CPB Netherlands Bureau for
Economic Policy Analysis

Economic interwovenness with China through trade: two sides of the same coin

Since mutual import tariffs were gradually lowered in the 1990s, trade between China and the European Union has continued to increase. This leads to a growing interwovenness that brings both benefits and risks. The benefits consist of a larger and more diverse product supply at lower prices. It also means the EU is able to impose trade sanctions and economic pressure on China.

As China's geopolitical power has also increased, some are advocating for less trade with China. Whether a decrease in the dependence on China is worth the cost is a political choice.

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Economic interwovenness with China

Increased trade with China involves both risks and benefits. Whether the costs of phasing out or reducing trade outweigh the concerns of geopolitical dependence remains a political choice

Advantages

Trade between China and the European Union has increased enormously. This is to Europe's benefit in various ways:

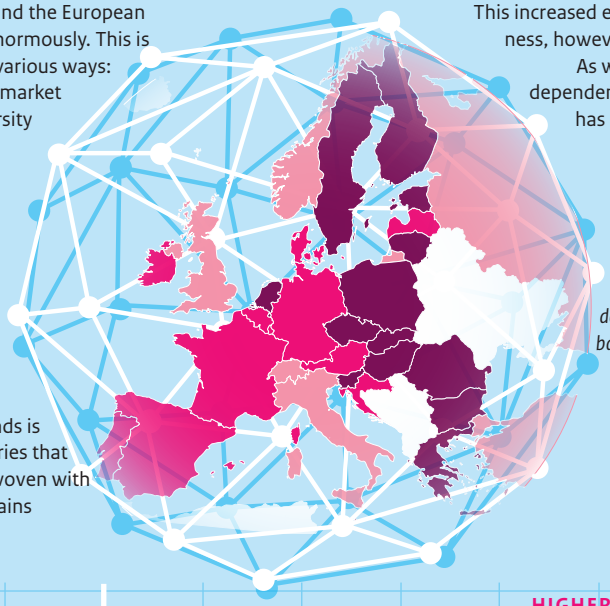
- access to large trade market
- greater product diversity
- (much) lower prices
- employment

Risks

This increased economic interwovenness, however, is not without risk. As we have become more dependent on the Chinese, this has also given them more geopolitical power

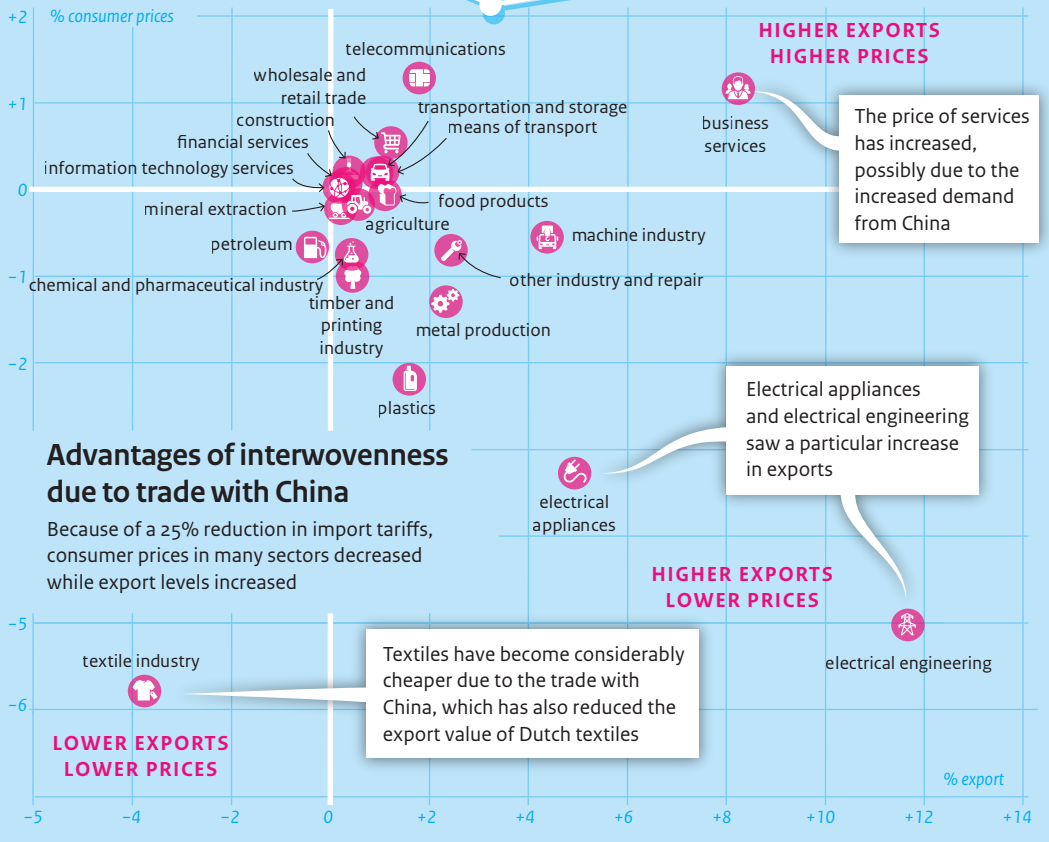
Most interwoven

Together with eastern Europe, Finland and Sweden, the Netherlands is amongst the EU countries that are most closely interwoven with Chinese production chains



potential impact factor
degree of interwovenness, based on gross production

1.1
1.0
0.9
0.1
no data



Advantages of interwovenness due to trade with China

Because of a 25% reduction in import tariffs, consumer prices in many sectors decreased while export levels increased

Main Findings

Europe is benefiting from increased trade with China, in several ways. Since mutual import tariffs were gradually lowered in 1994 and China joined the World Trade Organization (WTO) in 2001, trade between China and Europe has boomed. Europe particularly increased goods imports from China and, albeit to a lesser extent, its export to China. This has benefited European consumers as well as certain producers.

For European consumers, this has meant a greater diversity in available products at a significantly lower prices. Prices of particularly electrical appliances, electronics, plastics and textiles are lower than they would otherwise have been (between 2% and close to 6%). This benefits both consumers and producers who use these products as inputs.

European producers are benefiting from the easier access to a large market and, thus, are exporting greater volumes to China. Together with Eastern European countries, Finland and Sweden, the Netherlands is amongst the EU Member States that are most closely interwoven with Chinese production chains. The Netherlands is therefore benefiting to a relatively large degree from Chinese trade. The lower import tariffs with China have led to some 1.8% increase in EU exports. For the Netherlands, this increase has been 2.6%, which in turn led to more employment. In 2020, Dutch earnings and employment associated with exports to China amounted to 7 billion euros and 66,000 FTEs, respectively. As European producers are able to import cheaper resources (i.e. parts and materials) from China, their level of competitiveness on the global market has also increased.

Economic integration with China has a geopolitical dimension, too. The costs related to a trade conflict are higher when there is greater economic interdependence. As a result, countries may use economic sanctions, such as imposing import tariffs, to achieve certain political goals.

However, this knife cuts both ways. There is a concern that China has gained too much geopolitical power due to a growing mutual dependence. Europe is importing a large number of products from China, some of which have few alternatives (i.e. rare earth metals). This makes Europe vulnerable to Chinese sanctions of a geopolitical nature. For example, Lithuania was punished with a trade boycott by China for increasing its ties with Taiwan (link). One of the solutions to counter such dependence is a decoupling from China, which would mean fewer or even no related imports or exports.

Such a decoupling would negate all the benefits of trading with China. It would result in a reduction in product diversity and higher product prices for consumers and producers. In addition, it would depress trade at the expense of jobs and earnings. Finding new suppliers or bringing production back to Europe (reshoring) would also involve (one-time) transition costs, for example, related to building sufficient production capacity. The question is whether the benefit of reducing this geopolitical vulnerability justifies the economic consequences. This is a political, strategic choice that should also take into account the benefits of such trade.

1 Introduction

'...and the further he travelled, the longer the way back became' — C.C.S. Crone[1]

Since the 1990s, trade between China and the EU has grown, and with it, the economic integration. Particularly after joining the World Trade Organization (WTO) in 2001, China started to increase its export levels (Euwals et al., 2021). Low-cost production factors — particularly labour — enable China to compete with cheap products on the world market. In the initial period, this mainly concerned cheap clothing and consumer products, later followed by high-quality technical products and goods used as input in industrial production in the importing countries. As the Chinese economy grew, the country also began to import more from developed countries that had and still have a competitive advantage in producing high-quality goods and services.

Imports from China have led to permanently lower consumer prices. For France, Canada and the United States, a number of studies have calculated how much lower consumer prices are as a result of cheaper Chinese products. For example, for France, Carluccio et al. (2018) calculate that imports from China contributed to reducing French inflation on average by 0.10 percentage points per year, between 1994 and 2014. For Canada, Morel (2007) finds the same effect for the 2001–2006 period. In another study on Canada, Kim (2020) calculates that inflation between 2001 and 2011 was even 0.23 percentage points lower per year. For the United States, the lowering impact on prices has been even larger, according to Lau and Tang (2018); between 1994 and 2017, a 1 percentage point increase in the share of US imports from China has lowered the annual growth rate of the US price index by about 1 percentage point; overall, inflation would have been 27 percentage points higher.

Economic integration through trade may reduce risks. If certain goods are not available in a given country or region, for example following a natural disaster, they can be imported. Especially for agricultural products, as these are dependent on the weather, trade can be a solution. If the harvest is poor, the shortfall can be imported; if the harvest is very plentiful, the surplus can be exported to avoid a sharp drop in prices. But economic integration also has a geopolitical dimension. As Nicolas Mulder puts it: 'mutual dependence is the fuel of sanctions'.[2] Sanctions have specific goals, such as the preservation of peace, treaty enforcement (e.g. nuclear non-proliferation), or to defend human rights. Sanctions can be deployed for various purposes, from deterrence, to communication and coercion. Without economic integration, the 'economic weapon' of sanctions is not available, and this may increase the risk of armed conflict (Mulder, 2022).

The increased import of cheap Chinese products also has a number of drawbacks: in some countries it has led to lower employment in the manufacturing industry and inequality on the labour market. Feenstra and Sasahara (2017) state that trade played only a minor role in the early 1990 and in the 2000s, because trade flows with low-wage countries were still limited. This changed after China joined the WTO and exports increased rapidly. In a widely cited study by Autor et al. (2013), the authors note that China's increasing competitiveness resulted not only in lower wages in the United States, but also in higher unemployment, reduced labour participation and increased use of disability benefits. Euwals et al. (2021) do not find these effects for the Netherlands, however. The Dutch economy adapted early on by specialising in types of manufacturing industries that do not compete with the cheap imports from China.

In addition, international trade also involves a number of inherent risks, such as products or services that may not be delivered, or perhaps are of the wrong quality or payment may fail. Contracts are always

[1] From: De schuiftrompet (*The trombone*), 1947.
[2] KVS lecture 2022; 30 May 2022 (link).

incomplete (Williamson, 2010) and may lead to lengthy legal proceedings. These risks can increase even further, especially when trading with international partners in countries where the costs involved in legal action are high.[3] The highly fragmented international production chains often lead to companies depending on certain specific inputs (*asset specificity*). This makes both parties vulnerable to so-called hold-up problems. This occurs when two parties refrain from trading because they are afraid of giving the other party more negotiating power at the expense of their own profits. Uncertain circumstances also play a role (e.g. natural disasters or the coronavirus pandemic). These types of risks are part and parcel of international trade.

There are also risks associated with changing trade policy, such as sanctions, boycotts and tariffs. Greater mutual economic integration means that changes in trade policy can lead to damage. For example, in 2014, China temporarily introduced an export ban on rare earth metals that were crucial as input for high-tech production in Europe and elsewhere. And, in 2018, the then US President introduced import tariffs on steel and aluminium from the European Union and China. In 2022, when Lithuania allowed Taiwan to open an embassy there, China blocked Lithuanian imports as well as imports from other EU Member States if those contained components from Lithuanian origin (also see BBC, link).

The disruptions to global value chains — through both changing trade policies and events such as the Suez Canal blockade or the coronavirus pandemic — have rekindled the debate on the costs and benefits of globalisation. This debate focuses, in part, on the risks associated with international fragmentation of production in global value chains (Arriola et al., 2020) and the risks of trade distortions driven by geopolitical motives. For certain critical goods, one of the suggested solutions could be reshoring or near-shoring of production (bringing production back to domestic manufacturing). However, doing so may involve substantial one-off transaction costs. A more extreme solution would be a complete decoupling from countries with a regime that one may not want to depend on. In such cases, alternative trading countries would need to be found, or some products would have to be reshored.

There have been many studies on national economic impact of increased trade with China, but relatively few on the consequences of reducing such trade. Eppinger et al. (2021) and Felbemayer et al. (2021) calculate what a reduction in Chinese trade would mean for the German and European economies. Eppinger et al. (2021) conclude that the global impact of a supply shock (such as due to the coronavirus pandemic) in China overall would be smaller in a decoupled world. Thus, shutting down global value chains would indeed reduce the international transmission of such shocks. However, the study also finds that the welfare losses from decoupling would be larger than the benefits from a lower exposure to shocks. For example, reshoring production would reduce national prosperity levels by 2.2%, but this would hardly change the US exposure to foreign shocks. Felbemayer et al. (2021) describe a number of scenarios, including that of a reduction in trade between the European Union and China. For the European Union, a unilateral reduction in Chinese imports would lead to a loss of 0.9% of GDP. If China, in turn, would also reduce European imports (in effect, this would be a trade war), this loss would be 1.0%. The US Chamber of Commerce has calculated that reducing trade between the United States and China (by imposing a 25% import tariff) would mean an annual loss to the US economy of USD 190 billion by 2025 (or 0.8% of GDP). As US companies have large foreign direct investments (FDIs) in China, decoupling would also come at a high cost.

This study shows that Europe and the Netherlands are interwoven with China through trade in various ways; decoupling would carry a high cost. Chapter 2 shows the current interwovenness with China by providing insight into trade volumes and the types of products imported and exported. Chapter 3 explains the methodology used. Chapter 4 shows the economic benefits of this interwovenness by comparing the current trade relationships with a what-if scenario in which trade with China is severely hampered. A first analysis (Section 4.1) shows the direct and indirect interwovenness through production chains and compares the

[3] In Williamson's thinking, this is because there are high costs associated with drafting, monitoring and enforcing agreements.

situation in the Netherlands with that in other EU Member States. A second analysis (Section 4.2) shows what the reduction in tariffs since 1994 has meant for the trade between Europe and China. It also analyses possible diversions if trade barriers would be introduced. These analyses were conducted on a macro level and for individual business sectors. Section 4.3 looks at a specific product (rare earth metals). And, finally, Chapter 5 discusses a number of issues that were not included in this study.

1.1 Research question and scope

Commissioned by the Dutch Ministry of Economic Affairs and Climate Policy, CBS and CPB studied China's economic interwovenness with the European Union and the Netherlands. CBS (Statistics Netherlands) describes the direct and indirect interwovenness of the Dutch and Chinese economies (Chapter 2). Subsequently, CPB analyses the interwovenness between China and the European Union by calculating the consequences of a certain degree of decoupling (Chapters 3 and 4). Using the international input-output tool, the direct and indirect interwovenness between China and the Netherlands is outlined and compared with other countries and EU Member States. The gravity model allowed us to calculate the amount of additional trade generated by the tariff reduction between the European Union and China and what the trade diversion would be if the trade with China were to stop.

This study does not investigate the financial interwovenness with China. Dutch investment (FDI) in China is small, compared to that of other countries and to the value of the trade between the Netherlands and China. The total value of outbound Dutch investments in China was 16.1 billion euros in 2015 and dropped to 12.7 billion in 2018. China was the 26th largest investment destination for Dutch companies in 2018. Foreign investment in China is concentrated mainly in mineral extraction and the food industry (Creemers et al., 2020). The amounts are of course not negligible, but in our study we focused on the trade relationship, because trade is so much more important. The contribution by Wageningen University & Research provides more information on investments in the food industry (Berkum and Herceglic, 2022).

2 Trade with China: current situation

Several studies investigate the extent to which, in the past, the Dutch economy was connected with China through imports and exports. Lemmers and Wong (2019) show that two thirds of Dutch imports of goods from China are destined to be resold directly to third countries (re-exports). Cremers et al. (2019) look at Dutch import dependence on China, on an industrial level, and whether the imported goods and services were used for the Dutch market or in export production. Aerts et al. (2020) looked at Dutch import and export dependence on China, import use and bilateral investment relationships. A CBS study (2020) examines trade relationships, directly and through the supply chain, as well as investment relationships.

This chapter discusses how the Netherlands is connected to China through direct and indirect trade (i.e. imports and exports). In the first case, Chinese and Dutch companies sell directly to each other. In the second case, these companies sell their goods and services to companies in other countries that, in turn, use these as inputs for their exports to China or the Netherlands. The data are often broken down by type of goods/services, industry and year (2015–2020), so that a trend can be detected. More details are provided in the comprehensive tables accompanying this report.[4]

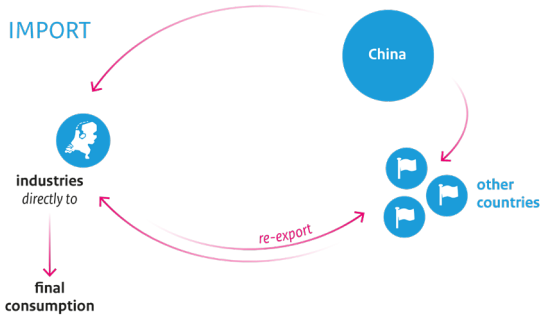
This chapter is structured as follows. First, it looks at imports; it discusses which goods and services are imported by which industries. This is followed by a section that looks at the countries from which Dutch industries indirectly import from China. Exports are also discussed, providing insight into which goods and services are exported by which industries and how much export earnings and employment this generates. There is also an analysis of the international value chain that shows in which countries the goods and services exported by Dutch industries are processed in final exports to China and how many goods and services this involves.

2.1 Import relationships

The Dutch economy is interwoven with production in China, in several ways. Dutch companies directly import goods and services from China. They use these as inputs for production, to sell directly to Dutch consumers, the government and other companies, or to sell directly abroad (re-export). In addition, China produces for other countries, which in turn use these goods and services for exports to the Netherlands. See Figure 2.1.

[4] See link

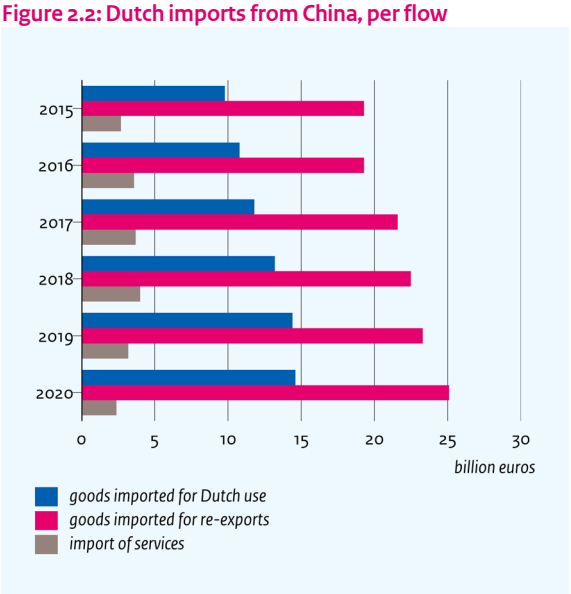
Figure 2.1 Economic interwovenness between the Netherland and China — the import side



2.1.1 Dutch imports from China

In 2020, Dutch imports from China amounted to 42 billion euros; even when the coronavirus pandemic broke out, imports rose compared to the previous year. As in previous years, these imports were mainly for re-export, such as consumer electronics and clothing that was directly sold to the European hinterland. This means that the usual import figures make the Dutch relationship with China look much bigger than it really is. A smaller share of the imports concerned goods for the Dutch market, and the share of imported services was even smaller. Imports of Chinese goods, both for the Dutch market and for resale to foreign markets, are increasing steadily. The number of goods imported from other countries, in 2020, increased less rapidly and even decreased in this first year of the coronavirus crisis. Imports of services from China increased up to 2018 and then decreased again. These increases and decreases are mainly attributable to changes in the imports of 'other business services', consisting of R&D, professional and management consulting services, and technical services.

Figure 2.2: Dutch imports from China, per flow



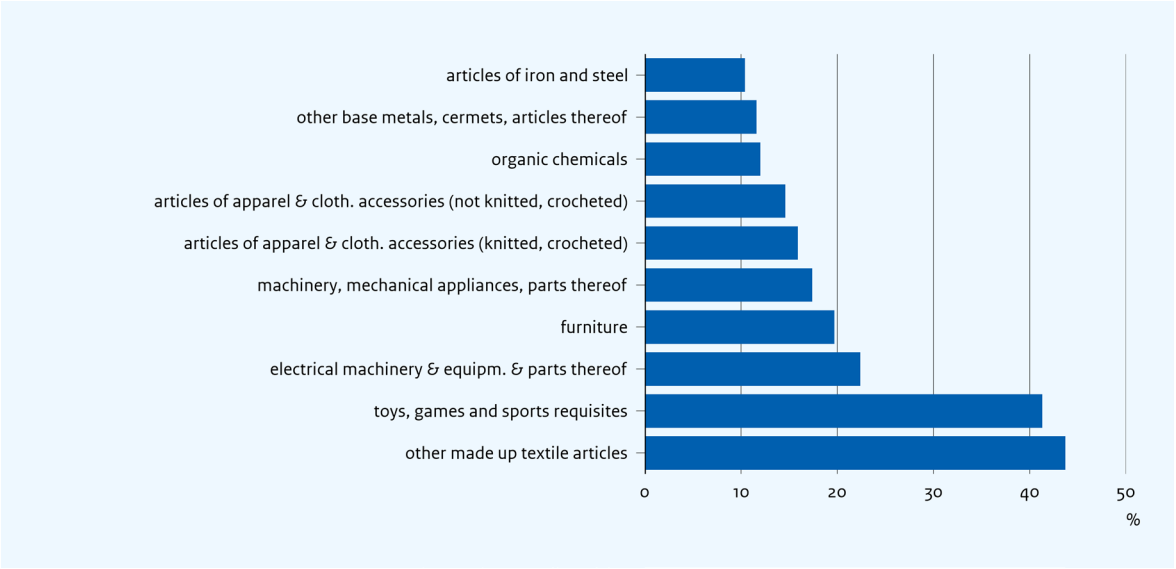
Source: CBS

Imports of goods are highly concentrated in specific products. Machinery and mechanical appliances (10 billion euros), electrical machinery and equipment (11 billion euros), clothing (3 billion euros) and furniture (2 billion euros), together, accounted for two thirds of Dutch goods imported from China in 2020. Again, most of

these goods were sold on directly to other countries. Imported services were also highly concentrated; the category 'other business services' accounted for 0.7 billion euros of imports from China, more than half of total Dutch services imported from China.

For several products imported for Dutch consumption, the Chinese share is considerable. Figure 2.3 shows that share, for goods with a total import value of at least 1 billion euros, and a Chinese share of at least 10%. In addition to clothing, toys and furniture, this also includes electrical machines, organic chemical products and articles of various metals. Here, the Dutch import dependence on China is large, in both relative and absolute terms.

Figure 2.3: Chinese share of imports for use in the Netherlands; imports of at least 1 billion euros, 2020

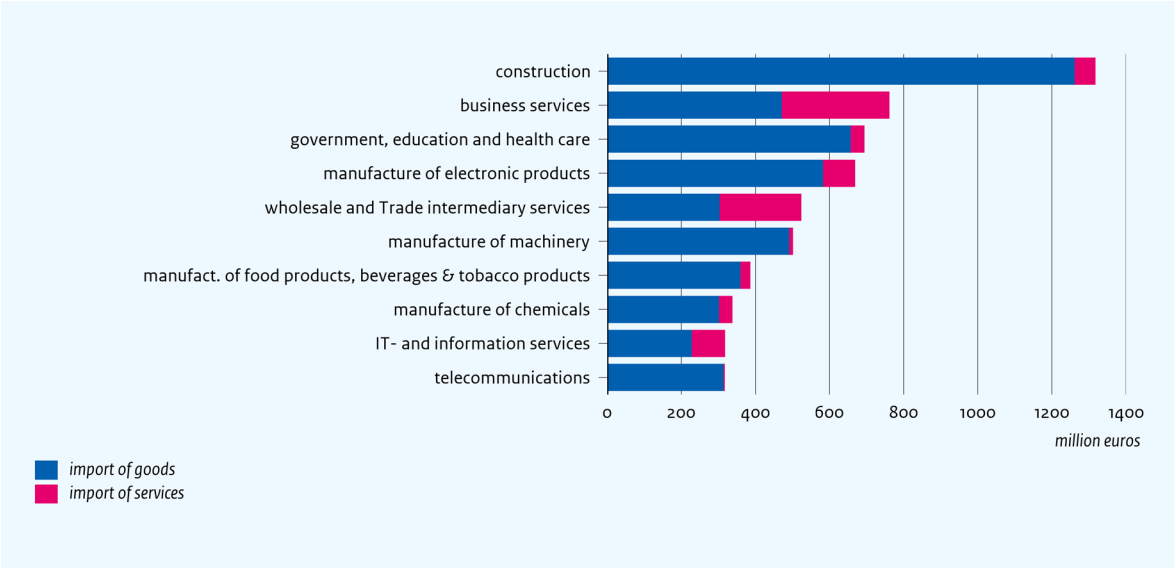


Source: CBS

Earlier CBS research looks at import dependencies in general, from all countries around the world. Looking at products with at least 250 million euros in import value and a certain concentration on the global market in terms of exporters, CBS (2021) finds that China is the main import partner only in the category of television sets. Lemmers et al. (2021) look at goods of specific industries on a very detailed product level (including 3450 products), irrespective of whether the Netherlands imports a large amount of them and the world market is concentrated or not. They find that there are two products with a concentrated world market of which the Netherlands imports more than 100 million euros worth from China: one is LEDs (representing 113 million euros in imports) and laptops (with a value of 4.4 billion euros in imports).

The industries that import the most from China include service industries, such as construction and business services (see Figure 2.4). Similar to the other industries, they mainly import machinery and electrical equipment from China. The Netherlands imports far more goods than services from China; this is also true for most industries. Exceptions are wholesale trade, trade intermediation and business services. Again, these are imports of 'other business services'.

Figure 2.4: Top 10 industries with the largest amount in imports from China, 2020

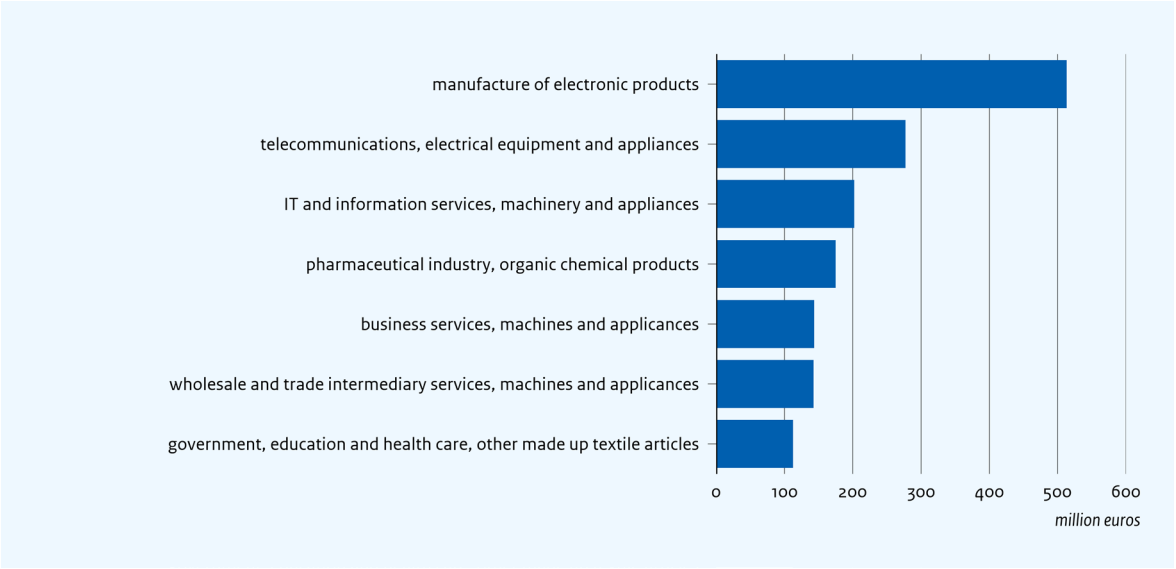


Source: CBS

Industries source specific goods and services from China and the rest of the world. For 96 goods and 25 services, we outlined the sectors (36 in total) that were importing them to use in their own production processes, in order to provide a detailed picture of which sectors were importing relatively many or few goods from China. This showed that the manufacturing industry imports the most goods from China, totalling 3.4 billion euros, followed by construction with 1.3 billion euros. Here, again, imports of machinery and electrical equipment are leading. However, it is also noticeable that all types of goods from China are used throughout the economy and this is increasing in virtually every industry. Looking at services, too, there is a concentration in specific industries. Wholesale trade and trade intermediary services, together with business services, account for almost half of the services imported from China; many of these also fall into the category of 'other business services'.

One way of zooming in on import dependence is to look at the Chinese share in the imports of a particular industry. It turns out that this is actually only about goods, rather than also about services. For seven combinations of products and business sectors, imports from China amounted to at least 100 million euros in 2020 and China's share in imports of these products by these industries was at least 25% (Figure 2.5). For example, the manufacture of electronic products industry imported 513 million euros worth of electrical machinery and equipment from China. That was 29% of their total imports of those goods.

Figure 2.5: Combinations of products and industries where Chinese share in Dutch imports is at least 25%, 2020

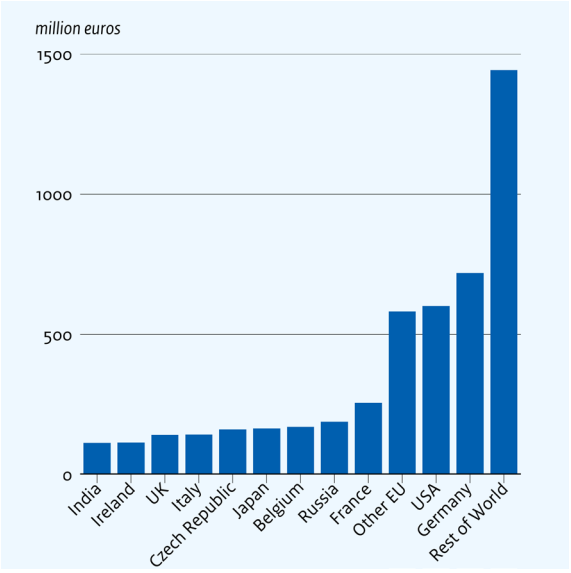


Source: CBS

2.1.2 Dutch imports from China via other countries

In addition to these direct imports (Chinese companies selling directly to Dutch companies), there are also indirect imports. In such cases, Chinese products are sold to companies outside the Netherlands and subsequently incorporated (possibly via other countries) into products that are exported to the Netherlands again. For this analysis, we looked at the country from which the Netherlands ultimately imports. These countries are therefore important access channels for Chinese companies to reach the Dutch market. High on the list are some traditional trading partners: Germany, the United States and France. Relatively low on the list are Belgium and the United Kingdom (Figure 2.6). From this last country, the Netherlands mainly imports services; services include relatively few components that are imported from other countries. Manufacturing accounts for about half of the indirect imports. When looking on a national level, similar proportions are found.

Figure 2.6: Chinese goods and services incorporated in Dutch imports from other countries, 2019



Source: CBS

2.2 Export relationships

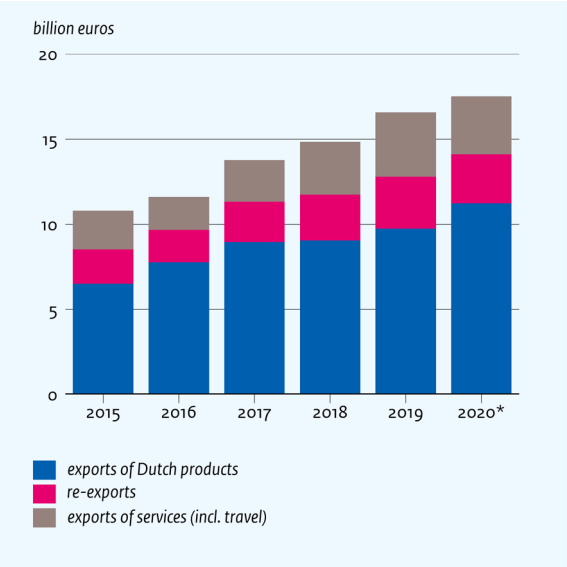
There are several ways in which the Dutch economy depends on China as a sales market. Dutch companies are exporting goods and services directly to China. In addition, the Netherlands also produces for other countries that, in turn, use these Dutch goods and services in their own exports to China. Import figures provide a detailed account of the import levels per business sector and type of product. Similar figures are available that show the export value. In addition, this section also provides the level of export earnings (in terms of value added) and number of jobs associated with three export flows: the export of Dutch products, re-export of Dutch products and export of Dutch services.

2.2.1 Dutch exports to China

This section describes the main figures related to direct exports to China. This information is available at sector and product levels, for example on exported metal products or specialised business services in the automotive industry. Furthermore, we also calculated the resulting export earnings and employment figures.

Exports to China are growing steadily, from 11 billion euros in 2015 to 18 billion in 2020 (see Figure 2.7). The largest component is made up of exports that are produced in the Netherlands, which also grew the most, to up to 11 billion euros in 2020. The re-exports and exports of services each accounted for 3 billion euros. Unlike the exports to European countries, the share of re-exports is only limited, because Dutch re-exports largely consist of products that were originally imported from Asia. China is able to obtain these goods directly from the region or even from a domestic source.

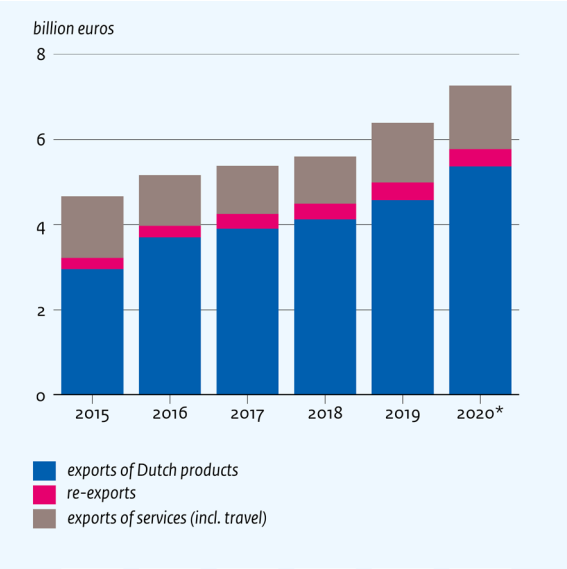
Figure 2.7: Exports to China, per flow



Source: CBS; * Preliminary figures

Earnings from exports to China also rose steadily, from 5 billion euros in 2015 to 7 billion in 2020 (see Figure 2.8). Exports of Dutch products again form the largest share and the share of re-exports in export earnings is relatively small. Per euro, much less is earned from re-exporting previously imported goods than from exported goods and services that are produced in the Netherlands itself. In 2019, total Dutch export earnings came to 254 billion euros, divided into goods exports (120,120 billion euros), exports of services (100 billion euros) and re-exports (34 billion euros). China, thus, is a relatively modest exporting country, accounting for 2.8% of total earnings due to exports. Total exports to China account for 0.9% of Dutch GDP.

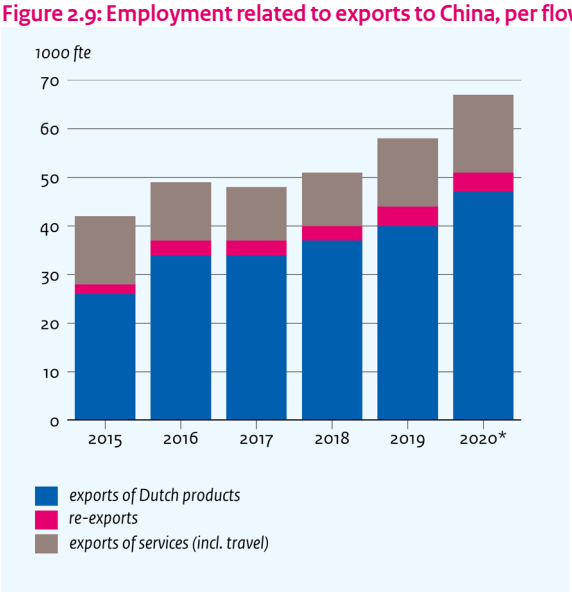
Figure 2.8: Revenues from exports to China, per flow



Source: CBS; * Preliminary figures

Employment related to exports to China shows the same picture (see Figure 2.9), with a steady increase, from 43,000 FTEs in 2015 to 66,000 FTE in 2020. Again, exports of Dutch goods form the largest component, followed by exports of services and re-exports. The contribution to total Dutch employment was 0.9%. Goods and services imports also generate employment, such as in logistics to get the imported products to their final destination. On this subject no estimations have been made.

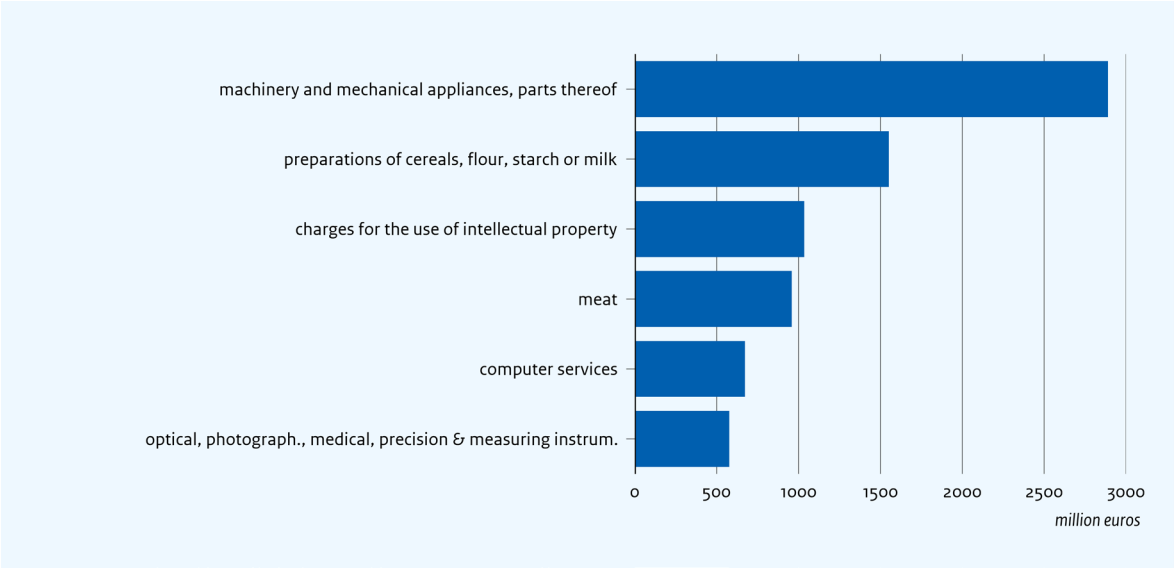
Figure 2.9: Employment related to exports to China, per flow



Source: CBS; * Preliminary figures

As is the case with imports, figures show a strong concentration amongst the goods and services traded with China (see Figure 2.10). Of all Dutch export products, machinery, food products, specialist tools and meat account for 2.9 billion, 1.6 billion, 1.0 billion and 0.6 billion euros, respectively. Together, these account for about two thirds of the goods that were produced in the Netherlands to be exported to China. With regard to the exported services, intellectual property fees (1.0 billion euros) and computer services (0.7 billion euros) stand out. Together, they account for about half of the services exported to China.

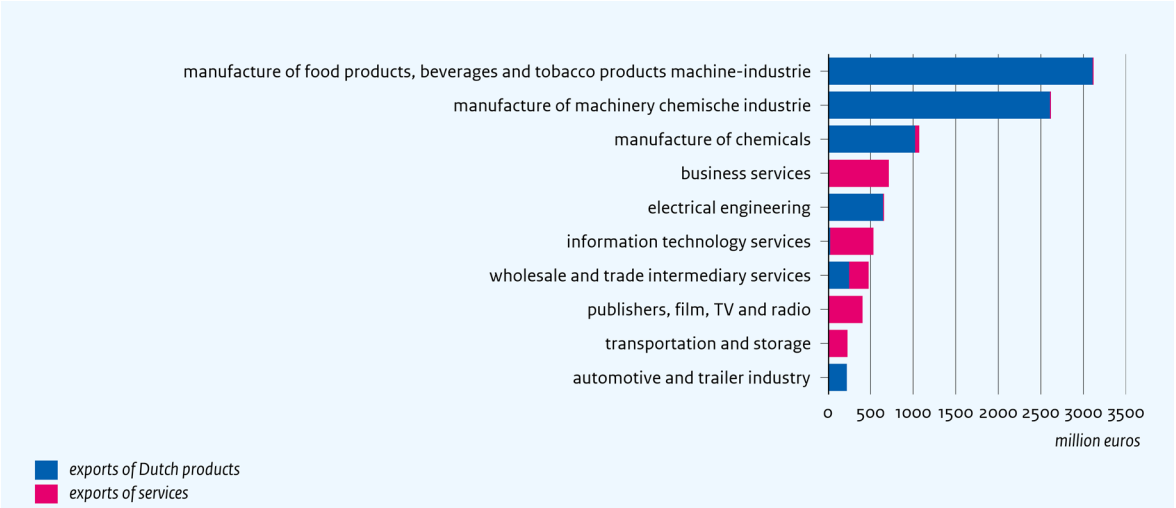
Figure 2.10: Goods and services produced in the Netherlands with at least 0.5 billion euros in exports to China, 2020



Source: CBS

Export levels from the manufacturing industry to China are particularly high; the three industries with the highest export levels are all in manufacturing (see Figure 2.11). These are the food products, beverages and tobacco products industry (e.g. baby food), machinery industry and chemical industry, with 3.1 billion, 2.6 billion and 1.1 billion euros, respectively.

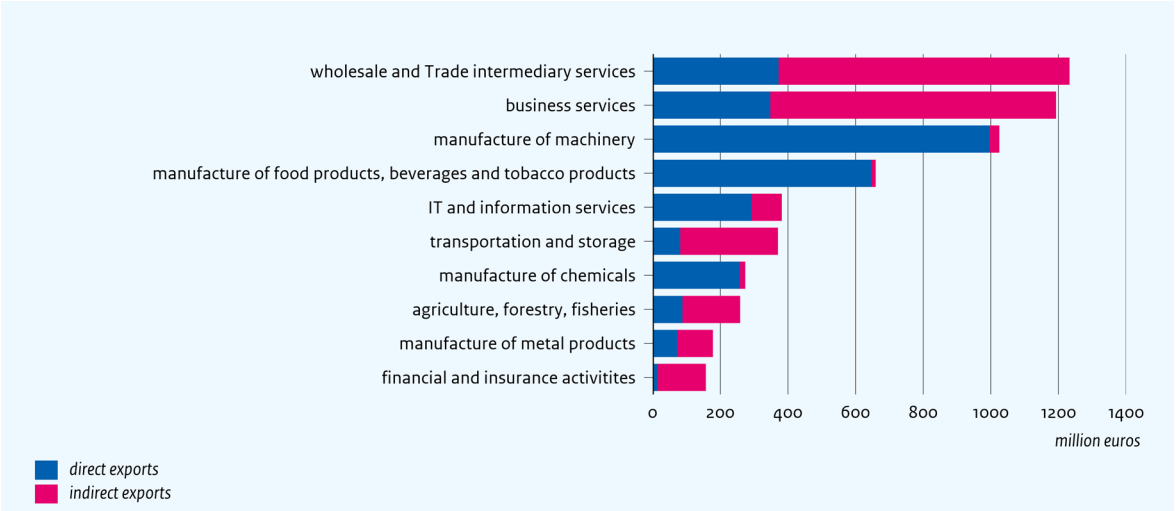
Figure 2.11: Top 10 industries with the most exports to China, 2020



Source: CBS

The picture is completely different when it comes to the industries with the highest earnings from exports to China (see Figure 2.12). In this respect, the three most important industries are wholesale and trade intermediary services, business services and manufacture of machinery. The earnings in the first two industries mainly come from their indirect exports, as they provide goods and services to the supply chains of other Dutch industries that use those inputs in products that are subsequently exported to China. The earnings in manufacture of machinery, on the other hand, are almost entirely due to direct exports. These are the goods and services that this industry sells directly to China.

Figure 2.12: Top 10 business sector with highest revenues, thanks to Dutch exports to China



Source: CBS

The picture for employment is a little different, although there are similarities with export earnings (see Figure 2.13). The difference is due to the fact that 1 euro of earnings, value added, (wages and salaries) is associated with more employment in one industry and less in another. Wholesale trade and trade intermediary services have approximately the same export earnings as business services, but significantly lower employment. This is due to the fact that, in business services, where a relatively large number of temporary employees is involved in exports to China, relatively lower wages are paid than in wholesale and trade intermediary services.

Figure 2.13: Top 10 industries with highest employment levels, thanks to Dutch exports to China, 2020

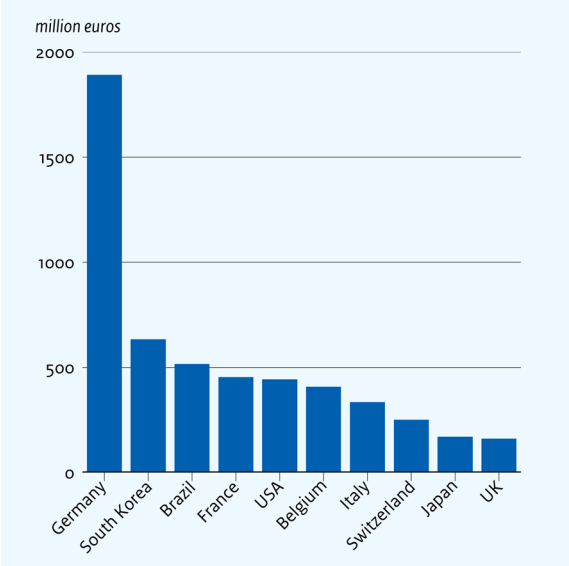
Source: CBS

2.2.2 Dutch exports to China via other countries

Dutch companies also reach the Chinese market via other countries. In a fictitious example, a Dutch company may sell metal sheets to a French company that then uses the sheets for the production of car roofs and sells those roofs to a German car manufacturer who uses them in the production of cars that are ultimately sold to China. In this example, Dutch exports indirectly find their way to China via France and Germany. In practice, Dutch goods reach China mainly via Germany, South Korea and Brazil. Almost 2 billion euros of value

added created in the Netherlands flows through Germany, at some point, to eventually reach China (see Figure 2.14). In total, in 2019, the Netherlands earned close to 4 billion euros from products exported to other countries that were ultimately used in exports to China (i.e. indirect exports). In comparison, Dutch value added embodies in direct exports from the Netherlands to China amounted to over 6 billion euros that year. Dutch exports to China, both direct and indirect, are growing much faster than those to the rest of the world. The Chinese economy/sales market is also growing more strongly than other economies around the world.

Figure 2.14: Dutch value added flowing to China via exports to other countries, 2019



Source: CBS

CBS also investigated which country ultimately exports to China. More than half of export earnings are related to exports to a country outside the European Union, most of which in trade, manufacturing and business services, with 0.9, 0.7 and 0.4 billion euros, respectively.

3 Scenario analysis

3.1 Scenarios

We used scenarios and a counterfactual analysis to further explore the ways in which China and the European Union are interwoven. Chapter 2 shows the current state of affairs. Scenario analysis allowed us to compare that situation against a what-if scenario, examining what would have happened if China and the EU were interwoven to a lesser degree or not at all. In other words, this scenario compares the consequences of a certain fictitious situation against the current situation. This makes it possible to isolate the impact of a certain factor from other factors, such as increasing economic growth and trade flows worldwide.[5]

The greatly increased interwovenness between the European Union and China since the 1990s has partly been due to the lowered mutual import tariffs, which have increased trade. Using the gravity model, we therefore created a scenario that limits trade by keeping import tariffs at the 1990 level. We subsequently compared this scenario against reality, allowing us to paint a picture of the impact of the lower import tariffs

[5] The scenarios do not take the Brexit into account, because the data we used for the scenario analyses only went up to 2017. Therefore, in these analyses, the United Kingdom is still part of the European Union. The effect of abolishing import tariffs without the United Kingdom in the European Union will probably be slightly smaller than in the current scenario analyses.

and increased trade between the European Union and China. Using the international input–output (IIO) method, we simulate an impulse that reduces imports from China for intermediate use. The direct and indirect impact of that impulse on, for example, output showed how interwoven countries and industries are with imports from China.

To calculate the economic benefits of the trade with China, the main scenario considers a situation where import tariffs between the European Union and China are 25 percentage points higher than in the current situation for all goods and services.[6] This applies to imports from China to the European Union and vice versa. This scenario depicts a trade relationship between the European Union and China without the tariff cuts of recent decades. We looked only at the impact of import tariffs between China and the EU, not between China and other countries. The results are independent of the fact that the interwovenness between China and other countries such as the United States has indeed increased. Therefore, this is a partial effect. To calculate the level of interwovenness, we reduced the exports between China and the European Union by 25% (EU exports to China).

The appendix also presents another scenario. This scenario uses trade tariffs that have remained high — not only between the European Union and China, but also between the United States and China with, for the latter, also a 25 percentage point higher import tariff. The same was applied to the interwovenness, only here this was not a tariff but an incentive of 25% lower import.

3.2 Measuring economic consequences

3.2.1 International input–output method

The international input-output (IIO) tool was used for analysing the economic interwovenness of international production or supply chains. In addition to the direct interwovenness through these production chains, there is also indirect interwovenness with other parts of the economy or other parts of the world.

We used international input–output tables to gain insight into the interwovenness via trade chains and, thus, to identify indirect effects. These tables show the value of the trade between industries. In the case of multi-regional input–output tables (MRIO), this concerns the trade flows of goods and services for intermediate use between various industries in various countries.

The standard input-output (IO) model analyses only the demand: in case of a change in final demand, yhe model can be used for calculating the necessary and corresponding changes in gross production. This includes all recurring backward effects on industries upstream.

Limitations of IO models are the fixed input coefficients and the fact that they do not include price changes or substitution. As a result, they are generally considered suitable only for conducting short-term impact analyses. For example, the model does not allow companies to respond to demand constraints by raising prices. In addition, no capacity or supply constraints can be imposed. A small category of IO models does meet this need; they insert the IO structure into an optimisation framework. In Koks and Thissen (2016), this is a linear programming model. In Oosterhaven and Bouwmeester (2016), it is in a non-linear optimisation model, where the short-term behavioural response of economic agents is to deviate as little as possible from the situation that precedes a shock. CPB's IIO tool was grafted onto Oosterhaven and Bouwmeester's model and, therefore, allows including the forward effects on declining industries, both

[6] The 25 percentage points correspond roughly with the average tariffs imposed in the early 1990s on trade between China and the European Union.

national and international. This provides a more complete picture of the interwovenness.

The fixed input coefficients represents a Leontief technology; a fixed ratio of inputs is always needed. The input that, relatively speaking, is the least available determines the level of production. This may result in a supply constraint in a given industry in a given country having far-reaching consequences for all consuming industries around the world. This in turn has a knock-on effect on industries downstream, and so on. Industries can be directly interwoven when they use imported materials from China as input for their own production processes. In addition, they may also indirectly involved in Chinese imports. This is the case, for example, when they use inputs that are supplied by industries that are directly interwoven with China.

The interwovenness with China is indicated by a 'potential impact factor' (PIF). To determine the interwovenness between the European Union and China, we added a certain impulse to the IIO tool and observed the size of the related direct and indirect effects. The impulse consisted of a reduction in EU imports of Chinese intermediate inputs. The ultimate interwovenness of gross production (output) of the industries is indicated in relation to the initial percentage (or impulse) — the potential impact factor. For example, if the initial impulse is 25%, the final impact on gross output of the automotive industry is 35%. This corresponds to a potential impact factor of 1.4. As the tool is largely linear, the potential impact factors are stable over various impulses. We assume that gross output for the directly involved industries is initially reduced by the same percentage as the intermediate input from China (the impulse).

3.2.2 Gravity model

To determine the impact of tariffs on EU-China trade in the medium term, we used the gravity model.[7] The model uses the physics principle of gravity between two objects in space and applies it to trade.[8] The heavier two objects are, the greater the force of attraction, and the further apart they are, the smaller the force of attraction. Jan Tinbergen (1962) was one of the first to show that this principle can be applied to trade. For example, there will be a large amount of trade between countries if they both have large economic mass, or high levels of GDP, and there is a small physical distance between them. So, the larger the size of a country's economy, the greater its production and exports volumes will be. The related revenues, in turn, may be used to import many goods from other countries. The smaller the distance between such countries, the lower the trade costs (e.g. related to transport). The Netherlands' trade with Germany is substantial, as this country has a large economy and is geographically close. In addition to the physical distance between two countries, economic and cultural distance are also relevant. Speaking the same language, for example, facilitates easy communication and reduces trade costs.

At the beginning of the 21st century, Anderson and Van Wincoop (2003) used their theoretical foundation of the model to show that not only the absolute distance between countries is important, but so is their relative distance to third countries.[9] Two countries can be at a considerable distance from each other in absolute terms, but if third countries are even further away, there will still be a relatively large amount of trade between the two. Think, for example, of Australia and New Zealand. The opposite is also true, as two countries that are relatively close, geographically speaking, may trade relatively low volumes with each other in absolute terms, such as in case of the Netherlands and Belgium, due to other countries also being rather close by, such as Germany. In addition, the European Union, and the resulting economic integration of the Member States, has ensured that the economic distance between member and, therefore, also the trade costs between them have been greatly reduced. The formation of the European Union has thus resulted in more countries being

[7] See Bollen et al. (2020) for an extensive description of the gravity model used by CPB..
[8] Gravity is proportional to the product of the two masses of the two objects and inversely proportional to the distance between the two objects' centres of gravity squared.
[9] For comprehensive literature reviews of the gravity model, see Anderson (2011) and Head and Mayer (2014).

relatively close to each other.[10] This relative distance to third countries as a unit of measurement is also called *multilateral trade costs*. This type of trade cost has also been included in our analysis.

Lowering trade tariffs or non-tariff barriers to trade (NTBs) reduces trade costs and can thus be seen as a reduction in distance. The reduction in mutual trade costs between the European Union and China has primarily consisted of lower import tariffs. In our scenarios we therefore created a counterfactual in which these tariffs remained 25 percentage points higher. We subsequently compared this counterfactual with reality to gain insight into the impact of a tariff reduction (see also Section 3.1 for a description of the scenarios and Appendix 6.1 for a brief description of the gravity model methodology).

The gravity model scenario analyses include general equilibrium effects that lead to trade diversion. The change in trade costs not only affects the trade between countries directly involved, but also has an indirect effect on third countries. Adjusting trade tariffs affects trade prices, multilateral trade costs and trade-related revenues for all countries. This can lead to trade diversion: third countries that had previously been relatively cheap became relatively more expensive after the lowering of tariffs, such as between the European Union and China. Some of that trade will therefore be diverted away from those third countries, leading to additional trade between the European Union and China.

The gravity model is simple and intuitive and therefore very suitable for analysing trade cost changes. Larger general equilibrium models are often more of a black box. In comparison, the gravity model results can be well explained using economic theory. In addition, all necessary parameters of the gravity model can be estimated within the model (see Section 6.1), in turn making it unnecessary to extract parameters from the literature.

CPB's gravity model, however, does not take account of value chains and dynamic effects of trade. In the past, international trade mainly consisted of final goods, such as motorised vehicles manufactured in one country by one company. But today, international trade consists mainly of intermediate products, which are then used in various industries to produce new products that are used as intermediate products in other types of industries. We call this the value chain. The dynamic effects of trade consist of countries opening up to trade will become more productive. After all, an increase in competition from foreign companies will force domestic companies to innovate and become more productive (Melitz, 2003). Because we did not include these effects, the actual impact of trade distortions may be higher than estimated with this model. For example, Costinot and Rodríguez-Clare (2014) show that including value chains leads to two to three times larger estimations of welfare effects.

4 Trade with China: interwovenness and economic benefits

4.1 Interwovenness

This section shows the results from the scenarios in which we applied the IIO method. It shows the interwovenness between Dutch industries and China and compares this against that of other EU Member States. We measured the degree of interwovenness by reducing import levels for goods and services by 25%

[10] See Freeman et al. (2022) for an extensive discussion of the trade benefits of the European Union and the internal market.

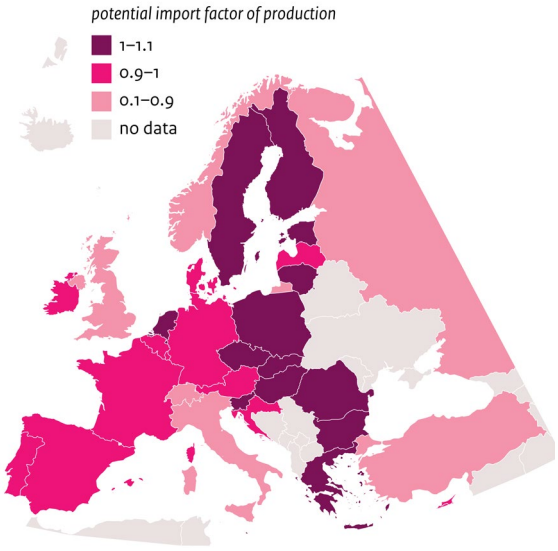
(impulse) and subsequently comparing the result (impact) against the initial impulse. We first reduced EU imports from China and then also China's imports from the European Union.

4.1.1 Comparison between the Netherlands and other EU Member States

Figure 4.1 shows that EU Member States have various degrees of interwovenness with Chinese imports via trade chains. In particular, those in eastern Europe with their relatively large industrial sectors are interwoven with Chinese imports of inputs that are then processed further in other European countries. We used the potential impact factor to shows how much an initial shock was amplified by interwovenness in value chains. For example, if there is strong direct and indirect interwovenness then a 25% change in imports from China will lead to a change in production of more than 25%.

Countries and regions with a strong degree of interwovenness with Chinese production chains are the Netherlands, eastern Europe, Finland and Sweden (as Norway is not an EU Member State it was not included here). The Netherlands stands out in Figure 4.1 because it has a small open economy that depends heavily on trade flows; so does eastern Europe because of its large manufacturing base. The results for the industries in the Netherlands are shown later in this section.

Figure 4.1: Interwovenness with China via production chains (measured with potential impact factor on production)



Note: A potential impact factor of > 1 means that a country has both indirect and direct connections to China.

As Figure 4.1 shows, there are considerable differences between EU Member States and other European countries. Table 4.1 shows what would happen if China also were to reduce its imports from the European Union by 25%. A number of central and eastern EU Member States, such as Bulgaria, the Czech Republic, Poland, Slovenia, Slovakia and Hungary, have strong direct and indirect ties with China. In addition, Sweden, Finland and the Baltic States of Estonia and Lithuania are more than averagely connected to China, whereas Luxembourg, in particular, is much less connected, with a potential impact factor of well below 1, reflecting its low direct and indirect connection to China. For Finland, the potential impact factor will even go down if China also decouples from the European Union, as there are more inputs available on the market for domestic production when countries no longer export to China. The potential impact factor measures only gross output, rather than value added or other economic variables.

Table 4.1: Interwovenness measured according to the potential impact factor (PIF); results for EU Member States

Country	EU	EU-CN
China	0.07	0.95
Austria	0.96	0.96
Belgium	0.98	0.98
Bulgaria	**1.01**	1.00
Cyprus	0.90	0.90
Czech Republic	**1.02**	**1.02**
Germany	0.98	0.99
Denmark	0.96	0.96
Estonia	**1.05**	**1.04**
Greece	**1.05**	**1.05**
Spain	0.98	0.98
Finland	**1.07**	0.96
France	0.95	0.96
Croatia	0.92	0.92
Hungary	**1.02**	**1.02**
Ireland	0.96	0.94
Italy	0.83	0.82
Lithuania	**1.04**	**1.04**
Luxembourg	0.55	0.54
Latvia	0.99	0.98
Malta	**1.03**	**1.04**
Netherlands	1.00	1.00
Poland	**1.06**	**1.06**
Portugal	0.96	0.90
Romania	**1.04**	**1.04**
Sweden	**1.04**	**1.03**
Slovenia	**1.02**	**1.02**
Slovakia	**1.02**	**1.02**

Note: A potential impact factor of > 1 is presented in bold; the impact is that on gross production. The 'EU' column = only the European Union is decoupling; 'EU-CH' = both the European Union and China are decoupling.

Table 4.2 shows other countries' interwovenness with China via the European Union. None of the potential impact factors are greater than 1, which means that they will hardly be affected indirectly if the European Union were to decouple from China.

Table 4.2: Interwovenness measured according to the potential impact factor (PIF); results for other countries

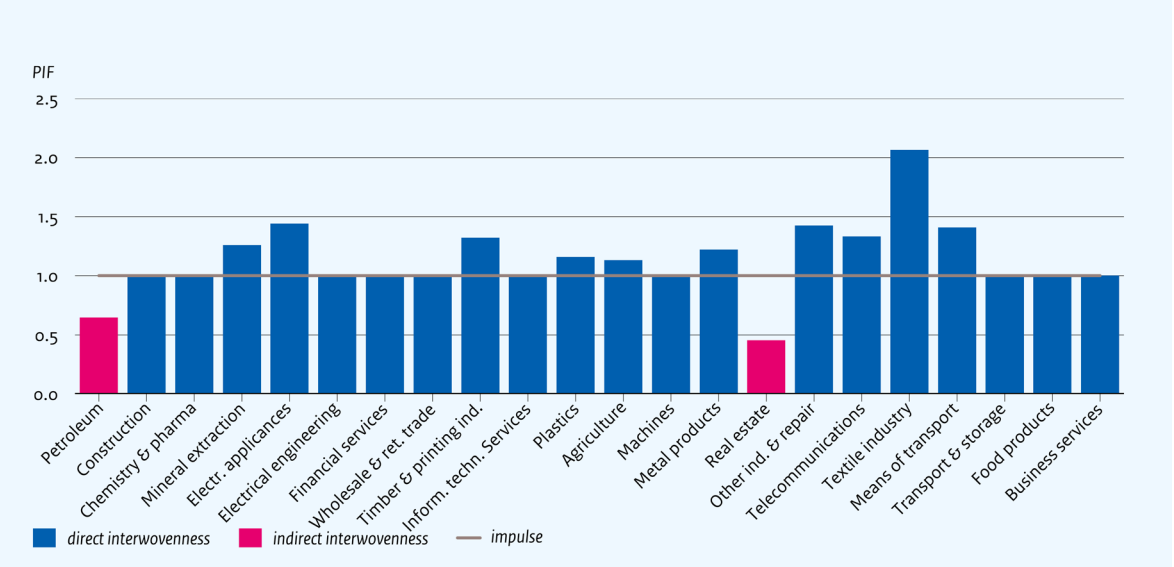
Country	EU	EU-CN
China	0.07	0.95
United States	0.06	0.08
Argentina	0.05	0.04
Australia	0.06	0.09
Brazil	0.08	0.09
Canada	0.05	0.08
Switzerland	0.32	0.30
Indonesia	0.04	0.06
India	0.06	0.07
Japan	0.05	0.07
South Korea	0.10	0.18
Mexico	0.05	0.08
Norway	0.23	0.20
Russia	0.17	0.16
Saudi Arabia	0.06	0.07
Turkey	0.15	0.12
United Kingdom	0.15	0.14
South Africa	0.13	0.14
Rest of the world	0.15	0.17

Note: A potential impact factor of > 1 is presented in bold; the impact is that on gross production. The 'EU' column = only the European Union is decoupling; 'EU-CH' = both the European Union and China are decoupling.

4.1.2 Business sectors

The Netherlands is directly interwoven with China via nearly all Dutch industries (see Figure 4.2). This is because the European Union imports a wide range of products and inputs from China. The figure shows how directly and indirectly interwoven some Dutch industries are with imports from China. Some to a larger degree than others. A change of 25% in imports from China would lead to more than 25% change in production. Textiles stand out because they are highly interwoven with trade chains; this industry is largely dependent on international markets for both inputs and outputs. The part of the effect above the 'impulse' line is an indirect effect. Only two sectors are indirectly interwoven, namely oil etc. and real estate. This means that these industries do not import anything directly from China, but they are nevertheless interwoven via the trade chains.

Figure 4.2: Interwovenness with imports from China, per business sector, measured according to the potential impact factor (PIF)



We can also consider the interwovenness between individual Chinese industries and the European Union through the use of separate scenarios in which we reduced the product export levels of a given Chinese industry. The industries in the Netherlands and the other EU countries that obtain these products as inputs are directly related to the Chinese industries involved — and other European industries that get their inputs from those directly interwoven EU industries are themselves in this way also indirectly related to those Chinese industries.

Table 4.3 illustrates the interwovenness with China by showing what would happen to total gross production and total exports (for final use) if imports from a given Chinese industry were reduced by 25%. In addition to the effect on production in the Netherlands, we also present the effects on total production for the European Union and the world, for the sake of comparison. In these scenarios, EU industries are affected by reduced imports from China for a certain industry, but not vice versa. The potential impact factor, in the last column of the table, shows the ratio of the value of the total impact (direct and indirect) to the value of the direct impact (the impulse).

Table 4.3: Interwovenness per Chinese business sector, for the Netherlands, the European Union and the world

Change in percentages in:	Gross production – total			Exports for end use – total	Potential impact factor (PIF)
	Netherlands	EU	world	Netherlands	Netherlands
All business sectors	**-24.07**	**-23.30**	**-5.94**	**-34.6**	**-1.07**
Agriculture	-2.71	-2.10	-0.44	-9.0	-1.47
Mining	-10.92	-4.11	-1.16	-18.9	-4.07
Food industry	-5.00	-5.12	-1.63	-11.3	-2.15
Clothing industry	-12.40	-18.63	-4.93	-16.2	-1.96
Timber & woodwork	-9.57	-11.31	-3.23	-14.3	-2.54
Cokes & petroleum processing	-0.01	-0.05	-0.01	0.00	0.00
Chemical industry	-10.42	-15.34	-4.48	-18.5	-2.27
Plastics industry	-17.81	-16.80	-4.81	-30.7	-1.36
Metal industry	-11.40	-14.68	-4.47	-23.0	-1.98
Computer industry	-16.43	-19.26	-5.04	-24.2	-1.64
Electrical appliances	-11.16	-18.65	-4.96	-18.0	-2.00
Other machinery	-10.08	-15.95	-4.67	-17.1	-2.23
Automotive industry	-5.55	-5.08	-1.22	-9.1	-1.79
Other manufacturing	-11.34	-14.05	-4.02	-15.4	-1.83
Electricity, natural gas, water	-0.02	-0.08	-0.03	0.00	0.00

First, we look at the scenario for agriculture (and fisheries and forestry). There are 28 European industries directly linked to Chinese agriculture through imports. For 9 EU Member States, including the Netherlands, this also concerns agriculture itself — which means that Dutch agricultural businesses directly import Chinese agricultural inputs. The food industry in most EU Member States (19) is directly linked to Chinese agriculture.

The effect on total Dutch gross production is limited, with 2.71%, but so are the shares of the agricultural sector and the food industry. The total effect is 147% of the direct effect, see the potential impact factor. The indirect interwovenness with Chinese agriculture is thus 47% of the direct effect. But the most striking result is the proportionally large reduction of 9% in total Dutch exports for final use (abroad). This is caused by a more than 30% decrease in these exports from the directly affected industries (not shown in the table).

Table 4.4: Directly connected industries of the Chinese mining industry; some highlighted EU Member States

	Mining	Plastics	Metal	Construction
France	1			
Croatia			1	
Lithuania	1	1		1
Netherlands	1	1	1	1
Austria		1		
Slovakia	1			

Reducing imports of mining products from China affects only a small number of industries in Europe, see Table 4.4. In the Netherlands, four industries are directly affected, including construction. This concerns an import value of only a few million euros. But the assumption in this analysis is that every input is critical. The total impact is, however, substantial with 10.9% of total Dutch production (see Table 4.3). The knock-on effect on other industries, therefore, is large; the total effect is more than four times the direct effect; thus,

three quarters of the links to the Chinese mining industry are indirect.

The Chinese agricultural and mining sectors are more interwoven with the Netherlands than with the European Union. This does not apply to all sectors. Table 4.3 shows that, for other types of industries, the degree of interwovenness with the European Union, on average, is higher than with the Netherlands. The Netherlands is most interwoven with the import of products from the plastics industry (rubber, plastics). In this industry, the Netherlands is also more interwoven with China than is the rest of the European Union. This is followed by the computer sector (imports of laptops from China are also mentioned in Section 2.1.1). This is the Chinese industry with which the European Union is most interwoven. Then comes the internationally highly interwoven clothing industry.

The European Union hardly imports any Chinese cokes and petroleum products. Neither are domestic services, such as utilities (supply of electricity, natural gas, water), sourced from China. However, local domestic services may be affected indirectly. This is, for example, the case for the catering industry, where agricultural products are purchased from Dutch agriculture, which in turn imports directly from China.

We looked at the Dutch industries by turning this perspective around. A number of industries are relatively often directly connected to Chinese industries (the construction industry, automotive industry, metal industry and other machinery industries). The Dutch plastics industry is less often directly connected, but indirectly it is in fact more connected to Chinese industries.

4.2 Economic benefits of lowering import tariffs

This section shows the results from the first scenario that was calculated using the gravity model. The first scenario is that of the impact of the tariff reduction in the 1990s on goods and services between the European Union and China, compared against an alternative scenario where there is no such reduction.

Open economies, such as that of the Netherlands, are more interwoven with China than those of other EU Member States, because exports are an important part of such economies (see Figure 4.2). China's lower import tariffs lead to about 2.6% more exports for the Netherlands than in a scenario without the reduction in import tariffs applied since the 1990s between China and the European Union. Of all the EU Member States, only Germany and Finland are more closely connected to China. On average, the European Union has increased its exports by 1.8% as a result of the tariff reduction between China and the European Union.

Compared to the EU Member States, China is benefiting the most from opening its own market to trade with the European Union. Chinese exports have increased by about 10%. Because China earns a relatively small part of its income from exports (about 7%), a large increase in exports does not immediately lead to a large increase in revenues.[11] For a small open economy such as the Netherlands, on the other hand, things are rather different. Here, a relatively modest increase in exports leads to a relatively large increase in revenues. This also applies to the other scenarios described in the appendix.

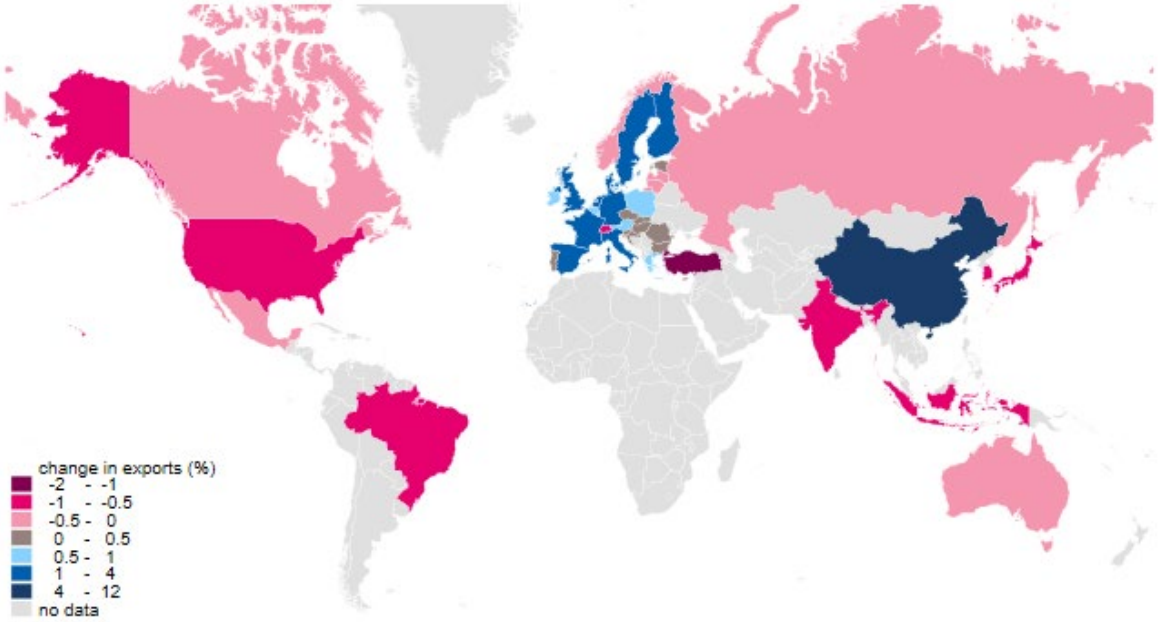
China has also benefited from lowering its tariffs with the United States.[12] This has given China access to several large markets, resulting in a sharp increase in exports. However, should the United States or European Union decide to decouple from China, this would mean the loss of a major market. The more countries would decouple from China, the greater the impact on that country would be, as this would reduce China's ability to

[11] This percentage and other percentages in this section are based on the data set compiled by CPB. They may deviate slightly from those from other sources.
[12] See Section 6.2.2 for a description of the scenario that looks at the impact of lower Chinese import tariffs for the European Union and the United States.

divert trade. In contrast, the additional impact on the Dutch economy would be limited or even diminished should more third countries join in and also decouple from China.

Looking at the impact of lower import tariffs between the European Union and China reveals a reduction in export levels from other countries. This is because China and the European Union have been trading more with each other and less with those third countries. This is what is called trade diversion. In reality, China not only lowered tariffs on trade with the European Union, but with almost all countries. So, here we show a partial effect: the impact on the United States is purely from lower tariffs between the European Union and China. The impact of lower tariffs between the United States and China were not taken into account and are much larger than this negative partial effect (see Figure 6.1 in the appendix).

Figure 4.3: Macro impact on exports by lower tariffs between China and the European Union



Note: Macro impact on exports compared to the scenario in which the European Union and China impose a 25 percentage points increase in trade tariffs. For underlying figures, see Table 6.6 of the appendix.

The Netherlands started to export less to both EU Member States and non-EU countries due to lower tariffs between the European Union and China (see top two panels in Figure 4.4). Dutch exports have diverted, mainly from EU Member States (5 billion euros) and the United States (1 billion euros), to China where trade levels increased by 85% (or 13 billion euros). In addition to exports to China, the Netherlands notably also increased its exports to Turkey, South Korea and, albeit to a lesser extent, Russia and Japan. For these countries, China is becoming relatively more expensive because the EU demand, and therefore the price, for Chinese products has increased. They have partly diverted their imports to the European Union.[13]

Imports into the Netherlands seem to have partly been diverted from outside the European Union to China. Lower tariffs between the European Union and China have increased imports from China by 82%, representing 31 billion euros. Besides the fact that imports from other EU Member States have decreased by 10 billion euros, there has also been a substantial decrease in imports from Japan (2 billion euros) and South Korea (1 billion euros). These countries have become relatively more expensive for the Netherlands. The Netherlands also consumed 1.4%, or 8 billion euros, less of its domestic production. In absolute terms, this is a substantial share, but compared to the lower consumption level of China's domestic production, this is still relatively low, as the Netherlands exports a large part of its own production.

[13] Turkey has reduced its imports from China by 9%. South Korea, Russia and Japan all exported 4% less. These are partial effects.

China has started to trade more with the European Union and to focus less on servicing its own market (see the two bottom panels in Figure 4.4). In addition, China has exported less to countries outside the European Union, such as the United States (18 billion euros), Japan (7 billion euros) and South Korea (5 billion euros), because these countries were looking for the same types of products from China as were the EU Member States. But, ultimately, China has been exporting much of its own production, which was previously destined for domestic consumption. Although this has only decreased by 1%, in absolute terms, it represents a large amount of money (283 billion euros).[14] Currently, 7% of Chinese production is destined for export. Without the reduction in tariffs between the European Union and China, this would have been 6%, and in the early 1990s it was around 5%. In addition, China has reduced its imports from the United States (7 billion euros), Australia (2 billion euros), Russia and Brazil (both 1 billion euros), as they have become relatively more expensive compared to the European Union. But for China, these are ultimately fairly small trade flows.

Figure 4.4: Import and export trade diversion due to a 25 percentage point reduction in import tariffs between the European Union and China

Note: The figure shows the 12 countries with the largest absolute change, in millions of euros, of imports or exports from or to the country in question. The European Union and Rest of the World (ROW) have also been added. The boxes represent 95% confidence intervals based on a block bootstrap with the residuals, where we draw the residuals within the country pairs. In total, we did 500 draws. For the regions, it is not possible to derive confidence intervals

[14] In comparison, Dutch consumption of domestic production has increased by 1.4%. But, in an open economy such as the Netherlands, 41% of domestic production is exported. Such an increase in the consumption of domestic production is relatively limited in absolute terms, compared to in China.

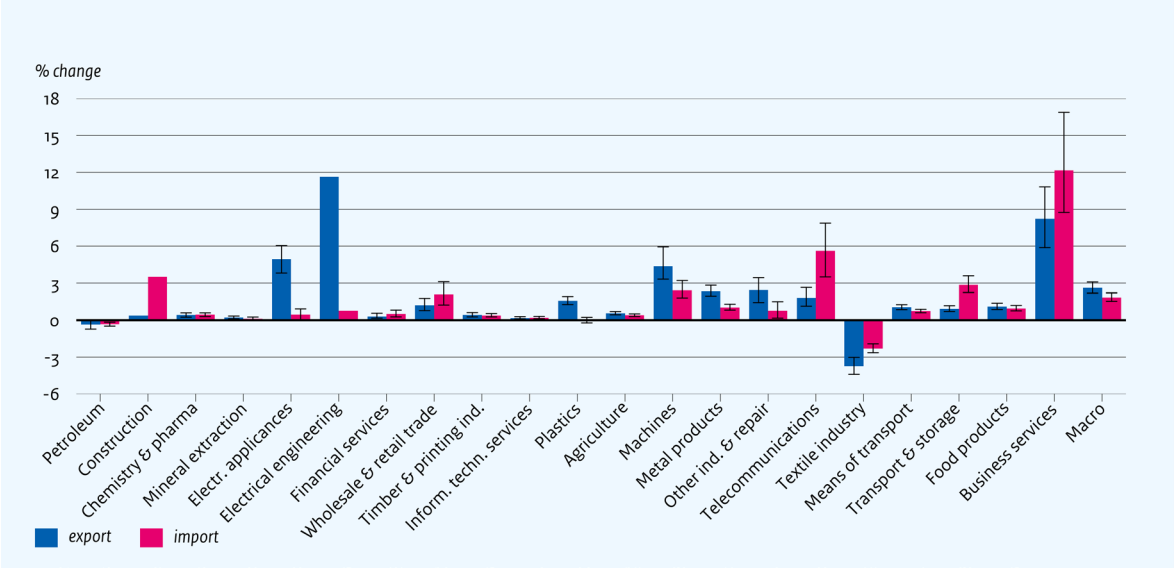
4.2.1 industries

Almost all Dutch industries increased their exports as a result of the tariff reduction between the European Union and China (see Figure 4.5).[15] The electrical engineering sector has benefited the most. According to the UN definition (link), the computer industry includes the production of computers and closely related products, communication equipment and similar equipment as well as the parts for such equipment. Consumer electronics, optical instruments, media, measurement, testing, navigation and monitoring equipment are also included. The industry also includes medical devices and the production of the computer chips themselves. Semi-conductor equipment, however, is not included in this industry but in 'other machinery'. Business services, the electrical equipment and machinery industries have also benefited greatly, with increases in exports of around 5%. Only the textile industry has reduced its export levels, although the overall decline in export value is limited. In the textile industry, the decline in export value is due to the increase in supply available from China. As a result of increasing competition from China, the Dutch textile industry is receiving lower prices for its products. In absolute value, business services benefited by far the most from lower tariffs, with more than 6 billion euros. Another large increase in exports, in absolute value, was in electrical engineering, with over 1.5 billion euros.

As a result of the reduction in tariffs, imports also increased in almost all industries (see Figure 4.5). Imports increased most in business services — which also represents the largest increase, in absolute terms, with almost 6 billion euros. Other notable risers are telecommunications and construction, but, in absolute terms, these import levels (and therefore also the increase) are small. In absolute terms, the imports in the machinery, wholesale and retail trade and electrical engineering saw a considerable increase. Only the textile industry, again, faced a noticeable drop in imports. This is a decline in value and not necessarily in number of garments imported. In Figure 4.6 we can see that this is probably caused by the lower consumer price of clothing, because cheaper clothing can be imported from China.

[15] The scenario analysis is based on data from 2017. This allowed us to estimate the trade flows if import tariffs were still at the level of the early 1990s. Our results show the difference between reality and this scenario. Thus, an increase in exports represents higher export levels, compared to the scenario.

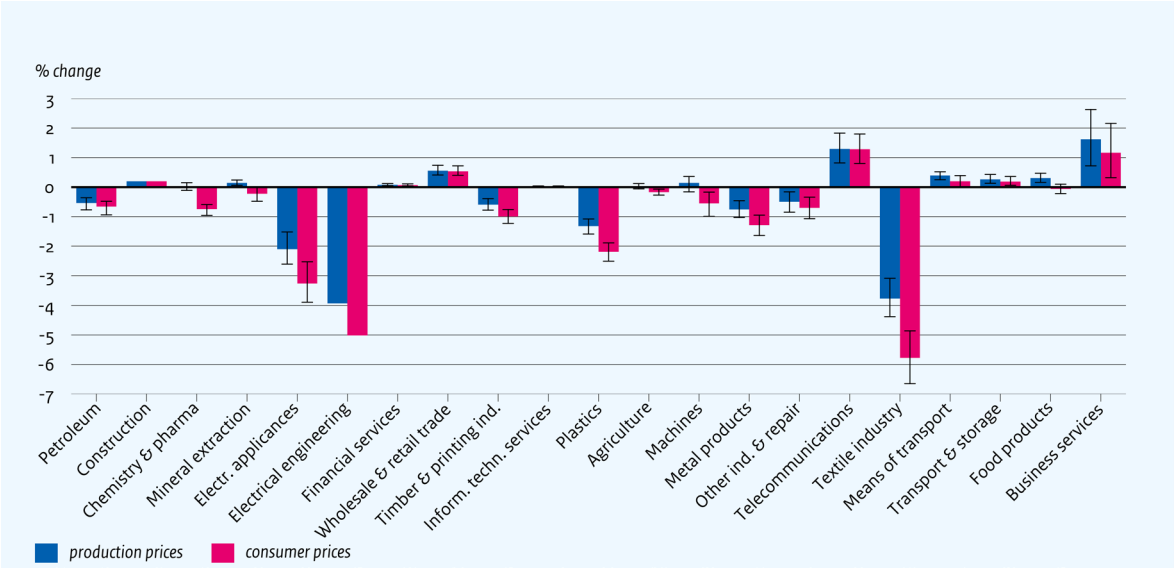
Figure 4.5: Impact of lower import tariffs between the European Union and China on Dutch imports and exports per industry



Note: The impact on imports and exports of Dutch industries compared to the scenario where the European Union and China impose 25 percentage points higher trade tariffs. The boxes show 95% confidence intervals based on a block bootstrap with the residuals, where we draw the residuals within the country pairs. In total, we did 500 draws. For some industries, it was not possible to derive confidence intervals.

Dutch consumers have benefited from cheap goods as a result of the reduction in tariffs between the European Union and China (see Figure 4.6). The increased supply of cheap Chinese goods has caused consumer prices to fall sharply in almost all goods sectors. In contrast, services have generally become more expensive, possibly due to increased demand from China. Producer prices show a similar picture. Increased supply from China has generally reduced the prices that Dutch goods producers receive for their goods. At the same time, producer prices for services have risen.

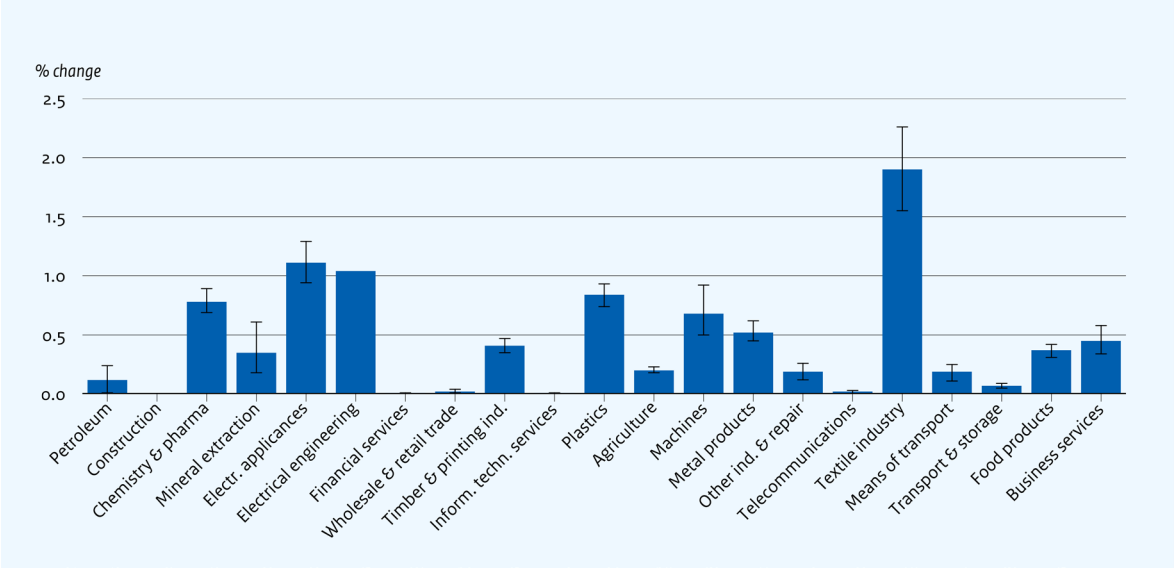
Figure 4.6: Impact of lowered tariffs on Dutch value added and production and consumer prices per industry



Note: Impact on production and consumer prices per industry for the Netherlands. Production prices are the prices that Dutch producers receive for their products. Consumer prices are a weighted average of prices paid by consumers for goods in this industry, both domestic and from abroad. The results are for the scenario where we compare exports of Dutch industries with the scenario where the European Union and China impose 25 percentage points higher trade tariffs. The boxes show 95% confidence intervals based on a block bootstrap with the residuals, where we draw the residuals within the country pairs. In total, we did 500 draws. For some industries, it was not possible to derive confidence intervals.

All Dutch industries have seen their real value added increase (see Figure 4.7). Most notable is the textile industry. Although exports have decreased in value, the real value added of this industry increased the most, with 2%. But ultimately, this is a small industry for the Dutch economy as a whole. Other industries that have benefited greatly from lowered tariffs are again the electrical appliances industry and the electrical engineering industry. In absolute terms, business services have benefited the most (by about 0.4 billion euros). This industry has greatly increased its exports to China and saw the demand for its product — and therefore also the prices — increase. Two other industries with high benefits in absolute terms are the chemical and pharmaceutical industries and the machinery industry (both with an increase of 0.1 billion euros in real value added). In these sectors, producer prices remained virtually unchanged, which is why this concerns mainly a trade-volume effect.

Figure 4.7: Impact of lowered tariffs on Dutch real value added, per business sector



Note: Impact on value added per industry for the Netherlands. The results are for the scenario where we compare exports of Dutch industries with the scenario where the European Union and China impose 25 percentage points higher trade tariffs. The boxes show 95% confidence intervals based on a block bootstrap with the residuals, where we draw the residuals within the country pairs. In total, we did 500 draws. For some industries, it was not possible to derive confidence intervals.

4.3 Goods with high substitution costs

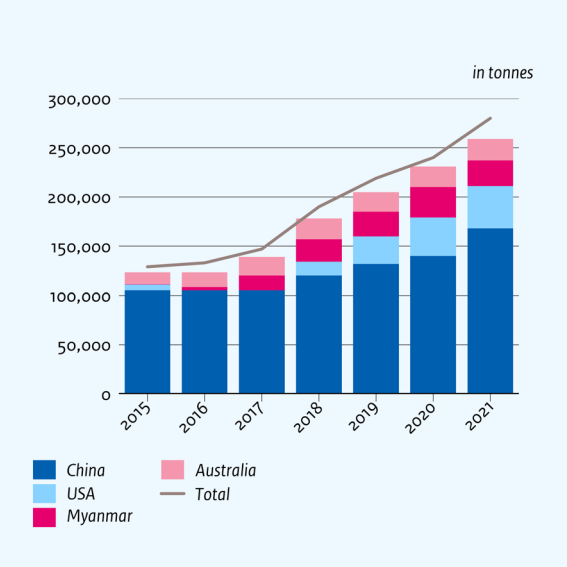
For some goods, the cost of creating alternative production capacity may be very high. The medium-term analyses assume that alternatives exist for imported goods and services from China and assume that production capacity will be diverted to other countries. However, this involves costs. This section discusses the example of rare earth metals (including 17 different ones). These are used in all sorts of sophisticated products, such as hybrid vehicles, semiconductors and mobile telephones.

Contrary to what the name suggests, rare earth metals are not always rare. But they are scarce nevertheless because of the very high exploitation and processing costs. The environmental costs of production and processing involve large quantities of toxic waste. This must be managed safely to avoid environmental damage and risks to human health.

China is the largest producer of rare earth metals. China has invested heavily in the production of these metals and has accepted the high environmental costs. It has thus become the largest supplier (see Figure 4.8). Perhaps more important than China's large share in total mining production of rare earth metals is its dominance of the entire supply chain. China extracts raw rare earth metals (e.g. bastnaesite and monazite), processes them (into oxides, metals and alloys) and uses them to manufacture magnets, batteries and engines,

amongst other things.

Figure 4.8: The production of rare earth metals takes place particularly in China



Source: United States Geological Survey (link)

The vast majority goes to economically and technologically developed countries. Data from China Customs show that country exported just over 45,000 tonnes in rare earth metals in 2019, at a total value of USD 398.8 million. The largest export destination was Japan, with a volume of 36%, followed by the United States with 33.4%. Together with the Netherlands (9.6%), South Korea (5.4%) and Italy (3.5%), these countries account for 87.8% of China's rare earth metal exports.[16]

The Chinese Government's decision to restrict exports of rare earth metals in 2010 was seen by many as a geopolitical act to gain an internationally competitive advantage (Zhang et al., 2014). Countries that were dependent on China subsequently implemented policies to reduce this dependence. The United States stepped up production, but is still sending some of its earth metals to China for processing, as it wants to avoid the environmental damage associated with this processing, and labour costs are much lower in China (Nayar, 2021). The European Union finances the recycling of permanent magnet waste into new alloys and materials.[17] South Korea is trying to increase its imports from Japan and to use innovation to find ways to reduce its consumption of rare earth metals (see link). All these initiatives cost time and money, especially if high environmental costs are to be avoided. In addition, the price of rare earth metals on the international market has not been high and stable enough to encourage mining developments outside China (Packey and Kingsnorth, 2016). These factors make decoupling from China for rare earth metals a very long-term matter.

5 Discussion

In this report, strategic dependence is measured as the trade between China and the European Union (including the Netherlands) whereby a reduced dependence leads to lower trade levels. In addition, there are a few things that should also not be forgotten, such as the transition costs, finding new trading partners and building new or expanding existing production capacity. If the decision is made to stop importing a product from a certain country (e.g. by imposing import tariffs), alternatives need to be considered. These may

[16] Cited in CSIS (link).
[17] See EU (link).

be found in other countries that produce a similar product. Presuming that these exist, transaction costs will be incurred (in finding new partners, drawing up contracts and monitoring the agreements made (North, 1987)). Furthermore, the need to create more production capacity may also be due to an increase in demand.

The cost of building production capacity can be high for some products. For example, because of specific production steps and the knowledge that is required. According to ASML, a Dutch chip manufacturer, the production of microchips is not easy and involves numerous processes, including the six crucial production steps of manufacturing semiconductors.[18] This is one of the reasons why production is fragmented; each step requires specific knowledge and production capacity and these cannot always be found within the same country. Other products may involve other costs, such as those related to the environment. In a recent ESB article, Meijerink and Van 't Riet (2021) argue that the environmental costs of processing rare earth metals are so high that production in Europe will require substantial investments, and assuming that such processing will not cause any environmental or health damage.

Finally, building production capacity domestically comes at the expense of something else. The required use of scarce resources involves 'opportunity costs', as their scarcity means that they may need to be taken away from other production processes. Examples are labour and financial investments. The greater the amount of production that is brought back to the country or region, the higher these opportunity costs will be.

However, it may be of political importance to reduce the level of dependence on certain products. The European Commission has therefore recently conducted an analysis to identify 'strategic dependencies' (European Commission, 2021). The analysis identifies the most sensitive industrial ecosystems, such as in the field of health care. It also proposes measures to reduce these dependencies, including diverting production and supply chains, creating strategic stocks and stimulating production and investment in Europe. To this end, the European Union has identified 137 products for which strategic dependence plays a role, and 50% of the import value of these products was related to China.

[18] See ASML, 2021 (link)

6 Appendix

6.1 Scenario analysis using the gravity model

The scenario analysis using the gravity model consists of two steps: first, we estimated trade elasticities. We used a gravity equation to estimate the trade elasticities of trade tariffs on goods trade (see Sections 6.1.1 and 6.1.2 for a detailed discussion): this is the percentage change in exports caused by a percentage change in, for example, import tariffs on food. Carrying out scenario analyses in a general equilibrium model requires step number two.[19]

In the second step, a counterfactual analysis is used to calculate the scenarios in the gravity model, a general equilibrium model. This means that we compared the consequences of a specific intervention, for example increasing import tariffs, against the actual data on a situation in which this intervention did not take place. This allowed us to determine the impact of such an intervention on exports and prices without changing other factors, such as general economic growth. Thus, in this study, we calculated the effects of increasing trade costs as described in the scenarios. For a detailed description of the second step of this method, see Bollen et al. (2020).

6.1.1 Estimating partial effects in the gravity model

To estimate trade elasticities, we used a standard gravity equation. We estimated this equation using the Poisson pseudo maximum likelihood (PPML) estimation method (see Santos-Silva and Tenreyro, 2006), as is common in the gravity literature. This method has two important advantages. First, it can deal with exports equalling zero between two countries, in contrast to, for example, the ordinary least squares (OLS) method. Second, the estimated export flows per country add up to the actually observed total exports of each country, if we include exporter-time and importer-time fixed effects (FE) (see Fally, 2015). This characteristic can be exploited in the second step to calculate the overall equilibrium effects.

The estimation equation consists of the following components:

$$X_{ijt}^{k} = \exp\left(Tariffs_{ijt}^{k}\beta_1^k + EU_{ijt}\beta_2^k + EU_{ijt}^{3e}\beta_3^k + \sum\nolimits_d Grens_{ijd}\,\delta_d^k + \alpha_{ij}^k + \theta_{ijt}^{x,k} + \theta_{ijt}^{m,k}\right)\eta_{ijt}^k$$

The dependent variable X_{ijt}^{k} is the exports in industry k of country i to j at time t. The main independent variable is $Tariffs_{ijt}^{k}$: the import tariffs that country j sets for products in business sector k from country i at time t. Besides playing an important role in the scenario analysis, this variable also determines the elasticities of substitution, an important parameter in the gravity model.

We also added several control variables to the estimation equation that are important for explaining output. First, we added the dummy variable EU_{ijt}. This is 1 if the exporting and importing country are both EU Member States, otherwise the dummy is 0. In addition, we corrected for trade diversion, due to the formation of the EU, in exports from third countries to EU Member States using the dummy variable EU_{ijt}^{3e} (see Head and Mayer, 2021). This dummy is 1 if a non-EU Member State exports to an EU Member State, in all other cases the dummy is 0. If the formation of the European Union caused a trade diversion in third-country exports (from

[19] Freeman et al. (2022) use trade elasticities to calculate the partial impact of the European Union and the internal market on exports: the impact on EU exports, for example, all else remaining equal. This is also called the ceteris paribus effect. The partial effect does not yet take into account general equilibrium effects. This study only addresses the general equilibrium effects.

non-EU to EU), β_2^k is positive. If the reverse process has taken place, β_2^k is negative. In order to distinguish between international and domestic trade flows, and goods traded between countries and within a country itself, we added a time-dependent *border* dummy, $Border_{ijd}$, (see Bergstrand et al., 2015, for a detailed explanation). This dummy is 1 if a trade flow crosses an international border in period d and it is 0 in other cases, distinguishing five-year periods (e.g. 2005–2009). These border dummies correct for time-specific changes in international trade.

Finally, we also added various types of fixed effects (FE), as suggested in the literature. First, we added the sector-dependent country pair FE, α_{ij}^k. With this, we corrected for country-pair-specific factors that influence exports and do not change over time, such as when two countries share a common language or a border (see Baier and Bergstrand, 2007). Finally, we also added industry-dependent exporter time, $\theta_{ijt}^{x,k}$ and importer time, $\theta_{ijt}^{m,k}$FE. These firstly correct for multilateral trade costs (see Section 3.2.2) and secondly allowed us to exploit the addition property of PPML,[20] as briefly discussed above. In the literature, country pair FE is sometimes added (see Bun and Klaassen, 2007, and Freeman et al., 2022), but since we applied a very short time period and already added five-year border dummies that can capture some of the trends in exports, it did not seem necessary to add them in our estimating equation.

6.1.2 Estimating substitution elasticities

To estimate the general equilibrium effects of a change in trade costs, we needed the elasticity of substitution of each industry. The substitution elasticity indicates how sensitive the demand for exports of a certain product is to a change in price. For example, if products from the Netherlands become more expensive for Belgium, the substitution elasticity indicates how Belgium replaces that demand for Dutch products with that for similar German products. The effect of import tariffs, β_1^k, is equal to minus the elasticity of substitution, as import tariffs directly affect price. The elasticity of substitution is indirectly incorporated in the other trade elasticities, such as β_2^k (that for the EU), but cannot directly be derived from it.

For this study, we used the estimated elasticities of substitution from Freeman et al. (2022) (see Table 6.1), instead of estimating them ourselves with the estimating equation. We chose not to estimate the substitution elasticities ourselves, because our data only covered the most recent period (2000–2017) in which tariffs were generally low and hardly changed at all. As a result, there was too little variation in the tariff data to allow accurate estimation of the substitution elasticities. Freeman et al. (2022) use similar data (LTWIOD[21]), but over a period (1988-2011) in which there was more variation in the tariff data, which therefore did allow an accurate estimation. The estimation equation in their study is similar to the one in this study. We were not able to estimate substitution elasticities for services, because there are no import tariffs imposed on them. Therefore, to be able to make estimations for services, we followed the literature (Freeman et al., 2021) by using 1.5 times the average of the trade elasticity of goods.[22] Thus, the services sectors were set to a substitution elasticity of 10.6.

[20] Poisson Pseudo Maximum Likelihood.
[21] See Woltjer et al. (2021).
[22] Freeman et al. (2022) use a substitution elasticity of 4 for services sectors, in line with Egger et al. (2012) and Felbermayr et al. (2021).

Table 6.1: Estimated substitution elasticities from Freeman et al. (2022)

Business sector	Tariff elasticity	Standard error
Agriculture, forestry, fisheries	-4.1*	1.0
Mineral extraction	-6.8*	1.2
Food industry	-3.2*	0.7
Textile industry	-4.8*	0.8
Timber, printing industry	-3.2*	0.7
Petroleum industry	-7.0*	2.2
Chemical & pharmaceutical industry	-7.2*	1.1
Plastics industry	-5.4*	1.7
Metal production	-5.9*	0.7
Electrical engineering	-12.1*	1.8
Electric appliances industry	-12.1*	1.8
Machine industry	-13.2*	2.0
Transport equipment manufacturing	-8.1*	1.7
Other industry and repair	-12.1*	1.3

Note: The estimated tariff elasticity is equal minus the substitution elasticity. The * indicates a 95% confidence interval. See Freeman et al. (2022) for more information about the estimation method.

6.2 Results on macro level when including the United States

6.2.1 Interwovenness between the European Union and China with the United States

In this section, the EU–China interwovenness is measured by including the United States in the analysis. We considered two additional scenarios where the United States is also decoupled. In each case, we worked out the interwovenness using the potential impact factor (PIF) calculating a given percentage reduction in all imports from China to the EU Member States for intermediate use. This given percentage represents the initial shock or impulse. The potential impact factor then reflects the percentage change in gross output relative to the initial impulse. A potential impact factor of less than 1 indicates that the impact is lower than the initial shock. When the factor is greater than 1 this indicates that there is also an indirect impact due to production chain links. The results are shown for four scenarios, at macro level per country, and for the Netherlands also for individual industries. The two additional scenarios are:

1. EU+US: The European Union and United States are decoupling from China
2. EU+US-CN: The European Union and United States are decoupling from China, and vice versa

Table 6.2 shows the results for the world and the weighted EU average, as well as for China, the Netherlands and the United States. Including the United States reveals that the Netherlands is also connected to China via the United States, albeit very slightly. The potential impact factor goes up slightly, from 1.00 to 1.01. The European Union is barely connected to China via the United States; the potential impact factor does not go up. Interestingly, the United States is more connected to China via the European Union; if the European Union were to decouple from China and vice versa, then the United States would be slightly affected.

Table 6.2: Interwovenness measured by the impact on gross production (potential impact factor (PIF)) in four decoupling scenarios

	EU	EU-CN	EU+US	EU+US-CN
World	0.24	0.44	0.46	0.66
China	0.07	0.95	0.06	0.97
European Union	0.96	0.96	0.96	0.96
Netherlands	1.00	1.00	**1.01**	**1.01**
United States	0.06	0.08	**1.02**	**1.03**

Note: A potential impact factor of > 1 is presented in bold. EU: only the European Union is decoupling; EU-CN: China is also decoupling; EU+US: only the European Union and United States are decoupling; EU+US-CN: China is also decoupling

What is notable is that few other countries appear to be linked to China via the United States (see Table 6.3). Comparing the results in the first two columns reveals that a small number of countries are slightly interwoven with China via the United States. This is particularly the case for Luxembourg, which is indirectly interwoven with China in this way, although it has little direct and indirect connections to China. Most countries are not interwoven with China via the United States, which is shown in the potential impact factor not going up if the United States would also decouple from China. If the European Union and the United States unilaterally reduce their imports from China, this will have an additional impact on production via the United States. If China also starts to reduce its imports from the European Union and the United States, this has less impact on production levels in a number of EU Member States: the potential impact factor will go down. This is because gross US production will decrease due to decoupling from China, so fewer inputs will be needed, including from Finland and Estonia. Those inputs can then be used for domestic production. In general, EU Member States are not very connected to the United States, because reduced availability of US inputs will generally have no effect on them.

Table 6.3: Interwovenness measured by potential impact factor (PIF) via the United States — results for EU Member States

Country	EU	EU+US	EU-CN	EU+US-CN
China	0.07	0.06	0.95	0.97
United States (US)	0.06	1.02	0.08	1.03
Austria	0.96	0.96	0.96	0.96
Belgium	0.98	**0.99**	0.98	**0.99**
Bulgaria	1.01	1.01	1.00	1.00
Cyprus	0.90	0.90	0.90	0.90
Czech Republic	1.02	1.02	1.02	1.02
Germany	0.98	**0.99**	0.99	0.99
Denmark	0.96	0.96	0.96	0.96
Estonia	1.05	1.03	1.04	1.04
Greece	1.05	1.05	1.05	1.05
Spain	0.98	0.98	0.98	0.98
Finland	1.07	1.01	0.96	0.97
France	0.95	**0.96**	0.96	**0.97**
Croatia	0.92	0.92	0.92	0.92
Hungary	1.02	1.02	1.02	1.02
Ireland	0.96	0.95	0.94	**0.95**
Italy	0.83	0.83	0.82	0.83
Lithuania	1.04	1.04	1.04	1.04
Luxembourg	0.55	**0.59**	0.54	**0.59**
Latvia	0.99	0.98	0.98	0.98
Malta	1.03	**1.04**	1.04	**1.05**
Netherlands	1.00	**1.01**	1.00	1.01
Poland	1.06	1.06	1.06	1.06
Portugal	0.96	0.96	0.90	**0.92**
Romania	1.04	1.04	1.04	1.04
Sweden	1.04	1.03	1.03	1.03
Slovenia	1.02	1.02	1.02	1.02
Slovakia	1.02	1.02	1.02	1.02

Note: Bold figures show the countries that are indirectly interwoven with China via the United States; the impact is on gross production. EU: only the European Union is decoupling; EU-CN: China is also decoupling; EU+US: only the European Union and United States are decoupling; EU+US-CN: China is also decoupling

Table 6.4 shows the interwovenness of other countries with China via the European Union or the United States. None of the potential impact factors (PIFs) are greater than 1, which means that if the European Union and the United States were to decouple from China, the effect on them would be negligible.

Table 6.4: Interwovenness measured by the potential impact factor via the United States — results for other countries

Country	EU	EU-CN	EU+US	EU+US-CN
China	0.07	0.95	0.06	0.97
United States (US)	0.06	0.08	**1.02**	**1.03**
Argentina	0.05	0.04	0.05	0.04
Australia	0.06	0.09	0.05	0.09
Brazil	0.08	0.09	0.08	0.10
Canada	0.05	0.08	0.11	0.14
Switzerland	0.32	0.30	0.31	0.32
Indonesia	0.04	0.06	0.04	0.07
India	0.06	0.07	0.06	0.08
Japan	0.05	0.07	0.05	0.08
South Korea	0.10	0.18	0.10	0.19
Mexico	0.05	0.08	0.12	0.16
Norway	0.23	0.20	0.21	0.20
Russia	0.17	0.16	0.14	0.16
Saudi Arabia	0.06	0.07	0.05	0.07
Turkey	0.15	0.12	0.12	0.13
United Kingdom	0.15	0.14	0.20	0.21
South Africa	0.13	0.14	0.11	0.15
Rest of the World	0.15	0.17	0.14	0.18

Note: A potential impact factor (PIF) of < 1 is presented in bold; the impact is on gross production.
EU: only the European Union is decoupling; EU-CN: China is also decoupling; EU+US: only the European Union and United States are decoupling; EU+US-CN: China is also decoupling

There is some variation in the effects on various industries in the Netherlands if the United States is also included. First, there are three industries (oil etc.; electricity, natural gas and water; and real estate (see the last column in Table 6.5)) that do not use any imports from China and, therefore, will not be directly affected by decoupling. Then there are those that are directly affected but not indirectly. They have a potential impact factor of exactly 1 (see column ImpCN). Finally, there are industries that are also indirectly affected because they lack imports from elsewhere. Those that are more interwoven in value chains, such as the clothing industry, are thus the most interwoven with China. A number of industries are also indirectly interwoven with China via the United States; for them, the potential impact factor would go up, slightly, if the United States would also decouple from China.

Table 6.5: Interwovenness of Dutch industries with China, also via the United States (measured with the potential impact factor (PIF))

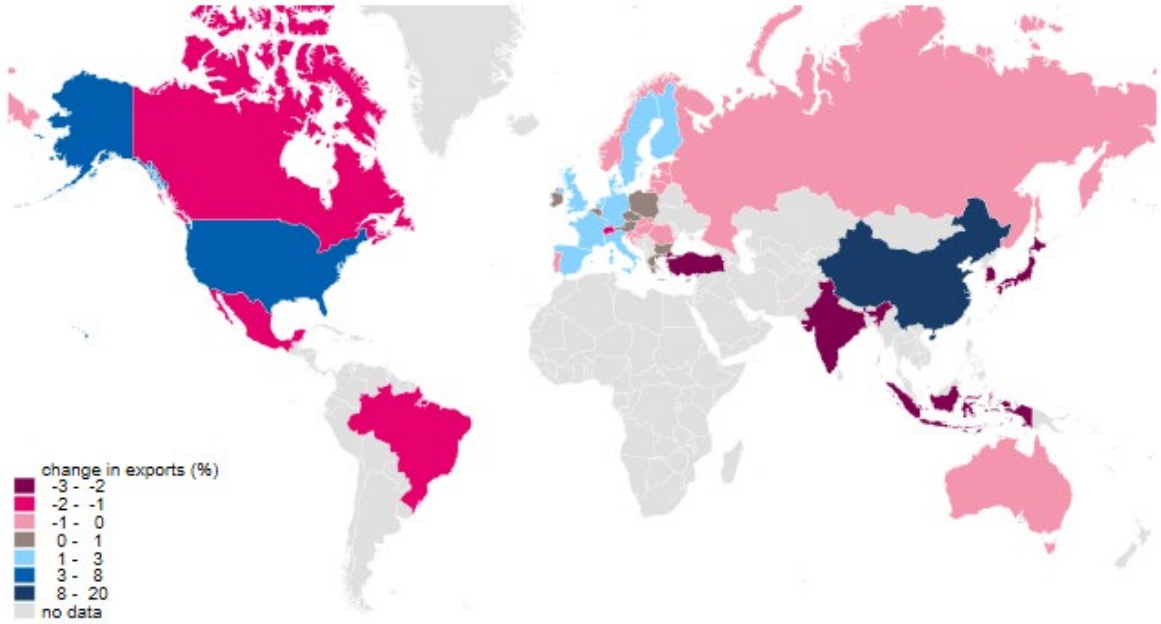
Code	Business sector	EU	EU-CN	EU+US	EU+US-CN	ImpCN
A	Agriculture	1.13	1.12	1.14	1.13	1
B	Minerals	1.26	1.23	1.26	1.23	1
C10-12	Food & tobacco	1.00	1.00	1.00	1.00	1
C13-15	Clothing	2.06	2.09	2.07	2.10	1
C16-18	Timber, paper	1.32	1.35	1.34	1.37	1
C19	**Oil, etc.**	**0.65**	**0.63**	**0.70**	**0.68**	
C20_21	Chemicals, pharmacy	1.00	1.00	1.00	1.00	1
C22_23	Rubber, plastics, minerals	1.16	1.19	1.19	1.22	1
C24_25	Metal products	1.22	1.24	1.26	1.29	1
C26	Computers, etc.	1.00	1.00	1.00	1.00	1
C27	Electrical equipment	1.44	1.47	1.48	1.51	1
C28	Other machines	1.00	1.00	1.00	1.00	1
C29_30	Motorised vehicles	1.41	1.45	1.41	1.46	1
C31-33	Other manufacturing	1.43	1.40	1.42	1.42	1
D_E	Electricity, natural gas, water	1.22	1.21	1.22	1.21	
F	Construction	1.00	1.00	1.00	1.00	1
G	Trade	1.00	1.00	1.00	1.00	1
H	Transport	1.00	1.00	1.00	1.00	1
I	Hospitality	1.00	1.00	1.00	1.00	1
J58-60	Media, etc.	1.24	1.20	1.33	1.33	1
J61	Telecommunications	1.33	1.36	1.35	1.40	1
J62_63	Information technology services	1.00	1.00	1.00	1.00	1
K	Financial services	1.00	1.00	1.00	1.00	1
L68	**Real estate**	**0.46**	**0.46**	**0.45**	**0.45**	

Note: A potential impact factor (PIF) of < 1 is presented in bold; the impact is on gross production.
EU: only the European Union is decoupling; EU-CN: China is also decoupling; EU+US: only the European Union and United States are decoupling; EU+US-CN: China is also decoupling

6.2.2 Macro impact of a reduction in import tariffs China, European Union and United States

Figure 6.1 shows the impact on exports in a scenario in which the current situation (where there are no or very low tariffs) is compared against a scenario where the European Union and the United States impose 25 percentage points higher tariffs on trade with China and vice versa. These results are very similar to those from the main scenario discussed in detail in Section 4.2. As an open economy, the Netherlands benefits more than other EU Member States and has seen its exports increase by about 2.5%. The impact on exports from China was the greatest of all countries. Again, this is a partial effect; countries that were not included in our analysis, such as India and Japan, saw their export levels go down as a result of trade diversion — due to the increased trade between the European Union, United States and China.

Figure 6.1: Macro impact of lowering import tariffs for exports between China and the European Union and United States



Note: The map shows the macro impact on exports compared to the scenario in which 25 percentage points higher trade tariffs are imposed by the European Union and United States on the one hand and China on the other.

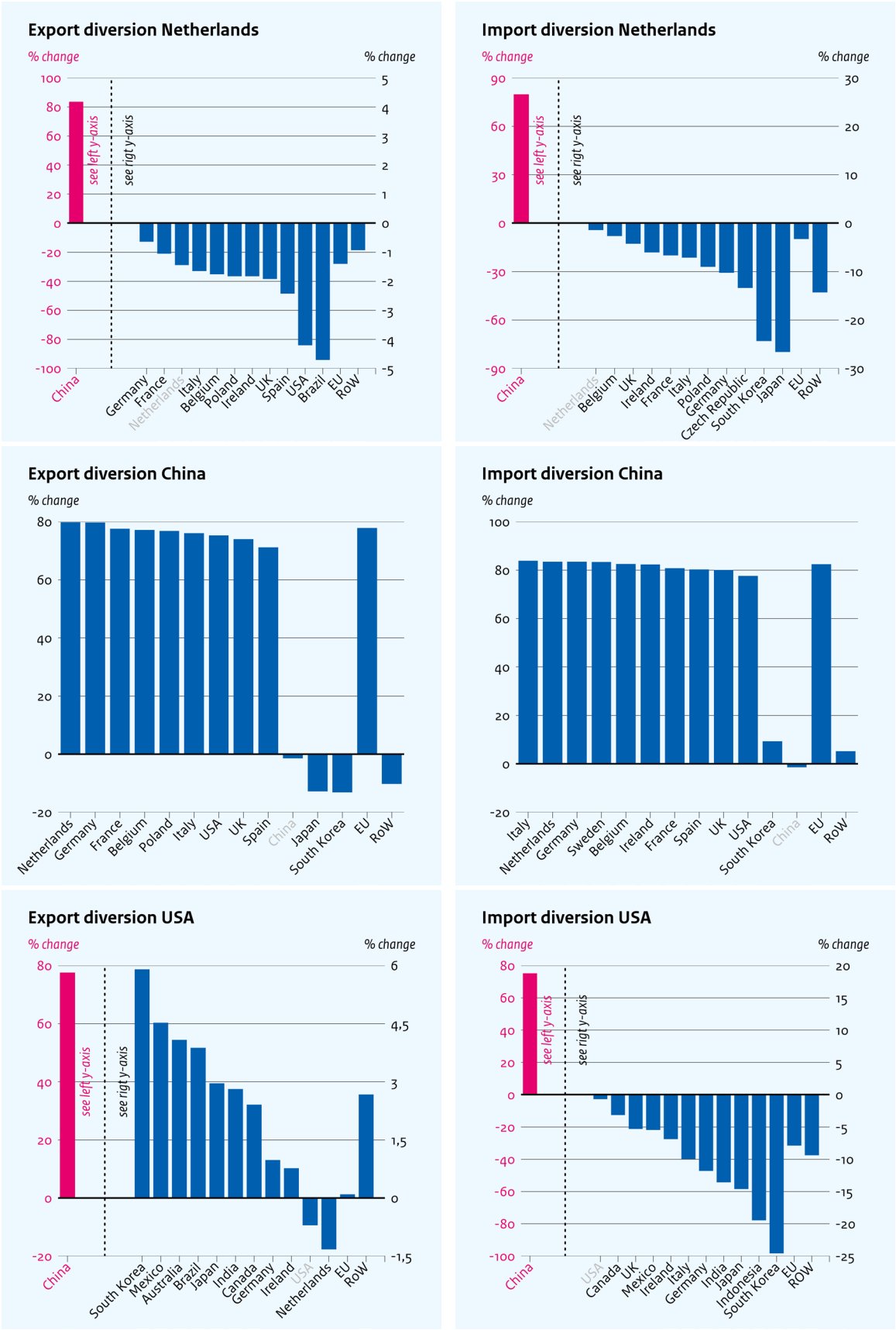
The Netherlands decreased its exports to both non-EU and EU Member States, whereas reductions in import levels mainly concerned non-EU Member States (see the first two panels of Figure 6.2). Dutch exports were mainly diverted from other EU Member States (6 billion euros) and the United States (1 billion euros) to China, which showed an 84% increase (13 billion euros). Notably, in addition to the exports to China, the Netherlands also increased its exports to Russia, South Korea, Turkey and Japan. For these countries, China has become relatively more expensive because the EU and US demand for Chinese products — and therefore also the price — has increased.

Dutch imports have partly been diverted, from outside the European Union to China. Lower tariffs have increased imports from China by 80% (30 billion euros). Besides the fact that imports from other EU Member States have decreased by 10 billion euros, there were also substantial decreases in imports from Japan (3 billion euros) and South Korea (1 billion euro), as these countries became relatively more expensive. The Netherlands also consumed 1.4% (8 billion euros) less of its domestic production.

In addition, lower trade tariffs with the European Union and the United States have decreased China's exports to countries outside the European Union and the United States, such as Japan (20 billion euros) and South Korea (18 billion euros), as the demand from these countries for Chinese products was similar to that from EU Member States. Overall, however, China particularly reduced the consumption of its domestic production. Although this consumption only decreased by 1.5%, in absolute terms this is a large amount that represents 403 billion euros. In addition, China has imported less from countries such as Australia, Brazil and Russia because those countries became relatively more expensive compared to EU Member States and the United States, although for China, these trade flows are ultimately fairly small.

The United States imported less from the European Union and the rest of the world, while exporting more to most countries (see the bottom two panels in Figure 6.2). The United States has increased its exports, not only to China (89 billion euros) but also to the European Union (0.4 billion euros) and the rest of the world (29 billion euros). And it is consuming 0.7% (118 billion euros) less of its domestic production. This is a relatively low percentage, but because exports form a relatively small part of its total production, as is the case in China, the amounts involved are quite large. The Netherlands is one of the few countries that has reduced its imports from the United States (by 1.3% or 1 billion euros).

Figure 6.2: Trade diversion for imports and exports via a 25 percentage points lower import tariff between the European Union and China and between the United States and China.



Note: Each figure shows the 12 countries with the largest absolute change in millions of euros of imports or exports from or to the country in question as a percentage of the current trade flow. The European Union and Rest of the World (ROW) have also been added.

Table 6.6 shows the macro-level impact for exports and imports under the two main scenarios. The first scenario concerns the impact of the tariff reduction in the 1990s on goods and services traded between the European Union and China, compared to an alternative scenario where this reduction did not take place. The second scenario is the impact of the tariff reduction in the 1990s on goods and services for the European Union and the United States on the one hand and China on the other, compared to an alternative scenario in which the reduction did not take place. In the alternative scenario, it is assumed that the tariff reduction was in fact implemented for the trade between China and other countries.

Table 6.6: Impact on macro level for exports and imports via a 25 percentage points higher import tariff between the European Union and China and between the United States and China

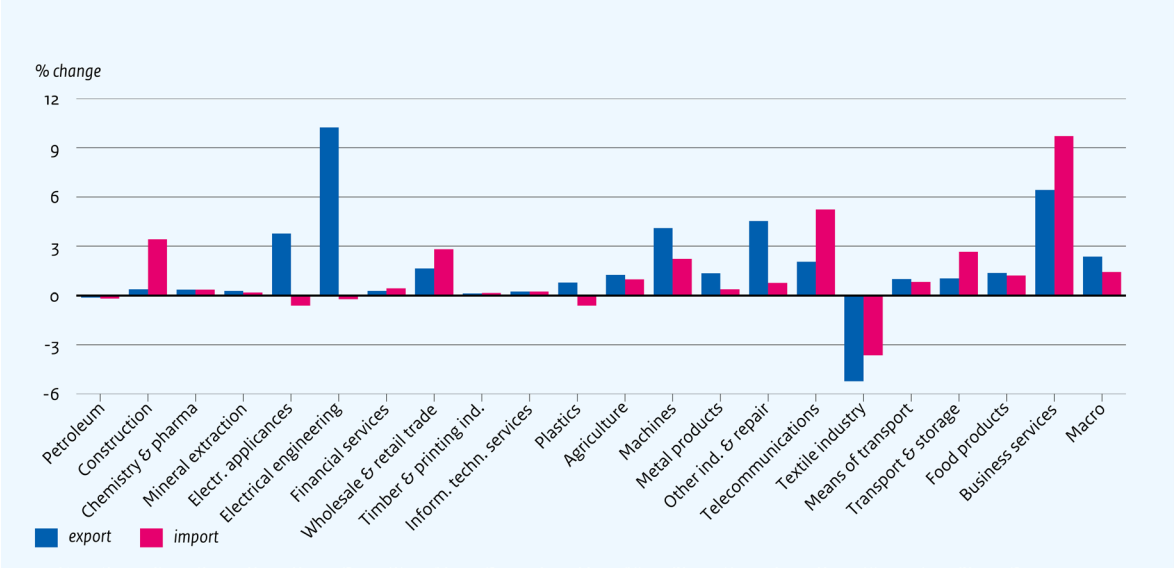
	Low tariffs between the European Union and China				Low tariffs between the European Union and the United States on the one side and China on the other	
	Export (%)		Import (%)		Export (%)	Import (%)
Countries	Median	95% interval	Median	95% interval		
Denmark	1.5	[1.7;1.3]	1.6	[1.8;1.4]	1.5	1.5
Germany	2.8	[2.9;2.6]	3.5	[3.8;3.2]	2.6	3.3
France	1.9	[2.1;1.7]	1.8	[2.0;1.7]	1.8	1.7
Ireland	0.6	[0.9;0.5]	1.3	[1.7;0.9]	0.0	1.1
Italy	1.7	[1.8;1.6]	2.2	[2.4;2.1]	1.4	2.0
Netherlands	**2.6**	**[3.1;2.2]**	**1.8**	**[2.2;1.5]**	**2.4**	**1.4**
Portugal	-0.1	[0.2;-0.2]	0.3	[0.5;0.1]	-0.3	0.2
Spain	1.3	[1.5;1.2]	1.0	[1.1;0.9]	1.4	0.9
Sweden	2.0	[2.3;1.9]	2.1	[2.4;2.0]	1.8	1.9
Australia	-0.6	[-0.3;-0.9]	-0.4	[-0.2;-0.6]	-0.9	-0.6
Brazil	-0.7	[-0.4;-1.0]	-0.7	[-0.4;-1.1]	-1.8	-1.7
Canada	-0.2	[-0.1;-0.2]	-0.2	[-0.1;-0.2]	-1.7	-1.5
China	10.4	[10.9;9.9]	13.1	[13.7;12.6]	18.6	23.3
India	-0.8	[-0.7;-0.9]	-0.6	[-0.5;-0.7]	-2.3	-1.8
Japan	-0.8	[-0.7;-0.9]	-0.6	[-0.6;-0.7]	-2.3	-1.8
Mexico	-0.2	[-0.1;-0.2]	-0.1	[-0.1;-0.2]	-2.0	-1.8
Russia	-0.3	[-0.2;-0.4]	-0.4	[-0.3;-0.5]	-0.6	-0.6
United Kingdom	1.5	[1.7;1.3]	1.6	[1.8;1.5]	1.4	1.4
United States	-0.8	[-0.7;-0.9]	-0.6	[-0.5;-0.6]	7.5	4.9
South Korea	-0.9	[-0.8;-1.0]	-0.7	[-0.7;-0.8]	-2.1	-1.7

Note: Macro effects for two scenarios: (i) the impact of reduced tariffs on goods and services between the European Union and China, and (ii) on goods and services for the European Unions and the United States on the one hand and China on the other. In the first scenario, 95% confidence intervals are shown between square brackets, based on a block bootstrap with residuals drawn within country pairs. In total, we performed 500 of such draws.

Due to the lower import tariffs between both the European Union and China and the United States and China, almost all of the industries in the Netherlands have increased their exports (see Figure 6.3). Electrical engineering has benefited the most, closely followed by electrical appliances, business services, the machine industry and the other industry and repair sector. Only the textile industry has suffered a negative impact, although the total decrease in the value of exports has been limited. The decline in the textile industry's export value was due to an increase in the supply from China, which resulted in the products of the Dutch textile industry fetching lower prices. In absolute value, business services benefited the most by far, with almost 5.2 billion euros. Another large increase in exports (more than 1.3 billion euros) occurred in the electrical engineering sector.

The lower tariffs have caused import levels to increase in almost all sectors (see Figure 6.3). The business services sector saw the sharpest increase in imports. This is also the largest increase in absolute terms (4.7 billion euros). Another notable benefiting sector is that of telecommunications, although in absolute terms this sector's imports, and thus also the increases, are small. There are also significant increases in import levels in the machinery, wholesale and retail trade sectors, in absolute terms (0.9 billion and 0.6 billion euros, respectively). The textile industry saw a notable decrease in imports (0.5 billion euros).

Figure 6.3: Impact on Dutch imports and exports, per business sector, from lower mutual tariffs of the European Union, the United States and China.

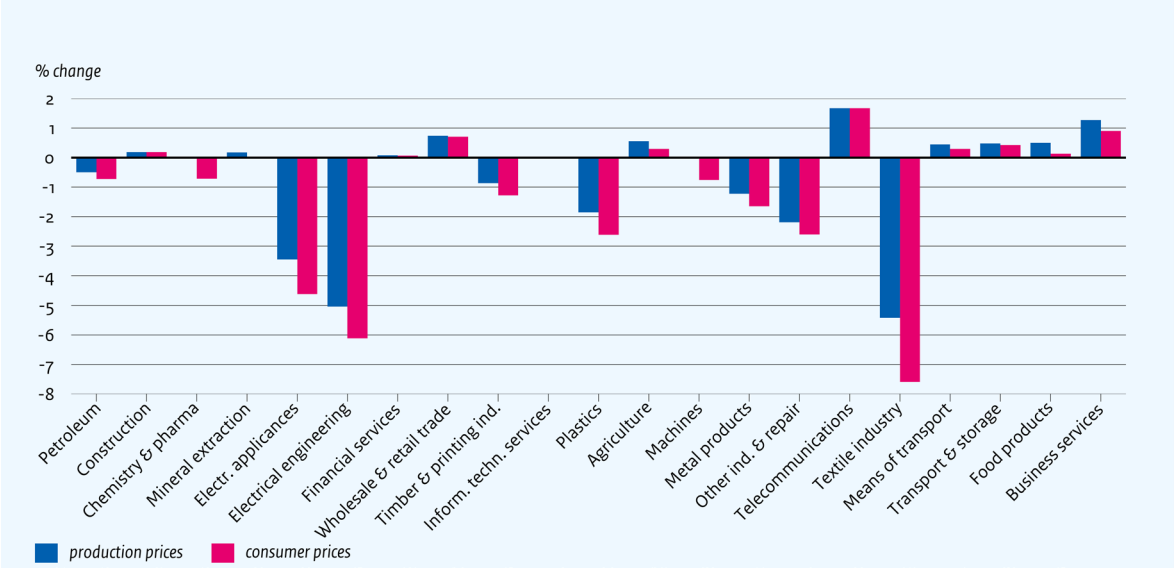


Note: Impact on import and export of Dutch industries compared against the scenario in which the European Union and China impose 25 percentage points higher trade tariffs.

Dutch consumers have benefited from cheap goods as a result of the tariff reduction between both the European Union and China and the United States and China (see Figure 6.4). The increased supply of cheap Chinese goods has lowered consumer prices in almost all goods sectors. In contrast, services have generally become more expensive, possibly due to increased demand from China. Producer prices show a similar picture. Increased supply from China has generally reduced the prices that Dutch goods producers receive for their goods. At the same time, producer prices for services have risen.

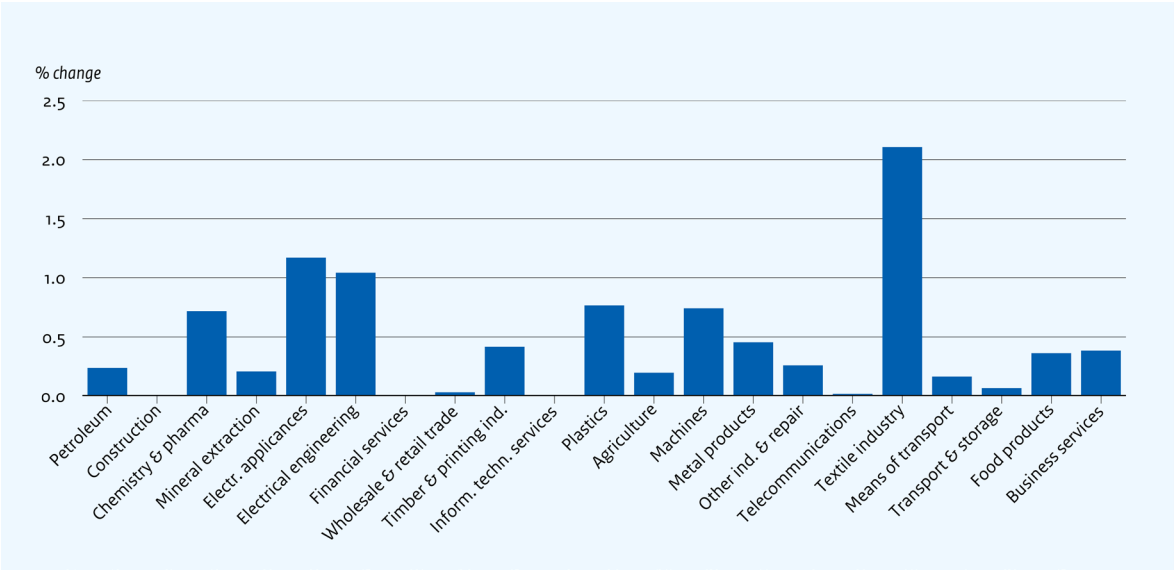
All Dutch industries have seen an increase in their real value added (see Figure 6.5). The textile industry saw the largest increase with 2%, although exports still decreased in value. Other sectors that have benefited greatly are again electrical appliances and electrical engineering.

Figure 6.4: Impact on Dutch production and consumer prices, per business sector, from lower mutual tariffs of the European Union, the United States and China



Note: Impact on product and consumer prices, per business sector, for the Netherlands. Product prices are the prices that Dutch producers receive for their products. Consumer prices are a weighted average of prices paid by consumers for goods from this business sector, both in the Netherlands and abroad. The results are compared against the scenario in which the European Union and China impose 25 percentage points higher trade tariffs.

Figure 6.5: Impact on Dutch real value added, per business sector, from lower mutual tariffs of the European Union, United States and China



The industry-specific impacts on exports, imports, real value added and prices for the two different main scenarios are shown in Tables 6.7 to 6.10. Below, the results are shown, per business sector, for the Netherlands and China.

Table 6.7: Impact on Dutch exports and imports, per business sector, from lower mutual tariffs of the European Union, the United States and China

	Effect on the Netherlands			
	Low tariffs between the European Union and China		Low tariffs between the European Union, United States and China	
Business sector	**Exports (%)**	**Imports (%)**	**Exports (%)**	**Imports (%)**
Petroleum	-0.4	-0.3	-0.1	-0.2
	[0;-0.7]	[-0.2;-0.5]		
Construction	0.4	3.5	0.4	3.4
Chemical and pharmaceutical industry	0.4	0.5	0.3	0.4
	[0.6;0.3]	[0.6;0.3]		
Mineral extraction	0.2	0.1	0.3	0.2
	[0.3;0.1]	[0.3;0.0]		
Electrical appliances	4.9	0.5	3.8	-0.6
	[6.1;3.8]	[0.9;0.0]		
Electrical engineering	11.6	0.8	10.2	-0.2
Financial services	0.3	0.5	0.3	0.4
	[0.6;0.2]	[0.8;0.3]		
Wholesale and retail trade	1.2	2.1	1.6	2.8
	[1.8;0.8]	[3.1;1.2]		
Timber & printing industry	0.4	0.4	0.1	0.1
	[0.6;0.3]	[0.5;0.3]		
Information technology services	0.2	0.2	0.2	0.2
	[0.3;0.1]	[0.3;0.1]		
Plastics	1.6	0.0	0.8	-0.6
	[1.9;1.3]	[0.2;-0.2]		
Agriculture, forestry, fisheries	0.6	0.4	1.2	1.0
	[0.7;0.4]	[0.5;0.3]		
Machine industry	4.4	2.4	4.1	2.2
	[5.9;3.3]	[3.2;1.8]		
Metal production	2.3	1.0	1.4	0.4
	[2.8;2.0]	[1.3;0.8]		
Other industry and repair	2.4	0.8	4.5	0.8
	[3.4;1.4]	[1.5;0.2]		
Telecommunications	1.8	5.6	2.1	5.2
	[2.7;1.1]	[7.9;3.5]		
Textile industry	-3.7	-2.3	-5.2	-3.6
	[-3.0;-4.4]	[-1.9;-2.6]		
Means of transport	1.1	0.8	1.0	0.8
	[1.3;0.9]	[0.9;0.6]		
Transportation and storage	0.9	2.9	1.0	2.7
	[1.2;0.7]	[3.6;2.2]		
Food products	1.1	1.0	1.4	1.2
	[1.4;0.9]	[1.2;0.8]		
Business services	8.2	12.2	6.4	9.7
	[10.8;5.9]	[16.9;8.7]		

Note: Import and export effects of the Netherlands, per business sector, in two scenarios: (i) impact of reduced tariffs on goods and services between the European Union and China, and (ii) on goods and services for the European Union and the United States on the one hand and China on the other. In the first scenario, 95% confidence intervals are shown between square brackets, based on a block bootstrap with residuals drawn within country pairs. In total, we performed 500 of such draws.

Table 6.8: Impact on Chinese exports and imports, per business sector, due to lower mutual tariffs from the European Union, the United States and China

	Effect on China			
	Low tariffs between the European Union and China		Low tariffs between the European Union, United States and China	
Business sector	**Exports (%)**	**Imports (%)**	**Exports (%)**	**Imports (%)**
Petroleum	6.8	6.3	15.3	12.2
	[9.1;4.8]	[8.2;4.9]		
Construction	2.6	7.2	2.9	7.8
Chemical and pharmaceutical industry	10.5	8.7	22.5	18.0
	[11.6;9.4]	[9.9;7.7]		
Mineral extraction	4.8	0.4	8.5	0.5
	[6.1;3.8]	[0.6;0.3]		
Electrical appliances	7.3	22.4	12.7	39.8
	[9.6;5.7]	[25.7;18.4]		
Electrical engineering	8.7	14.0	17.8	28.6
Financial services	7.6	3.8	8.5	5.0
	[9.6;5.9]	[5.7;2.4]		
Wholesale and retail trade	8.7	23.2	11.1	29.4
	[11.4;7.0]	[27.6;19.5]		
Timber & printing industry	6.3	7.5	13.8	16.2
	[6.9;5.7]	[8.3;6.6]		
Information technology services	3.1	3.2	3.5	3.8
	[4.2;2.2]	[4.4;2.2]		
Plastics	6.0	15.2	10.7	26.7
	[6.6;5.4]	[16.6;13.7]		
Agriculture, forestry, fisheries	6.8	1.2	15.2	3.4
	[7.5;6.1]	[1.5;1.0]		
Machine industry	20.1	30.1	30.3	47.3
	[23.5;16.9]	[34;25.1]		
Metal production	7.7	9.2	13.7	15.5
	[8.7;6.9]	[10.3;7.8]		
Other industry and repair	12.3	22.1	27.2	45.8
	[15.6;9.3]	[28.8;17.9]		
Telecommunications	28.1	7.3	38.3	10.7
	[33.3;24.1]	[10.0;5.1]		
Textile industry	3.3	10.8	6.8	23.2
	[4.0;2.7]	[12.1;9.4]		
Means of transport	22.7	22.8	40.1	41.5
	[25.9;19.7]	[26.5;18.7]		
Transportation and storage	11.7	11.3	28.4	25.3
	[14.3;8.8]	[15.2;8.2]		
Food products	6.3	4.7	13.2	10.5
	[6.9;5.9]	[5.7;4.1]		
Business services	44.4	34.2	57.0	45.9
	[52.4;35.0]	[42.6;26.2]		

Note: Import and export effects, per business sector, for China, in two scenarios. For more information, see note Table 6.7.

Table 6.9: Impact on Dutch value added, producer and consumer prices, per business sector, from lower mutual tariffs of the European Union, United States and China

	Effect on the Netherlands					
	Low tariffs between the European Union and China			Low tariffs between the European Union, United States and China		
Business sector	**Value added (%)**	**Producer prices (%)**	**Consumer prices (%)**	**Value added (%)**	**Producer prices (%)**	**Consumer prices (%)**
Petroleum	0.1	-0.5	-0.7	0.2	-0.5	-0.7
	[0.2;0.0]	[-0.4;-0.8]	[-0.5;-0.9]			
Construction	0.0	0.2	0.2	0.0	0.2	0.2
Chemical and pharmaceutical industry	0.8	0.0	-0.8	0.7	0.0	-0.7
	[0.9;0.7]	[0.2;-0.1]	[-0.6;-1.0]			
Mineral extraction	0.4	0.1	-0.2	0.2	0.2	0.0
	[0.6;0.2]	[0.2;0.1]	[0.0;-0.5]			
Electrical appliances	1.1	-2.1	-3.3	1.1	-3.5	-4.6
	[1.3;0.9]	[-1.5;-2.6]	[-2.5;-3.9]			
Electrical engineering	1.0	-3.9	-5.0	1.0	-5.0	-6.1
Financial services	0.0	0.1	0.1	0.0	0.1	0.1
	[0.0;0.0]	[0.1;0.1]	[0.1;0.0]			
Wholesale and retail trade	0.0	0.6	0.5	0.0	0.7	0.7
	[0.0;0.0]	[0.7;0.4]	[0.7;0.4]			
Timber & printing industry	0.4	-0.6	-1.0	0.4	-0.9	-1.3
	[0.5;0.4]	[-0.4;-0.8]	[-0.8;-1.2]			
Information technology services	0.0	0.0	0.0	0.0	0.0	0.0
	[0.0;0.0]	[0.0;0.0]	[0.0;0.0]			
Plastics	0.8	-1.3	-2.2	0.7	-1.9	-2.6
	[0.9;0.7]	[-1.1;-1.6]	[-1.9;-2.5]			
Agriculture, forestry, fisheries	0.2	0.0	-0.2	0.3	0.6	0.3
	[0.2;0.2]	[0.1;-0.1]	[-0.1;-0.3]			
Machine industry	0.7	0.1	-0.6	0.8	0.0	-0.8
	[0.9;0.5]	[0.4;-0.2]	[-0.2;-1]			
Metal production	0.5	-0.8	-1.3	0.4	-1.2	-1.7
	[0.6;0.5]	[-0.5;-1]	[-1;-1.6]			
Other industry and repair	0.2	-0.5	-0.7	0.4	-2.2	-2.6
	[0.3;0.1]	[-0.2;-0.9]	[-0.3;-1.1]			
Telecommunications	0.0	1.3	1.3	0.0	1.7	1.7
	[0.0;0.0]	[1.8;0.8]	[1.8;0.8]			
Textile industry	1.9	-3.8	-5.8	2.0	-5.4	-7.6
	[2.3;1.6]	[-3.1;-4.4]	[-4.9;-6.7]			
Means of transport	0.2	0.4	0.2	0.1	0.5	0.3
	[0.3;0.1]	[0.5;0.3]	[0.4;0.0]			
Transportation and storage	0.1	0.3	0.2	0.1	0.5	0.4

	[0.1;0.1]	[0.4;0.1]	[0.4;0.1]			
Food products	0.4	0.3	-0.1	0.4	0.5	0.1
	[0.4;0.3]	[0.5;0.2]	[0.1;-0.2]			
Business services	0.5	1.6	1.2	0.4	1.3	0.9
	[0.6;0.3]	[2.6;0.7]	[2.2;0.3]			

Note: Results for the Netherlands, per business sector, on real value added, producer and consumer prices of the Netherlands, in two scenarios: (i) the impact of reduced tariffs on goods and services between the European Union and China, and (ii) the impact on goods and services for the European Union and the United States on the one hand and China on the other. In the first scenario, 95% confidence intervals are shown between square brackets, based on a block bootstrap with residuals drawn within country pairs. In total, we performed 500 of such draws.

Table 6.10: Impact on Chinese value added, producer and consumer prices, per business sector, from lower mutual tariffs of the European Union, United States and China

	Effect on China					
	Low tariffs between the European Union and China			Low tariffs between the European Union, United States and China		
Business sector	**Value added (%)**	**Producer prices (%)**	**Consumer prices (%)**	**Value added (%)**	**Producer prices (%)**	**Consumer prices (%)**
Petroleum	0.0	0.8	0.7	0.1	1.1	1.1
Mineral extraction	0.0	-0.1	-0.1	0.0	-0.3	-0.3
	[0.0;0.0]	[0.0;-0.2]	[0.0;-0.2]			
Electrical appliances	0.1	0.6	0.5	0.2	1.5	1.4
	[0.2;0.1]	[0.7;0.5]	[0.6;0.3]			
Electrical engineering	0.3	0.7	0.4	0.6	1.6	1.0
Financial services	0.0	-0.6	-0.6	0.0	-0.8	-0.8
	[0.0;0.0]	[-0.4;-0.8]	[-0.4;-0.8]			
Wholesale and retail trade	0.1	-0.9	-1.0	0.1	-1.2	-1.3
	[0.1;0.1]	[-0.7;-1.1]	[-0.8;-1.2]			
Timber & printing industry	0.1	0.5	0.4	0.2	1.4	1.2
	[0.1;0.1]	[0.7;0.3]	[0.6;0.2]			
Information technology services	0.0	-0.2	-0.2	0.0	-0.2	-0.2
	[0.0;0.0]	[-0.1;-0.3]	[-0.1;-0.3]			
Plastics	0.1	0.7	0.6	0.1	1.9	1.8
	[0.1;0.1]	[0.8;0.6]	[0.7;0.5]			
Agriculture, forestry, fisheries	0.0	-0.1	-0.1	0.0	-1.4	-1.4
	[0.0;0.0]	[0;-0.1]	[0;-0.1]			
Machine industry	0.2	-0.5	-0.8	0.4	0.3	-0.1
	[0.3;0.2]	[-0.2;-0.9]	[-0.4;-1.1]			
Metal production	0.1	0.3	0.2	0.1	1.1	1.0
	[0.1;0.1]	[0.4;0.1]	[0.4;0.1]			
Other industry and repair	0.7	0.6	-0.1	1.4	3.0	1.6
	[0.8;0.6]	[0.8;0.3]	[0.2;-0.5]			
Telecommunications	0.0	-1.6	-1.6	0.0	-2.9	-2.9
	[0.0;0.0]	[-1.1;-2.2]	[-1.1;-2.2]			
Textile industry	0.0	0.9	0.9	-0.1	2.1	2.2
	[0.1;0.0]	[1.0;0.8]	[1.0;0.8]			
Means of transport	0.2	-2.0	-2.3	0.4	-3.1	-3.5
	[0.2;0.2]	[-1.5;-2.6]	[-1.7;-2.9]			
Transportation and storage	0.1	-0.4	-0.5	0.2	-1.4	-1.6
	[0.1;0.1]	[-0.1;-0.7]	[-0.2;-0.8]			
Food industry	0.1	-0.4	-0.4	0.2	-0.8	-0.9
	[0.1;0.1]	[-0.1;-0.6]	[-0.2;-0.6]			
Business services	0.3	-1.2	-1.4	0.3	-1.8	-2.1
	[0.3;0.2]	[-0.2;-2.2]	[-0.5;-2.4]			

Note: Results for China, per business sector, on real value added, producer and consumer prices of the Netherlands, in two scenarios. For more information see the note of Table 6.9.

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