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Informal Institutions and Global Trade: Real Effects of the Elusive

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Informal Institutions and Global Trade: Real Effects of the Elusive

Eiji Fujii ^{a,b}

This version: September 2025

Abstract

Countries routinely participate in intergovernmental forums such as the G7, G20, BRICS, and MIKTA. These informal institutions—unlike formal bodies such as the EU and WTO—lack permanent administrative structures, operate through rotating presidencies, and do not issue legally binding commitments. Although often overlooked as drivers of global trade, their formation and evolution embody underlying structural shifts in the world economy. Using data for over 200 countries spanning 1994-2023, this study introduces informal institutions as a distinct determinant of trade within the gravity framework. We find that BRICS exerts trade-facilitating effects comparable to those of formal agreements such as regional trade agreements and WTO accession. This highlights a novel channel of international integration beyond legal commitments.

Keywords: *Informal institutions; international trade; gravity model; BRICS; MIKTA; G20; G7.*

JEL Classifications: F10, F13, F14, O10, O19

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1. Introduction

In a global landscape where the competing interests of countries with diverse economic and political foundations intersect, informal institutions serve as important platforms for policy dialogue and negotiation. Unlike formal institutions such as the European Union (EU) and World Trade Organization (WTO), informal institutions—including the Group of Seven (G7), Group of Twenty (G20), BRICS, and MIKTA—lack permanent administrative bodies or fixed headquarters, rotate presidencies, and make decisions by consensus that are non-binding.¹

These characteristics may suggest that informal institutions are too insubstantial to play a decisive role in shaping global trade dynamics. Indeed, they are generally not regarded as significant determinants in empirical analyses of world trade. However, sovereign nations are rarely willing to bind themselves to rigid and enforceable rules such as those of the EU. By contrast, informal institutions provide flexible venues for dialogue and coordination, which can generate real economic consequences even in the absence of formal agreements.

Structural shifts in the global economy do not often result from one-off formal changes. The formation and evolution of informal institutions often reflect gradual transformations unfolding beneath the surface. For example, the initiation of the G20 signaled the rising importance of emerging markets and developing economies (EMDEs) as the world confronted financial crises and climate change. Likewise, BRICS has emerged as an alternative pole of economic influence to the stagnating G7. In this context, informal institutions warrant closer attention as potential drivers of global trade dynamics.

Motivated by this discussion, this paper examines global trade flows with a focus on

¹ MIKTA consists of Mexico, Indonesia, South Korea, Türkiye (Turkey), and Australia.

the role of informal institutions. Using an augmented gravity model and bilateral trade data for more than 200 countries spanning 1994–2023, we test whether informal institutions significantly affect trade flows, controlling for a wide array of factors, including economic size, regional trade agreements (RTAs), currency unions and substitution, and exchange rate volatility. We also trace how these institutional effects evolve over time.

If informal institutions merely provide platforms for discussion without real economic consequences, they should have no measurable effect on members' trade flows once the influence of formal institutions—such as trade agreements, monetary unions, and WTO membership—as well as economic, geographical, cultural and historical factors are accounted for. Alternatively, if structural shifts in the global economy are partly shaped by informal dialogue and coordination, these institutions should exert distinct effects on trade flows beyond those captured by standard determinants. From this perspective, informal institutions reveal implicit forces of trade promotion or inhibition that are absent from the conventional gravity framework. Their formation and evolution therefore embody significant structural shifts in the architecture of global trade.

To preview our findings, our augmented gravity model explains approximately 73% of the variation in bilateral trade flows worldwide. We extend the model by introducing informal institutions as a distinct determinant of trade, showing that BRICS effects rival those of formal agreements such as RTAs or WTO. This highlights a novel channel of international economic integration beyond legal commitments.

The remainder of the paper is organized as follows. Section 2 reviews the institutional background and related literature. Section 3 details the empirical strategy and data sources. Section 4 reports the baseline estimates, while Section 5 investigates structural shifts

through subsample splits and event study designs. Section 6 discusses the interpretation of results, and Section 7 concludes with implications for policy and future research.

2. Institutional Background and Related Literature

Countries routinely participate in intergovernmental forums such as the G7, G20, BRICS, and MIKTA to coordinate policy dialogue.² Table 1 summarizes their main characteristics. According to official websites, they are described as “informal forums” for “partnership” and “collaboration and cooperation.”³ Their stated objectives—facilitating trade and investment, deepening bilateral ties, promoting economic development, and ensuring financial stability—make it plausible that these forums help foster trade, especially among economies amenable to active state involvement in trade and industrial policy.

Membership in informal institutions is shaped not only by economic metrics but also by political and strategic considerations. Some groups formed in unexpected ways. For example, BRICS traces its origin to 2001, when Jim O’Neill of Goldman Sachs coined the acronym BRIC to refer to Brazil, Russia, India, and China—emerging economic powers at the time.⁴

² The Group of Seven (G7) is an intergovernmental political and economic forum that evolved from the G5 consisting of the United States (US), United Kingdom (UK), France, West Germany, and Japan and the G6 (which added Italy) before Canada joined in 1976. The European Union (EU) is a non-enumerated member. The Group of Twenty (G20) was established in 1999 in the aftermath of the Asian financial crisis as an informal forum for finance ministers and central bank governors from both industrialized and developing economies to discuss issues of international economic and financial stability. BRICS is an association of emerging economies that seeks to promote economic growth and development through collaboration and cooperation, while also serving as a platform that connects businesses and individuals within member states to facilitate trade, investment, and cultural exchange. MIKTA, launched in 2013, describes itself as a “partnership for progress” that plays a constructive role in the international environment as a cross-regional consultative platform aimed at increasing mutual understanding, deepening bilateral ties, and identifying common ground for cooperation.

³ <https://g20.org/about-g20/overview/>, <https://www.brics.org/>, and <http://mikta.org/>.

⁴ BRIC began its cooperative engagement with a meeting of foreign ministers in 2006, followed by

Despite lacking binding treaties, informal institutions have proven dynamic, often building capacity over time. The G7, for instance, has coordinated exchange rate and trade policy for decades.⁵ More recently, it organized sanctions against Russia after the Ukraine invasion, targeting energy exports. In 2024, G7 trade ministers issued joint statements against trade distortions, widely read as responses to Chinese practices.

Consensus-based but non-binding actions can still produce tangible economic effects. Sanctions, for instance, reshaped Russia's trade with G7 countries and third parties like India, while also influencing capital flows within BRICS (Ftiti *et al.*, 2024).

BRICS, as a coalition of large EMDEs, has developed concrete operational mechanisms. It created the New Development Bank in 2014 and ratified the Contingent Reserve Arrangement, offering alternatives to Western-dominated financial system. Evidence suggests increasing policy convergence among BRICS members, particularly in countering influence of the United States (US) (Papa, Han, and O'Donnell, 2023). BRICS summits have also deepened financial connectedness (Su and Chen, 2024), reinforcing arguments that BRICS plays a crucial role in shaping a new global economic order (Rodrik, 2013; Stuenkel, 2024).

Figure 1 plots global GDP shares of the G7, the G20 excluding the G7, and non-G20 countries. While the G20 share looks stable overall, internal shifts are evident: the G7's share has steadily declined, while the share of the remaining G20—BRICS, MIKTA, Argentina, and Saudi Arabia—has grown in relative weight.

the inaugural leaders' summit in 2009. The group was reconstituted as BRICS in 2011 upon the accession of South Africa. Membership expanded further in 2024 to include the United Arab Emirates, Iran, Egypt, and Ethiopia, and in 2025 with the addition of Indonesia. For a discussion of the implications of this enlargement, see Carmody *et al.* (2024).

⁵ The Plaza Accord and the Louvre Accord represented coordinated interventions aimed at alleviating trade imbalances and stabilizing exchange rates. By contrast, the G7 Exchange Rate Commitments of 2017 signaled a collective shift away from active intervention toward a rules-based restraint.

If these shifts merely reflected relative GDP growth, the figure would be self-explanatory. However, the G7's decline is often interpreted as part of a broader shift: BRICS and other emerging powers advance alternative economic and political models, thereby diminishing Western—especially G7—influence. International trade is one channel where these shifts manifest, often through trade diversion.

Hanson (2012) highlights EMDEs' growing prominence in global trade, noting that EMDE trade has outpaced GDP growth—patterns not fully explained by shipping costs, tariff reductions, or WTO membership (see Hummels, 2007; Rose, 2004a, 2004b; Yi 2003). Rising productivity, especially in China, expanded production networks and offshoring (Feenstra and Wei, 2010).

The analytical framework of this study is the gravity model of trade, the cornerstone of empirical trade analysis. Since Tinbergen (1962), it has evolved significantly through theoretical and empirical advances. Bergstrand, Egger, and Toubal (2024) summarize recent developments, and Head and Mayer (2014) provide an authoritative discussion.

Key theoretical contributions include Anderson (1979), Bergstrand (1985, 1989), Deardorff (1998), Eaton and Kortum (2002), Anderson and van Wincoop (2003), Chaney (2008), Helpman, Melitz, and Rubinstein (2008). On the empirical side, important studies include Geraci and Prewo (1977), Head and Mayer (2000), Baier and Bergstrand (2001), Rose (2000, 2004a), Baldwin and Harrigan (2011), and Baier, Yotov, and Zylkin (2019).

Closest in spirit to our analysis is Frankel, Stein, and Wei's (1995) on regional trade blocs. Unlike them, we analyze effects of informal institutions using broader determinants and a different empirical strategy. This addresses a gap in the literature: despite their growing prominence, informal institutions remain largely absent from gravity-based analyses of trade.

3. Analytical Framework and Empirical Strategy

3.1 Gravity Model and Trade Determinants

We begin with standard determinants of bilateral trade, which serve as a benchmark for assessing the additional role of informal institutions. In log-linear form, the gravity model posits that bilateral trade flows are proportional to the product of economic sizes and inversely proportional to distance. Anderson and van Wincoop (2003) demonstrate that a theoretically consistent specification must also account for multilateral resistance—remoteness from other trading partners. We adopt the remoteness measure of Baldwin and Harrigan (2011), which captures the limited availability of nearby alternative partners. Greater remoteness is expected to exert a positive effect on bilateral trade flows.⁶

We include a wide set of additional controls—both conventional and distinctive. These cover economic development, geography, cultural and historical ties, formal institutions, and currencies/exchange rates, as outlined below.

- *Economic development*: GDP per capita proxies for income levels, as wealthier countries typically trade more.
- *Geography*: Contiguity reduces transport costs; landlocked status restricts seaborne trade. We distinguish between one landlocked partner and both landlocked.
- *Cultural and historical ties*: Common language reduces transaction costs; colonial ties exert persistent trade effects.⁷ We also code common colonial heritage.
- *Formal institutions*: WTO membership grants most-favored-nation status; RTAs

⁶ Unlike Newton's law of universal gravitation, forces to attract trade in a world of geographically uneven economic mass is not determined solely by the size of two economies and their distance; it also depends on the availability of alternatives from other nearby countries (see Krugman, 1995).

⁷ Colonial history can exert a persistent influence on trade through historical investment, infrastructure, and legal linkages. Although this effect exhibits an element of *hysteresis*, Head, Mayer, and Ries (2010) find that colonial trade linkages, while persistent in the short run, diminish after approximately four decades.

proliferated from 37 in 1994 to 366 in 2023.⁸ While the EU treaty is classified as an RTA, we separate WTO, RTA, and EU membership given EU's deeper integration.⁹

- *Currencies and Exchange Rates*: Exchange rate volatility discourages trade, while common currencies promote it.¹⁰ We distinguish currency unions from currency substitution, in which a country unilaterally adopts a foreign currency (i.e., dollarization).
- *Exchange rate variability*: Measured as the five-year rolling standard deviation of first differences in logged monthly bilateral nominal exchange rates.
- *Currency unions*: We include the eurozone (euro), Organization of Eastern Caribbean States (OECS) (Eastern Caribbean Dollar), Economic and Monetary Community of Central Africa (CEMAC) (Central African CFA franc), and West African Economic and Monetary Union (WAEMU) (West African CFA franc), allowing heterogeneous effects.¹¹
- *Currency substitution*: We identify six anchor currencies: US Dollar (USD), euro (EUR), Australian dollar (AUD), South African rand (ZAR), Danish krone (DKK), and Russian ruble (RUB) and distinguish unilateral adoption of euro from eurozone membership.¹²

Our baseline specification is:

⁸ The Regional Trade Agreements Database (<https://rtais.wto.org>).

⁹ Because the EU treaty is incorporated into the RTAs, the EU indicator variable captures the marginal effects of RTAs that are specific to EU member countries.

¹⁰ Rose (2000) shows that the effects of reduced exchange rate variability and those of common currencies are different. However, his estimates of currency union effect received fierce criticism due to a seemingly excessive magnitude. See Persson (2001), Micco *et al.* (2003), Baldwin (2006), Berger and Nitsch (2008) among others. Also, see Rose (2001), Rose and van Wincoop (2001), and Glick and Rose (2002) for rebuttal. Frankel (2010) dissects the debates.

¹¹ Although commonly called CFA franc and have the same fixed exchange rate against the euro, the Central African CFA franc and the West African CFA franc are issued by two different central banks and, hence, not interchangeable. Thus, they represent two juxtaposed monetary zones.

¹² The eurozone comprises countries that meet the established convergence criteria. Kosovo and Montenegro bypass these requirements by unilaterally adopting the euro. Technically, San Marino is also a euro-substituting country, but its adoption of the euro is officially sanctioned by the European Parliament. Moreover, the microstate is geographically surrounded by Italy and historically used the Italian lira. Given this close integration with Italy, we treat San Marino as part of the eurozone rather than categorizing it alongside Kosovo and Montenegro.

$$\begin{aligned}
\ln X_{i,j,t} = & \alpha_t + \beta_1 \ln(Y_{i,t} * Y_{j,t}) + \beta_2 \ln Dist_{i,j} + \beta_3 \ln(REM_{i,t} * REM_{j,t}) \\
& + \delta \ln [(Y_{i,t}/N_{i,t}) * (Y_{j,t}/N_{j,t})] + \gamma_1 Cont_{i,j} + \gamma_2 Lock1_{i,j} + \gamma_3 Lock2_{i,j} \\
& + \tau_1 Lang_{i,j} + \tau_2 Col_{i,j} + \tau_3 ComCol_{i,j} + \lambda_1 WTO_{i,j,t} + \lambda_2 RTA_{i,j,t} \\
& + \lambda_3 EU_{i,j,t} + \psi \sigma_{i,j,t} + \mu_1 EUR_{i,j,t} + \mu_2 ECD_{i,j,t} + \mu_3 CCFA_{i,j,t} \\
& + \mu_4 WCFA_{i,j,t} + \phi_1 USDZ_{i,j,t} + \phi_2 EURZ_{i,j,t} + \phi_3 AUDZ_{i,j,t} \\
& + \phi_4 ZARZ_{i,j,t} + \phi_5 DKKZ_{i,j,t} + \phi_6 RUBZ_{i,j,t} + \varepsilon_{i,j,t}
\end{aligned} \tag{1}$$

where i and j index countries, t denotes year ($1994 \leq t \leq 2023$), α_t s are year-specific constants, and $\varepsilon_{i,j,t}$ is the disturbance term.¹³ Variable definitions are as follows. Unless otherwise stated, indicator variables equal zero when conditions are not satisfied.¹⁴

$X_{i,j,t}$: bilateral trade between i and j in year t

$Y_{i,t}$: GDP of country i in t

$Dist_{i,j}$: distance between countries i and j

$REM_{i,t}$: remoteness of i in t , à la Baldwin and Harrigan (2011)¹⁵

$N_{i,t}$: population of i in t

$Cont_{i,j}$: 1 if i and j are contiguous

$Lock1_{i,j}$: 1 if either i or j is landlocked

$Lock2_{i,j}$: 1 if both i and j are landlocked

$Lang_{i,j}$: 1 if i and j share a common language

$Col_{i,j}$: 1 if one of i or j colonized the other

$ComCol_{i,j}$: 1 if both are former colonies of the same colonizer

$WTO_{i,j,t}$: 1 if both are WTO members in t

$RTA_{i,j,t}$: 1 if a regional trade agreement is in force between i and j in t

$EU_{i,j,t}$: 1 if both countries belong to the EU in t

$\sigma_{i,j,t}$: five-year ($t-5$ to $t-1$) standard deviation of first differences in logged monthly bilateral exchange rates

$EUR_{i,j,t}$: 1 if both belong to the eurozone in t

$ECD_{i,j,t}$: 1 if both belong to the OECS (using the Easter Caribbean Dollar) in t

¹³ Many variables are country pair-specific and are often time-invariant. Even some time-varying variables remain constant for certain country pairs—for example, the EU, RTAs, and currency unions and substitution. As a result, the model is not compatible with country-pair fixed effects for estimation.

¹⁴ The appendix provides details on the variables and their data sources.

¹⁵ Specifically, $REM_{i,t} = [\sum_k Y_{k,t} Dist_{i,k}^{-1}]^{-1}$ with k denoting any country including i . Constructing the remoteness index requires assigning a value of internal distance, which is a country's distance to itself. Following Head and Mayer (2000) and Head (2003), we use the square root of land area multiplied by 0.4 as a proxy measure of the internal distance.

$CCFA_{i,j,t}$: 1 if both belong to the CEMAC (using the Central African CFA franc) in t
 $WCFA_{i,j,t}$: 1 if both belong to the WAEMU (using the West African CFA franc) in t
 $USDZ_{i,j,t}$: 1 for trade between the US and USD-substituting countries
 $EURZ_{i,j,t}$: 1 for trade between eurozone countries and EUR-substituting countries
 $AUDZ_{i,j,t}$: 1 for trade between Australia and AUD-substituting countries
 $ZARZ_{i,j,t}$: 1 for trade between South Africa and ZAR-substituting countries
 $DKKZ_{i,j,t}$: 1 for trade between Denmark and DKK-substituting countries
 $RUBZ_{i,j,t}$: 1 for trade between Russia and RUB-substituting countries

3.2 Data Sources and Sample Construction

Data come from multiple sources. Bilateral trade is from IMF's *Direction of Trade Statistics* (DOTS); GDP (in constant 2015 USD) and population from *World Development Indicators* (WDI); distances computed from latitude and longitude coordinates of capitals; landlocked status from *World Atlas*; languages from *CIA World Factbook* (WFB); colonial ties from WFB and Anele (2023); WTO/RTAs from WTO databases; exchange rates from IMF's *International Financial Statistics* (IFS); and currency unions/substitution cases from WFB, Levy Yeyati and Sturzenegger (2003), and Hawkins and Masson (2003). For Taiwan, GDP and population data are from *National Accounts Yearbook*. The details are provided in the appendix.

DOTS reports annual export and import values in current USD. In theory, exports from country i to j should equal j 's imports from i . In data, however, these figures often diverge despite broad comparability. To address this discrepancy, we compute the average of total trade flows (exports + imports) in both directions.¹⁶ We then convert them into real terms using the U.S. GDP deflator from WDI.

The sample covers 1994–2023, focusing on the post–Soviet Union period. Some countries dissolved, and new states emerged during this period.¹⁷ Data limitations also

¹⁶ This ensures $X_{i,j} = X_{j,i}$. Not to double count, we use observations with i 's IMF code less than j 's.

¹⁷ Former Yugoslavia represented by Serbia and Montenegro (1992-2006) was subsequently replaced by Slovenia, Croatia, Bosnia-Herzegovina, Serbia, Montenegro, Northern Macedonia, and Kosovo.

generate variation in the number of effective observations by year.

4. Empirical Results: Aggregate Patterns

4.1 Baseline Model Estimates

We estimate Equation (1) using pooled observations from all years, incorporating year-specific intercepts to control for temporal effects. The coefficient estimates and robust standard errors appear in the first two columns of Table 2 (denoted as [1]). The model explains 73% of the variation in bilateral trade worldwide. All coefficients are statistically significant at the 1% level and broadly consistent with theoretical expectations.

The fundamental gravity variables perform as expected: the elasticity of trade with respect to GDP and distance are close to one and minus one, respectively. Both remoteness and GDP per capita are positive and significant, as anticipated.

Geographic factors matter substantially. Controlling for other factors, contiguous countries trade 180% more than non-contiguous pairs ($e^{1.04} \approx 2.82$). Conversely, if either country is landlocked, trade is reduced by approximately 40% ($e^{-0.54} \approx 0.58$), with a further 20% reduction if both countries lack sea access ($e^{-0.24} \approx 0.79$).¹⁸ These findings confirm that seaport accessibility remains a crucial determinant of international trade.

Common language and colonial ties also exert significant positive effects of substantial magnitudes. Shared language increases trade by approximately 80%. Former colonizer–colony pairs trade about 140% more, while countries sharing a common colonizer trade about 64% more.

Formal institutions also play a significant role. WTO membership increases trade by

¹⁸ For the remainder of the paper, we calculate percentage-based marginal effects in the same way.

approximately 35%. RTAs add about 40%, and EU membership raises intra-EU trade by additional 17%.

Exchange rate variability suppresses trade, while common currencies generally promote it. The eurozone effect is approximately 10%, reflecting the euro's contribution beyond EU integration and RTAs. Together, eurozone membership and EU effects imply roughly 30% more intra-eurozone trade than otherwise predicted—roughly two-thirds of it attributable to the EU, with a smaller but significant contribution from the common currency. This estimate is far below the contested 300% effect of Rose (2000).¹⁹

Among the currency unions, the Central African CFA franc stands out with a negative coefficient (−0.46), suggesting 37% lower intra-union trade. This likely reflects common oil-exporting structures and limited intra-union complementarity of the CEMAC.²⁰ In contrast, the East Caribbean Dollar and the Western African CFA franc exhibit significant positive effects.

Currency substitution tends to facilitate trade with anchor economies, as seen in the cases of the AUD, ZAR, DKK, and RUB. These typically involve smaller states adopting the dominant currency of a regional partner with whom they maintain strong trade ties.²¹

A notable exception is the unilateral euro adoption by Kosovo and Montenegro, which correlates with a 35% decline in trade with eurozone members. This underscores the role of formal convergence criteria in unlocking the potential benefits of monetary

¹⁹ Several factors account for this discrepancy. Most notably, Rose estimates the effect of currency unions using data from 1970–1990, prior to the introduction of the euro. In contrast, our sample spans both the pre-euro and euro periods and includes a broader set of currency unions. Furthermore, we differentiate between currency unions and currency substitution while estimating separate coefficients for each currency. We also distinguish the EU from general RTAs.

²⁰ The sole exception is the Central African Republic. The CEMAC countries appear to prioritize exchange rate stability with euro over fostering intra-regional trade.

²¹ For instance, on average, 84% of Greenland's exports are destined for Denmark. Similarly, on average, 85% of Lesotho's imports come from South Africa.

integration.²²

4.2 Informal Institutions as Trade Catalysts: Deviations from Gravity Predictions

Unlike Newton’s law of universal gravitation, international trade can be influenced by additional forces of trade promotion among specific groups of countries. If such forces arise in connection with informal institutions through dialogue and strategic coordination, their effects may be significant yet elusive. To test this, we augment Equation (1) with pairwise indicators for institutional memberships.

As illustrated in Figure 2, our nested grouping distinguishes between G20 and non-G20 countries at the top level. Within the G20, we further separate the G7 and the remaining twelve members (R12, henceforth) including BRICS, MIKTA, Argentina, and Saudi Arabia.²³ Our aim is to determine whether these institutions exert effects on trade flows that lead to significant deviations from the baseline gravity model predictions. With a broad range of economic, geographic, cultural, and historical controls, significant coefficients on the pairwise institution indicators would suggest the presence of unmodeled group-level dynamics.

At the broadest level, we introduce indicators for trade between G20 countries and for trade between G20 and non-G20 countries. Since the G20 was established in 1999, these indicators are set to one only for 1999–2023 and zero for 1994–1998.

Column [2] of Table 2 shows that intra-G20 trade is approximately 20% higher ($e^{0.19} \approx 1.21$) than predicted by fundamentals, while G20 and non-G20 trade is indistinguishable from non-member trade.²⁴ This suggests that G20 membership entails additional trade-facilitating forces not captured by standard gravity variables.

²² This outcome is unsurprising; absent such a penalty, countries would face incentives to free ride.

²³ R12 is an artificial category for our analysis, not an actual institution. Argentina and Saudi Arabia have been invited to join BRICS, but they have not done so.

²⁴ We note that “non-member trade” includes trade between member countries during 1994–1998.

Table 3 disaggregates G20 into G7 and R12 countries.²⁵ In column [1], intra-G7 trade is approximately 12% below baseline predictions, reflecting the group's declining relative importance as trade partners to one another.²⁶ By contrast, intra-R12 trade exceeds baseline predictions by 72%, and G7–R12 trade is 24% higher.

In Column [2], breaking down R12 further, intra-BRICS trade is 84% higher than baseline predictions, while intra-MIKTA trade is 70% higher.²⁷ Trade between BRICS and MIKTA members is also elevated, by about 74%. Cross-group effects with G7 are smaller but still positive: 32% for BRICS-G7 and 17% for MIKTA-G7.

These findings highlight structural realignments within global trade. While intra-G7 trade has weakened, BRICS and MIKTA exhibit strong positive deviations from gravity model predictions. Their growing prominence reflects more than relative economic growth, suggesting that informal institutions may function as channels of trade facilitation beyond conventional determinants.

5. Temporal Dynamics of Trade Among Informal Institutions

5.1 Subperiod Estimates and Structural Shifts

To examine how the institution-specific effects evolved, we divide the sample into three subperiods: 1994–2003, 2004–2013, and 2014–2023. In contrast to the previous

²⁵ The objective is to disaggregate the effects of G20. Thus, we set G7 and R12 indicators to be unity only for 1999–2023 (i.e., the same period as the G20) even though G7 existed before G20.

²⁶ Although the G7 includes EU member countries, intra-EU trade is also influenced by the effects captured by the RTA and EU dummies. When these additional effects are accounted for, the net effect corresponds to approximately a 65% increase in trade (i.e., $-0.14+0.34+0.30=0.5$ and $e^{0.5}\approx 1.65$). Further, eurozone countries benefit from an extra boost, with combined effects on trade reaching almost 85% (i.e., $0.5+0.11=0.61$ and $e^{0.61}\approx 1.84$) relative to the baseline, which represents trade among non-G20 countries.

²⁷ The decomposition is approximate, as it excludes Argentina and Saudi Arabia. The BRICS grouping is defined as Brazil, Russia, India, and China for 2006–2010, adding South Africa from 2011 onward; MIKTA membership starts in 2013. The corresponding indicators reflect these timelines.

section, we treat G20, BRICS, and MIKTA as if they were present throughout the entire 1994–2023 period, despite their inception in 1999, 2006, and 2013, respectively. This retrospective approach enables a broader assessment of how trade-facilitating dynamics among member countries transitioned from the pre-institutional era into the institutional period.²⁸

Table 4 reports the estimates, while Figure 3 visualizes the percentage effects.²⁹ Several patterns emerge. First, intra-G7 trade effects shifted from significantly positive in the first decade to significantly negative thereafter, with the negative effects intensifying over time. This reversal explains the aggregate negative intra-G7 effect in Table 3. Second, intra-BRICS trade effects, initially insignificant, turned strongly positive in 2004–2013 and continued to grow, reaching approximately 80% above baseline predictions by 2014–2023. Third, intra-MIKTA and BRICS–MIKTA trade effects were significant throughout but became stronger in the second and third decades. Finally, G7–BRICS and G7–MIKTA effects remained positive but declined modestly over time.

Overall, the subperiod estimates underscore that trade-facilitating forces associated with informal institutions are not static. Rather, they evolve over time, reflecting deeper structural shifts in global economic alignments.

5.2 Event Study Analysis: Do Informal Institutions Lead or Follow Effects?

While the subsample analysis is informative, it relies on an arbitrary division of the sample. A central question is when institution-specific effects begin to influence trade

²⁸ Montenegro, Kosovo, and Belarus initiated currency substitution in 1999, 2001, and 2004, respectively. Furthermore, trade data for Montenegro and Kosovo are available only from 2006 and 2008, respectively. Data are also sparse for ZAR-substituting countries, including Eswatini, Lesotho, and Namibia. Consequently, EURZ, ZARZ, and RUBZ were excluded from the 1994–2003 estimations.

²⁹ Due to space constraints, the estimates of other variables are reported in the appendix as Tables A4-1 and A4-2.

among member countries—whether the observed effects originate from the institutions themselves or were already present prior to their establishment.

This distinction is particularly salient for informal institutions, which differ from formal ones. In formal institutions, member privileges and obligations are defined *ex ante* and take effect upon accession, producing a discrete and enduring shift in conditions.³⁰

By contrast, informal institutions evolve through ongoing dialogue and coordination. Their absence of binding commitments implies that any associated trade effects may be gradual, contingent, or even temporary. To capture this dynamic, we adopt an event study framework that allows institutional effects to emerge progressively and vary over time.

Specifically, we estimate:

$$\ln X_{i,j,t} = \alpha_t + \rho_t^k D_{i,j}^k + W\Phi + \varepsilon_{i,j,t} \quad (2)$$

where, W and Φ are the control variables and associated coefficient vector from Equation (1). The indicator variable $D_{i,j}^k$ equals 1 if country pair (i, j) belongs to informal institution k , and 0 otherwise. The coefficient ρ_t^k captures the average deviation in trade flows of category k pairs relative to others in year t , conditional on all controls. A significant ρ_t^k implies the presence of measurable institution-specific effects in that year.

This framework is particularly well suited to informal institutions, whose influence emerges through ongoing dialogue and coordination rather than discrete commitments. It accommodates temporal variation and allows for gradual or intermittent institutional impact.³¹

Table 5 and Figure 4 present the results as time paths of the coefficient estimates $\widehat{\rho}_t^k$ and corresponding percentage marginal effects, with insignificant $\widehat{\rho}_t^k$ s set to zero. Several

³⁰ For instance, when a country enters the EU or signs an RTA, it experiences a sudden and lasting shift in trade-related conditions.

³¹ For a discrete shift with permanent effects, a difference-in-differences approach may be appropriate.

patterns emerge.

Intra-G20 trade effects first appear in 1998, preceding the inaugural G20 meeting by one year. Since its inception in 1999, intra-G20 trade has fairly consistently exhibited positive effects, averaging roughly 21% above baseline predictions over the 1999–2023 period. In contrast, G20–non-G20 trade effects show a brief uptick in 1997-1999 but dissipate thereafter—suggesting an increasing concentration of trade within the G20 bloc. While this trend benefits member countries, it places non-members—representing nearly 40% of the global population—at a relative disadvantage, underscoring the asymmetric distribution of trade gains in the post-G20 era.³²

Positive trade effects for BRICS emerged in 2007, one year after the group's formation, and reached 100% above baseline predictions by 2010. These effects weakened temporarily between 2012 and 2020 but reemerged strongly from 2021 onward.³³ On average, BRICS effects amount to 47% increase in trade over 2006-2023, comparable in magnitude to the effects of WTO accession and RTAs.

Large positive effects for MIKTA emerge as early as 2005, well before the institution's formal establishment in 2013. This pattern suggests that the observed trade-facilitating effects among Mexico, Indonesia, Korea, Turkey, and Australia were primarily driven by pre-existing economic dynamics rather than institutional coordination.

Taken together, these results indicate that informal institutions can foster substantial trade effects, though their timing and persistence vary considerably. BRICS exhibits the clearest institution-driven impact, whereas MIKTA's influence appears to reflect pre-

³² Based on the 2023 WDI data, the total population in our sample is approximately 3.1 billion for non-G20 countries and 4.9 billion for G20 countries.

³³ Between 2012 and 2020, the effects are significant at the 10% level except for 2016. The trajectory underscores the gradual and episodic nature of informal institutional influence, in contrast to the discrete shifts with formal accession.

existing bilateral relationships rather than post-formation institutional mechanisms.

While the findings offer a novel contribution to the literature on informal institutions and trade, a caveat remains: the event study framework cannot fully rule out the presence of unobserved confounders that may influence the estimated effects.

6. Interpretation of Results

The analyses above demonstrate that informal institutions exert significant and evolving influences on global trade—effects that extend beyond the scope of standard gravity models. Disaggregating by institutional group reveals sharp contrasts in how different institutions shape trade flows.

The G7 has long symbolized Western economic leadership, comprising advanced democracies with liberal market systems. Yet our estimates show that intra-G7 trade now falls below gravity model predictions, suggesting weakening internal integration amid declining GDP shares and shifting global influence.

The G20, established in the wake of the Asian financial crisis, was designed to broaden dialogue by incorporating EMDEs alongside advanced economies. With members accounting for over 80% of global GDP and 60% of the world’s population, the G20 inevitably engages a wide array of policy domains. However, this breadth has also exposed deep internal divisions—particularly on issues such as climate policy and Russia’s invasion of Ukraine.³⁴ Our results indicate that intra-G20 trade exceeds baseline predictions, but this aggregate effect conceals divergent subgroup dynamics rather than reflecting a unified institutional impact.

³⁴ Recent G20 meetings have been presided over by EMDEs, more specifically BRICS and MIKTA members: Indonesia in 2022, India in 2023, Brazil in 2024, and South Africa in 2025.

BRICS stands in sharp contrast. Formed as a counterweight to Western hegemony, it brings together large EMDEs with economic models often marked by strong state intervention.³⁵ Unlike the G20, BRICS has actively developed operational institutional mechanisms—such as the New Development Bank and the Contingent Reserve Arrangement—that deepen economic cooperation. Our findings indicate that BRICS exhibits the strongest institution-driven trade effects, rivaling or even surpassing those of formal institutions such as RTAs and WTO.

MIKTA, by comparison, remains limited in scope. Since its inception in 2013, it has operated primarily through foreign ministerial meetings and only recently convened its first leaders' summit in 2023. Its stated mission emphasizes diplomatic dialogue and mutual understanding rather than concrete economic integration. Our results align with this characterization, revealing little evidence to corroborate an institution-driven impact on trade. The observed positive deviations from gravity benchmarks largely predate MIKTA's formal establishment and reflect pre-existing bilateral linkages.

Taken together, these findings underscore the heterogeneity of informal institutions. The G7 reflects waning cohesion among advanced economies; the G20 exhibits diversity without unity, marked by fragmented subgroup dynamics; BRICS demonstrates robust institution-driven effects; and MIKTA remains primarily diplomatic in orientation. Collectively, however, the results suggest that informal institutions can reconfigure global trade flows in ways not captured by conventional models. Recognizing these dynamics is essential to understanding the evolving architecture of global trade and the nuanced role informal institutions play in shaping it.

³⁵ BRICS declares to “provide a platform that connects businesses and individuals within the BRICS nations, facilitating trade, investment, and cultural exchange.” (<https://www.brics.org/>).

7. Conclusions and Policy Implications

Drawing on augmented gravity models and bilateral trade data for over 200 countries spanning 1994 to 2023, this study demonstrates that informal institutions exert a significant and evolving influence on global trade. Notably, BRICS exhibits strong trade-facilitating effects, comparable in magnitude to those of formal agreements such as WTO accession and regional trade arrangements. The G20 shows aggregate gains driven by subgroup dynamics, while MIKTA remains primarily a consultative forum with limited institutional impact.

These findings extend Frankel, Stein and Wei's (1995) typology of trade blocs. Beyond natural, unnatural, or supernatural blocs, we show that trade blocs can also be informal and elusive—generating measurable effects through dialogue, coordination, and strategic alignment rather than binding rules.

The policy implications are twofold. First, informal institutions should not be dismissed as mere “talk shops.” In the case of BRICS, their trade effects rival those of formal agreements, suggesting that EMDEs may leverage such platforms as alternative channels of economic integration. Second, as multilateralism weakens and the WTO's authority erodes, the role of informal institutions is likely to expand. They may serve as early indicators of structural realignments in the global economy, particularly in how emerging powers challenge traditional Western dominance.

At the same time, our results caution against overgeneralization. Informal institutions vary widely in their design and impact. Not all produce sustained trade effects, and their influence may depend on policy orientation, institutional depth, and geopolitical context.

Future research should pursue three directions. First, examining the interaction between informal and formal institutions could deepen understanding of global trade

governance. Second, incorporating sectoral trade data would help identify the specific channels—such as supply chains or investment flows—through which institutional effects operate. Third, extending the dataset beyond 2023 would enable analysis of recent developments, including shifts in US trade policy, BRICS enlargement, and renewed geopolitical fragmentation, and their implications for the evolving role of informal institutions in the global trade architecture.

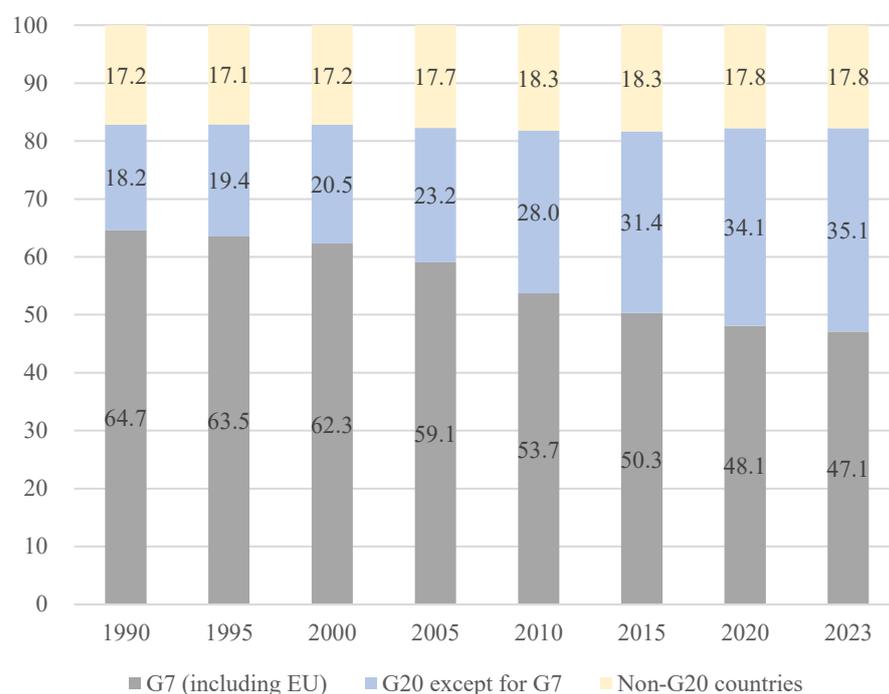
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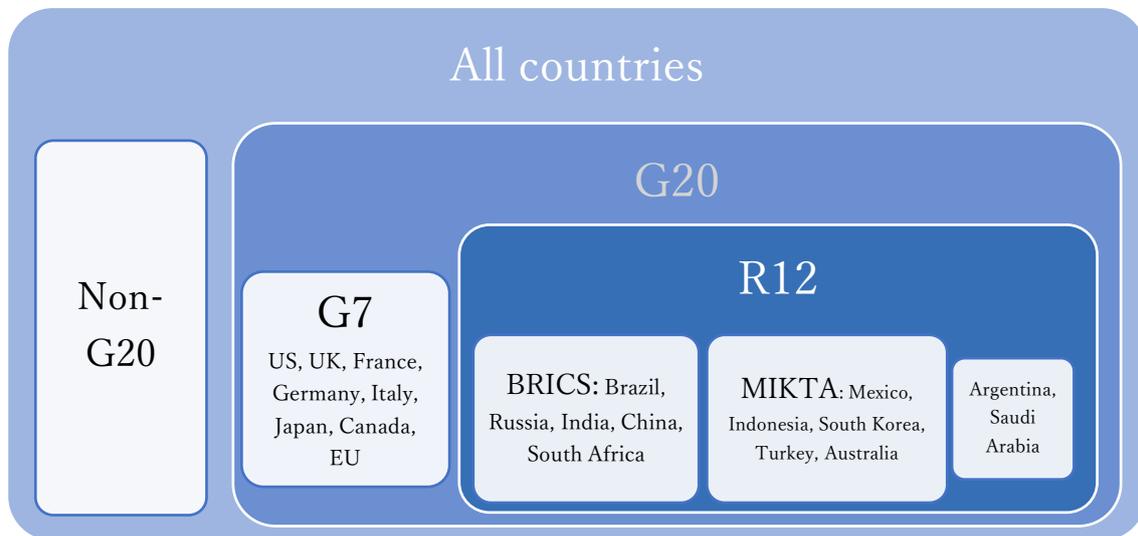
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Figure 1. Global GDP Shares by Country Group (1990-2023)



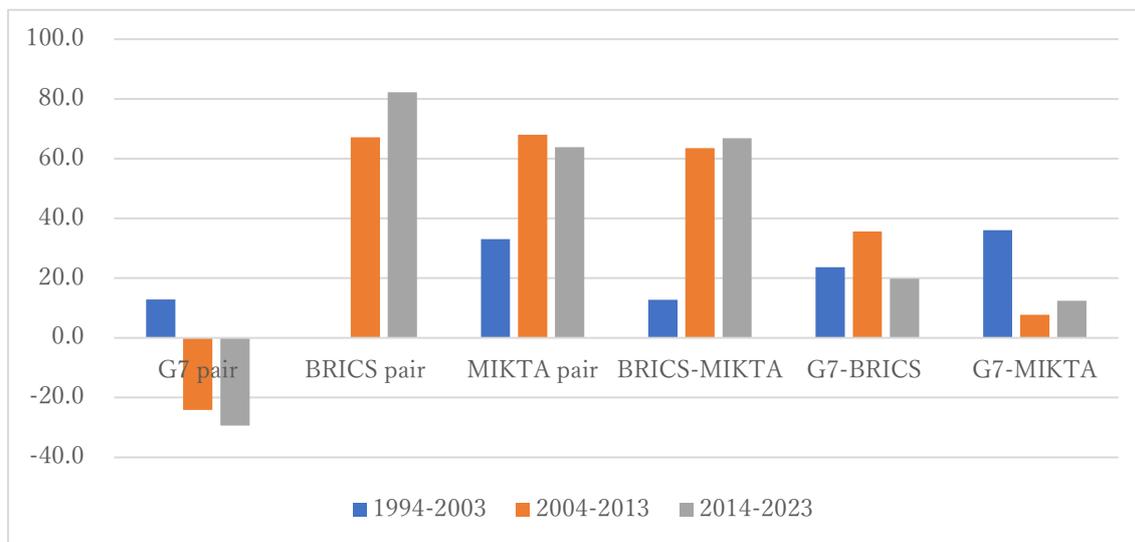
Notes: The time span begins in 1990 to illustrate pre-analysis trends relevant to institutional shifts. The main empirical analysis covers 1994–2023. Relative shares (in percent) are calculated using GDP in constant 2015 USD, sourced from the World Development Indicators database. The G7 is defined to include the European Union alongside the United States, United Kingdom, France, Germany, Italy, Japan and Canada. The G20 countries, excluding the G7, comprise BRICS, MIKTA, Argentina, and Saudi Arabia. The African Union—whose G20 membership was announced in September 2023—is not included in the G20 grouping.

Figure 2. Country Groupings by Institutional Category



Notes: The G7 is treated as inclusive of the EU. BRICS is defined by its original five member states, as the 2024 and 2025 expansions fall outside the sample period (1994–2023); accordingly, Indonesia is classified as non-BRICS despite its accession in 2025. The African Union is excluded from the G20 grouping, as its membership was announced only in September 2023.

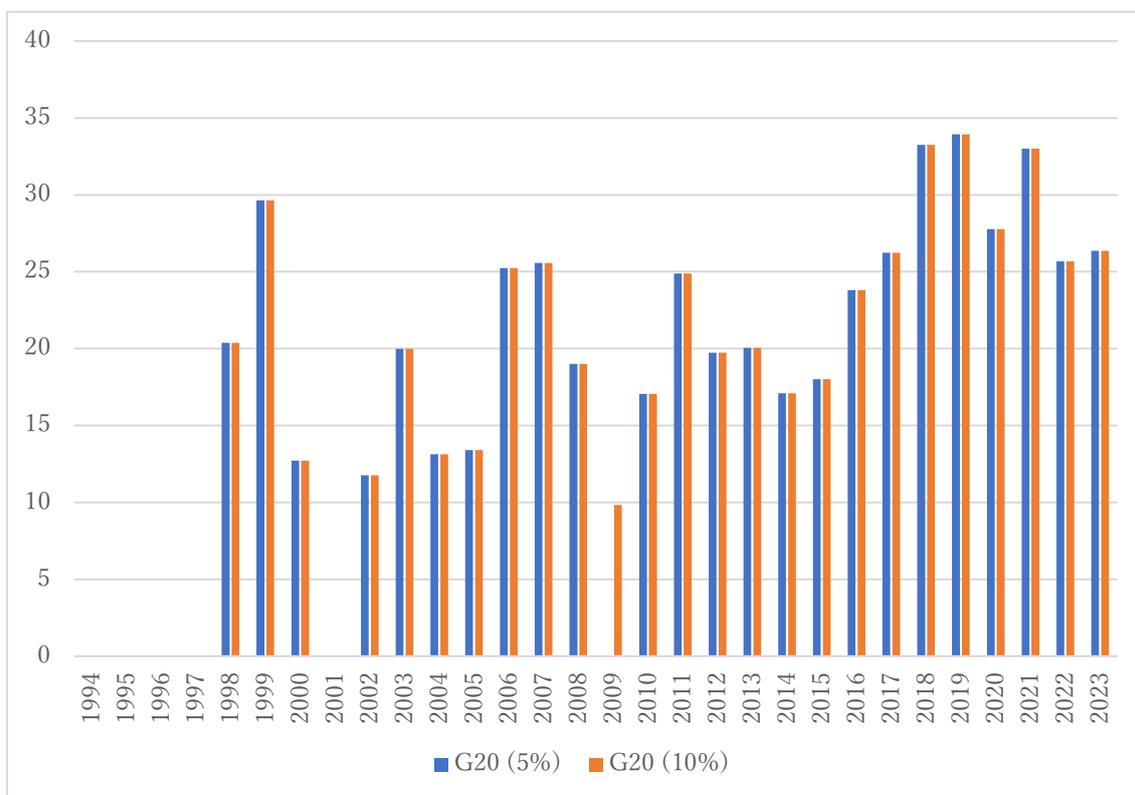
Figure 3. Subperiod Effects on Bilateral Trade Flows (%)



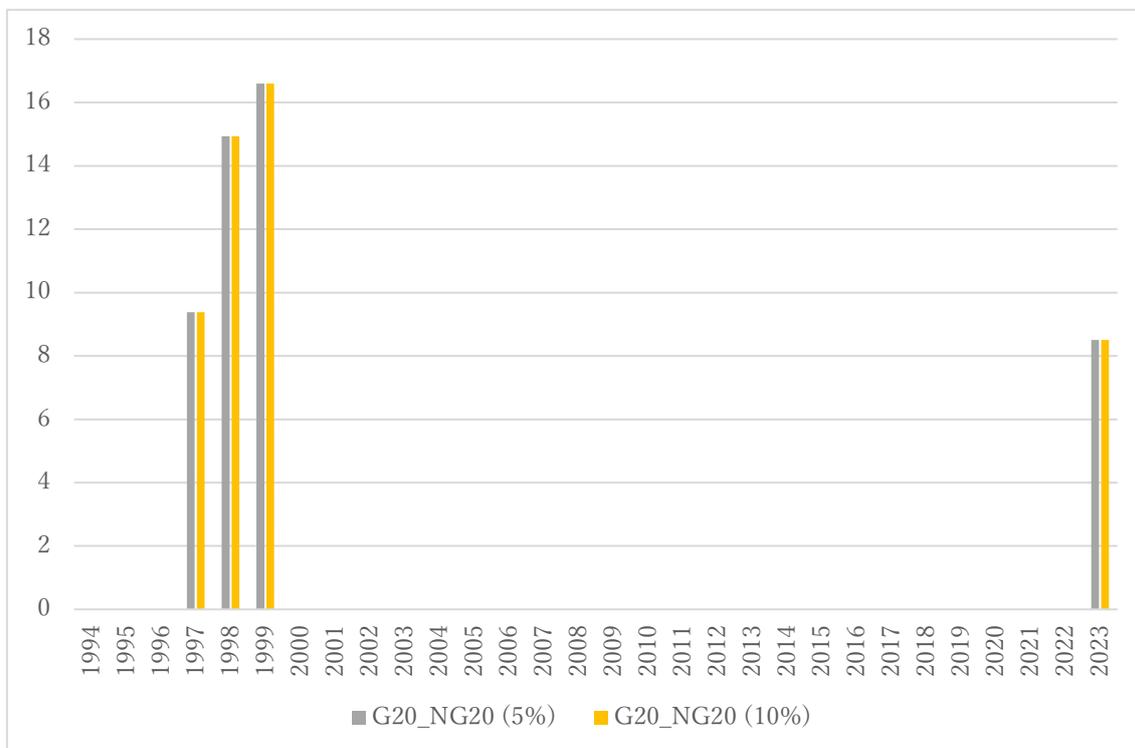
Notes: The figure displays marginal effects on bilateral trade (in percent) by country pair and subsample period, computed from the estimated coefficients of augmented Equation (1), which includes pairwise institutional indicators. For EU country pairs, the effect reflects the combined influence of the EU and G7 institutional categories. For eurozone pairs, the effect additionally incorporates the euro-specific component.

Figure 4. Evolution of Trade Effects by Institutional Category (%), 1994–2023

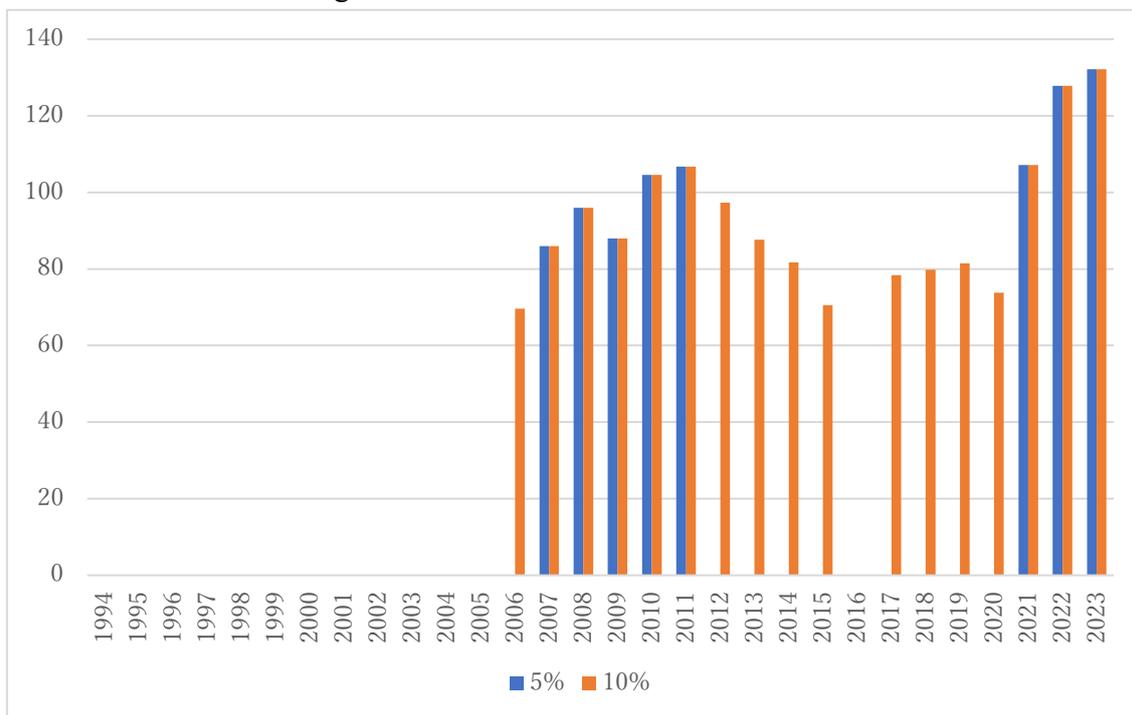
4.1a Bilateral Trade Between G20 Members



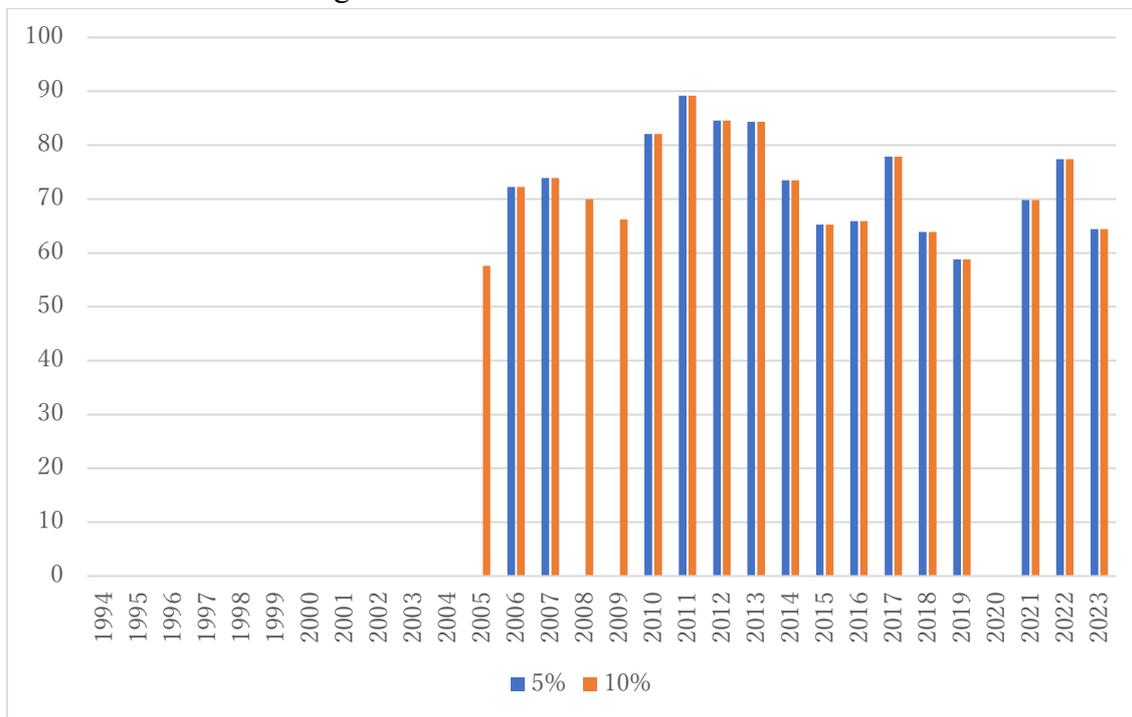
4.1b Bilateral Trade Between G20 and Non-G20 Countries



4.2 Bilateral Trade Among BRICS Countries



4.3 Bilateral Trade Among MIKTA Countries



Notes: Figures display the temporal evolution of bilateral trade effects (in percent) by institutional category, computed from the coefficient estimates of Equation (2) in the main text. Results are shown for both the 5% and 10% significance levels.

Table 1. Informal Institutional Characteristics: Comparative Overview

	G7 (1976-)	G20 (1999-)	BRICS (2006-)	MIKTA (2013-)
Economic development status & political stance	Advanced economies, pillars of the Western hegemony	Mixture of advanced economies and EMDEs	Large EMDEs, a counter pole to the Western hegemony	Advanced & upper middle-income countries
Inception	Expansion of G6 to include Canada in 1976 ^a	Finance Ministers & Central Bank Gov. meeting in 1999	Foreign Ministers meeting in 2006	Foreign Ministers meeting in 2013
Summit/leaders meetings	Annually	Annually, 2008-	Annually, 2009-	The 1 st gathering in 2023
Fields of ministerial & working group meetings	Finance ministers and central bank governors meet multiple times per year. Economy, finance, environment, health, <i>trade</i> , technology/digital, development, foreign policy/diplomacy	Finance, foreign affairs, development, agriculture, tourism, education, research, labor, energy, environment/climate, women's empowerment, anti-corruption, health, digitization, <i>trade and investment</i> , and culture	Foreign affairs, agriculture, energy, environment, health, labor and employment, industry, communications, culture, education, tourism, anti-corruption, disaster management, supreme audit institutions, and statistics	Parliamentary speakers meeting started in 2015. International energy governance and access, counterterrorism and security, peacekeeping, <i>trade and economy</i> , gender equality, good governance, sustainable development
Other coordination mechanisms & initiatives	Science: Carnegie group ^b Security: G7 Rapid Response Mechanism (RPM) ^c	Troika system ^d , Engagement groups (business, civil society, labor, think tanks, women, youth, urban, science, judiciary, ocean, audit institution, and parliament), Cross-track coordination ^e	New Development Bank (NDB) ^f , Contingent Reserve Arrangement (CRA) ^g , interbank cooperation to <i>facilitate trade financing in national currency</i>	Exchange programs, workshops and academic network

Notes: ^a Started as the G5 (US, UK, France, Germany, Japan) in 1974, before Italy joined in 1975 to become the G6.

^b A forum for science ministers and advisors.

^c Coordination mechanism for defending democracy, by sharing threat analysis and facilitating collaboration against malign influence.

^d A collaborative structure consisting of the current, previous, and next presidencies for continuity and preparation.

^e Coordination to link financial and other agendas such as climate and foreign affairs for better coherence.

^f Founded in 2014 to start operating in 2015, with the headquarter in Shanghai, regional offices in Johannesburg, São Paulo, Ahmedabad, and Moscow.

^g Liquidity support framework to provide emergency funding by currency swaps among BRICS central banks.

Sources: <https://groupofnations.com/summit/g7/>, <https://g20.org/>, <https://www.brics.org/>, <https://bricsportal.org/>, <http://mikta.org/> etc.

Table 2. Gravity Model Estimates (1994–2023)

	[1] Coeff.	S. E.	[2] Coeff.	S. E.
(G20, G20)	-	-	0.191**	0.014
(G20, non-G20)	-	-	-0.003	0.009
ln GDP	0.933**	0.001	0.927**	0.001
ln Distance	-1.064**	0.006	-1.063**	0.006
ln Remoteness	0.048**	0.002	0.049**	0.002
ln GDP per capita	0.075**	0.002	0.074**	0.002
Contiguity	1.037**	0.022	1.036**	0.022
Landlock 1	-0.539**	0.007	-0.535**	0.007
Landlock 2	-0.242**	0.022	-0.243**	0.022
Common language	0.603**	0.011	0.601**	0.011
Colonizer-colony	0.891**	0.029	0.900**	0.029
Common colonies	0.497**	0.019	0.487**	0.019
WTO membership	0.302**	0.009	0.298**	0.009
Regional Trade Agreements	0.338**	0.008	0.338**	0.008
EU	0.159**	0.016	0.006	0.017
Exchange rate variability	-0.165**	0.015	-0.166**	0.015
Euro	0.100**	0.022	0.094**	0.022
East Caribbean Dollar	1.467**	0.047	1.441**	0.047
Central African CFA franc	-0.460**	0.020	-0.458**	0.020
West African CFA franc	0.130**	0.016	0.130**	0.016
USD-substitution	0.542**	0.060	0.576**	0.059
EUR-substitution	-0.437**	0.053	-0.433**	0.053
AUD-substitution	2.297**	0.091	2.285**	0.091
ZAR-substitution	2.751**	0.069	2.755**	0.068
DKK-substitution	4.178**	0.029	4.179**	0.029
RUB-substitution	1.568**	0.048	1.592**	0.048
Number of observations	225,187		225,187	
Adjusted R ²	0.730		0.731	

Notes: Column [1] reports pooled estimates of Equation (1) for the period 1994–2023, including year-specific intercepts. Robust standard errors are presented, and ** denotes statistical significance at the 1% level. Column [2] presents estimates from a modified specification that allows for differential effects of trade among G20 countries and between G20 and non-G20 countries, relative to the benchmark. Pairwise institutional indicators are set to zero for the pre-G20 period (1994–1998).

Table 3. Disaggregated Trade Effects Within and Across G20 Subgroups

	[1] Coeff.	S. E.	[2] Coeff.	S. E.
(G7, G7)	-0.122**	0.018	-0.143**	0.018
(R12, R12)	0.544**	0.025	-	-
(G7, R12)	0.214**	0.011	-	-
(BRICS, BRICS)	-	-	0.608**	0.090
(MIKTA, MIKTA)	-	-	0.536**	0.069
(G7, BRICS)	-	-	0.275**	0.019
(G7, MIKTA)	-	-	0.160**	0.019
(BRICS, MIKTA)	-	-	0.555**	0.048
ln GDP	0.926**	0.001	0.930**	0.001
ln Distance	-1.064**	0.006	-1.063**	0.006
ln Remoteness	0.046**	0.002	0.048**	0.002
ln GDP per capita	0.076**	0.002	0.076**	0.002
Contiguity	1.034**	0.022	1.034**	0.022
Landlock 1	-0.532**	0.007	-0.535**	0.007
Landlock 2	-0.241**	0.022	-0.240**	0.022
Common language	0.604**	0.011	0.604**	0.011
Colonizer-colony	0.899**	0.029	0.891**	0.029
Common colonies	0.490**	0.019	0.495**	0.019
WTO membership	0.300**	0.009	0.301**	0.009
Regional Trade Agreements	0.334**	0.008	0.337**	0.008
EU	0.295**	0.021	0.301**	0.021
Exchange rate variability	-0.164**	0.015	-0.164**	0.015
Euro	0.112**	0.022	0.110**	0.022
East Caribbean Dollar	1.430**	0.047	1.449**	0.047
Central African CFA franc	-0.457**	0.020	-0.458**	0.020
West African CFA franc	0.133**	0.016	0.133**	0.016
USD-substitution	0.576**	0.059	0.557**	0.060
EUR-substitution	-0.439**	0.053	-0.458**	0.053
AUD-substitution	2.286**	0.091	2.288**	0.091
ZAR-substitution	2.759**	0.068	2.759**	0.068
DKK-substitution	4.172**	0.029	4.170**	0.030
RUB-substitution	1.592**	0.048	1.582**	0.048
Number of observations	225,187	-	225,187	-
Adjusted R ²	0.731	-	0.731	-

Notes: Entries summarize pooled estimates from modified specifications of Equation (1) for the period 1994–2023, allowing for differential effects on intra- and inter-institutional trade. All specifications include year-specific intercepts. ** denotes statistical significance at the 1% level. The G7 comprises the US, UK, France, Germany, Italy, Japan, Canada, and the EU. BRICS includes Brazil, Russia, India, China, and South Africa; MIKTA includes Mexico, Indonesia, South Korea, Turkey, and Australia. R12 comprises Argentina and Saudi Arabia, in addition to BRICS and MIKTA.

Table 4. Subperiod Estimates of Trade Effects by Informal Institutional Category

	1994-2003	2004-2013	2014-2023	1994-2003	2004-2013	2014-2023
(G7, G7)	0.142** (0.035)	-0.264** (0.031)	-0.337** (0.030)	0.121** (0.035)	-0.276** (0.030)	-0.347** (0.030)
(R12, R12)	0.251** (0.045)	0.561** (0.039)	0.530** (0.037)	-	-	-
(G7, R12)	0.300** (0.021)	0.184** (0.018)	0.152** (0.017)	-	-	-
(BRICS, BRICS)	-	-	-	0.103 (0.105)	0.514** (0.100)	0.600** (0.112)
(MIKTA, MIKTA)	-	-	-	0.286* (0.114)	0.519** (0.085)	0.494** (0.072)
(BRICS, MIKTA)	-	-	-	0.120* (0.057)	0.492** (0.051)	0.512** (0.052)
(G7, BRICS)	-	-	-	0.212** (0.030)	0.305** (0.024)	0.181** (0.025)
(G7, MIKTA)	-	-	-	0.308** (0.029)	0.074** (0.027)	0.117** (0.022)
Number of observations	60,232	77,369	87,586	60,232	77,369	87,586

Notes: Entries report estimated effects of intra- and inter-informal institutions on bilateral trade. See notes to Table 3. ** and * denote statistical significance at the 1% and 5% levels, respectively.

Table 5. Temporal Evolution of Trade Effects by Institutional Category

	G20 (1999-)	G20-non-G20	BRICS (2006-)	MIKTA (2013-)
1994	-0.024	0.062	-0.607	-0.001
1995	-0.043	0.016	-0.455	-0.145
1996	-0.001	0.025	-0.490	0.035
1997	0.076	0.089*	-0.352	0.078
1998	0.185**	0.139**	-0.055	0.185
1999	0.259**	0.153**	0.142	0.215
2000	0.119*	-0.043	-0.011	0.248
2001	0.084	-0.048	0.050	0.193
2002	0.111*	-0.018	0.147	0.275
2003	0.182**	-0.001	0.186	0.224
2004	0.123*	-0.055	0.282	0.349
2005	0.125*	-0.053	0.436	0.455 [†]
2006	0.225**	-0.009	0.528 [†]	0.544*
2007	0.227**	0.051	0.620*	0.553*
2008	0.174**	-0.016	0.673*	0.531 [†]
2009	0.093 [†]	-0.053	0.631*	0.508 [†]
2010	0.157**	-0.050	0.716*	0.599*
2011	0.222**	0.014	0.726*	0.638*
2012	0.180**	-0.019	0.680 [†]	0.613*
2013	0.182**	-0.012	0.630 [†]	0.612**
2014	0.157**	-0.038	0.597 [†]	0.551*
2015	0.165**	-0.023	0.534	0.502*
2016	0.213**	-0.048	0.444	0.506*
2017	0.233**	-0.003	0.579 [†]	0.576**
2018	0.287**	0.048	0.587 [†]	0.494*
2019	0.292**	0.061	0.596 [†]	0.462*
2020	0.245**	0.007	0.553	0.367
2021	0.285**	0.011	0.728*	0.529*
2022	0.223*	0.016	0.823*	0.573*
2023	0.233**	0.081*	0.842*	0.497*

Notes: The table summarizes the evolution of coefficient estimates for institution-specific effects on bilateral trade, denoted as ρ_t^k in Equation (2) of the main text. The entries in the first row indicate institution category k and its inception year (in parentheses). **, * and [†] denote statistical significance at the 1 %, 5% and 10% levels, respectively.

Appendix

Data Sources

Data come from multiple sources.

Exports and imports (in millions of USD) are from IMF's *Direction of Trade Statistics* (DOT) database. We use the value of exports, free on board (FOB), and value of imports, cost, insurance, freight (CIF) in USD. For imports, FOB series are available only for a small number of countries in DOT.

GDP and population data are from World Bank's *World Development Indicators* (WDI) database. The US GDP deflator series, with the base year 2015, is also from the WDI.

GDP data for Taiwan are from *National Accounts Yearbook 2023* of Taiwan (<https://eng.stat.gov.tw/>). Figures in Million NT\$ are converted to USD using period-average nominal exchange rate series from IMF's *International Financial Statistics* (IFS). All nominal exchange rate data come from the IFS. Inter-country distance in kilometers is calculated as the great circle distance between national capitals using their latitude and longitude information. We used the Great Circle Calculator provided by Ed Williams at <https://edwilliams.org/gccalc.htm>.

Sample Period

1994–2023. Due to data limitations, shorter sample periods apply to some countries.

Sample Countries

We downloaded data for all countries from the DOT and WDI databases. We then selected countries for which both trade data (DOT) and GDP data (WDI) were available. The table below presents the list of countries in the sample. See notes below the table.

Sample Countries

Afghanistan	Albania	Algeria	American Samoa
Angola	Antigua and Barbuda	Argentina	Armenia
Aruba	Australia	Austria	Azerbaijan
Bahamas	Bahrain	Bangladesh	Barbados
Belarus	Belgium	Belgium-Luxembourg ¹	Belize
Benin	Bermuda	Bhutan	Bolivia
Bosnia and Herzegovina	Botswana	Brazil	Brunei Darussalam
Bulgaria	Burkina Faso	Burundi	Cabo Verde
Cambodia	Cameroon	Canada	Central African Rep.
Chad	Chile	China, P.R.: Hong Kong	China, P.R.: Macao
China, P.R.: Mainland	Colombia	Comoros	Congo, Dem. Rep.
Congo, Rep. of	Costa Rica	Côte d'Ivoire	Croatia, Rep. of
Cuba	Curaçao	Cyprus	Czech Rep.
Denmark	Djibouti	Dominica	Dominican Rep.
Ecuador	Egypt	El Salvador	Equatorial Guinea
Eritrea	Estonia	Eswatini	Ethiopia
Faroe Islands	Fiji	Finland	France
French Polynesia	Gabon	Gambia	Georgia
Germany	Ghana	Gibraltar	Greece
Greenland	Grenada	Guam	Guatemala
Guinea	Guinea-Bissau	Guyana	Haiti
Honduras	Hungary	Iceland	India
Indonesia	Iran	Iraq	Ireland
Israel	Italy	Jamaica	Japan
Jordan	Kazakhstan	Kenya	Kiribati
Korea, Rep. of	Kosovo	Kuwait	Kyrgyz Rep.
Lao	Latvia	Lebanon	Lesotho
Liberia	Libya	Lithuania	Luxembourg
Madagascar	Malawi	Malaysia	Maldives
Mali	Malta	Marshall Islands	Mauritania
Mauritius	Mexico	Micronesia	Moldova
Mongolia	Montenegro	Morocco	Mozambique
Myanmar	Namibia	Nauru	Nepal
Netherlands	New Caledonia	New Zealand	Nicaragua
Niger	Nigeria	North Macedonia	Norway

Oman	Pakistan	Palau	Panama
Papua New Guinea	Paraguay	Peru	Philippines
Poland	Portugal	Qatar	Romania
Russian Federation	Rwanda	Samoa	San Marino
São Tomé and Príncipe	Saudi Arabia	Senegal	Serbia and Montenegro ²
Serbia	Seychelles	Sierra Leone	Singapore
Sint Maarten	Slovak	Slovenia	Solomon Islands
Somalia	South Africa	South Sudan	Spain
Sri Lanka	St. Kitts and Nevis	St. Lucia	St. Vincent & the Grenad.
Sudan	Suriname	Sweden	Switzerland
Syrian Arab Rep.	Taiwan ³	Tajikistan	Tanzania
Thailand	Timor-Leste	Togo	Tonga
Trinidad and Tobago	Tunisia	Türkiye (Turkey)	Turkmenistan
Tuvalu	Uganda	Ukraine	United Arab Emirates
United Kingdom	United States	Uruguay	Uzbekistan
Vanuatu	Venezuela	Vietnam	West Bank and Gaza
Yemen	Zambia	Zimbabwe	

Notes: ¹ Belgium-Luxembourg: The DOT database reports data for Belgium-Luxembourg as a single entity from 1994 to 1996. Separate data for Belgium and Luxembourg became available in 1997. To maintain consistency, GDP and population data for this period were aggregated. For the purpose of calculating distance between countries, Brussels was used for the combined Belgium-Luxembourg entity.

² Serbia-Montenegro: Data for Serbia-Montenegro were reported as a single country from 1994 to 2004. Separate data for Serbia and Montenegro are available from 2006 onward. To maintain consistency, GDP and population data were treated in the same manner. For distance calculations, Belgrade was used as the capital for the combined Serbia-Montenegro entity.

³ Taiwan: The DOT does not include data for Taiwan as a reporting country. Therefore, Taiwan's trade was calculated by aggregating the exports and imports of all other countries to and from Taiwan.

The number of countries varies slightly over the sample period, as detailed below:

1994–1998: 203 countries. During this period, Belgium-Luxembourg and Serbia-Montenegro were each treated as a single entity.

1999–2005: 204 countries. Belgium and Luxembourg were reported as separate countries,

while Serbia-Montenegro remained a single entity.

2006–2023: 205 countries. Belgium, Luxembourg, Serbia, and Montenegro are all reported as separate states, following the independence of Serbia and Montenegro.

Informal Institutions

Group of 7 (G7) countries: Canada, France, Germany, Italy, Japan, UK, US and the EU (1994-2023).

BRICS: Brazil, Russia, India, and China (2006-23), and South Africa (2011-23).

MIKTA: Mexico, Indonesia, Korea, Turkey, and Australia (2013-2023).

G20: The G20 consists of the G7 members (Canada, France, Germany, Italy, Japan, UK, US, and the EU); the BRICS members (Brazil, Russia, India, China, and South Africa); the MIKTA members (Mexico, Indonesia, Korea, Turkey, and Australia); and Argentina and Saudi Arabia (1999–2023).

Formal Institutions

The European Union (EU): Membership evolved over the sample period.

1994–2023: Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, and Spain.

1994–2020: The UK.

1995–2023: Austria, Finland, and Sweden.

2004–2023: Cyprus, Czechia, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, and Slovenia.

2007–2023: Bulgaria and Romania.

2013–2023: Croatia.

Regional Trade Agreements

Regional Trade Agreement (RTA) data were sourced from the World Trade Organization’s (WTO) “RTA in force” database (<https://rtais.wto.org/>). When the timing of entry into force differed between goods and services trade, the date for goods trade was used, as it generally becomes effective first. For RTAs that entered into force in December, the following year was set as the first year in effect. Our analysis included all 366 RTAs that were in force by 2023.

WTO Membership

WTO membership data were sourced from the official WTO website (<https://www.wto.org/>). We have set the effective membership year based on the dates

below. For countries that joined the WTO in December of a given year, we consider their effective membership to begin in the following year to ensure accuracy for annual frequency observations. For countries marked with *, the actual accession date was in December of the preceding year.

1995: Antigua and Barbuda, Argentina, Australia, Austria, Bahrain, Bangladesh, Barbados, Belgium (Belgium-Luxembourg), Belize, Bolivia, Botswana, Brazil, Brunei Darussalam, Burkina Faso, Burundi, Canada, Central African Republic, Chile, Colombia, Costa Rica, Cote d'Ivoire, Cuba, Cyprus, Czechia, Denmark, Djibouti, Dominica, Dominican Republic, Egypt, El Salvador, Eswatini, Finland, France, Gabon, Germany, Ghana, Greece, Guatemala, Guinea, Guinea-Bissau, Guyana, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Jamaica, Japan, Kenya, Korea, Kuwait, Lesotho, Luxembourg, Macao, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Mauritania, Mauritius, Mexico, Morocco, Mozambique, Myanmar, Namibia, Netherlands, New Zealand, Nicaragua, Nigeria, Norway, Pakistan, Paraguay, Peru, Philippines, Poland, Portugal, Romania, Senegal, Sierra Leone, Singapore, Slovak Republic, Slovenia, South Africa, Spain, Sri Lanka, St. Lucia, St. Vincent and the Grenadines, Suriname, Sweden, Switzerland, Tanzania, Thailand, Togo, Trinidad and Tobago, Tunisia, Turkey, Uganda, United Kingdom, United States, Uruguay, Venezuela, Zambia, Zimbabwe.

1996: Angola, Benin, Cameroon*, Chad, Ecuador, Fiji, Gambia, Grenada, Haiti, Papua New Guinea, Qatar, Rwanda, Solomon Islands, St. Kitts and Nevis, United Arab Emirates.

1997: Bulgaria*, Congo (Rep.), Congo (Dem. Rep.), Mongolia, Niger*, Panama.

1999: Estonia, Kyrgyz Republic*, Latvia.

2000: Albania, Croatia, Georgia, Jordan, Oman.

2001: Lithuania, Moldova.

2002: China*, Taiwan.

2003: Armenia, North Macedonia.

2004: Cambodia, Nepal.

2006: Saudi Arabia*.

2007: Tonga, Vietnam.

2008: Cabo Verde, Ukraine.

2012: Montenegro, Russia, Samoa, Vanuatu.

2013: Lao People's Democratic Republic, Tajikistan.

2014: Yemen.

2015: Kazakhstan, Seychelles.

2016: Afghanistan, Liberia.

Common Languages

To identify countries sharing common languages, we used the information from the CIA's *The World Factbook* (WFB, <https://www.cia.gov/the-world-factbook/countries/>). The languages considered common for our analysis are listed below by region:

European languages: English, French, German, Spanish, Italian, Dutch, Portuguese, Danish, Swedish, Greek, Albanian, Serbian, Croatian, Bosnian, and Russian.

Middle Eastern / Central Asian languages: Turkish, Arabic, Hebrew, Pashto, Uzbek, and Tajik.

Asian / Pacific languages: Tamil, Malay, Mandarin, Cantonese, Samoan, and Bahasa.

African languages: Setswana, Somali, Kinyarwanda, and Swahili.

Creole / Caribbean languages: Papiamentu and Creole.

Exchange Rate Variability

To measure exchange rate variability, we first used monthly average series of the USD bilateral exchange rates (from the IFS) to derive bilateral exchange rates among all sample countries as cross-rates. We then calculated the standard deviation of the first difference of the logged bilateral rates to represent nominal exchange rate changes over the preceding five-year periods. The initial data were at a monthly frequency, while the final exchange rate variability measure is at an annual frequency.

Currency Unions

To identify currency unions and currency substitution cases, we used the WFB, Levy Yeyati and Sturzenegger (2003), and Hawkins and Masson (2003).

The following currency unions and their member countries were included in the sample:

- Eurozone (Euro):

1999 onward: Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Portugal, and Spain.

2001 onward: Greece.

2007 onward: Slovenia.

2008 onward: Cyprus and Malta.

2009 onward: Slovakia.

2011 onward: Estonia.

2014 onward: Latvia.

2015 onward: Lithuania.

2023 onward: Croatia.

Note: Although not an official member, San Marino's adoption of the euro has been officially approved by the European Parliament. Given its close monetary integration with Italy, San Marino is treated as a member of the Eurozone in our analysis.

- Organization of Eastern Caribbean States (Eastern Caribbean Dollar): Antigua and Barbuda, Dominica, Grenada, Saint Kitts and Nevis, Saint Lucia, and Saint Vincent and the Grenadines.
- Economic and Monetary Community of Central Africa (Central African CFA franc): Cameroon, Central African Republic, Chad, Congo (Rep.), Equatorial Guinea, and Gabon.
- West African Economic and Monetary Union (West African CFA franc): Benin, Burkina Faso, Cote d'Ivoire, Mali, Niger, Senegal, and Togo. Guinea-Bissau is included from 1997 onward.

Currency Substitutions

The following countries were treated as using a foreign currency as a substitute for their own domestic currency:

- US Dollar-substitution:
 - All years (1994-2023): Marshall Islands, Micronesia, Palau, and Panama.
 - 2000 onward: Ecuador.
 - 2001 onward: El Salvador and Guatemala.
- Euro-substitution:
 - 1999 onward: Montenegro.
 - 2001 onward: Kosovo.
- Australian Dollar-substitution:
 - All years (1994-2023): Kiribati, Nauru, and Tuvalu.
- South African Rand-substitution:
 - All years (1994-2023): Lesotho, Namibia, and Eswatini.
- Danish Krone-substitution:
 - All years (1994-2023): Greenland.
- Russian Ruble-substitution:
 - 2004 onward: Belarus.

Internal Distance and Land Area

To construct the remoteness index of Baldwin and Harrigan (2011), it is necessary to assign a value for a country's distance to itself. Following the suggestion of Head and Mayer (2000) and Head (2003), we used the square root of a country's land area, multiplied by 0.4, as an approximate measure of "internal distance." To generate this proxy variable, we used land area data from WDI. Land area data for Kosovo and Taiwan were obtained from the CIA's WFB.

Landlocked Countries

Landlocked countries were identified by referencing the *World Atlas* (<https://www.worldatlas.com/articles/landlocked-countries-of-the-world.html>).

A country is considered landlocked if it is surrounded by one or more other countries and has no direct access to open water. Our sample includes the following 41 countries: Afghanistan, Armenia, Austria, Azerbaijan, Belarus, Bhutan, Bolivia, Botswana, Burkina Faso, Burundi, Central African Republic, Chad, Czechia, Eswatini, Ethiopia, Hungary, Kazakhstan, Kyrgyzstan, Laos, Lesotho, Luxembourg, Malawi, Mali, Moldova, Mongolia, Nepal, Niger, North Macedonia, Paraguay, Rwanda, San Marino, Serbia, Slovakia, South Sudan, Switzerland, Tajikistan, Turkmenistan, Uganda, Uzbekistan, Zambia, and Zimbabwe.

Colonial and Historical Ties

The following list identifies former colonies and territories that gained independence after 1945, along with their respective colonizing countries.

- Belgium: Burundi, Democratic Republic of the Congo, Rwanda.
- France: Algeria, Benin, Burkina Faso, Cambodia, Cameroon, Central African Republic, Chad, Comoros, Republic of the Congo, Côte d'Ivoire, Djibouti, Gabon, Guinea, Laos, Madagascar, Mali, Mauritania, Morocco, Niger, Senegal, Togo, Tunisia, Vanuatu, Vietnam.
- Netherlands: Indonesia, Suriname.
- Portugal: Angola, Cabo Verde, Timor-Leste, India (Goa, Daman and Diu), Guinea-Bissau, Mozambique, São Tomé and Príncipe.
- United Kingdom: Antigua and Barbuda, Bahamas, Barbados, Belize, Botswana, Brunei, Cyprus, Dominica, Fiji, The Gambia, Ghana, Grenada, Guyana, India, Jamaica, Kenya, Kiribati, Kuwait, Lesotho, Malawi, Malaysia, Malta, Mauritius, Myanmar, Nauru, Nigeria, Pakistan, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Seychelles, Sierra Leone, Sri Lanka, Sudan, Eswatini, Tanzania, Tonga, Trinidad and

Tobago, Uganda, Vanuatu, Yemen, Zambia, Zimbabwe.

- United States: American Samoa, Guam, Marshall Islands, Micronesia, Palau, the Philippines.

Table Appendix

Table A4-1. Subsample Estimates: Control Variables

	1994-2003		2004-2013		2014-2023	
	Coef.	S. E.	Coef.	S. E.	Coef.	S.E.
ln GDP	0.888**	0.003	0.951**	0.003	0.927**	0.003
ln Distance	-0.997**	0.010	-1.120**	0.011	-1.062**	0.012
ln Remoteness	0.048**	0.004	0.073**	0.004	0.018**	0.003
ln GDP per capita	0.097**	0.003	0.067**	0.003	0.074**	0.003
Contiguity	0.981**	0.038	0.966**	0.037	1.160**	0.038
Landlock 1	-0.478**	0.014	-0.512**	0.013	-0.587**	0.012
Landlock 2	-0.032	0.041	-0.258**	0.040	-0.362**	0.036
Common language	0.548**	0.020	0.622**	0.018	0.617**	0.018
Colonizers-colonies	1.297**	0.046	0.849**	0.050	0.553**	0.051
Common colonies	0.404**	0.035	0.553**	0.032	0.492**	0.031
WTO members	0.165**	0.015	0.244**	0.015	0.469**	0.017
Regional Trade Agreements	0.359**	0.019	0.317**	0.015	0.319**	0.013
EU	-0.055	0.046	0.420**	0.036	0.540**	0.036
Exchange rate variability	-0.166**	0.031	-0.136**	0.017	-1.459**	0.099
Euro	0.175**	0.059	0.013	0.033	0.105**	0.032
East Caribbean Dollar	1.700**	0.082	1.340**	0.076	1.250**	0.084
Central African CFA	-0.476**	0.036	-0.378**	0.035	-0.529**	0.032
Western African CFA	0.007	0.030	0.249**	0.026	0.106**	0.026
USD-substitution	0.610**	0.079	0.370**	0.058	0.788**	0.124
EUR-substitution	-	-	-0.405**	0.096	-0.486**	0.065
AUD-substitution	2.209**	0.194	2.338**	0.132	2.311**	0.157
ZAR-substitution	-	-	2.760**	0.110	2.616**	0.091
DKK-substitution	4.019**	0.049	4.135**	0.038	4.300**	0.057
RUB-substitution	-	-	1.437**	0.073	1.642**	0.065
Number of observations	60,232		77,369		87,586	
Adjusted R ²	0.727		0.737		0.730	

Notes: Entries report estimates for control variables other than the institutional category indicators shown in the first three columns of Table 4. Heteroskedasticity-consistent standard errors are listed under the heading “S.E.” ** denotes statistical significance at the 1% level. See also notes to Table 4.

Table A4-2. Subsample Estimates: Control Variables

	1994-2003		2004-2013		2014-2023	
	Coef.	S. E.	Coef.	S. E.	Coef.	S.E.
ln GDP	0.891**	0.003	0.952**	0.003	0.928**	0.003
ln Distance	-0.997**	0.010	-1.119**	0.011	-1.062**	0.012
ln Remoteness	0.049**	0.004	0.075**	0.004	0.019**	0.003
ln GDP per capita	0.097**	0.003	0.068**	0.003	0.075**	0.003
Contiguity	0.982**	0.038	0.968**	0.037	1.161**	0.038
Landlock 1	-0.480**	0.014	-0.514**	0.013	-0.588**	0.012
Landlock 2	-0.031	0.041	-0.257**	0.040	-0.362**	0.036
Common language	0.549**	0.020	0.620**	0.018	0.617**	0.018
Colonizers-colonies	1.293**	0.046	0.844**	0.050	0.549**	0.051
Common colonies	0.410**	0.035	0.555**	0.032	0.493**	0.031
WTO members	0.160**	0.015	0.245**	0.015	0.471**	0.017
Regional Trade Agreements	0.359**	0.019	0.320**	0.015	0.318**	0.013
EU	-0.047	0.046	0.426**	0.036	0.545**	0.036
Exchange rate variability	-0.164**	0.031	-0.136**	0.017	-1.451**	0.099
Euro	0.173**	0.059	0.009	0.033	0.104**	0.032
East Caribbean Dollar	1.719**	0.082	1.346**	0.076	1.255**	0.084
Central African CFA	-0.475**	0.036	-0.378**	0.035	-0.529**	0.032
Western African CFA	0.008	0.030	0.250**	0.026	0.107**	0.026
USD-substitution	0.593**	0.079	0.359**	0.058	0.782**	0.124
EUR-substitution	-	-	-0.404**	0.096	-0.486**	0.065
AUD-substitution	2.211**	0.193	2.337**	0.132	2.313**	0.157
ZAR-substitution	-	-	2.757**	0.110	2.616**	0.091
DKK-substitution	4.019**	0.049	4.132**	0.038	4.300**	0.057
RUB-substitution			1.435**	0.073	1.640**	0.065
Number of observations	60,232		77,369		87,586	
Adjusted R ²	0.727		0.737		0.730	

Notes: Entries report estimates for control variables other than the institutional category indicators shown in the first three columns of Table 4. Heteroskedasticity-consistent standard errors are listed under the heading "S.E." ** denotes statistical significance at the 1% level. See also notes to Table 4.