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Original Article

Trade Partner Concentration of Vietnam, 2010-2025, Under Global Geoeconomic Fragmentation

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Abstract: *Geoeconomic fragmentation is reshaping how countries organize trade and supply chains, yet its effect on the partner structure of open developing economies such as Vietnam has rarely been quantified. This study measures the concentration of Vietnam's merchandise trade partners over 2010-2025 with the Herfindahl-Hirschman Index (HHI), cross-checked by Shannon Entropy and the combined share of the top three and top five partners (CR3, CR5), calculated separately for exports and imports. Partner-level data come from UN Comtrade (2010-2023) and the Statistics Office of Vietnam (2024-2025). The indices are compared with three geopolitical milestones (2018, 2020, 2022), the entry-into-force dates of major free trade agreements (FTAs), and results for Thailand and Indonesia. Export HHI rises from 744 to 1,389 points and import HHI from 1,011 to 1,984 points. Exports concentrate on the United States (from 19.73% to 32.25% of the total), while imports concentrate on China (from 23.81% to 40.89%), forming an asymmetric two-ended structure. Vietnam's increase is several times larger than those of Thailand and Indonesia, indicating a Vietnam-specific rather than a region-wide trend. Because the analysis is descriptive, it cannot separate fragmentation from the effects of foreign direct investment (FDI) and FTAs; the results are consistent with a pattern of bifurcated integration in global value chains. The findings offer a reference for monitoring trade dependence risks and guiding market diversification.*

Keywords: *Bifurcated Integration, Geoeconomic Fragmentation, Herfindahl-Hirschman Index, Shannon Entropy, Trade Partner Concentration, Vietnam.*

I. INTRODUCTION

Since the 2008-2009 global financial crisis, and especially since the outbreak of US-China trade tensions in 2018, the COVID-19 pandemic in 2020, and the Russia-Ukraine conflict in 2022, many countries have looked beyond cost efficiency and prioritized resilience to shocks. International organizations such as the IMF and the WTO describe the reshaping of trade, investment, and technology flows along political or alliance lines as "geoeconomic fragmentation" [1], [2]. Fragmentation, however, does not imply an absolute decline in global trade. Blanga-Gubbay and Rubínová [3] find that trade between hypothetical East and West blocs has grown about 4% more slowly than within-bloc trade since the Russia-Ukraine war began, yet they find no strong evidence of near-shoring or regionalization of global trade; Jean [4] argues that the clearest signs are concentrated in a few hotspots, namely Russia's trade and US-China relations.

Vietnam is a notable case because it is widely regarded as a clear beneficiary of the relocation of supply chains away from China. With one of the highest trade openness ratios in the world (total trade regularly exceeds 150% of GDP), its economy is directly exposed to external shocks; if trade increasingly depends on a few large partners, the risks of tariffs, trade remedy investigations, or supply disruptions rise. The question is how the concentration of Vietnam's trade partners changed over 2010-2025, and whether this change is linked to geoeconomic fragmentation or mainly to other factors, such as the wave of new-generation free trade agreements (FTAs), including CPTPP, EVFTA, and RCEP.

This paper measures the concentration of Vietnam's merchandise trade partners over 2010-2025 with the Herfindahl-Hirschman Index (HHI), cross-checked by Shannon Entropy and the combined share of the top three and top five partners (CR3, CR5), calculated separately for exports and imports. The indices are compared with three geopolitical milestones (2018, 2020, 2022), the entry-into-force dates of major FTAs, and results for Thailand and Indonesia. The paper contributes in three ways: (i) it builds a long, two-direction measurement series for an open developing economy, a case less studied than the large economies; (ii) it updates the data to 2025; and (iii) it provides a preliminary benchmark against two ASEAN economies to establish whether the observed trend is specific to Vietnam or common to the region.

The rest of the paper is organized as follows. Section II reviews the literature, Section III presents the methodology and data, Section IV reports the results and discussion, and Section V concludes with policy implications.

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II. LITERATURE REVIEW

A) Geoeconomic Fragmentation and Trade Partner Concentration

Aiyar et al. [1] define geoeconomic fragmentation as the reversal of economic integration, driven by policy and geopolitical considerations, operating through trade, FDI, technology, labor migration, and capital flows. The concept is often accompanied by friend-shoring (shifting production and supply chains to political allies), near-shoring (moving production closer to consumer markets), and slowbalization (the slowdown of globalization since 2008). It is not synonymous with deglobalization: international flows are reorganized along geopolitical lines rather than shrinking across the board, so the world may still trade a great deal, but trade is tilted toward countries with close political ties or mutual FTAs.

Trade partner diversification is the extent to which a country spreads its exports and imports across many partners. In contrast, concentration refers to heavy dependence on one or a few partners. The two are inversely related and are usually measured by the same indices. The most common is the HHI, which originated in industrial organization to measure market-share concentration among firms and was later applied to partners or products in international trade; Shannon Entropy, from information theory, serves as a complementary measure of diversity. High concentration is not necessarily harmful, since it may reflect comparative advantage or the efficiency of large markets. However, it increases exposure to shocks in the main partner (e.g., economic crises, conflicts, tariff changes) because substitute markets are scarce.

This study does not equate partner concentration with fragmentation. The HHI is only a descriptive measure of trade structure at a point in time, whereas fragmentation has political and geopolitical roots; a rising HHI does not prove fragmentation as the cause, because new FTAs or ordinary demand fluctuations may also raise it. To limit over-interpretation, a change in HHI is treated as possibly related to fragmentation only when three groups of evidence are considered together: (i) timing that coincides with the milestones; (ii) a direction of share shifts consistent with fragmentation logic (for example, lower imports from China and higher exports to the US or EU); and (iii) a divergence from a regional benchmark. All results are cross-checked against FTA entry-into-force dates.

B) Empirical Evidence on Fragmentation

On costs, Aiyar et al. [1] estimate that global output losses from trade fragmentation range from about 0.2% to nearly 7% of GDP depending on the degree of fragmentation assumed, with emerging economies significantly affected. Clayton et al. [5] build a framework that places economic power, security, and trade policy in one model; Mattoo et al. [6] argue that geopolitical rivalry raises the incentive to use trade policy for security purposes, but outside extreme cases, the basis for multilateral cooperation remains; Antràs [7] surveys open questions in international trade. Bolhuis et al. [8] use a general-equilibrium model covering 145 countries and show that losses are larger for low-income countries and that ignoring primary commodities and intermediate inputs understates the cost of fragmentation; Alvarez et al. [9] show that splitting commodity trade along bloc lines can cause large swings in energy, mineral and agricultural prices. Both studies suggest that partner dependence should be examined by direction of trade, especially for imported inputs.

On empirical evidence, the largest strand uses gravity models with geopolitical distance measures, typically based on voting similarity in the United Nations General Assembly. Campos et al. [10] estimate that a one standard deviation increase in a geopolitical trade barrier indicator is equivalent to about 7.6 percentage points of tariffs; Bosone and Stamato [11] report that a 10% increase in geopolitical distance, similar to the rise in US-China distance since 2018, is associated with about 2% lower bilateral manufacturing trade; Qiu et al. [12], [13] find that trade between geopolitically distant economies grows more slowly (about 2.5% in quarterly volume over 2017-2023 and about 12 percentage points in annual value); and Hakobyan et al. [14] and Abeliansky and Mayrhuber [15] report similar results. However, results depend on how geopolitical distance is measured [16], so voting-based indicators should be seen as proxies. Conversely, Blanga-Gubbay and Rubínová [3], Jean [4] and the WTO [2] are more cautious: signs of fragmentation are concentrated in a few hotspots and concerns about "deglobalization" are overstated. The methodological implication is that a change in Vietnam's partner structure is not automatically attributable to fragmentation and must be tested using country-specific data.

C) Vietnam, Supply-Chain Reallocation and Measurement

For Vietnam, Gopinath et al. [17] classify the country as a "connector economy" between geopolitical blocs and note that this role does not necessarily reduce strategic dependence or create genuine diversification. Lim et al. [18] argue that Vietnam is becoming an intermediary economy between the United States and China: imports depend heavily on Northeast Asia, especially China, while exports depend strongly on US demand. Alfaro and Chor [19], [20] describe a "great reallocation" in US supply chains in which direct imports from China fall and Vietnam's share rises, although supply chains have not fully decoupled from China. On the nature of exports to the US, Schulze and Xin [21] find that Vietnam's case leans toward trade reallocation through expanded domestic production, partly linked to FDI by China-origin firms, rather than rerouting; Zou and Gong [22], using firm-to-firm transaction data, record both rerouting and value-adding processing, and note that part of the additional domestic intermediate inputs contains Chinese inputs. Hayakawa [23], using provincial trade data for machinery from January 2019 to

December 2023, shows that higher exports of downstream products to the US are accompanied by higher imports of upstream products from China. This relationship is not significant for imports from Japan, Korea, and Taiwan. Because the FDI sector strongly shapes Vietnam's trade structure, Aiyar et al. [24] and Grover and Vézina [25] suggest an intermediate mechanism: fragmentation reallocates FDI, thereby changing supply chains and, ultimately, partner concentration.

On measurement, Afonso et al. [26] compute the HHI and the Gini coefficient for export and import partner concentration in 31 European countries over 1995-2023 and show that the drivers differ between the two directions, so each direction should be computed separately; Önder and Yilmazkuday [27] take a network approach, showing that diversification relates to a country's position in the trade network and not only to the number of partners. A European Commission report [28] interprets the partner HHI on a 0-1 scale with thresholds of 0.15 and 0.25, equivalent to 1,500 and 2,500 on a 0-10,000 scale, while noting that interpretation depends on context. For Vietnam's bilateral trade, Phat and Hanh [29] use panel data on 53 countries over 1997-2019 and show that FTAs have a positive effect, while transport costs and institutional distance reduce trade with developed countries; Nguyen and Wu [30] find that China's dominance is lower under a Revealed Trade Preference index than under traditional shares, a reminder that a high share does not mean absolute dependence. At a broader level, the World Bank [31] places Vietnam's trade in the context of capability upgrading and a changing global trade environment.

D) Research Gap

Within the literature reviewed (which does not imply that no study exists on these topics), five gaps remain. First, there is no long, consistent series that separates the two trade directions for Vietnam: studies of Vietnam's trade mostly use gravity models or bilateral intensity indices, whereas separate export and import HHIs have been computed for European countries [26]. Second, quantitative work linking Vietnam's partner concentration directly to fragmentation is scarce: fragmentation studies measure effects on bilateral flows, while Vietnam studies explain mechanisms using firm- or provincial-level data over short periods. Third, the asymmetry between the two ends of Vietnam's trade has only been tested at the provincial level over a short period [23]. Fourth, concentration due to fragmentation has not been clearly distinguished from concentration due to FDI [21], [18]. Fifth, many studies stop in 2023, while the heightened trade policy uncertainty of 2025 [32] is not yet reflected in Vietnam's partner structure.

This study addresses these gaps by building annual HHI, Entropy, CR3 and CR5 series separately for exports and imports (first gap); comparing them with the 2018, 2020 and 2022 milestones (second); tracking the shares of the United States and China at the national level throughout the period (third); and adding 2024-2025 data (fifth). The fourth gap is only partly addressed: because only merchandise trade is analyzed, the paper cannot fully separate fragmentation from FDI, and instead compares HHI movements with FTA timing, interprets them cautiously, and records this as a limitation. In addition, no study has compared Vietnam's concentration trend with comparable ASEAN economies; benchmarking against Thailand and Indonesia helps establish whether the observed trend is specific to Vietnam or regional.

III. METHODOLOGY AND DATA

A) Concentration Indices

The analysis is limited to merchandise trade and excludes services trade and FDI flows. Three indicators are computed separately for exports and imports for every year from 2010 to 2025. The HHI is calculated as:

$$\mathrm{HHI}_t^d = \sum_{i=1}^{n} \left(s_{it}^d\right)^2 \tag{1}$$

where s_{it}^d is the share (in %) of partner i in Vietnam's total trade in year t for trade direction d (exports or imports), and n is the number of partners. The HHI ranges from nearly 0 (trade is evenly distributed) to 10,000 (all trade is with a single partner). Common reference thresholds are used: below 1,500 is dispersed, 1,500-2,500 is moderately concentrated, and above 2,500 is highly concentrated [28]; because these are only conventions, results are read mainly through trends over time.

For cross-checking, Shannon Entropy is also used:

$$E_t^d = -\sum_{j=1}^{N} s_{j,t}^d \ln\left(s_{j,t}^d\right) \tag{2}$$

Where the shares s_{it}^d are expressed as decimals (0 to 1, summing to 1), and Entropy is measured in nats. Entropy is inversely related to HHI: the higher the value, the more diversified the partner structure. Finally, the cumulative share of the k largest partners is:

$$\mathrm{CR}_{k,t}^d = \sum_{i=1}^{k} s_{(i)t}^d \tag{3}$$

where $s_{(i)t}^{d}$ is the share of the partner ranked i by trade value in descending order, with $k = 3$ and $k = 5$. CR3 and CR5 are more intuitive and complement the HHI, which is sensitive to how small partners are treated.

All indices are computed for individual partner countries. To describe shifts between blocs, partners are also grouped by region and agreement (United States; mainland China; South Korea; Japan; Taiwan-Hong Kong-Macao; ASEAN-9; EU-27; remaining CPTPP members; India; United Kingdom; Russia; rest of the world). The grouping is descriptive only and is not used to compute the HHI, since merging several countries into one "partner" would overstate concentration.

B) Data and Data Processing

Partner-level export and import values for 2010-2023 come from UN Comtrade [33]. For 2024-2025, the data are drawn from the table "Export and import turnover by country, group of countries and territory" published by the Statistics Office of Vietnam (GSO) [34], as the corresponding Comtrade data were not fully updated at the time of collection. All data were checked for completeness (partner totals against official totals) and converted to current US dollars.

Using two sources raises two consistency issues. First, Comtrade figures for years in which Vietnam did not report may be mirror data inferred from partner reports. Second, the GSO table lists only about 70 main partners in detail, against about 200 in Comtrade. To handle this, one rule is applied to both sources: the official national total remains the denominator when computing each partner's share, while the residual (the "Areas, NES" line in Comtrade, or the gap between the official total and the listed partners in GSO data) is excluded from the sum of squares in the HHI because it is not a single partner. A sensitivity check for 2024-2025 shows that residual accounts account for only about 3-3.6% of total trade each year and change the HHI by less than 1% relative to a hypothetical full partner list. The 2024-2025 GSO figures are preliminary at first release, and later revisions are typically below 0.5%.

The narrowing from about 200 to about 70 partners creates a technical break in the series in 2024. Indicators sensitive to the tail of the distribution, such as Entropy, fall more sharply, whereas the HHI is less affected because its weight is concentrated in the largest partners. The decline in Entropy over the last two years therefore partly reflects a technical effect and should be interpreted with caution.

C) Analytical Design

First, event windows. Three milestones are identified as the clearest manifestations of geoeconomic fragmentation in the period: 2018 (the US imposes tariffs on Chinese goods, opening the US-China trade war), 2020 (the COVID-19 pandemic, a global supply shock) and 2022 (the Russia-Ukraine conflict). The "before" value is the average of the two to three preceding years (2015-2017, 2018-2019, and 2020-2021), and the "after" value is the year immediately following (2019, 2021, and 2023). Because each period has very few observations, the series is trending, and the windows are adjacent, no statistical tests are used, and the results are descriptive.

Second, FTA timing. To separate the effects of fragmentation from those of new FTAs, movements in the HHI and in partner shares are compared with the entry-into-force dates of ATIGA (tariff elimination completed in 2018), CPTPP (January 14, 2019), EVFTA (August 1, 2020) and RCEP (January 1, 2022) [35]. When a movement coincides with an FTA, this factor is also considered to avoid attributing the entire change to fragmentation.

Third, a regional benchmark. The HHIs for Thailand and Indonesia are computed at the aggregate level for each year, using the same formulas and data-processing rules as for Vietnam to ensure comparability. The two countries play only a supporting role and are not analyzed partner by partner or bloc by bloc.

IV. RESULTS AND DISCUSSION

A) Trade Scale and Main Partners

Vietnam's total merchandise trade rose from USD 157.08 billion in 2010 to USD 930.05 billion in 2025, with exports growing from USD 72.24 billion to USD 475.04 billion and imports from USD 84.84 billion to USD 455.01 billion (Table A1 in the Appendix). Vietnam ran a trade surplus almost continuously from 2012 to 2022 (except 2015). In 2020, despite the pandemic, exports and imports still grew by 6.36% and 3.10%; 2023 is the only year in 2012-2025 in which both fell (exports by 4.81% and imports by 9.29%). The 2025 surplus (USD 20.03 billion) was lower than in 2023 (USD 27.63 billion) and 2024 (USD 24.77 billion), despite higher total trade, because imports grew faster than exports (19.50% versus 17.14%), implying that export growth is accompanied by deepening dependence on imported inputs.

Table 1 shows that exports increasingly rely on the US market. The United States is the only market whose share widened steadily against the rest, from 19.73% in 2010 to 32.25% in 2025; the sharpest jump was in 2018-2020 (from 19.52% to 27.38%, almost 8 percentage points in two years), coinciding with the US-China trade war and COVID-19. China's share rose from 10.72% to a peak of 17.37% in 2020 and then fell to 14.83% in 2025. Japan and ASEAN declined in relative terms, even as their

absolute values continued to rise (Japan from 10.70% to 5.63%; ASEAN from 14.37% to 8.94%). The EU share follows an inverted U: it rose to 19.10% in 2015 and then fell steadily, including after EVFTA entered into force, to 12.50% in 2025, although its absolute value rose from USD 11.37 billion to USD 59.38 billion.

Table 1: Vietnam's Largest Export Markets, USD Billion (Share of Total Exports)

Partner	2010	2015	2018	2020	2022	2024	2025
United States	14.25 (19.73%)	33.48 (20.66%)	47.58 (19.52%)	77.07 (27.38%)	109.46 (29.51%)	119.50 (29.47%)	153.18 (32.25%)
China	7.74 (10.72%)	16.57 (10.23%)	41.37 (16.97%)	48.88 (17.37%)	57.68 (15.55%)	61.21 (15.09%)	70.45 (14.83%)
South Korea	3.09 (4.28%)	8.92 (5.50%)	18.24 (7.48%)	19.13 (6.80%)	24.26 (6.54%)	25.62 (6.32%)	28.94 (6.09%)
Japan	7.73 (10.70%)	14.10 (8.70%)	18.83 (7.73%)	19.27 (6.85%)	24.23 (6.53%)	24.61 (6.07%)	26.77 (5.63%)
ASEAN	10.38 (14.37%)	18.29 (11.29%)	24.74 (10.15%)	23.25 (8.26%)	34.28 (9.24%)	38.10 (9.40%)	42.48 (8.94%)
EU	11.37 (15.74%)	30.94 (19.10%)	41.88 (17.19%)	40.06 (14.23%)	47.53 (12.81%)	51.80 (12.77%)	59.38 (12.50%)

Source: *Authors' calculations based on UN Comtrade (2010-2023) and Statistics Office of Vietnam (2024-2025).*

On the import side (Table 2), China's share rose almost continuously from 23.81% in 2010 to 40.89% in 2025, fastest in 2020-2025 (from 32.22% to 40.89%), faster than over the whole of 2010-2020. By contrast, the shares of South Korea and Japan both fell after peaking around 2018 (South Korea from 20.09% to 13.31%; Japan from 8.04% to 5.42%), which may reflect the FDI investment cycles of these two countries entering a mature phase and a reduction in initial machinery and equipment imports. Taiwan runs counter to the general trend, rising to 7.26% in 2025, likely linked to its growing role in semiconductor and electronic component supply chains.

Table 2: Vietnam's Largest Import Sources, USD Billion (Share of Total Imports)

Partner	2010	2015	2018	2020	2022	2024	2025
China	20.20 (23.81%)	49.44 (29.82%)	65.52 (27.66%)	84.20 (32.22%)	117.65 (32.79%)	144.02 (37.82%)	186.03 (40.89%)
South Korea	9.76 (11.50%)	27.58 (16.64%)	47.58 (20.09%)	46.86 (17.93%)	62.05 (17.29%)	55.93 (14.69%)	60.54 (13.31%)
Taiwan	6.98 (8.22%)	10.94 (6.60%)	13.23 (5.59%)	16.70 (6.39%)	22.61 (6.30%)	22.74 (5.97%)	33.03 (7.26%)
Japan	9.02 (10.63%)	14.18 (8.56%)	19.04 (8.04%)	20.28 (7.76%)	23.31 (6.50%)	21.59 (5.67%)	24.68 (5.42%)
ASEAN	16.33 (19.25%)	23.94 (14.44%)	31.88 (13.46%)	30.06 (11.50%)	47.24 (13.17%)	44.79 (11.76%)	51.21 (11.25%)
United States	3.78 (4.46%)	7.79 (4.70%)	12.76 (5.39%)	13.76 (5.27%)	14.48 (4.04%)	15.10 (3.97%)	19.29 (4.24%)

Source: *Authors' calculations based on UN Comtrade (2010-2023) and Statistics Office of Vietnam (2024-2025).*

Together, the two directions form an "asymmetric two-ended" structure (Fig. 1). The United States accounts for 32.25% of Vietnam's exports but only about 4-5% of its imports (4.24% in 2025), while China accounts for over 40% of imports but only 14.83% of exports. Outputs increasingly depend on final consumer demand in the United States, while inputs depend overwhelmingly on China's supply of raw materials and components. A one-sided bilateral imbalance with the United States is often grounds for trade remedy measures or tariff negotiations.

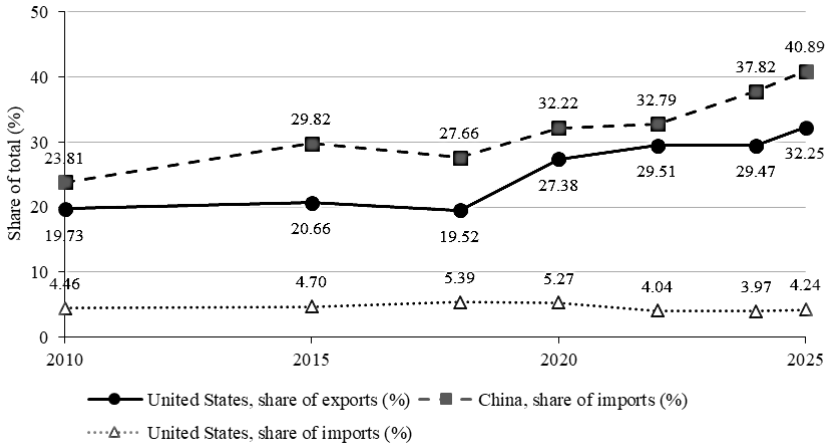

Figure 1. Selected Partner Shares in Vietnam's Trade, 2010-2025 (%)

Source: *Authors' calculations based on UN Comtrade and the Statistics Office of Vietnam.*

B) Concentration of trade partners

Table 3 and Fig. 2 present the HHI and Entropy by year. The two indices show consistent long-run trends: between 2010 and 2025, export HHI rises from 744 to 1,389 points, while Entropy falls from 3.28 to 2.67; import HHI rises from 1,011 to 1,984 points, while Entropy falls from 2.92 to 2.29. Among the 30 annual changes (15 years × 2 directions), the two indices move in opposite directions in 26; the other four move in the same direction by small margins (HHI up 13-34 points, Entropy up 0.003-0.02), possibly because the HHI weights large partners heavily. At the same time, Entropy is more sensitive to the tail of small partners. Because both derive from the same set of partner shares, this agreement shows that the conclusion does not depend on a single formula; it is not two independent verifications.

Table 3: HHI and Entropy of Vietnam's Exports and Imports, 2010-2025

Year	Export HHI (points)	Import HHI (points)	Export Entropy (nats)	Import Entropy (nats)
2010	744.44	1,010.72	3.2774	2.9156
2011	703.38	986.76	3.2932	2.9394
2012	683.96	1,109.87	3.2995	2.8591
2013	669.75	1,243.57	3.3258	2.7975
2014	686.50	1,310.98	3.3397	2.7562
2015	745.15	1,370.51	3.2812	2.7016
2016	831.53	1,357.64	3.2019	2.7120
2017	836.49	1,413.93	3.1764	2.6806
2018	866.71	1,355.14	3.1169	2.6932
2019	968.39	1,416.67	3.0673	2.6572
2020	1,205.76	1,537.23	2.9119	2.5994
2021	1,239.37	1,550.10	2.9146	2.6195
2022	1,259.73	1,530.56	2.8970	2.6260
2023	1,199.46	1,564.91	2.9177	2.6389
2024	1,235.68	1,775.14	2.7467	2.4084
2025	1,388.71	1,984.48	2.6706	2.2887

Source: *Author's calculations based on UN Comtrade (2010-2023) and Statistics Office of Vietnam (2024-2025). Entropy for 2024-2025 partly reflects the change in data source (Section III-B).*

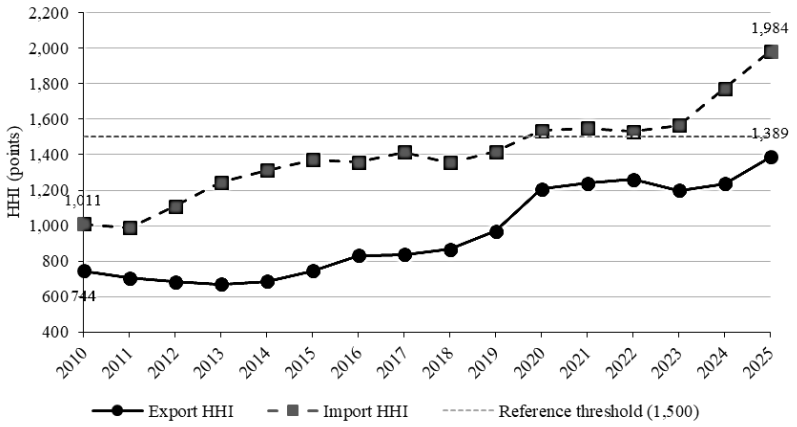

Figure 2. Export and Import HHI of Vietnam, 2010-2025

Source: *Authors' calculations based on UN Comtrade and the Statistics Office of Vietnam.*

For exports, the HHI fluctuates between 670 and 745 points in 2010-2015, rises gradually to 867 in 2018 and 968 in 2019, then jumps to 1,205.76 in 2020 (an increase of over 237 points in one year, the largest one-year rise in the series) and peaks at 1,388.71 in 2025, the highest in 16 years. This remains below the 1,500 threshold, indicating a trend toward concentration rather than a high absolute concentration; the main risk lies in the United States' own share (32.25%).

For imports, concentration was already higher than for exports in 2010 (1,010.72 versus 744.44 points) and rises in steps rather than continuously: rapidly in 2011-2015 (from 987 to 1,371), flat around 1,355-1,417 in 2015-2019, up to the 1,530-1,565 range in 2020-2023, then accelerating over the last two years, from 1,564.91 in 2023 to 1,775.14 in 2024 and 1,984.48 in 2025, an increase of more than 400 points. The 2025 import HHI approaches 2,000, still within the moderate range, and should be read alongside China's 40.89% share, which more clearly reflects dependence.

Table 4 offers a more intuitive view consistent with the HHI and Entropy. In 2025, the three largest partners account for 53.17% of exports and 61.46% of imports, and the five largest for 62.50% and 71.12%. Compared with 2010, CR3 is 12.0 percentage points higher for exports and 15.5 percentage points higher for imports. The composition of the leading group changes little on the export side (the United States, China, and an alternating order between Japan and South Korea in third place), so the rise in CR3 comes mainly from these countries' growing shares. On the import side, Japan, always among the top three sources from 2010 to 2022, is replaced by Taiwan in 2025, and from 2018 the United States replaces Thailand in fifth place.

Table 4: Top-Partner Concentration Ratios (CR3, CR5), Selected Years

Year	Export CR3	Export CR5	Import CR3	Import CR5
2010	41.15% (US, CN, JP)	51.04% (+KR, DE)	45.94% (CN, KR, JP)	60.76% (+TW, TH)
2015	39.59% (US, CN, JP)	49.39% (+KR, HK)	55.02% (CN, KR, JP)	66.61% (+TW, TH)
2018	44.22% (US, CN, JP)	55.23% (+KR, DE)	55.79% (CN, KR, JP)	66.77% (+TW, US)
2020	51.60% (US, CN, JP)	62.10% (+KR, HK)	57.91% (CN, KR, JP)	69.57% (+TW, US)
2022	51.60% (US, CN, KR)	61.09% (+JP, HK)	56.58% (CN, KR, JP)	66.92% (+TW, US)
2025	53.17% (US, CN, KR)	62.50% (+JP, HK)	61.46% (CN, KR, TW)	71.12% (+JP, US)

Source: *Authors' calculations based on UN Comtrade (2010-2023) and Statistics Office of Vietnam (2024-2025). US: United States; CN: China; JP: Japan; KR: South Korea; TW: Taiwan; TH: Thailand; DE: Germany; HK: Hong Kong.*

C) Event Windows and FTA Timing

Table 5 summarizes movements in the indicators around the three milestones.

Table 5: Changes in the Indicators around Geoeconomic Milestones

Milestone	Comparison period	Export HHI (points)	Import HHI (points)	US share of exports (%)	China share of imports (%)
2018	Average 2015-2017 vs 2019	804.4 → 968.4 (+164.0)	1,380.7 → 1,416.7 (+36.0)	20.6 → 23.2 (+2.6 pp)	28.6 → 29.8 (+1.2 pp)
2020	Average 2018-2019 vs 2021	917.5 → 1,239.4 (+321.9)	1,385.9 → 1,550.1 (+164.2)	21.4 → 28.7 (+7.3 pp)	28.7 → 33.2 (+4.5 pp)
2022	Average 2020-2021 vs 2023	1,222.6 → 1,199.5 (−23.1)	1,543.7 → 1,564.9 (+21.2)	28.0 → 27.5 (−0.5 pp)	32.7 → 34.0 (+1.3 pp)

Source: *Authors' calculations based on UN Comtrade (2010-2023) and the Statistics Office of Vietnam (2024-2025). pp = percentage points.*

At the 2018 milestone, the clearest reaction is on the export side: the 2019 export HHI is 164 points above the 2015-2017 average, while the import HHI rises only 36 points; the US share of exports rises by 2.6 percentage points (from 20.6% to 23.2%). The jump occurs mainly in 2019 (up 102 points) rather than in 2018 (up 30 points), consistent with the trade war first affecting export flows to the US through order relocation.

The 2020 milestone shows the strongest movement in both directions: the export HHI rises by 321.9 points, twice the 2018 rise, and the import HHI by 164.2 points. The US share of exports rises by 7.3 percentage points, consistent with surging US demand for electronics, home-working equipment, and medical supplies during lockdowns. In comparison, China's share of imports rises by 4.5 percentage points as global supply chains were disrupted. However, COVID-19 was a global supply shock rather than fragmentation along political lines, and 2020 also coincides with EVFTA's entry into force, so this movement cannot be attributed to fragmentation alone.

The 2022 milestone yields the opposite result: export HHI falls slightly by 23.1 points, while export Entropy edges up. Russia and Ukraine account for less than 1% of Vietnam's trade, so the conflict does not create a significant market reallocation shock; the 2022 milestone is therefore not a strong test of the fragmentation hypothesis. The import side continues to concentrate on China (a further 1.3 percentage points), indicating that this dependence is structural and long-term, not tied to individual events.

On FTAs, the increases in export HHI in 2019 (102 points) and 2020 (237 points) coincide with the entry into force of CPTPP and EVFTA. Looking only at timing, one could conclude that these FTAs raised concentration; however, the direction of share shifts suggests the opposite. ATIGA, CPTPP and EVFTA were all designed to widen and diversify markets. Exports to ASEAN (from USD 24.74 billion to USD 42.48 billion) and the EU (from USD 41.88 billion to USD 59.38 billion) rose in absolute terms in 2018-2025. However, not as fast as exports to the United States, where Vietnam gained no new bilateral FTAs during this period, so the US share continued to widen the gap and pushed the HHI up. This does not mean FTAs are ineffective: their purpose is to expand market space and raise absolute trade.

ATIGA illustrates the point: although it removed nearly all intra-ASEAN tariffs, Vietnam's export share to ASEAN fell from 10.15% in 2018 to 8.94% in 2025, with a low of 8.26% in 2020. Around RCEP (2022), the export HHI is flat near its peak; the export share to China falls from 17.37% in 2020 to 15.55% in 2022, and ASEAN edges up from 8.26% to 9.24%, so the agreement had not yet produced a clear shift in export structure in its early period. This is a descriptive comparison only: since the HHI under a no-FTA counterfactual cannot be estimated, the paper cannot claim that the agreements slowed concentration, and the separate contributions of order relocation, the pandemic, and the FDI channel cannot be isolated with the available data.

D) Comparison with Thailand and Indonesia

Table 6 and Fig. 3 place Vietnam's results beside those of Thailand and Indonesia, two ASEAN economies of broadly similar size and degree of integration.

Table 6: HHI of Exports and Imports, Vietnam, Thailand and Indonesia (Points)

Year	Exp. - Vietnam	Exp. - Thailand	Exp. - Indonesia	Imp. - Vietnam	Imp. - Thailand	Imp. - Indonesia
2010	744.44	526.32	716.21	1,010.72	809.08	805.81
2015	745.15	515.22	610.22	1,370.51	841.56	853.05
2018	866.71	522.10	662.40	1,355.14	812.40	885.20
2020	1,205.76	548.20	698.50	1,537.23	884.10	924.30
2022	1,259.73	561.10	745.60	1,530.56	905.20	935.10
2024	1,235.68	560.40	740.20	1,775.14	920.80	955.20
2025	1,388.71	572.80	755.00	1,984.48	954.10	980.50
Change 2010-2025	+87%	+9%	+5%	+96%	+18%	+22%

Source: *Authors' calculations based on UN Comtrade and the Statistics Office of Vietnam (Vietnam, 2024-2025). Exp. = exports; Imp. = imports.*

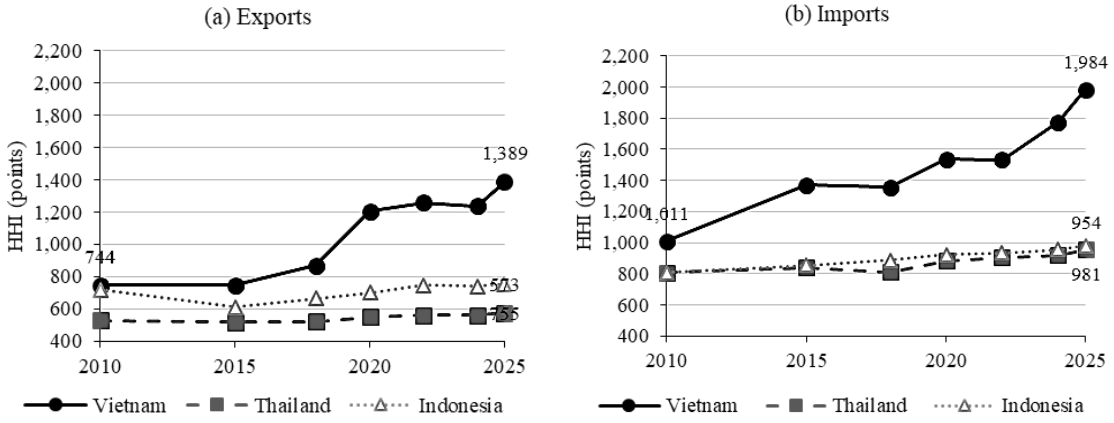

Figure 3. Export and import HHI: Vietnam, Thailand and Indonesia

Source: *Authors' calculations based on UN Comtrade and the Statistics Office of Vietnam.*

On exports, Thailand maintains high and stable diversification, with the HHI confined to a narrow range of 515-573; Indonesia is higher but relatively stable, at 610-756. Vietnam started in 2010 at a level similar to Indonesia (744.44 versus 716.21) but from around 2018 broke away from the common path, reaching 1,200-1,389 at the end of the period, 2.4 times Thailand's level and almost twice Indonesia's in 2025. On imports, the gap is even clearer: the HHIs of Thailand and Indonesia are close to each other and rise only slightly, to 954 and 981 in 2025, while Vietnam's was already higher in 2010 (1,010.72 versus under 810) and reaches 1,984.48, double the two comparators.

In terms of speed, over 2010-2025, the export HHI of Thailand and Indonesia rises by only about 9% and 5%, and the import HHI by about 18% and 22%, compared with about 87% and 96% for Vietnam. If rising concentration were an inevitable result of an open economy integrating deeply into regional supply chains amid fragmentation, Thailand and Indonesia should have recorded similar increases. They did not, so Vietnam's concentration trend is highly specific and not a general ASEAN phenomenon. All three economies are exposed to the wave of FDI relocating from China. However, Vietnam's very high openness, combined with deep specialization in electronics assembly and components (an industry with closed supply chains and final consumption directed toward the United States), may make its partner structure more sensitive. This is an inference from the observed context and trade structure, not yet tested directly with FDI data.

E) Discussion

The results show two concentration processes of different natures. On exports, there is a clear turning point in 2020: before it, the HHI fluctuated fairly steadily within 670-970 points for almost a decade, after which it jumped and settled at a new level (1,200-1,389); the driver is mainly the US market, with most of the share gain concentrated in 2018-2020. On imports, there is no abrupt break; concentration rises almost continuously, with China as the dominant driver, and accelerates most strongly after 2020, the exception being 2015-2018, when China's share eased from 29.82% to 27.66%, probably linked to imports of machinery

and equipment for Korean FDI projects. Export concentration can be described as reactive to exogenous events, while import concentration is structural and reflects accumulated supply dependence over time.

Taken together, Vietnam's trade has not simply become more concentrated; it has concentrated in a pattern tied to its position in the value chain: importing raw materials and components from China, processing and assembling at home, then exporting finished goods to the United States. This is consistent with Hayakawa [23] and Lim et al. [18]. It does not operate purely as friend-shoring, which would imply reduced trade with the geopolitical rival; China's share of imports has not fallen but has risen faster, especially in 2020-2025. Vietnam, therefore, is not decoupling from China to lean toward one pole; it is integrating more deeply with China at the input end while tightening ties with the United States at the output end. This can be summarised as "bifurcated integration", in which Vietnam participates in two distinct stages of a fragmenting supply chain and serves as an intermediary node linking East Asian supply to North American consumption; this remains a hypothesis requiring further testing.

Assessing the three groups of evidence set out in Section II-A: (i) on timing, the export HHI rises sharply in 2019-2020 but not at the 2022 milestone, because Russia and Ukraine account for a very small share of Vietnam's trade, so the coincidence is uneven; (ii) on direction, the shift of exports toward the United States is consistent with order relocation, but rising imports from China do not match the criterion of reduced trade with the other pole, and the shares of newer FTA markets such as ASEAN and the EU fall in relative terms; (iii) on regional specificity, Thailand and Indonesia show no similar path, which does not support a "common ASEAN trend", though this is not enough to claim that global fragmentation is the sole cause, since both face the same international environment. The initial hypothesis is therefore only partly supported.

This combination of timing, the direction of share shifts, and the regional benchmark is a form of triangulation. It provides an empirical basis for the argument but cannot replace econometric models with controls or quasi-experimental designs. More precisely, the results show that concentration rises as the milestones and the US share of exports and China's share of imports increase. At the same time, the separate contributions of fragmentation, FTAs, FDI, order relocation, and the global trade cycle cannot be isolated.

V. CONCLUSION AND POLICY IMPLICATIONS

This paper measures the concentration of Vietnam's merchandise trade partners over 2010-2025 with the HHI, Shannon Entropy, CR3 and CR5, separately for the two trade directions. Concentration rises markedly in both: export HHI from 744 to 1,389 points and import HHI from 1,011 to 1,984 points. Behind this are two opposing yet tightly linked trajectories: exports increasingly concentrate on the United States (from 19.73% to 32.25%), and imports increasingly concentrate on China (from 23.81% to 40.89%), forming an "asymmetric two-ended" structure. The increase is much larger than in Thailand and Indonesia, so it is specific to Vietnam and not a common ASEAN trend. The concentration trend correlates with the shift in global supply chains and reflects a pattern of "bifurcated integration"; however, the descriptive method only identifies a structural link and does not establish causality.

As for policy implications, the Strategy for Goods Export and Import to 2030 (Decision No. 493/QĐ-TTg) focuses on market diversification and limiting over-dependence, but sets targets by continent: by 2025 the Americas account for 32-33% of exports; on imports, Asia falls to about 78% while Europe and the Americas rise to 8-9% each [36]. Against the results, the United States alone already accounts for 32.25% of exports, so a single country reaches the target for the whole Americas; the five largest Asian partners and blocs in Table 2 (China, South Korea, ASEAN, Taiwan and Japan) account for 78.13% of imports, of which China alone is 40.89%. The US share of imports is only 4.24%, about half the 8-9% target. Continental targets can therefore mask a high concentration among a few individual partners, and monitoring should be detailed down to the level of key partners. On this basis, four groups of measures are proposed.

First, on exports, the feasible approach is not to restrain growth in the US market but to promote exports to other markets by making better use of new-generation FTAs: several CPTPP markets in the Americas, such as Canada, Mexico, Peru and Chile, still account for small shares relative to their potential, and the EU's share has fallen in relative terms despite rising value. Firms need support to meet rules of origin and technical and environmental standards, together with targeted trade promotion; increasing imports of machinery and source technology from the United States and the EU could also help balance the bilateral surplus and reduce exposure to trade remedy measures.

Second, on imports, the long-term task is to develop supporting industries and domestic production of raw materials, in line with the localisation targets of raising the rate from 20-25% to 30% by 2025 and 40% by 2030 under Resolution No. 50-NQ/TW [37] and the requirement to diversify markets and supply chains and reduce dependence on a few partners under Resolution No. 59-NQ/TW [38]; in the short and medium term, firms should be supported in finding and expanding supplies of inputs from alternative sources such as India or ASEAN.

Third, risks from Vietnam's intermediary position must be managed. Rising imports from China, alongside rising exports to the United States, put Vietnam in a sensitive position and require a clear distinction between illegal transshipment (foreign goods merely relabelled or repackaged without substantial domestic value added) and legitimate processing or assembly that meets the rules of origin. In 2025, the two countries announced a new trade framework under which Vietnamese exports face a 20% tariff, and goods deemed transshipped face a tariff of up to 40%. However, the specific rates remain subject to negotiation and legal developments. Policy should combine tighter control of certificates of origin and penalties for origin fraud with technical support for firms to raise local value content, meet change-of-tariff-classification criteria and standardize input traceability records.

Fourth, agencies such as the Ministry of Industry and Trade and the Statistics Office could consider integrating the HHI, CR3, CR5 and Shannon Entropy, by partner and by product group, into periodic monitoring reports as an early-warning tool against over-dependence on a few partners.

The study has several limitations. First, the data come from two sources with different partner coverage; the 2024-2025 figures are preliminary, and Entropy's figures for the last two years partly reflect a technical effect. Second, the descriptive method does not control for confounders, so it cannot quantify the separate contributions of fragmentation, FTAs, the macroeconomic cycle, exchange rates, or FDI attraction policy. The windows around 2018, 2020, and 2022 are close together, so the effects of successive shocks overlap. Third, the indices are computed at the partner level only, without concentration by product (HS code). Fourth, the explanation of Vietnam's divergence from Thailand and Indonesia through the FDI channel remains an inference. Future research could apply difference-in-differences or synthetic control methods to build counterfactual HHI paths; integrate FDI data by source country and localization rates; extend the comparator sample to India, Mexico, Bangladesh or Malaysia; combine partner and product concentration (HS 2- or 6-digit) for electronics, machinery and textiles; and use monthly or quarterly data to identify policy lags.

Interest Conflicts

The authors declare that there is no conflict of interest concerning the publication of this paper.

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Appendix 1. Merchandise Trade of Vietnam, 2010-2025

Table A1 reports the scale, growth, and balance of Vietnam's merchandise trade, as used in Section IV.A.

Table A1: Scale, Growth and Balance of Vietnam's Merchandise Trade (USD Billion; Growth in %)

Year	Exports	Export growth (%)	Imports	Import growth (%)	Total trade	Balance
2010	72.24	-	84.84	-	157.08	-12.60
2011	96.91	+34.15	106.75	+25.83	203.66	-9.84
2012	114.53	+18.18	113.78	+6.59	228.31	+0.75
2013	132.03	+15.28	132.03	+16.04	264.07	~0.00
2014	150.22	+13.77	147.84	+11.97	298.06	+2.38
2015	162.02	+7.85	165.78	+12.13	327.79	-3.76
2016	176.58	+8.99	174.98	+5.55	351.56	+1.60
2017	215.12	+21.83	213.22	+21.85	428.33	+1.90
2018	243.70	+13.29	236.87	+11.09	480.57	+6.83
2019	264.61	+8.58	253.44	+7.00	518.05	+11.17
2020	281.44	+6.36	261.31	+3.10	542.75	+20.13
2021	335.79	+19.31	330.75	+26.57	666.54	+5.04
2022	370.91	+10.46	358.79	+8.48	729.70	+12.12
2023	353.08	-4.81	325.44	-9.29	678.52	+27.63
2024	405.53	+14.86	380.76	+17.00	786.29	+24.77
2025	475.04	+17.14	455.01	+19.50	930.05	+20.03

Source: Authors' calculations from the Statistics Office of Vietnam (2024-2025) and UN Comtrade (2010-2023).