The Hague Centre for Strategic Studies

Geopolitical Annual Trade Risk Index

Methodological Notes

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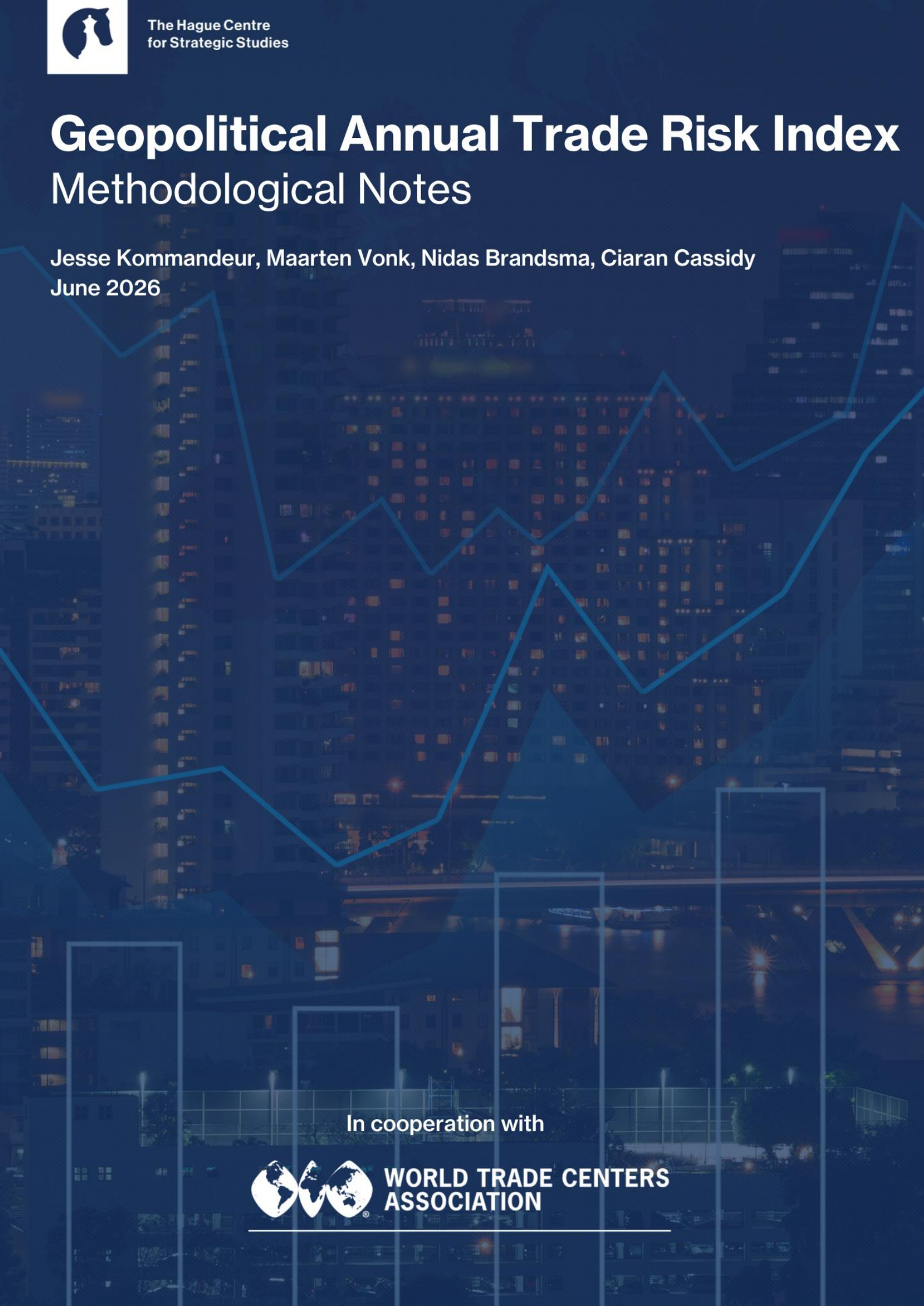
June 2026



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WORLD TRADE CENTERS ASSOCIATION

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Created: June 2025
Updated: June 2026

Cover photo: OpenAI

This methodological note has been constructed by the HCSS Datalab. The conclusions and recommendations presented in this report are the result of in-house independent research and development. Responsibility for the content rests with the authors and the authors alone.

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About HCSS

The Hague Centre for Strategic Studies (HCSS) is a knowledge institute that conducts independent research. Our goal is to offer fact-based analysis of the challenges that our societies face to inform public discourse, public and private strategic decision making, and contribute to international peace and national security in accordance with liberal democratic values.

About WTCA

The **World Trade Center Alliance** (WTCA) is a global network of organisations that aim to promote international trade and economic development. WTC connects over 300 World Trade Center locations in nearly 100 countries, providing services such as trade information, business matchmaking, international trade education, and access to trade missions. Each local WTC acts as a hub for global commerce, fostering partnerships between businesses, governments, and economic development organizations.

GATRI In short

In an era in which traditional assumptions about global order no longer hold, GATRI offers a structured way to assess not just the state of the world, but the *broader system level forces* reshaping the international system. It does so by measuring both the absolute level of geopolitical risk and its volatility – capturing how threatened the system is *and* how fast it is shifting. The index focuses on the *geopolitical climate*, rather than reacting to the 'weather' of isolated incidents, enabling users to see through the noise and track underlying system dynamics.

GATRI aggregates open-source data across three core domains of global power politics: economic, military, and diplomatic. It includes material indicators like sanctions, military deployments, and trade disruptions, as well as behavioural signals such as diplomatic sentiment and foreign state visits. This multi-domain approach tries to aggregate both the visible actions and the strategic posture shifts that shape the global system over time.

By combining various structured numerical and unstructured textual indicators into a single annual score – indexed to a baseline of 100 in 2024 – GATRI provides a yearly snapshot of global geopolitical conditions and relates it to trade. The underlying data is weighted, normalised, and publicly sourced, making the index transparent, verifiable, and accessible. Its strength lies in its dual function: as a high-level risk signal for decision-makers, and as a tool for unpacking the structural shifts driving systemic global instability.

1. Introduction

The return of hard competition between great powers negatively affects the world's security and prosperity. The measures the United States, China and Russia take to pursue their interests impact international security, international political institutions, international trade, global finance, and global cooperation on climate change and health crises. The war in Ukraine, disrupted supply chains, and COVID-19 have already led to the highest levels of inflation since the late-1970s.

In essence, in world of great power competition the purpose of all the diplomatic, military, and economic measures these powerful states take is to achieve relative gains vis-à-vis competitors. This endangers the stability of international affairs, as it unsettles the international rules and norms accepted between nations that enabled states to pursue absolute gains for over 30 years, for instance in the field of trade. Not coincidentally, small-and-mid-sized countries, industry, and investors thrived throughout the last three decades. As the world shifts back to a state in which great powers compete with one another, geopolitical risk is first and foremost generated by the increasing willingness and ability of powerful states to use coercive tools (e.g., imposition of tariffs) and in the second place by the long-term system effects of their actions (e.g., deterioration of the WTO-system).

This results in a proliferation of geopolitical risks. These are not sufficiently incorporated in the medium-to-long-term strategies of governments, industry, and investors. Policymakers and business analysts lack methods and metrics to qualify – let alone quantify – them.

The **Geopolitical Annual Trade Risk Index (GATRI)** stands as a metric designed to arm policymakers and business leaders with a numerical barometer that merges the realms of global trade and geopolitical dynamics. This measure seeks to quantify the level of change in global risk and instability from one year to the next, producing a global risk index that can be compared to patterns in international trade. While GATRI is not causally mapped to trade outcomes, it is overlaid with trade data to explore correlations and contextualize potential impacts. Launched with a baseline score for 2024 of 100, GATRI harnesses open-source data across economic, military, and diplomatic fields to provide an annual snapshot that reflects the state of geopolitical stability and its impact on international trade.

This 2026 release extends the GATRI series through 2025, the first complete-data refresh since launch. The 2024 baseline remains fixed at 100; the 2019–2023 historical series is recomputed against the updated seven-year reference window. Two methodological refinements accompany this release: (i) the aggregate GATRI score is now explicitly anchored at 2024 = 100 (see §4.3), and (ii) a soft-clip tail compression has been applied to all 13 indicators so that exceptional outlier years do not dominate the composite score (see §4.6). The 2025 GATRI score lands at 99.4, marginally below the 2024 baseline, with internal composition shifts described in §5.

GATRI is tailored for policymakers and business executives who need a quick, reliable reference to assess the impact of geopolitical changes on trade opportunities and risks. By delivering a single, digestible figure, GATRI serves as new tool in strategic decision-making, helping users navigate the complexities of international markets influenced by geopolitical shifts.

The index is built on a foundation of transparency and accessibility, using only open-source data to ensure high standards of data integrity and non-partisanship. This approach allows users not only to trust the reliability of the data but also to verify it independently. Each year, GATRI compiles global data

that tracks economic performances, military developments, and diplomatic activities to offer a holistic view of the geopolitical landscape.

While GATRI presents a singular value annually, its true value lies in its simplicity provided by the underlying data scores. This design enables GATRI to function both as a quick reference and a more detailed analytical tool, meeting the diverse needs of various stakeholders. Reflecting a commitment to informed global discourse, GATRI is freely accessible to the public. This openness ensures that a broad spectrum of stakeholders, from government officials to corporate strategists, can leverage the insights GATRI provides.

This report is structured to guide the reader from conceptual foundations to practical application, offering both a high-level overview and technical insights.

Following the introduction, chapter 2 provides the conceptual foundation of the index. It introduces and differentiates the four central constructs – geopolitical stability, dependency, volatility, and risk – and explains their interrelationship. Each concept is grounded in existing academic and policy literature and linked to observable trends in international affairs. This chapter helps understand how GATRI moves beyond traditional risk and peace indices to offer a dynamic, system-level measure of change over time. A conceptual diagram at the end of the chapter summarises the causal logic and informs the methodological choices that follow.

Chapter 3 presents the indicators and data sources that underpin the index. It is organised by domain – diplomatic, military, and economic – and provides explanation of each indicator: what it measures, why it matters, where the data comes from, and how it is operationalised. This chapter is designed to be both transparent and methodical, helping the reader to understand how abstract concepts are translated into quantifiable variables. A data summary table at the end of the chapter offers an overview of all indicators, their sources, and their relevance to the index.

Chapter 4 is the methodological core of the report. It outlines the three-step process used to calculate the GATRI score, beginning with the computation of volatility at the country level and moving through to global trade-weighted aggregation, domain-level synthesis, and the final composite index. This chapter provides the bridge between conceptual intent and empirical execution, showing how annual volatility in global diplomacy, conflict, and economic dynamic is captured in a single index value.

Chapter 5 presents *the* ***results across the 2019–2025 period*** and offers descriptive insights into the systemic trends identified by GATRI. Rather than simply displaying data in the tool, this chapter contextualises the results with geopolitical interpretation – highlighting, for instance, the divergence in UN speech sentiment post-2022, or the systemic implications of rising conflict intensity and interest rates. Results are presented at both the indicator and domain levels, allowing readers to understand not only the headline volatility score but also the underlying drivers of change across dimensions.

Chapter 6 reflects on the limitations of the current methodology and propose avenues for refinement. Topics will include data gaps, model assumptions, outlier sensitivity, and the potential incorporation of additional domains or higher-frequency data in future iterations. This chapter will ensure that GATRI remains open to scrutiny and iterative development, aligning with its core principles of transparency, accessibility, and analytical utility.

Taken together, the report is designed to move from why volatility matters, to what it looks like, to how it is measured. Readers are encouraged to follow this flow sequentially for a complete understanding, but each chapter also stands on its own as a reference point. Whether the reader's focus is conceptual

clarity, methodological rigour, or empirical insight, the structure of the report is intended to support a cumulative and coherent reading experience.

2. Conceptual Framework

The Geopolitical Annual Trade Risk Index (GATRI) aims to provide a nuanced measure of the global geopolitical environment, focusing specifically on volatility alongside stability, risk and dependency. Designing such an index benefits significantly from understanding previous attempts to quantify related geopolitical concepts. While many indices have focused on levels of risk or instability, fewer have explicitly tackled volatility.

This chapter reviews the core concepts causally interrelated with geopolitical volatility – namely Geopolitical (In)Stability, Geopolitical Risk, and Geopolitical Dependency, – examining their definitions, prior measurement approaches, and their specific applications within the GATRI framework. By building on this foundation, GATRI seeks to offer a transparent, and policy-relevant tool for relating various geopolitical dynamics to trade.

2.1. Geopolitical Stability

2.1.1. Definition

Geopolitical Stability "signifies the existence of a predictable and relatively conflict-free system of international relations, one characterized by the acceptance of established protocols, active engagement in diplomacy, and mechanisms designed for conflict resolution rooted in international laws and competition".[1] Such stability is often characterised by a balance of power between states that ensures that conflict does not occur and no actor is able to act unilaterally to change the system.

By contrast, a situation of geopolitical instability is characterised by the breakdown of international norms and patterns of predictable behaviour, leading to increased conflict and competition over resources or territory.[2] Often such instability emerges from factors such as shifts in the global balance of power between great powers, increased resource scarcity, clashes over ideological outlooks, territorial disputes, and increasing influence of non-state actors on the world stage. There is a frequent distinction made between "positive peace" and "negative peace" understandings of geopolitical stability, with the latter denoting simply the lack of war and violence, and the former a situation of good governance, economic prosperity, human rights, positive diplomatic relations, an open information environment, and relative resource equity.[3] Empirical measures of stability sometimes eschew "positive peace" concepts in favour of purely negative measures of peace, though more comprehensive indices embrace the latter as a more useful concept at a macro level for understanding the drivers of (in)stability.

[1] Sustainability Directory. 'Geopolitical Stability'. February 2025. https://energy.sustainability-directory.com/term/geopolitical-stability/.
[2] Sustainability Directory. 'Geopolitical Instability', February 2025. https://pollution.sustainability-directory.com/term/geopolitical-instability/.
[3] Livecchi, Cris, Leanne Sulewski, and John A. Dutton. 'Peace Defined'. Penn State College of Earth and Mineral Sciences. Accessed 29 April 2025. https://www.e-education.psu.edu/geog571/node/499.

2.1.2. **Measurements**

Most current approaches measure stability at the state level before potential aggregation. These methodologies combine quantitative data (indicative of peace/stability) and qualitative expert assessments to capture complexity.

- **World Bank Political Stability and Absence of Violence/Terrorism:** This measure captures perceptions of the likelihood of government destabilization through unconstitutional or violent means. It relies heavily on collating survey data (capturing subjective perceptions) related to security risk, ethnic tensions, armed conflict, and social unrest, aligning more with a "negative peace" concept. [4]
- **Fragile States Index (FSI):** Developed by The Fund for Peace, the FSI uses 12 indicators across Cohesion, Economic, Political, and Social categories (e.g., Security Apparatus, Economic Decline, State Legitimacy, Demographic Pressures). [5] It employs a triangulated methodology combining quantitative data, qualitative review by social scientists, and content analysis (analysing media for indicator saliency).
- **Global Peace Index (GPI):** From the Institute for Economics and Peace, the GPI is a measure combining quantitative data and qualitative expert assessments. [6] It scores countries based on three domains: Ongoing Domestic and International Conflict, Societal Safety and Security, and Militarisation. Indicators include conflict deaths, political instability, homicide rates, military expenditure, and weapons trade. The GPI 2024 report, for instance, noted a deterioration in global peacefulness, highlighting 56 active conflicts worldwide – the highest number since WWII, indicating rising instability.

Geopolitical stability is a foundational concept for GATRI. Reflecting the broad scope seen in existing indices, GATRI adopts a macro-level perspective. It measures stability by incorporating international data on political and military conflicts, casualties, diplomatic agreements, and relevant geopolitical economic characteristics (like trade patterns indicative of cooperation). GATRI provides an annual stability score, establishing a baseline against which volatility and risk can be assessed. A year with a lower absolute level of military conflict and strong diplomatic and economic relations would score high on stability, while a year marked by a high absolute level of these measures would score low. This stability component helps contextualize the index's risk findings.

2.2. **Geopolitical Dependency**

2.2.1. **Definition**

Geopolitical Dependency describes a condition where a nation's critical needs or interests (e.g., energy, key commodities, technology, finance, security) are heavily reliant on external states or actors.[7] This reliance implies vulnerability: if the supplying entity alters its policy (e.g., imposes export controls, changes alliances) or faces a crisis, the dependent state may struggle to meet its needs, potentially constraining its strategic autonomy, or causing second-order destabilising effects. It's a state-level

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[4] Kaufmann C., Mastruzzi, Massimo Daniel, Kraay, Aart, 'The Worldwide Governance Indicators : Methodology and Analytical Issues', Text/HTML, World Bank, accessed 29 April 2025, https://documents.worldbank.org/en/publication/documents-reports/documentdetail/en/630421468336563314. Institute for Economics & Peace. (2024, June). *Global Peace Index 2024*. https://www.economicsandpeace.org/global-peace-index/

[5] 'Fragile States Index Methodology', Fragile States Index, 2017, https://fragilestatesindex.org/methodology/.

[6] Institute for Economics & Peace. (2024, June). *Global Peace Index 2024*. https://www.economicsandpeace.org/global-peace-index/

[7] Sustainability Directory. (2025a, February). *Geopolitical dependencies*. https://energy.sustainability-directory.com/term/geopolitical-dependencies/

vulnerability arising from external reliance, distinct from firm-level interdependencies. Europe's reliance on Russian gas prior to the Ukraine war is a prime example.

Geopolitical dependence can act as a mechanism both magnifying the size of geopolitical instability and spreading it across the global system.[8] Countries with high levels of bilateral trade and geographic proximity with a geopolitically unstable country themselves will experience higher levels of geopolitical instability. This is particularly true if the instability "transmitting" country is large. At the level of uncertainty/volatility, Ahir, Bloom, and Fuceri find that uncertainty in economically systemic countries, especially the US and UK, has spillover effects whereby uncertainty in these economies significantly increases uncertainty across the globe.[9] For both individual countries and the global system instability is likely to have spillover effects.

2.2.2. **Measurements**

Measuring dependency often involves quantifying reliance and exposure, primarily using trade and economic data.

- **Trade dependence indicators:** Basic metrics include import dependence ratios (share of consumption met by imports) and bilateral trade shares (share of total trade with a specific partner).[10] For example, calculating the percentage of a critical mineral imported from a single country. Albert Hirschman's work emphasised trade concentration and the lack of alternative suppliers as key factors.
- **Concentration and diversification indexes:** The Herfindahl–Hirschman Index (HHI), typically used for market concentration, can measure the concentration of a country's import sources for specific goods.[11] A high HHI indicates reliance on few suppliers (higher dependency risk), while a low HHI signifies diversification (lower risk). The European Commission used this approach to identify strategic dependencies based on import concentration and the product's importance.[12]

Each country's contribution to geopolitical trade risk is shaped by its role within the global trade system. GATRI accounts for this by including variables – such as tariffs – according to a country's share in global trade. Geopolitical dependency serves as a transmission channel and amplifier: countries less integrated into the system (via high imports, exports, or both) cause less intense external shocks and thus export less increases in risk and instability. Conversely, countries with larger trade volumes exert stronger destabilising effects, and are accordingly weighted more heavily in the model.

[8] Faruk Balli et al., 'Geopolitical Risk Spillovers and Its Determinants', *The Annals of Regional Science* 68, no. 2 (1 April 2022): 463–500, https://doi.org/10.1007/s00168-021-01081-y.
[9] Hites Ahir, Nicholas Bloom, and Davide Furceri, 'The World Uncertainty Index', Working Paper, Working Paper Series (National Bureau of Economic Research, February 2022), https://doi.org/10.3386/w29763. pg. 14-17
[10] Gartzke, E., & Li, Q. (2003). Measure for measure: Concept operationalization and the trade interdependence: Conflict debate. *Journal of Peace Research*, *40*(5), 553–571. https://doi.org/10.1177/00223433030405004
[11] Garcia, W. C., & Ho, V. (2025). External Vulnerability Index: A tool to assess trade weaknesses. *Intereconomics: Review of European Economic Policy*, *60*(1), 40–45. https://doi.org/10.2478/ie-2025-0008
[12] Vicard, V., & Wibaux, P. (2023, June). *EU strategic dependencies: A long view* (CEPII Policy Brief No. 2023-41). CEPII. https://www.cepii.fr/PDF_PUB/pb/2023/pb2023-41.pdf

2.3. Geopolitical Volatility

2.3.1. Definition

Geopolitical Volatility, also known as geopolitical uncertainty, refers to the *degree of sudden, unpredictable change* and fluctuation in the international political environment.[13] This concept captures the variability and instability in relations between states, such as abrupt shifts in alliances, conflict dynamics, or diplomatic alignments. Crucially, volatility focuses on the *rate and unpredictability of change*, regardless of whether the situation is inherently "good" or "bad." Economic actors have a significant capacity to adapt to adverse geopolitical conditions if they are predictable and economic decisions are largely made based on reasonable expectations about the future. However, under high volatility, economic actors find it difficult to predict conditions and plan around them. This entails negative poor levels of effectiveness and timeliness in economic decision making. Thus, volatility imposes distinct costs over and above the costs imposed by geopolitical instability itself.[14] Past a certain level of volatility or uncertainty economic confidence can degrade, causing a lack of investment, and further uncertainty in a self-reinforcing cycle.[15] As a result geopolitical volatility is just as important as risk or stability despite garnering lower levels of attention in previous indices.

Volatility is distinct from stability in this index's conceptualisation in that stability assesses the current conditions of our key indicators , while volatility measures the *frequency and magnitude of fluctuations* or surprises in level of geopolitical stability.. A high-instability environment can have low volatility if the level of instability is changing in a predictable manner. Conversely, a situation might be volatile (e.g., rapid, peaceful government changes or the signing of several peace treaties in long-running conflicts) without necessarily implying worse absolute levels of geopolitical stability.

2.3.2. Measurements

There are broadly three main methods to gauge volatility/uncertainty. The first is through the study of financial markets, the second uses survey data explicitly asking questions about levels of uncertainty, and the third involves quantitative content analysis of newspapers, social media, or official communications.

- **Diplomatic Volatility:** Adarkwah et al. measure volatility through the instability of political affinity between countries, quantified by fluctuations (e.g., standard deviation) in UN General Assembly voting patterns and treaty alignments over time.[16]
- **Quantitative Content Analysis:** The World Uncertainty Index seeks to capture global uncertainty via the analysis of Economist Intelligence Unit's (EIU) country reports for 143 countries on quarterly basis between 1952 and today. It generates its results by counting the number of times "uncertainty" and its synonyms are mentioned in said reports per thousand words.[17]
- **Event Frequency and Severity:** Tracking the number and types of significant geopolitical events (e.g., conflicts, coups, major sanctions, diplomatic crises) over a defined period. GATRI

[13] Adarkwah, G. K., Dorobantu, S., Sabel, C. A., & Zilja, F. (2024). Geopolitical volatility and subsidiary investments. *Strategic Management Journal*, *45*(11), 2275–2306. https://doi.org/10.1002/smj.3631;
[14] Adarkwah, G. K., Dorobantu, S., Sabel, C. A., & Zilja, F. (2024). Geopolitical volatility and subsidiary investments. *Strategic Management Journal*, *45*(11), 2275–2306. https://doi.org/10.1002/smj.3631 pg. 2282-2281
[15] Nicholas Bloom, 'Understanding and Measuring Uncertainty | Econofact', 15 March 2023, https://econofact.org/understanding-and-measuring-uncertainty.
[16] Adarkwah, G. K., Dorobantu, S., Sabel, C. A., & Zilja, F. (2024). Geopolitical volatility and subsidiary investments. *Strategic Management Journal*, *45*(11), 2275–2306. https://doi.org/10.1002/smj.3631
[17] Hites Ahir, Nicholas Bloom, and Davide Furceri, 'The World Uncertainty Index', Working Paper, Working Paper Series (National Bureau of Economic Research, February 2022), https://doi.org/10.3386/w29763.

compiles this information into a volatility score based on raw event frequency and categorical impact, without applying weighted severity measures. Historical examples of automated event classification include the now-terminated POLECAT project, which used the PLOVER ontology to code events such as military threats, diplomatic escalations, or economic coercion from open-source reporting.[18] While POLECAT is no longer active, its structured approach to geopolitical event coding provides a conceptual foundation. In addition, live databases like ACLED (Armed Conflict Location & Event Data Project) offer granular and frequently updated data on political violence and protest activity, serving as a vital source for GATRI's event-tracking framework.[19]

- **Volatility of Risk/Stability Indices:** Calculating the statistical volatility (e.g., standard deviation) of higher-frequency indices like the monthly GPR index by Caldara and Iacoviello within a given year can be used as a measure of volatility.[20] High fluctuation from one month to the next indicates high volatility.
- **Econometric Models:** Advanced models, like Robert Engle's work, analyse financial market volatility (e.g., in country ETFs) to isolate the component driven by geopolitical events, identifying specific dates of major shocks.[21] Since asset prices reflect expert's opinions about the future backed by their economic interest, they can be taken as an indicator of expert opinion about future (geopolitical) volatility.
- **Proprietary Indices:** Some firms (e.g., previously Predata) developed indices using digital signals (social media, web searches) to measure real-time risk oscillations, essentially capturing short-term volatility.

GATRI emphasises volatility, drawing on approaches such as Adarkwah et al. but adopting a broader scope. Volatility is often measured as the standard deviation of each variable over time. This captures the degree of fluctuation within domains such as diplomacy, military activity (e.g., conflict events), and economic measures (e.g., tariffs), quantifying the turbulence and unpredictability of the geopolitical environment. This focus is critical because volatility itself drives reactive decision-making by governments and industries, forcing sub-optimal adaptation. As a result, it is a key component of our overarching "geopolitical risk" concept that GATRI measures.

2.4. Geopolitical Risk

2.4.1. Definition

In the literature, Geopolitical Risk can refer either to the *possibility* or threat that political events, decisions, or conditions (both intra- and interstate) will disrupt the stability of states or the international system, producing adverse outcomes or the actual presence of geopolitical phenomena causing instability.[22] In the former case approaches to measurement will often use expert assessments of

[18] Andrew Halterman et al., 'PLOVER and POLECAT: A New Political Event Ontology and Dataset' (SocArXiv, April 2023), https://doi.org/10.31235/osf.io/rm5dw.

[19] Clionadh Raleigh, Roudabeh Kishi, and Andrew Linke, 'Political Instability Patterns Are Obscured by Conflict Dataset Scope Conditions, Sources, and Coding Choices', *Humanities and Social Sciences Communications* 10, no. 1 (25 February 2023): 74, https://doi.org/10.1057/s41599-023-01559-4.

[20] Caldara, D., & Iacoviello, M. (2022). Measuring geopolitical risk. *American Economic Review*, *112*(4), 1194–1225. https://doi.org/10.1257/aer.20191823.

[21] Robert F. Engle, Eric Ghysels, and Bumjean Sohn, "Stock Market Volatility and Macroeconomic Fundamentals," *The Review of Economics and Statistics* 95, no. 3 (July 2013): 776–797, https://doi.org/10.1162/REST_a_00300.

[22] Xu Gong and Jun Xu, 'Geopolitical Risk and Dynamic Connectedness between Commodity Markets', *Energy Economics* 110 (1 June 2022): 106028, https://doi.org/10.1016/j.eneco.2022.106028. pg. 4;

imminent risks, as with PRS' International Country Risk Guide[23] or attempt to quantitatively measure leading risk indicators as with the Blackrock Geopolitical Risk Indicator.[24] Less predictive approaches are more similar to measures of geopolitical stability, though with a greater emphasis on change over time and the downstream economic effects of geopolitical events. For example, the approach of De Vila, who provides a multi-level framework for business executives to assess geopolitical risks and their company's exposure to said risks in the present.[25] GATRI falls within the second camp, with a quantitative approach to assessing actual risk.

IN literature, risk has also be conceptualised as either being "perceived" in the case of future risk and "actual" in the case of present/actual risk. In an influential paper Caldara and Iacoviello define geopolitical risk as "the threat, realization, and escalation of adverse events associated with wars, terrorism, and tensions among states and political actors that affect the peaceful course of international relations".[26] This definition captures both dimensions of geopolitical risk, which is inevitable for a study that uses quantitative content analysis of news sources. Such an approach will pick up both dimensions in a comparable manner as words related to political risk will appear in news sources when speaking about both actual existing, and potential events. This is something that the two authors have recognised as a potential limitation of GPR.[27] Given that the GATRI Index obtains its values based on measures of empirical phenomena rather than texts, its approach differs somewhat while maintaining a similar conception of geopolitical risk.

Therefore, in the GATRI index, geopolitical risk is conceptualised as a backward-looking measure that combines the current level of instability and dependency with volatility over time. Higher absolute values of instability, when coupled with greater volatility, indicate elevated geopolitical risk for trade. As a result, concepts previously detailed in this section are conceived as being subcomponents of the overarching concept of political risk that we derive in our indices. Consequently, "perceived" risk is outside of our model in favour of describing "actual" risk at particular points in time. However, since current risk is causally related to actual increases or decreases in future risk and perceptions of future risk, "perceived" risk can be inferred from our model to some extent. Many variables implicitly reflect both current instability and potential future deterioration in this manner.

For example, some variables can also be directly self-reinforcing, in 1930 the imposition of tariffs by the US on its trading partners provoked tit-for-tat responses in following years, making deteriorating trade an indicator both of current "actual" risk and predictive of future risk.[28] Equally, internal conflict in one country more than doubles the likelihood of conflict occurring in a neighbouring country.[29] As a result, while this index does not predict future instability the description of current risk is also a partial descriptor of both future risk and risk perceptions. This index thus has added value in being able to

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[23] PRS Group. (2022). *The International Country Risk Guide methodology*. https://www.prsgroup.com/wp-content/uploads/2022/04/ICRG-Method.pdf

[24] BlackRock Investment Institute, "Geopolitical Risk Dashboard," BlackRock, accessed May 1, 2025, https://www.blackrock.com/corporate/insights/blackrock-investment-institute/interactive-charts/geopolitical-risk-dashboard.

[25] Maria A. De Villa, 'Assessing Geopolitical Risk: A Multi-Level Approach for Top Managers of Multinationals', *AIB Insights* 23, no. 1 (17 January 2023), https://doi.org/10.46697/001c.67875.

[26] Caldara, D., & Iacoviello, M. (2022). Measuring geopolitical risk. *American Economic Review*, *112*(4), 1194–1225. https://doi.org/10.1257/aer.20191823.

[27] Caldara, D., & Iacoviello, M. (2022). Measuring geopolitical risk. *American Economic Review*, *112*(4), 1194–1225. https://doi.org/10.1257/aer.20191823 pg. 8.

[28] Douglas A. Irwin, *Trade Policy Disaster : Lessons From the 1930s*, The Ohlin Lectures (Cambridge, Mass: The MIT Press, 2012), https://search.ebscohost.com/login.aspx?direct=true&db=nlebk&AN=433787&site=ehost-live&scope=site. pg. 1-48.

[29] Halvard Buhaug and Kristian Skrede Gleditsch, 'Contagion or Confusion? Why Conflicts Cluster in Space', *International Studies Quarterly* 52, no. 2 (1 June 2008): 215–33, https://doi.org/10.1111/j.1468-2478.2008.00499.x. pg. 225

clearly separate conditions of geopolitical risk from perceptions of geopolitical risk in a manner unavailable to other measurement approaches.

2.4.2. Measurements

- **Geopolitical Risk Index (GPR):** This influential quantitative approach tallies the frequency of keywords related to geopolitical tensions (e.g., "war," "terrorism") in major English-language newspapers over time. Spikes in the monthly index correlate with major geopolitical events (e.g., Gulf War, 9/11, 2003 Iraq invasion, 2022 Ukraine invasion) and signal heightened global risk perception.[30]
- **International Country Risk Guide (ICRG):** The PRS Group's ICRG includes a political risk component measured at the national level.[31] It uses expert assessments across 12 weighted factors (e.g., Government Stability, Internal/External Conflict, Corruption, Socioeconomic Conditions) and provides risk forecasts under best/worst-case scenarios.
- **WEF Global Risks Report:** This report surveys global experts to assess the likelihood and impact of various risks, including geopolitical ones like interstate conflict, use of WMDs, geoeconomic confrontation, and intrastate violence.[32]
- **Market-Based Indicators:** Financial markets can reflect perceived geopolitical risk. Examples include the BlackRock Geopolitical Risk Indicator (BGRI)[33], which uses asset price changes and media sentiment, or fluctuations in the VIX index or specific commodity prices (like oil) around geopolitical events to measure current market responsiveness to geopolitical risk.[34]

In summary, within the GATRI framework, geopolitical risk is defined as a non-forward-looking measure that reflects disruptions arising from the geopolitical system over the past year(s). It is shaped by the level of geopolitical instability and system dependencies, and further amplified by multi-period volatility. GATRI assesses this risk using inputs from the military (e.g., conflict), economic, and diplomatic domains – combining present instability with recent historical volatility. This approach captures both immediate tensions and the latent potential for adverse developments within the global system.

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[30] Caldara, D., & Iacoviello, M. (2022). Measuring geopolitical risk. *American Economic Review*, *112*(4), 1194–1225. https://doi.org/10.1257/aer.20191823

[31] PRS Group. (2022). *The International Country Risk Guide methodology*. https://www.prsgroup.com/wp-content/uploads/2022/04/ICRG-Method.pdf

[32] Elsner, M., Atkinson, G., & Zahidi, S. (2025, January). *Global risks report 2025*. World Economic Forum. https://www.weforum.org/publications/global-risks-report-2025/

[33] BlackRock Investment Institute, "Geopolitical Risk Dashboard," BlackRock, accessed May 1, 2025, https://www.blackrock.com/corporate/insights/blackrock-investment-institute/interactive-charts/geopolitical-risk-dashboard.

[34] Robert E. Whaley, "Understanding VIX," *Journal of Portfolio Management* 35, no. 3 (Spring 2009): 12–17, https://www.google.com/search?q=https://doi.org/10.3905/JPM.2009.35.3.012.

2.5. Conceptual Summary

Understanding the contemporary geopolitical landscape requires acknowledging the distinct roles and interplay of stability, dependency, predictive risk, and volatility. GATRI is designed to synthesize these elements into a cohesive framework, moving beyond single-dimension indices. Our core concept of geopolitical risk is both a product of geopolitical (in)stability and volatility at a given point and a cause of future. How those concepts relate to each other in GATRI is visualised in figure 1.

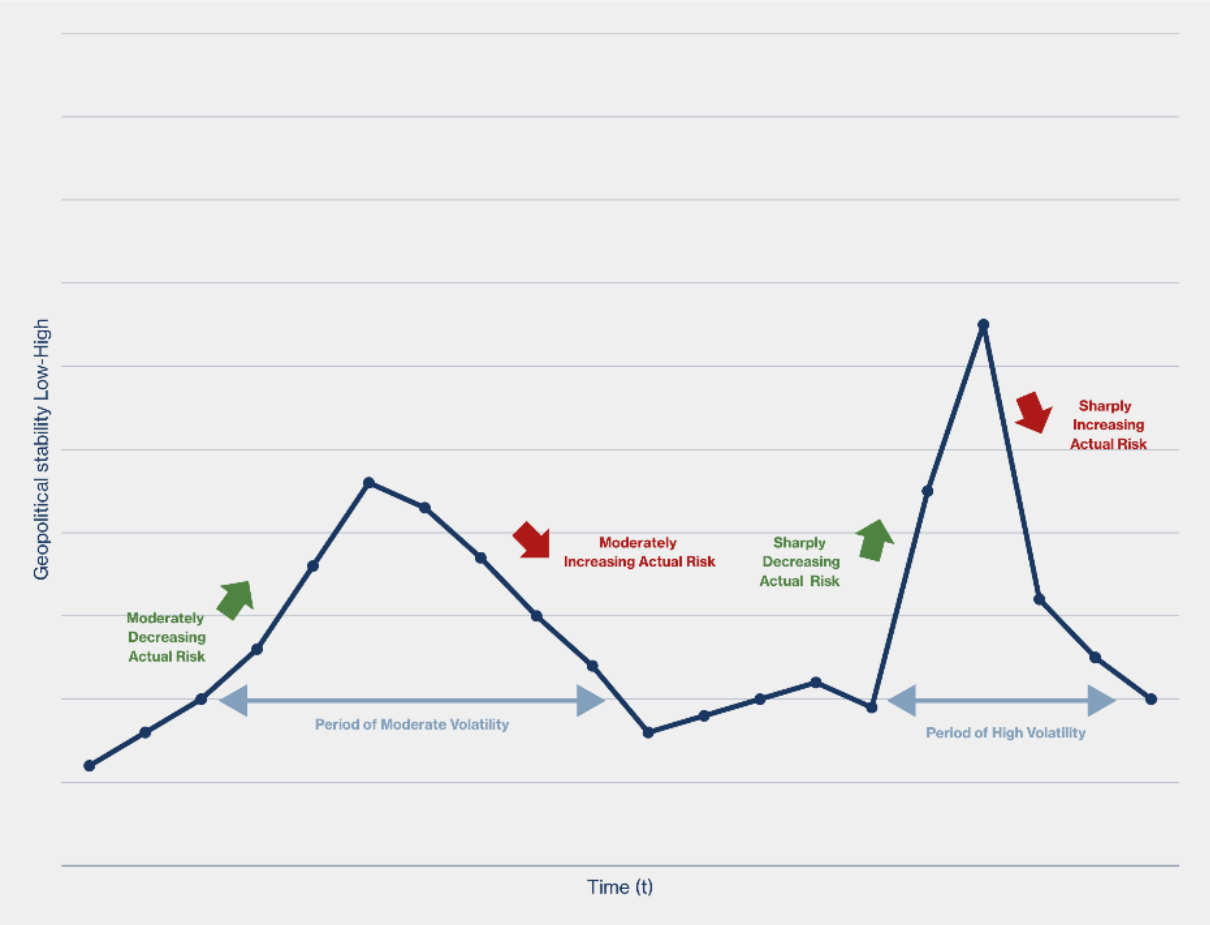

Figure 1 - Conceptual Overview GATRI

Volatility, or the magnitude of the change in geopolitical (in)stability, is shown when the differences in levels of stability over the years are large. This is independent of whether the absolute level of stability is high or low. Volatility functions as a penalty term: greater volatility increases geopolitical risk, while lower volatility reduces it. The GATRI index is based on both absolute level of instability and volatility for each of our thirteen measures before they are aggregated to the domain and overall index levels. Thus, this chart visualises measurement made for each individual indicator, not the overall index. A detailed explanation of how this is operationalised can be found in chapter 4. The table below summarizes the conceptual distinctions:

Concept	What It Captures	How It's Measured (Examples)	Role in GATRI
Geopolitical Stability	The current state of peace, order, and predictability in international relations.	Composite indices (GPI, FSI), conflict counts, governance indicators (World Bank), diplomatic indicators.	Provides the baseline state of the international system (macro-level score).
Geopolitical Dependency	Reliance on external actors for critical needs; vulnerability to external shocks.	Trade dependence ratios, import/export concentration (HHI), identification of strategic dependencies (critical minerals, tech).	Dependency is integrated into the model through the greater weighting given to higher trade volume countries.
Geopolitical Volatility	Variability, unpredictability, and frequency of swings in geopolitical conditions.	Event frequency/severity tracking, volatility of risk indices (std. dev. of GPR), diplomatic volatility (UN voting), econometric models (Engle).	GATRI's core focus: measures the turbulence of geopolitical stability.
Geopolitical Risk	The presence of disruptive geopolitical phenomena.	News-based indices (GPR), expert risk ratings (ICRG, WEF), market signals (BGRI, VIX).	GATRI's core focus: a combination of geopolitical stability, accounted for geopolitical dependency, and geopolitical volatility.

GATRI synthesises geopolitical stability, dependency, and volatility into a single composite indicator of geopolitical risk. This integration is guided by key lessons learned from previous attempts at geopolitical measurement, shaping GATRI's core methodological principles:

- **Global system perspective:** The index primarily assesses yearly risk combined with volatility at the systemic level, analysing how global interactions, major power dynamics, and international norms are changing. While informed by state-level events, GATRI's core focus remains on the stability and predictability of the overall international environment rather than changes solely within individual states.
- **Focus on annual volatility trends:** By aggregating underlying data and analysing changes on a yearly basis, GATRI smooths out short-term fluctuations. This intentional focus allows the index to identify significant, persistent shifts in the overall geopolitical volatility landscape, prioritising structural trends over transient shocks and focusing on the 'grand scheme of things'.
- **Domain specific change:** Moving beyond static stability rankings, GATRI emphasises *volatility* – the unexpected shifts, surprises, and turbulence in the geopolitical environment. By tracking changes in volatility over time and across dimensions, the index highlights which domain (e.g. diplomatic, economic and military) is driving changes in global stability offering critical insights for decision-makers.
- **Transparency and updateability:** The construction of GATRI, including its components and weighting, will be transparent. Like the most effective indices, it will be updated yearly and accessible to the public, providing timely information relevant to policy and industry needs.

3. Indicators and data

This chapter details the practical construction of GATRI, outlining the specific indicators and data sources chosen to measure systemic annual geopolitical volatility and its relation to trade. Building on the conceptual foundation in the previous chapter, we first revisit the precise definition of the GATRI construct in Section 1.1, clarifying what the index captures. The subsequent sections then systematically explore the carefully selected indicators within the three core domains used to quantify this construct being Diplomatic (Section 3.2), Military (Section 3.3), and Economic (Section 3.4).

Within each domain's section, individual indicators are presented with consistent details covering their data source, time coverage, relevance to geopolitical risk and trade, and the specific measurement methodology employed. This structured approach serves as a transparent methodological reference, allowing readers to understand precisely how GATRI translates the complex concept of geopolitical risk based on stability and volatility into a quantifiable annual index based on verifiable data points.

3.1. Concept to Construct

Building on its conceptual foundations, GATRI's core purpose is to quantify systemic **annual geopolitical risk** – defined as *instability, adjusted for dependency, and combined with multi-year volatility within the international system.* Moving beyond static assessments of stability, GATRI focuses on capturing the turbulence and fluctuations that characterise the contemporary global environment, viewed through a systemic lens and emphasising sustained annual trends.

GATRI achieves this by synthesizing a wide array of open-source data to produce an annual index that reflects the geopolitical risk landscape – separate from, but designed to be compared against, patterns in international trade. To construct this index, GATRI integrates indicators across three core domains: diplomatic, military, and economic. While the index does not model causal relationships with trade, it provides a contextual overlay to help interpret how shifts in global risk conditions may align with developments in global commerce.

- **Diplomatic Domain:** Indicators within this sphere gauge the health and predictability of international relations. Data on diplomatic engagement, alignment shifts (e.g., voting patterns) and speech behaviour provide insights into the underlying stability and cooperative capacity of the system. Significant changes here reflect diplomatic volatility and shifting risk perceptions.

- **Military Domain:** This domain addresses the hard security aspects of the geopolitical environment. Indicators track conflict and their intensity. Volatility in this domain could have immediate consequences for trade routes, regional security, and global market confidence.

- **Economic Domain:** Indicators here capture the direct economic manifestations of geopolitical conditions. Data on trade disruptions, sanction events, investment climate changes, and ease of transport impacts on global commerce and economic resilience.

3.2. Diplomatic data

In the domain of diplomacy, GATRI assesses several aspects. The voting behaviour of nations at the United Nations on issues such as economic sanctions, nuclear proliferation, human rights, and regional conflicts among others offers insights into global political alignments and priorities. Additionally, the analysis of speech patterns at the UN reveals the tones of diplomatic discourse – positive, neutral, or negative – that signify underlying relationships and tensions between countries. The frequency and nature of state visits also serve as indicators of the intensity of diplomatic engagements and are often precursors to bilateral agreements or collaborations.

3.2.1. UN Voting Alignment

Domain: Diplomatic
Source: UNVD[35]
Dates: 2019-2025, yearly aggregated

Voting alignment in the United Nations General Assembly (UNGA) offers insight into the level of consensus or division among member states on international issues. High alignment typically reflects broad agreement, often signalling geopolitical stability or shared interests. In contrast, low alignment may indicate emerging fractures in global cooperation, diverging national priorities, or intensifying political tensions. Tracking these shifts over time helps capture patterns of geopolitical risk, particularly as alliances evolve or contestations increase in response to global events.

Voting alignment is measured by looking at how evenly or unevenly countries vote "yes," "no," or "abstain" on a given resolution. If nearly everyone votes the same way, alignment is high. If votes are more evenly spread across the three options, alignment is low. The idea is to measure how far the actual voting outcome deviates from a situation where all three options receive exactly one-third (⅓) of the votes.[36] With lower deviation indicating higher dealignment and higher deviation lower dealignment.

Let p_{yes}, p_{no}, and $p_{abstain}$ represent the proportion of total votes in each category. The alignment score is calculated as follows:

1. Compute the total deviation from an even split:

$$D = \frac{1}{2}\left(\left|p_{yes} - \frac{1}{3}\right| + \left|p_{no} - \frac{1}{3}\right| + \left|p_{abstain} - \frac{1}{3}\right|\right)$$

2. Normalise this deviation to a 0–1 scale, where 0 indicates a perfect split and 1 indicates complete alignment in one category:

$$\text{Vote Alignment} = \frac{D}{\frac{4}{3}}$$

This score provides a standardised measure of how concentrated or divided UN member states were in their voting on each resolution. The score ranges from 0 – indicating a perfectly even split (i.e. most disagreement or diversity) – to 1, which reflects total alignment in one category (e.g., all "yes" votes).

[35] Erik Voeten, Anton Strezhnev, and Michael Bailey, 'United Nations General Assembly Voting Data', ed. Erik Voeten (Harvard Dataverse, 2009), https://doi.org/10.7910/DVN/LEJUQZ.
[36] Rijul Magu and Gonzalo Mateos, 'United Nations General Assembly Vote Similarity Networks', in *Complex Networks & Their Applications VI* (International Conference on Complex Networks and their Applications, Springer, Cham, 2018), 1174–83, https://doi.org/10.1007/978-3-319-72150-7_95.

3.2.2. **UN Speech Sentiment**

Domain: Diplomatic

Source: UNGDC[37]

Dates: 2019-2025, yearly aggregated. Since the General Assembly opens in September with the General debate, we use those speeches by Heads of State as our text input. So, the general debate in September of 2024 is counted for the year 2024. Incorporating speech sentiment data from the UN General debate offers a valuable lens through which to assess the tone of international diplomacy, complementing formal voting behaviour. While votes reflect official stances on resolutions, the language used in speeches captures broader rhetorical signals, including expressions of support, criticism, or concern directed at other states. Shifts in sentiment over time can indicate emerging tensions, improving relations, or changing diplomatic priorities – factors that often precede or accompany changes in geopolitical alignment. Since geopolitical risk can directly affect trade flows, investment patterns, and multilateral cooperation, sentiment data provides an early signal of conditions that may influence the global trade environment.

In simple terms, sentiment is measured by reading each speech and counting how often countries are mentioned in a positive or negative way. These counts are then used to calculate a score: more positive mentions raise the score; more negative mentions lower it. If the score is close to zero, the overall tone is neutral.

Formally, the **General Sentiment Index (GSI)** is calculated as:

$$GSI = \frac{Positive\ Mentions - Negative\ Mentions}{Total\ Mentions}$$

Where:

- *Positive Mentions* are statements expressing approval or praise towards other states.
- *Negative Mentions* are critical or hostile statements.
- *Total Mentions* includes positive, negative, and neutral references.

Sentiments are determined by processing speeches sentence by sentence using Twitter-roBERTa-base, a sentiment analysis model developed by Cardiff NLP. In parallel, SpaCy's GPE (Geopolitical Entity) detection model identifies which sentences refer to states. By combining these outputs, the sentiment associated with each state mention is extracted. This approach captures general tone rather than precise opinion and is subject to occasional misclassification. For more details on the sentiment analysis, the reader is referred to the GINA diplomatic dashboard of HCSS.

3.2.3. **Number of State Visits**

Domain: Diplomatic

Source: Jonathan et al. (2025) and COLT[38]

Dates: 2019–2025, yearly aggregated

Relevance: State visits by heads of government and state (HOGS) represent a direct and visible form of diplomatic engagement, offering a valuable lens through which to observe shifts in international priorities and alignments. The Country and Organizational Leader Travel (COLT) dataset captures this

[37] Slava Jankin, Alexander Baturo, and Niheer Dasandi, 'United Nations General Debate Corpus 1946-2024', ed. Slava Jankin (Harvard Dataverse, 2017), https://doi.org/10.7910/DVN/0TJX8Y.

[38] Jonathan D. Moyer et al., 'Country and Organization Leader Travel (COLT)' (Harvard Dataverse, 2025), https://doi.org/10.7910/DVN/HJK7DN.;
Jonathan D Moyer et al., 'When Heads of Government and State (HOGS) Fly: Introducing the Country and Organizational Leader Travel (COLT) Dataset Measuring Foreign Travel by HOGS', *International Studies Quarterly* 69, no. 2 (1 June 2025): sqaf013, https://doi.org/10.1093/isq/sqaf013.

form of high-level interaction at a global scale, providing a novel empirical basis to assess geopolitical volatility. Since such visits are often linked to trade negotiations, conflict mediation, alliance signalling, and institutional cooperation, fluctuations in their frequency, direction, or intensity can indicate emerging political realignments or strategic interests. As a result, this dataset enables a richer understanding of how evolving diplomatic patterns may influence, or be driven by, changes in global trade dynamics.

Measuring Network Density from State Visits: In simple terms, network density is a way of measuring how connected a group of countries is based on the foreign visits between their leaders. If many leaders visit each other, the network is dense, meaning there is frequent diplomatic engagement. If few visits occur, the network is sparse, indicating weaker or less active diplomatic ties.

Formally, density in this context is calculated using a standard formula from network theory:

$$Density = \frac{Number\ of\ edges}{Number\ of\ possible\ edges}$$

Here, each *edge* represents at least one state visit between two countries in a given period, forming a connection in the network. The *number of possible edges* is determined by the total number of country pairs that could exist in the dataset. This approach quantifies how many of the possible diplomatic ties are actually being used, offering a proxy for the overall level of geopolitical interaction and potentially signalling changes in international engagement or isolation.

3.3. Military data

Turning to military indicators, GATRI incorporates data on conflicts which directly influence regional trade dynamics. Protests and riots are monitored as soft indicators of civil unrest, often precipitating more significant geopolitical shifts that can disrupt economic activities. Explosions, battles, and violence against civilians are quantified to gauge the severity of conflict and instability in regions, which can severely impact trade by disrupting supply chains and increasing the risk to international investments.

3.3.1. Battles

Domain: Military
Source: ACLED[39]
Dates: 2019-2024, yearly aggregated

Relevance: Armed conflict is one of the most direct and disruptive manifestations of geopolitical volatility, with significant implications for global trade. Battles – defined as violent engagements between organised armed groups – can destabilise regions, interrupt supply chains, reduce investor confidence, and prompt the reconfiguration of trade routes and alliances. Tracking the frequency of such events therefore offers a critical indicator of geopolitical instability that can have both immediate and long-term effects on international economic flows. As part of a broader index, the number of battles provides a grounded measure of physical conflict intensity relevant to global market risk assessments.

Measuring Number of Battles: The total number of battles is calculated as the summated number of recorded battle events per year.

[39] Clionadh Raleigh, Roudabeh Kishi, and Andrew Linke, 'Political Instability Patterns Are Obscured by Conflict Dataset Scope Conditions, Sources, and Coding Choices', *Humanities and Social Sciences Communications* 10, no. 1 (25 February 2023): 74, https://doi.org/10.1057/s41599-023-01559-4.

3.3.2. **Protests**

Domain: Military
Source: ACLED[40]
Dates: 2019–2025, yearly aggregated

Relevance: Protests reflect underlying political, social, and economic tensions within states, and when widespread, they can signal domestic instability with potential spillover effects on regional or global trade. Large-scale or sustained protest activity may disrupt production, transport infrastructure, or governance, and can trigger shifts in policy or leadership. As such, protest dynamics offer a complementary indicator of geopolitical risk, particularly in contexts where state-citizen tensions affect international investor sentiment, supply chain reliability, or trade agreements. Including protest frequency in a geopolitical risk index adds a layer of socio-political sensitivity to evolving risks in the global trade environment.

Measuring Number of Protests: The total number of protests is calculated as the summated number of recorded protest events per year.

3.3.3. **Riots**

Domain: Military
Source: ACLED[41]
Dates: 2019–2025, yearly aggregated

Relevance: Riots represent sudden and often intense forms of civil unrest, typically involving spontaneous violence, property damage, and confrontation with authorities. Unlike organised protests, riots can be more unpredictable and disruptive, posing immediate risks to political stability and economic activity. Their occurrence can affect investor confidence, interrupt commercial operations, and provoke government responses that alter trade policies or bilateral relations. As such, the frequency of riots offers a distinct indicator of domestic risk with potential ramifications for global trade flows, especially in politically sensitive or economically integrated regions.

Measuring Number of Riots: The total number of riots is calculated as the summated number of recorded riot events per year.

3.3.4. **Explosions**

Domain: Military
Source: ACLED[42]
Dates: 2019–2025, yearly aggregated

Relevance: Explosions – such as bombings or improvised explosive device (IED) attacks – are a specific form of political violence that often signal heightened security threats, insurgent activity, or targeted attacks on infrastructure. These incidents can disrupt transport networks, damage critical trade facilities, and provoke regional instability. Their presence may also influence diplomatic relations and

[40] Clionadh Raleigh, Roudabeh Kishi, and Andrew Linke, 'Political Instability Patterns Are Obscured by Conflict Dataset Scope Conditions, Sources, and Coding Choices', *Humanities and Social Sciences Communications* 10, no. 1 (25 February 2023): 74, https://doi.org/10.1057/s41599-023-01559-4.
[41] Clionadh Raleigh, Roudabeh Kishi, and Andrew Linke, 'Political Instability Patterns Are Obscured by Conflict Dataset Scope Conditions, Sources, and Coding Choices', *Humanities and Social Sciences Communications* 10, no. 1 (25 February 2023): 74, https://doi.org/10.1057/s41599-023-01559-4.
[42] Clionadh Raleigh, Roudabeh Kishi, and Andrew Linke, 'Political Instability Patterns Are Obscured by Conflict Dataset Scope Conditions, Sources, and Coding Choices', *Humanities and Social Sciences Communications* 10, no. 1 (25 February 2023): 74, https://doi.org/10.1057/s41599-023-01559-4.

trigger shifts in trade patterns due to increased risk or the need for heightened security measures. Including the frequency of explosions in a geopolitical risk index provides a focused measure of security-related disruptions with direct and indirect consequences for international trade.

Measuring Number of Explosions: The total number of explosions is calculated as the summated number of recorded explosion events per year.

3.3.5. Violence Against Civilians

Domain: Military
Source: ACLED[43]
Dates: 2019–2025, yearly aggregated

Relevance: Violence against civilians is a critical indicator of instability, reflecting the breakdown of state authority, the presence of armed groups, or targeted repression. Such incidents can lead to forced displacement, humanitarian crises, and deteriorating governance – all of which undermine local and regional security. In economic terms, violence against civilian populations can disrupt labour markets, reduce productivity, and weaken institutional capacity, thereby affecting trade operations and investor confidence. Tracking this form of violence enhances the sensitivity of a geopolitical risk index to conditions that erode societal stability and economic resilience, with clear implications for global trade dynamics.

Measuring Violence Against Civilians: The total number of incidents is calculated as the summated number of recorded violence against civilians events per year.

3.3.6. Casualties

Domain: Military
Source: ACLED
Dates: 2019–2025, yearly aggregated

Relevance: The number of conflict-related fatalities serves as a direct measure of the human cost and intensity of political violence. High fatality counts often indicate sustained or escalating conflict, with severe implications for governance, economic activity, and regional stability. Such conditions can deter foreign investment, hinder trade infrastructure, and prompt shifts in international diplomatic or economic engagement. As a result, conflict fatalities offer a quantitative indicator of the scale and severity of geopolitical unrest, providing critical context for understanding its potential impact on global trade systems.

Measuring Casualties: The total number of casualties is calculated as the summated number of recorded deaths from the categories battles, protests, riots, explosions, and violence against civilians.

3.4. Economic data

On the economic front, GATRI analyses several critical indicators. Trade interventions such as tariffs, sanctions, and quotas are examined to understand the barriers erected in global trade. Transport costs are also scrutinized; they not only reflect the logistical challenges of international trade but also indicate

[43] Clionadh Raleigh, Roudabeh Kishi, and Andrew Linke, 'Political Instability Patterns Are Obscured by Conflict Dataset Scope Conditions, Sources, and Coding Choices', *Humanities and Social Sciences Communications* 10, no. 1 (25 February 2023): 74, https://doi.org/10.1057/s41599-023-01559-4.

economic barriers that can shift trade balances. Foreign Direct Investment (FDI) flows are pivotal, as they reflect the confidence of businesses in the global market environment, providing a barometer of economic stability and openness. Interest rates are considered too, as they influence international capital flows; turbulent rates may deter investment across borders.

By weaving together these indicators, GATRI offers a comprehensive and robust measure of how geopolitical events shape the landscape of international trade. This conceptual framework not only facilitates the operationalization of GATRI but ensures its strategic relevance in aiding policymakers and business leaders to navigate the complexities of the global market. Through its annual updates, GATRI remains a crucial tool in the arsenal of those making strategic decisions in an interconnected world, where geopolitical and economic landscapes are rapidly evolving.

3.4.1. **Tariffs**

Domain: Economic
Source: WTO Tariff & Trade Data[44]
Dates: 2019–2025, yearly aggregated

Relevance: Tariffs are a central instrument of trade policy and a direct reflection of a country's stance on international economic openness. Changes in tariff levels can signal shifts in political priorities, economic protectionism, or responses to geopolitical tensions such as sanctions, trade disputes, or strategic realignments. As such, tracking tariffs offers a concrete measure of how states adjust their trade relations in the face of evolving geopolitical conditions. Most Favoured Nation (MFN) applied tariffs are particularly suitable for this purpose, as they represent the baseline, non-discriminatory duties imposed on imports from all WTO members in the absence of preferential agreements. Unlike bound tariffs, which are ceilings, or preferential tariffs, which apply only within specific agreements, MFN applied tariffs provide a consistent and general view of a country's actual trade policy, making them the most appropriate for assessing geopolitical risk in relation to global trade dynamics.

Measuring MFN Applied Tariffs: MFN applied tariffs are measured as the actual import duties a country levies on goods from all WTO members, excluding any preferential or special agreements. They are typically reported as ad valorem rates – percentages of the imported good's value – and are collected at the product level based on the Harmonized System (HS) codes. These rates are then averaged across products to provide simple or trade-weighted tariff indicators at national or sectoral levels, with the trade-weighted average being the most appropriate measure, as it reflects the effective tariff burden based on actual import values. This measure captures the real, non-discriminatory tariff regime that a country applies under its WTO obligations. Preferential tariffs apply only to specific blocs, so they can obscure rising geopolitical tensions with non-member countries that are better captured by changes in MFN tariffs, which remain relevant as approximately 80% of global trade still takes place under MFN conditions. To aggregate country tariff data to a global value, we weight each country's tariffs by its share of total global trade, ensuring that countries with lower trade volumes do not exert disproportionate influence on the global measure.

3.4.2. **Transport Costs**

Domain: Economic
Source: BDI[45]
Dates: 2019–2025, yearly aggregated

[44] 'WTO Tariff and Trade Data: Integrated Database and Consolidated Tariff Schedules' (Geneva: World Trade Organisation, May 2025), https://ttd.wto.org/en.
[45] 'Baltic Exchange Dry Index', Trading Economics, May 2025, https://tradingeconomics.com/commodity/baltic.

Relevance: The Baltic Dry Index (BDI) serves as a key real-time indicator of global maritime transportation costs, particularly for bulk commodities such as coal, iron ore, and grains. As these goods form the backbone of many international supply chains, fluctuations in the BDI reflect changes in global trade demand, shipping capacity, and logistical disruptions. In the context of geopolitical volatility, the BDI is especially relevant: conflict, sanctions, or political instability can alter shipping routes, restrict port access, or increase insurance and fuel costs – factors that are quickly absorbed into freight rates and captured by the index. Although a state-of-the-art dataset for transportation costs is available through the UN Trade Global Transport Cost Dataset, it is limited to data up to 2021. Therefore, the BDI is employed as a timely and publicly available alternative to track trade-related transport dynamics in response to evolving geopolitical conditions.

Measuring the Baltic Dry Index: The Baltic Dry Index (BDI) is calculated as a composite of average daily charter rates for major dry bulk shipping vessels. Specifically, it combines timecharter averages from three vessel classes: Capesize (40%), Panamax (30%), and Supramax (30%). These vessel types differ in size and typical cargo, covering a broad segment of global bulk commodity transport. The index is published daily and reflects spot market prices, making it a timely indicator of changes in maritime freight costs driven by supply, demand, and geopolitical conditions. Higher global transportation costs, as indicated by a rising Baltic Dry Index (BDI), may reflect heightened geopolitical risk due to disrupted shipping routes, increased insurance premiums, or uncertainty in key trade corridors.

3.4.3. **Foreign Direct Investment**

Domain: Economic
Source: OECD Foreign Direct Investment[46]
Dates: 2019–2025 Q3, yearly aggregated

Relevance: Foreign Direct Investment (FDI) is a key indicator of international economic integration and long-term investor confidence. It reflects decisions by firms to establish or expand operations abroad, often in sectors directly linked to trade and logistics, such as manufacturing, transport infrastructure, and resource extraction. In the context of geopolitical risk, FDI flows are highly sensitive to changes in political risk, regulatory uncertainty, and diplomatic relations. Rising tensions may deter investment or prompt the reallocation of capital across regions, while periods of stability tend to support deeper economic interdependence. As such, FDI serves as a forward-looking measure of how geopolitical dynamics influence the structure and resilience of global trade networks. While the World Bank Open Data provides a comprehensive global FDI dataset, it is currently only available up to 2023. Therefore, we use the OECD International Direct Investment Statistics, which are available through Q3 2024. Although the OECD dataset does not represent all countries, its member states account for approximately 60% of global trade, making it a strong proxy for tracking trade-sensitive investment behaviour amid geopolitical shifts.

Measuring Foreign Direct Investment (FDI): FDI is measured as the net cross-border investment by entities aiming to establish a lasting interest in enterprises operating in a foreign economy. According to the OECD, this includes equity capital, reinvested earnings, and intra-company debt transactions, as defined under the OECD Benchmark Definition of FDI. The data are reported quarterly and reflect both outward investment flows, typically expressed in current USD. As of 2024, the OECD International Direct Investment Statistics provide data only up to the third quarter. To complete the annual series, we project the fourth quarter of 2024 by applying the average quarterly growth rate of FDI observed

[46] 'FDI in Figures, April 2025', OECD, 29 April 2025, https://www.oecd.org/en/publications/fdi-in-figures-april-2025_d5a76fd0-en/support-materials.html.

between 2024 Q1 and 2024 Q3 to investments in 2023 Q4. This approach allows for a more complete and timelier estimate of annual FDI flows.

3.4.4. **Interest Rates**

Category: Economic
Source: FED and ECB[47]
Dates: 2019–2025, yearly aggregated

Relevance: Interest rates set by major central banks, such as the U.S. Federal Reserve and the European Central Bank (ECB), play a critical role in shaping global financial conditions. These rates influence capital flows, currency values, borrowing costs, and investment decisions, all of which directly affect international trade dynamics. In periods of geopolitical risk, central banks may adjust rates in response to inflation, market instability, or economic uncertainty – further amplifying global financial shifts. Given that the United States and Euro Area together account for approximately 40–45% of global GDP, changes in their interest rates have widespread spillover effects, particularly for emerging economies and trade-exposed sectors. As such, central bank policy rates serve as a key indicator of how geopolitical developments translate into macroeconomic conditions with global trade implications.

Measuring Interest Rates (ECB and Federal Reserve): To assess the role of monetary policy in geopolitical risk and its implications for global trade, we include interest rate data from both the European Central Bank (ECB) and the U.S. Federal Reserve. For the Eurozone, we use the ECB Main Refinancing Operations (MRO) rate, which is the primary rate at which the ECB provides liquidity to commercial banks and serves as a key benchmark for short-term interest rates. For the United States, we use the Federal Funds Target Rate (mean), which represents the Federal Reserve's principal policy tool for steering short-term interest rates and managing liquidity conditions. Unlike market-derived benchmarks, both the MRO and the Federal Funds Target Rate are set directly by their respective central banks, making them appropriate indicators for the intended stance of monetary policy. While institutional differences remain, these rates are functionally comparable as they anchor short-term interest rates within their respective monetary systems.

3.4.5. **Trade Volumes**

Category: Benchmark
Source: UNCOMTRADE[48]
Dates: 2019–2025, yearly aggregated

Relevance: Trade volume is a direct measure of cross-border economic activity and a core component of global trade. Changes in trade volume immediately reflect shifts in demand, supply chain stability, and market access, making it a fundamental indicator for any trade-focused index.

Measuring Trade Volume: Trade volume is measured using data from UN COMTRADE, the industry standard and most comprehensive global database for trade statistics. We calculate trade volume by summing the total imports and exports reported by each UN member country that has provided data to

[47] 'Official Interest Rates', European Central Bank, April 2025, https://www.ecb.europa.eu/stats/policy_and_exchange_rates/key_ecb_interest_rates/html/index.en.html.; 'Federal Funds Effective Rate', Federal Reserve Bank of St Louis, May 2025, https://fred.stlouisfed.org/series/FEDFUNDS.
[48] 'UN Comtrade', May 2025, https://comtradeplus.un.org/TradeFlow.

UN Comtrade over 2019-202549, providing a consistent and comparable measure of cross-border goods movement. This approach captures both inbound and outbound trade flows, allowing for a balanced view of economic integration and responsiveness to geopolitical developments across these countries, which collectively accounts for a significant share of global trade.

3.5. Data Summary

The table below provides an overview of the indicators selected for GATRI, categorized within their respective domains. These indicators collectively aim to capture the multifaceted nature of systemic geopolitical risk and its relationship with international trade, building upon the conceptual framework outlined before. The table summarises the specific aspect measured by each indicator, its primary data source, the temporal coverage (typically 2019-2025, aggregated annually, with notes for partial year data), its relevance to the GATRI construct, and the basic measurement approach employed. In addition to the data sources to describe the geopolitical risks on trade, the indices are benchmarked against trade volumes.

Domain	Indicator	Specific Aspect Measured	Data Source(s)	Timeframe	Brief Relevance Summary	Measurement Approach
Diplomatic	UN Voting Alignment	Consensus/division in UNGA voting patterns	UNVD	2019–2025 Yearly	Signals global cooperation levels, fractures, shifting alliances	Normalized deviation score (0=split, 1=aligned)
Diplomatic	UN Speech Sentiment	Tone (pos/neg/neu) of diplomatic discourse	UNGDC	2019–2025 Yearly (Q3)	Captures rhetorical signals, emerging tensions/relations affecting trade environment	General Sentiment Index (GSI) based on positive/negative state mentions
Diplomatic	State Visits (Network Density)	Frequency/intensity of high-level engagement	COLT (Pardee)	2019–2025 Yearly	Reflects shifting alignments, priorities often linked to trade/cooperation	Network Density formula based on leader visits
Military	Number of Battles	Frequency of organized armed conflict events	ACLED	2019–2025 Yearly	Direct indicator of instability disrupting trade, supply chains, confidence	Simple yearly count of battle events
Military	Number of Protests	Frequency of socio-political unrest events	ACLED	2019–2025 Yearly	Signals domestic instability with potential trade/investment spillover effects	Simple yearly count of protest events
Military	Number of Riots	Frequency of intense, spontaneous civil unrest	ACLED	2019–2025 Yearly	Indicator of unpredictable disruptions affecting stability and commercial operations	Simple yearly count of riot events

[49] These 65 countries are: Antigua and Barbuda, Argentina, Armenia, Australia, Azerbaijan, Barbados, Belgium, Belize, Bolivia, Bosnia Herzegovina, Brazil, Burkina Faso, Canada, Czechia, Denmark, Dominican Republic, Ecuador, El Salvador, Estonia, Finland, Georgia, Germany, Greece, Guyana, Hong Kong SAR, Hungary, Iceland, Ireland, Israel, Italy, Japan, Latvia, Lithuania, Malaysia, Mauritius, Mexico, Myanmar, Montenegro, Netherlands, New Zealand, North Macedonia, Norway, Pakistan, Panama, Paraguay, Philippines, Poland, Portugal, Republic of Korea, Republic of Moldova, Slovakia, Sri Lanka, Spain, Suriname, Sweden, Switzerland, Thailand, Togo, Trinidad and Tobago, Türkiye, United Kingdom, United States of America, Uzbekistan, Zimbabwe.

Military	Number of Explosions	Frequency of bombings, IEDs, etc.	ACLED	2019-2025 Yearly	Measures specific security threats disrupting transport, trade facilities	Simple yearly count of explosion events
Military	Violence Against Civilians	Frequency of attacks on non-combatants	ACLED	2019–2025 Yearly	Signals breakdown of stability affecting labour, confidence, economic resilience	Simple yearly count of violence against civilian events
Military	Number of Casualties	Human cost/intensity of political violence	ACLED	2019–2025 Yearly	Quantifies scale/severity of unrest impacting investment, trade infrastructure	Simple yearly count of fatalities from political violence events
Economic	Tariffs (MFN Applied)	Level of non-discriminatory trade barriers	WTO Tariff & Trade Data	2019–2025 Yearly	Reflects trade policy shifts responding to geopolitical conditions	Trade-weighted average MFN applied tariff rate
Economic	Transport Costs (BDI)	Cost of global maritime bulk shipping	Baltic Dry Index (BDI)	2019–2025 Yearly	Real-time indicator of trade demand/disruptions influenced by geopolitical events	Baltic Dry Index value (composite index of charter rates)
Economic	Foreign Direct Investment (FDI)	Cross-border investment / investor confidence	OECD Int'l Direct Investment Statistics	2019–2025 Yearly (Q3)	Forward-looking measure of economic integration resilience to political risk	Net flows (USD, OECD definition), with Q4 2024 projection
Economic	Interest Rates (Policy Rates)	Key central bank policy interest rates	FED (Fed Funds Target Rate); ECB (MRO Rate)	2019–2025 Yearly	Indicator of macroeconomic response to/influence on geopolitics affecting trade/finance	Official policy rates (Mean Fed Funds Target, ECB MRO)
Benchmark	Trade Volumes (Goods)	Value of cross-border goods movement	UN COMTRADE	2019–2025 Yearly	Direct measure of global economic activity/integration responsive to geopolitics	Sum of total imports & exports

4. Index

This chapter details the complete methodology used to construct the GATRI score. It bridges the gap between the conceptual framework and the final index value by first explaining how core concepts like Stability and Volatility are combined, defined and operationalised to yield the final geopolitical Risk index. This initial section clarifies the conceptual logic and formulas underpinning the index's structure.

The second part of this chapter provides a detailed, step-by-step breakdown of how the GATRI index is calculated in practice. It begins with the computation of baseline (in)stability scores, standardised relative to a 2024 reference year. It then explains how volatility is measured across indicators – using standard deviation and normalisation techniques – to capture the degree of uncertainty in geopolitical conditions. Finally, it outlines the aggregation process through which volatility-adjusted scores for each of the 13 indicators are combined into a single composite risk index. This methodological sequence ensures the GATRI score reflects not only absolute levels of geopolitical (in)stability, but also the rate and unpredictability of change, resulting in a dynamic, multidimensional measure of global risk.

4.1. Index Components

To translate the conceptual framework into a quantifiable index, GATRI operationalises its core components as measurable constructs. **Geopolitical Stability** is treated as the baseline condition of a predictable and resilient political, military, and economic environment. It reflects steady diplomatic relations, minimal conflict, and healthy economic flows. Stability is inferred from a set of indicators, referred to as Stability Drivers, whose favourable values suggest higher levels of stability.

On the diplomatic front, these include high alignment in UN General Assembly voting, constructive sentiment in UN speeches, and a high frequency of state visits (as a proxy for network density). Military stability is reflected by low levels of battles, protests, riots, explosions, violence against civilians, and conflict fatalities, as captured by ACLED data. Economic stability is indicated by low tariffs, low transportation costs, strong outflows of foreign direct investment (FDI), and low policy interest rates.

- Diplomatic: High UN Voting Alignment, constructive UN Speech Sentiment, frequent State Visits (high network density).
- Military: Low numbers of Battles, Protests, Riots, Explosions, Violence Against Civilians, Conflict Fatalities.
- Economic: Low Tariffs, low transportation cost, strong FDI inflows, low policy Interest Rates.

Geopolitical Instability represents the erosion of this baseline condition. It is conceptualised as arising from negative shifts – or unfavourable levels – in the same set of stability drivers. Declines in UN voting alignment, deterioration in UN speech behaviour, and a reduction in state visits are seen as diplomatic indicators of growing instability. Militarily, increases in the number of battles, protests, riots, explosions, and civilian-targeting violence – as well as higher conflict fatality counts – signal instability. On the economic side, rising tariffs, declining FDI inflows, and increasing transportation costs contribute to a higher instability profile. Tightening interest rates also contribute to higher geopolitical instability because they amplify financial pressures in vulnerable economies, despite the ambiguous overall impact on global trade dynamics. For the purpose of the index, these indicators are integrated into a composite instability score, with variables negatively weighted as appropriate.

- Diplomatic: Declining *UN Voting Alignment*, deteriorating *UN Speech Behaviour*, fewer *State Visits*

- Military: Increases in *Battles*, *Protests*, *Riots*, *Explosions*, *Violence Against Civilians*, *Conflict Fatalities* (ACLED)
- Economic: Rising *Tariffs*, increasing transportation costs, declining *FDI*, tightening *Federal Funds/ECB rate*

Geopolitical Dependency is measured solely through total trade values. It reflects the degree to which an actor – be it a country, sector, or firm – is reliant on the global economic system. A highly trade-dependent actor is considered more vulnerable to external disruptions such as regional conflicts, sanctions, or supply chain shocks. For certain variables, such as tariffs, the aggregation from country-level to global instability accounts for each country's contribution to world trade, thereby weighting their individual impact on global trade risk.

Geopolitical Volatility captures the rate of change in geopolitical risk over time. High volatility reflects rapid shifts in either trade exposure or instability indicators, signalling increasing unpredictability and potentially reduced strategic foresight. Volatility is computed in terms of standard deviation of the geopolitical dependency over the last 5 years.

Lastly**, Geopolitical Risk** is defined as the combination of geopolitical stability, accounting for dependency, in combination with volatility. It takes the geopolitical stability or instability as a baseline from where it is penalized based on the volatility over the last 5 years.

4.2. Index Calculation

To construct the GATRI score, we employ a structured methodology. The process begins at the macro-level by calculating stability scores for a set of 13 indicators on a global level. When variables are not available on a global level, the stability scores are computed on a country level and aggregated on trade based on their respective contribution to global trade. In this step, the absolute global levels of stability are scaled such that 2024 is the baseline year, meaning it has a value of 100. The second step is to compute volatility of this scaled instability index and add or subtract this volatility from the baseline index of instability. The third step is to aggregate the 13 individual indicators together to arrive at the GATRI index. A detailed description of each step is given below.

4.3. Compute Baseline (In)stability

The first step of the GATRI index is to reflect the absolute values of global (in)stability as the baseline in our methodology. Each variable is standardised relative to the year 2024, which is assigned a base value of 100 to enable consistent comparisons over time. Observations for other years are scaled by their deviation from the 2024 baseline, normalised by the variable's historical standard deviation.

The direction of each variable's influence on stability is explicitly specified (as described above) to ensure interpretive coherence. For instance, higher levels of conflict are associated with greater instability and thus reduce the index score, whereas higher levels of foreign investment indicate increased stability and raise the score. In this way, 2024 serves as the reference point, and all other years fluctuate around the baseline of 100.

4.4. Incorporate Volatility

The second step of the GATRI index is to adjust the global (in)stability baseline for volatility, recognising that sudden or large fluctuations in an indicator may represent systemic risk beyond its absolute level. This is achieved by calculating the standard deviation of each indicator over time, following a Min-Max normalisation of the standard deviation across all indicators to ensure comparability across variables with different units and scales.

These standard deviations, representing indicator volatility, are first inverted (multiplied by -1) and then scaled according to a standard scaling approach (or standardisation). This standardisation adjusts them to have a mean of zero and unit variance, ensuring the overall volatility contribution to the index is balanced and centred. Greater original volatility results in a more negative standardised value, leading to a downward adjustment of the index score, as it signals heightened uncertainty and thus increases geopolitical risk for trade. Conversely, indicators with lower original volatility yield a less negative or positive standardised value, leading to an upward adjustment, reflecting a more stable and predictable geopolitical environment. This step ensures the index not only reflects the **absolute level of global (in)stability** but also incorporates the **destabilising effects of temporal uncertainty.**

4.5. Compute Global Risk Index

The final step aggregates the 13 volatility-adjusted indicator values into the composite GATRI score. The aggregation is performed in two stages:

(i) Domain-level means. Within each of the three domains (Diplomatic, Military, Economic), the volatility-adjusted indicator values are averaged with equal weight to produce a domain-level mean for each year. This yields three time series — one per domain — that summarise the trajectory of the underlying indicators without introducing any further normalisation.

(ii) Composite GATRI score. The headline GATRI value for each year is computed as the simple mean of all 13 volatility-adjusted indicator values. Indicators are equally weighted; no domain or indicator is given heavier influence. This deliberately preserves the philosophy that diplomatic, military, and economic factors contribute symmetrically to systemic risk.

Aggregate anchor at 2024 = 100. After the simple mean is computed, a constant shift is applied to the GATRI time series so that the 2024 composite value reads exactly 100. This is purely a centring operation: every year-over-year movement is preserved, only the absolute level is adjusted. The anchor reinforces 2024 as the conceptual reference point at the headline level — readers can directly interpret the composite score as a deviation from baseline without needing to recall a non-round reference value.

The three domain means are not re-anchored separately. They inherit the volatility-adjusted indicator values directly so that an interested reader can cross-check the domain mean against its constituent indicators without an unexplained offset.

4.6. Tail Compression (Soft-Clip)

After the volatility-adjusted standardisation step described in §4.4, the final indicator values are passed through a logarithmic soft-clip transformation so that exceptional outliers do not distort the composition story.

The transformation behaves as the identity function inside the comfortable range of 95 to 105 — within this range, every point of movement is reported exactly. Outside the range, the indicator value is smoothly compressed at a logarithmic rate (with the same derivative as the identity function at the boundary, so there is no visible kink). Crucially, no hard ceiling is applied: very extreme values keep growing, just slowly. The mathematical analogy is the decibel scale: the human ear hears volume logarithmically — a jet engine and a whisper differ enormously in physical intensity, but the ear compresses both into a single comprehensible range. The soft-clip applies the same principle to indicator values.

Formally, for a raw value x:

$y = x$ if $95 \leq x \leq 105$

$y = 105 + 5 \cdot \ln(1 + (x - 105)/5)$ if $x > 105$

$y = 95 - 5 \cdot \ln(1 + (95 - x)/5)$ if $x < 95$

A worked example: the 2025 UN voting alignment indicator produced a raw value of 116 — driven by an unusually high concentration of consensus votes in the General Assembly on Gaza and Russia/Ukraine. Without compression, this single indicator would have dominated the Diplomatic domain mean. After applying the soft-clip, the value lands at 110.8 — still clearly elevated and recognisable as an outlier year, but no longer drowning out the other Diplomatic indicators (UN speech sentiment, state visits) that moved much less. The composition story remains legible.

The transformation is symmetric around 100, deterministic, and configurable (the band [95, 105] and the compression scale of 5 are tunable parameters).

5. Trends

This chapter presents the initial results from the 2019–2024 period and offers descriptive insights into the systemic trends identified by GATRI. Rather than simply displaying data in the tool, this chapter contextualises the results with geopolitical interpretation – highlighting, for instance, the divergence in UN speech sentiment post-2022, or the systemic implications of rising conflict intensity and interest rates. Results are presented at both the indicator and domain levels, allowing readers to understand not only the headline volatility score but also the underlying drivers of change across dimensions.

5.1. Indicator Takeaways

This subsection explores developments at the level of individual indicators within the GATRI framework, offering the often year-to-year insights across diplomatic, military, and economic dimensions. Each indicator is examined for shifts, outliers, and explanatory context over the 2019–2024 period.

5.1.1. Diplomatic- State Visits

The most notable trend in the rate of diplomatic state visits is the sharp downturn in the years 2020/2021, obviously attributable to the global pandemic. Less noticeable but perhaps more notable is the fact that after reaching its highest rate of diplomatic visits in 2023, there was a significant slump in 2024 despite the significant increase in the rate of key military events such as casualties, battles, and explosions. It is logical to expect that increased levels of violence entails an increased need for diplomatic engagement, the lack of such a development could be a negative signal for the prospects of reducing geopolitical instability.

5.1.2. Diplomatic- UN Voting Alignment

Once again, in the UN Voting data COVID seems to have a significant impact on our results. 2020 was a high point for consensus in the UN, likely a result of the increased need for international cooperation in response to the pandemic. In 2021 the rate returns very nearly to the 2019 pre-covid score, indicating that the pressure for increased international cooperation was a fleeting one. In 2022 the Ukraine war appears to have had a significant effect, reducing consensus to its lowest level out of the five years. While it has since recovered somewhat, levels remain noticeably below prior scores. Notably, the Ukraine war also inaugurates a substantial increase in the size of the “no” voting bloc, perhaps indicating that the event has polarised a minority of countries (possibly Russia’s allies) against the views of the broader international community.

5.1.3. Diplomatic- UN Speech Sentiment

The effect of the Ukraine war Is even more noticeable at the more granular level of UN speech sentiment. While neutral affect has remained broadly stable throughout the time series, 2022 marked a nearly 6 percentage point increase in negative affect in UN speeches, staying at a heightened level for the following years of our study. This is perhaps our clearest indicator of international diplomatic polarisation. While voting alignment will depend on external factors and what is being voted on, and state visits could in theory be indicative of improving relations or a deteriorating geopolitical environment (building bridges or putting out fires), speech sentiment is more clearly indicative of the current state of international relations.

5.1.4. Military- Riots

Our data source defines riots as events in which a mob or group of demonstrators of three or more members engage in violent or destructive acts (against persons or property).50 There is a notably higher rate per capita of such events in democratic/mixed regimes than in autocratic regimes,

[50] ACLED. (2019). “ACLED Codebook, 2025.” Armed Conflict Location & Event Data Project (ACLED). www.acleddata.com

conceivably because of the draconian internal security of the latter. While India may appear to be an outlier on this map, it is in fact broadly in line with countries such as Germany, France, and Turkey on a per-capita basis. By far the largest per-capita outlier is Palestine, with extremely elevated levels both before and after the October 7th attacks. This is likely attributable to the high rates of inter-communal violence and protests related to Israeli settlement in the territory, in addition to elevated attention paid by the international community to the documentation of events in this area.

5.1.5. **Military- Explosions**

A clear result from the ACLED data is that between 2021 and 2024 there has been a precipitous increase in explosions related to conflict such as shelling, air strikes, IEDs, grenades etc. Equally, each consecutive year after 2022 has seen a roughly one-third increase year-on-year. This grim fact is unsurprising given the escalation of both the Ukraine war and the war in Gaza and broader region. From our map we can see that this is borne out, with a large majority of such events being concentrated in Russia/Ukraine and the broader Levant region. In 2024, Sudan and Myanmar are also both hotspots due to their ongoing civil wars.

5.1.6. **Military- Battles**

A similar picture to "explosions" emerges from the "battles" indicator, albeit with a much stronger concentration in the high-intensity conflict in Ukraine, and a relatively lower score for the broader Levant region. The latter result is almost certainly due to the Israel-Gaza War's emphasis on long-range fires over direct infantry engagements. A point of distinction from the "explosions" indicator also worth noting is the high numbers for 2024 in Brazil, Mexico, Colombia, and Haiti, which are attributable to the extremely high rates of violence related to criminal activity in these countries. Overall, battles are more evenly distributed across lower-intensity conflict zones, such as the insurgencies in the Sahel, Congo, India, Pakistan, and Syria in 2024, showing the added value of including this variable.

5.1.7. **Military- Protests**

Similarly to riots, we see an increased propensity for protests to occur in democratic/mixed regimes than in authoritarian/totalitarian. This is likely explainable by the higher levels of political freedoms in the former states as well as political legitimacy in these countries being premised on some form of popular consent/support. We do see some interesting outliers, Iran, Syria and Yemen had high rates of protest in 2024 despite being highly autocratic.[51] This may be indicative of the extreme illegitimacy of these regimes in the eyes of their public, or of their government's inability to repress protests as successfully as their autocratic peers.

5.1.8. **Military- Violence Against Civilians**

The results of our "violence against civilians" measure is likely to be surprising or unintuitive without further explanation. In the source for our data "Armed Conflict Location & Event Data" there is a hierarchy of events with, for example, "battles" being higher on the hierarchy than "violence against civilians", in order to prevent double counting, if an event has already been counted higher in the hierarchy it will not be counted again.52 Therefore, "violence against civilians" only counts situations in which said violence did not occur under "battles", "explosions", "riots", or "protests". Thus, the result we see in the data is heavily weighted towards events in which unsophisticated actors attacked civilians

[51] 'Countries and Territories', Freedom House, accessed 8 May 2025, https://freedomhouse.org/country/scores.
[52] ACLED. (2019). "ACLED Codebook, 2025." Armed Conflict Location & Event Data Project (ACLED). www.acleddata.com

outside the context of direct military engagements. As a result, the high levels in Brazil, Colombia and Mexico are attributable to gang violence (both between gang members and towards the civilian populace). Similarly, countries in which lightly armed groups frequently target civilians such as Sudan, Syria, Myanmar, the Sahel, Nigeria, and Cameroon also score highly.

5.1.9. **Military- Casualties**

This measure captures all casualties, military, non-state actor, or civilian in conflict and thus might be the most unambiguous indicator of conflict intensity. As with the "explosion" and "battle" indicators we see a significant increase in casualties after 2022, albeit from a higher relative baseline. This deterioration is reflected in the consistently worsening index scores from year to year after 2020. Once again our major conflict zones in Ukraine and the Levant stand out, though with Ukraine drawing away as the conflict by far the most destructive of human lives. More than other measures, which over-emphasise certain types of conflict over others ("explosions" for high tech wars, "civilian casualties" for gang violence), "casualties" can put ongoing conflicts into perspective relative to one another in a more absolute manner. While gang violence in the Americas is still visible as a severe source of conflict, they reduce somewhat relative to the civil conflicts in Myanmar, Syria, Ethiopia, West Africa and Sudan.

5.1.10. **Economic- Interest Rates**

In 2023 both the ECB and the US Fed set interest rates at their highest levels since 2008, before the Great Recession. In the intervening period rates had been set at historical lows by both institutions, as central banks sought to use cheap credit to stimulate battered western economies. This all changed with the persistently high inflation experienced by both monetary areas in the wake of COVID-induced supply shocks and economic stimulus. The graph depicts these changes over the five years 2019-2024. Our index for this indicator reflects both the absolute rate of interest as well as the volatility in interest rate changes. Since high interest rates are often correlated with economic contraction, unemployment and even recession, especially in developing countries, higher interest rates feed into lower overall economic scores at the domain level.

5.1.11. **Economic- Foreign Direct Investment**

From the headline FDI figures at the top of this page there is a clear pattern in which COVID once again has a significant impact, with the total dropping by nearly 50%. Equally, the release of pent-up demand for investment following the easing of lockdowns and in the context of huge economic stimulus in 2021 and 2022 is also clearly perceivable. More notable is China's outbound FDI behaviour, which has slight variation relative to Germany, Japan, or the US, always hovering between $30 and $60 billion per quarter. When compared to the US which has a range of negative $24 billion to $156 billion this is particularly striking. This is likely a result of China's more state-directed pattern of international capital allocation relative to the market-based approaches of the US, Germany, and Japan. It could be argued that this predictable economic behaviour has been a source of strength for China as it has sought to expand its influence through economic programs such as the Belt and Road Initiative.

5.1.12. **Economic- Tariffs**

The years from 2019-2024 saw stability, or even a decline in the headline most-favoured-nation (MFN) tariff rates of the world's largest economies, China, the EU, the United States and Japan. Apart from the EU and Japan's modest increases in 2023 and 2024 and a small US uptick in 2024, the general trend is towards low tariff rates being reduced to even lower levels. As a result, volatility is relatively low for this indicator. Three explanations for this data, which may be counterintuitive to those familiar with the tenor of public discourse around the state of global trade stand out. The first, is that countries increasingly ignore the MFN principle, given the limited ability of the World Trade Organization to enforce MFN,

especially on powerful jurisdictions. The theoretical MFN rate may stay the same while countries use loopholes to circumvent applying the rate to trade partners as it suits them. This is undoubtedly a factor, for example, tariffs under both Trump administrations and the Biden administration applied tariffs based on "national security" or "anti-dumping" grounds, which was interpreted broadly enough to give almost complete freedom of action in applying tariffs.

This circumvention of MFN is not a new development, with the principle being gradually degraded by major economies since the 1970s.[53] A second factor may be that the 2019-2024 period represented a relative "truce" in the broader pattern of trade wars globally, between the first and second Trump administration's major spats with trading partners and prior to the implementation of the EU's carbon border adjustment mechanism and more stringent anti-dumping measures. Equally, given the relatively targeted nature of major country tariffs in the period 2019-2024, tariffing individual products from specific countries, their overall impact on trade-weighted tariffs is likely to be modest. In any case, some care should be taken in interpreting this measure, given its exclusion of non-tariff trade barriers and "exceptional" tariffs that circumvent MFN.

5.1.13. **Economic- Transportation**

Once again, and in line with general expectations, COVID and its after-effects are the most visible source of volatility in the cost of goods transportation. Between March 2020 and the loosening of lockdowns at the end of 2021 the Baltic Dry Index (BDI) increased elevenfold. This was in large part a result of pent-up demand for consumer goods and re-opening of manufacturing after the COVID lockdowns coming into friction with logistics disruptions, mothballed container fleets, and uneven recovery in trade. Thus, we see the highest index score in 2021 as the impacts of COVID worked through the global trade network. Smaller peaks are noticeable in both early 2022 and late 2023, with the former corresponding with the beginning of the Russian invasion of Ukraine, and the latter with the start of Houthi attacks on shipping in the Red Sea, with both events leading the BDI to spike to around 3000 points. Given that the longer-term average is in the 1000-2000 range we can see a clear impact of geopolitical instability on this indicator.

5.2. **Domain-Level Takeaways**

In this subsection, the focus shifts to domain-level interpretations, aggregating trends across indicators to assess how overall conditions have evolved within the diplomatic, military, and economic spheres. By synthesizing multiple data streams, we aim to identify systemic signals – such as the timing and pacing of instability across domains.

5.2.1. **Diplomatic**

As with each of our macro-level indicators, the overall trend in our diplomatic indicator has been one of gradual deterioration and increasing volatility. This has been driven by both increasingly fractured UN voting behaviour and negative sentiment in UN speeches. This has been counteracted somewhat by a quite stable rate of state visits, though as noted above, this is a somewhat ambiguous indicator. When comparing indicators, it is interesting to note that the largest decline in the diplomatic indicator (2021-2022) predates the largest decline in the military indicator (2022-2023). Of course, this isolated correlation is far from sufficient to establish a causal relationship. However, it is suggestive that poor

[53] Pinar Cebi and Rodney Ludema, 'The Rise and Fall of the Most-Favored-Nation Clause', Working Paper 2002-06-B, 2002, https://doi.org/10.22004/ag.econ.15853.

diplomatic relations are a leading indicator of increasing volatility and decreasing stability in the military domain, as has been surmised above

5.2.2. **Military**

The military macro-indicator as noted, exhibits an overall pattern of decline in stability and increased volatility, especially since the COVID pandemic. The largest single decline came between 2022 and 2022, unsurprisingly given the escalations of the Ukraine and Myanmar wars and the initiation of the Gaza war. Across our indicators volatility has increased and stability declined, with the exceptions of protests and riots, which have both remained relatively steady through our period of study. As a result, it is clear that this decline is being driven by an uptick in active warfare. Both the instability level and the rate of this deterioration (volatility) has increased, with clearly worrying implications for the global economic system.

5.2.3. **Economic**

Our economic index shows a persistent decline in stability and an increase in volatility and risk. Across our time series. The only exception is an uptick in the year 2020. Given the events of 2020 this will be counterintuitive. However, when we note that this improvement was driven by lower transport costs, interest rates, and tariff barriers we can see clearly that the efforts to counteract COVID's economic effects had a distorting effect on our key economic indicators. As with any selection of indicators that are informative during normal economic conditions, our economic indicators function less well during the extremely abnormal conditions of the covid-19 pandemic and are no longer good proxies for economic conditions in 2020. This is a limitation of this study that will be discussed further in the next chapter. The strongest driver of the decline in this index after 2022 is the increasing interest rate, which, as noted above, was increased to its highest level in sixteen years in response to covid-driven inflation. From 2020 to 2021 and 2021 to 2022 the decline is driven mostly by increasing transport costs and reduced FDI/increased tariffs respectively.

5.3. Trend summary

The table below presents a summary of the individual indicator scores from 2019 to 2024. These indicators represent geopolitical risk and are based on their combined levels of volatility and (in)stability, reflecting the degree of fluctuation and uncertainty in each category over time. To help interpret the data, year-on-year changes have been color-coded: green represents a positive development – suggesting decreasing risk – while red indicates a negative shift, pointing to increasing risk. This approach offers a clear, visual summary of how stability is evolving across different domains, including military, economic, and diplomatic indicators. The combination of ranking and color-coding allows for quick identification of emerging risks as well as areas showing signs of improvement.

Domain	Indicator	2019	2020	2021	2022	2023	2024	2025
Diplomatic	State Visits	97.5	90.2	92.0	97.1	100.2	98.8	99.7
Diplomatic	UN Speech Sentiment	100.0	99.6	98.2	91.3	91.2	91.1	93.7
Diplomatic	UN Voting	104.0	106.8	104.6	101.6	102.5	102.2	110.8
Military	Battles	104.0	107.2	108.5	108.2	105.9	101.8	95.8
Military	Casualties	105.5	106.9	105.0	104.6	101.3	95.3	95.1
Military	Explosions	106.5	107.7	107.7	103.9	101.3	96.2	98.2
Military	Protests	111.1	105.7	101.6	105.4	105.1	104.7	103.0
Military	Riots	101.6	107.1	101.1	97.3	92.9	104.6	98.2
Military	Violence against civilians	108.7	108.3	105.7	102.1	102.7	103.3	95.8
Economic	Foreign Direct Investment	101.3	96.0	109.0	106.6	105.8	104.4	107.7
Economic	Interest Rates	102.0	104.2	104.6	101.8	93.7	93.2	96.3
Economic	Tariffs	100.7	108.1	101.1	96.9	94.9	102.5	95.6
Economic	Transportation	107.7	108.9	95.5	103.7	107.5	105.2	105.8

5.4. 2025 update

This section presents the takeaways from the first complete-data refresh of GATRI, extending the time series to 2025. The methodology is unchanged from the launch release except for the two refinements noted in §4.3 and §4.6 (aggregate anchor at 2024 = 100 and the soft-clip tail compression). All values reported below are post-soft-clip.

5.4.1. Indicator takeaways (2025)

State Visits rebounded from the 2024 dip (98.8 → 99.7). Drivers were the Trump inauguration in January 2025 and the flurry of foreign-leader visits to Washington that followed; the Syria post-Assad transition (new Damascus government received Arab and Turkish leaders); EU enlargement diplomacy around Ukraine, Moldova, and Georgia; and the resumption of G20 / BRICS summits on the normal calendar.

UN Voting Alignment surged in 2025 (102.2 → 110.8). The UN General Assembly held 192 recorded-vote resolutions, roughly twice the historical norm, and mean alignment jumped from 0.34 to 0.41. Heavy Gaza and Russia/Ukraine resolution traffic produced very lopsided majorities (often 180+ to 5). The isolated "no" bloc (US, Israel, a few Pacific states) became more consistent, paradoxically raising the consensus statistic. The raw alignment score reached 116; the soft-clip transformation (§4.6) dampens it to 110.8 so this single indicator does not dominate the Diplomatic story.

UN Speech Sentiment partially recovered from the 2022–2024 floor (91.1 → 93.7). Less extreme negative tone observed around Ukraine (war fatigue, normalisation of position-taking) and Gaza. Still well below pre-war 2019 levels.

Battles worsened (101.8 → 95.8) as battle frequency rose further. The Ukraine war entered its fourth year with renewed offensives, the Sudan civil war intensified across Darfur and Khartoum, and Myanmar's civil war continued ground operations. The Israel/Hezbollah cessation in late 2024 partially offset, but Sahel insurgencies (Mali, Burkina Faso, Niger) drove the global count higher.

Casualties held near 2024's already-stretched level (95.3 → 95.1). The deadliest theatres were Ukraine (third winter of attritional warfare), Gaza, Sudan (where civilian fatalities in El-Fasher and Gezira reached historic highs), and Mexico cartel violence. Combined global fatalities ticked above the 2024 peak.

Explosions fell modestly (96.2 → 98.2, a small improvement). Russia/Ukraine front lines stabilised after the Kursk withdrawal, reducing very high-volume strike days. The Israel/Hezbollah ceasefire took explosion-heavy southern Lebanon largely off the tally. Houthi Red Sea attacks continued and Sudan air strikes intensified, partly offsetting the decline.

Protests ticked up further (104.7 → 103.0). Notable mobilisations included Georgia EU-accession protests, Romania annulled-election protests, Slovakia opposition protests, and continued Iran labour and hijab protests. US anti-tariff demonstrations rose after the spring 2025 escalations.

Riots rose sharply (104.6 → 98.2). Drivers included carry-over from the UK far-right riots (Summer 2024 momentum), Bangladesh political-transition unrest, France banlieue protests, and periodic Kenya finance-bill riots. Mexico cartel-related clashes contributed an Americas dimension.

Violence against civilians registered the largest single-year deterioration of any military indicator (103.3 → 95.8). Gaza, Sudan RSF atrocities (Gezira and North Darfur), and the DRC M23 offensive drove civilian-targeting events to multi-year highs. Mexico cartel fragmentation (Sinaloa Cartel internal split) added an Americas dimension.

Foreign Direct Investment rose materially (104.4 → 107.7). OECD outward FDI reached roughly $1.22T in 2025 from $1.09T in 2024. Key drivers: the AI capex boom (US tech investment in data-centre infrastructure), US reshoring via CHIPS Act and IRA-era projects, and China outbound to Southeast Asia (manufacturing relocation away from tariff exposure).

Interest Rates improved (93.3 → 96.3) as both major central banks eased through 2025. The ECB stepped its Main Refinancing Operations rate from 3.15% to 2.15% across four cuts (February, March, April, June), while the US Federal Reserve cut its target midpoint from 4.375% to 3.625–3.875% as inflation moderated.

Tariffs moved against this trend (102.5 → 95.6). Trade-weighted MFN tariffs across the 15 reporters that had published 2025 data showed a small downtick (3.40% → 3.18% globally), but the indicator captured volatility from US Section 301 tariffs and the Trump 2025 escalations on steel, aluminium, and Chinese goods. Important caveat: MFN excludes the national-security "circumvention" tariffs that dominated 2025 trade-policy headlines, so the headline number understates the real disruption.

Transportation was slightly calmer (105.2 → 105.8). The Baltic Dry Index averaged 1,679 in 2025 versus 1,754 in 2024. Red Sea Houthi attacks continued to push routing pressure via the Cape of Good Hope, but Panama Canal throughput recovered as the 2024 drought eased. Capesize[54] rates softened as Chinese iron-ore demand cooled.

[54] Capesize ships are the largest dry cargo ships with ball mark dimension

5.4.2. **Domain-level takeaways (2025)**

The **Diplomatic** domain showed the strongest 2025 improvement (97.4 → 101.4). The largest single driver was the surge in UN voting alignment described above. State visits rebounded modestly following the 2024 dip, with the Trump inauguration and the post-Assad Syrian transition triggering regional visits. UN speech sentiment recovered partially from its 2022–2024 floor.

The **Military** domain worsened (101.0 → 97.7), continuing the deterioration trajectory since 2022. The largest single-indicator drop was violence against civilians, driven by Gaza, Sudan RSF atrocities, and the DRC M23 offensive. Battles also rose as Ukraine, Sudan, Myanmar, and Sahel insurgencies all expanded ground operations; riots ticked up. Two indicators slightly improved: explosions (Russia/Ukraine front-line stabilisation and the Lebanon ceasefire) and casualties (essentially flat). The picture is one of widening intensity in lower-tech ground conflict and civilian targeting.

The **Economic** domain was essentially flat (101.3 → 101.3) but with sharp divergence between indicators. Foreign Direct Investment rose materially on the AI capex boom and US reshoring. Interest rates improved as both major central banks eased. Transportation was slightly calmer. Tariffs moved against this trend on US Section 301 and Trump 2025 escalations, though the MFN average understates the real disruption.

5.4.3. **2025 composite summary**

The 2025 GATRI score landed marginally below the 2024 baseline (99.4 vs 100.0), but the underlying composition shifted markedly. Diplomatic and economic gains mostly cancelled the military deterioration, leaving the composite essentially flat just below baseline. Looking across the seven-year series, GATRI peaked at 104.1 in 2020 (early COVID and Ukraine build-up) and has trended gradually downward since, a slow decline in geopolitical stability of roughly 4.7 points over the period.

6. Limitations

This chapter reflects on the limitations of the current methodology and propose avenues for refinement. Topics include limitation inherent to Composite Indicators, indicator choice, model assumptions, data availability, index weighing and the potential incorporation of additional domains or higher-frequency data in future iterations. This chapter aims to support GATRI's ongoing development by promoting transparency, accessibility, and analytical utility, while welcoming future refinement.

6.1. Composite Indicators

As with all approaches to representing the complexity of the social world, creating a single composite indicator to represent a set of concepts as broad as "geopolitical stability", "geopolitical risk", and "geopolitical volatility" has significant drawbacks in addition to advantages. The indicator may conceal extreme values in individual measures through the "averaging out" effect of combining several indicators. For example, the amalgamating of even two indicators into a single measure can assign a situation in which both indicators are broadly average with the same score as a situation in which one is at an extremely above average and the other an extremely below average level. As such, as much attention should be paid to the individual components as the domain level and overall index aggregations when assessing this data.

Another example of how such composites can fail is by assuming that the effects of each indicator on the outcome of interest (in this case geopolitical instability/risk/volatility) are both linear and cumulative. For example, that it assumes that 400,000 battle casualties is twice as impactful on geopolitical stability as a year with 200,000, when in fact there could be critical values/thresholds over which the effect becomes stronger or weaker than a linear extrapolation would suggest. If someone were to say that WW2 had three as much of an impact on geopolitical stability as WW1 as it had roughly that many times more battles, explosions, and casualties we would of course be sceptical. The impacts of these events arose from far more than just such quantifiable factors.

Geopolitical risk, as conceptualised in this framework, is treated as a composite of two distinct yet interrelated dimensions: instability, which serves as the baseline condition of a geopolitical system, and volatility, which acts as an amplifying effect that can either increase or decrease the overall level of risk in a given year. This dual-structure approach attempts to distinguish between the enduring characteristics of a relatively stable geopolitical environment and the fluctuations or shocks that may exacerbate or temporarily relieve systemic tensions.

However, this framing introduces further limitations. For one, it presupposes that stability and volatility can be neatly separated and independently measured, when in reality, volatility may be endogenous to the very conditions that define stability. Additionally, treating volatility purely as an amplifier, risks oversimplifying its role – it may not merely modulate risk, but fundamentally alter the character or direction of geopolitical dynamics in non-linear, context-specific ways. By abstracting these dimensions into discrete metrics, there is a danger of missing complex feedback loops or inflection points that only emerge in specific historical or regional settings. As such, while this distinction may aid interpretability at an index level, it should be used with caution and always alongside more granular, qualitative understanding of the underlying phenomena.

6.2. Indicator Choices

While the choices of indicators for this study's composite scores have been based on an extensive survey of the existing literature, the decision of what to include and exclude will always be open to contestation. This applies especially when they are attempting to capture variation in phenomena as encompassing as military, diplomatic, and economic (in)stability/risk. Inevitably, even if every possible data source that could be construed to be proxies for such phenomena were included the resulting measure would still only be an approximation. Equally, there is a trade-off between the statistical noise that such an encompassing approach would create and the clarity and usefulness of the measure. With these caveats in mind, the creators of this index are confident of the applicability of our measures to our core concepts.

6.3. Data Availability

The indicators for the Military domain spans over the countries ACLED is covering,[55] while the Diplomatic domain consists of UN member states and, in case of speech data also UN observer states. In contrast, the Economic domain does not encompass every state, as data availability for certain indicators is limited. Specifically, tariffs and foreign direct investment (FDI) are only reported by a subset of countries. These reporting countries are indicative of global trade trends but do not represent a comprehensive global sample. Moreover, the FDI indicator has been extrapolated for the entirety of 2024 to ensure consistency across the dataset and to maintain comparability with other indicators that span through 2024.

FDI data is particularly limited, as the majority of countries do not report it consistently or at all. Tariff data is available, but its use requires scaling based on trade volumes, for which UN Comtrade data is employed. However, many countries do not report recent trade figures (notably for 2023 and 2024), or do not report at all, which constrains the accuracy of the tariff indicator.

For certain economic indicators, such as interest rates, the direction of their effect on global trade remains ambiguous; both increases and decreases may influence trade flows in complex, context-dependent ways. Lastly, it should be noted that volatility is measured only across years, not within them. While interannual volatility offers insight into broader trends, intra-annual variation might reveal more granular dynamics and could potentially yield a more refined understanding of economic fluctuations.

6.4. Index Weighting

In GATRI, each individual indicator is assigned equal weight to maintain methodological simplicity and transparency. While this approach facilitates comparability and ease of interpretation, it does not account for the varying degrees of influence that different events or measures may have on geopolitical trade risk. For instance, treating a military conflict and a diplomatic state visit as equally significant may not accurately reflect their respective impacts. For this reason, users are allowed to tailor the index to specific risk profiles or areas of interest. Future refinements of the index should consider differential weighting schemes that better capture the relative contribution of each indicator to overall trade risk, potentially enhancing the index's explanatory and predictive value.

[55] https://acleddata.com/knowledge-base/country-time-period-coverage/

6.5. Domain diversity

This index adopts the DIME framework – Diplomatic, Informational, Military, and Economic – to structure the assessment of geopolitical trade risk. However, the informational domain is currently excluded due to limitations in data availability and measurement. Future research should aim to incorporate this dimension, as information-related activities, such as disinformation campaigns or cyber operations, may significantly influence trade dynamics and geopolitical stability.

6.6. Soft-clip interpretive trade-off

The tail-compression transformation described in §4.6 deliberately dampens extreme indicator readings. While this improves visual comparability across the 13 indicators and prevents a single outlier from dominating the composite, it also means that very large deviations are not reported on a linear scale. Users interested in the *magnitude* of an extreme reading should consult the underlying raw indicator value (available in the dashboard's downloadable data export and in the indicator-specific page narratives) rather than the soft-clipped final value. The transformation is symmetric, smooth, and continuous, but it does compress information about outliers – an acceptable trade-off given GATRI's intended use as a composite barometer, not as a precision measure of any single dimension.

6.7. Validation

As of this version, the GATRI index has not been formally tested against other established indices of geopolitical risk, volatility, or instability, nor has it been quantitatively benchmarked to indicators of global trade performance such as trade volumes, market volatility, or price movements. While GATRI is designed to be overlaid with trade data to explore correlations and contextual relationships, it does not aim to model causality or provide predictive analytics at this stage.

This absence of formal validation introduces an important caveat: it remains an open question whether the GATRI index correlates meaningfully with real-world trade disruptions or with other recognized geopolitical risk assessments (e.g., the World Uncertainty Index, GPR index, or EIU risk models). Future iterations of GATRI should seek to address this by testing its correlation with known periods of elevated trade disruption, such as during large-scale conflicts, global sanctions regimes, or periods of supply chain crisis (e.g., post-2022 war in Ukraine or the COVID-19 pandemic).

Incorporating such corroboration efforts will be essential to improve the credibility, interpretability, and utility of the index, especially for decision-makers looking to understand how shifts in geopolitical risk might relate to trade exposure. Additionally, peer comparison with alternative risk indices may help identify blind spots or overemphasized dimensions within GATRI's current structure, guiding methodological refinement over time.

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