GLOBAL TRADE PATTERNS AND CONCENTRATION: LEADING COUNTRIES, DOMINANT PRODUCTS AND TRENDS

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Introduction

Over the past two decades, global trade has undergone significant structural transformations driven by globalization, technological advancement, and recent geopolitical disrupttions. The world economy has faced several disruptions – including the 2008-2009 financial crisis, the COVID-19 pandemic, and more recently the Russia - Ukraine conflict – all of which have reshaped international supply chains, trade volumes, and geographic trade patterns [Baldwin, 2016; World Trade Organization, 2024; UNCTAD, 2023].

While international trade rebounded after each shock, its composition has changed substantially. The 2008-2009 crisis accelerated financial integration and production outsourcing, whereas the pandemic exposed the fragility of global supply chains. The Russia – Ukraine conflict, in turn, has deeply affected the energy and agricultural sectors, leading to volatility in oil, gas, and grain markets and to major trade reorientations between Europe and Asia [UNCTAD, 2023].

Understanding these structural changes is essential for assessing global economic resilience and the concentration of trade flows. High concentration levels may increase vulnerability to external shocks, whereas diversification enhances stability and sustainable development [Krugman et al., 2018]. Examining these patterns allows policymakers and researchers to evaluate trade dependence, the balance of export structures, and the evolution of comparative advantages across regions.

The main objective of this study is to analyze the evolution of global trade structure identifying:

- the top exporting and importing countries,
- the dominant traded products at HS-2,
- the degree of concentration using the Herfindahl-Hirschman Index (HHI),
- to detect long-term trade trends and structural shifts associated with technological and geopolitical changes.

Scientific novelty

This study provides an original empirical contribution to the literature on global trade by simultaneously examining long-term trade trends and structural concentration across both countries and product groups over a twenty-year period. Unlike previous works that focus predominantly on macro-level trade growth, individual crises, or sectoral trends, this research integrates two complementary analytical dimensions – geographic concentration and product diversification – using the Herfindahl–Hirschman Index (HHI) applied systematically at the HS-2 level. The novelty of the study can be specified as follows:

- *Dual-dimension concentration assessment:* The paper offers a combined measurement of trade concentration by both exporting/importing countries and product groups, providing a more comprehensive view of systemic vulnerabilities than studies that examine only one dimension.
- *Long-run shock analysis using structural metrics:* The research empirically quantifies how major global disruptions (2008–2009 crisis, 2015 commodity downturn, COVID-19 pandemic, and the Russia - Ukraine conflict) influenced concentration and diversification patterns, rather than merely affecting trade volumes.
- *Integration of trend-based econometric forecasting with market concentration (HHI):* The study is among the first to project near-term trade trajectories (2025-2026) while simultaneously assessing expected changes in structural concentration, allowing for forward-looking evaluation of risks.
- *Identification of dominant global product clusters:* By mapping HS-2 categories over the long run, the research reveals persistent dominance of specific product groups (electronics, machinery, energy, and vehicles), highlighting structural dependence on high-tech and energy sectors.

Literature review

Research on global trade increasingly focuses on how leading countries, dominant product groups, and long-run structural shifts reshape the global distribution of trade flows. The literature highlights three main research directions: (1) institutional narratives and forecasts; (2) structural transformations in trade geography; and (3) long-term modeling of trade concentration.

Institutional reporting, particularly by the WTO, plays a critical role in shaping perceptions of trade dynamics. Gioeva [Gioeva, 2018] argues that WTO reports tend to frame trade performance in a risk-oriented tone, influencing expectations of slowdown. Mishchenko and Butenko [Mishchenko et al., 2025] expand this view, showing that global organizations construct interconnected narratives linking trade to capital flows and financial markets. Knobel [Knobel, et al.,, 2020] emphasize that structural weaknesses within the multilateral system and trade conflicts reduce prospects for sustained growth, suggesting that future resilience depends on political de-escalation.

A second research stream explores structural changes in global trade geography. Spartak and Likhachev [Spartak & Likhachev, 2018] highlight that emerging economies increasingly shape global trade but that overall trade growth is slowing relative to world GDP due to technological and structural shifts. This view is consistent with Tipanov [Tipanov, 2013], who links long-term trade evolution to geopolitical shocks. Gladkov [Gladkov, 2023; Gladkov, 2024; Gladkov, 2025] further documents post-2020 disruptions caused by sanctions, military conflicts, and the post-pandemic period, suggesting growing instability of traditional trade flows and a transition toward post-industrial exchange.

The third group of studies relies on quantitative modeling to forecast long-term trade structure. Bekkers [Bekkers et al., 2024] predict that services will replace manufacturing as a dominant component of world trade by 2050. Anderson and Strutt [Anderson & Strutt, 2012] show a significant future expansion of South–South trade, reducing OECD dominance. Château [Château et al., 2014] argue that investment and liberalization will intensify specialization in high-skill sectors. Using network forecasting, Chen [Chen, 2024] demonstrates that emerging regional blocs, particularly around China, will redefine future trade hierarchies. Finally, Fagerberg and Srholec [Fagerberg & Srholec; 2004] provide evidence that trade structure follows persistent long-term trends, suggesting that concentration patterns can be reliably forecasted.

Methodology

This study relies on data extracted from the International Trade Centre (ITC) TradeMap database covering the period 2005–2024 [ITC, 2024; WB, 2024]. The dataset includes annual statistics on exports, imports by country, as well as product-level trade values under the Harmonized System (HS-2 and HS-4) classification. All values are reported in current U.S. dollars. The top trading countries were determined by their shares in total world exports and imports, while top traded products were identified based on aggregated HS-2 categories. To assess market concentration, the Herfindahl-Hirschman Index (HHI) was calculated for both countries and product categories [Hirschman, 1964]. To analyze long-term trends, the total value of exports and imports was aggregated across all reporting economies for each year. The compound annual growth rate (CAGR) was computed to capture the average rate of trade expansion. A trend analysis was conducted for both exports and imports over the period [Eliseeva, 2010]. In addition, turning points correspondding to major global shocks – such as the 2008-2009 financial crisis, the COVID-19 pandemic, and the Russia - Ukraine conflict – were highlighted to illustrate structural breaks in the trade trajectory. This approach enables a comprehensive assessment of how international trade has evolved and adjusted to economic and geopolitical disruptions.

Analysis

The total value of world merchandise imports reached USD 24.1 trillion in 2024. The distribution of imports across countries remains highly concentrated among the leading economies. As shown in Table 1, the top ten importing countries – the United States, China, Germany, the United Kingdom, Japan, France, India, Hong Kong (China), the Netherlands, and the Republic of Korea – together accounted for USD 12.3 trillion, or approximately 51% of total global imports.

Table 1. TOP-10 importer countries 2024

Country	Import '000 USD	Share
United States of America	3 359 310 385	14%
China	2 587 295 232	11%
Germany	1 425 209 578	6%
United Kingdom	815 579 239	3%
Japan	743 267 456	3%
France	740 812 466	3%
India	702 773 476	3%
Hong Kong, China	698 906 913	3%
Netherlands	635 408 553	3%
Korea, Republic of	632 098 015	3%
Top-10	**12 340 661 313**	**51%**

Authors' calculations based on TradeMap Database

The USA remained the world's largest importer with a value of USD 3.36 trillion (14% of global imports), followed by China with USD 2.59 trillion (11%) and Germany with USD 1.43 trillion (6%). Other major importers, including the United Kingdom, Japan, France, India, and the Republic of Korea, each contributed about 3% of world imports.

The total value of world merchandise exports reached USD 23.8 trillion in 2024. As in previous years, global exports remain highly concentrated among a limited number of advanced and industrialized economies. The top ten exporting countries – China, the United States, Germany, the Netherlands, Japan, the Republic of Korea, Italy, Hong Kong (China), France, and Mexico – accounted collectively for USD 12.0 trillion, representing approximately 50% of total global exports.

Table 2. TOP-10 exporter countries 2024

Country	Export '000 USD	Share
China	3 575 457 663	15%
United States of America	2 064 516 772	9%
Germany	1 684 013 664	7%
Netherlands	722 294 257	3%
Japan	707 995 434	3%
Republic of Korea	683 691 488	3%
Italy	674 873 608	3%
Hong Kong, China	640 570 014	3%
France	626 943 857	3%
Mexico	618 982 287	3%
Top-10	**11 999 339 044**	**50%**

Authors' calculations based on TradeMap Database

China retained its position as the world's largest exporter, with USD 3.58 trillion, or about 15% of global exports, followed by the United States (USD 2.06 trillion; 9%) and Germany (USD 1.68 trillion; 7%). The remaining seven economies – including the Netherlands, Japan, Korea, Italy, Hong Kong, France, and Mexico – each contributed around

3% of global exports. The top ten product groups at the HS-2 level accounted for USD 16.0 trillion, or approximately 66% of total global imports, reflecting a high degree of product concentration in international trade.

Table 3. TOP-10 import product groups HS2 2024

Product group	Import '000 USD	Share
'85	3 792 641 333	16%
'27	3 105 923 605	13%
'84	2 876 224 376	12%
'87	1 872 068 511	8%
'71	957 232 434	4%
'30	955 000 127	4%
'39	740 199 874	3%
'90	705 477 385	3%
'29	519 972 085	2%
'72	470 293 863	2%
Top-10	**15 995 033 593**	**66%**

Authors' calculations based on TradeMap Database

The leading imported category was Electrical machinery and equipment (HS 85), valued at USD 3.79 trillion or 16% of total imports. This group includes semiconductors, telecommunications devices, and computer components – core elements of the global digital economy. The dominance of HS 85 underscores the central role of technology-intensive products and the continued expansion of global value chains in the electronics sector.

The second-largest category, Mineral fuels, oils, and related products (HS 27), reached USD 3.11 trillion (13% of total imports), driven by energy demand recovery and ongoing price volatility linked to geopolitical tensions and the Russia - Ukraine conflict. The next group, Machinery and mechanical appliances (HS 84), contributed USD 2.88 trillion (12%), reflecting the strong integration of industrial supply chains and investment in capital goods. Other major import categories included Vehicles (HS 87) at 8%, Precious metals and stones (HS 71) and Pharmaceutical products (HS 30) each at 4%, and Plastics (HS 39), Optical and medical instruments (HS 90), Organic chemicals (HS 29), and Iron and steel (HS 72) together contributing about 10% of total imports.

The top ten HS-2 product categories accounted for USD 15.4 trillion, or approximately 65% of total world exports, indicating a high level of product specialization and concentration in international trade. The largest export category was Electrical machinery and equipment (HS 85), with a value of USD 3.56 trillion, representing 15% of total global exports. This group includes semiconductors, computers, telecommunications devices, and electronic components – the backbone of global manufacturing networks and digital industries. Its dominance reflects the strong position of East and Southeast Asian economies, particularly China, Korea, and Taiwan, in high-technology production and export-led growth.

Table 4. TOP-10 export product groups HS2 2024

Product group	Export ‘000 USD	Share
'85	3 564 432 262	15%
'27	2 977 268 581	13%
'84	2 760 895 004	12%
'87	1 845 526 244	8%
'71	953 718 497	4%
'30	906 671 301	4%
'39	750 458 626	3%
'90	695 983 084	3%
'29	488 057 143	2%
'99	453 465 388	2%
Top-10	**15 396 476 130**	**65%**

Authors' calculations based on TradeMap Database

The second major category, Mineral fuels, oils, and related products (HS 27), reached USD 2.98 trillion (13%), maintaining its structural importance amid volatile global energy prices and continued demand from major importers. The Machinery and mechanical appliances (HS 84) category ranked third, contributing USD 2.76 trillion (12%), driven by industrial equipment, engines, and production technologies exported primarily from advanced manufacturing economies such as Germany, Japan, and the United States.

Other significant export groups included Vehicles (HS 87) at 8%, Precious metals and stones (HS 71) and Pharmaceutical products (HS 30) each at 4%, and Plastics (HS 39) and Optical and medical instruments (HS 90) at 3%. Organic chemicals (HS 29) and Commodities not elsewhere specified (HS 99) together contributed another 4%.

Table 5. Global trade concentration indicators 2024

Indicator	Export	Import
HHI by country	0.05	0.05
Number of effective partners	22	22
HHI by product HS2	0.07	0.07
Number of effective product groups	14	14

Authors' calculations

For exports, the HHI by country was 0.05, while for imports, it was also 0.05. The corresponding number of effective trading partners, calculated as $1/HHI$, was approximately 22 for both exports and imports. This means that the global trade system functions as if 22 equally significant countries determined the majority of world trade turnover—evidence of broad participation and market openness. Similarly, the HHI by product groups (HS2 level) was estimated at 0.07 for both exports and imports, corresponding to roughly 14 effective product categories. This result indicates a moderate level of product concentration – that is, while trade covers a wide range of goods, a limited set of core sectors (technology, energy, machinery, vehicles, and pharmaceuticals) still dominate total trade volumes.

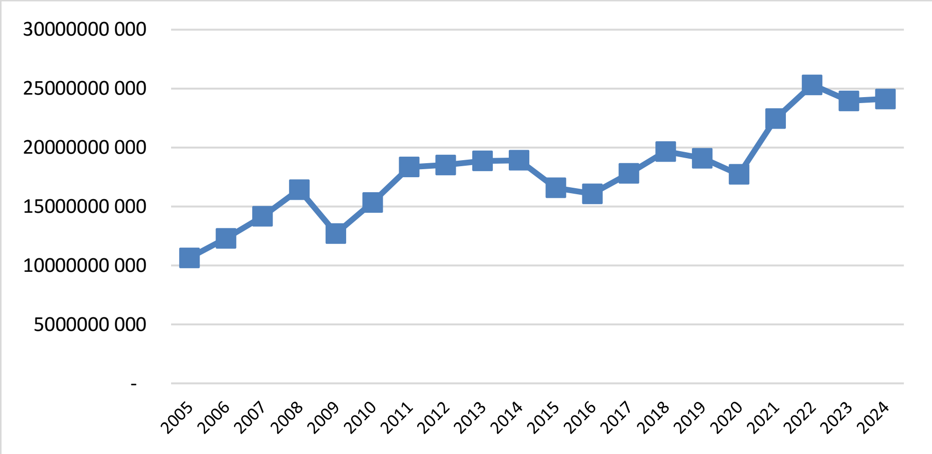

Figure 1. Global import dynamics 2005-2024

Source: TradeMap Database

To examine long-term changes in global imports, a linear trend model was estimated for the 2005–2024 period using annual import values (in USD). The specification included a trend variable to capture the general upward trajectory of world trade and a dummy variable for crisis years, representing the global financial crisis, the trade slowdown due to falling commodity prices, and the COVID-19 pandemic respectively.

The regression results indicate a strong and statistically significant trend component (β = 590.9 billion, $p < 0.01$), confirming a steady growth of world imports over the last two decades. On average, the total value of merchandise imports increased by approximately USD 590 billion per year. The intercept of USD 12.17 trillion represents the estimated baseline level of imports in the initial year (2005), while the R-square value of 0.84 demonstrates that the model explains about 84% of the variation in global import values – indicating a very good fit.

The dummy variable for crisis years is negative and statistically significant (β = –2.80 trillion, $p = 0.01$), suggesting that during major global disruptions, the world's total imports dropped by an average of USD 2.8 trillion compared to the trend level. This effect reflects the contraction in international trade during the 2009 financial crisis, the 2015 commodity downturn, and the 2020 COVID-19 shock. The forecasted total imports are expected to reach approximately USD 24.6 trillion in 2025 and USD 25.2 trillion in 2026. To evaluate long-term export dynamics, a linear trend regression model was estimated for the period 2005–2024, using world export values. The model included a time trend variable to capture the general trajectory of export growth and a dummy variable for crisis years to account for major global disruptions—the financial crisis, the commodity-price downturn, and the COVID-19 pandemic. The regression results show a strong and statistically significant positive trend (β = 587.0 billion, $p < 0.01$), indicating that global exports have expanded by an average of USD 587 billion per year over the last two decades. The intercept term (USD 11.93 trillion) approximates the baseline export level in 2005, and the model explains 85 percent of the total variation in global exports ($R^2 = 0.85$), confirming an excellent fit.

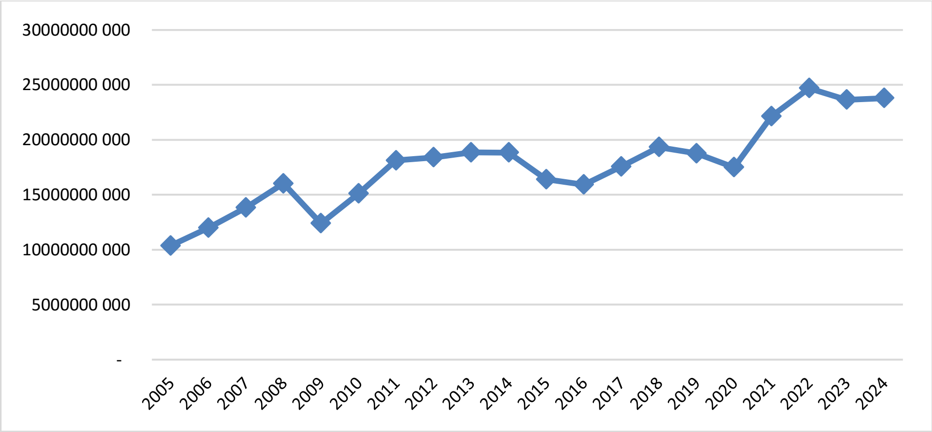

Figure 2. Global export dynamics 2005-2024

Source: TradeMap Database

The dummy variable for crisis years is negative and significant ($\beta = -2.76$ trillion, p = 0.02), suggesting that during major global shocks, total world exports dropped on average by nearly USD 2.8 trillion relative to the underlying trend. This reflects the contraction in international trade caused by the 2009 financial turmoil, the 2015 global slowdown, and the 2020 pandemic shock. The forecasted global export volumes are USD 24.26 trillion for 2025 and USD 24.85 trillion for 2026. These results imply a continuation of the long-term upward trend in global trade, assuming the absence of new systemic shocks.

Conclusion

The analysis reveals that global import demand remains dominated by a relatively small group of highly industrialized and consumer-driven economies. Their predominance reflects the scale of their markets, as well as their central role as hubs in international production and distribution networks. On the export side, the concentration pattern underscores the persistence of major production centers across Asia, Europe, and North America, where manufacturing and intermediate goods production continue to cluster within technologically advanced economies.

The structure of traded goods shows that global commerce is still heavily technology- and energy-dependent, with a limited number of product groups – particularly electronics, machinery, fuels, and vehicles – accounting for the majority of world trade. This specialization contributes to efficiency and global integration but also increases exposure to shocks in strategic sectors.

Taken together, the results indicate that the global trading system is geographically diversified but sectorally concentrated. This duality – broad participation across countries combined with dependence on a few high-value industries – reflects both the strength and fragility of the current trade architecture. Systemic disruptions in key products or major economies can rapidly transmit through interconnected global value chains, amplifying economic volatility.

Trend analysis confirms a sustained long-term upward trajectory in both exports and imports, with only temporary contractions during crisis years. The quick recovery after each downturn demonstrates the adaptive capacity of global trade, while recurring shocks expose underlying vulnerabilities to geopolitical and energy-related risks. If tensions remain contained and supply chains continue to stabilize, global trade is expected to surpass USD 25 trillion by 2026, consolidating its role as a central driver of global economic growth.

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Global trade patterns and concentration: leading countries, dominant products and trends

Key words: global trade, export–import dynamics, trade concentration, Herfindahl–Hirschman Index, trend analysis

The study aims to examine the long-term evolution of global merchandise trade, identifying the leading exporting and importing countries, dominant product groups (HS-2 classification), and assessing the degree of concentration and diversification within the global trading system. The analysis also evaluates the effects of major global shocks—including the 2008–2009 financial crisis, the 2015 commodity downturn, the COVID-19 pandemic, and the Russia–Ukraine conflict – on international trade dynamics. The research uses annual data from the International Trade Centre (ITC) TradeMap covering 2005-2024. Descriptive statistics, trend analysis, and linear regression modeling were employed to detect long-term trade trajectories. The Herfindahl–Hirschman Index (HHI) was applied to measure the concentration of trade flows by country and by product group. Forecasts for 2025-2026 were derived from the estimated trend models to project the future direction of global trade. The results reveal a strong positive trend in both exports and imports, with average annual growth of approximately USD 0.6 trillion. Despite short-term declines during global crises, world trade recovered rapidly each time. In 2024, world imports reached USD 24.1 trillion and exports USD 23.8 trillion, with the top ten countries accounting for about 50% of total trade and the top ten product groups – mainly electronics, machinery, energy, and vehicles – representing two-thirds of trade value. The findings emphasize the importance of enhancing export diversification, reducing dependence on a narrow set of high-tech and energy products, and strengthening supply-chain resilience in the face of geopolitical disruptions. Policymakers should encourage innovation, regional integration, and the development of value-added industries to achieve more balanced and sustainable trade growth.