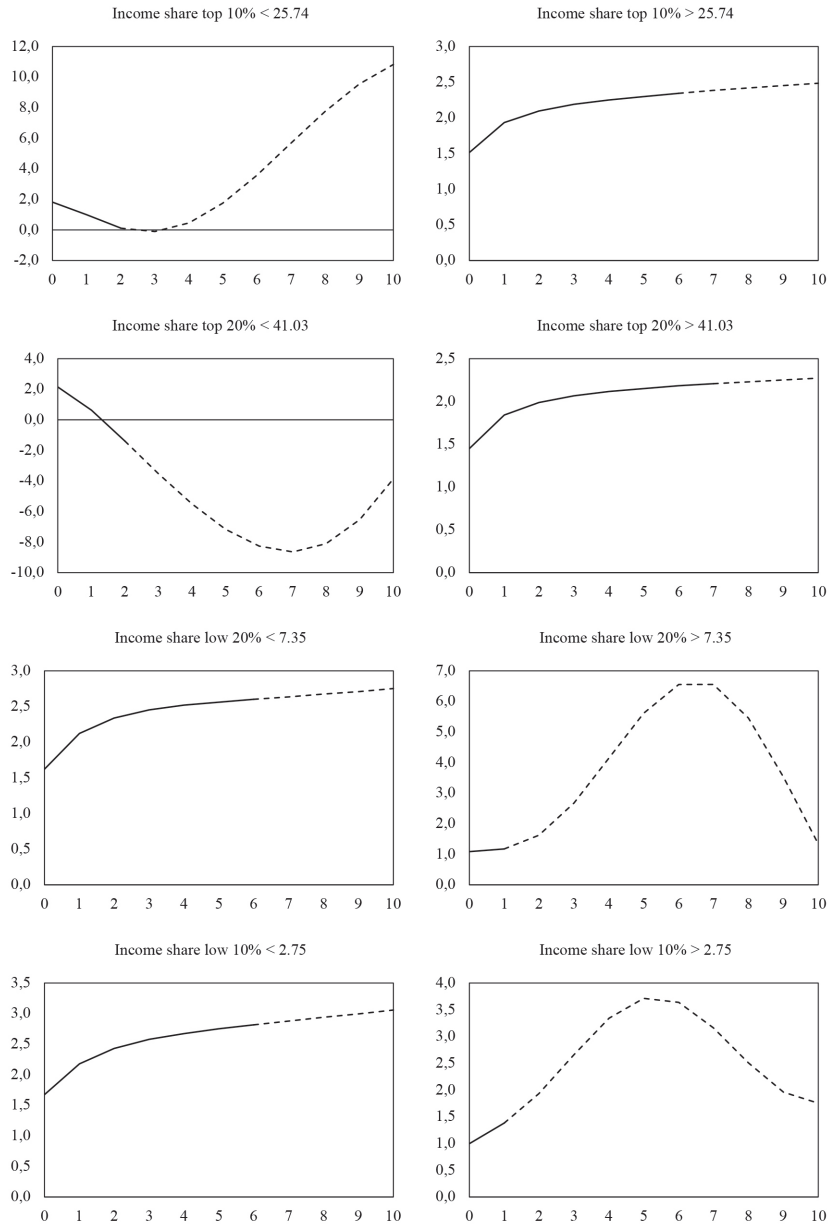
Notes: The line illustrates the impact on GDP resulting from a positive government consumption shock, equal to 1% of GDP. A statistically significant portion of the response is indicated by a solid line.

Table 6. Determinants of the magnitude of government consumption multiplier - panel vector autoregression model with two lags



Notes: The line illustrates the impact on GDP resulting from a positive government consumption shock, equal to 1% of GDP. A statistically significant portion of the response is indicated by a solid line.

Continuation of Table 6. Determinants of the magnitude of government consumption multiplier - panel vector autoregression model with two lags



Notes: The line illustrates the impact on GDP resulting from a positive government consumption shock, equal to 1% of GDP. A statistically significant portion of the response is indicated by a solid line.

6. CONCLUSION

In the past decade, the comprehensive understanding of the impact of fiscal stimuli on economic activity has made significant progress, mainly due to real economic conditions. This progress has been incremental and has expanded the set of determinants contributing to explaining the variation in the magnitude of fiscal multipliers over time and across different structural characteristics of countries. Despite the increasing perception of economic inequality as a broader societal issue in various parts of the world and under different socio-economic systems, the influence of income and wealth distribution on the functioning of fiscal transmission remains relatively poorly understood. In this paper, utilizing a new and large sample of 47 economies and employing VAR approach, we examine the influence and significance of income and wealth disparities on the size of government consumption multipliers.

The key findings of our paper can be summarised as detailed below. First, the estimated fiscal multipliers generally follow a positive trajectory throughout the forecast period in approximately 66% of the countries analysed (31 out of 47). In contrast, they remain largely negative in 19% of cases (9 out of 47), while in the remaining 15% (7 out of 47), they exhibit a mixed pattern, being positive only during certain periods. Second, in 53% of the countries examined (25 out of 47), the fiscal multiplier surpasses the threshold of one at least once during the forecast period, suggesting that government consumption in these economies has a stronger impact on output expansion. Third, the more pronounced the income and wealth inequality in a country, the higher the value of the fiscal multiplier. While the effect of income inequality and income distribution is strongly statistically significant, the effect of wealth inequality is at the threshold of statistical significance. Thus, we validate our primary hypothesis that higher economic inequality is connected with higher fiscal multiplier values. In essence, these results align with those of Brinca et al. (2016) and Brinca et al. (2021), supporting the idea that higher economic inequality, particularly income inequality, leads to larger fiscal multipliers. Our findings in this study, therefore, indicate that special care should be devoted to parameters of income and wealth inequality of the examined countries by fiscal policymakers. It is worth noting the limitations in the availability of data, as expanding the estimation of multipliers to additional countries would enhance the robustness of the results within the regression analysis framework.

Further research should focus on the following two aspects. First, aggregate fiscal spending should be disaggregated to examine the sensitivity and effectiveness of specific types of government spending in countries with varying income and wealth structures. Second, it is worthwhile to explore the distinction between the impact of taxes and public spending in relation to changing income and wealth distribution conditions.

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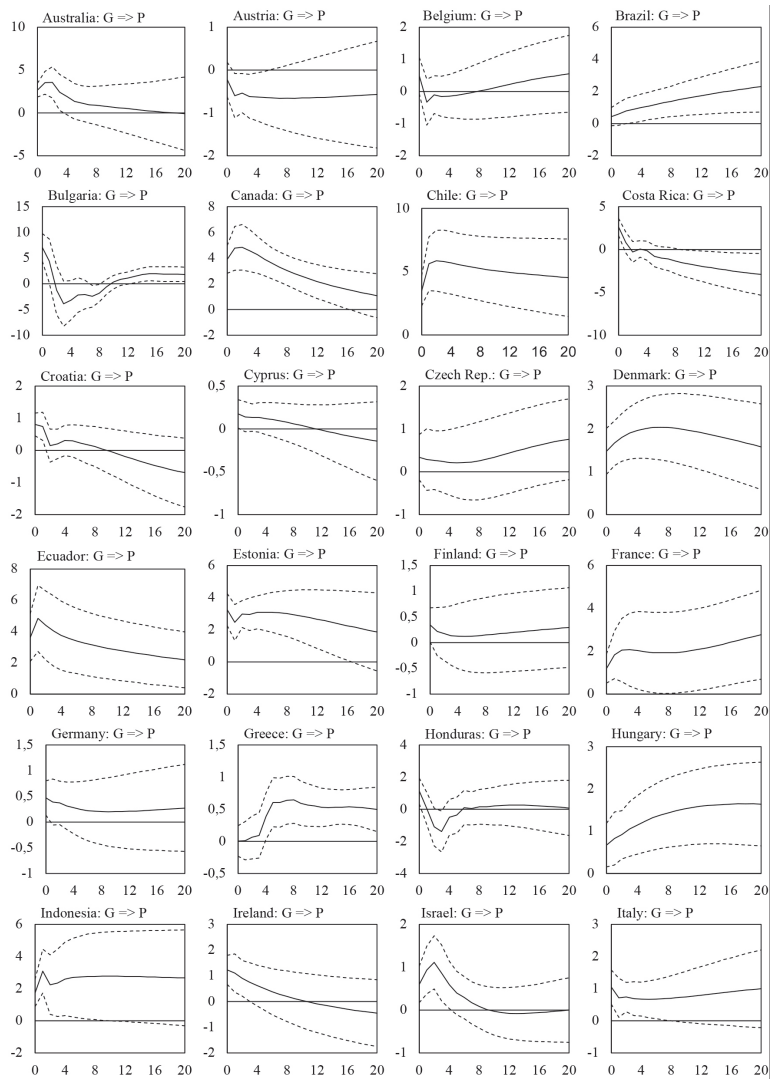
APPENDIX

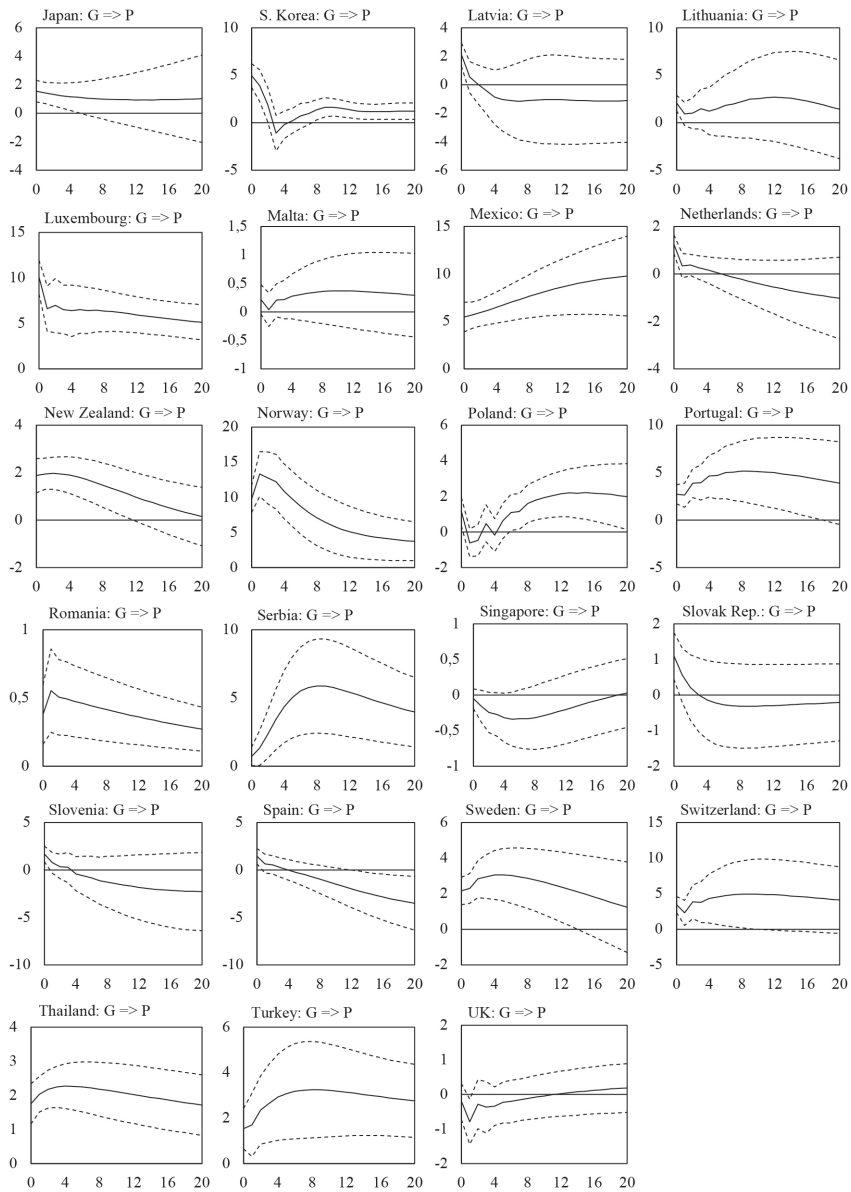
Table 1. Response of GDP deflator to a positive shock in government consumption across 47 economies



Notes: The solid line illustrates the impact on GDP deflator resulting from a positive government consumption shock equivalent to 1% of GDP. The 90% confidence interval's upper and lower boundaries

are indicated by dashed lines.

Continuation of Table 1. Response of GDP deflator to a positive shock in government consumption across 47 economies



Notes: The solid line illustrates the impact on GDP deflator resulting from a positive government consumption shock equivalent to 1% of GDP. The 90% confidence interval's upper and lower boundaries are indicated by dashed lines.

Table 2. List of used variables

Variable	Description
Government consumption (quarterly)	National currency units, constant 2010 prices (natural logarithm)
GDP (quarterly)	National currency units, constant 2010 prices (natural logarithm)
Price level (quarterly)	GDP deflator in index points (natural logarithm)
Government consumption (annual)	National currency units, constant 2015 prices (natural logarithm)
GDP (annual)	National currency units, constant 2015 prices (natural logarithm)
Price level (annual)	GDP deflator in index points (natural logarithm)
Income Gini	Index points
Income distribution (top 10 and 20%, lower 10 and 20%)	Shares in percentages
Wealth Gini	Index points