

Trading Under Pressure: The Heterogeneous Effects of Sanctions on African Economies

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Research Article

Keywords: Sanctions, Africa, gravity model, manufacturing, mining & energy

Posted Date: May 25th, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-9633621/v1>

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Abstract

This study provides a comprehensive and disaggregated analysis of the impact of sanctions on African trade using a structural gravity model, with a particular focus on sectoral, country-level, and sender-specific heterogeneity. The findings identify manufacturing and mining & energy as the main transmission channels, though with distinct mechanisms. Manufacturing affected through supply chain disruptions, financial constraints, and reduced participation in global value chains, while mining & energy (especially oil and gas) experience the most severe trade contractions due to direct export restrictions. Country-level results highlight that less diversified and structurally dependent economies suffer the largest trade losses, whereas limited positive effects in some cases reflect trade diversion rather than resilience. The results further show that senders with different income-level and geographical landscape affect trade asymmetrically. Sectoral results show that sanctions have heterogeneous effects, with the strongest negative impacts concentrated in manufacturing and resource-dependent industries, while some sectors experience neutral or positive effects due to trade diversion and structural adjustment. These findings suggest that African countries should focus on strengthening economic resilience through diversification, deeper regional integration, and more robust supply chains. In particular, expanding manufacturing capacity, reducing reliance on primary commodity exports, improving access to trade finance, investing in industrial infrastructure, and promoting intra-African trade are critical for mitigating the adverse effects of external shocks.

1. Introduction

Economic sanctions have become a central instrument of international diplomacy, used to influence political behaviour, enforce global norms, and respond to crises (Drezner, 2011; Hufbauer et al., 2007). In Africa, sanctions are often imposed in response to governance failures, human rights violations, and security concerns. However, their economic consequences, particularly for international trade, remain questioned. Earlier research highlights the uneven and often unintended economic effects of sanctions (Galtung, 1967), a concern that remains highly relevant for African economies.

Although politically motivated, sanctions operate primarily through economic and trade channels. Empirical evidence shows that they reduce bilateral trade flows, restrict access to foreign exchange, and contribute to macroeconomic instability, ultimately lowering income and welfare levels (Hufbauer et al., 2007; Neuenkirch & Neumeier, 2015). These effects are especially pronounced in African economies, where sanctions lead to export losses, reduced participation in global value chains, and spillover effects on neighbouring economies, alongside broader developmental and humanitarian challenges (Bruno et al., 2025; Evenett, 2002; Larochelle et al., 2014; Lazanyuk & Diu, 2022; Slavov, 2007). Sanctions imposed on African countries also display clear temporal and regional patterns. As shown in Fig. 1, sanctions fluctuate considerably over the period 1990–2022, with pronounced peaks in the early 2000s and again in 2013–2014, followed by a decline and a modest recent increase. Figure 2 further reveals a highly uneven regional distribution of sanctioning activity. Europe and Central Asia account for the largest share, followed by Latin America & Caribbean, and East Asia & Pacific. In contrast, regions such as South Asia and North America contribute relatively fewer sanctions. These patterns highlight the dynamic and uneven nature of sanctions affecting African countries and reinforce the need for systematic analysis of their trade impacts.

Theoretical perspectives further insight into these dynamics. Realism views sanctions as instruments of power used to shape trade in pursuit of strategic interests, while liberal institutionalism views them as rule-based tools for enforcing compliance despite short-term economic costs. Dependency theory, in contrast, emphasizes how sanctions reinforce structural inequalities within the global economy. Together, these perspectives suggest that the impact of sanctions extends beyond political outcomes and must be understood through their differentiated trade effects, shaped by power asymmetries, institutional frameworks, and structural constraints.

Provided that many African economies are structurally dependent on a narrow range of primary exports and rely heavily on imports of essential goods, a systematic analysis of trade effects is necessary to assess both the scale and distribution of economic costs. Such an approach also helps identify adjustment mechanisms such as trade diversion, shifts toward alternative trading partners, and the expansion of informal trade channels (Bove et al., 2023; Shingal, 2024). Such analysis enables a more balanced evaluation of whether sanctions achieve their intended objectives or instead exacerbate existing vulnerabilities.

Building on these insights, this paper examines how sanctions affect bilateral trade flows involving African countries. It argues that sanctions significantly reduce trade volumes and disproportionately affect structurally dependent economies, thereby amplifying existing vulnerabilities and constraining long-term development. Although prior research has explored the broader economic, social, and political consequences of sanctions, limited attention has been paid to their trade-specific effects in the African context. Addressing this gap is important, as trade remains a central channel through which external shocks affect developing economies. By focusing explicitly on trade, this study provides a clearer understanding of how sanctions reshape economic relationships and development trajectories across African countries.

The present study integrates theoretical insights with comprehensive empirical analysis to analyse how sanctions shape trade patterns, sectoral performance, and development outcomes across African economies. It focuses on the manufacturing and mining & energy sectors due to their economic importance and high exposure to sanctions. Mining and energy exports generate significant foreign exchange and government revenue, while manufacturing supports industrialization and export diversification. Both sectors depend heavily on global markets, finance, and technology, making them particularly vulnerable to sanctions. Empirical evidence confirms significant trade declines in these sectors (Larch et al., 2022), identifying them as key channels through which sanctions affect African economies.

The study pursues four main objectives. First, it examines the overall impact of sanctions on African countries' trade across manufacturing and mining & energy sectors. Second, it evaluates country-specific effects, with a focus on manufacturing and mining & energy. Third, it analyses how these effects vary across sanctioning countries with different income levels and across regions. Finally, it investigates sectoral impacts within African economies.

For econometric analyses, the study employs a theoretically consistent structural gravity model framework (Anderson & van Wincoop, 2003) to estimate the effects of sanctions on bilateral trade flows. It leverages the most advanced gravity estimation techniques that address key methodological challenges such as zero trade values, heteroscedasticity in trade data, endogeneity of trade policy variables, while accounting for multilateral resistance terms (MRTs). The inclusion of intranational trade flows further strengthens the analysis by capturing the trade impact of sanctions within a comprehensive fixed effects structure (Beverelli et al., 2024; Heid et al., 2021; Larch et al., 2018).

This study contributes to the literature in several ways. First, it provides a continent-wide perspective on sanctions affecting African countries, offers country-level insights that reveal heterogeneous effects, and highlights how structural factors such as income levels and regional integration shape outcomes. Second, its sectoral analysis generates new evidence on how sanctions affect key industries differently, with implications for trade composition and development. Therefore, this study advances understanding of how sanctions interact with structurally vulnerable economies and offers evidence-based policy insights.

The rest of the paper is organized as follows. Section 2 reviews the theoretical framework supporting the study's analysis and existing qualitative and quantitative studies assessing the impact of sanctions. Section 3 outlines the methodology and data sources. Section 4 discussing the main findings and robustness checks. Section 5 presents the conclusion along with the policy implications of the study.

2. Theoretical Framework and Literature Review

2.1. Theoretical Framework

The study adopts a synthesized theoretical framework that integrates realism, liberal institutionalism, and dependency theory to conceptualise sanctions as complex instruments operating simultaneously across geopolitical, institutional, and structural economic dimensions. This combined framework directly informs the empirical strategy of the study, particularly the focus on heterogeneity across countries, regions, and sectors.

From a realist perspective, sanctions are instruments of state power deployed by dominant actors to pursue strategic interests and shape the behaviour of weaker states (Fearon, 1998). Within this framework, trade is not merely an economic exchange but a strategic domain through which influence is exercised. Sanctions therefore function as coercive tools that deliberately disrupt trade flows, reconfigure bilateral relationships, and alter patterns of economic dependence. This perspective provides the foundation for modelling sanctions as exogenous shocks to trade costs within the gravity framework, reflecting shifts in geopolitical constraints rather than purely market-driven adjustments.

In contrast, liberal institutionalism emphasises the role of international institutions, rules, and norms in shaping state behaviour (Keohane, 1984). From this viewpoint, sanctions are not only coercive but also regulatory mechanisms embedded in institutional frameworks such as the WTO or multilateral sanction regimes. This perspective introduces the expectation that the effects of sanctions may vary depending on countries' degree of institutional integration, compliance capacity, and participation in global governance structures. It also provides a basis for interpreting heterogeneity in outcomes across countries with different levels of resource dependence.

Dependency theory offers a structural lens, focusing on the asymmetric integration of African economies into the global system (Prebisch, 1950; Wallerstein, 2004). It posits that developing economies are characterised by reliance on primary exports, limited diversification, and dependence on external markets, finance, and technology. Within this framework, sanctions are not neutral policy instruments but mechanisms that can reinforce existing structural inequalities by disproportionately constraining already vulnerable economies. This perspective is particularly relevant for understanding why sanctions may have uneven effects across countries, sectors, and trading partners.

2.2. Literature Review

The literature on economic sanctions provides extensive evidence of their economic, social, and political consequences, yet it remains divided in its interpretation of their effectiveness and mechanisms. Most studies find that sanctions generate significant economic costs, including declines in GDP, trade, investment, and foreign direct investment, alongside inflation and currency instability (Gutmann et al., 2023; Kim et al., 2023; Neuenkirch & Neumeier, 2015). These findings are widely supported and suggest that sanctions function as powerful tools of economic disruption. These findings are often accompanied by adverse social outcomes, such as increased poverty, inequality, and reduced living standards (Neuenkirch & Neumeier, 2016; Rodríguez, 2024), and political costs (Eichenberger & Stadelmann, 2022; Peksen, 2016). The studies report negative humanitarian, developmental, and governance outcomes for targeted states and vulnerable groups (Allen, 2008; Gibson & Darmstadt, 2025). Although trade-specific evidence is limited, studies indicate sharp declines in exports and imports, trade diversion, and severe impacts on mining and energy sectors (Afesorgbor, 2019; Crozet and Hinz, 2021; Larch et al., 2022; Rahimzadeh et al., 2022; Shirazi et al., 2026). With all these evidence, one significant question remains, i.e., whether the costs of sanctions translate into meaningful change or lead to limited or even counterproductive policy outcomes.

This tension reflects a deeper divide in the literature between those who view sanctions as effective coercive instruments and those who emphasise their unintended consequences and limited strategic success. In the African context, this debate becomes particularly salient. Existing studies consistently document reduced foreign exchange availability, declining investment, and inflationary pressures (Frimpong, 2023), higher poverty, malnutrition, and mortality, as well as weakened institutional capacity (Asgardoon et al., 2022; Nyinevi & Fosu, 2023). Notably, the evidence on political effectiveness remains ambiguous, with some studies suggesting that sanctions may entrench existing regimes or shift adjustment burdens onto vulnerable populations (Boon & Eburne, 2025). This raises important questions about the distributional consequences of sanctions, which are often underexplored in aggregate analyses.

Country-specific studies highlight heterogeneous but consistently negative impacts of sanctions across African economies. For example, sanctions reduced South Africa's exports to the United States and global value chain participation under the U.S. Comprehensive Anti-Apartheid Act (Evenett, 2002). In Angola, United Nations sanctions contributed to decline GDP and trade reorientation toward alternative partners (Lazanyuk & Diu, 2022). Similarly, in Zimbabwe and Namibia, sanctions, particularly those affecting energy supplies, have increased production costs, intensified inflationary pressures, and deepened structural vulnerabilities (Larochelle et al., 2014; Petrica, 2023). These differences suggest that sanctions do not operate uniformly but interact with domestic economic structures, institutional capacity, and external linkages. Yet much of the empirical literature fails to systematically account for this heterogeneity, limiting the generalisability of its findings.

Focusing specifically on trade, the literature shows that sanctions reshape African trade patterns through multiple channels. They directly reduce bilateral trade flows between sanctioned countries and their trading partners, as evidenced in the case of South Africa (Evenett, 2002), while also prompting trade diversion toward alternative markets (Lazanyuk & Diu, 2022). In addition, sanctions disrupt participation in global value chains (Bruno et al., 2025). They also generate regional spillover effects on neighbouring countries through disrupted trade routes and economic instability (Bove et al., 2023) and encourage informal trade practices, including rerouting and re-exporting through third countries (Shingal, 2024). This suggests that sanctions may not fully constrain trade but instead alter its composition and visibility. However, these dynamics are often overlooked in standard empirical models, which focus on formal trade flows and may therefore underestimate the extent of economic adjustment.

Despite a growing body of research documenting the adverse economic and social consequences of sanctions on African countries, several important gaps remain in the literature. First, most studies focus on aggregate macroeconomic outcomes rather than providing a systematic and comprehensive analysis of trade-specific effects. The trade-focused analyses are often limited to individual case studies or specific sanction episodes (e.g., South Africa or Angola). Second, African countries are often treated as a homogeneous group. This neglect of country-specific analysis obscures important heterogeneity in economic structure, trade dependence, and resilience to external shocks. Third, little attention is given to differences across sanctioning countries, despite their varying economic power and geopolitical positioning. Finally, there is no comprehensive analysis comparing the effects of sanctions across key industries within a unified framework.

Against this backdrop, this study positions itself as both a refinement and a challenge to existing literature. It builds on established findings regarding the negative trade effects of sanctions but moves beyond them by explicitly accounting for heterogeneity across countries, sectors, and sanctioning partners. By employing a structural gravity framework, the study also addresses key methodological limitations in earlier work (Evenett, 2002; Lazanyuk & Diu, 2022). In doing so, it seeks to provide a more nuanced and theoretically grounded understanding of how sanctions reshape trade patterns in African economies.

3. Methodology and Data

3.1. Econometric Specification

The empirical analysis is based on a structural gravity model, which provides a theoretically consistent framework for analysing bilateral trade flows within a general equilibrium setting (Anderson & van Wincoop, 2003). In contrast to traditional gravity models, the structural approach explicitly incorporates multilateral resistance terms (MRTs), capturing the relative trade costs that countries face with all trading partners. This is particularly important in the context of sanctions, which alter not only bilateral trade relationships but also the broader structure of global trade networks.

Following the best established practices for estimating determinants of trade flows (Yotov et al., 2016), the baseline specification is as follows:

$$X_{ijt} = \exp\left(\pi_{it} + \chi_{jt} + \mu_{ij} + Sanctions_{ij,t} \alpha + GRAV_{ij,t} \beta + \sum_{t=1990}^{2022} INT_{ij}^t\right) \times \epsilon_{ijt}$$

1

In Eq. (1), X_{ijt} denotes nominal bilateral trade flows from exporter i to importer j at time t , including both international and intra-national trade flows. Sanctions are modelled as policy-induced shocks to bilateral trade costs, affecting both direct trade flows and indirect trade patterns through reallocation and substitution effects. Thus, the inclusion of intranational trade flows allows the analysis to capture shifts between domestic and international markets. The main covariates from the vector $Sanctions_{ij,t}$ capture different forms of sanctions, combined in alternative specifications. $GRAV_{ij,t}$ denotes a vector of time-varying bilateral covariates, which includes indicator variables to control for the presence of regional trade agreements between countries i and j at time t (RTA_{ijt}), common membership in the World Trade Organization (WTO_{ijt}), and membership in the European Union (EU_{ijt}). Finally, specification (1) includes three sets of fixed effects. π_{it} and χ_{jt} are exporter-time and

importer-time fixed effects. These effects are included to control for MRTs and any other observable and unobservable country-specific determinants of trade flows. In addition, country-pair fixed effects (μ_{ij}) are included to account for time-invariant bilateral trade costs (Agnosteva et al., 2019; Egger & Nigai, 2015;) and alleviate endogeneity concerns of trade policy variables (Baier & Bergstrand, 2007). With respect to sanctions, the use of exporter-time and importer-time fixed effects completely controls for any target-specific linkages (Felbermayr et al., 2022). Alternative specifications incorporate standard gravity controls such geographic distance, contiguity (shared border), common language, and colonial ties, and GDP.

The model is estimated using Poisson Pseudo-Maximum Likelihood (PPML) with high-dimensional fixed effects. This approach accounts for zero trade flows, addresses heteroskedasticity, and is consistent with the structural gravity framework (Santos Silva & Tenreyro, 2016, 2022). Standard errors are clustered by exporter, importer, and year. Robustness checks include lagged and lead values of sanctions, alternative time intervals, cross-sectional analysis, and alternative measures of capturing globalization effects.

3.2. Data Sources

The study combines multiple data sources. Bilateral trade data are obtained from International Trade and Production Database for Estimation Release 3 (ITPD-E-R03) (Borchert et al., 2021; Larch et al., 2025). Sanctions data are compiled from the Global Sanctions Data Base (GSDB) (Felbermayr et al. 2020). The data on RTAs, WTO membership, EU membership, and other standard gravity controls, including geographic distance, contiguity (shared border), common language, colonial ties, and GDP is sourced from the USITC Dynamic Gravity Database Version 2.1 (Gurveich & Herman, 2018). The sample includes 250 countries¹ over the period 1990–2022, including 27 African countries that experienced economic sanctions. This broad coverage enables both cross-country and within-country analysis. The description of variables and their sources are presented in Table 1.

Table 1
Description of Variables

Variables	Description	Sources
Trade flows	Trade flows in millions of current US dollars	Borchert et al. (2021) and Larch et al. (2025)
Sanctions (all)	Indicator variable equal to one for any type of sanction (arm, military, trade, travel, financial, and other)	Felbermayr et al. (2020)
Sanctions (trade)	Indicator variable equal to one for trade sanction	
RTA	A dummy variable taking the value of one if country pair is in at least one active preferential trade agreement, zero otherwise	Gurveich and Herman (2018)
WTO membership	A dummy variable taking the value of one if country pairs are member of World Trade Organization, zero otherwise	
EU membership	A dummy variable taking the value of one if country pairs are member of European Union, zero otherwise	
Distance	Population weighted distance between country pair	
Contiguity	A dummy variable taking the value of one if country pair shares a common border, zero otherwise	
Common language	A dummy variable taking the value of one if residents of country pair speak at least one common language, zero otherwise	
Common colony	A dummy variable taking the value of one if country pair has been in a colonial relationship, zero otherwise	
Common colonizer	A dummy variable taking the value of one if country pair has been colonized by a common colonizer, zero otherwise	
GDP	Real, inflation-adjusted, PPP-adjusted GDP of origin/destination country in 2011 thousands US\$ (PWT)	
Source: Author’s compilation		

A descriptive statistic of variables employed in the study is presented in Table 2. It shows that trade flows are substantially higher and more variable in manufacturing than in mining & energy.

Table 2
Summary Statistics

Manufacturing					
Variables	Observations	Mean	Std. Dev.	Min	Max
Trade flows (in current Million US \$)	14,07,087	1335.869	93815.83	0	2.89E + 07
RTA	13,98,378	0.1610752	0.3676004	0	1
WTO	14,07,087	0.3990137	0.4896958	0	1
EU	14,07,087	0.0105495	0.1021674	0	1
Sanctions (trade)	14,07,087	0.0097997	0.0985071	0	1
GDP (PPP) (000 US \$)	9,48,437	4.28E + 08	1.49E + 09	72161.68	1.79E + 10
Distance	12,72,522	8142.551	4643.773	2	19930
Contiguity	12,72,522	0.0143416	0.1188946	0	1
Common language	12,37,221	0.1671221	0.373085	0	1
Common colony	12,37,221	0.1122912	0.3157245	0	1
Common colonizer	12,37,221	0.0073996	0.0857024	0	1
Mining & Energy					
Variables	Observations	Mean	Std. Dev.	Min	Max
Trade flows (in current Million US \$)	6,62,443	167.3649	8202.596	0	2034313
RTA	6,57,205	0.2503983	0.4332427	0	1
WTO	6,62,443	0.5257237	0.4993382	0	1
EU	6,62,443	0.0222389	0.1474597	0	1
Sanctions (trade)	6,62,443	0.0102801	0.1008685	0	1
GDP (PPP) (000 US \$)	5,00,616	6.95E + 08	1.96E + 09	72161.68	1.79E + 10
Distance	5,98,039	6887.894	4443.257	2	19930
Contiguity	5,98,039	0.0285968	0.1666705	0	1
Common language	5,93,228	0.166661	0.3726733	0	1
Common colony	5,93,228	0.0923018	0.2894517	0	1
Common colonizer	5,93,228	0.0140014	0.1174962	0	1
Source: Author's compilation					

4. Results and Discussion

4.1. Overall Impact of Sanctions

Table 3 presents the baseline estimates comparing the effects of overall sanctions and trade-specific sanctions across two major sectors, namely manufacturing, and mining & energy. Columns (1) and (3) of Table 3 include a composite sanctions variable capturing all forms of sanctions (arms, military, financial, travel, trade, and others). This dummy variable takes the value of one for any sanctions that were imposed on African countries during the period of investigation and zero otherwise. While columns (2) and (4) isolate trade-specific sanctions, which includes a dummy variable that takes the value of one for only trade-related sanctions that were imposed on African countries and zero otherwise. The results reveal clear asymmetries in both the magnitude and transmission channels. In the manufacturing sector, both overall sanctions and trade sanctions have negative and statistically significant effects, reducing trade by approximately 48% [$(e^{-0.660} - 1) \times 100$] and 35% [$(e^{-0.438} - 1) \times 100$], respectively (as shown in columns 1 and 2). The larger impact of overall sanctions suggests that indirect channels, particularly financial restrictions, supply chain disruptions, and reduced investment, play a critical role alongside direct trade barriers. This finding reflects the sector's deep integration into global value chains and reliance on imported intermediate inputs, making it highly sensitive to broad-based external shocks.

For the mining and energy sector, the results show a negative but insignificant effect for overall sanctions (as shown in column 3), while trade sanctions have a negative and weakly significant effect (as shown in column 4), implying a trade reduction of about 39% $[(e^{-0.494}-1) \times 100]$. This indicates that direct trade restrictions are more binding in resource-based sectors, where exports of oil, gas, and minerals depend heavily on access to international markets. The relatively muted effect of overall sanctions may reflect persistent global demand for natural resources and the ability of exporters to redirect trade toward non-sanctioning partners.

The control variables further highlight sector-specific dynamics. Regional trade agreements (RTA) promote manufacturing trade but reduce trade in mining and energy, suggesting differences in regional integration patterns. WTO membership remains insignificant across sectors, while EU membership is positive associated with manufacturing trade.

Overall, these findings demonstrate that sanctions operate through distinct sectoral channels. Manufacturing is primarily affected through indirect constraints on finance, logistics, and global production networks, whereas mining & energy is more directly influenced by export restrictions and demand conditions. This pattern aligns closely with the theoretical framework: dependency theory explains the heightened vulnerability of globally integrated sectors, while realism highlights the strategic targeting of resource-based industries.

Table 3
The effects of Sanctions on Africa

	Manufacturing		Minig & Energy	
	(1)	(2)	(3)	(4)
	All	trade	All	trade
RTA _{ijt}	0.120	0.121	-0.205	-0.205
	(0.051)**	(0.051)**	(0.106)*	(0.105)*
WTO _{ijt}	-0.046	-0.045	0.001	0.001
	(0.038)	(0.038)	(0.033)	(0.033)
EU _{ijt}	0.099	0.098	-0.088	-0.088
	(0.050)**	(0.050)**	(0.135)	(0.134)
Sanctions _{ijt}	-0.660	-0.438	-0.156	-0.494
	(0.299)**	(0.100)***	(0.170)	(0.264)*
Constant	13.755	13.754	10.404	10.403
	(0.019)***	(0.019)***	(0.108)***	(0.108)***
No. of Observations	1397661	1397661	656455	656455
Notes: These estimates are obtained with the PPML estimator and include the full set of fixed effects from specification (1), whose estimates are omitted for brevity. Standard errors (clustered by importer, exporter, and year) are in parentheses. ***, **, * denote statistical significance at 1%, 5% and 10%, respectively.				

4.2. Country-Specific Effects

Table 4 reports country-level estimates, revealing substantial heterogeneity in the impact of trade sanctions across African economies. For the analysis, the dummy variables for specific African countries are added taking the value of one for trade sanctions that were imposed on respective African countries during the period of investigation and otherwise zero.

In the manufacturing sector, the effects are largely negative and statistically significant for many countries. Countries such as Burundi, Nigeria, Somalia, Sudan, Zimbabwe, and Lesotho experience large trade contractions by 70%, 68%, 72%, 84%, 73%, and 56% respectively, reflecting structural weaknesses such as limited industrial capacity, high import dependence, and constrained adjustment mechanisms. Similarly, Angola, Egypt, Ghana, Mozambique, and Libya show moderate but significant trade declines by 29%, 25%, 33%, 47%, and 23%, respectively. These results suggest that sanctions disrupt manufacturing primarily through input shortages, financial constraints, and reduced external demand. However, some countries, including Eritrea, Cameroon, the Democratic Republic of Congo, Côte d'Ivoire, and Ethiopia, exhibit positive and significant effects. The results suggest that trade sanctions have increased trade of Eritrea, Cameroon, Democratic Republic of Congo, Côte d'Ivoire, and Ethiopia by 522%, 156%, 118%, 57%, and 76%, respectively. These outcomes likely reflect trade diversion and reallocation, where manufacturing activity shifts toward alternative markets or benefits from reduced competition. They may also indicate reliance of these economies on less sanction-sensitive sectors such as agriculture.

In the mining & energy sector, the effects are much larger and more extreme. Several countries, including Somalia, Sudan, Mozambique, Nigeria, Libya, Tanzania, and Guinea, experience near-complete trade collapses (ranging from 79% to 99%), indicating the sector's dependence on export markets, foreign capital, and financial infrastructure. These findings highlight the direct and immediate impact of sanctions on resource-based economies. Conversely, positive and significant effects are observed in countries such as the Democratic Republic of Congo, Ghana, Zimbabwe, and Mali. These positive impacts are primarily driven by trade diversion and global commodity market adjustments. When sanctions constrain major exporters, demand shifts toward alternative suppliers, allowing non-targeted countries to expand exports or benefit from higher prices. However, these gains are likely short-term and do not reflect structural resilience, as they remain dependent on volatile commodity markets and external demand conditions.

Overall, the results confirm that manufacturing experiences broad but moderate declines, while mining & energy sector faces more volatile and extreme impacts. This divergence reflects fundamental structural differences, as manufacturing is shaped by indirect constraints within global value chains, whereas mining & energy responds more directly to export restrictions and global demand shifts.

Table 4
Country-specific effects of trade sanctions

RTA _{ijt}	Manufacturing Sector			Mining & Energy			
	0.120	Liberia	-0.649	RTA _{ijt}	-0.206	Liberia	-0.676
	(0.051)**		(0.180)***		(0.106)*		(0.421)
WTO _{ijt}	-0.045	Libya	-0.306	WTO _{ijt}	0.001	Libya	-2.372
	(0.038)		(0.147)**		(0.035)		(0.440)***
EU _{ijt}	0.098	Mali	-0.843	EU _{ijt}	-0.088	Mali	1.468
	(0.050)*		(0.384)**		(0.142)		(0.813)*
Algeria	0.230	Mozambique	-0.632	Algeria	-0.001	Mozambique	-2.670
	(0.401)		(0.381)*		(0.822)		(1.038)**
Angola	-0.348	Nigeria	-1.147	Angola	-0.466	Nigeria	-2.240
	(0.184)*		(0.632)*		(0.603)		(0.594)***
Burundi	-1.196	Sierra Leone	-0.055	Burundi	0.067	Sierra Leone	0.808
	(0.391)***		(0.262)		(0.714)		(0.518)
Cameroon	0.941	Somalia	-1.269	Cameroon	1.126	Somalia	-7.067
	(0.445)**		(0.423)***		(0.546)**		(0.949)***
Central African Republic	-0.557	South Africa	-0.982	Central African Republic	-1.765	South Africa	-0.725
	(0.245)**		(0.674)		(0.754)**		(0.609)
Côte d'Ivoire	0.449	South Sudan	-0.037	Côte d'Ivoire	0.166	South Sudan	0.000
	(0.231)*		(0.408)		(0.267)		(.)
Democratic Republic of the Congo	0.778	Sudan	-1.827	Democratic Republic of the Congo	2.385	Sudan	-5.353
	(0.308)**		(0.885)**		(0.729)***		(0.622)***
Egypt	-0.294	Tanzania	-0.111	Egypt	-0.314	Tanzania	-1.798
	(0.168)*		(0.279)		(0.418)		(0.433)***
Eritrea	1.827	Uganda	-0.138	Eritrea	-7.381	Uganda	-0.840
	(0.598)***		(0.479)		(0.543)***		(0.858)
Ethiopia	0.563	Zimbabwe	-1.292	Ethiopia	-1.654	Zimbabwe	1.701
	(0.306)*		(0.283)***		(0.521)***		(0.464)***
Gambia	-0.728	Constant	13.754	Gambia	-4.554	Constant	10.403
	(0.373)*		(0.019)***		(1.292)***		(0.108)***
Ghana	-0.403	No. of Observations	1397661	Ghana	1.785	No. of Observations	656455
	(0.197)**				(0.559)***		
Guinea	0.376			Guinea	-1.559		
	(0.252)				(0.412)***		
Lesotho	-0.831			Lesotho	-0.468		
	(0.274)***				(1.150)		

Notes: These estimates are obtained with the PPML estimator and include the full set of fixed effects from specification (1), whose estimates are omitted for brevity. Standard errors (clustered by importer, exporter, and year) are in parentheses. ***, **, * denote statistical significance at 1%, 5% and 10%, respectively.

4.3. Heterogenous Effects by Income and Region

Table 5 examines how the effects of sanctions vary depending on the income level and regional origin of sanctioning countries. The estimates are obtained by introducing an additional indicator variable that takes the value of one for trade sanctions imposed by specific income group and region on African economies during the period of study and zero otherwise.

For manufacturing, regional trade agreements and EU linkages have positive and significant effects, reflecting the importance of trade integration and preferential access, while WTO membership remains insignificant. However, sanctions from most income groups significantly reduce manufacturing trade except lower-middle income countries (as shown in column 1 of Table 5). The largest effects originate from low-income (64%) and upper-middle-income countries (59%), followed by high-income countries (34%). These findings suggest that manufacturing is broadly vulnerable to disruptions across diverse trading partners, reflecting its dependence on complex and geographically dispersed supply chains.

From a regional perspective, sanctions from the East Asia & Pacific, Middle East, South Asia, North America, and Europe & Central Asia significantly reduce manufacturing trade by 42%, 45%, 50%, 47%, and 27% respectively (as shown in column 2 of Table 5). The findings reflect that these regions are key suppliers of intermediate goods, capital equipment, and trade finance, indicating that disruptions in global production networks are a primary transmission channel. In contrast, sanctions from Latin America are insignificant, reflecting weaker trade linkages.

In contrast, the mining & energy sector exhibits a different pattern. Regional trade agreements have a negative effect, indicating that extractive industries are less influenced by regional integration and more by global demand conditions. Sanctions from all income groups significantly reduce trade. Sanctions from low-income, lower-middle-income, and high-income countries significantly reduce trade by 71%, 39%, and 39%, respectively, while upper-middle-income countries also exert negative effects, though of smaller magnitude (35%) (as shown in column 3 of Table 5). This highlights the sector's exposure to both demand-side shocks and financial constraints. Regionally, sanctions from the Middle East (82%) and East Asia & Pacific (77%) have the largest impacts (as shown in column 4 of Table 5), consistent with their central role in global energy markets and commodity trade. Sanctions from South Asia and North America also significantly reduce trade by 70% and 61%, respectively. In contrast, sanctions from Europe and Latin America are insignificant, suggesting greater scope for trade diversion in resource markets.

Overall, these findings reinforce the distinction between sectoral transmission mechanisms. Manufacturing sector is primarily affected by supply-side disruptions in global value chains, whereas mining & energy sector is more sensitive to demand-side shocks from major consuming regions.

Table 5
Heterogenous Effects of trade sanctions imposed by countries of different income levels and regions

Manufacturing				Mining & Energy			
	(1)		(2)		(3)		(4)
RTA _{ijt}	0.121	RTA _{ijt}	0.121	RTA _{ijt}	-0.205	RTA _{ijt}	-0.206
	(0.051)**		(0.051)**		(0.105)*		(0.106)*
WTO _{ijt}	-0.045	WTO _{ijt}	-0.045	WTO _{ijt}	0.001	WTO _{ijt}	0.001
	(0.038)		(0.038)		(0.033)		(0.033)
EU _{ijt}	0.098	EU _{ijt}	0.098	EU _{ijt}	-0.088	EU _{ijt}	-0.088
	(0.050)**		(0.050)**		(0.133)		(0.134)
High-income	-0.422	Middle East	-0.549	High-income	-0.501	Middle East	-1.735
	(0.095)***		(0.204)***		(0.262)*		(0.477)***
Low-income	-1.013	Europe & Central Asia	-0.310	Low-income	-1.242	Europe & Central Asia	-0.199
	(0.298)***		(0.103)***		(0.710)*		(0.277)
Upper middle income	-0.883	East Asia & Pacific	-0.592	Upper-middle income	-0.429	East Asia & Pacific	-1.461
	(0.260)***		(0.254)**		(0.233)*		(0.385)***
Lower middle income	-0.319	Latin America & Caribbean	-0.274	Lower-middle income	-0.502	Latin America & Caribbean	0.186
	(0.301)		(0.358)		(0.248)**		(0.186)
		South Asia	-0.698			South Asia	-1.203
			(0.285)**				(0.486)**
		North America	-0.637			North America	-0.946
			(0.174)***				(0.449)**
Constant	13.754	Constant	13.754	Constant	10.403	Constant	10.403
	(0.019)***		(0.019)***		(0.108)***		(0.108)***
No. of Observations	1397661	No. of Observations	1397661	No. of Observations	656455	No. of Observations	656455

Notes: These estimates are obtained with the PPML estimator and include the full set of fixed effects from specification (1), whose estimates are omitted for brevity. Standard errors (clustered by importer, exporter, and year) are in parentheses. ***, **, * denote statistical significance at 1%, 5% and 10%, respectively.

4.4. Heterogenous Effects across manufacturing and mining & energy industries

The study further explores the impact of sanctions at industry-level. The disaggregated-level results reveal that substantial variation within industries (as shown in Table 6 and 7). In manufacturing, sanctions generate widespread but uneven effects. Agro-processing and food industries, including fish processing, vegetable oils, dairy, animal feeds, bakery products, tobacco and beverages, experience significant declines, reflecting dependence on imported inputs and external markets. Similarly, textiles, apparel, leather industries carpets, knitted fabrics, wearing apparel, footwear, and fur-related products show strong contractions, consistent with their labour-intensive and export-oriented nature.

In resource-based and wood-related industries, the effects are also largely negative, particularly for veneer sheets, wooden containers, and other wood products. However, some segments such as sawmilling and pulp and paper show positive effects, indicating partial trade reallocation or domestic demand substitution. The chemicals and intermediate goods sectors show mixed but generally negative outcomes. Paints, soaps, plastics, and rubber products decline significantly, reflecting disruptions in input-intensive industries dependent on imports and finance. Likewise, construction-related industries such as cement and stone processing are adversely affected. In capital goods and machinery sectors, most coefficients are negative but statistically insignificant, suggesting limited direct exposure or slower adjustment. However, high-technology and precision industries, such as optical equipment, watches, and communication equipment, show significant declines, highlighting the role of technological and financial restrictions. The transport equipment sector presents a mixed picture. Motor vehicles and aircraft show strong positive

effects, likely reflecting trade diversion or procurement shifts, while motorcycles and shipbuilding decline significantly, indicating uneven sectoral responses.

However, some sectors exhibit positive effects, including other publishing, service activities related to printing, cordage and netting, and basic metals. These gains likely reflect reallocation of trade, niche specialization, or reduced competition from sanctioned markets rather than broad-based resilience.

Table 6
Heterogenous effects across manufacturing industries

Sectors	Coefficients		Sectors	Coefficients		Sectors	Coefficients	
Processing/preserving of meat	-0.734	(0.819)	Other publishing	1.801	(0.555)***	Machine tools	-0.035	(0.176)
Processing/preserving of fish	-0.682	(0.200)***	Printing	-0.228	(0.223)	Machinery for metallurgy	-0.173	(0.271)
Processing/preserving of fruit & vegetables	-0.199	(0.178)	Service activities related to printing	0.912	(0.346)***	Machinery for mining & construction	0.024	(0.108)
Vegetable and animal oils and fats	-0.321	(0.131)**	Coke oven products	-0.777	(0.876)	Food/beverage/tobacco processing machinery	0.011	(0.136)
Dairy products	-0.303	(0.129)**	Refined petroleum products	-0.307	(0.489)	Machinery for textile apparel and leather	-0.173	(0.123)
Grain mill products	-0.426	(0.346)	Processing of nuclear fuel	0.112	(0.332)	Weapons and ammunition	0.690	(0.242)***
Starches and starch products	0.112	(0.152)	Basic chemicals except fertilizers	-0.107	(0.129)	Other special purpose machinery	-0.076	(0.132)
Prepared animal feeds	-0.544	(0.090)***	Fertilizers and nitrogen compounds	-0.165	(0.167)	Domestic appliances n.e.c.	0.049	(0.149)
Bakery products	-0.257	(0.107)**	Plastics in primary forms; synthetic rubber	0.051	(0.057)	Office accounting and computing machinery	0.120	(0.097)
Sugar	1.023	(0.681)	Pesticides and other agro-chemical products	-0.086	(0.139)	Electric motors generators and transformers	-0.078	(0.091)
Cocoa chocolate and sugar confectionery	0.074	(0.175)	Paints varnishes printing ink and mastics	-0.247	(0.115)**	Electricity distribution & control apparatus	0.040	(0.071)
Macaroni noodles & similar products	-0.331	(0.500)	Pharmaceuticals medicinal chemicals etc.	-0.047	(0.079)	Insulated wire and cable	0.227	(0.229)
Other food products n.e.c.	-0.170	(0.149)	Soap cleaning & cosmetic preparations	-0.230	(0.111)**	Accumulators primary cells and batteries	0.123	(0.205)
Distilling rectifying & blending of spirits	0.232	(0.205)	Other chemical products n.e.c.	0.088	(0.068)	Lighting equipment and electric lamps	-0.269	(0.324)
Wines	0.543	(0.257)**	Man-made fibres	-0.222	(0.460)	Other electrical equipment n.e.c.	-0.217	(0.105)**
Malt liquors and malt	-0.883	(0.432)**	Rubber tyres and tubes	-0.053	(0.209)	Electronic valves tubes etc.	-0.312	(0.343)
Soft drinks; mineral waters	-0.327	(0.188)*	Other rubber products	-0.278	(0.074)***	TV/radio transmitters; line comm. Apparatus	-0.294	(0.154)*
Tobacco products	-0.649	(0.262)**	Plastic products	-0.298	(0.178)*	TV and radio receivers and associated goods	-0.421	(0.225)*
Textile fibre preparation; textile weaving	-0.173	(0.211)	Glass and glass products	0.034	(0.206)	Medical surgical and orthopaedic equipment	0.027	(0.067)
Made-up textile articles except apparel	-0.017	(0.379)	Pottery china and earthenware	0.134	(0.400)	Measuring/testing/navigating appliances etc.	0.104	(0.079)
Carpets and rugs	-0.830	(0.282)***	Refractory ceramic products	-0.099	(0.066)	Optical instruments & photographic equipment	-0.550	(0.209)***

Notes: These estimates are obtained with the PPML estimator and include the full set of fixed effects and control variables from specification (1), whose estimates are omitted for brevity. Standard errors (clustered by importer, exporter, and year) are in parentheses. ***, **, * denote statistical significance at 1%, 5% and 10%, respectively.

Sectors	Coefficients		Sectors	Coefficients		Sectors	Coefficients	
Cordage rope twine and netting	0.702	(0.242)***	Struct.non-refractory clay; ceramic products	-0.263	(0.205)	Watches and clocks	-0.636	(0.235)***
Other textiles n.e.c.	-0.195	(0.224)	Cement lime and plaster	-0.380	(0.259)	Motor vehicles	0.628	(0.213)***
Knitted and crocheted fabrics and articles	-0.712	(0.384)*	Articles of concrete cement and plaster	0.120	(0.314)	Automobile bodies trailers & semi-trailers	-0.142	(0.208)
Wearing apparel except fur apparel	-0.384	(0.169)**	Cutting shaping & finishing of stone	-0.896	(0.333)***	Parts/accessories for automobiles	-0.156	(0.238)
Dressing & dyeing of fur; processing of fur	-1.274	(0.394)***	Other non-metallic mineral products n.e.c.	-0.272	(0.281)	Building and repairing of ships	-0.432	(0.237)*
Tanning and dressing of leather	-0.854	(0.719)	Basic iron and steel	-0.100	(0.197)	Building/repairing of pleasure/sport. Boats	0.056	(0.194)
Luggage handbags etc.; saddlery & harness	-0.695	(0.299)**	Basic precious and non-ferrous metals	0.427	(0.142)***	Railway/tramway locomotives & rolling stock	-0.235	(0.255)
Footwear	-0.519	(0.146)***	Structural metal products	-0.167	(0.242)	Aircraft and spacecraft	0.594	(0.183)***
Sawmilling and planing of wood	0.265	(0.120)**	Tanks reservoirs and containers of metal	0.088	(0.231)	Motorcycles	-0.504	(0.143)***
Veneer sheets plywood particle board etc.	-0.753	(0.153)***	Steam generators	-0.420	(0.450)	Bicycles and invalid carriages	0.364	(0.324)
Builders' carpentry and joinery	-0.010	(0.104)	Cutlery hand tools and general hardware	-0.143	(0.159)	Other transport equipment n.e.c.	-0.335	(0.268)
Wooden containers	-0.755	(0.299)**	Other fabricated metal products n.e.c.	-0.022	(0.136)	Furniture	-0.644	(0.340)*
Other wood products; articles of cork/straw	-1.129	(0.117)***	Engines & turbines (not for transport equipment)	0.206	(0.147)	Jewellery and related articles	-1.582	(0.419)***
Pulp paper and paperboard	0.246	(0.106)**	Pumps compressors taps and valves	0.078	(0.091)	Musical instruments	-0.271	(0.197)
Corrugated paper and paperboard	-0.327	(0.270)	Bearings gears gearing & driving elements	-0.022	(0.079)	Sports goods	-0.339	(0.172)**
Other articles of paper and paperboard	-0.179	(0.254)	Ovens furnaces and furnace burners	-0.089	(0.388)	Games and toys	-0.259	(0.124)**
Publishing of books and other publications	-0.174	(0.149)	Lifting and handling equipment	-0.187	(0.153)	Other manufacturing n.e.c.	-0.938	(0.535)*
Publishing of newspapers journals etc.	-0.228	(0.261)	Other general purpose machinery	-0.099	(0.079)			
Publishing of recorded media	0.071	(0.501)	Agricultural and forestry machinery	-0.037	(0.126)			

Notes: These estimates are obtained with the PPML estimator and include the full set of fixed effects and control variables from specification (1), whose estimates are omitted for brevity. Standard errors (clustered by importer, exporter, and year) are in parentheses. ***, **, * denote statistical significance at 1%, 5% and 10%, respectively.

The mining and energy results show clear asymmetry across subsectors. The most pronounced effects are observed in hydrocarbon-related activities. Crude petroleum and natural gas experience large and significant declines, reflecting their dependence on international markets, finance, and technology (as shown in Table 7). In contrast, coal-related activities, namely mining of hard coal and lignite, are statistically insignificant, suggesting lower global integration or greater domestic absorption. Some subsectors, such as other mining and quarrying, exhibit positive and weakly significant effects, indicating substitution toward less restricted commodities.

Overall, these results confirm that sanctions operate through sector-specific and industry-specific channels. Export-oriented, input-dependent, and technology-intensive industries are most vulnerable, while less integrated or domestically oriented sectors exhibit relative resilience.

Table 7
Heterogenous Effects across mining & energy industries

Sectors	Coefficients	
Mining of hard coal	0.022	(0.239)
Mining of lignite	0.951	(1.117)
Extraction crude petroleum and natural gas	-1.290	(0.399)***
Mining of iron ores	-0.909	(0.556)
Other mining and quarring	0.972	(0.586)*
Electricity production, collection and distribution	1.860	(1.668)
Gas production and distribution	-1.744	(1.074)
Notes: These estimates are obtained with the PPML estimator and include the full set of fixed effects and control variables from specification (1), whose estimates are omitted for brevity. Standard errors (clustered by importer, exporter, and year) are in parentheses. ***, **, * denote statistical significance at 1%, 5% and 10%, respectively.		

4.5. Robustness Test

The robustness results (presented in Table 8) confirm the stability and reliability of the baseline findings across multiple specifications. Focusing on manufacturing trade, all tests consistently show a negative and statistically significant impact of sanctions.

In column (1) of Table 8, the study estimates baseline specification including five-year lags of sanctions. The results finds that sanction have a negative and significant effect, implying a trade reduction of about 22%. The lagged sanctions variable is also significant, indicating persistent long-term trade losses.

Table 8
Robustness Test Results

RTA_{ijt}	(1)	(2)	(3)	(4)	(5)	(6)
	0.126	0.124	0.147	0.147	0.736	0.070
	(0.053)**	(0.044)***	(0.035)***	(0.061)**	(0.089)***	(0.055)
WTO_{ijt}	-0.050	-0.041	-0.037	-0.096	-0.145	-0.352
	(0.037)	(0.036)	(0.034)	(0.096)	(0.360)	(0.238)
EU_{ijt}	0.073	0.115	0.076	0.138	0.161	0.094
	(0.036)**	(0.075)	(0.056)	(0.071)*	(0.191)	(0.101)
$Sanctions_{ijt}$	-0.251	-0.401	-0.235	-0.410	-0.773	-0.433
	(0.125)**	(0.192)**	(0.089)***	(0.103)***	(0.258)***	(0.127)***
$Sanctions_{ij(t-5)}$	-0.422		-0.561			
	(0.176)**		(0.672)			
$Sanctions_{ij(t+5)}$		0.183	0.075			
		(0.138)	(0.138)			
Constant	14.487	13.855	13.965	13.412	15.109	13.080
	(0.021)***	(0.021)***	(0.015)***	(0.019)***	(0.032)***	(0.305)***
No. of Observations	1154200	1137098	905932	346445	45043	1267139
5-year lag	Yes	No	Yes	No	NO	No
5-year lead	No	Yes	Yes	No	No	No
Year interval	No	No	No	3-year	No	No
Cross-section data	No	No	No	No	Yes	No
$\ln(\text{distance}) \times \text{year FE}$	No	No	No	No	No	Yes
Notes: All estimations are performed with exporter-time, importer-time, and country-pair fixed effects, using the PPML estimator. Additionally, <i>International Border</i> $\times$ <i>Period</i> dummies are included in the regressions but omitted in the table for brevity. Standard errors are multiway clustered by importer, exporter, and year and reported in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$						

Column (2) of Table 8 includes five-year leads of sanction variable, where the sanctions coefficient remains negative and significant, while the lead term is insignificant. This suggests the absence of pre-trends, supporting a causal interpretation. While Column (3) of Table 8 presents the estimates with combined lag and lead specification, confirming strong negative contemporaneous and lagged effects, with insignificant leads. The insignificant lead confirms absence of anticipation effects. Column (4) of Table 8 estimates the baseline specification with three-years interval data. The results suggest that the sanctions effect remains significant, indicating that results are not sensitive to temporal aggregation. The estimated results with cross-sectional specification (as shown in column 5 of Table 8) indicate a larger long-run trade reduction (over 50%), capturing structural differences across countries. Lastly, column (6) incorporates an alternative measure to account for globalization effects, i.e., interactions between $\ln(\text{distance})$ and year fixed effects. The sanctions coefficient remains negative and significant, confirming robustness to time-varying trade costs. These robustness checks provide strong empirical support for the conclusion that sanctions impose substantial and durable trade costs on African economies.

4.6. Comparing our results with previous studies

The findings of this study diverge from the existing literature primarily due to differences in empirical specification. Table 9 illustrates how alternative modelling choices influence estimated effects. Column (1) of Table 9 presents the preferred specification, incorporating intranational trade flows, multilateral resistance terms (MRTs), and comprehensive fixed effects. This approach provides theoretically consistent and robust estimates of sanctions' trade effects. Column (2) replicates standard approaches used in earlier studies such as Evenett (2002) and Lazanyuk and Diu (2022), which focus solely on international trade and exclude domestic trade adjustments. This yields weaker trade effects of sanctions but fails to capture substitution between domestic and external markets. Column (3) further simplifies the model by excluding MRTs and unobserved heterogeneity and relying on standard gravity controls. While this produces larger estimated effects, it introduces potential bias due to omitted variables and endogeneity

These comparisons highlight that methodological differences, particularly the inclusion of intranational trade and proper control for multilateral resistance, are central to explaining divergences from previous findings. By incorporating recent advances in structural gravity modelling, this study provides more nuanced and, in many cases, more consistent estimates of trade impacts of sanctions.

Table 9
Comparison of our results to previous studies

RTA_{ijt}	(1)	(2)	(3)
	0.121	0.088	0.176
	(0.051)**	(0.026)***	(0.018)***
WTO_{ijt}	-0.045	-0.029	0.137
	(0.038)	(0.013)**	(0.015)***
EU_{ijt}	0.098	0.050	0.133
	(0.050)**	(0.030)*	(0.020)***
$Sanctions_{ijt}$	-0.438	-0.116	-0.674
	(0.100)***	(0.070)*	(0.047)***
$\ln(GDP_{it})$			0.835
			(0.004)***
$\ln(GDP_{jt})$			0.838
			(0.005)***
$\ln(distance_{ij})$			-0.570
			(0.010)***
$Contiguity_{ij}$			0.400
			(0.030)***
$Common\ language_{ij}$			0.355
			(0.023)***
$Common\ colony_{ij}$			0.616
			(0.041)***
$Common\ colonizer_{ij}$			0.398
			(0.029)***
Constant	13.754	9.673	-21.662
	(0.019)***	(0.017)***	(0.166)***
No. of Observations	1397661	1392146	999824
Globalization trend	Yes	No	No
MRTs	Yes	Yes	No
Unobserved heterogeneity	Yes	Yes	No
All trade flows	Yes	No	No
Notes: ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors clustered by exporter, importer, and year are reported in parentheses for Columns (1) and (2), while robust standard errors are used in Column (3).			

5. Conclusion and Policy Implications

This study provides comprehensive evidence that sanctions significantly reshape African trade, with effects that vary across sectors, countries, and sanctioning partners. At the aggregate level, sanctions, particularly trade sanctions, lead to substantial declines in trade flows, confirming their role as effective instruments of economic pressure. However, these effects are highly uneven.

The findings show that manufacturing and mining & energy sectors are the primary transmission channels. Manufacturing is mainly affected through supply chain disruptions, financial constraints, and reduced participation in global value chains, while mining & energy experiences the most severe contractions due to direct export restrictions and dependence on global commodity markets. Country-level results reveal significant asymmetries, where structurally dependent and less diversified economies face the largest trade losses, whereas a few countries benefit from trade diversion and market reallocation. Similarly, the effects vary by income-level and regional landscape of sanctioning partners. Sectoral analysis further shows that export-oriented, input-intensive, and globally integrated industries are most vulnerable, while limited gains in some sectors reflect adaptive but uneven adjustments.

These findings point to several policy implications. First, African countries should prioritise economic diversification by promoting domestic production of key intermediate goods, supporting industrial development, and investing in infrastructure. Second, governments should deepen regional integration to reduce external dependence and enhance intra-African trade, particularly through effective implementation of the African Continental Free Trade Area (AfCFTA). Third, improving access to trade finance is critical, including the development of regional financial institutions and alternative payment systems that are less vulnerable to sanctions. Fourth, resource-dependent economies should adopt stabilisation mechanisms, diversify export markets, and invest in value addition to reduce vulnerability to external shocks. Fifth, governments should adopt targeted industrial policies that support sectors with demonstrated adaptive capacity, encouraging innovation and export diversification. Finally, African countries should pursue broader trade and diplomatic diversification by strengthening to South–South trade partnerships. This will reduce reliance on traditional sanctioning regions.

The present study can be extended further in several ways. First, future studies might examine the dynamic and long-term effects of sanctions on industrialisation and economic transformation, providing deeper insights into development outcomes. Second, future studies could incorporate firm-level or micro-level data to better understand the mechanisms through which sanctions affect production, employment, and productivity. Finally, further research could investigate how regional integration frameworks mitigate the impact of sanctions and facilitate economic adjustment.

Overall, the findings suggest that while sanctions impose significant and persistent constraints on African economies, their effects are neither uniform nor entirely deterministic. Strategic policy responses, focused on diversification, regional integration, and institutional resilience, can mitigate adverse impacts and create pathways for adaptation.

Declarations

Competing interests

The author declares that there are no competing interests.

Funding Details

No funding has been received for conducting this study.

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Footnotes

1. The list of sample countries is presented in Appendix table A1.

Figures

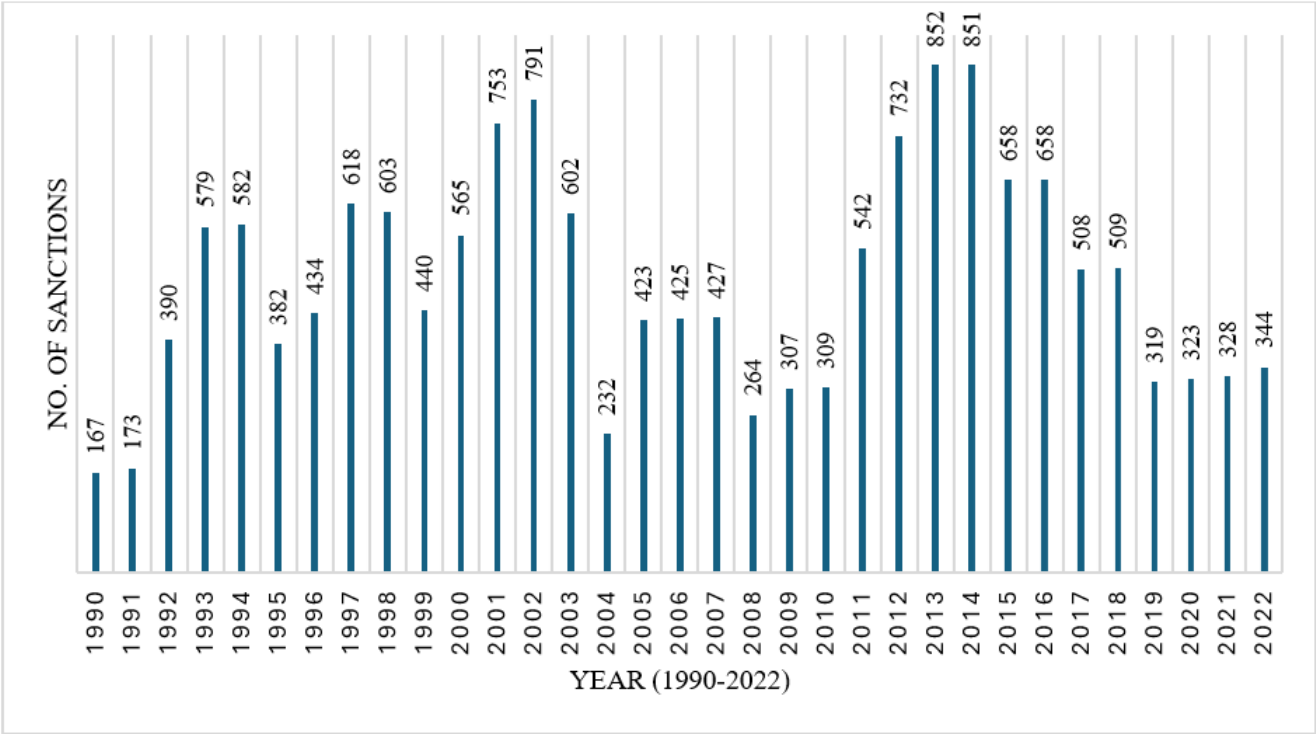


Figure 1

Total number of sanctions imposed on African countries over the years

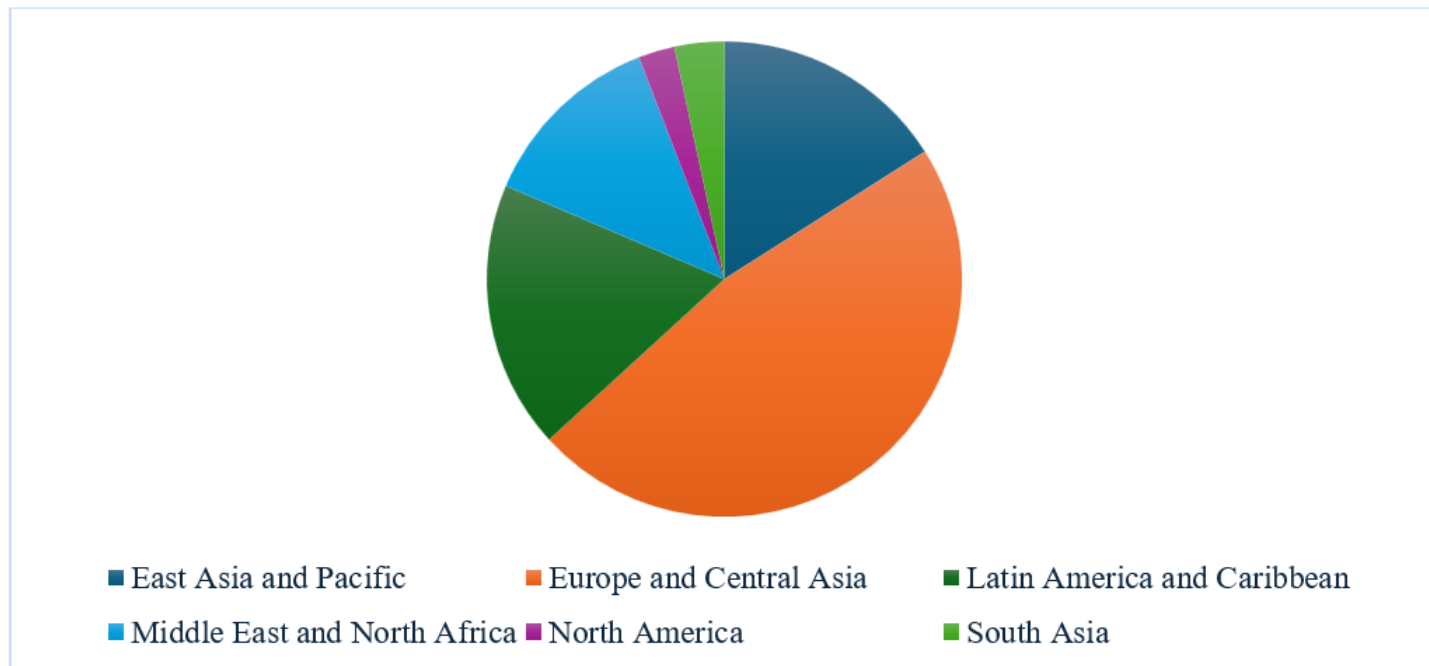


Figure 2

Distribution of Sanctions by Region

Supplementary Files

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- [AppendixTableA1.docx](#)