

Alliances Under Pressure: What World Wars Did to Global Commitments

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In this study, “pressure” refers to three forces acting on states during major wars:

- **Military pressure** – rapid escalation and uncertainty forced states to seek immediate security guarantees rather than long-term commitments.
- **Political pressure** – shifting regimes, collapsing empires, and ideological divides reduced trust in binding defense obligations.
- **Strategic pressure** – states prioritized flexibility and risk management, leading to temporary or low-commitment alliance choices.

Introduction

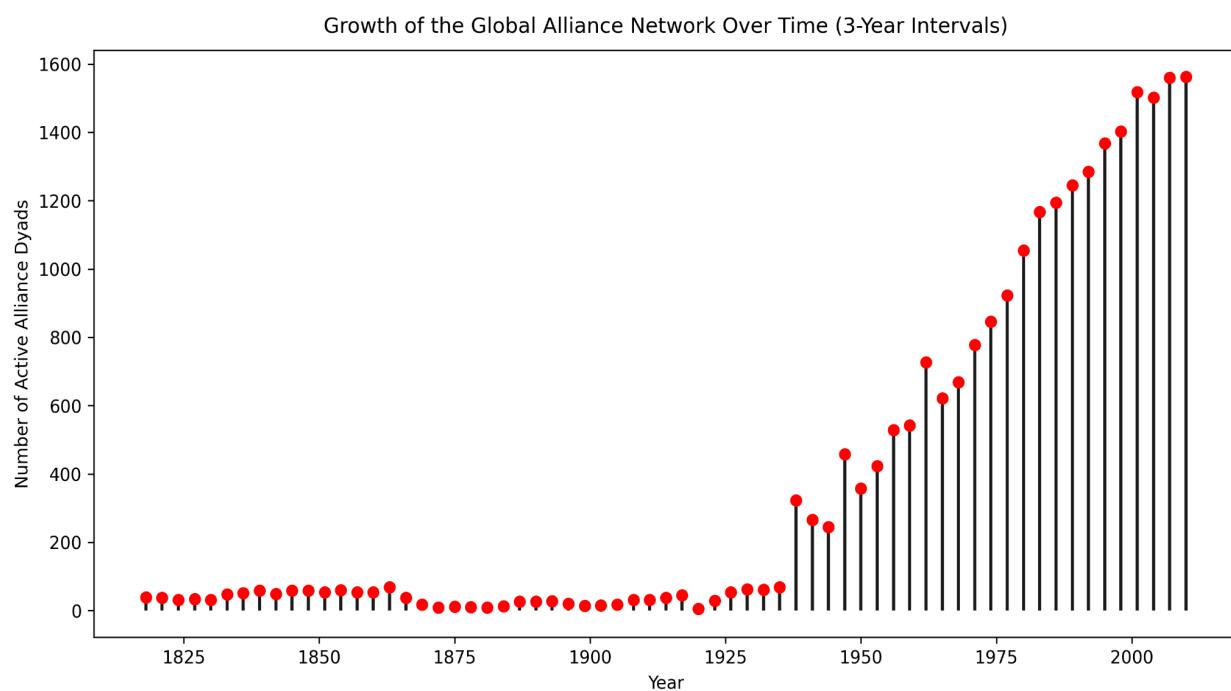
International alliances are not fixed institutions; they evolve in response to global instability. From the early nineteenth century to the modern era, the international system has witnessed a steady expansion in formal alliance relationships, reflecting states' growing reliance on cooperation for security. This long-term growth suggests that alliances became an increasingly central tool of global politics. Crucially, this growth was accompanied by shifts in the depth and rigidity of alliance commitments, particularly during times of war.

However, periods of major systemic conflict — especially the World Wars — did more than increase alliance activity. They altered the *type* of commitments states were willing to make. Faced with extreme uncertainty, rapid military escalation, and fragile political conditions, states increasingly favored flexible, low-commitment arrangements such as ententes and non-aggression pacts over binding defense treaties. Together, these patterns indicate that global wars not only expanded alliance networks but also reshaped their structure, prioritizing adaptability alongside cooperation.

1. Long-Term Growth of Alliance Networks

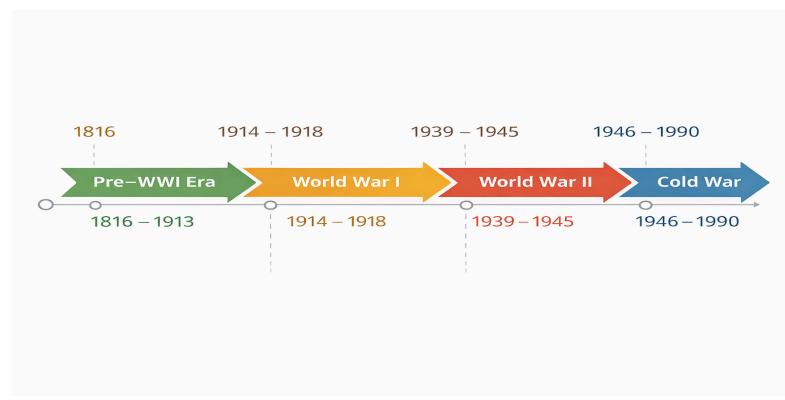
Over the past two centuries, international alliances have evolved from occasional diplomatic instruments into a core feature of the global security architecture. As states confronted rising military costs, technological change, and increasingly interconnected threats, acting alone became progressively less viable. These conditions encouraged governments to rely more heavily on formal alliances to share risks, deter adversaries, and coordinate security policies. If alliances truly became more central to international politics over time, this shift should be visible in a sustained expansion of alliance networks, particularly in the aftermath of large-scale conflicts such as the World Wars.

To understand how global alliances evolved, we begin with the **long-term trajectory of alliance formation over time**. The **lollipop chart** presents alliance activity at regular **three-year intervals**, summarizing the total number of active alliance dyads across the period from 1816 to 2012. Each point represents the scale of formal alliance activity in a given period, making the overall trend immediately visible.

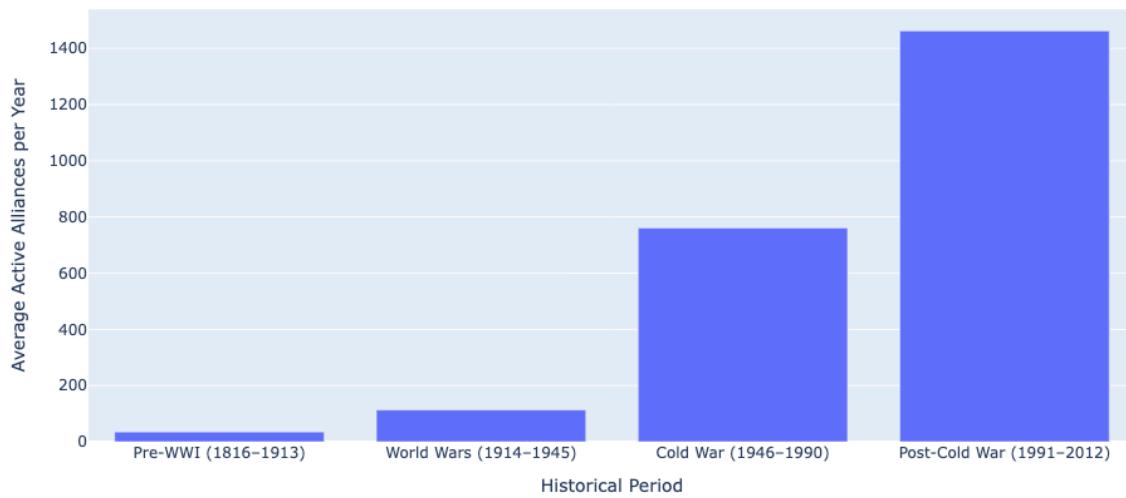


What stands out is the **clear upward movement across the nineteenth and twentieth centuries**, followed by a dramatic acceleration after the mid-twentieth century. Early periods show relatively sparse alliance activity, reflecting a more fragmented international system with limited institutionalized cooperation.

To place this growth in historical context, the **timeline visualization** highlights the major systemic phases that shaped international politics: the Pre-World War I era, the World Wars, and the Cold War. While the timeline itself is illustrative rather than analytical, it serves an important interpretive role—it anchors the observed growth within distinct geopolitical environments. Each phase corresponds to different strategic conditions. The pre-1914 system was characterized by limited but growing diplomatic coordination. The World Wars disrupted existing arrangements but also laid the groundwork for more formalized postwar institutions. The Cold War, in particular, marks a turning point where alliance-building became both global and institutionalized.



Average Number of Active Alliances per Year by Historical Period



The **bar chart of average active alliances per year by historical period** reinforces this interpretation by aggregating alliance activity into meaningful eras. The comparison reveals a stark contrast:

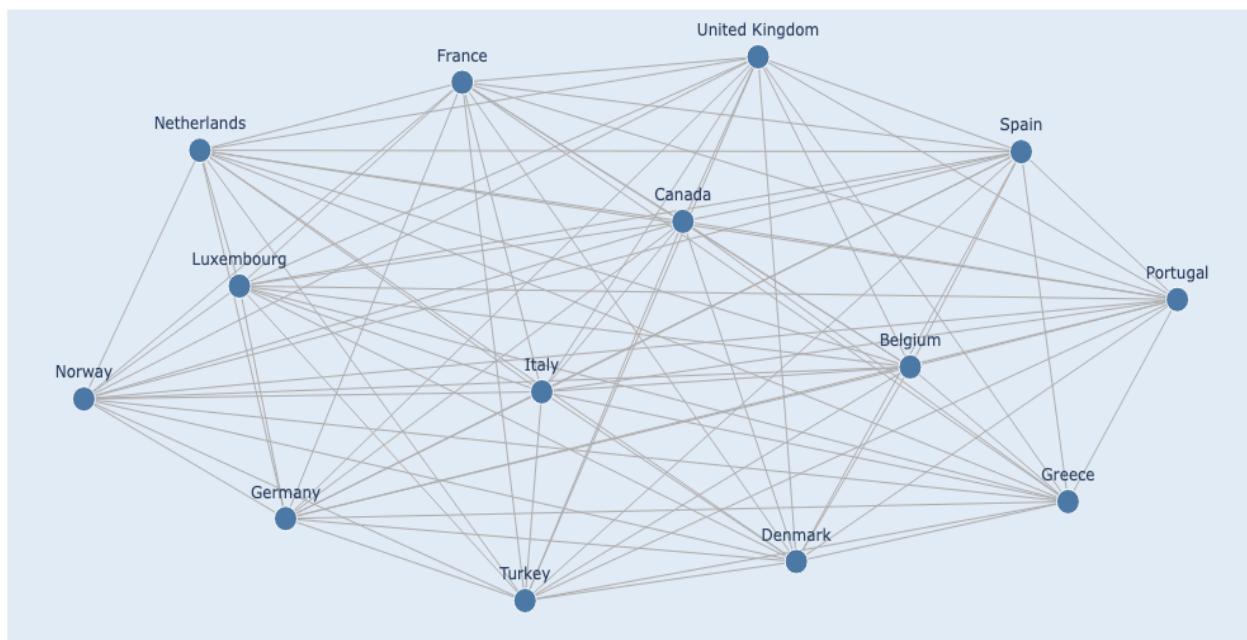
- The Pre-World War I period exhibits very low alliance density.
- The World Wars period shows moderate growth but remains constrained by conflict.
- The Cold War period displays a sharp increase in alliance activity.
- The Post-Cold War era reaches the highest average alliance density in the dataset.

While the number of active alliances increased steadily over time, aggregate growth alone cannot explain how cooperation was structured or power distributed within the international system. To move beyond counts, the analysis turns to alliance networks, which reveal the underlying architecture of cooperation and strategic alignment.

=>Introducing the Network Graphs

The following network graphs visualize alliance relationships during the Cold War, illustrating how states were connected to one another within two opposing security blocs. Nodes represent states and links indicate alliances, revealing differences in cohesion, symmetry, and power concentration across the two systems.

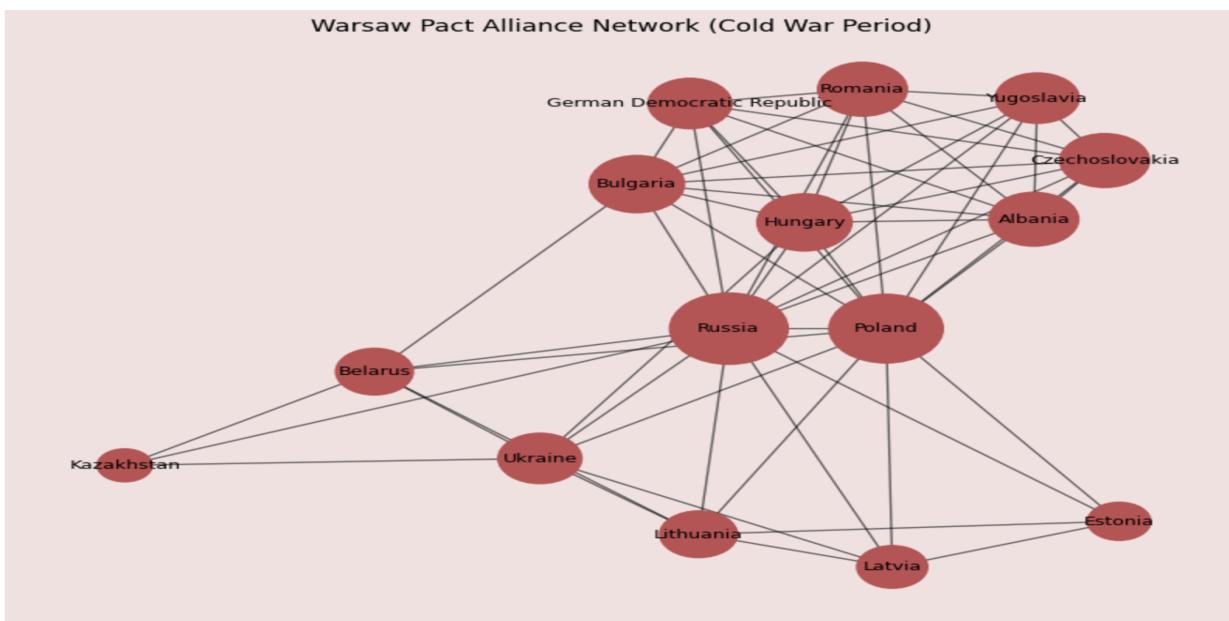
NATO Alliance Network (Cold War Period)



NATO Alliance Network: Dense and Interwoven Cooperation

- NATO operates under a **collective defense policy**, where an attack on one member is treated as an attack on all.
 - The network shows **dense interconnections** among members, with most states maintaining multiple alliance ties.
 - **Power is distributed**, with no single dominant hub.
 - Shared commitments foster **stability and mutual dependence**.

Warsaw Pact Network: Centralized and Hierarchical Alignment



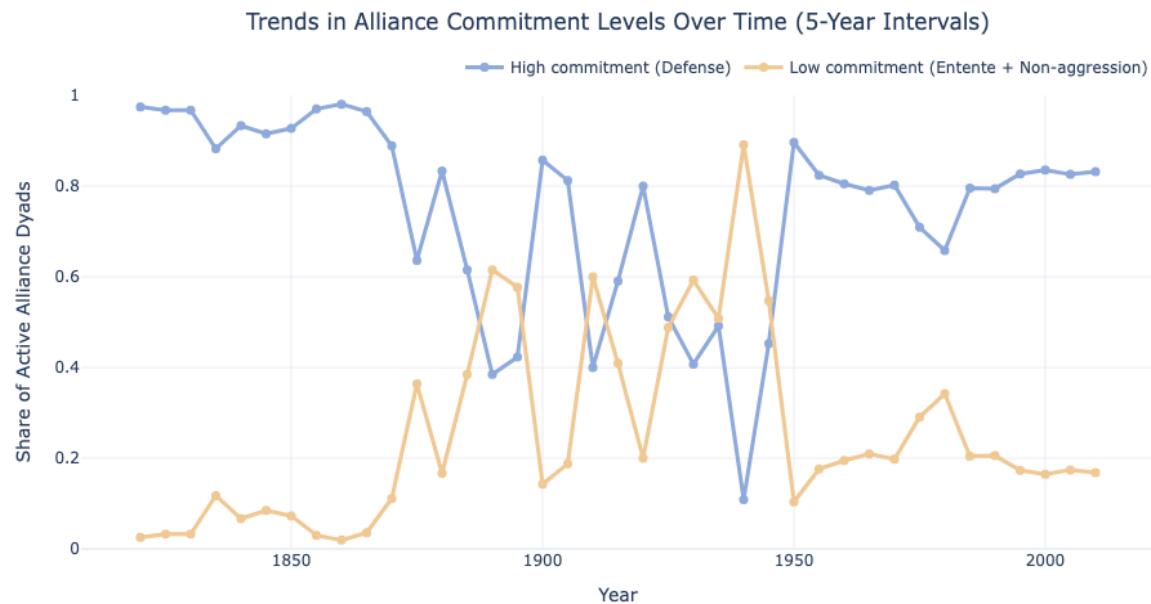
- The Warsaw Pact operated under a **centralized security policy**, with coordination driven by a dominant core.
 - **Russia emerges as the central hub**, holding the majority of alliance connections.
 - Many member states (e.g., Belarus, Kazakhstan, Baltic states) connect **primarily to the core rather than to each other**, revealing a clear core-periphery structure.
 - The uneven node sizes and asymmetric link patterns reflect **hierarchical dependence**, not reciprocal multilateral cooperation.

Overall, the network graphs show that alliance expansion did not produce a single uniform structure: NATO developed as a dense, shared system of mutual commitments, while the Warsaw Pact remained centralized around a dominant core. This contrast highlights that growth in alliances was accompanied by important differences in how power and obligations were organized, the next step is to examine whether periods of intense global conflict—especially the World Wars—pushed states away from rigid, high-commitment defense pacts toward more flexible, low-commitment arrangements.

2. World Wars and the Transformation of Alliance Commitments

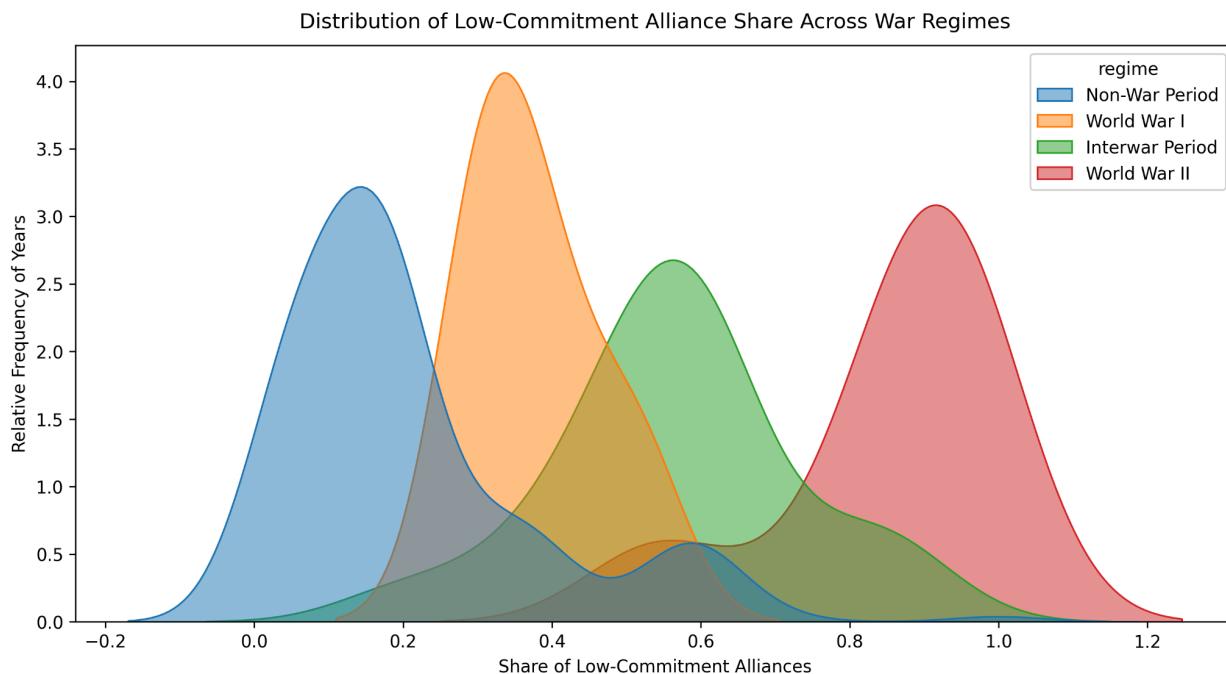
Major systemic conflicts place extraordinary pressure on international cooperation. During large-scale wars, states confront heightened uncertainty, rapidly shifting threats, and the risk of being locked into costly obligations. Under these conditions—particularly during World War I and World War II—states increasingly relied on low-commitment alliance arrangements rather than high-commitment alliance arrangements. This shift reflects how global conflict reshapes not just the number of alliances, but the nature of commitment.

- **Low-Commitment Alliance Agreements - Ententes, Non-Aggression pacts**
- **High-Commitment Alliance Agreements - Defense pacts**



- Both World War I, Inter War and World War II periods correspond with **sudden spikes in low-commitment alliances**.
- Post-1870 spikes reflect the shock of **German unification** and resulting uncertainty in Europe's power balance.
- During these periods, the **share of defense pacts drops sharply**, indicating a retreat from binding obligations.
- The shifts occur as **abrupt breaks rather than gradual trends**, showing that war directly alters alliance behavior.
- States turn to flexible agreements to preserve strategic autonomy while maintaining cooperation under uncertain wartime conditions.

The distribution plot complements the time-series evidence by showing how alliance behavior differs across war regimes. Instead of focusing on when changes occur, this visualization shows **how alliance strategies cluster during different historical conditions**.



- **Each colored curve represents a different historical regime**, showing how often certain levels of *low-commitment alliance share* occurred during those times.

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- **The x-axis shows the share of low-commitment alliances.** Values closer to **0** mean defense pacts dominated; values closer to **1** mean low-commitment agreements dominated
 - **During non-war periods (blue curve),** most years cluster at low values on the x-axis, indicating that defense pacts were more common and low-commitment alliances were relatively rare.
 - **During World War I and especially World War II (orange and red curves),** the distributions shift strongly to the right, meaning a much larger share of alliances were low-commitment agreements in most wartime years.
 - **The separation between curves shows a structural change, not noise:** wartime years consistently exhibit higher reliance on low-commitment alliances compared to peacetime, reinforcing the idea that global conflicts fundamentally alter how states manage alliance commitments.

Conclusion:

This study demonstrates that international alliances have undergone a significant long-term expansion, becoming an increasingly central feature of the global security architecture. From the early nineteenth century through the post-Cold War era, states relied more heavily on formal cooperation to manage security concerns, reflecting the growing complexity and interdependence of the international system. The empirical evidence presented in this project confirms that alliance formation was not static or episodic, but part of a sustained structural transformation in world politics.

At the same time, the analysis shows that major systemic shocks—most notably World War I and World War II—fundamentally altered the nature of alliance commitments. During these periods of extreme uncertainty, states shifted away from rigid defense pacts toward more flexible, low-commitment arrangements, allowing them to balance cooperation with strategic autonomy. The visual evidence supports the conclusion that global conflict places alliances under pressure, reshaping not only how many alliances exist, but how deeply states are willing to commit. Together, these findings confirm that alliances expand over time, yet adapt in form during crises, fulfilling the central objective of this study and validating its core argument.

Future Extensions and Next Experiments:

- Extend the analysis beyond 2012 to examine how **contemporary global shocks** affect alliance behavior.
- Conduct a **pre- and post-COVID-19 comparison** to assess whether large-scale non-military crises also encourage shifts toward **low-commitment or informal cooperation**.
- Undertake a focused case study of the **Russia-Ukraine war** to analyze how modern high-intensity conflict shapes alliance formation, expansion, and strategic signaling.
- Pay particular attention to **NATO dynamics** and the responses of **non-aligned states** during this conflict.
- Use these extensions to test whether the **World War-era patterns** identified in this study persist in the **twenty-first century**, reinforcing the argument that systemic shocks reshape not only alliance size but also **depth of commitment**.

References and Citations:

1. <https://correlatesofwar.org/data-sets/formal-alliances/>
2. <https://www.nato.int/en/about-us/official-texts-and-resources/official-texts/1949/04/04/the-north-atlantic-treaty>
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