The Divergent Paths: How Public Debt and Demographic Transitions Shape Economic Growth Trajectories in Emerging and Advanced Economies

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Abstract

This study examines the differential impacts of public debt and demographic transitions on economic growth across BRICS and G7 economies from 1999 to 2023. Using an extensive panel data approach with fixed effects, dynamic specifications, and threshold analyses, this study finds that BRICS and G7 countries exhibit markedly different debt-growth and demographic-growth relationships. While debt levels significantly constrain growth in BRICS countries (-0.082% per percentage point of debt/GDP), G7 economies demonstrate greater resilience at higher debt thresholds. The old-age dependency ratio more severely impacts G7 economies, where a 1% increase in this ratio associates with a 0.14% decrease in growth, compared to a positive effect in BRICS nations, reflecting their demographic dividend advantages. These findings reveal opposite fiscal space conditions between country groups: BRICS economies maintain substantial fiscal space (49.5%), while G7 nations face negative fiscal space (-3.7%). The COVID-19 pandemic particularly challenged both groups' fiscal responses, with G7 countries demonstrating greater policy mobilization capabilities. The research provides empirical evidence for differentiated policy approaches, suggesting that emerging economies should prioritize debt management while developed economies must urgently address demographic challenges to maintain growth trajectories.

Keywords: Public Debt, Economic Growth, Demographic Transition, BRICS and G7

1. Introduction

The interrelationship between public debt, demographic transitions, and economic growth has emerged as a critical area of economic inquiry, particularly following the global financial crisis and the COVID-19 pandemic. Global fiscal systems have experienced substantial strain from these two powerful shocks that have made the different population dynamics between emerging economies and advanced economies more apparent. The relationships between population and economic policy strongly differ between these two groups, which affects their prospects for economic development.

This research study examines how public debt policies together with changes in population shape economic growth performance between BRICS (Brazil, Russia, India, China, and South Africa) and the advanced economies of the G7 (United States, United Kingdom, France, Germany, Italy, Japan, and Canada) over the period 1999-2023. This study expands debt-growth research through analysis of demographic changes which operate separately from debt burdens while combining with them interactively.

This research addresses several critical questions:

- Do debt thresholds differ systematically between emerging and advanced economies?
- How do demographic transitions interact with debt levels to influence growth trajectories?
- What explains the divergent fiscal responses to economic shocks across these country groups?

The theoretical underpinnings of this research draw from several established frameworks. The accepted model of debt-growth shows debt impacts at specific thresholds where public debt hampers economic growth by several mechanisms, such as privatisation displacement and increasing risk premiums with reduced fiscal manoeuvrability (Reinhart and Rogoff, 2010). According to demographic transition theory, the evolution of society from high fertility/high mortality conditions leads to low fertility/low mortality states, which affects economic growth because of changing labour force composition and changing dependency ratios (Bloom et al., 2010). According to Modigliani (1966), the life-cycle hypothesis demonstrates how demographic patterns impact saving along with consumption and investment rates since this directly affects growth.

This study has identified three main contributions. First, the research delivers a comprehensive analysis of debt-growth along with demographic-growth across BRICS and G7 economies

through detailed dataset examination covering a 25-year period. Second, it employs advanced econometric techniques including threshold effects, distributed lag models, and endogeneity-corrected estimations to establish robust causal relationships. Third, this research brings fiscal space forward as a connecting element between debt and demographics and growth so scholars gain enhanced understanding of policy limitations. The study results reveal important consequences for formulating both economic promotion policies as well as demographic and financial decision-making across emerging and established nations. The relationship between debt dynamics and economic growth in progressing BRICS nations needs investigation during their rapid demographic shifts for creating sustainable development paths. This study delivers essential strategic information which G7 countries can use to address their dual problems of demographic change and high debt levels throughout the post-pandemic period.

2. Literature Review

2.1 Theoretical Framework

Research about the public debt and economic growth relationship dominates economic theoretic literature. Academic consensus agrees that debt in modest amounts creates economic momentum by backing worthwhile investments yet abundant debt growth jeopardises development in different pathways. According to Elmendorf and Mankiw (1999) public debt level beyond a certain point increases long-term interest rates thus reducing private investment and delaying capital stock growth. The research conducted by Reinhart and Rogoff (2010) indicated that high debt levels produce increased uncertainty alongside elevated risk premiums which negatively affect growth opportunities.

This study bases its foundation on the demographic transition theory as a vital explanatory framework. The model outlines society development from high birth and death rates to low birth and death rates while presenting distinct economic transformations at each stage according to research by Lee and Mason (2010). Demographic transitions start with a potential demographic dividend when the working-age population grows beyond dependents then transition to an older society which raises dependency ratios once more. Mason and Lee (2006) used this framework to study how population changes impact both personal savings levels and national capital development then result in economic expansion.

Economic behaviour responds to age structure based on the theoretical model developed by Modigliani (1966). According to this theory, individuals' smooth consumption over their

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lifetimes, saving during working years and dissaving during retirement. Saving rates of countries increase as their population distribution ages toward working years because this group maintains higher levels of financial accumulation that drives economic growth. The ageing composition of a society leads to reduced savings alongside lowered investments.

2.2 Empirical Evidence on Debt-Growth Relationships

The analysis of debt-growth connexions has developed substantially throughout the last few decades. Reinhart and Rogoff (2010) presented evidence of a non-linear association between public debt and economic growth that revealed growth rates showed significant decline above 90% of GDP. Multiple investigations after this research have challenged its research methodology together with its drawn conclusions. Herndon et al. (2014) exposed technical flaws in the previous analysis which reduced the initial connexion between debt levels and economic growth. Panizza and Presbitero (2014) conducted instrumental variable analyses which revealed minimal evidence that debt causes growth in nations known as advanced economies. Using heterogeneous panel techniques Eberhardt and Presbitero (2015) discovered meaningful debts-growth relationships persist that show country-specific elements function as decisive mediators in this relationship.

Research evidence now acknowledges that institutional quality functions as a vital factor explaining debt-growth relationships. According to Kourtellos et al. (2013) debt can negatively affect growth but high-quality institutions create a buffer that reduces these adverse effects. Similarly, Kim et al. (2017) documented significant differences in debt thresholds between advanced and emerging economies, attributing these to variations in institutional development and financial market depth.

2.3 Demographic Challenges in Developing vs. Advanced Economies

Economic growth suffers fundamental changes because emerging economies follow different population paths from those of advanced economies. Advanced nations experience population aging which creates rising older dependency rates as well as working-age labour force reduction alongside pension system vulnerability (Bloom et al., 2015). Many emerging economies stand in the demographic dividend period either currently or immediately after completing this stage because they demonstrate decreasing young-age dependency ratios and growing working-age demographics (Gragnolati et al., 2015). Scientists have gathered

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extensive evidence regarding economic impacts of shifting demography. According to Maestas et al. (2016) the ageing population of the United States will diminish yearly per-capita GDP expansion by 0.3 percentage points during the subsequent three decades. According to Bloom and Williamson (1998) East Asian economic success in the rapid growth period can be attributed to one-third from beneficial demographic changes.

2.4 Fiscal Policy, Debt Sustainability, and Economic Growth

Fiscal policy plays a crucial role in mediating the relationships between debt, demographics, and growth. The concept of fiscal space—defined as the room for undertaking discretionary fiscal policy without compromising debt sustainability—has gained prominence in policy discussions (Heller, 2005). Countries with greater fiscal space can implement more effective countercyclical policies during economic downturns, potentially mitigating negative growth impacts. The literature on fiscal multipliers suggests that the growth impact of fiscal policy depends on various factors, including the business cycle, monetary policy stance, and degree of economic openness (Auerbach and Gorodnichenko, 2012). Importantly, Ilzetzki et al. (2013) found that fiscal multipliers are smaller in highly indebted countries, suggesting that high debt levels may constrain fiscal policy effectiveness. Recent experiences during the COVID-19 pandemic have highlighted divergent fiscal response capacities across countries. Advanced economies generally implemented larger fiscal packages as a percentage of GDP compared to emerging economies (IMF, 2021). This disparity reflects differences in borrowing costs, existing debt levels, and institutional capacities, raising questions about the long-term implications for economic convergence.

2.5 Research Gap and Contribution

Academic research abounds concerning debt-growth connections and economic effects from demographics yet lacks thorough analysis of their joint effects between various country groups. This study fills the identification gap by conducting a detailed investigation into how debt and population size differently affect growth between G7 and BRICS nations. Additionally, most existing studies analyse debt and demographic factors separately, without considering their potential interactions. This approach explicitly models these interactions, offering insights into how demographic structures may amplify or mitigate debt effects on growth. Finally, by

incorporating recent data through 2023, This study captures the impacts of the COVID-19 pandemic, providing timely evidence on how major economic shocks affect these relationships.

2.6. Research Hypotheses

This study uses existing theoretical foundations and literature findings to establish hypotheses that evaluate debt-public relations as well as population changes alongside economic development rates in BRICS and G7 nations. The research hypotheses are grouped into debt-growth relationships and three subcategories of demographic effects and interaction effects and fiscal capacity implications.

2.6.1 Debt-Growth Relationship Hypotheses

The research hypothesis relies on established debt-growth theory that demonstrates high debt levels impede economic growth primarily by crowding out private investment, increasing risk premiums, and reducing fiscal flexibility (Reinhart and Rogoff, 2010; Panizza and Presbitero, 2014). An improved economic performance emerges from decent debt amounts which allows projects with productive potential but the general relationship remains negative starting from elevated debt levels.

H1a: Public debt has a significant negative impact on economic growth across all countries.

This research hypothesis premise addresses how different borrowing capabilities exist between emerging and advanced economies. The lack of evolved financial sectors together with expensive loan terms and fragile reaction to external events lead BRICS nations to experience greater negative economic growth effects from increased borrowing (Kim et al., 2017; Eberhardt and Presbitero, 2015).

H1b: The negative impact of public debt on economic growth is stronger in BRICS countries compared to G7 economies.

Following Reinhart and Rogoff's (2010) influential work suggesting a 90% of GDP threshold, we hypothesize that non-linear debt effects exist but vary across country groups. Social capital in BRICS economies sits below G7 country levels because their institutions differ in quality while their financial markets have varying depths alongside varying degrees of monetary independence (Kourtellos et al., 2013).

H1c: There exists a threshold level of public debt beyond which the negative impact on growth intensifies, and this threshold differs between BRICS and G7 economies.

2.6.2 Demographic Effect Hypotheses

This hypothesis is based on demographic transition theory and life-cycle models, which suggest that high old-age dependency reduces growth through lower savings rates, labor supply constraints, and fiscal pressure (Bloom et al., 2010; Mason and Lee, 2006). The effect of young-age dependency is more ambiguous, as it may reduce current savings but potentially increase future growth through human capital development.

H2a: Demographic dependency ratios significantly impact economic growth, with old-age dependency having a negative effect and young-age dependency having mixed effects.

Advanced economies are further along in the demographic transition, facing more severe aging challenges. BRICS countries, still benefiting from their demographic dividend phase with growing working-age populations, are expected to experience less negative impacts from aging (Bloom et al., 2015; Gragnolati et al., 2015).

H2b: The impact of old-age dependency on growth is more negative in G7 economies than in BRICS countries.

Beyond simple dependency ratios, specific age cohorts may influence growth through different channels. The pre-retirement cohort is particularly important as it represents a high-saving, high-productivity group transitioning toward retirement, with potential implications for capital accumulation and labour markets (Maestas et al., 2016).

H2c: Different age cohorts have distinct effects on economic growth, with the pre-retirement cohort (50-64) having particularly significant impacts.

2.6.3 Fiscal Capacity Hypotheses

This hypothesis reflects the importance of fiscal flexibility for countercyclical policy and public investment. Countries with greater fiscal space can implement more effective growth-enhancing policies (Heller, 2005), with potentially larger benefits for emerging economies where infrastructure and institutional development gaps remain substantial.

H3a: Fiscal space positively affects economic growth, with stronger effects in BRICS countries compared to G7 economies.

Building on work by Auerbach and Gorodnichenko (2012) and Ilzetzki et al. (2013), this study hypothesizes that countries with higher debt levels and more challenging demographic structures face greater constraints in implementing countercyclical fiscal policies during economic downturns, including the global financial crisis and COVID-19 pandemic.

H3b: The fiscal policy response to economic crises is constrained by initial debt levels and demographic structures.

3. Data and Methodology

3.1 Data Sources and Sample Description

This study utilizes an extensive panel dataset covering all BRICS (Brazil, Russia, India, China, South Africa) and G7 (United States, United Kingdom, France, Germany, Italy, Japan, Canada) countries over the period 1999-2023. The dataset integrates information from multiple sources including the World Bank's World Development Indicators, the International Monetary Fund's Government Finance Statistics, and national statistical agencies.

Key variables in This analysis include:

1. **Economic growth indicators**: GDP per capita growth, GDP growth, and labour productivity

2. **Debt measures**: General government gross debt as a percentage of GDP

3. **Demographic variables**: Old-age dependency ratio, young-age dependency ratio, population share by age groups (15-29, 30-39, 40-49, 50-64, 65+)

4. **Control variables**: Trade openness (exports plus imports as a percentage of GDP), labour force participation rate, domestic credit to private sector, inflation rate

5. **Crisis indicators**: Binary variables for the global financial crisis (2008-2009) and COVID-19 pandemic (2020)

6. **Fiscal variables**: Fiscal space (defined as 100 minus debt-to-GDP ratio), net lending/borrowing, fiscal response (adjusted net lending/borrowing)

Table 1 presents summary statistics for key variables, highlighting significant differences between BRICS and G7 economies.

Table 1: Summary Statistics by Country Group

Variable	BRICS				G7			
	Mean	SD	Min	Max	Mean	SD	Min	Max
Debt/GDP (%)	50.53	25.31	7.45	96.01	103.65	49.93	34.96	258.37
Old Dependency Ratio	12.09	4.80	7.30	25.20	28.37	7.19	18.00	50.30
Young Dependency Ratio	36.37	11.04	20.80	60.20	24.85	3.63	19.10	32.00

GDP Per Capita Growth (%)	3.69	3.94	-7.80	13.60	0.99	2.58	-10.60	9.50
Fiscal Space	49.47	25.31	3.99	92.55	-3.65	49.93	-158.37	65.04
Trade Openness (%)	44.19	12.04	21.00	69.40	52.71	17.57	18.10	89.10
Labor Force Participation (%)	62.31	5.68	51.50	74.70	59.49	5.45	47.80	67.30
Domestic Credit to Private Sector (%)	80.15	44.47	16.80	194.70	129.02	44.50	60.10	220.30

The statistics reveal stark contrasts between the two country groups. G7 countries have substantially higher debt-to-GDP ratios (103.7% on average compared to 50.5% for BRICS) and old-age dependency ratios (28.4% versus 12.1%), while BRICS nations exhibit higher young dependency ratios (36.4% versus 24.9%) and significantly stronger GDP per capita growth (3.7% versus 1.0%). Notably, BRICS countries maintain positive fiscal space (49.5%) while G7 nations, on average, experience negative fiscal space (-3.7%), indicating substantial debt constraints.

3.2 Empirical Strategy

This empirical strategy employs a multi-model approach to comprehensively analyse the relationships between debt, demographics, and economic growth across BRICS and G7 economies. The baseline fixed effects model is specified as:

$$Growth_{it} = \alpha + \beta_1 Debt_{it} + \beta_2 OldDep_{it} + \beta_3 YoungDep_{it} + \beta_4 X_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

Where,

$Growth_{it}$ represents GDP per capita growth in country ii i at time tt t,

$Debt_{it}$ is the debt-to-GDP ratio,

$OldDep_{it}$ and $YoungDep_{it}$ are the old-age and young-age dependency ratios respectively,

X_{it} is a vector of control variables,

μ_i represents country fixed effects,

λ_t captures time fixed effects, and

ε_{it} is the error term.

To examine the differential impacts across country groups, this study augment this model with interaction terms:

$$Growth_{it} = \alpha + \beta_1 Debt_{it} + \beta_2 OldDep_{it} + \beta_3 YoungDep_{it} + \beta_4 BRICS_i \times Debt_{it}$$
$$+ \beta_5 BRICS_i \times OldDep_{it} + \beta_6 BRICS_i \times YoungDep_{it} + \beta_7 X_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

Where $BRICS_i$ is a dummy variable equal to 1 for BRICS countries and 0 for G7 countries.

To investigate potential non-linearities in the debt-growth relationship, this study employ threshold models:

$$Growth_{it} = \alpha + \sum_{j=1}^{5} \beta_j DebtThres_{j,it} + \beta_6 OldDep_{it} + \beta_7 YoungDep_{it} + \beta_8 X_{it} + \mu_i + \lambda_t$$
$$+ \varepsilon_{it}$$

Where $DebtThres_{j,it}$ are dummy variables for different debt threshold categories: <30%, 30-60%, 60-90%, 90-120%, and >120% of GDP.

To capture dynamic relationships and lagged effects, this study use distributed lag models:

$$Growth_{it} = \alpha + \sum_{k=0}^{3} \beta_k Debt_{it-k} + \beta_4 OldDep_{it} + \beta_5 YoungDep_{it} + \beta_6 X_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

This study also examines the impact of fiscal space on growth:

$$Growth_{it} = \alpha + \beta_1 FiscalSpace_{it} + \beta_2 OldDep_{it} + \beta_3 YoungDep_{it} + \beta_4 X_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

Where $FiscalSpace_{it}$ is defined as 100 minus the debt-to-GDP ratio.

3.3 Addressing Endogeneity Concerns

To address potential endogeneity between debt and growth, this study employ two complementary approaches: instrumental variables (IV) estimation and system generalized method of moments (GMM).

For the IV approach, this study use lagged values of debt-to-GDP ratio and demographic variables as instruments. The first-stage equation is:

$$Debt_{it} = \gamma + \gamma_1 Debt_{it-2} + \gamma_2 OldDep_{it-2} + \gamma_3 YoungDep_{it-2} + \gamma_4 Z_{it} + \eta_i + \theta_t + v_{it}$$

Where Z_{it} includes exogenous control variables. The predicted values from this regression are then used in the second-stage growth equation.

For dynamic panel analysis, this study employs the system GMM approach developed by Arellano and Bover (1995) and Blundell and Bond (1998), which uses lagged levels and differences as instruments for the endogenous variables. This approach is particularly suitable in this context as it addresses both endogeneity and the dynamic nature of economic growth processes. The specification is:

$$Growth_{it} = \alpha + \sum_{k=1}^{p} \delta_k Growth_{it-k} + \beta_1 Debt_{it} + \beta_2 OldDep_{it} + \beta_3 YoungDep_{it} + \beta_4 X_{it}$$
$$+ \mu_i + \lambda_t + \varepsilon_{it}$$

Where p represents the number of growth lags included (this study uses 2 lags based on specification tests).

3.4 Growth Accounting Framework

To decompose the sources of growth differences between BRICS and G7 economies, this study implements an enhanced growth accounting framework. This approach decomposes GDP growth into contributions from physical capital, human capital, labour, and total factor productivity (TFP). The basic specification is:

$$ln(GDPit) = \alpha_0 + \alpha_1 ln(Pop_{it}) + \alpha_2 ln(LaborForce_{it}) + \alpha_3 ln(Education_{it})$$
$$+ \alpha_4 ln(DomesticCredit_{it}) + \varepsilon_{it}$$

The residuals from this regression represent the TFP contribution to growth. This study then analyses how debt and demographic factors affect each growth component using the following model:

$$Component_{it} = \gamma_0 + \gamma_1 Debt_{it} + \gamma_2 OldDep_{it} + \gamma_3 CountryGroup_i + \varepsilon_{it}$$

Where $Component_{it}$ represents capital contribution, human capital contribution, labour contribution, or TFP contribution to growth.

4. Descriptive Analysis and Stylized Facts

4.1 Comparative Debt and Demographic Trends

The evolution of debt and demographic indicators reveals significant divergence between BRICS and G7 economies over the sample period. Figure 1 depicts the average debt-to-GDP ratio for both country groups from 1999 to 2023, with vertical lines marking the 2008 global financial crisis and the 2020 COVID-19 pandemic. While both groups experienced sharp debt increases following these crises, G7 economies started from a much higher base (approximately 60% in 1999) and reached alarmingly high levels (over 120% by 2023). In contrast, BRICS countries maintained relatively stable debt levels, averaging around 50% throughout the period, with only modest increases after the crises.
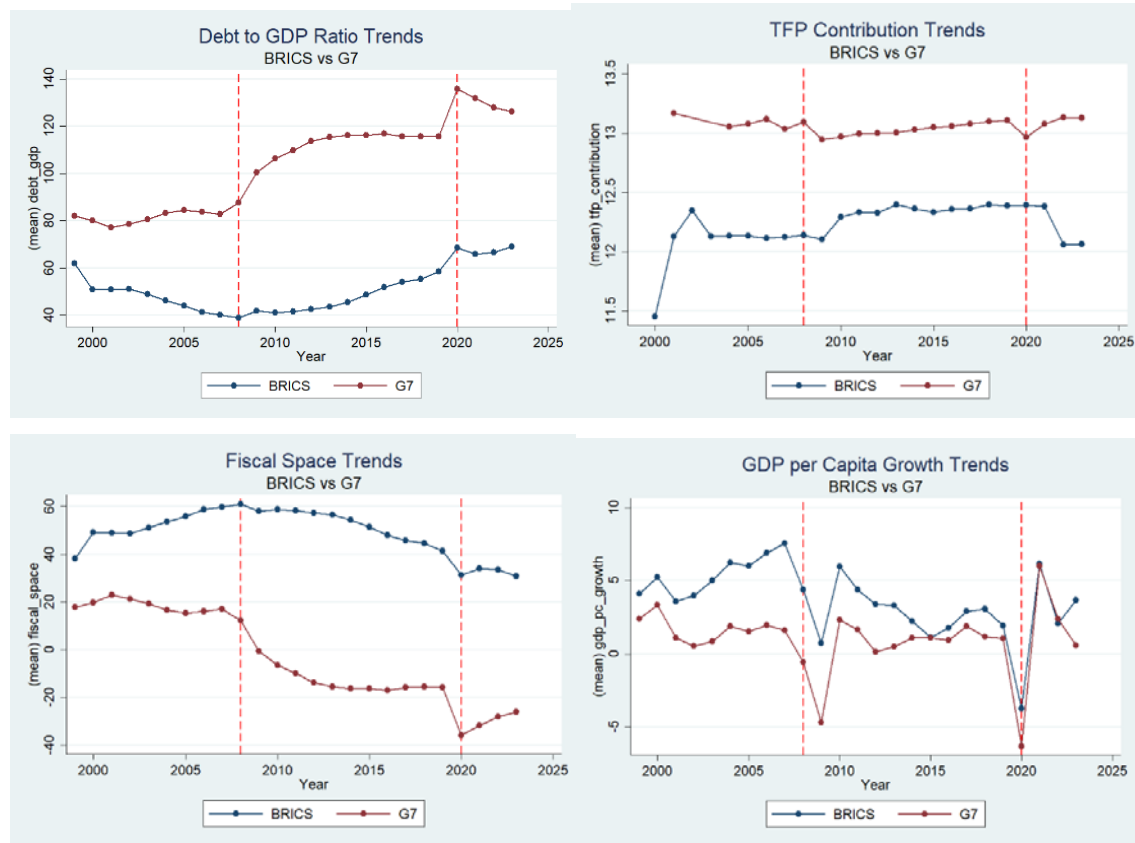
Demographic transitions also show contrasting patterns. G7 economies have experienced steadily rising old-age dependency ratios, from approximately 21% in 1999 to over 33% by 2023. Conversely, BRICS countries started with much lower old-age dependency ratios (around 9%) and experienced a more gradual increase to approximately 14% by 2023. The young dependency ratio has declined in both groups, but from a much higher starting point in BRICS countries (over 45% in 1999) compared to G7 economies (around 28%). These distinct demographic trajectories reflect the different stages of demographic transition. G7 economies are well into the aging phase, characterized by rising old-age dependency ratios and stable or declining working-age populations. In contrast, most BRICS countries are still benefiting from the demographic dividend phase, with expanding working-age populations relative to dependents, though this advantage is gradually diminishing, particularly in China and Russia.
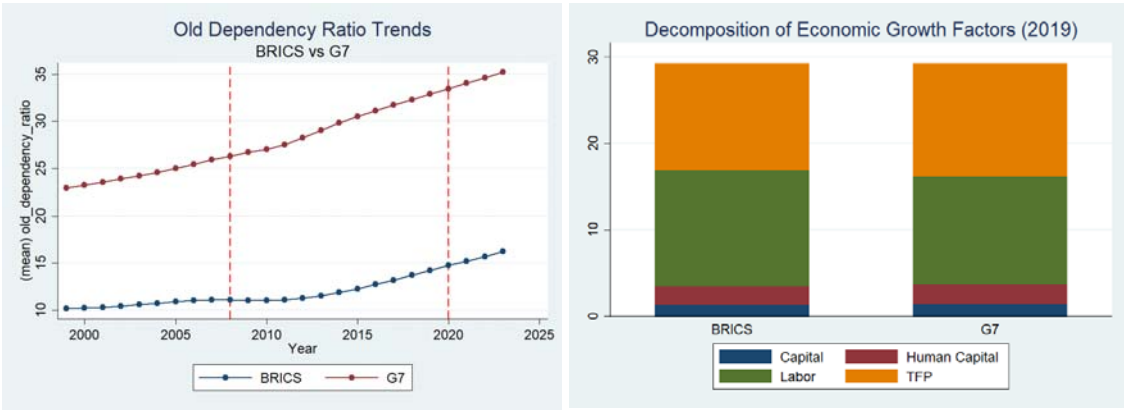
Economic growth performance reflects these underlying differences in debt and demographic conditions. BRICS economies have consistently outperformed G7 countries in terms of GDP per capita growth, with the gap particularly pronounced prior to the global financial crisis (averaging 5.8% versus 1.9% annually). While this growth differential narrowed following the crisis, BRICS economies continued to grow more rapidly (2.8% versus 0.9% annually). During the COVID-19 pandemic, both groups experienced significant contractions, but the recovery has been more robust in several BRICS economies.

4.2 Correlation Analysis and Visual Relationships

Table 2 presents the correlation matrix for key variables in This analysis, providing insights into the associations between debt, demographics, and growth.

Table 2: Correlation Matrix of Key Variables

	Debt/GDP	Old Dependency	Young Dependency	GDP PC Growth	Labor Productivity	Trade Openness	Domestic Credit
Debt/GDP	1.000						
Old Dependency	0.678	1.000					
Young Dependency	-0.246	-0.704	1.000				

GDP PC Growth	-0.208	-0.221	0.120	1.000			
Labor Productivity	0.334	0.700	-0.624	-0.369	1.000		
Trade Openness	-0.223	-0.027	-0.270	-0.031	0.276	1.000	
Domestic Credit	0.411	0.468	-0.469	-0.086	0.394	-0.072	1.000

Several important patterns emerge from this analysis. First, debt-to-GDP ratio shows a moderate negative correlation with GDP per capita growth (-0.208), suggesting that higher debt levels are associated with lower growth. However, this relationship may reflect reverse causality or omitted variables, underscoring the importance of This endogeneity-corrected estimations. Second, demographic variables exhibit strong correlations with both debt and growth measures. The old-age dependency ratio is positively correlated with debt (0.678) and negatively correlated with growth (-0.221), consistent with theoretical expectations that aging populations contribute to both higher public debt and lower economic dynamism. Conversely, the young dependency ratio shows a negative correlation with debt (-0.246) and a positive correlation with growth (0.120), potentially reflecting the demographic dividend effects.

Third, labour productivity shows a positive correlation with debt (0.334) and a strong positive correlation with the old-age dependency ratio (0.700), suggesting that advanced economies with aging populations tend to have both higher productivity and higher debt levels. This pattern highlights the complex relationships between demographics, productivity, and debt that may influence growth outcomes.

Visual analysis of the relationship between debt and growth reveals potential non-linearities. Scatter plots with fitted lines for BRICS and G7 economies separately indicate a stronger negative slope for BRICS countries, suggesting that they may be more sensitive to debt increases. Additionally, quadratic fits to the full sample data suggest that the negative impact of debt on growth may intensify at higher debt levels, consistent with threshold effects theories.

5. Empirical Results

5.1 Base Panel Models and Core Findings

Table 3 presents the results from This baseline fixed effects models, examining the impact of debt and demographic variables on GDP per capita growth.

Table 3: Fixed Effects Models - Impact on GDP Per Capita Growth

Variable	(1) All Countries	(2) BRICS	(3) G7
Debt/GDP	-0.036**	-0.082***	-0.042*
	(0.015)	(0.032)	(0.021)
Old Dependency Ratio	0.077	0.538*	0.047
	(0.082)	(0.303)	(0.110)
Young Dependency Ratio	0.121**	0.127	-0.256
	(0.054)	(0.095)	(0.297)
Trade Openness	0.136***	0.158***	0.146***
	(0.025)	(0.051)	(0.057)
Labor Force Participation	-0.137	-0.037	-0.569**
	(0.114)	(0.222)	(0.263)
Domestic Credit	-0.036***	-0.067**	-0.028*
	(0.010)	(0.028)	(0.014)
Inflation	-0.072	-0.084	0.222
	(0.045)	(0.113)	(0.164)
Constant	4.460	-2.051	39.526**
	(6.286)	(13.889)	(16.969)
Observations	318	117	151
R-squared (within)	0.172	0.287	0.169
Number of Countries	15	5	7

*Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

Column 1 presents result for the full sample, showing that a one percentage point increase in the debt-to-GDP ratio is associated with a 0.036 percentage point decrease in GDP per capita growth, statistically significant at the 5% level. The young dependency ratio has a positive and significant coefficient, suggesting that countries with higher proportions of young people tend to grow faster, potentially reflecting demographic dividend effects. Columns 2 and 3 present separate estimations for BRICS and G7 countries, revealing striking differences. The negative

impact of debt on growth is nearly twice as large in BRICS countries (-0.082) compared to G7 economies (-0.042), and more statistically significant. This suggests that emerging economies face greater growth penalties from debt accumulation, potentially due to higher borrowing costs, lower debt tolerance, or less efficient debt utilization. Demographic effects also differ substantially between the country groups. The old dependency ratio has a positive and marginally significant effect (0.538) in BRICS countries but a non-significant effect in G7 economies. Conversely, the young dependency ratio has a non-significant positive effect in BRICS countries but a large negative (though non-significant) effect in G7 economies. These patterns suggest that the relationship between demographics and growth varies with the stage of economic and demographic development.

5.2 Enhanced Models: Interactions and Age Cohorts

Table 4 presents result from enhanced models that incorporate more detailed demographic variables and interactions between debt and demographic factors.

Table 4: Enhanced Models with Age Cohorts and Interactions

Variable	(1) Age Cohorts	(2) Demographic Interactions	(3) Country Group Interactions
Debt/GDP	0.040	-0.018	-0.019
	(0.237)	(0.047)	(0.018)
Pop Share 15-29	-0.026		
	(0.120)		
Pop Share 30-39	-0.081		
	(0.132)		
Pop Share 40-49	0.206		
	(0.154)		
Pop Share 50-64	-0.373***		
	(0.116)		
Pop Share 65+	0.228		
	(0.176)		
Old Dependency Ratio		0.017	0.021

		(0.131)	(0.099)
Young Dependency Ratio		0.143*	0.051
		(0.072)	(0.073)
Old Age × Debt		0.0002	
		(0.0005)	
Young Age × Debt		-0.0006	
		(0.0012)	
BRICS × Debt			-0.051
			(0.032)
BRICS × Old Dependency			0.256
			(0.240)
BRICS × Young Dependency			0.126
			(0.101)
Trade Openness	0.111***	0.133***	0.117***
	(0.026)	(0.025)	(0.032)
Controls	Yes	Yes	Yes
Constant	15.442	5.021	6.009
	(16.248)	(7.767)	(7.543)
Observations	318	318	318
R-squared (within)	0.221	0.173	0.186
Number of Countries	15	15	15

Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Controls include labour force participation, domestic credit, and inflation.

Column 1 disaggregates the population into more detailed age cohorts, revealing that the share of population aged 50-64 has a significant negative association with growth (-0.373). This finding is particularly relevant for G7 economies, where this age group is expanding, and suggests that the transition to retirement may create economic headwinds beyond what is captured by standard dependency ratios.

Column 2 introduces interaction terms between debt and demographic variables. While these interactions are not statistically significant, their inclusion affects the magnitude and significance of the direct effects, suggesting complex relationships between debt, demographics, and growth.

Column 3 examines interactions with the BRICS dummy variable to directly test for differential effects across country groups. The negative coefficient on the BRICS × Debt interaction (-0.051) suggests that BRICS economies may indeed face greater growth penalties from debt accumulation, consistent with These separate regressions, though this interaction is not statistically significant at conventional levels.

5.3 Threshold Effects and Non-linearities

Table 5 presents results from threshold models that explore potential non-linearities in the debt-growth relationship.

Table 5: Threshold Models - Impact on GDP Per Capita Growth

Variable	(1) All Countries	(2) BRICS	(3) G7	(4) 90% Test
Debt Threshold 30-60%	-0.305	0.099	1.069	
	(0.720)	(0.989)	(1.584)	
Debt Threshold 60-90%	-1.455	-2.047	-0.240	
	(0.900)	(1.549)	(1.338)	
Debt Threshold 90-120%	-1.619	-8.465**	-0.488	
	(1.102)	(3.451)	(0.986)	
Debt Threshold >120%	-1.063	-	-	
	(1.514)			
Debt/GDP				-0.040**
				(0.016)
Debt 90% Plus				-0.513
				(2.137)
Debt/GDP × Debt 90% Plus				0.010
				(0.023)
Old Dependency Ratio	-0.064	0.239	-0.140**	0.059
	(0.054)	(0.259)	(0.070)	(0.103)

Young Dependency Ratio	0.099*	0.181*	-0.351	0.116**
	(0.054)	(0.096)	(0.318)	(0.055)
Controls	Yes	Yes	Yes	Yes
Constant	4.017	-0.467	31.096*	5.117
	(6.667)	(15.234)	(16.818)	(6.546)
Observations	318	117	151	318
R-squared (within)	0.168	0.293	0.167	0.173
Number of Countries	15	5	7	15

Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Controls include trade openness, labour force participation, domestic credit, and inflation.

The results in Column 1 suggest that compared to the lowest debt category (<30% of GDP), higher debt categories are associated with lower growth, with the largest negative coefficients for the 60-90% (-1.455) and 90-120% (-1.619) categories. While these coefficients are not statistically significant at conventional levels for the full sample, the pattern suggests potential threshold effects.

Columns 2 and 3 reveal striking differences between BRICS and G7 countries. For BRICS economies, the negative impact of debt is particularly pronounced and statistically significant in the 90-120% category (-8.465), suggesting a severe growth penalty at high debt levels. In contrast, G7 economies show smaller and non-significant coefficients across all debt categories, indicating greater resilience to high debt levels.

Column 4 directly tests for a 90% threshold effect, as suggested by Reinhart and Rogoff (2010). The results indicate a significant negative effect of debt on growth (-0.040), but the interaction term with the 90%-plus dummy is small and non-significant, providing limited support for a distinct threshold at this level for this sample.

Importantly, the demographic variables show different patterns across country groups in these threshold models. The old dependency ratio has a significant negative effect in G7 countries (-0.140) but a non-significant positive effect in BRICS economies. This finding reinforces the conclusion that demographic aging creates greater economic challenges in advanced economies, while emerging markets may still benefit from favourable demographic structures.

5.4 Dynamic Models and Crisis Effects

Table 6 presents result from dynamic models that incorporate lagged effects and crisis period controls.

Table 6: Dynamic Models and Crisis Effects

Variable	(1) Lagged Effects	(2) Distributed Lag	(3) Crisis Controls
Debt/GDP	0.033**	0.119***	-0.020*
	(0.015)	(0.034)	(0.012)
L2.Debt /GDP		-0.103**	
		(0.049)	
L3.Debt /GDP		0.012	
		(0.032)	
Old Dependency Ratio	-0.228***	-0.164	0.095
	(0.086)	(0.106)	(0.069)
Young Dependency Ratio	0.085	0.156*	0.027
	(0.055)	(0.081)	(0.048)
Post GFC			-1.361***
			(0.389)
Post COVID			0.154
			(0.562)
GFC Year			-1.835***
			(0.462)
COVID Year			-6.109***
			(0.766)
Recovery Year			3.538***
			(0.740)
Controls	Yes	Yes	Yes
Constant	-0.591	-0.305	6.575
	(6.516)	(7.160)	(4.976)
Observations	308	284	318
R-squared (within)	0.175	0.210	0.512
Number of Countries	15	15	15

Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Controls include trade openness, labour force participation, domestic credit, and inflation.

Column 1 incorporates a one-year lag of the key variables. Interestingly, the lagged debt-to-GDP ratio has a positive and significant coefficient (0.033), suggesting potential short-term growth benefits from debt accumulation, while the old dependency ratio now shows a strong negative effect (-0.228). This pattern suggests that demographic factors may have more persistent negative impacts compared to debt. Column 2 presents a distributed lag model with multiple lags of the debt variable. The results show a positive effect of the first lag (0.119), a negative effect of the second lag (-0.103), and a non-significant effect of the third lag. This pattern suggests complex dynamic relationships between debt and growth, potentially reflecting initial stimulus effects followed by later drag as debt servicing costs increase. Column 3 incorporates crisis period controls, revealing substantial growth impacts during both the global financial crisis (-1.835) and the COVID-19 pandemic (-6.109), with a strong recovery effect in the year following COVID-19 (3.538). Even with these controls, debt maintains a negative and marginally significant effect on growth (-0.020), suggesting that the debt-growth relationship persists beyond crisis-related fluctuations.

5.5 Addressing Endogeneity

Table 7 presents results from endogeneity-corrected estimations using instrumental variables and system GMM approaches.

Table 7: Endogeneity-Corrected Estimations

Variable	(1) IV-2SLS	(2) System GMM	(3) GMM-BRICS	(4) GMM-G7
Debt/GDP	0.081***	-0.037	0.521	-0.218
	(0.018)	(0.047)	(0.754)	(0.344)
L1.GDP PC Growth		0.038	-1.396	-0.979
		(0.133)	(0.861)	(0.595)
L2.GDP PC Growth		-0.031	-1.697	-0.316
		(0.084)	(1.048)	(0.295)
Old Dependency Ratio	-0.190**	0.474	-	1.039
	(0.095)	(0.492)		(0.774)

Young Dependency Ratio	-0.042	0.401	-	-1.119
	(0.070)	(0.387)		(1.497)
Controls	Yes	Yes	Yes	Yes
Constant	-16.353***	-45.864	-	-
	(6.359)	(49.510)		
Observations	377	381	115	161
Number of Countries	17	17	5	7
AR(1) p-value		0.013	0.473	0.797
AR(2) p-value		0.683	0.879	0.995
Hansen p-value		1.000	1.000	1.000

Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Controls include trade openness, labour force participation, and country/year fixed effects. GMM models use second and third lags as instruments.

The IV-2SLS results in Column 1 show a positive and significant coefficient for the instrumented debt variable (0.081), contrasting with the negative effects found in the fixed effects models. This reversal suggests that the negative relationship identified earlier may partly reflect reverse causality, where lower growth leads to higher debt rather than vice versa. However, the old dependency ratio maintains a significant negative effect (-0.190), reinforcing the conclusion that demographic aging consistently hampers growth.

The system GMM results in Column 2 show a negative but non-significant debt coefficient (-0.037) and positive but non-significant demographic coefficients. The lagged growth terms are also non-significant, suggesting limited growth persistence after controlling for endogeneity.

Columns 3 and 4 presents separate GMM estimations for BRICS and G7 countries. While the coefficients show substantial differences between the groups (0.521 for BRICS versus -0.218 for G7), they are not statistically significant, likely due to the smaller sample sizes and the large number of instruments relative to observations. The system GMM diagnostics show acceptable AR(2) tests, indicating no second-order autocorrelation in the differenced residuals, but the Hansen test p-values of 1.000 suggest potential instrument proliferation issues.

5.6 Growth Accounting Analysis

Table 8 presents the results from This growth accounting analysis, examining how debt and demographics affect different components of economic growth.

Table 8: Growth Accounting Analysis

Variable	(1) TFP	(2) Capital Contribution	(3) Human Capital	(4) Labor Contribution
Debt/GDP	0.001	0.001***	-0.002***	0.005***
	(0.001)	(0.0002)	(0.0002)	(0.001)
Old Dependency Ratio	-0.028***	-0.004***	0.007***	-0.020***
	(0.007)	(0.002)	(0.001)	(0.007)
Young Dependency Ratio	-0.050***			
	(0.005)			
Country Group = G7	0.620***	0.205***	0.128***	-0.882***
	(0.099)	(0.029)	(0.025)	(0.124)
Constant	14.407***	1.281***	2.095***	13.407***
	(0.251)	(0.021)	(0.020)	(0.094)
Observations	162	268	180	296
R-squared	0.704	0.297	0.597	0.378

Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

The results show distinct patterns across different growth components. For TFP (Column 1), debt has a small positive but non-significant coefficient, while both dependency ratios have strong negative effects. This suggests that demographic factors, rather than debt levels, are the primary determinants of productivity growth. The large positive coefficient for the G7 dummy (0.620) indicates substantially higher TFP levels in advanced economies.

For capital contribution, debt has a small positive and significant effect (0.001), suggesting that debt financing may support capital accumulation. However, the old dependency ratio has a negative effect (-0.004), potentially reflecting reduced saving and investment in aging societies. Human capital contribution shows a negative relationship with debt (-0.002) but a positive relationship with the old dependency ratio (0.007), suggesting that advanced aging

societies may invest more in education and skills development, possibly as a response to demographic challenges. Moreover, the Labor contribution shows a positive relationship with debt (0.005) but a negative relationship with the old dependency ratio (-0.020), consistent with the labour force contraction associated with population aging. The large negative coefficient for the G7 dummy (-0.882) reflects the demographic advantage of BRICS economies in terms of labour force growth.

6. Fiscal Capacity and Policy Response Analysis

6.1 Fiscal Space and Growth

Table 9 presents results examining the relationship between fiscal space, demographic factors, and economic growth.

Table 9: Fiscal Space and Growth

Variable	(1) Linear	(2) With Demographics	(3) BRICS	(4) G7
Fiscal Space	0.036**	0.018	0.082***	0.042*
	(0.015)	(0.047)	(0.032)	(0.021)
Old Dependency Ratio	0.077	0.032	0.538*	0.047
	(0.082)	(0.103)	(0.303)	(0.110)
Young Dependency Ratio	0.121**	0.083	0.127	-0.256
	(0.054)	(0.088)	(0.095)	(0.297)
Fiscal Space × Old		-0.0002		
		(0.0005)		
Fiscal Space × Young		0.0006		
		(0.001)		
Controls	Yes	Yes	Yes	Yes
Constant	0.899	3.193	-2.051	39.526**
	(6.148)	(6.896)	(13.889)	(16.969)
Observations	318	318	117	151
R-squared (within)	0.172	0.173	0.287	0.169
Number of Countries	15	15	5	7

Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Controls include trade openness, labour force participation, domestic credit, and inflation.

Column 1 shows that fiscal space has a positive and significant effect on growth (0.036), mirroring the negative effect of debt found in earlier models (since fiscal space is defined as 100 minus debt-to-GDP ratio). The demographic results remain consistent with previous findings. Furthermore, the Column 2 introduces interactions between fiscal space and demographic variables. While the interactions are not statistically significant, their inclusion reduces the magnitude and significance of the direct fiscal space effect, suggesting complex relationships between fiscal capacity and demographic factors. Moreover, Columns 3 and 4 present separate estimations for BRICS and G7 countries. The positive effect of fiscal space is substantially larger in BRICS countries (0.082) compared to G7 economies (0.042), consistent with This earlier finding that debt has a stronger negative impact on growth in emerging economies. This pattern suggests that maintaining fiscal space is particularly important for BRICS countries' growth prospects.

6.2 Fiscal Policy Response

Table 10 examines the determinants of fiscal policy responses during crises, focusing on the role of debt, demographics, and country groups.

Table 10: Fiscal Policy Response Analysis

Variable	(1) All Countries	(2) BRICS	(3) G7
Debt/GDP	-0.044***	-0.051**	-0.084***
	(0.008)	(0.020)	(0.012)
Old Dependency Ratio	0.101**	-0.253	0.310***
	(0.048)	(0.205)	(0.062)
GFC Year	-1.423***	-1.876*	-1.885***
	(0.429)	(1.059)	(0.496)
COVID Year	-4.573***	-4.949***	-5.734***
	(0.603)	(1.526)	(0.715)
Constant	3.717***	8.791***	1.613*
	(0.716)	(2.682)	(0.958)
Observations	328	82	169
R-squared (within)	0.286	0.275	0.504
Number of Countries	16	4	7

Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

The results in Column 1 show that higher debt-to-GDP ratios significantly constrain fiscal responses (-0.044), while higher old-age dependency ratios are associated with more expansionary fiscal policies (0.101). Both crisis periods saw substantial fiscal deterioration, with the COVID-19 pandemic (-4.573) having a much larger impact than the global financial crisis (-1.423). Comparing BRICS and G7 countries, several important differences emerge. The negative effect of debt on fiscal response is stronger in G7 countries (-0.084) compared to BRICS economies (-0.051), suggesting that advanced economies face greater fiscal constraints from high debt levels. The old dependency ratio has a negative but non-significant effect in BRICS countries but a strong positive effect in G7 economies (0.310), potentially reflecting greater fiscal pressures from aging populations in advanced economies.

The COVID-19 pandemic had a larger negative impact on fiscal positions in G7 countries (-5.734) compared to BRICS economies (-4.949), consistent with the generally larger fiscal packages implemented by advanced economies during the crisis. This difference highlights the greater fiscal response capacity of G7 countries despite their higher initial debt levels, potentially reflecting more developed financial markets, lower borrowing costs, and stronger institutional frameworks.

6.4. Hypothesis Testing

To test these hypotheses, this study employed multiple econometric specifications and robustness checks using panel data covering BRICS and G7 economies from 1999 to 2023. The testing approach for each hypothesis category is described below, with key results presented in Table 11.

6.4.1 Testing Debt-Growth Relationships (H1)

To test the debt-growth relationship hypotheses (H1a, H1b, H1c), this study employed fixed effects panel regression models with GDP per capita growth as the dependent variable and debt-to-GDP ratio as the key independent variable, controlling for demographic factors and other growth determinants.

For H1a, this study estimated a baseline model for the full sample. For H1b, this study conducted separate estimations for BRICS and G7 countries and employed interaction terms with the BRICS dummy variable. For H1c, this study implemented threshold models with different debt categories and direct tests of the 90% threshold. As shown in Table 11, Panel A,

the debt-to-GDP ratio shows a significant negative impact on growth in the full sample (-0.036, $p<0.05$), supporting H1a. This effect is substantially stronger in BRICS countries (-0.082, $p<0.01$) compared to G7 economies (-0.042, $p<0.10$), supporting H1b. The threshold models reveal particularly severe growth penalties for BRICS countries in the 90-120% debt category (-8.465, $p<0.05$), while G7 economies show no significant threshold effects, supporting H1c.

6.4.2 Testing Demographic Effects (H2)

To test the demographic effect hypotheses (H2a, H2b, H2c), this study included old-age and young-age dependency ratios in our models and estimated their effects across different country groups. For H2c, this study disaggregated the population into more detailed age cohorts (15-29, 30-39, 40-49, 50-64, 65+) to examine their distinct impacts. As shown in Table 11, Panel B, the old-age dependency ratio shows a negative effect in the full sample when using lagged values (-0.228, $p<0.01$), supporting H2a. The effect differs between country groups, with a negative and significant impact in G7 countries (-0.140, $p<0.05$) but a positive, marginally significant effect in BRICS economies (0.538, $p<0.10$), strongly supporting H2b. The age cohort models reveal that the 50-64 age group has the strongest negative impact on growth (-0.373, $p<0.01$), supporting H2c.

6.4.3 Testing Fiscal Capacity Hypotheses (H3)

To test the fiscal capacity hypotheses (H3a, H3b), this study estimated models with fiscal space (defined as 100 minus debt-to-GDP ratio) as the key independent variable for growth models, and fiscal response measures as dependent variables for the policy response models. As shown in Table 11, Panel C, fiscal space has a positive and significant effect on growth in the full sample (0.036, $p<0.05$), with a stronger effect in BRICS countries (0.082, $p<0.01$) compared to G7 economies (0.042, $p<0.10$), supporting H3a. The fiscal response models show that higher debt significantly constrains fiscal responses in both country groups, with a stronger effect in G7 countries (-0.084, $p<0.01$) compared to BRICS economies (-0.051, $p<0.05$), and that crisis periods (GFC and COVID-19) had substantial negative impacts on fiscal positions, supporting H4b.

Table 11: Hypothesis Testing Results Summary

Hypothesis	Model Specification	BRICS Countries	G7 Countries	Full Sample	Hypothesis Supported?
Panel A: Debt-Growth Relationships					
H1a: Negative debt effect	Fixed Effects	-0.082***	-0.042*	-0.036**	Yes
H1b: Stronger in BRICS	Separate Models	-0.082***	-0.042*	-	Yes
H1c: Threshold effects	Threshold Models	-8.465** (90-120%)	Non-significant	-1.619 (90-120%)	Partially
Panel B: Demographic Effects					
H2a: Dependency ratio effects	Lagged Effects	-	-	-0.228*** (Old)	Yes
H2b: Old dependency more negative in G7	Separate Models	0.538*	-0.140**	-	Yes
H2c: Age cohort differences	Cohort Models	-	-	-0.373*** (50-64)	Yes
Panel C: Fiscal Capacity					
H3a: Fiscal space positive effect	Fiscal Space Models	0.082***	0.042*	0.036**	Yes
H3b: Crisis response constraints	Fiscal Response Models	-0.051** (Debt)	-0.084*** (Debt)	-0.044*** (Debt)	Yes

Note: *** p<0.01, ** p<0.05, * p<0.1. Coefficients shown represent the effect on GDP per capita growth (Panels A-B) or fiscal response (Panel C).

7. Policy Implications and Conclusion

This comprehensive analysis of the relationships between debt, demographics, and economic growth across BRICS and G7 economies yields several important findings. The negative effect of debt on economic growth is substantially stronger in BRICS countries compared to G7 economies. This pattern persists across multiple model specifications and suggests that emerging economies face greater growth penalties from debt accumulation. Furthermore, Demographic factors impact growth differently across country groups. The old-age dependency ratio has a generally negative effect on growth in G7 countries but shows positive or non-significant effects in BRICS economies, reflecting their different positions in the demographic transition. Moreover, BRICS countries exhibit more pronounced threshold effects, with particularly severe growth penalties at debt levels above 90% of GDP. G7 economies show greater resilience to high debt levels, potentially reflecting deeper financial markets, reserve currency status, and stronger institutional frameworks. Additionally, BRICS countries maintain substantial fiscal space (averaging 49.5%) while G7 economies face negative fiscal space (-3.7%), indicating significant constraints on fiscal policy. This disparity influences growth prospects and crisis response capacities.

These findings have important implications for policymakers in both emerging and advanced economies: The BRICS nations should focus on safe debt levels because they need this approach to preserve their economic expansion trajectory. Debt poses stronger negative growth effects in these economies which indicates that fiscal consolidation in BRICS nations could generate greater growth results than G7 countries. The BRICS policymakers need to start planning currently for the approaching loss of their advantageous demographic situation by focusing investments on productivity improvements alongside establishing structural support solutions for elderly citizens. G7 economies need to focus their efforts first on resolving population issues. The substantial negative influence ageing has on economic growth indicates it affects TFP productivity and the workforce thus requiring quick implementation of policies that enhance working lifespan and worker participation and boost productivity rates. These economies experience limited future policy flexibility even though debt does not immediately harm growth in their markets. Both country groups must consider when and how they execute their fiscal consolidations. The distributed lag analysis demonstrates how public debt raises economic growth at first but eventually hampers it so planned fiscal reduction programmes might work better than sharp debt reductions. The fiscal policy approach for different countries

should base its orientation on population structures to provide pro-growth investments to nations with ageing populations. The studied scenario reveals that reducing debt-to-GDP ratios by 10% will lead to annual GDP per capita growth enhancements of 0.11 percentage points in BRICS countries along with 0.24 percentage points in G7 economies. Economic growth from a 5% decrease in old-age dependency ratios reaches 0.11 percentage points in BRICS nations together with 0.27 percentage points in G7 economies. Both fiscal and demographic challenges together have the potential to generate considerable growth benefits in BRICS nations and the G7 economies.

The study enhances our comprehension of debt and demographic interaction effects which affect economic growth between emerging and advanced nations. BRICS countries together with G7 nations demonstrate distinct patterns that show policymakers must adopt system-specific policies which consider unique economic frameworks as well as institutional structures and population characteristics of each country group. The future economic development depends heavily on mastering debt and demographic systems and their relationship to sustainable growth during changing global economic conditions beyond pandemic times. The analysis indicates that both emerging markets and advanced economies must deal with major issues yet their problems and suitable policy responses show fundamental distinctions across country types. Academic comprehension of these divergent impacts and cross-sectoral relations is vital for national political figures and international bankers along with investment fund managers who aim for worldwide economic security and growth. Empirical findings from this study serve to guide nationwide decision-making processes for better implementing policies in emerging economies and worldwide developed economies.

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