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## **The Risk of De-Risking: Dissecting ASEAN's Exposure Within the Intricate Weave of Global Trade**

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# The Risk of De-Risking: Dissecting ASEAN's Exposure Within the Intricate Weave of Global Trade

Xin Yi\*

## Abstract

Pundits often discuss the benefits for ASEAN nations from the relocation of FDI due to de-risking policies. In this essay, I explore the converse: the potential collateral damage that ASEAN could face from such initiatives. My analysis focuses on risk concentration in over 5,000 individual products and the intricate interconnections within modern supply chains. The findings offer several insights. First, I argue that de-risking cannot be properly understood without examining product-level trade data, and aggregate statistics would mask concentration of ASEAN's trade with China which leads to indirect spillover risks for ASEAN. The concept of risk premium is also introduced to rationalize the observed de-risking dynamics. Second, among a global cohort of more than 60 major economies, ASEAN's exposure to collateral damage is particularly high due to both import and export concentration in intermediate trade with China. However, this should not be misconstrued as economic dependency on China, a point that requires careful consideration through the lens of a gravity model of trade. Third, I connect my data with international input-output tables to pinpoint specific ASEAN products at risk from spillover impacts. This essay illustrates these vulnerabilities through case studies of critical supply chains such as semiconductors and electric vehicles. My findings underscore the importance of policy mitigation for ASEAN products that are incidentally caught in the shifting geoeconomic landscape. Furthermore, they highlight the need for deeper trade integration, preferably through establishing a free-trade area centered on rules of origin between de-risking countries and ASEAN. This approach is far more sustainable and would strategically incentivize supply chain diversification away from China rather than alienating ASEAN with punitive tariffs.

*Key Words:* ASEAN; De-Risking; Interconnectedness; Supply Chain Diversification; Spillover Risk; Collateral Damage; Gravity; Strategic Trade Policies; Rules of Origin

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# 1 Introduction

Amid rising tensions, de-risking has emerged as a policy approach for nations seeking to reduce their over-dependence on a single country, notably China. This approach is equally important for businesses, especially in light of the heightened supply chain vulnerabilities exposed by the COVID-19 pandemic and the geopolitical uncertainties following the atrocious Russian invasion of Ukraine. As firms reevaluate their supply chain strategies, the focus has shifted back to diversification and resilience, moving away from previous emphasis on specialization, efficiency, and economies of scale.

Despite its growing importance, the concept of de-risking is often misunderstood by both pundits and the public. What does it mean to de-risk? Is the impact uniform across all societies? In an interconnected world, should governments consider the potential collateral damage when they manage international relations and strategic competition with China? What should businesses consider when they withdraw growth money out of China and diversify their supply chains, which remain deeply intertwined with Chinese markets? Is it a sustainable approach for nations to impose punitive tariffs on third parties in order to force them to de-risk from China as well?

This paper aims to partly address these issues within the ASEAN context. In particular, I argue that the impact of de-risking cannot be properly understood without examining trade data at the product level. There are several reasons for this. First, aggregate statistics mask concentration at the product level and hence defeat the purpose of examining “dependency risk.” If one examines hundreds or thousands of products—some risky, others not—all together (by sector or country), this effectively diversifies risks. Hence, the concept of de-risking becomes meaningless when approached with aggregate statistics. Second, I argue that the concept of risk itself is inherently linked to specialization and hence the relevance of products. Specialization and over-concentration induce efficiency, but they also create risks. In this sense, the return to specialization can be seen as a risk premium for over-concentration. Third, I argue that given the complex web of today’s global supply chains and the specialization of production, risks are not just about direct dependency risks but also about indirect spillover risks (i.e., collateral damage). While it is entirely within the agency of countries to de-risk from a specific trade partner, this will also inadvertently create collateral damage for some.

Given these understandings, I then examine product-level data for ASEAN’s trade with China. Several findings emerged. First, ASEAN’s trade with China appears to be heavily concentrated at the product level. In terms of imports from China, thousands of products are overly concentrated with China as the dominant supplier. In terms of exports to China,

hundreds of products are overly concentrated with China as the dominant market destination. Second, compared to a cohort of 60 major economies in the world, ASEAN's exposure to China is relatively one of the highest. But I argue that this result should be cautiously interpreted through the lens of a gravity model of trade, in the sense that the exposure is nothing but a manifestation of trade geography, as evidenced by the equally high exposure of other Asian economies such as Japan and Korea.

Next, I analyzed the product-level trade data by categorizing it according to supply chain stages. I found that for exports from the ASEAN-6 economies, over-concentration predominantly involve intermediate goods, parts, and components. In contrast, for imports, both intermediate goods and consumer products are equally significant. Notably, the high-concentration intermediate exports represent a more substantial share of total trade, indicating their relatively higher value. My findings highlight the potential for spillover risks. Consider a hypothetical scenario where the export concentration to China mainly involves consumer products. In such a case, reducing imports of goods from China would likely not cause direct disruptions across supply chains, since by assumption ASEAN's exports to China are consumption goods instead of intermediate goods. However, the current reality is that there is a significant concentration of intermediate exports to China. This means that reducing dependency on China could cause significant ripple effects throughout ASEAN's supply chains, particularly if investments were to move out of Asia entirely.

To further determine which products might face collateral damage from reducing reliance on China, I combined my product-level analysis with input-output tables. I began by identifying the Chinese sectors that have the highest number of exports with significant concentration to G7 countries, as these are the sectors most likely to be affected by de-risking efforts. Using the input-output tables, I then pinpointed the ASEAN sectors that heavily supply inputs for these Chinese outputs, as well as the specific high-concentration products within these broader sectors. My analysis revealed that thousands of Chinese products are highly concentrated in exports to G7 countries. This suggests that hundreds of products from the Chemicals, Textiles, Basic Metals, and Electronics sectors in the ASEAN-6 countries are potentially at risk of collateral damage, with nearly 40% of these products having a concentration ratio exceeding 90%.

My findings highlight the critical importance of proactive policy interventions to mitigate adverse spillover impacts for ASEAN products inadvertently entangled in the rapidly changing geoeconomic landscape. Additionally, my analysis underscores the need for deeper trade integration among ASEAN nations and their trading partners, who are keen to promote strategic diversification of trade relationships in East Asia. Establishing a free-trade area, particularly one that emphasizes rules of origin and provides market access for ASEAN

countries, could be instrumental in this context. This strategy would incentivize ASEAN countries to promote supply chain diversification without economic loss. Such an approach is more sustainable than the use of punitive tariffs, which could alienate ASEAN countries (Chor, 2024).

The remainder of the paper is organized as follows: Section 2 details the importance of product-level trade data. Section 3 examines the import and export concentrations of ASEAN products, as well as the stages of the supply chain, and compares these across ASEAN economies. Section 4 identifies the products that are exposed to collateral damage. Section 5 conducts three case studies on specific supply chains, such as those for electric vehicles (EVs) and semiconductors. Section 6 discusses policy implications of my work. Section 7 concludes.

## Related Literature

My work is related to several contemporary literature. First, it aligns with the studies by Baldwin et al. (2023), Mejean and Rousseaux (2022), and Dahlman and Lovely (2023). Similar to these projects, which focus on moving beyond aggregate statistics to understand de-risking, my research emphasizes product-level trade data to uncover the hidden risks associated with aggregation. While both Mejean and Rousseaux (2022) and Dahlman and Lovely (2023) computed Herfindahl index based on product-level trade data that is similar to my approach, their measures also incorporate other low-risk products and essentially provide only an ordinal comparison across industries.

My emphasis on individual product data also aligns with literature on specific supply chain relationships. Elliott et al. (2022) investigates the fragility of production networks by modeling firms' multisourcing decisions to insure against weak relationship strength. Thun et al. (2022) examines what they term 'Massive Modular Ecosystems' (MMEs) in the smartphone industry. Among other things, they find that the complex production networks and economies of scale have led to high degrees of market concentration at the component and parts level. Barrot and Sauvagnat (2016) notes that it is costly for firms to substitute specific inputs during the initial quarters of a supply chain disruption, which can lead to significant output losses. Carvalho et al. (2021) and Boehm et al. (2019) both study supply chain linkage during the 2011 Tōhoku earthquake. The former shows that input-output linkages are crucial for the amplification of shocks, while the latter finds evidence of a Leontief production network with minimal room for input substitution. Other works that have also considered specialized inputs include de Gortari (2019) and Pichler et al. (2023). I contribute to these perspectives by considering input concentration between ASEAN and China and

exploring the consequences of such concentration.

Second, my work contributes to the empirical literature on the reconfiguration of supply chains, including studies by [Alfaro and Chor \(2023\)](#), [Clancy et al. \(2024\)](#), [Freund et al. \(2023\)](#), and [Attinasi et al. \(2023\)](#). Additionally, my paper complements the literature on various general equilibrium models that simulate the impact of de-risking, such as those by [Bolhuis et al. \(2023\)](#) and [Okuda and Tsuruga \(2024\)](#). It also addresses literature on various adverse impacts of de-risking including [Cerdeiro et al. \(2024\)](#). My research introduce an additional dimension by examining spillover effects on third-party economies through the lens of individual products, rather than through counterfactuals with full-blown de-coupling.

Third, my essay contributes to discussions in the think tank space such as [Capri \(2023\)](#), [Zenglein \(2024\)](#), [Farrell and Newman \(2023\)](#) and [Pisani-Ferry et al. \(2022\)](#). My work offers a unique perspective from ASEAN countries in the Indo-Pacific, which are increasingly recognized as alternative locations for de-risking due to their favorable labor cost and strategic non-neutrality.

Last, my work relates to [Baldwin and Freeman \(2022\)](#) by interpreting the de-risking process through the lens of modern portfolio theory. My analysis complements theirs by introducing the concept of risk premium into the discussion, thereby interpreting current de-risking practices through this framework. Though neither our work utilizes a constrained linear programming approach to model the risk-reward tradeoff as suggested by [Markowitz \(1952\)](#). Our work is also related to [Caselli et al. \(2020\)](#), [Allen and Atkin \(2022\)](#), and [Baley et al. \(2020\)](#) which explored the relationship between volatility and trade and approached the question using quantitative trade models to assess risk-reward tradeoffs. Future work could build on this modeling approach and explore comparative statics of the multinational corporations' location choices when the volatility of a country increases sharply.

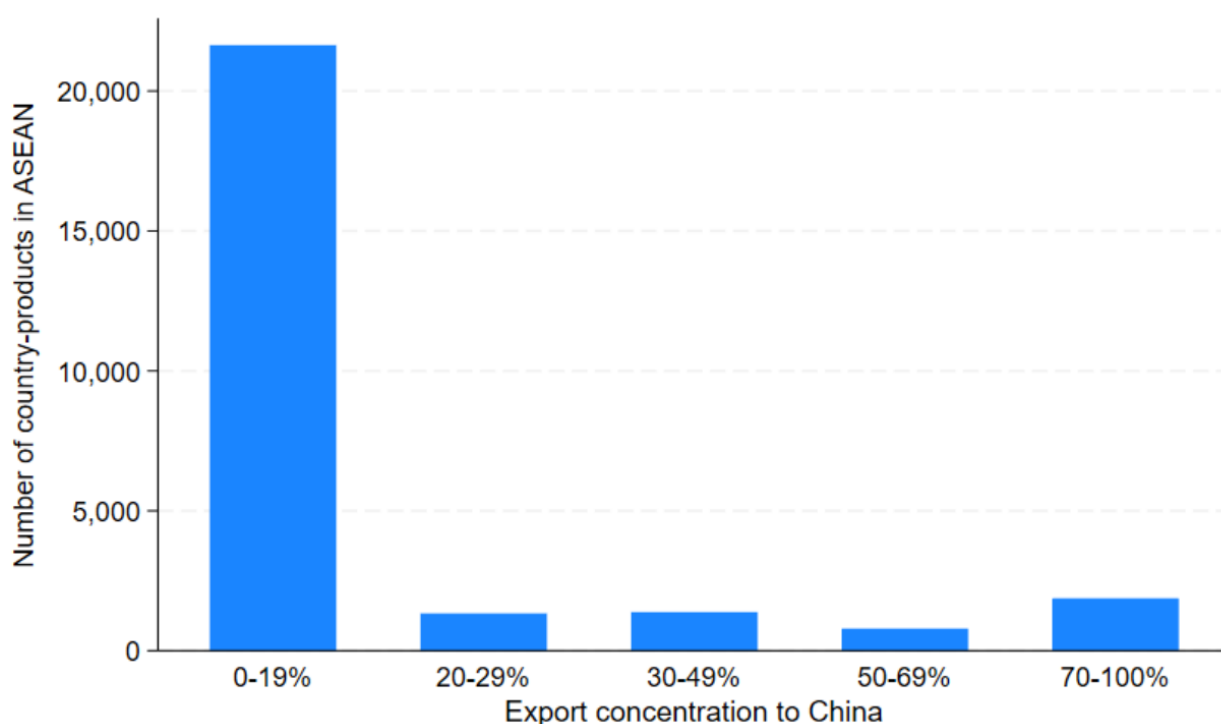
## 2 How to Properly Understand De-Risking?

Before examining ASEAN's exposure to collateral damage from de-risking using product-level trade data, I will first motivate the importance of these data. My key thesis is that aggregate statistics would mask nuances of each individual product and effectively diversify the risks across thousands of products. Hence, the concept of risks is inherently related to individual products and specialization, which are increasingly relevant to globalization.

## Why aggregate statistics diversify risks

First, I argue that aggregate statistics on risk concentration effectively mask the risks associated with individual products. To illustrate my point, I consider whether ASEAN's exports to China represent a risk in terms of over-concentration in the Chinese market. Using aggregate statistics, one might simply conclude that China is a significant trade partner, given that ASEAN's export share to China is about 18%. However, this conclusion falls short of identifying any real risk in ASEAN's exports since an 18% share is substantial yet not dominant. In contrast, if we tabulate the distribution of risk concentration across individual products in each ASEAN country, a more nuanced picture emerges. Figure 1 shows that while the majority have an export concentration of less than 20%, thousands of ASEAN products still face significant risks, as their export share to China exceeds 70%. This suggests substantial over-concentration and potential damage from supply chain disruptions. In other words, for the numerous local suppliers of these thousands of products across ASEAN countries, their businesses are heavily concentrated in China and would face existential threats, especially in the short term, if demand from China were to be substantially reduced.

Figure 1: Distribution of export concentration across country-product pairs in ASEAN



In this sense, examining de-risking from the perspective of aggregate statistics yields no useful conclusions. The broader the perspective, the less useful the derived conclusion

becomes. This occurs because a more aggregate view combines an ever-increasing quantity of individual products, each with varying levels of risk concentration. This effectively mimics the concept of diversification in financial portfolio management—the larger the basket of products, the greater the diversification. In the example above, we approached the question from the most aggregate perspective by including all products across ASEAN countries, resulting in tens of thousands of country-product pairs in the aggregation. This is an extreme example. But does the picture improve when one zooms into a more disaggregated view, such as by country or by individual sector or industry? One common sectoral definition used in media reports is the ISIC sectors, such as chemicals or electronics. However, each of these sectors still encompasses, on average, more than 200 individual 6-digit HS product categories. Therefore, although this approach may offer weak qualitative insights, it typically fails to provide quantitatively meaningful conclusions due to the broad aggregation of diverse product categories within each sector.

## **De-risking through the lens of portfolio management**

Next, I argue that the concentration of trade share across individual products is essentially a consequence of specialization and globalization. In particular, while specialization increases concentration risks, it also enhances the returns through economies of scale and cost efficiency. This can be viewed as a ‘risk premium’ associated with over-concentration and specialization.

Specialization and global trade allow economies to focus on the production of goods where they have a comparative advantage, to reap benefits from increasing returns to scale, and to enhance pro-competitive effects that self-select domestic firms that are more productive, leading to increased efficiency and production capacity. This concentration, however, also heightens risks as these economies become more dependent on each other. For instance, a country that specializes in the production of a single product may face significant economic disruptions if global demand for that product declines either because of strategic reasons or idiosyncratic shocks.

Thus, while it expands markets and potentially increases profits for specialized products, specialization and globalization also expose producers to heightened volatility due to concentration. To properly manage the risk-return tradeoff, the concept of risk premium, which refers to the additional returns required by investors or producers to compensate for the higher risks of specialization or overconcentration, could be applied here. This risk premium manifests through economies of scale, which lower production costs and increase profitability. However, these benefits must be weighed against the vulnerability created by over-reliance



on a single dominant supplier or market destination. Such concentration risks can lead to severe economic consequences if external shocks occur, such as a pandemic or geopolitical tensions that disrupt trade routes or demand.

Further extending this argument to corporate strategy, similar to financial portfolio management where assets with higher risks demand higher returns to compensate, a similar principle applies to trade and multinational production. If the risk associated with a specific production location increases—possibly due to political instability, supply chain disruptions, or sudden changes in geopolitical tensions—companies would subsequently demand higher returns to justify the continued investment in this economy. Without adequate returns, investors or companies might divest these assets or cease production, leading to a decline in the asset’s market value or the investment’s face value. Consequently, the price reduction could elevate the return to the investment, or the risk premium, to a level that compensates for the heightened risks. This argument is best illustrated by the heightened yields, in percentage terms, due to the price drop of stocks heavily exposed to Chinese markets in recent years. For example, the yield of CapitaLand China Trust currently stands at 9.5%.

This mechanism underlies corporate risk management strategies in China. Firms increasingly evaluate their exposure to the Chinese market in terms similar to portfolio management, weighing the risks and returns of continuing business amid changing conditions. In periods when Chinese manufacturing is extremely efficient and resilient to external shocks, firms engage in ‘up-risking’ by flocking to the Chinese market. They bid up asset (factories, land, properties) values until the asset yields are low enough to match the muted volatility in Chinese supply chains, leading to specialization and over-concentration. Conversely, in times of heightened volatility due to geopolitical tensions or supply chain disruptions, companies reassess their operational and investment strategies, mirroring asset management tactics in finance. This strategic recalibration, or ‘de-risking,’ results in the divestment of Chinese assets, causing asset prices to drop to a point where the returns are high enough to compensate for the increased risks.

## **Direct dependency risks versus indirect spillover risks**

The risks I have described so far are primarily in the form of direct dependency risks. While it is reasonable for certain countries or companies to view over-concentration in the Chinese market as a risk, especially given recent circumstances, other nations may not perceive these exposures as risks, depending on their own contexts or bilateral relations with China. However, globalization and specialization imply that there will also be risks for third countries in terms of collateral damage or spillover effects from de-risking.

Particularly, US-China relations entered a subdued state of geopolitical tensions during the two decades following the collapse of the Berlin Wall. After granting Permanent Normal Trade Relations to China and its accession to the WTO, globalization advanced, and specialization deepened rapidly in East Asia and Southeast Asia. This has increased the likelihood that entire supply chains are over-concentrated at various stages. Such over-concentration could be evident not only in the relationships between China and the G7 countries but also in the upstream relationships between China and the Southeast Asian countries within the same supply chain.

Hence, de-risking strategies could potentially trigger ripples throughout the entire supply chain and cause significant disruptions to the upstream ASEAN suppliers of intermediate inputs demanded by factories in China. In particular, if the G7 countries reduce their demand for specific products, such as smartphones produced in China, then the upstream demand for ASEAN's semiconductor output could also be affected. The impact could be especially severe if the sales of semiconductors are heavily concentrated in the Chinese market and if the diverted supply chains exit Asia entirely. We will revisit this point later.

So far, I have underscored the importance of individual products and specialization in assessing risks in international trade, as well as how specialization and globalization could lead to indirect spillover risks for ASEAN countries, beyond the direct dependency risks often highlighted through the conventional perspective of G7 countries. I will now turn to product-level trade data to examine ASEAN's risk exposure to de-risking.

### **3 ASEAN's Trade Concentration with China**

To summarize ASEAN's position regarding over-concentration across individual products, I have collected trade data for over 5,000 HS 6-digit products from 60 major economies during the period 2000-2022. I then computed the number of individual products for which China is a major supplier or market destination such that the trade share with China exceeds 50%. The results are plotted in Figures 2 to 5, from which several observations emerge.<sup>1</sup>

First, the number of imported products with a high concentration in China is significantly large among G7 countries, ranging from hundreds to thousands of products. The count of such high-concentration products nearly doubled from 2000 to 2018, confirming my prior statements about deepened specialization following China's accession to the WTO. However, the number of high-concentration products notably declined for the US after 2018 due to the US-China trade war, effectively leading to de-risking. Further de-risking from China by the G7 countries could pose significant challenges for the Chinese economy, especially since

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<sup>1</sup>Changing the threshold to 30%, 70%, or 90% would not change the findings qualitatively.

Figure 2: Number of G7 products with more than 50% import share from China

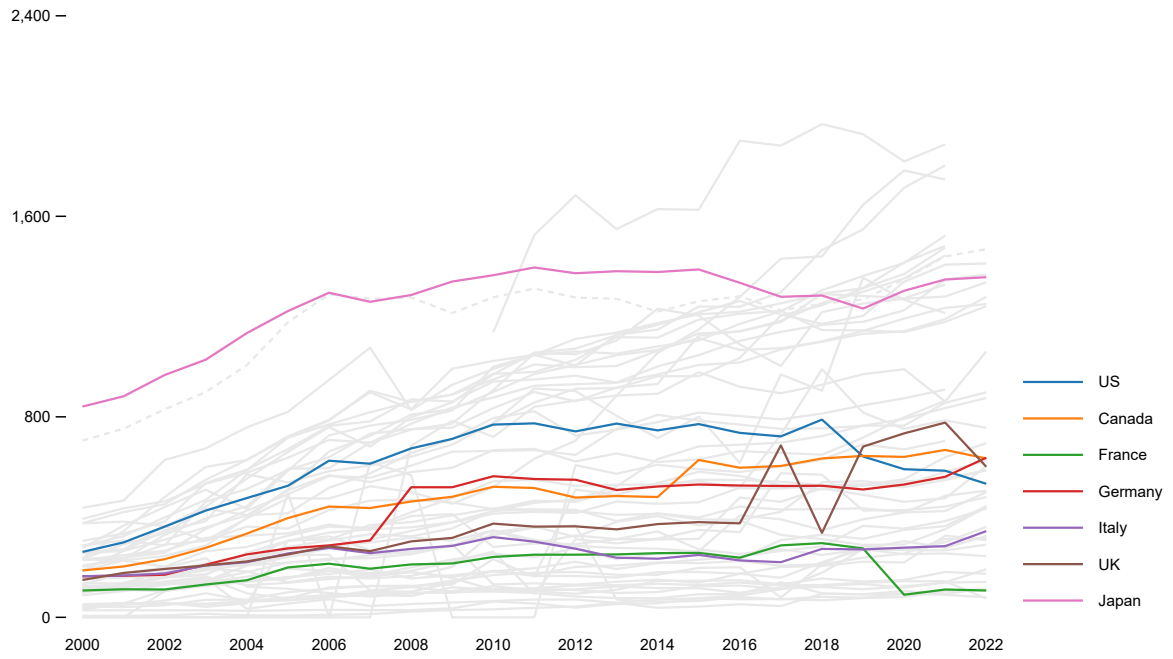


Figure 3: Number of G7 products with more than 50% export share to China

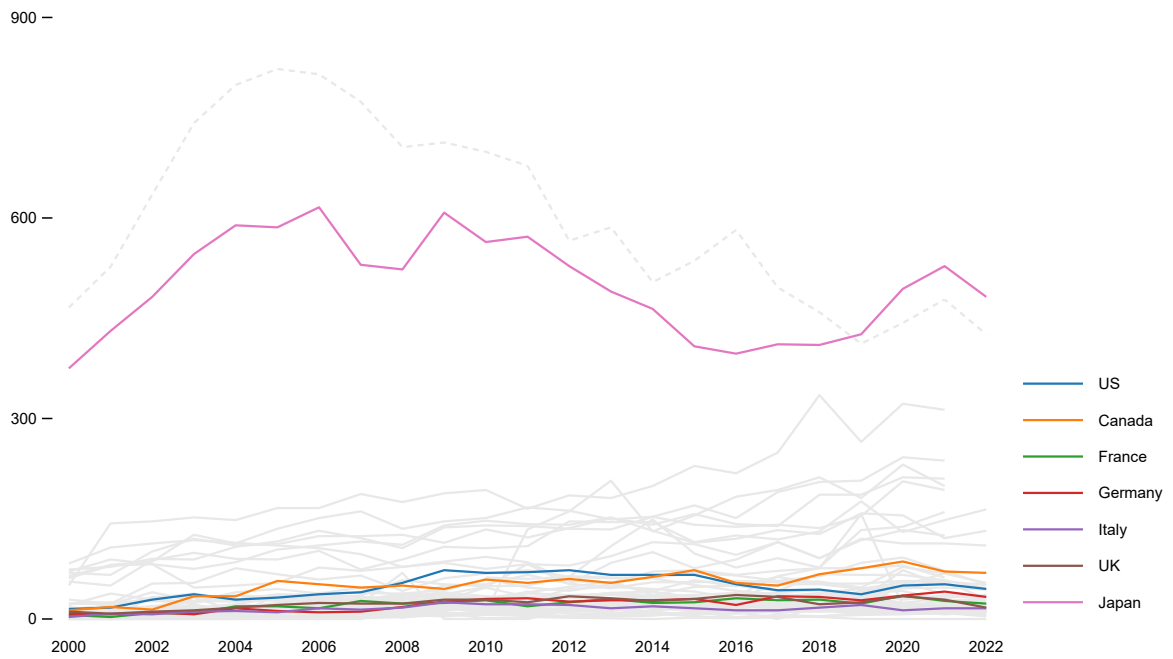


Figure 4: Number of ASEAN products with more than 50% import share from China

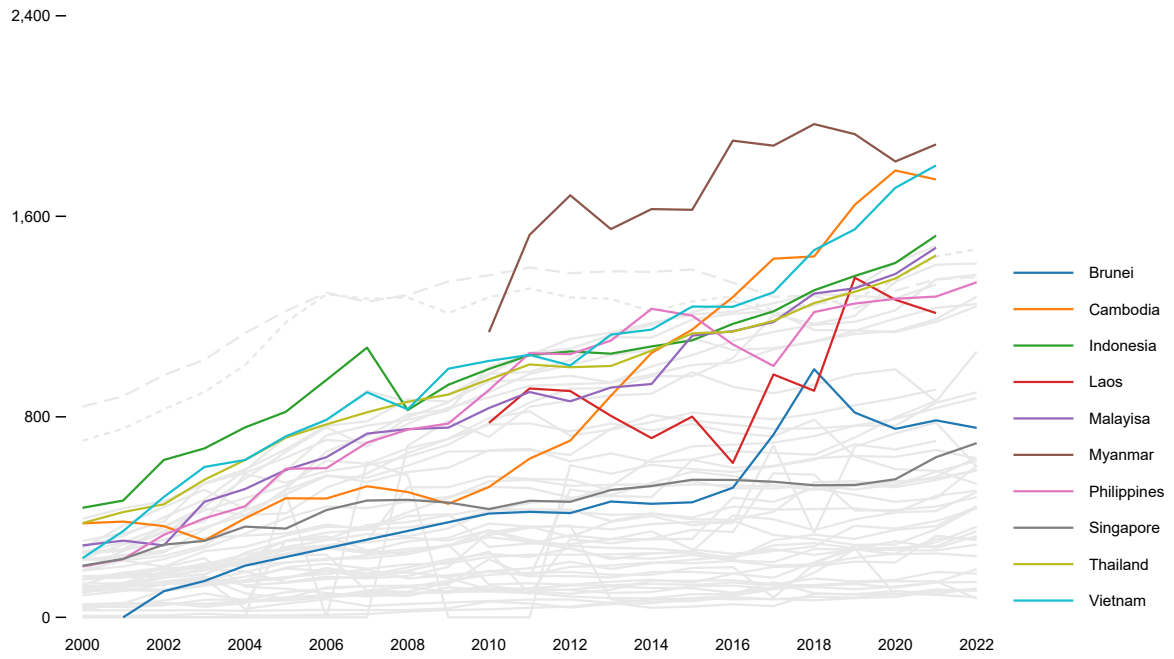
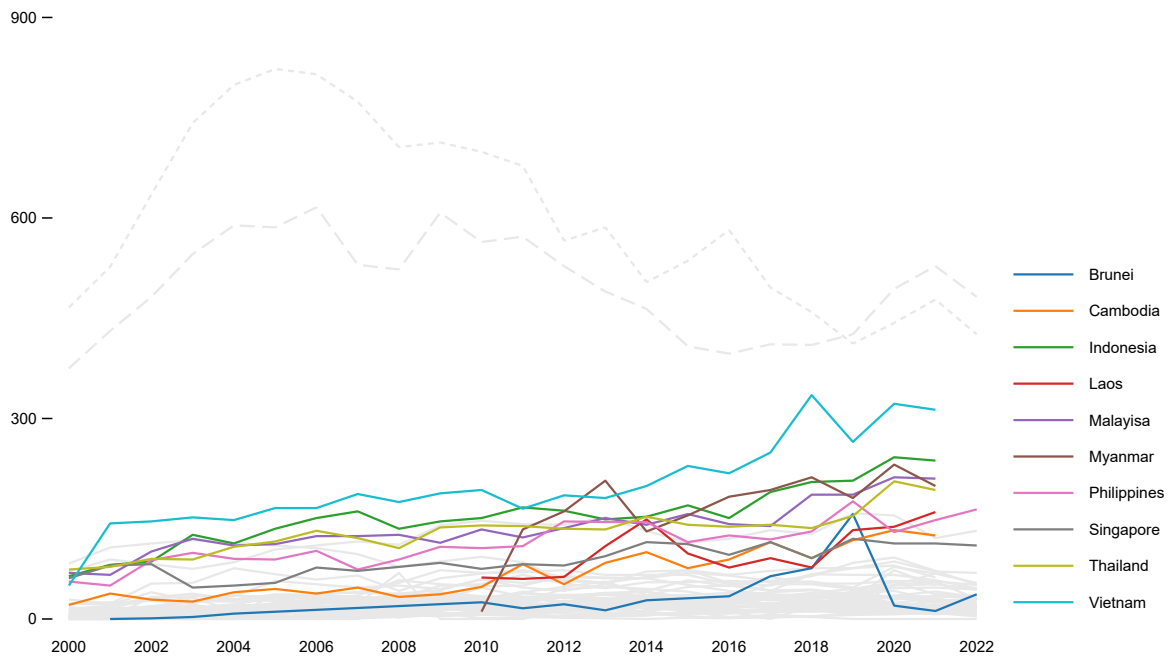


Figure 5: Number of ASEAN products with more than 50% export share to China



these countries collectively account for more than 40% of the world GDP, not to mention additional EU countries. In contrast, for export concentration, G7 countries generally have modest or small exposure to the Chinese market.

Second, for ASEAN, the number of products with high concentration in China is also remarkably high and even tripled or quadrupled from 2000 to 2022. This is true for nearly every ASEAN economy and for trade in both directions. The number of imported products that have high-concentration from China is especially high, which account for 20% of the product space of 5,000 products. As I will show later, these high-concentration imports consist of intermediates (40%), consumption goods (30%), and capital goods (30%). In contrast, for exports, the high-concentration products are almost exclusively in the form of primary materials and intermediates.

Third, compared to a cohort of 60 major economies as outlined in Table 1, ASEAN countries have a notably large number of products with high concentration in China. Japan and South Korea, represented by the dashed lines, are the only countries with a similar or even greater number of such high-concentration products.

Table 1: Data availability for reporting countries.

Countries	Years	Countries	Years	Countries	Years
US	2000-2022	Brunei	2001-2022	Greece	2000-2022
Canada	2000-2022	Cambodia	2000-2021	Spain	2000-2022
Japan	2000-2022	Indonesia	2000-2021	Croatia	2000-2022
India	2000-2022	Laos	2010-2021	Cyprus	2000-2022
South Korea	2000-2022	Malaysia	2000-2021	Latvia	2000-2022
Australia	2000-2022	Myanmar	2010-2022	Lithuania	2000-2022
Brazil	2000-2022	Philippines	2000-2022	Luxembourg	2000-2022
Russia	2000-2021	Singapore	2000-2022	Hungary	2000-2022
South Africa	2000-2022	Thailand	2000-2021	Malta	2000-2022
Chile	2000-2022	Vietnam	2000-2021	Netherlands	2000-2022
Colombia	2000-2021	France	2000-2022	Austria	2000-2022
Egypt	2000-2022	Germany	2000-2022	Poland	2000-2022
Qatar	2000-2022	Italy	2000-2022	Portugal	2000-2022
Saudi Arabia	2000-2021	UK	2000-2022	Romania	2000-2022
UAE	2000-2021	Belgium	2000-2022	Slovenia	2000-2022
Kuwait	2000-2021	Bulgaria	2000-2022	Slovakia	2000-2022
Peru	2000-2021	Czechia	2000-2022	Finland	2000-2022
Mexico	2000-2022	Estonia	2000-2022	Sweden	2000-2022
Turkey	2000-2022	Ireland	2000-2022		

## Dependency on China?

Despite evidence of both an absolute and relatively high concentration of trade with China, it would be premature to infer from this exercise that ASEAN is economically dependent on China. Such a conclusion is misleading. The high concentration of ASEAN trade with China is a reflection of economic geography, which should be understood through a trade gravity model. Mr. Lee Kuan Yew famously articulated this dynamic:

China is sucking the Southeast Asian countries into its economic system because of its vast market and growing purchasing power. Japan and South Korea will inevitably be sucked in as well. ([Allison et al., 2020](#))

What Mr. Lee Kuan Yew described aligns with the gravity model of international trade. This model, similar to its physics counterpart, suggests that the trade flow between two economies is directly proportional to their economic size and inversely proportional to the trade distance. The larger the economies and the shorter the distance—considering factors such as transportation, tariffs, culture, language, religion, colonial links, information, or non-tariff measures—the greater the trade flow between them. Therefore, it is not surprising that the trade connections between China and ASEAN are so extensive, and the deepening of specialization is much greater than in the rest of the world, especially since China joined the WTO. This dynamic is akin to the relationship that Canada or Mexico have with the US, where the US is the dominant trade partner for a large number of products. Similarly, this argument applies to Japan and South Korea, which are represented by the dashed lines and have equally large or even larger numbers of products with high concentrations in China. Despite this, Japan and South Korea, like ASEAN, maintain their economic agency and are not dependent on China.

## Supply Chain Stages and Indirect Spillover Risks

Next, I examine the distribution of high-concentration products by supply chain stages. Specifically, I reclassify the trade data into four supply chain stages, primary materials, intermediates, capital and parts, and consumption goods, using Broad Economic Categories (BEC) classifications, as shown in Table 2. The results are depicted in Figures 5 and 6.

The conclusions from this analysis are as follows. Figure 5 indicates that, in terms of import concentration from China, the high-risk products are predominantly intermediates and consumer goods. Conversely, Figure 6 reveals that the high-risk products in terms of export concentration are mainly intermediates and raw materials. This supports our hypothesis that ASEAN may be at risk of indirect spillovers, since the high-concentration

products exported to China are primarily used as intermediate inputs in Chinese production. Additionally, contrary to the common perception that China exports intermediates and capital goods to ASEAN while ASEAN exports final consumption goods, I find that ASEAN still imports a significant number of consumer products exclusively from China.

I further examine the share of high-concentration products in overall exports and imports with China in Table 3. Although the number of high-risk exporting products is considerably lower, their share of the total value is substantially higher. This suggests that, on average, the exporting products at risk of collateral damage from de-risking are of higher value than those imported. This exacerbates the spillover risks ASEAN faces with these products, as they are higher-value and potentially have a larger economic impact.

Table 2: Concordance from BEC categories to supply chain stages

<b>Stages</b>	<b>BEC Categories</b>
<b>Primary</b>	111 Food and beverages, primary, mainly for industry 21 Industrial supplies, primary 31 Fuel and lubricants, primary
<b>Intermediates</b>	121 Food and beverages, processed, mainly for industry 22 Industrial supplies, processed 322 Other fuels and lubricants, processed
<b>Capital, Components, and Parts</b>	42 Parts and accessories, capital 53 Parts and accessories, transport equipment 41 Capital goods except transport equipment 521 Transport equipment, industrial
<b>Consumption</b>	112 Food and beverages, primary, mainly for household consumption 122 Food and beverages, processed, mainly for household consumption 321 Motor spirit, processed 51 Passenger motor vehicles 522 Transport equipment, non-industrial, consumption 61, 62, 63 Consumer goods, durable, semi-durable, non-durable

## 4 Which Products Are At Risk of Collateral Damage?

In the previous sections, I emphasized the importance of understanding the indirect spillover risks or collateral damage at the product level that ASEAN may face from de-risking. I now

Figure 6: High-concentration exports to China by supply chain stages

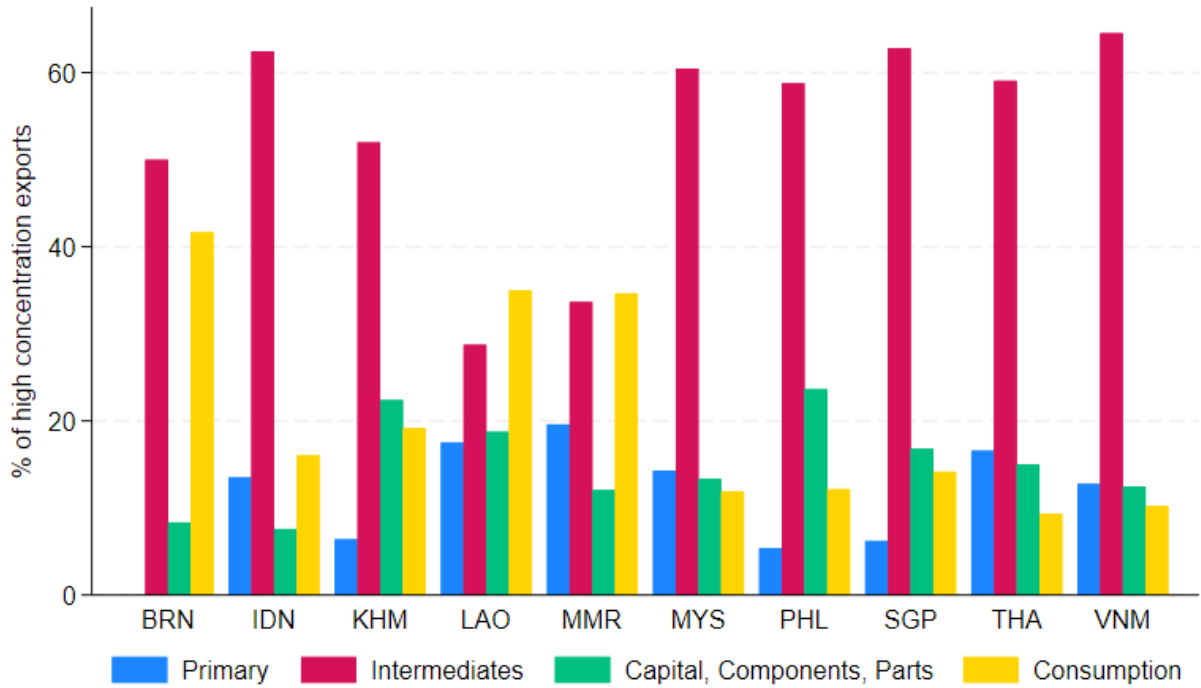


Figure 7: High-concentration imports from China by supply chain stages

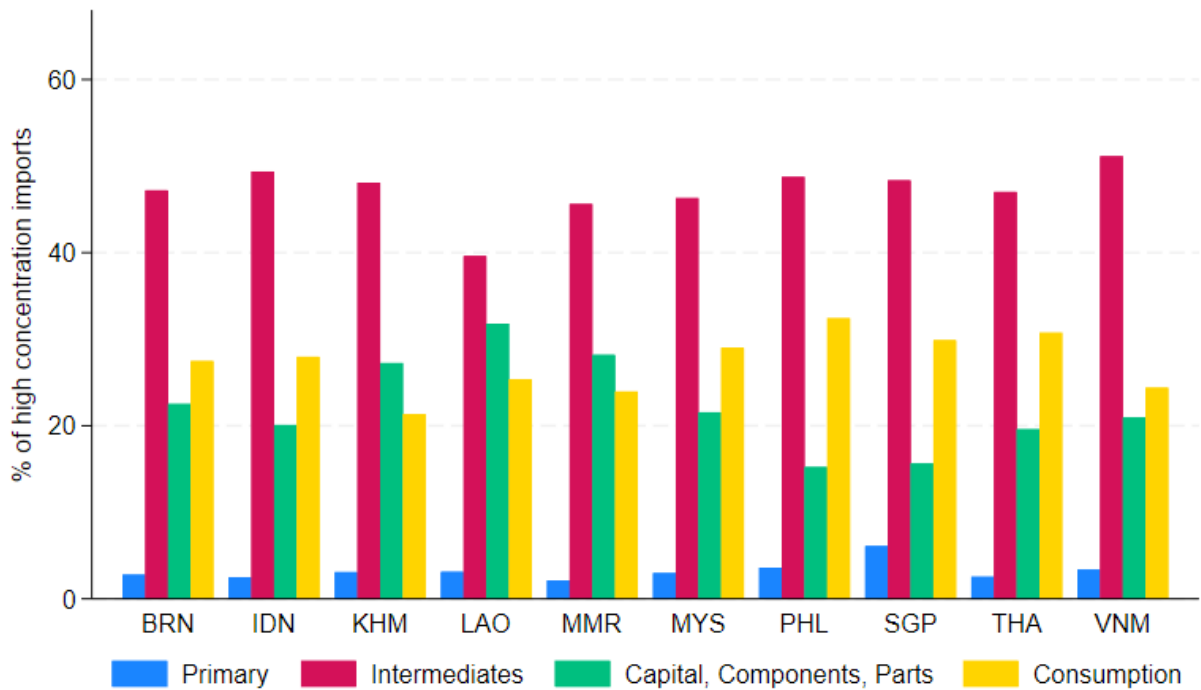




Table 3: Trade share of high-concentration products

	No. of products		Share of trade	
	Imports	Exports	Imports	Exports
Brunei	786	12	4%	16%
Cambodia	1,747	125	35%	6%
Indonesia	1,523	237	27%	13%
Laos	1,214	160	21%	29%
Malaysia	1,475	210	17%	4%
Myanmar	1,887	199	42%	24%
Philippines	1,280	148	14%	8%
Singapore	639	113	6%	3%
Thailand	1,444	193	19%	8%
Vietnam	1,803	313	29%	18%

attempt to pinpoint the exact individual products in ASEAN that may face severe disruptions by combining product-level trade data with the OECD Inter-Country Input-Output Tables. The procedure is as follows: I first identify high-concentration imports from China targeted by G7 countries. Then, using the input-output tables, I determine which ASEAN products are extensively used in the production of these high-concentration Chinese imports.

The results are summarized in Tables 4, 5, and 6. Table 4 indicates that thousands of Chinese products, mainly from sectors such as textiles, chemicals, machinery, metals, and electronics, may be subject to de-risking by G7 countries due to their high concentration. It is important to note that these products are not merely consumption goods; the majority are actually intermediates, even for textiles and electronics. This characteristic makes them especially susceptible to de-risking by G7 countries, which prioritize the economic security of their supply chains and place a disproportionate emphasis on avoiding economic coercion.

Table 5 further integrate the above analysis with the input-output tables to identify the ASEAN input sectors most heavily utilized in the production of these Chinese products. Specifically, products from textiles, chemicals, metals, and electronics sectors in the ASEAN-6 economies are identified as those most intensively used in production. Furthermore, it shows that the export value of these sectors is particularly high and accounts for close to 20% of ASEAN's exports to China.

Table 6 calculates how many of these ASEAN inputs are identified as having a high concentration in exports to China. It reveals that hundreds of products, intensively used as inputs for Chinese products, are subject to de-risking by G7 countries. This interdependency underscores the potential for significant economic repercussions in the short run should these supply chains be disrupted. It also calls for early-stage policy mitigation to assist the

associated companies with the transition.

Table 4: Number of Chinese products exposed to de-risking

	50%	70%
Textiles	496	269
Chemicals	277	163
Machinery	178	90
Fabricated metals	137	70
Electronics	117	65
Manufacturing nec	109	67
<b>Total</b>	<b>1,314</b>	<b>724</b>

Table 5: Sectors exposed to potential de-risking and the ASEAN input suppliers

De-risking sectors	Top input suppliers	Top input sectors	Billion USD
Textiles	VNM, THA, IDN	Textiles	6.3
Chemicals	SGP, THA, MYS	Chemicals	9.5
Machinery	VNM, MYS, SGP	Electronics	5.8
Fabricated metals	IDN, SGP, VNM	Basic Metals, Electronics	2.0
Electronics	VNM, MYS, SGP	Electronics	39.9

Table 6: Number of ASEAN intermediates at risk of spillover

	50%	70%	Top ASEAN suppliers
Chemicals	245	185	SGP, THA, MYS
Textiles	175	132	VNM, THA, IDN
Metals	109	82	IDN, SGP, VNM
Electronics	57	36	VNM, MYS, SGP
<b>Total</b>	<b>586</b>	<b>435</b>	

## 5 Case Studies

I now illustrate these vulnerabilities behind de-risking through three case studies, focusing on critical supply chains such as semiconductors and electric vehicles. Each case study highlights

the importance of product-level trade and demonstrates how disruptions create ripple effects throughout the supply chains that rely heavily on intermediate exports concentrated in China.

## Semiconductors

ASEAN is a key player in the global semiconductor production landscape. Table 7 summarizes the supply chain stages of semiconductors in ASEAN. While advanced economies like the US, EU, Korea, and Japan specialize in design and equipment supply, ASEAN countries are involved in various downstream stages from the fabrication of integrated circuits to assembly, testing, and packaging (ATP).

Table 7: Semiconductor supply chain stages

Supply Chain Stages	Locations
Design and Equipment	US, Europe, Korea, Japan
Wafer Fabrication (Fab)	<b>Singapore</b> , Taiwan, Korea, Japan, China
Assembly, Testing, Packaging (ATP)	<b>Malaysia, Thailand, Vietnam, Philippines</b> , China
Import Intermediates for Manuf.	China, Japan, Korea, India, <b>Indonesia, Vietnam</b>

The US-China trade war significantly disrupted Chinese exports to the United States, including the electronics industry. As the United States imposed a 25% tariff and restrictions on Chinese electronic goods, demand in one of China’s largest export markets declined sharply. Since semiconductors are crucial inputs in electronics manufacturing, this drop in exports directly reduced China’s semiconductor demand.

The questions arise: Did ASEAN feel the brunt of this downturn as collateral damage from the US-China trade war? Was there an over-concentration of ASEAN semiconductor exports to China? To examine these issues, it is necessary to look at product-level trade data for semiconductors, rather than relying on aggregate statistics. In this analysis, I focus on two products—processors and memories—which are the most common types of integrated circuits used in electronics. Table 8 compiles the trade statistics of these two products across ASEAN nations.

I found that major ASEAN exporters of semiconductors, notably Singapore and Malaysia, are heavily concentrated in the Chinese market, accounting for more than 50% of their

Table 8: ASEAN’s Processors and Memories Exports to China

	Processors and Memories Exports from ASEAN to China					Chinese Exports of Electronics to US (Billion USD)
	SGP	MYS	THA	PHL	VNM	
2017	23.3	20.6	3.8	5.2	4.4	277.6
2018	23.2	28.4	3.0	4.7	5.7	291.6
2019	19.5	25.8	1.9	6.5	7.8	237.1
Growth 2018-19	-16%	-9%	-37%	+38%	+37%	-19%
Concentration	52%	47%	48%	40%	73%	
Supply Chain	Fab	ATP	ATP	ATP	ATP	

market share. As a result, Singapore and Malaysia experienced significant impacts from the US-China trade war, which saw a 19% decrease in Chinese electronics exports to the US. Consequently, Singapore and Malaysia’s exports of processors and memories to China also suffered a 10% decline, equating to a decrease in value of approximately four billion USD in each country. This underscores the point that an over-concentration of intermediate exports to China presents significant challenges in terms of indirect spillover risks from de-risking strategies.

## Electric Vehicles

The second case study explores the supply chain of electric vehicles (EVs), which have garnered significant attention due to US and EU tariffs on Chinese EVs. This section investigates the implications for ASEAN’s intermediate exports to China, which are used as inputs for EV production.

To approach this analysis, I utilize a GPT-assisted methodology outlined in another paper by [Lu and Yi \(2024\)](#), identifying 55 individual products within the EV supply chain. These include EVs themselves, batteries, electric motors, semiconductors, and critical minerals. I then examine the concentration of trade shares for these products from ASEAN to China, as detailed in Table 9. The analysis reveals that critical minerals, in particular, show a high degree of export concentration to China.

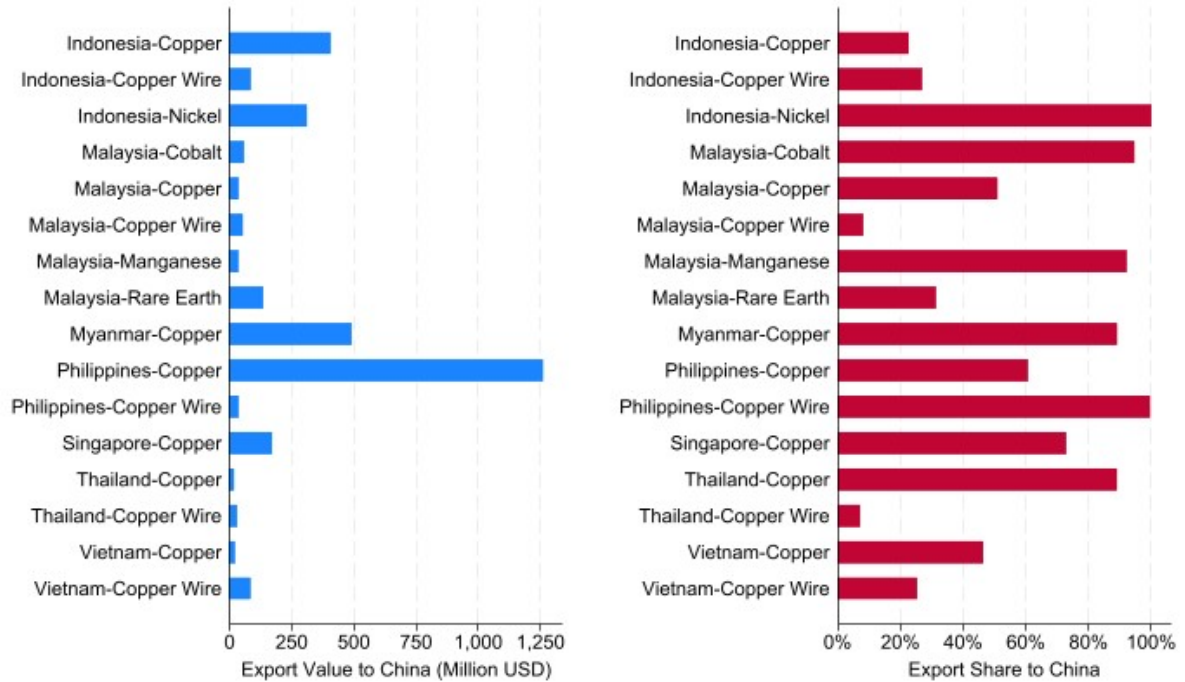
To further elucidate this point, Figure 7 plots both the trade value and export share to China of critical minerals. It shows that ASEAN countries export three billion USD worth of critical minerals needed for EV production to China annually, with export shares exceeding 80% across key ASEAN economies such as Philippines, Indonesia, Malaysia, and Thailand

Table 9: Concentration of ASEAN’s trade with China within the EV supply chain

Categories	# of products	Concentration > 50%	Concentration > 70%
Electric Vehicles	3	0	0
Batteries	2	1	1
Electric Motors	5	1	0
Semiconductors	2	1	1
<b>Critical Minerals</b>	<b>33</b>	<b>14</b>	<b>7</b>
Others	10	2	2
<b>Total</b>	<b>55</b>	<b>19</b>	<b>11</b>

for commodities like copper, nickel, cobalt, and manganese.<sup>2</sup> This implies that these exports are almost exclusively to China.

Figure 8: ASEAN critical mineral exports concentration to China



These findings highlight the challenges ASEAN faces with critical minerals, especially as major economies begin to impose tariffs on Chinese EVs. This scenario could potentially mirror the semiconductor market’s experiences during the lead-up to the US-China trade

<sup>2</sup>Though it has been reported that the Philippines’ exports of nickel are also highly concentrated in China, with a 90% concentration share and a trade value exceeding 1 billion USD. We checked that this trade value is reported in BACI data but not our Comtrade data.

war. It raises questions about whether ASEAN critical mineral suppliers will struggle in the short term due to their near-exclusive reliance on China.

Additionally, I tabulated the top inputs beyond critical minerals that ASEAN countries export to China in Table 10. Mixed signal integrated circuits (IC) emerged as the largest export across all intermediate input exports. Notably, Singapore may be the most affected by supply chain disruptions, as it exports 20 billion USD worth of mixed signal ICs to China annually, nearly half of its total exports of this product. Similarly, Malaysia exports 9 billion USD or 30% of its total to China. Given the high concentration of exports to China and the billions in export value, it is likely that these industries will face significant difficulties coping with a trade war on Chinese EVs, especially in the short term, as demonstrated by the empirical evidence in [Barrot and Sauvagnat \(2016\)](#). My results thus underscore the importance of policy measures to mitigate potential collateral damage from de-risking in the Chinese EV industry, particularly concerning ASEAN’s critical mineral and mixed signal IC exports to China.

Table 10: Top ASEAN products exposed to spillover from EV trade wars

<b>Country</b>	<b>Concentration</b> (%)	<b>Exports to China</b> (Million USD)	<b>Products</b> (HS 6-digit)
<b>Singapore</b>	<b>47</b>	<b>20,325</b>	<b>Mixed signal IC</b>
<b>Malaysia</b>	<b>30</b>	<b>9,289</b>	<b>Mixed signal IC</b>
<b>Philippines</b>	<b>40</b>	<b>2,704</b>	<b>Mixed signal IC</b>
<b>Thailand</b>	<b>34</b>	<b>2,122</b>	<b>Mixed signal IC</b>
Philippines	61	1,261	Copper
Myanmar	89	491	Copper
Indonesia	23	406	Copper
<b>Vietnam</b>	<b>44</b>	<b>336</b>	<b>Mixed signal IC</b>
Indonesia	100	311	Nickel
Singapore	73	171	Copper
Malaysia	31	134	Rare earth

## Nearshoring

The third case study investigates another form of de-risking: nearshoring. This approach is distinct from the previous two case studies because it involves the supply chain potentially leaving Asia. The theory is that when factories move from China to a non-Asian region like North America, trade gravity would favor sourcing intermediates from the region rather than from ASEAN. This shift may eventually lead to the regionalization of trade. Although

ASEAN countries might benefit from the relocation of industries to Southeast Asia, the net effect on global trade could become more regionalized, potentially resulting in a net loss for ASEAN, which is deeply rooted in international trade.

To investigate this hypothesis, we examine the nearshoring of textile industries to North American countries, such as Mexico. Table 11 presents the findings. We first identify a set of ‘high-risk’ textile intermediates that are at risk of collateral damage from de-risking. We then examine whether Mexico has imported more or fewer such intermediates since the US-China trade war. Although the trade statistics are distorted by supply chain disruptions during COVID, it is evident that the import of these intermediates from ASEAN, both in terms of value and share, decreased after the US-China trade war. This suggests that the nearshoring of textile factories to Mexico led to supply chains leaving Asia, which could potentially incur repercussions for ASEAN industries. In terms of quantitative magnitude, the textile industry is relatively small in Mexico and therefore does not pose a substantial challenge for ASEAN in the near term. However, this exercise illustrates how nearshoring could lead to a net loss for ASEAN, a scenario that can occur in any quantitatively significant sector.

Table 11: Mexican imports of textile intermediates from ASEAN

<b>Year</b>	<b>“High-risk” textile imports from ASEAN</b>	<b>ASEAN’s share across all import origins</b>
2018	42.0 million	1.0%
2019	22.8 million	0.7%
2020	21.5 million	0.9%
2021	4.2 million	0.3%
2022	6.1 million	0.4%

## 6 Policy Implications

My work presents several implications for policies in both ASEAN countries and de-risking countries. First, my research has consistently argued that de-risking will pose significant challenges for numerous ASEAN export products that are extensively utilized as inputs in Chinese manufacturing. It is crucial to identify the companies involved and allocate transition funds to assist them in the short term. Furthermore, financial incentives such as tax breaks and grants could be offered to encourage companies to invest in developing alternative supply chains or to enter less familiar markets. These targeted support measures

would not only cushion the impact of market shifts but also empower companies to build a more resilient business.

Second, I argue that it's critical for de-risking countries such as the US to pursue a Free Trade Agreement (FTA) centered on rules of origin with ASEAN, instead of expanding their yards and targeting ASEAN with punitive tariffs due to its trade linkages with China. Recent discussions, as noted by [Guarascio \(2024\)](#), suggest the possibility of increased tariffs on products from Southeast Asia. The intended goal of such measures is to prevent the leakage of Chinese exports transshipped through ASEAN and to encourage ASEAN to integrate their supply chains more closely with America and its allies, rather than with China. However, from the perspective of the gravity model of international trade, this proposal is misguided. The trade gravity model suggests that enhancing trade between ASEAN and America should involve reducing the relative trade distance between them via trade pacts, rather than increasing it through tariffs, which could push ASEAN away. In fact, Mr. Lee Kuan Yew had a similar view. Continuing from the earlier quote, he further argued from the perspective of the gravity model that the optimal strategy for linking ASEAN economies with America would be to establish a free-trade area between them:

China's neighbors want the US to stay engaged in the Asia-Pacific so that they are not hostages to China. The US should have established a free-trade area with Southeast Asia 30 years ago, well before the Chinese magnet began to pull the region into its orbit. If it had done so, ... all of the Southeast Asian countries would have been linked to the US economy. ([Allison et al., 2020](#))

My arguments are also similar to [Chor \(2024\)](#), whose policy recommendations to the problem of Chinese transshipment are to avoid 'blanket calls for tariffs increases on Vietnam and Mexico' which 'would risk alienating these countries'.

Furthermore, [Chor \(2024\)](#) recommends that the ideal policy approach should involve upgrading existing enforcement measures for rules of origin to discourage minimal local value-added transshipment from China. Motivated by his viewpoint, I argue that it complements my call for a free-trade area with ASEAN, considering that existing rules-of-origin regimes are predominantly instituted within free trade agreements. Under these regimes, products are granted zero tariffs only if a significant amount of value added originates from within the free-trade area, as demonstrated by established rules-of-origin provisions in regional trade blocs such as RCEP and NAFTA. If the United States is committed to mitigating Chinese transshipment via ASEAN or encouraging ASEAN to diversify its economic linkages, establishing robust rule-of-region provisions through a trade agreement with the region could serve as an effective strategy. This approach would motivate ASEAN countries to enhance internal supply chain integration, reduce over-reliance on foreign inputs, increase domestic value



added, and diversify their economic relationships in order to access the richest and most advanced economy in the world, namely the U.S., on preferential terms. In contrast, punitive tariffs may only lead to further integration of ASEAN economies with other countries, including China, and alienate ASEAN from the American sphere of economic influence.

## 7 Conclusion

In this essay, I discussed the potential collateral damage that ASEAN could face from de-risking practices, particularly from the perspective of product-level trade data, which I argue is essential to examine de-risking. My findings suggest that a substantial number of intermediate exports in ASEAN are at high risk of spillovers due to their high concentration in the Chinese market, which is subject to de-risking. This exposure is notably high compared to a cohort of international peers because of trade gravity. Specifically, these intermediates are predominantly in the textiles, chemicals, electronics, and metals sectors.

The policy implications of my findings are as follows. First, it is crucial for ASEAN governments to actively develop strategies that mitigate the negative impacts on products that are highly susceptible to spillovers due to de-risking practices. This might involve building more resilient supply chains, enhancing trade diversification, and implementing supportive fiscal policies aimed at cushioning short-term disruptions in supply chains and assisting firms in transitioning into new phases. Second, promoting trade integration with third countries could serve as a strategic approach for those aiming to reduce their dependence on China. This approach would not only help mitigate the consequences for third parties but also foster more sustainable and diversified trade relationships. Such integration could involve forming multilateral trade blocs centered on rules of origin, or updating existing ones to cover new areas of trade such as AI, digital, and green economies.

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