DYNAMIC PANEL ANALYSIS OF BRICS–G7 TRADE DYNAMICS: IMPLICATIONS FOR GLOBAL ECONOMIC GOVERNANCE AND INSTITUTIONAL REFORM

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1. Overview or Opening Section

The world of global trade has entered an era of radical change during which multipolarity emerges. Since the 1970s, the G7 economies have been the most important players influencing the economic governance, trade regulations, and institutional standards around the world, which include the United States, the United Kingdom, Canada, France, Germany, Italy, and Japan (Nasim et al., 2024). Their dominance entailed technological superiority and capital accumulation as well as gaining past mastery over international institutions like the IMF, World Bank, and WTO. However, the evolution of the BRICS bloc, consisting of Brazil, Russia, India, China and South Africa, has shifted the world economic power balance (Nach & Ncwadi, 2024). Currently, BRICS has positioned itself as a fast-moving section of GDP, technological advancements and trade movements, while raising concerns of Western orientation.

The history of BRICS and G7 shows their different but interconnected aspects. As compared to the G7, which is identified by economic maturity, stable political institutions and technological leadership, the BRICS economies showcase high growth potential, demographic advantages, growing consumption and regional assertive influence (Bawono et al., 2025). Their strategic significance extends beyond the economic to the geopolitical, since both determine the negotiations on global trade, finance on development and institutional reform discourses. The rising trade relations between BRICS and G7 indicate that such relations are highly interdependent. While BRICS widely depends on G7 markets and technology, G7 are progressively dependent on BRICS as suppliers of chains, natural resources and emerging consumer markets (Andal & Muratshina, 2022). For this reason, understanding BRICS-G7 trade dynamics is essential in the larger political economy of the world. With the global community losing its unipolarity, trade relations between the blocs

also determine the persistence of global value chains, technology diffusion trends and the development of multilateral governance.

In this regard, key questions raised such as:

I. What will be the evolution in trade rules in a multipolar world?

II. How will global organisations adapt to new economic realities?

III. Can BRICS create relevant alternatives towards G7-directed governance structures?

This chapter is intended to explore these questions by constructing and analysing the BRICS-G7 trade relations in a dynamic panel manner. The chapter assesses both the short-run and long-run determinants of trade within and between the blocs using sophisticated econometric methods, such as panel unit root tests, cointegration, ARDL models, and GMM estimations. The analysis will also contribute empirical evidence that the current institutional arrangements are still sufficient or the emergence of BRICS indicates the necessity of reforming the system. The chapter proceeds by establishing a theoretical base, reviewing the literature, methodology, and processes, and presents empirical findings, concluding with policy implications of global trade governance in a multipolar world.

Chapter Roadmap: In Section 2, the study will provide context on BRICS-G7 dynamics by looking at their geopolitical and historical context. Section 3 describes the conceptual and theoretical foundations of the paper, including a review of the empirical literature related to this area. Section 4 describes the trade and economic environment between the two blocs. Section 5 describes the methodological framework used, data architecture, as well as formal model specifications and the definitions of variables being used in this paper. Section 6 provides the empirical results and limitations of empirical findings as well as diagnostics and robustness checks. Sections 7 through 9 provide details on implications for governance, possible future directions and a final closing summary.

1.1 Chapter Objectives

The chapter is an empirical investigation of BRICS-G7 trade dynamics to determine their implications to global economic regulation and institutional reform. The main objectives will be to determine the short-run and long-run determinants of trade flows between the blocs, to assess the asymmetry in trade behavior as well as to measure whether the current multilateral institutions are sufficient in a multipolar world. The scope will concentrate on the macroeconomic and institutional variables that have an impact on bilateral trade and utilize a balanced panel data 1990-2020 on BRICS and G7 countries. It contributes to the testable evidence on heterogeneity, cointegration, policy lever in the reform, and creates a connection between trade theory and political economy to inform the debate around governance.

The research questions are formulated into the following testable objectives:

- Objective 1: The BRICS-G7 trade is influenced by economic foundations like GDP, FDI and ICT and institutional factors with great variation among blocs bigger uses of testing to slope variations and cointegration.
- Objective 2: There are asymmetric effects of short-run trade shocks such as exchange rate volatility, which will require adaptive governance reforms, with BRICS being more responsive than G7.
- Objective 3: There is long-run equilibrium in the trade relations, yet the existing institutions, including WTO and IMF, are not enough in the multipolar dynamics and prefer BRICS-led ones, like the NDB.

The GDP per capita is a dependent variable selected as a proxy of economic growth, and power of trade based on its use in the gravity models as a measure of market size and absorptive capacity to enable the elasticities to capture the institutional impacts of development by trade elasticity.

2. Historical and Geopolitical Context

The conceptual category of BRICS developed in the early twentieth century as a term to denote the rising economies of high growth with a growing global impact. Formalisation started in 2006 when Brazil, Russia, India and China started to coordinate diplomatically and was followed by South Africa in 2010. On the other hand, BRICS aimed at ensuring that the voice of developing nations was heard in the world economic system and creating South-South collaboration (Diko & Sempijja, 2021). Its emergence is also linked with the rapid economic growth, demographic and technological improvements. This evolved into an institutional identity of BRICS with annual summits, New Development Bank (NDB), the Contingency Reserve Arrangement (CRA), as well as synchronised trade reform in the global institution.

In contrast, the G7 was formed in the 1970s to counter worldwide economic turbulence, which was characterised by the oil crisis, inflation and currency instability. Initially identified as the largest and most developed economies in the world, the group proposed to coordinate the macroeconomics and ensure financial stability. The G7 started incorporating the trade policy, international security, financing development, climate change, and governance of technology over the decades (Duggan et al., 2022). Its institutional history is deeply rooted in the development of the new economic order, such as the creation and management of the IMF, World Bank and WTO. Also, being a group of developed democracies, G7 traditionally exercises the global system by controlling the trade regulations and financial system.

The BRICS and G7 are vastly different in terms of economic philosophy and priority in trade. The BRICS economies are more focused on development-based growth, industrial modernisation, technological modernisation as well as exports and investment opportunities in the global markets (Banik & Mawdsley, 2023). Resource security, competitive

manufacturability, and diversification of the market are usually their trade priorities. On the contrary, the G7 shares a liberal economic philosophy, connecting trade flows, regulation standards, intellectual property rights and high-value technological sectors. As G7 countries insist on remaining at the forefront of the global value chains structures, BRICS challenges structural inequalities within the trade regimes to seek more inclusive rules and representation of the rising economies.

BRICS and G7 economies are mutually reliant even though they are often perceived as systemic competitors. For instance, China is the largest trading partner of all G7 countries, while G7 markets are significant in BRICS exports of manufactured goods, commodities and services (Kamin & Langhammer, 2024). Hence, the differences in political regimes, economic models and geopolitical interests create competitive forces. The G7 perceives BRICS, especially China and Russia, as threats to the liberal rule-based order, while from BRICS's perspective, the G7 dominates international institutions. Therefore, this relationship is associated with structural interdependence linked to a multifaceted association wherein trade collaborations allow sustaining even strategic competition in global value chains.

Trade patterns between BRICS and G7 are affected heavily by geopolitical tensions (Gonchar et al., 2025). Supply chains, trade routes and investment flows have been changed by sanctions against Russia, US-China trade disputes, and technology restrictions. On the other hand, regional unrest and relations contribute to maritime routes, energy movement and commodity costs. In contrast, geopolitical friction tends to undermine bilateral trade, but can help progress the intra-BRICS cooperation and enhance cooperation with the Global South. Therefore, trade relationships between BRICS and G7 are not guided by market forces and exchange only, but by strategy and ideological values.

3. Conceptual and Theoretical Foundations

The chapter utilises the existing trade theory, political economy views on institutions and power, and the modern discussions of multiple poles of economic governance in the world. These strands, combined, present an idea of explaining BRICS-G7 trade dynamics. The empirical model employs natural logs of key explanatory variables, including GDP, FDI, ICT, exchange rates, trade openness, and institutional quality, to reflect elasticities, scale heterogeneity, and the multiplicative form of the gravity-type relationships.

3.1 Classical and "New" Trade Theories

The Heckscher-Ohlin (H-O) model offers a theoretical explanation for international trade, grounded in varying factor endowments. It assumes that nations export products that are intensive in their comparatively plentiful factors, such as labour, capital, or natural resources, and import products that reflect their relatively scarce factors of production (Lu, 2024). Recent reports still report empirical confirmation of H-O patterns despite the emergence of global value chains, which argues that the relative levels of factors continue to have a significant impact on trade designs between regions (Dewar & Kulkarni, 2025). This can be applied to BRICS-G7 trade, which suggests that relative labour abundance, natural resources, and human-capital intensity will still play a role in the determination of bilateral flows, but not enough to explain the full complexity of trade patterns. New Trade Theory (NTT) builds on these insights by adding increasing returns to scale, product differentiation, and monopolistic competition (Mohan, 2024). NTT assists in understanding why big, similarly developed economies participate in intra-industry trade strongly, where companies take advantage of the economies of scale and the variety desired by customers in their products. This is reflected in the existing intra-G7 trade and G7 exports of differentiated manufactured products and high-tech services. More and more advanced branches of BRICS

export, especially Chinese high-tech products and new Indian services, also suit the patterns of NTT. Thus, market size (GDP), technological capability, firm productivity, and ICT development are the key drivers of trade in the BRICS-G7 context, which further justifies their use in the empirical model. These theoretical assumptions are implemented in the gravity model as a common empirical tool. The bilateral trade in operational relation to the economic mass of trading partners, which is usually the GDP, income, or population, and negative to the cost of trade, which is the distance, tariffs, and regulatory barriers, is illustrated in structural gravity models. The current gravity models include multilateral resistance variables, which reflect the average trade frictions in every country with all its partners (Shepherd et al., 2019). This is integrated with policy variables like free-trade agreements, WTO membership, institutional quality, and regime of exchange rates. The log-linear version of the gravity equation has the benefit of stabilising variation across heterogeneous countries, and in this analysis, the logarithmic transformation of continuous variables can be interpreted as elasticities.

3.2 Political Economy: Institutions, Dependency and Power Shifts

Unlike the trade theory, which provides the economics of trade, political economy views emphasize the role of institutions and power arrangements in determining the results of trade. Liberal institutionalism focuses on how rule-based institutions, the WTO, IMF, and World Bank, cut the uncertainty and lock into cooperative deals, as well as open trading (Montoute, 2018). Dependency and world-systems approaches, however, emphasize the long-term existence of core-periphery structures, in which they claim that patterns of trade tend to reproduce uneven development and skewed bargaining power in favor of developed economies and the emerging ones. The emergence of BRICS has revived arguments about power transition in the world. BRICS is often represented as a reformist or anti-hegemonic

bloc aimed at rebalancing the control over the institutions traditionally filled by the US and G7 (Duggan et al., 2022; Haryono et al., 2024). This has been shown in the IMF quota reform support, creation of the New Development Bank (NDB) and Contingent Reserve Arrangement, and continued de-dollarisation and alternative payment system interest (Bastanifar et al., 2025). These changes impact the trade indirectly by imposing sanctions, accessing finance, and strategic alliances that change trade incentives. Comparative studies demonstrate systematic disparities between BRICS and G7 in the economic magnitude, the structure of trade, technological capacities, and diplomatic networks, in which BRICS bridges aggregate gaps, and also G7 institutional and technological benefits (Cochrane & Zaidan, 2024). Therefore, BRICS-G7 trade is ingrained in the wider political rivalry and does not entirely rely on the market.

3.3 Concepts of Multipolar Trade Governance

Multipolar trade governance is defined as the model whereby the rule-making power is decentralized and shared among several economic and political centres instead of being centralized into one powerful bloc. The BRICS approach does not solely aim to substitute the old institutions but to water down the Western supremacy and, in cases of need, create parallel mechanisms, including the NDB, trans-border settlement systems, and regional financing tools, as a way of becoming weaker to conditionality and sanctions (Montoute, 2018; Patrick, 2024). The strategies of diversification have an influence on the costs of trade and the perceptions of risks through alternative financing, currency swaps, connectivity initiatives, and new trade agreements. In a structural gravity approach, multipolarity influences the bilateral trade costs through sanctions, preferences, infrastructure corridors, as well as multilateral resistance terms, as network centrality changes. Based on this, the variables that measure institutional participation, exposure to sanctions, and congruence with

regulatory standards mediate the way economic fundamentals are converted into real trade patterns.

3.4 Expected Differences Between BRICS and G7 Trade Behaviour

There are a number of theoretical mechanisms that indicate that there are differences in trade behaviour between BRICS and G7 economies.

- **Factor endowment differences:** The BRICS economies are still more labour- and resource-intensive, and the G7 economies are capital- and technology-intensive. This will determine the composition and factor content of exports (Youseuf, 2024).
- **Trade structure differences:** Intra-industry trade in differentiated goods and advanced services is prevalent in G7 trade, which is in line with findings of recent studies and reports. The BRICS trade traditionally focused on inter-industry trade, but now, it begins to shift up the value chain (ANI, 2024a; ANI, 2024b; Cochrane and Zaidan, 2024).
- **Geopolitical behaviour:** BRICS states in the multipolar system usually trade with various partners to minimize dependency and geopolitical risk. In the meantime, G7 nations maintain power with the help of trade and finance instruments (Duggan et al., 2022; Haryono et al., 2024). These dynamics suggest that BRICS is more sensitive to institutional variables like sanctions, currency arrangements, and being a member of emerging financial mechanisms.

3.5 Conceptual Model

The conceptual model is an attempt to combine these revelations and perceive BRICS-G7 bilateral trade as being led by:

- **Economic fundamentals:** log GDP, log population, log FDI inflows, log ICT penetration, and log real exchange rates, the mass of the economy, investment integration, productive capacity, and price competitiveness (Ravi Kumar et al., 2024).
- **Institutional and governance variables:** trade contracts, WTO membership, quality of governance, and BRICS-specific innovations like NDB membership or new payment systems.
- **Geopolitical alignment and power shifts:** sanctions exposure, strategies, and vote similarity in international organisations.

Continuous variables are all input in natural logs to ensure that the gravity-model logic works and coefficients can be interpreted as elasticities. This specification is an agreement between theoretical expectations and the current practice in econometrics.

3.6 Dedicated Empirical Literature Review

Empirical research on BRICS-G7 trade relations brings out changing trends and factors. Sousa Filho et al. (2024) demonstrate that BRICS intra-trade development can be sustained by the growth of value-added sectors in the economy, with the specific reference to FDI and ICT as the driving force, whereas Cochrane and Zaidan (2024) identify BRICS exports to shift to high-tech, surpassing G7 shares by 2026 (ANI, 2024a, 2024b). Malik and Sah (2024) show that the quality of governance enhances FDI inflows in BRICS leading to trade integration, but Wongkantarakorn et al. (2022) find spillover effects in bloc corporate governance. Joo and Shawl (2023) use panel ARDL to assert the influence of FDI on BRICS growth over the long run is positive, and Adenutsi et al. (2025) associate macroeconomic variables with trade equilibria in economies that are dependent on imports. Nevertheless, there are still gaps in dynamic panel models of heterogeneity and institutional reforms, and this chapter fills such gaps using cointegration and robustness tests.

4. BRICS-G7 Economic and Trade Landscape

According to recent statistics by the IMF and UNCTAD, the international economy has turned from being purely based on a G7 dominance to a dual-core system where the BRICS and the advanced economies are at par with the former in terms of aggregate weight. As a portion of global GDP, BRICS has continued to increase to an estimated 37-40 percent in purchasing power parity (PPP) terms in the early 2020s, where the G7 share has fallen in the high-20s to low-30s (Chief, 2025). However, it is the convergence that hides an underlying structure of differences where BRICS represent the majority of the world and slow growth, but G7 economies are more productive, technologically advanced, and financially mature (Bogdanova, 2025).

4.1 Macroeconomic comparison of the blocs

Based on the indicators of the IMF and World Bank, the BRICS+ economies experience a higher rate of growth and an unequal contribution to the global output growth (BRICS Data, 2025). Nevertheless, the G7 continues to dominate in the value of nominal GDP, the world financial market, the use of reserve currency, and outward FDI (Chief, 2025). The income inequality in per-capita incomes is still high, where the majority of G7 nations have over USD 40,000-50,000 per-capita income, whereas the BRICS averages are much lower, despite the fact that China and Russia have already become upper-middle-income countries (Varindia, 2025; Statista, 2024). These asymmetries define the roles in trade where the G7 are high-income consumer markets and technological centres, and the BRICS are major suppliers of manufactures and commodities and are also rapidly emerging consumer economies.

over knowledge-intensive services. Globally, it is reported that developed economies still lead in two-thirds of services trade, indicating their human-capital and innovation advantages (UNCTAD, 2025).

4.4 Role of FDI, ICT, exchange rates, and GDP

The BRICS-G7 trade is primarily caused by FDI, technology, and digitalisation. The BRICS countries receive much FDI in the manufacturing, infrastructure, and digital industries, and China is becoming an important outward investor (Tsikelashvili, 2025). ICT growth, digital platforms, and increasing flows of data have also made BRICS producers more deeply embedded in GVCs so that they can export competitive services and reduce selected technological distances. The dynamics of the exchange rate affect competitiveness and invoicing of trade. The discussion of BRICS is more focused on the need to reduce reliance on the US dollar by finding alternative payment methods to reduce the exposure to exchange-rate and sanctions risks (Nach and Ncwadi, 2024). In the meantime, the G7 currencies, notably the dollar and euro, are taking over the global reserves and settlements. The size of GDP, which is in the natural log form in gravity-style models, also continues to be a fundamental predictor of bilateral trade flows, and this is the reason why the growing BRICS economic base has remained the centre of bilateral trade growth (Chief, 2025).

4.5 Geographical and institutional asymmetries

The blocs are also geographically and institutionally different. BRICS covers a wide variety of continents and resource bases, defining various trade corridors and contributing to the recent increase of intra-BRICS trade in comparison to BRICS-G7 flows (Azevedo, 2024). The G7 nations, which are concentrated in North America, Western Europe, and East Asia, enjoy high levels of institutionally harmonized trade networks. G7 members are at the centre of the IMF, World Bank, OECD, and worldwide financial governance institutionally, but

BRICS are creating parallel or supplementary systems like the New Development Bank and alternative payment systems (Nach & Ncwadi, 2024). The combination of these stylised patterns describes how the world order based on the G7 can be replaced by a more multipolar one, where BRICS become more central yet more heterogeneous actors (Kumar et al., 2024).

5. Methodological Framework & Data Architecture

5.1 Data Architecture

This paper considers a balanced annual panel dataset, including two interest groups of countries, namely, the Group of Seven (G7) and BRICS (Brazil, Russia, India, China, South Africa). In general, the sample period of previous panel studies of G7 vs BRICS is usually in a range of two decades, such as 1993–2019 in Dempere et al. (2023) or 2000-2020 in Yilmaz (2022). The data sample will be the major economic and institutional factors: GDP, FDI inflows, ICT development indicators, real exchange rates, trade openness, and bilateral trade flows. Continuous variables, excluding dummy indicators, are transformed with the natural logarithm to decrease the heteroskedasticity and stabilize variance as well as enable the interpretation of coefficients in terms of elasticity (Malik and Sah, 2024). The natural log specification is consistent with common studies based on gravity and long-run panels, in which studies are examining the trade and investment aspects, such as Sousa Filho et al. (2024). A dummy variable or a grouping indicator differentiates between BRICS = 1 and G7 = 0 (or the other way around) countries, which makes it possible to compare the analyses and estimate subgroups. Those are institutional-governance variables and trade governance indicators, which are added to reflect the structural differences between blocs (Malik and Sah, 2024). The sample design allows both panel diagnostics (unit-root, cointegration) and dynamic modelling (panel ARDL, system GMM) in line with the custom in recent empirical studies on the topic of emerging vs advanced economies.

5.2 Analytical Logic

The BRICS-G7 trade can be analysed using dynamic panel techniques, as the trade flows are path-dependent, where the current exports and imports of the countries are based on the past trade volumes, sunk investments, the existing chains of supply, and the existing long-term contracts. Panel ARDL and dynamic GMM are techniques that expressly contain lagged dependent variables, allowing the model to capture persistence and slow adaptation as opposed to assuming that annual trade performance is independent (Joo and Shawl, 2023). It is especially vital in an environment where shocks, as in the case of sanctions, financial crisis, geopolitical strains, or exchange rate oscillations, cause both contemporaneous and protracted consequences that dynamic techniques are aimed at identifying. Recent comparison analyses regularly estimate joint panels both on BRICS and G7, as well as model individual blocks to prevent the structural heterogeneity from being obscured (Mukhopadhyay & Nayak, 2024). The two groups have a wide disparity in terms of income levels, quality of governance, technological capacity, and positions in the global value chains. Therefore, they should not be pooled blindly as there is a risk of bias or overgeneralization. The analysis can be conducted to determine the stronger effects of variables like FDI, ICT development, exchange rates or institutional quality on trade in BRICS than in G7 or whether G7 trade is more sensitive to governance and policy related indicators through the use of dynamic estimation using group specific models, interaction terms or bloc dummies (Wongkantarakorn et al., 2022; Malik and Sah, 2024). It is also important that dynamic panel models that distinguish between short-run and long-run effects are used. A Panel ARDL, for instance, takes into account instant changes in the form of differenced terms and long-run equilibrium relations in the form of cointegration, which are used in recent BRICS research (Joo & Shawl, 2023). This will allow the chapter to demonstrate the short-run impact of temporary shocks to GDP, FDI, or

exchange rates on trade and whether BRICS-G7 trade returns to a long-run level, which is appropriate to the modern dynamic analysis of macro-linkages (Adenutsi et al., 2025).

5.3 Formal Econometric Model Specification

The model of the equalization takes the form of a gravity model of bilateral trade flows, modified to a panel dynamic:

$$\ln(T_{it}) = \alpha + \beta_1 \ln(GDPPC_{it}) + \beta_2 \ln(FDI_{it}) + \beta_3 \ln(ICT_{it}) + \beta_4 \ln(EXR_{it}) + \beta_5 \ln(TO_{it}) + \beta_6 \ln(TFP_{it}) + \gamma_i + \delta_t + \varepsilon_{it} \quad (1)$$

where T_{it} is trade receipts and GDPPC is the GDP per capita, FDI is foreign direct investment, ICT is information and communication technology, EXR is exchange rate, TO is trade openness, TFP is total factor productivity, γ_i is country specific fixed effects, δ_t is time fixed effects and ϵ_{it} is the stochastic error term.

Regarding short run dynamics, the Panel Autoregressive Distributed Lag (ARDL) model with Pooled Mean Group (PMG) estimator is given as:

$$\Delta \backslash ln(T_{it}) = \phi ECT_{\{it-1\}} + \sum_{j=1}^{p} \lambda_j \Delta \ln(X_{it} - j) + \mu_i + \varepsilon_{\{it\}} \quad (2)$$

where ECT_{it-1} is the error-correction value calculated using the equilibrium relationship of the long run as:

$$\ln(T_{it}) = \alpha_i + \sum_{k=1}^{q} \beta_k In(X_{it} - k) + \nu_{it} \quad (3)$$

and X represents a vector of the explanatory variables in the model.

The example of the error-correction formulation of the Mean Group (MG) and Dynamic Fixed Effects (DFE) estimators is presented as:

$$\Delta \ln(T_{it}) = \pi_i ECT_{it} - 1 + \sum_{j=0}^{p-1} \delta_j \Delta \ln(X_{it} - j) + \mu_i + \varepsilon_{it} \quad (4)$$

The specifications are used to jointly describe dynamic adjustment in the short-run and long-run equilibrium relations, and Generalized Method of Moments (GMM) estimation is used as a strength test to overcome possible endogeneity threats.

5.4 Variable Definition and Expected Signs Table

Table 5.4.1: Variable Definitions, Proxies, Data Sources, and Expected Signs

Variable	**Definition**	**Proxy**	**Data Source**	**Expected Sign**	**Justification**
GDP per Capita (Dependent)	Economic output per person, proxy for market size and trade capacity	Real GDP per capita (constant USD)	World Bank World Development Indicators	N/A (Dependent)	Chosen for its centrality in gravity models; positive correlations expected with trade drivers.
Trade Receipts (TR)	Total trade inflows, capturing bilateral trade volume	Exports + Imports (USD)	UNCTAD Trade Statistics	Positive	Reflects trade interdependence; higher receipts indicate stronger economic ties.
Exchange Rate (EXR)	Real effective exchange rate	Index (2010=100)	IMF International	Negative (BRICS);	Depreciation boosts competitiveness in BRICS; appreciation aids G7 imports.