

Import Dependencies: Where Does the EU Stand?

Kevin Lefebvre & Pauline Wibaux

Summary

Faced with growing competition and geopolitical tensions, major economies worry about the risks associated with over-reliance on the Chinese economy.

Using detailed product-level import data, we compare both large countries' trade dependencies and the extent to which they supply their trading partners with products they depend on.

China stands out for its low number of dependent products. While the United States and the European Union have a similar number of trade dependencies, this number is larger for Japan. The sources of dependencies are common to all four countries, and lie in four sectors: chemicals, electronics, pharmaceuticals and the steel industry.

The EU is heavily exposed to China: 61% of its import dependencies come from that country. This potential vulnerability is partially offset by the fact that the EU is China's leading supplier for a fourth of its 47 import-dependent products. China is three times as exposed to the EU as it is to the US.

The EU dependence on China increased between 2019 and 2022 owing to both an increase in the number of European dependencies on China and a reduction in the number of Chinese dependencies on the EU.



Introduction

The Covid-19 pandemic and the war in Ukraine have highlighted the challenge raised by import dependencies in trade relationships. These dependencies are widespread: a fourth of all countries imported the majority of their products from a single origin in 2022.¹ While inevitable in a globalized economy, they can turn into vulnerabilities when trade disruptions occur.

The source of these disruptions can take different forms, affecting one country, one region or sometimes all countries simultaneously as in the case of the Covid-19 pandemic, through an unexpected global shock.² In other cases, rising economic, strategic or geopolitical tensions between countries are increasingly leading to the weaponization of trade relationships. There is no shortage of recent cases. The packages of trade sanctions imposed on Russian imports from the EU following its invasion of Ukraine, the export restrictions enforced by the US on semiconductors shipped to the Chinese economy, and the reaction of China, which restricted its exports of gallium and germanium to the United States, are emblematic illustrations.

Policymakers' decisions to limit their country's vulnerability will likely differ according to the type of shock they intend to protect against. While it is possible to increase domestic production capacity or stockpiles to prevent a supply shock affecting all exporting countries, alternative options are available in other cases. In addition to industrial policy, diversifying suppliers of specific products (when they exist) may substantially reduce exposure to specific countries (or regions). Finally, bilateral endogenous shocks most likely occur when a country exploits its dominant position on certain critical products over a trade partner. Rebalancing market power on critical products within country pairs may therefore reduce exposure to bilateral shocks.

These policies are often tied to complex trade-offs. On the one hand, they deliver economic security through lower exposure

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to supply disruptions. On the other hand, they involve short-term costs: the price of diversifying away from cost-efficient producers or building up production capacity can be substantial. Furthermore, not all products are created equal: only a fraction of imported goods are considered critical. In this context, identifying the most critical products as well as the types of trade disruption risks is key to designing such policies.

(1) Source: BACI, CEPII.

(2) Extreme climatic conditions or wars devastating specific areas are other examples of these exogenous shocks.

In practice, major economies such as the United States (US), the European Union (EU) and Japan are putting together economic security strategies to address vulnerabilities associated with openness in an increasingly geopolitical global environment. The EU, for instance, has developed a de-risking strategy, to mitigate the risks associated with over-reliance on the Chinese economy and on other trading partners. The US is following the same direction, with a decoupling strategy with respect to the Chinese economy.

Conceptually, most existing studies focus on one specific country. This policy brief provides an analysis of EU trade dependencies and compares them to those of the major economies using a new methodology that can be applied uniformly to all countries (Lefebvre and Wibaux, forthcoming).³ It highlights not only the exposure of the EU's strategic imports to global or country-specific shocks, but also the extent to which major economies are dependent on EU exports.

China stands out for its low exposure compared to other major economies, such as the EU, the USA and Japan, the latter being the most exposed country. While the EU has fewer import dependencies than the US and Japan, a shock affecting China would leave the EU highly exposed: China is the EU's leading supplier for 61% of its 122 import-dependent products.

The other side of the coin is that China is far more exposed to a shock affecting the EU than one affecting other major economies. Yet the EU, the US and Japan are more dependent on China than China is on these major economies. Interestingly, the EU

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stands out by having a negative net balance with respect to China only, in particular in chemicals and electronics.

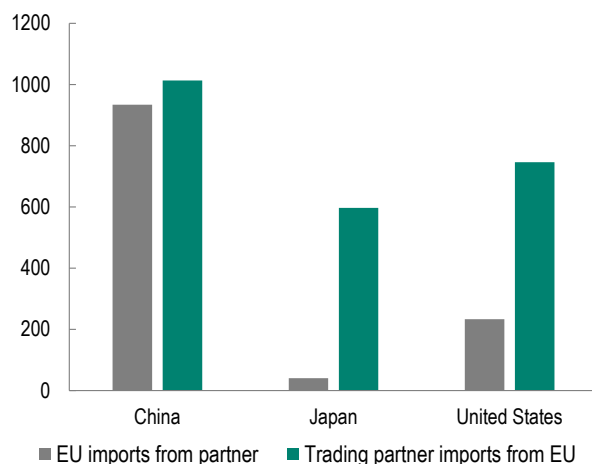
1. A first glance at the EU's import dependence

For a first glance at the level of EU import dependencies, we consider European imports and exports of highly concentrated products, sourced from and exported to China, Japan and the US. Figure 1 plots the number of highly concentrated products, defined as the number of HS6 goods⁴ for which at least half the import value comes from a single trading partner, traded in each country pair: EU-China, EU-Japan, EU-USA, in 2022. The EU imports 934 highly concentrated products from China, limiting diversification opportunities for 18% of its imported goods. Interestingly, China also imports a substantial number of concentrated products from the EU, over 1,000, leaving

(3) The dataset for all countries is freely available at https://www.cepii.fr/CEPII/fr/bdd_modele/bdd_modele_item.asp?id=41

(4) The harmonized system trade nomenclature distinguishes more than 5,000 products at the 6-digit level.

Figure 1 – Number of highly concentrated imported products between the EU and its trade partners



Sources: Authors' calculation based on BACI, CEPII.

Note: Number of HS6 products (revision 2017) in 2022. Highly concentrated = more than 50% of product-specific total imports.

the two economies in a balanced position. The EU, however, appears far less dependent on Japan and the US than these two economies are on the EU. Both economies import a large number of highly concentrated products from the EU, 597 and 746 respectively, while the EU imports only a low number of products for which there are fewer alternatives than either Japan or the US.

Considering highly concentrated products offers a first overview of the EU's import dependencies and its position relative to other economies. However, the level of import concentration is not a sufficient indicator of import dependencies. First, this simple number of products ignores domestic capacities. While China imported 69.5% of its unwrought magnesium (HS 810419) from the EU in 2022, China's share of world exports of this product is over 60%. More broadly, 73 other highly concentrated HS6 products (out of 1,013) imported by China from the EU are in the same situation. This is not surprising given China's unusual dominance in world exports: in 2019, China held a share of at least 50% of the worldwide export market for approximately 600 HS 6-digit products (Jean *et al.*, 2023). Second, product-specific import concentration does not fully capture alternative supply sources. For instance, the EU imported 62.4% of its data-processing machines (HS 847141) from China in 2022. However, the share of Chinese exports in world trade of this product was below 15%, leaving room for potential diversification with other trading partners. A total of 657 other highly concentrated HS6 products (out of 934) imported by the EU from China fall into the same category. Taking these other aspects into account helps to determine which products qualify as import-dependent in

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different countries and sectors. We study this more in depth using a tractable and comprehensive methodology for import dependency identification.

2. A new methodology

Several studies propose different methodologies to identify country-specific import dependencies (see Arriola *et al.*, 2024; Baur and Flach, 2022; Bonneau and Nakaa, 2020; Chimits, 2024; European Commission, 2021; Jaravel and Méjean, 2021; Mejean and Rousseaux, 2024; Vicard and Wibaux, 2023).⁵⁶ All studies are based on the level of concentration of imports, which reflects the current level of suppliers' diversification. When focusing on the EU, a frequently used criterion is the share of extra-EU imports in total imports. The underlying idea is to account for the supplies that can be met within the EU. Finally, studies generally account for the substitutability of foreign supply, either with European production, or by capturing the degree of concentration of supply. Indeed, the dependence on foreign supply for a product appears stronger if the domestic production is not enough to cover the demand, and if the supply of the product is concentrated over a few trading partners. A more recent study from the European Commission presents a novel methodology, in which the time-variance of trade dependencies is accounted for.⁷ Indeed, as highlighted in Vicard and Wibaux (2023), there is a significant churning in dependent product from one year to the next.

These studies are, however, country or region-specific, as they focus on the European Union, Germany, China or France, often using detailed firm-level measures or criteria that cannot be applied worldwide. Since our goal is to compare the level of import dependence of the main economies, as well as their bilateral dependence, we cannot apply any of these methodologies. In Lefebvre and Wibaux (forthcoming), we present a tractable methodology that can be used uniformly for all countries, using product-level trade data.⁸ We define a dependent product along four criteria: i) the level of concentration of imports; ii) the level of concentration of world exports; iii) the substitutability of exports by domestic supply; and iv) the long-lasting dimension of dependencies. More specifically, we measure the product-specific level of import concentration using a Herfindahl-Hirschman index: a value higher than 0.4 defines a concentrated product. To account for the possibility of switching suppliers while

(5) We follow these studies, and focus our analysis on the number of dependent products identified, although expressing dependent imports in value, or share of total imports, may also be informative.

(6) Only Arriola *et al.* (2024) and Chimits (2024) conduct a multi-country analysis, although Chimits (2024) focuses the analysis on China.

(7) European Commission (2023).

(8) Calculations use the BACI database, CEPII, revision HS-17 (Gaulier and Zignago, 2010). We disregard intra-EU trade flows and define the EU as EU27 consistently over time.

considering both existing and non-existing trade partners, we also compute a Herfindahl-Hirschman index capturing the concentration of world exports; a value higher than 0.4 defines a concentrated product. We then compute the substitutability of a product as the ratio of imports over exports, assuming that exports can be redirected to the domestic market; a product is non-substitutable by domestic production if this ratio is larger than one. Finally, we consider only those products for which all three criteria hold for at least two years in a three-year window.⁹

This methodology presents the advantage of being applicable to all countries. It provides a global view of import dependencies, and enables the computation of the interdependencies position of various country-pairs. Table 1 presents the main statistics of import dependencies for the European Union, China, the United States and Japan. While we have an exhaustive list of dependent product for each economy, we focus on “strategic sectors” to consider products with economic relevance. Indeed, there are products whose supply is highly concentrated but that are not considered strategic. For example, the vast majority of European imports of artificial plastic flowers and fruit (HS 670210) come from China. On the other hand, a similar proportion of European imports of antibiotics and their derivatives (HS 294140) comes from China, and are viewed as strategic products. We follow the list of strategic ecosystems of the European Commission, and define as strategic the following sectors: agrifood, chemicals, health, steel, defence and aerospace, transport and electronics. In 2022, these strategic sectors accounted for 60% of world trade. Yet, focusing on these products reduces the number of import-dependent products for major economies by approximately 70%.

3. Import dependencies

China stands out with its low number of dependent products (47), although they represent a substantial share of its total imports value. This large import share is mostly related to Chinese imports of iron ores and concentrates (HS 260111) from Australia, accounting for 5.2% of Chinese imports of strategic products and 3.7% of its total imports in 2022. The US and the EU have a similar position, with 117 and 122 dependent products in strategic sectors, respectively. Japan displays a higher number of dependent products. In the event of a global shock, such as Covid-19, China would therefore experience half as much product-specific import dependencies as other major economies.

China stands out with its low number of dependent products

Table 1 – Number of import dependent products, by country (2022)

	All sectors	Sub-sample of strategic sectors		
	Number of products	Number of products	Import share (%)	Top-3 origins
European Union	390	122	4.9	China (74) India (12) United States (8) United Kingdom (8)
China	154	47	10.5	European Union (12) Indonesia (5) United States (4) India (4)
United States	395	117	11.2	China (54) European Union (32) India (8)
Japan	442	132	10.3	China (72) European Union (25) United States (10)

Sources: GEODEP, CEPII.

Note: Products are defined at the HS 6-digit level (revision 2017). Import share is the share of import value of strategic dependent products in total import value of strategic products. The last column defines bilateral dependency as the number of strategic dependent products for which a specific origin is the leading supplier.

To study the resilience of these four economies to a country- or region-specific shock, we define a bilateral dependence as when the trade partner is the main supplier of the dependent product. The last column of Table 1 indicates the most important suppliers of dependent products for each country.¹⁰ For example, of the 122 strategic products for which the EU has an import dependency, China is the main supplier for 74 of them. Interestingly, the supply of strategic dependent products is highly concentrated around the European Union, China and the United States. The EU is nonetheless characterized by strong exposure to China, which is the main supplier for 61% of its 122 import-dependent products. Only 10 other countries share such a strong concentration of dependent products from China.¹¹ These results contrast with Arriola *et al.* (2024) who find that EU Member States appear as countries with some of the lowest levels of import dependencies in the Organisation for Economic Co-operation and Development (OECD), given that most of their concentrated import linkages are with other EU countries. The other side of the coin is that, when it comes to products for which China is dependent on imports, the EU is its leading supplier for a fourth of its 47 import-dependent products. In fact, China is three times as exposed to a shock on its imports from the EU as to a similar shock involving the

(10) Overall, the global economy is highly exposed to a country specific shock: 107 out of 200 countries import more than half of their dependent products from one country in 2022.

(11) By way of comparison, this rate is 46% and 55% for the United States and Japan, respectively.

(9) For example, we define a product as dependent in 2022 if it meets all three criteria for the years 2022 and 2020 or 2021, or both.

USA. The following section of the policy brief explores these interdependencies between the EU and China.

Going further in the analysis of bilateral import dependencies, Figure 2 presents the number of dependent products in each strategic sector for each economy, considering as trading partners the top-3 origin country of their dependent products. Among strategic sectors, all economies present a large number of dependent products in the chemical industry (more than half of the dependent products in strategic sectors), as well as in pharmaceutical and electronics.

Figure 2 plots the same information, but breaks down the products into three categories: consumption goods, intermediate goods and capital goods.¹² For all four economies, strategic dependencies are concentrated in intermediate goods.

These two figures also highlight that sectoral composition of dependencies varies with the trading partner. Both China and the EU are major suppliers of a wide range of dependent products. They both provide a large number of chemical, pharmaceutical and electronic products. China also exports transport and steel products, while the EU exports defense goods to both the US and Japan. The US supplies China with certain steel products on which the Chinese economy depends, but not to the same extent as Indonesia.

4. Import interdependencies

While studies have largely focused on country-specific import dependencies, our multi-country methodology allows the taking of a step further by accounting for interdependences between two trading partners. As Baverez *et al.* (2023) point out, it is often argued that EU policymakers should leverage trade interdependencies by increasing the competitiveness of EU exports, which act as a safeguard against dependency and the risk of economic coercion.¹³ In 2022, the EU was the main provider of dependent products for 46 countries. Baverez *et al.* (2023) suggest a rebalancing of dependencies across trading partners, as part of a strategic management of interdependence. Two strategies are therefore possible: either increasing foreign reliance on European exports, or reducing import dependencies. In both cases, identifying trade interdependencies is key.

(12) We follow the BEC classification.

(13) Beyond the EU, Japan's strategy also advocates "strategic indispensability": it aims to strengthen the centrality of its economy by enabling Japanese companies to emerge as key suppliers of critical products (Chimits *et al.*, 2024).

This bilateral approach is especially important since current heightened geopolitical tensions increase the probability of weaponization of trade dependencies. A country may decide to leverage its dominant position, as demonstrated by US export restrictions of high-end semiconductor devices to China on October 7, 2022. In a tit-for-tat strategy, the other country may also respond.¹⁴ In such cases, the bargaining power of an economy over its trade partners reflects interdependencies between them. We thus investigate bilateral import dependencies as the difference between the numbers of import-dependent products sourced primarily from each country pair, considering again the four economies: China, the European Union, the United States and Japan. For example, considering the China-EU pair, we compute the number of dependent products for the EU and China.

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For each product, we keep those dependent for the EU and imported mainly from China, and the Chinese dependent product imported mainly from the EU. We then compute a *dependency balance*, just like a trade balance. This allows us to identify the net balance of

each country pair (in number of products).

Although the EU imports a large number of dependent products from China, taking interdependencies into account reduces its exposure to potential bilateral trade conflict (Figure 3). Overall, China supplies the EU with 62 more dependent products than it imports from the EU.¹⁵ Its position is more favorable with respect to the US and Japan, given that both countries import more dependent products from the EU than the EU does from them.¹⁶ The US also faces a negative position with respect to China, while Japan imports more dependent products from China, the EU and the US than it supplies to them.¹⁷

taking interdependencies into account reduces EU's exposure to potential bilateral trade conflict

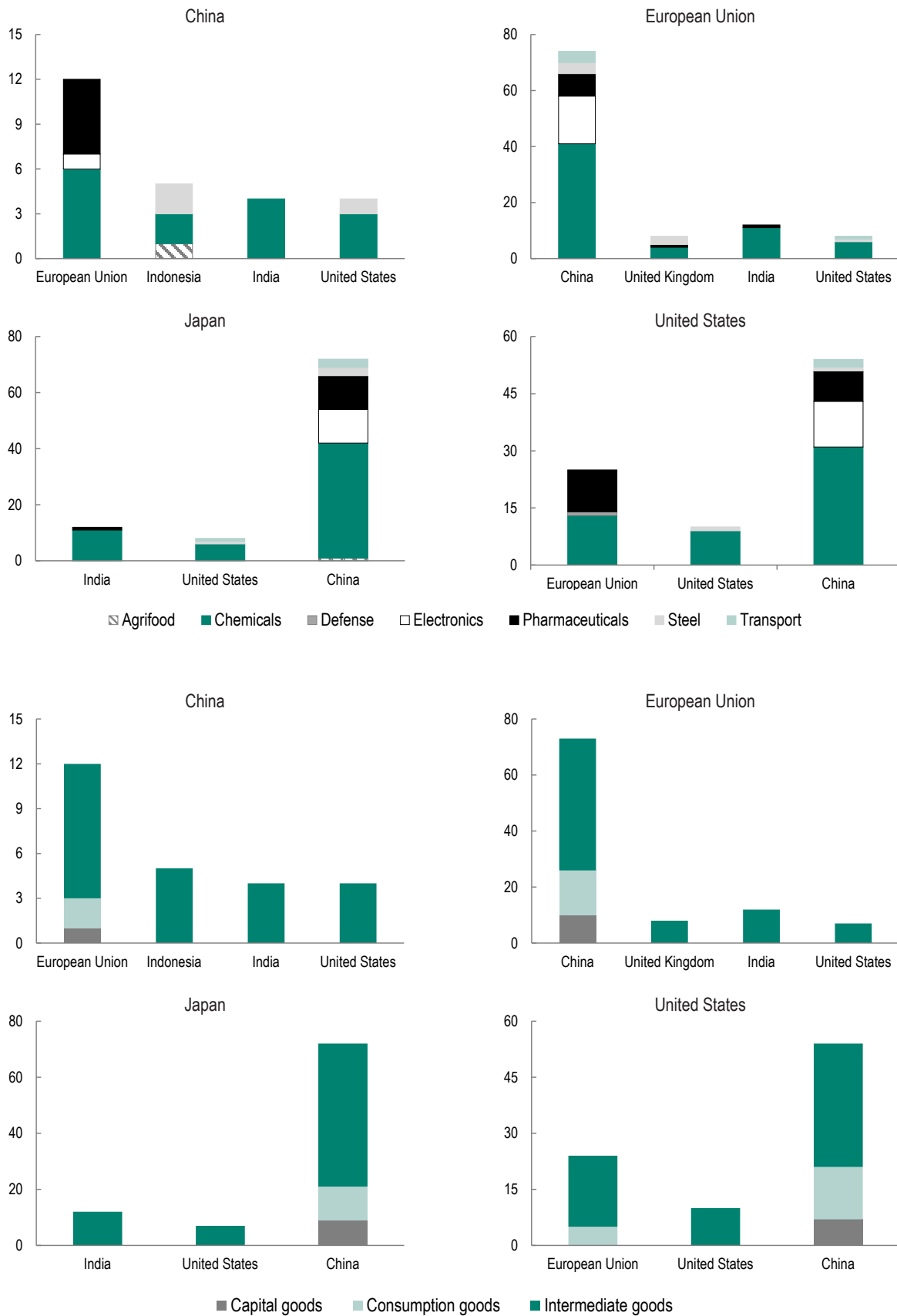
(14) Following the US export restriction, China restricted its exports of gallium and germanium on July 3, 2023.

(15) The EU imports 74 dependent products of which China is the main source, while China only imports 12 dependent products of which the EU is the main source.

(16) The European Union imports 8 dependent products of which the United States is the main source, while the United States imports 32 dependent products of which the European Union is the main source.

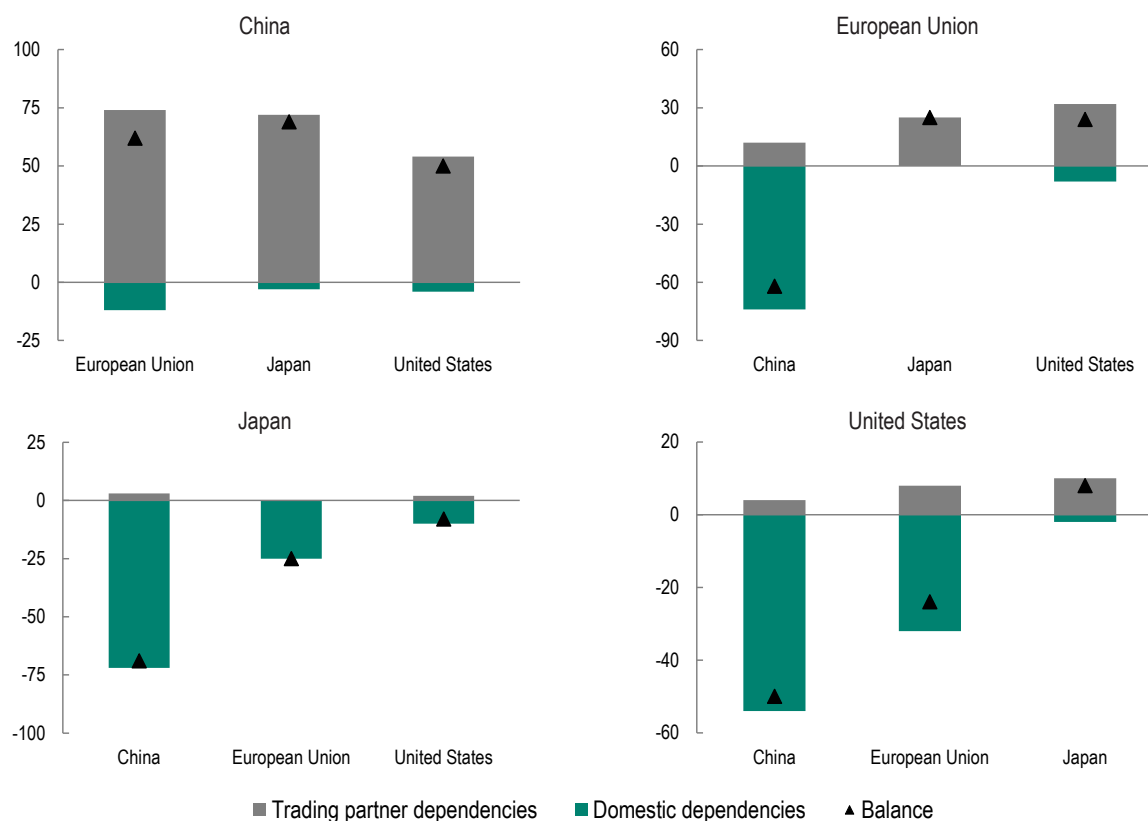
(17) More generally, China is the leading supplier of the majority of import dependencies for a half of the countries in 2022. By contrast, the EU and the United States are the leading suppliers of import dependencies for 46 and 21 countries (out of 200), respectively.

Figure 2 – Sectoral composition of import dependencies (2022)



Source: GEODEP, CEPII.
Notes: Strategic sectors only.

Figure 3 – Bilateral trade dependencies, by country pairs (2022)



Source: GEODEP, CEPII.

Notes: Strategic sectors only.

5. Recent evolution of import interdependencies

Brussels and Washington have recently adopted de-risking approaches designed to limit their dependence on China. However, these policy changes are barely perceptible in the data: neither the number of strategic dependencies originating from China nor their share in the total number of strategic dependencies

neither the number of strategic dependencies originating from China, nor their share in the total number of strategic dependencies declined between 2019 and 2022 for the European Union and the United States

declined between 2019 and 2022 for the European Union and the United States. While the proportion of strategic products for which China is the leading supplier has only slightly increased for the EU (by 3 percentage points), their absolute number grew by more than 20% over this period, as the total number of dependent products also increased. By contrast, the

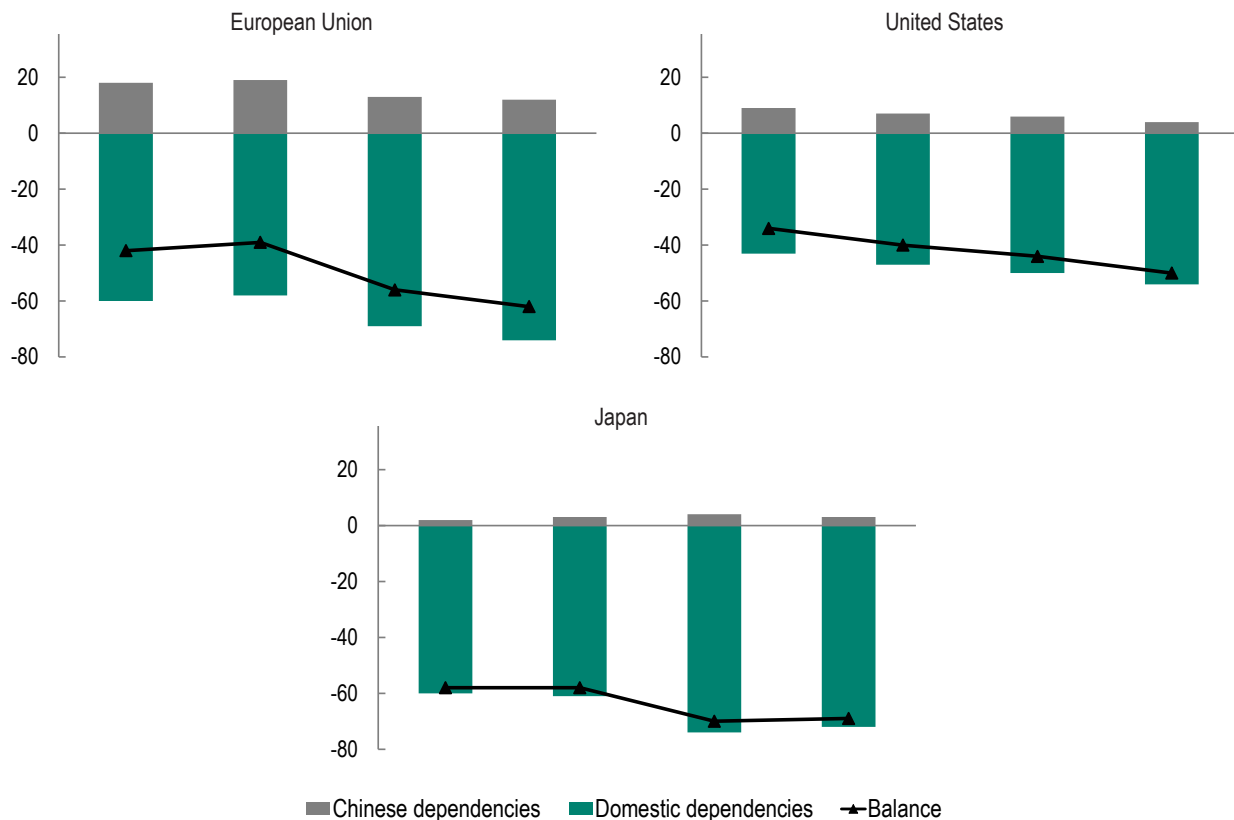
number of US dependencies on the rest of the world remained stable, but the share of dependent products sourced mainly

from China rose sharply, by almost 10 percentage points, between 2019 and 2022.

China, meanwhile, has managed to curb its exposure to both the EU and the US by at least a third over that period. As a result, the balance of trade dependencies with respect to China has worsened for both economies. Figure 4 plots the net balance of trade dependencies for the EU and the US with respect to China, between 2019 and 2022. The EU's reliance on China has increased by 48% over this period; this stems both from an increased number of European dependencies on China and a reduced number of Chinese dependencies on the EU. The dynamic is similar when considering the US economy's reliance on China, with an increased dependency of 47%. Japan's dependency on China is also worsening but to a lesser extent, with the net balance decreasing by 19%.

China, meanwhile, has managed to significantly curb its exposure to both the EU and the US by at least a third over that period

Figure 4 – Evolution of bilateral trade dependency balances



Source: GEODEP, CEPII.
Notes: Strategic sectors only.

Conclusion

Using trade data for all countries, our analysis suggests that EU import dependencies are twice those of China, yet comparable to the United States and Japan. More importantly, these countries are highly exposed to the Chinese economy, which is the major provider of 47% (for the US) to 60% (for the EU) of their strategic dependent products. Taking into account interdependences between countries attenuates these imbalances, but does not cancel them out.

Interestingly, the EU also stands as a major supplier of dependent products, including for China. In a global context of rising economic, strategic or geopolitical tensions between countries, these interdependences may limit the occurrence of bilateral frictions. In fact, China is the only country providing more strategic products to the EU than the EU supplies to it.

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Meanwhile, dependencies on China have intensified lately: the number of strategic products imported by the EU for which China is the main supplier increased between 2019 and 2022 (as well as for the US and Japan). Initiatives implemented

by the von der Leyen Commission as part of its China strategy, including industrial policy (Chips Act, Hydrogen Strategy, Pharmaceutical Strategy, Important Projects for Common European Interest, etc) and import restrictions (Critical Raw Materials Act, Anti-Dumping and Countervailing Duties) have yet to trigger a change in trend.

While trade diversification policies may take years to materialize, the increasing import dependence on China may also reflect the diverging views across Member States, some of which are keen to preserve close relations with China.

dependencies on China have intensified lately

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Policy Brief



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