The Limitations of Liberal Interdependence in Strategic Technologies: The Case Study of the U.S.–China Chip War

Haadia Riaz[1], Fouzia Amin[2]

Abstract

This paper analyses the limitations of liberal interdependence theory in explaining the state's behaviour in strategic technology sectors, using the U.S.-China semiconductor conflict as a case study. Semiconductors are incorporated in highly integrated global value chains (GVCs), with the United States generating over 48 percent of the world's chip design revenues, TSMC in Taiwan manufacturing 90 percent of advanced logic chip designs less than seven nanometers, and China supplying over 70 percent of global assembly, testing, and packaging, and importing more than USD 400 billion of chips each year. Despite such profound interdependence, the United States imposed export controls on Huawei and other Chinese companies in 2022, which threatens to cost the domestic companies billions of dollars annually. On the other hand, China has invested more than USD 150 billion since 2014 in the chip sector. These changes indicate the breakdown of the liberal assumptions of mutual vulnerability, the market's rationality, symmetry, and the separability of economic security in strategic areas. The results highlight the fact that economic integration does not necessarily limit strategic behaviour, which provides theoretical and policy implications for the governance of semiconductors and new high-tech sectors.

Keywords: *liberal interdependence, geo-economics, semiconductors, U.S.–China rivalry, global value chains, strategic technologies*

Introduction:

The semiconductor sector has become the hidden backbone of economic growth, technological advancement, and strategic rivalry worldwide. These chips are embedded in almost every new technology, such as smartphones, data centers, renewable energy systems, artificial intelligence, and precision-guided weapons. Semiconductor sales worldwide reached USD 676 billion in 2022 (Semiconductor Industry Association, 2023), more than 2 times the amount over the past decade, with China alone accounting for nearly 30 per cent of the total and thus the largest single market in this category of vital elements. This ubiquity is indicative of the strategic

[1] MPhil Scholar, Department of Strategic Studies, National Defense University Islamabad.
Email: haadiariaz96@gmail.com

[2] Assistant Professor, Department of Strategic Studies, National Defense University, Islamabad.
Email: fouzia@ndu.edu.pk

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interests of semiconductor production and control, which render commercial products as being weaponized in geopolitics.

Liberal interdependence theory traditionally provided a paradigm of the interaction of economic integration and conflict. According to this theory, economic relationships diminish the risk of interstate conflict by increasing the material costs of coercion, integrating states into rewarding relationships, and limiting behaviour by market values. With its multifaceted global value chains (GVCs) and intense integration of the United States, China, and other associated economic blocs, semiconductors seem to offer a paradigmatic example of liberal assumptions. Indicatively, China imported more than USD 400 billion of semiconductors each year between 2017 and 2021 (U.S. International Trade Commission, 2023), the largest importer of chips, where U.S. chipmakers received between 25-40% of their world revenues in China (U.S. International Trade Commission, 2023).

However, the current U.S-China semiconductor competition has put these hypothetical assumptions into question. Although there is great interdependence between the two, coercive actions of the states have not been restrained by economic integration. The 2022 export controls on advanced logic chips by the U.S., which include the ban of extreme ultraviolet (EUV) lithography machines and electronic design software, show that states are willing to make strategic goals over self-interested economic decisions. (Sargent et al., 2023) These were implemented despite the U.S. companies' warning of losing a billion a year to these measures, and the possible cumulative losses of USD 100 billion within the 10 years. (U.S. Department of Commerce, Bureau of Industry and Security, 2023) China accelerated its state-driven investment, exceeding USD 150 billion since 2014, which demonstrates the strategic determination to get technologically self-sufficient despite global interdependence.

These changes demonstrate some important dynamics. First, interdependence within strategic technological areas is usually asymmetric, where upstream chokepoints give coercive power to hegemonic players. Second, chips have a dual-use nature, which, together with their critical position in military and other critical infrastructure, makes security issues a priority over efficiency in the market. Third, states are becoming more actively involved in global value chains by applying industrial policy, export controls and coordination of alliances, turning interdependence into a stabilizing mechanism into a strategic competition instrument. These characteristics point to the shortcomings of liberal interdependence as a model of the analysis of technological rivalry in the fields of strategic value.

This paper will discuss these dynamics by considering the U.S.-China semiconductor relationship, evaluate liberal interdependence theory with empirical evidence, and determine the explanatory strength of the geo-economic framework. Geo-economics sees economic networks as a tool of power, leverage and strategic advantage, contrary to liberal models. The case of the U.S.-China chip war is one of the examples of how interdependence can be weaponized, redefined, and decoupled selectively to fulfil long-term strategic objectives.

The paper is further divided as follows. Section Two provides the main assumptions of liberal interdependence theory. The third section looks into the structure of global semiconductor value chains and interdependence patterns of the US and China, as well as the associated economies. Section Four examines the failure of this liberal interdependence to restrain state action. Section Five constructs a geo-economic understanding of the semiconductor GVC, revealing how the economic networks are employed as a tool of strategic leverage by the states.

Core Assumptions of Liberal Interdependence

The Liberal interdependence theory posits that deep economic integration among states creates incentives to cooperate and limits the application of coercion. (Rosecrance, 1986) The theory, which has its foundations in classical liberal political economy and was subsequently formulated in the neoliberal institutionalist school of thought, holds that the growth of trade, investment, and production networks alters interstate relations by making war more costly. (Keohane & Nye, 2012) Economists and other scholars such as Richard Rosecrance, Robert Keohane, Joseph Nye, and Andrew Moravcsik have highlighted how economic interdependence changes states' preferences, alters cost-benefit calculations, and integrates states into institutional and market forms that deter unilateral aggression. (Keohane & Nye, 2012) Although the theory does not refute the continuity of competition, it presumes that economic entanglement essentially moderates strategic behavior (Gartzke, 2007). This section describes the fundamental assumptions of liberal interdependence underlying these expectations.

Liberal interdependence is based on the premise of mutual vulnerability, which assumes that states that are integrated in broad economic networks are vulnerable to shocks in trade and investment flows. (Keohane & Nye, 2012) The idea of complex interdependence, developed by Keohane and Nye, highlights the fact that vulnerability is not only a result of exposure to economic exchange but is also caused by the inability to adapt to its destabilization (Keohane & Nye, 2012) Coercive measures like sanctions, embargoes or trade restrictions are costly to a state when states rely on each other to achieve economic welfare (Gartzke, 2007). According to liberal theorists, this mutual exposure would lead to incentives for restraint since conflict would be economically self-harming instead of strategically self-defeating. (Moravcsik, 1998) This reasoning is further supported by the concept of the trading state proposed by Rosecrance, who argues that states are increasingly seeking wealth by exchanging goods as opposed to seeking power by expanding their territories, and therefore, economic stability is a national interest. (Rosecrance, 1986).

A second underlying assumption is the rationality of the market and the constraining role of economic actors. Liberal theory assumes that private firms, investors, and consumers are strong domestic players that priorities efficiency, profitability, and predictability. (Keohane & Nye, 2012) Based on the liberal theory of state preferences as proposed by Moravcsik, state actions are the expression of societal interests, not autonomous geopolitical needs (Moravcsik, 1998, pp. 40–50). Economic actors will consequently seek to lobby against policies that destabilize markets, generate retaliation, or threaten long-term growth. (Moravcsik, 1998) According to this perspective, domestic political pressures constrain the readiness of governments to adopt coercive economic policies, especially those policies that jeopardize employment, innovation, or even competitiveness. (Moravcsik, 1998, pp. 40–50) Markets, rather than states alone, are viewed as disciplinary mechanisms that deter economically irrational behaviour (Gartzke, 2007).

Closely related is the assumption of positive-sum results of economic integration. Liberal interdependence theory denies the zero-sum logic of a realist competition, instead highlighting that trade and investment are mutually beneficial. (Keohane & Nye, 2012) Drawing on classical economic theory from Adam Smith and David Ricardo, liberal scholars argue that specialization and comparative advantage allow all participating states to benefit from exchange. (Smith, 1904, Book I, Ch. 3) Keohane goes further by affirming the role institutions play in minimizing transaction costs, adding more transparency, and stabilizing expectations, which further increases the cooperative impact of interdependence. (Keohane & Nye, 2012) States have a greater interest in maintaining the system that brings them economic benefits as these gains accumulate, which diminishes the motivation to disrupt the status quo by engaging in warfare or force. (Keohane & Nye, 2012)

The other main assumption is that economic and security realms are separable. Liberal interdependence theory conventionally assumes a wide separation between economic exchange and military and strategic competition. (Keohane & Nye, 2012) Liberals recognised that there might exist political tensions, but argue that even in times of diplomatic strain, economic relations tend to persist. (Keohane & Nye, 2012). This assumption indicates that markets are governed by efficiency and profit logics instead of power and domination logics (Gartzke, 2007). Keohane and Nye maintain that in the conditions of complex interdependence, military force turns into a less efficient tool of dispute resolution, as states rely on multiple channels of interaction beyond security competition. (Keohane & Nye, 2012) Economic engagement, in this framework, acts as a balancing mechanism that can co-exist with political disagreement (Keohane & Nye, 2012)

Finally, liberal interdependence assumes a degree of symmetry in dependence which strengthens mutual restraint. While Keohane and Nye distinguish between sensitivity and vulnerability, liberal theory generally presumes that deeply integrated states are constrained in relatively comparable ways. When dependence is symmetric, neither state can exploit economic ties without incurring equivalent costs. This is a preconception upon which it is assumed that interdependence makes coercion more difficult and economic pressure less effective. Even with the asymmetries, liberal scholars tend to believe that those institutional mechanisms and market adjustments tend to offset their strategic implications in the long term (Keohane & Nye, 2012). The next part shifts between theory and empirical structure by looking at global value chains in semiconductors and patterns of interdependence, tracing how production, design, manufacturing, and equipment supply are deeply independent and globally distributed.

Global Value Chains in Semiconductors and Patterns of Interdependence

The nature of the global semiconductor industry is highly complex, with a geographically dispersed production, design, and consumption network. The production of semiconductors is not concentrated in one country, but it goes through several steps with different locations with specialized functions. The global value chain (GVC) of the industry can be roughly categorized into design, fabrication, assembly, testing, packaging and distribution. U.S.-based firms like Nvidia, AMD and Intel are the leading players in chip design in the world, with Nvidia alone contributing about 50 percent of the total top chip design revenues in the world. (OECD, 2025) These companies are complemented by specialized electronic design automation (EDA) software vendors, the majority of whom are Synopsys, Cadence, and Mentor Graphics, which dominate more than 90% of the market (TrendForce, 2025), and which illustrates how knowledge and intellectual property are concentrated at the upstream end of the value chain.

The next important phase is fabrication, which involves huge capital and technology. More sophisticated nodes, especially the chips smaller than seven nanometers, are mostly made in Taiwan and South Korea. Taiwan Semiconductor Manufacturing Company (TSMC) is a single company that manufactures approximately 70 percent of all contract-manufactured chips in the world and almost 90 percent of the advanced logic chip manufacturing below seven nanometers (Economy Insights, 2025). In South Korea, Samsung holds another major portion of the state-of-the-art manufacturing (Yeju, 2025). The concentration of the fabrication capability in a few actors highlights the fragility and interdependence of the industry: an event in Taiwan or South Korea would be felt across all world supply chains, both in the manufacturing of consumer electronics and in vital industrial and defence products (Insights, 2025).

The assembly, testing, and packaging are downstream activities that are highly located in China. JCET and Tongfu Microelectronics are Chinese companies that rank among the top players in assembly and testing. (TrendForce, 2025) This enables China to act as a strategic point of converting raw or semi-finished wafers to integrated circuits that are deployable. This dependency is downstream, which is complemented by the fact that the country is the largest consumer market of semiconductors. In 2021, China imported over USD 432.6 billion in chips, which offers upstream manufacturers a market of unprecedented size (South Asia, 2023).

Interdependence is further enhanced during the distribution and integration phase. Consumer electronics, telecommunications systems, industrial machinery, and, more recently, military platforms contain chips manufactured by the global value chain. Even the smallest disturbance in one of the most important nodes, e.g., fabrication plants in Taiwan or EUV lithographers in the Netherlands, can cause ripple effects that can affect the supply and pricing around the world. As an example, ASML, the Dutch manufacturer of almost 100 per cent of extreme ultraviolet (EUV) lithography equipment, the key component in the manufacture of highly advanced chips, costs around USD 150 million per unit (Satariano, 2025). The dependence of TSMC, Samsung, and other manufacturers on this equipment depicts the multi-country dependencies that characterize the industry (Miller, 2022, pp. 279–285).

It is also interdependent in the aspects of technical expertise and human resources in the semiconductor GVC. The high-tech production of chips needs not only physical facilities but also many specialized skills in design, fabrication, and testing. The concentration of workforce and IP protection provides further levels of dependency. The countries which have access to high-end technology and skilled personnel, like the United States, the Netherlands and Taiwan, are placed in a structural position in the chain as other economies depend on their upstream partners to provide inputs and technical advice (Sargent, Singh & Sutter, 2023).

The extent of such interdependence is further indicated by quantitative measures. As of 2022, the sales of semiconductors in the world amounted to USD 676 billion (Semiconductor Industry Association, 2023), which indicates the economic size of the sector as well as the extent of integration within the country economies. The import dependency of China, coupled with the U.S. control in design and allied control in fabrication equipment, guarantees that production and consumption are cross-border and highly structured and mutually supportive. The assembly and packaging processes in China are also dependent on foreign input to a large extent, and more advanced designs made in the U.S are impossible to achieve without Asian fabrication capacity, which makes it a web of interdependent relationships. Therefore, the global semiconductor GVC is an example of intense interdependence, with key capabilities that are spread out in several nations, and each country has a specific and non-substitutable set of roles. The semiconductor GVC structure offers a good empirical basis on how, even with a great deal of economic integration, interdependence may still fail to constrain strategic behaviour- a question answered in the next section.

Why Interdependence Fails to Constrain State Behaviour in the U.S.–China Chip War

Although the semiconductor global value chain is deeply interdependent, the U.S.-China chip war shows that liberal interdependence theory does not necessarily inhibit state behaviour as a result of this kind of interdependence. The historical experience of the last five years shows that asymmetric dependencies, dual-use technologies, security primacy, and state intervention are some of the factors that act in the opposite direction to the restraining role of mutual economic dependence.

Dependence is an asymmetric phenomenon that is one of the most vivid aspects of the U.S.-China semiconductor conflict. As mentioned earlier, China is the biggest consumer of semiconductors, particularly for upstream technologies like advanced logic chips, extreme ultraviolet (EUV) lithography machines, and electronic design automation (EDA) software. Conversely, the United States, the Netherlands and the allied economies dominate these key nodes structurally. As an example, the Dutch company ASML manufactures almost all EUV lithography equipment, at an average price of USD 150 million per unit, which is needed to manufacture chips less than seven nanometers (ASML Holding N.V., 2024). In Taiwan, TSMC has over 90 percent of the advanced node manufacturing (Sargent, Singh & Sutter, 2023). This concentration allows the upstream actors to use coercive leverage to selectively constrain the downstream partners and shield them against similar weaknesses. In this respect, interdependence is not reciprocal anymore; it is a strategic instrument but not a stabilizing mechanism.

The dual-use aspect of semiconductors further adds limitations to liberal interdependence. Both civilian and military technologies have chips embedded in them, ranging from artificial intelligence systems and telecommunications infrastructure to sophisticated defence platforms. By the early 2022s, modern military systems had become deeply dependent on sophisticated microelectronics, rendering the regulation of the chip chain of supply a national security concern, rather than merely a commercial interest (CSIS, 2021). This aspect of security provides states with the incentives to act even when it risks short-term economic costs. This dynamic was seen in the export restrictions imposed by the United States on Huawei and other Chinese companies in 2022 (Congressional Research Service, 2022). The restrictions were extended and implemented despite the warning given by the U.S. semiconductor industry that they would decrease revenues by billion yearly and possibly hurt long-term innovation, (MLQ.ai, 2025) which indicated that it was ready to pay high economic prices to obtain technological independence.

The intervention by the state, whether direct or indirect, has essentially altered the semiconductor GVC, which further undermines the restraining force of interdependence. The United States government put export restrictions on advanced chip technology, coordinated export restrictions with allies (like Japan and the Netherlands), and gave subsidies via the CHIPS and Science Act, with an estimated

USD 52.7 billion subsidized to domestic semiconductor manufacturing and research (United States Congress, 2022). Meanwhile, China also followed aggressive industrial policy, such as huge state-funded investments, building of domestic fabrication capacity, and subsidies to local chip design companies (National Development and Reform Commission [NDRC], 2023). These interventions underscore the active role of governments in GVCs, rather than the passive role, breaking the liberal argument that economic actors are the ones to exercise discipline.

Additionally, interdependence fails to constrain behaviour because market incentives are subordinated to strategic imperatives. U.S. chipmakers, Intel, AMD, and Qualcomm, among others, made numerous statements to the effect that export restrictions would interfere with economies of scale, cripple R&D, and lower profitability. These economic issues, however, were secondary in comparison with the national security issues. Likewise, the investments in the semiconductor industry in China are fueled not only by the market opportunities but also by the necessity to minimize the susceptibility to highly important technologies. China has been spending more than USD 150 billion in semiconductors since 2014, with emphasis on the development of indigenous fabrics, advanced packaging and talent (Miller, 2022, pp. 150–155). These numbers demonstrate that interdependence, although economically important, does not necessarily mean behavioral restraint in situations with a high level of strategic interests.

The chip war between the U.S. and China also demonstrates the weakness of the liberal assumptions about symmetry. Although liberal theory assumes that the level of interdependence is equally distributed, the semiconductor industry is very hierarchical in nature. TSMC, ASML, and U.S.-based EDA companies (upstream actors) are endowed with structurally significant positions. Downstream assemblers, such as Chinese companies, in contrast, rely on upstream inputs that cannot easily be replaced (Yeju, 2025). This asymmetry of structure allows the upstream producers and their sponsoring states to exert a disproportionate power over their competitors, which points to one of the fundamental flaws of the liberal assumption that interdependence induces mutual restraint.

Furthermore, the continuity of the interdependence and the coercive actions of the state show that interdependence can be turned into a weapon. Global supply chains are still interconnected, despite export restrictions and state-directed strategic maneuvering. China still uses U.S and allied technologies in high-end chip manufacturing, and the U.S and allied companies are also commercially vulnerable to the Chinese market. Such a dynamic shows that interdependence is not eliminated in the face of conflict; it is exploited selectively to meet geopolitical objectives (Satariano, 2025), which liberal theory does not comprehensively predict.

Table 1: *Comparative Analytical Framework of Liberal Interdependence and Geo-economic Interpretations in the Semiconductor Industry*

Analytical Dimension	Liberal Interdependence	Semiconductor Evidence	Geo-economic Interpretation
Nature of Interdependence	Mutual vulnerability encourages cooperation	Upstream chokepoints create asymmetry	Interdependence used as leverage
Role of Markets	Market rationality constrains states	Firms oppose export controls but states override	Strategic priorities dominate markets
Economic Outcomes	Positive-sum cooperation	Selective decoupling and fragmentation	Economic networks used for power projection
State Role	States constrained by domestic economic actors	Massive industrial policies and subsidies	States actively restructure supply chains
Security–Economy Relationship	Separate spheres	Dual-use chips merge security and economy	Economic policy becomes security strategy
Structure of Dependence	Symmetrical and stabilizing	Hierarchical and chokepoint-based	Network centrality produces coercive capacity

Empirical developments in the semiconductor industry as summarized in Table 1, systematically falsify the basic assumptions of liberal interdependence and instead are consistent with geo-economic interpretations. The failure of liberal assumptions is due to asymmetric dependencies, dual-use applications, state intervention, market subordination to strategic goals, and structural hierarchy. Although economic integration is comprehensive, it is no longer a restraint; interdependence has become an instrument of power and not a stabilizing element. This empirical fact preconditions the shift towards a geo-economic approach that would be more appropriate in terms of strategic manipulation of economic networks and selective handling of interdependence.

Geo-economic Framework and Strategic Technology Governance

Geo-economics, which envisions economic networks as arenas of power and vehicles of strategic leverage, provides a more suitable lens to understand the US-China chip war competition. The contemporary conception of the notion is generally credited to Edward Luttwak, who, in his seminal 1990 article, proposed that the logic of conflict between major powers is increasingly evolving towards a pattern of economic competition. According to Luttwak, while the grammar of conflict remains geopolitical, the instruments of competition is increasingly commercial, technological, and financial (Luttwak, 1990). Based on this foundation, subsequent scholars extended the analysis of geo-economics. Blackwill and Harris developed geo-economics as the strategic application of economic instruments, such as trade policy, investment controls, and financial sanctions, to pursue national strategic goals (Blackwill & Harris, 2016, pp. 20–30).

More recently, Farrell and Newman proposed the notion of weaponized interdependence in which states that are in central positions within the global economic networks can leverage structural asymmetry to exert coercive leverage (Farrell & Newman, 2019). Within the framework of strategic technologies like semiconductors, these views underscore how the integration of economies can be engineered as an instrument of power rather than a form of cooperation. The U.S.-China semiconductor rivalry is one of the modern expressions of this developing geo-economic logic. Contrary to liberalism, where mutual vulnerability and market discipline restrain the acts of the states, geo-economics knows economic dependence can be deployed as a weapon, selectively decoupled, and managed strategically pursue geopolitical motives (Luttwak, 2012). These dynamics are clearly demonstrated in the semiconductor global value chain (GVC).

The central element of the geo-economic approach is the fact that states take advantage of structural imbalances in economic networks. These asymmetries are starting in the semiconductor industry. The advanced fabrication and design technology is concentrated in a limited number of actors: TSMC in Taiwan manufactures about 90 percent of the advanced logic chips under 7 nanometers, ASML, in the Netherlands, supplies almost all extreme ultraviolet (EUV) lithography machines, and U.S. companies dominate the electronic design automation software, controlling more than 90 per cent of the market worldwide (Miller, 2022, p. 135). These chokepoints provide the upstream actors and their sponsoring states with disproportionate power over their downstream partners. The United States has been exploiting these chokepoints by imposing coordinated export controls to discriminate against limited access to Chinese companies to critical technologies, while maintaining overall commercial exposure to global markets.

Weaponized interdependence is also evident in the coordinated efforts of the United States and its allies. The case of the U.S. export ban on advanced logic chips in 2022, enforced in collaboration with policy consultations with Japan and the Netherlands, is a good example of how states can use centrality of networks to achieve geopolitical objectives. Such actions impacted firms like Huawei and SMIC by limiting their ability to access state-of-the-art technologies (Semiconductor Industry Association, 2023). The approach has selective disconnection: although the global semiconductor network will continue to exist, its most strategically relevant nodes are insulated, in order to avoid technology parity by rivals (Xu & Qiu, 2025). This dynamic cannot be entirely explained through the liberal interdependence theory, which assumes that mutual dependence limits coercion instead of allowing targeted influence.

Industrial policy run by the state is also an example of geo-economic logic. Both China and the United States have invested more than ever to influence the semiconductor GVC in retaliation for the perceived technological weakness. In 2022, the U.S. CHIPS and Science Act provided USD 52.7 billion to the domestic manufacturing and research, with a focus on the production capacity as well as innovation of leading-edge nodes (United States Congress, 2022). Whereas China has invested more than USD 150 billion in national semiconductor funds, infrastructure development, and support of local chip design companies (Congressional Research Service, 2023). The extent of state intervention in the semiconductor industry can further be seen in the size of the public investments and industrial policies adopted in the leading economies as shown in Table 2. They are not entirely market-oriented investments; they are calculated interventions to control vulnerability, increase autonomy and project strategic impact in a vital international industry. Geo-economics views such practices as deliberate interventions in economic networks to create long-term power projections, and not market exceptions or anomalies. (Morse & Lewis, 2023).

Table 2: *State-Led Semiconductor Investments and the Shift from Comparative Advantage to Strategic Autonomy*

Country / Region	Estimated Public Investment / Subsidies (verified)	Key Program / Policy
United States	$52.5 billion for CHIPS for America (semiconductor manufacturing & R&D)	CHIPS and Science Act of 2022 (U.S. Department of Commerce, 2026)
China	~$95.7 billion total assets under the National Integrated Circuit Industry Investment Fund	National Integrated Circuit Industry Investment Fund ("Big Fund") (Blaugher & Gordon, 2025)
European Union	Up to ~€43 billion public investment mobilized under Chips Act	European Chips Act (capacity + supply chain & R&D) (European Commission, 2026)
South Korea	~20 trillion KRW (~$14.6 billion+) in government semiconductor support programs	Multiple semiconductor ecosystem funds / financial packages (News1/CHOSUNBIZ, 2024)

Japan	¥590 billion (~$3.9 billion) confirmed subsidies for Rapidus (plus broader government support measures)	Japanese semiconductor revitalization & subsidies (Argus Media, 2024)
India	~₹65,000 crore (~$7–10 billion) in semiconductor incentives under India Semiconductor Mission	India Semiconductor Mission (ISM) (India Science and Technology Portal, 2026)

The fact that semiconductors have dual uses increases the applicability of a geo-economic structure. The civilian and military technologies, such as AI platforms and 5G infrastructure, as well as advanced weapons systems, rely on chips. (Congressional Research Service, 2023). States can determine commercial performance as well as national security by managing access to strategically valuable nodes in the GVC. As an example, limiting access of China to EUV lithography machines or state-of-the-art logic chips not only affects smartphone production, but also AI-based defence systems and critical infrastructure. Geo-economics describes this cross of economic and security goals, highlighting that within the domain of dual-use capabilities, economic interdependence cannot be isolated from strategic rivalry. (Kliman, 2022).

Geo-economics has an explanatory power supported by quantitative evidence. The revenue of TSMC of advanced-node fabrication is over USD 22 billion in 2022 (TSMC, 2024), and the shipment of 38 EUV machines of ASML is approximately USD 150 million each (Satariano, 2025), which reflects the size of the market and strategic centrality. The imports of semiconductors in China have been above USD 400 billion each year, and this indicates that it is still relying on the global supply chains. In the meantime, the involvement of massive state funding in the production within the country points to the degree to which governments are actively involved in the manipulation of economic networks to gain strategic leverage. These numbers depict the duality of the interdependence as a commercial need as well as a means of geopolitical leverage.

Conclusion

The U.S.-China semiconductor war demonstrates that extensive economic interdependence, even in strategically critical areas, does not necessarily produce restraint. This article analysis indicates that the global semiconductor value chain is highly integrated, i.e. in terms of design, fabrication, assembly and distribution, but the structural concentration of capabilities, dual-use nature of chips, and state intervention are all aspects that work against the assumptions of liberal interdependence. Although China consumes more than 30 percent of the world's semiconductor consumption and American companies obtain up to 40 percent of their revenues in China, interdependence has not limited strategic decision-making. On the contrary, it has turned out to be a ground of leverage, selective decoupling, and long-term power projection.

Therefore, these results have significant theoretical implications. The liberal interdependence theory, though applicable in traditional trade and financial integration, cannot be used to explain the dynamics of strategic technology sectors. Its assumptions of mutual vulnerability and market discipline fail in industries' capabilities by dual-use applications, concentrated capabilities and heavy state involvement. A geo-economic view, in contrast, focuses on the manipulation of interdependence in terms of strategy, the exploitation of structural asymmetries by states in order to gain technological advantage. The rivalry between the United States and China in the semiconductor industry, therefore, demonstrates that interdependence theory has to be reconsidered in the context of the era of high-tech rivalry, with a particular focus on the overlapping of economic and strategic goals.

Policy implications are also far-reaching. Policy implications are also far-reaching. States located in key technological GVCs need to understand that interdependence can be both a weakness and a source of strategic leverage. In the case of the United States, the dilemma is to stay technologically ahead but still have access to the global market, a balance that has been maintained by concerted export controls, subsidies, and alliances. The priority of China should be to minimize upstream vulnerabilities, invest in local capabilities, and strategies dependencies to counter coercion. The asymmetric character of the interdependence that developing economies are involved in semiconductor value chains should also consider how reliance on the critical upstream nodes can expose them to geopolitical risk, despite the commercial benefits it has.

In the future, the U.S.-China chip war sets the example of how to govern emerging technologies like artificial intelligence, quantum computing, and critical minerals. The same dynamics will be replicated in these industries due to economic integration, elevated strategic value, and technological concentration. A geo-economic framework offers a potent means of perceiving the weaponization, exploitation and selective decoupling of interdependence, which can offer policymakers an analytical tool to predict risks, manage dependencies, and protect national interests.

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