On Finland´s trade dependencies on China

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On Finland´s trade dependencies on China

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Abstract

China is one of Finland's biggest trading partners. This study examines our bilateral trade in the light of figures and statistics. It discusses exports and imports as well as investments and Finnish subsidiaries in China. Raw materials, medicines and semiconductors are highlighted as special themes. The study sheds light on the complex reality behind monetary and trade flows and provides a background for public debate on Finland's dependence on China. The report is part of a series of publications that aim at strengthening Finland's resilience.

An appendix to the report is an analysis, which the **Ministry for Foreign Affairs** and the **Ministry of Economic Affairs and Employment** commissioned from **Statistics Finland**. (That report is only available in Finnish, and linked to the original Finnish version of this report).

Trade dependence is often a two-way dependence that is profitable for both parties. Attempting to eliminate all dependencies is not realistic or desirable in a world of trade interdependencies. A dependence may become a disadvantage when trade is disrupted temporarily or for a longer term. The importance of risk diversification is highlighted in such situations.

It is practically impossible to form a complete picture of trade dependencies, as it is not always possible to trace the origin of goods completely in a world of global subcontracting chains. While the substitutability of certain goods flows is a key question when examining dependencies, it is also a complex matter that would require more in-depth sector-specific research. However, the available data allows research to identify patterns of development in trade dependencies. The conclusions on the theme are summarised at the end of the report.

The study was coordinated by the **Ministry for Foreign Affairs**. **The Ministry of Economic Affairs and Employment**, **Bank of Finland Institute for Emerging Economies (BOFIT)**, **Statistics Finland**, **Confederation of Finnish Industries**, **National Emergency Supply Agency**, **Finnish Customs**, **Technology Industries of Finland**, and **Pharma Industry Finland** contributed to the work.

Keywords	China, dependency, trade, supply chains		
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Suomen kaupallisista riippuvuuksista Kiinaan

Valtioneuvoston julkaisuja 2023:25
Julkaisija Valtioneuvosto

Toimittaja/t Teemu Laakkonen, Arto Haapea, Marja Kuosmanen
Yhteisötekijä Ulkoministeriö, Itäisen Aasian ja Oseanian yksikkö

Kieli englanti **Sivumäärä** 28

Tiivistelmä

Kiina kuuluu merkittävimpiin kauppakumppaneihimme. Käsillä oleva selvitys tarkastelee kahdenvälistä kauppaamme tutkittujen lukujen ja tilastojen valossa. Viennin ja tuonnin lisäksi selvityksessä on käsitelty investointeja ja suomalaisia tytäryhtiöitä Kiinassa. Erityisteemoina nostetaan esiin kriittiset raaka-aineet, lääkkeet ja puolijohdekomponentit. Julkaisun tavoitteena on valottaa kompleksista todellisuutta raha- ja kauppavirtojen taustalla ja näin taustoittaa Kiina-riippuvuuksista käytävää yhteiskunnallista keskustelua faktapohjaisen tiedon avulla. Selvitys kiinnittyy osaksi Suomen resilienssiä vahvistamaan pyrkivien julkaisujen jatkumoa.

Selvityksen liitteenä julkaistaan **ulkoministeriön** ja **työ- ja elinkeinoministeriön** toimeksi antama raportti, jonka on laatinut **Tilastokeskus**. Raportissa on tutkittu Kiinan-kauppaamme ja kiinalaisia sijoituksia Suomeen useista näkökulmista, kuten työllisyysvaikutusten kautta (saatavilla vain suomeksi).

Kaupallinen riippuvuus on useimmiten kahdensuuntaista ja molemmille osapuolille kannattavaa. Kaupallisten keskinäisriippuvuuksien maailmassa ei myöskään ole realistista tai tavoiteltavaa pyrkiä kaikista riippuvuuksista eroon. Haavoittavaksi riippuvuus voi muuttua tilanteessa, jolloin kaupankäynti kohtaa tilapäisiä tai pitempikestoisia häiriöitä. Tällöin riskien hajauttamisen merkitys korostuu.

Täydellistä kuvaa kauppariippuvuuksista on käytännössä mahdotonta muodostaa, sillä globaalien alihankintaketjujen maailmassa tavaran alkuperää ei aina voida jäljittää aukottomasti. Käytettävissä oleva data mahdollistaa kuitenkin kauppariippuvuuksien kehityskaarien tunnistamisen. Selvityksen lopussa esitetään kokoavat johtopäätökset teemasta.

Ulkoministeriön koordinoimaan selvitystyöhön ovat osallistuneet ja panoksensa antaneet **työ- ja elinkeinoministeriö**, **Suomen pankin nousevien talouksien tutkimuslaitos BOFIT**, **Tilastokeskus**, **Elinkeinoelämän keskusliitto**, **Huoltovarmuuskeskus**, **Tulli**, **Teknologiateollisuus ry**, **Lääketeollisuus ry** sekä muut teemaa kartoittaneet tai kartoittavat tahot.

Asiasanat Kiina, riippuvuus, kauppa, toimitusketjut

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Finlands kommersiella beroendeförhållanden med Kina

Statsrådets publikationer 2023:25
Utgivare Statsrådet

Redigerare Teemu Laakkonen, Arto Haapea, Marja Kuosmanen
Utarbetad av Utrikesministeriet, Enheten för Östern Asien och Oceanien
Språk engelska **Sidantal** 28

Referat

Kina är en av våra viktigaste handelspartner. I denna utredning granskas den bilaterala handeln mellan Finland och Kina utifrån siffror och statistik. Utöver export och import behandlar utredningen investeringar och finländska dotterbolag i Kina. Särskilda teman som lyfts fram är kritiska råvaror, läkemedel och halvledarkomponenter. Syftet med publikationen är att belysa den komplexa verkligheten bakom penning- och handelsflödena och bidra med faktabaserad information till samhällsdebatten kring beroendeförhållandena med Kina. Utredningen är en del av en publikationsserie som syftar till att stärka Finlands resiliens.

Som bilaga till utredningen publiceras en rapport som **Statistikcentralen** har sammanställt på uppdrag av **utrikesministeriet** och **arbets- och näringsministeriet**. Vår handel med Kina och kinesiska investeringar i Finland granskas i rapporten ur flera synvinklar, bland annat med tanke på sysselsättningseffekter (tillgänglig bara på finska).

Det kommersiella beroendet går oftast i två riktningar och är lönsamt för båda parterna. I en värld som präglas av ömsesidiga kommersiella beroendeförhållanden är det inte heller realistiskt eller eftersträvansvärt att försöka frigöra sig från alla beroendeförhållanden. I en situation där handeln drabbas av tillfälliga eller långvariga störningar kan beroendeförhållandet dock orsaka sårbarhet. Då accentueras betydelsen av riskspridning.

Det är i praktiken omöjligt att få en fullständig bild av handelsberoenden, eftersom man i en värld av globala underleverantörskedjor inte helt uttömmande kan utreda var varor kommer ifrån. En viktig men komplicerad fråga vid granskningen av beroendeförhållanden är också i vilken mån varuflödena kan ersättas, men detta kräver mer ingående, sektorspecifik undersökning. Tillgängliga data gör det emellertid möjligt att identifiera utvecklingscyklerna för handelsberoenden. I slutet av utredningen presenteras sammanfattande slutsatser kring temat.

Arbets- och näringsministeriet, **Finlands Banks forskningsinstitut för tillväxtmarknader (BOFIT)**, **Statistikcentralen**, **Finlands näringsliv**, **Försörjningsberedskapscentralen**, **Tullen**, **Teknologiindustrin rf**, **Lääketeollisuus ry** samt andra aktörer som kartlagt temat har bidragit till utredningsarbetet, som har samordnats av **utrikesministeriet**.

Nyckelord Kina, beroende, handel, leveranskedjor

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Contents

1 Background

After the disruptions in production and supply chains caused by the corona pandemic, initiated a public debate on trade dependencies on countries outside the European Union. Following the Russian war of aggression against Ukraine, dependencies on Russia have largely been removed. Attention has also turned to China, which is among Finland’s five biggest trading partners and the third biggest importing country in terms of the value of goods and services.

Customs statistics on trade in goods show that both exports and imports to China continue to grow. Finland's trade deficit with China has grown strongly in recent years. However, the extent of the trade relationship cannot be seen only through export and import figures. It is important to include the business operations of Finnish subsidiaries operating in China, which is very significant. Also investments by Finnish companies in their home country made possible by profitable exports to China are part of the overall picture, as well as Chinese investments in Finland.

This report coordinated by the **Ministry for Foreign Affairs** examines Finland's bilateral trade with China in the light of researched figures and statistics. The goal of the report is to shine a light on the complex reality behind money and trade flows and hence to provide a background for the ongoing debate on China related dependencies, with the help of facts and figures. In the larger picture, the public study forms a part of an effort to strengthen Finland’s resilience. The same goal has also been supported in recent years by Finland´s governmental action plan on China, the report on the Impacts of the superpower competition to Finnish companies, the recommendations for academic cooperation with China by the **Finnish Ministry of Education and Culture**, and a report on the structure of our exports to China compiled by the **Ministry of Economic Affairs and Employment**, **Business Finland**, the **Bank of Finland’s Institute for emerging economies (BOFIT)**, and the **Ministry for Foreign Affairs**.

Discussing trade dependencies requires defining the concept. In this study, the European Commission’s general definition to the trade relationship between Finland and China has been applied: “Dependence is reliance on a limited number of producers in terms of goods, services, data, infrastructure, skills and technologies, so that imports cannot be replaced by production within the Union or can only be done to a limited extent”.[1]

1 https://commission.europa.eu/system/files/2021-05/swd-strategic-dependencies-capacities_en.pdf

Trade dependence is mostly two-way and profitable for both parties. Almost all dependency is therefore not harmful, which is often forgotten in the public debate. In the world of commercial interdependencies, it is also not realistic or desirable to try to get rid of all dependencies.

Dependency can however become harmful in a situation where trading is faced with temporary or longer-lasting interruptions. In such a scenario, the importance of risk diversification is emphasized. Such situations are often unpredictable and are caused by factors beyond Finland's influence. Disruptions in production chains or logistics are often shorter in duration, while a potential political crisis could cause longer-term damage to trade relations.

In its publications, the **Etla Economic Research** has brought up Finland's dependence on global value chains, which was recently seen in the production and delivery problems during the COVID-19 pandemic. **Etla** has referred to studies according to which industries exposed to imports from China contracted more than other industries during the shock effects of the beginning of the pandemic. On the other hand, the **World Trade Organization** has published studies according to which economies more tightly integrated into the world economy have recovered from the pandemic faster. In its national risk assessment, the Ministry of the Interior also notes the multiple effects of disruptions in value and supply chains, which can weaken the operating conditions of Finnish companies.

2 Structure and limitations of the study

The report focuses on the current trade between Finland and China. The trade flows analysed are ones where interruptions could cripple Finnish companies and thereby weaken the well-being of citizens and the fulfillment of consumption needs. A report commissioned by the **Ministry for Foreign Affairs** and the **Ministry of Economic Affairs and Employment** on trade between Finland and China, by **Statistics Finland**, is published as an appendix to the report. The report has examined Finland's trade with China and Chinese investments from several perspectives, such as through employment effects. The available statistical data extends until 2021. Statistics and the conclusions drawn from them are always subject to certain limitations and difficulties in interpretation, which **Statistics Finland** has clarified as part of its sector-specific analysis in the report. Simultaneously with this publication, **BOFIT** will publish its own report on goods imported from China to Finland and the European Union.

Data on trade dependencies is scattered in different sources. The mapping requires a multi-faceted analysis of the **Customs** statistics and data collected by **Statistics Finland**. Global supply chains and complicated ownership structures, the lack of up-to-date data, statistical challenges in tracing the country of origin, and use of raw materials as part of a certain end product increase the difficulty of the exercise. For example, car manufacturers are estimated to utilise up to 18,000 different suppliers as part of their production chain.

Criticality and substitutability are key questions when looking at dependencies. Most of the products in which a strong dependence on one importing country is seen, are not critical in nature for example individual textile industry products. For those products that are seen critical, substitutive supply chains should also be assessed. Both the criticality of a single imported article and the sector-specific substitution of commercial dependencies and contingencies for such scenarios would require their own more detailed study. A comprehensive overview of substitutability would require specific modeling where a certain commodity is hit by simultaneous sudden demand from all or several countries in the same situation. Trade flows related to national emergency supplies have also been left outside of the scope of this study.

The Ministry of Economic Affairs and Employment, **BOFIT**, **Statistics Finland**, **the Confederation of Finnish Industries**, **the National Emergency Supply Agency**, **Finnish Customs**, **the Technology Industries**, **the Pharmaceutical Industry Association** and other entities that have mapped or are mapping the theme have participated in and contributed to this study coordinated by the **Ministry of Foreign Affairs**.

In addition to the reviews published so far, various actors are conducting additional longer-term studies on the theme, complementing the overall picture once complete.

3 European and OECD points of view

Following the COVID-19 pandemic and Russia's war of aggression against Ukraine, the European Commission has encouraged Member States to examine their national trade dependencies. Studies are underway in several Member States, primarily to map trade dependencies on China. The European Council, consisting of the heads of state of EU Member States, held a strategic discussion on China in October 2022.

The Commission has published comprehensive reports on the matter, in which China is analysed as one of the most significant external trading partners. In the Commission's list of critical raw materials, the dependency of European industry's input use on each raw material group has been evaluated.

By strategic dependencies, the Commission refers to sectors that are of decisive importance in terms of securing the core interests of the EU and its Member States, such as security, health, or green and digital transition. The strategic nature of our trade dependencies on China has been considered in the light of this definition towards the end of this study. The studies published by the Commission on the subject are closely related to strengthening European competitiveness and strategic autonomy. The examination of China plays a central role in such efforts. The overview of the Commission's publications is broader than this study, which emphasizes the current status of our trade with China.

In its 2022 review, the Commission has considered rare earth metals, magnesium and solar panels as dependencies prone to vulnerability, as the global production of these is significantly concentrated in China.[2] It has previously assessed the following sectors as the most significant in terms of the Union's overall strategic dependence, when considering also trade partners other than China: raw materials, active pharmaceutical ingredients, lithium-ion batteries, hydrogen, semiconductors, and cloud and edge technologies.

The Organization for Economic Co-operation and Development (OECD) has studied supply chain disruptions during the COVID-19 pandemic. In a joint report, Statistics Finland and the OECD have researched the linkages of Finnish companies to global value chains and found that this mainly involves large industrial companies in Finland. Consequently, linkages of SMEs to global value chains takes place mainly through subcontracting relationships.

2 https://ec.europa.eu/docsroom/documents/48878.

4 Finland´s trade with China, Chinese investments in Finland, and the finance sector

The total value of business in China for Finnish companies is estimated to be more than 20 billion euros per year, taking into account the export and import of goods and services, the business operations of Finnish subsidiaries in China, and the impact of such business in Finland through investment, research and development, and jobs. Finnish research and development activities have also increasingly been transferred to China.

4.1 Exports to China

According to the preliminary statistics of Finnish Customs, in 2022 Finnish goods exports to China were 4 billion euros, which represented an 11.3% increase compared to the previous year. Of the Finnish export companies, 230 have a total value of export to China exceeding one million euros. These companies' exports to China cover 97% of all Finnish exports to China. Two thirds of the exporting companies are large companies. For 50 of these, exports to China make up at least a quarter of the turnover. Exports to China can be considered to employ 6,841 person-years (FTE). The figure is obtained by relating the number of employees of companies that export goods or services to China to the share of their turnover in China. The employment effects are most significant in Finnish industrial companies.

The total value of Finnish service exports in 2021 was 28 billion euros, of which five percent went to China. From the export of intellectual capital, mainly from license fees, an income of around 600 million euros was received from China to Finland in 2021, corresponding to 21% of all service exports of intellectual capital abroad. Before the COVID-19 pandemic, tourism services formed a significant part of the growth of Finnish service exports to China.

In 2020, the domestic value-added from Chinese exports to Finland was approximately EUR 3.2 billion, which accounted for 1.6% of Finnish GDP. The domestic value-added of exports is obtained when foreign inputs used in production, i.e. raw materials and services purchased from abroad, are deducted from the gross value of exports. Measured by trade in value-added, China's importance as an export market is slightly greater than the trade statistics indicate. According to the latest **OECD** statistics, China consumed around eight percent of Finnish trade in value-added abroad in 2018. This made China Finland's fourth most important trading partner in terms of final value added demand, right after the United States, Sweden and Germany.

The structure of Finland´s exports to China has been examined in a 2022 study by the **Ministry of Economic Affairs and Employment**, **Business Finland**, **BOFIT** and the **Ministry for Foreign Affairs**. According to the study, Finnish exports to China for the past decade have been increasingly focused on raw materials and intermediate products, being more one-sided than the exports of countries in Finland's reference group.

The turnover of Finnish subsidiaries in China increased significantly during the period 2013–2020: from just over 8 billion to 13 billion euros. According to the data compiled by Statistics Finland, in 2020, approximately one hundred Finnish-owned parent companies operating in Finland had a total of 250 subsidiaries or branches in China. Subsidiaries located in China made up about five percent of all foreign subsidiaries of companies operating in Finland. Disturbances in the operating environment of subsidiaries located in China would naturally affect our China business; it has not been possible to assess these disturbances within the scope of this study.

There are still significant opportunities for Finnish companies in the Chinese market. It would be reasonable, however, to aim at diversifying Finnish exports to China. Currently, Finland's export of goods to China relies on a few industries and a quantitatively small group of companies, which increases vulnerability. The vulnerability of exports is primarily related to a situation where certain companies or Finnish exports as a whole would face difficulties either due to changes in Chinese demand or secondary effects of political disputes at the state level.

4.2 Imports from China

According to the preliminary statistics by Finnish Customs, Finnish import of goods from China was 8.4 billion euros in 2022, representing was a 27.6% increase compared to the previous year. China has become Finland's third biggest importer. Based on various studies, the most significant trade dependencies are related to imports. There are approximately 300 companies in Finland with imports from China of at least one million euros and for which at least a quarter of the company's imports come from China two-thirds of these are small companies in the trade sector. If the limit value of one million euros is waived, there are well over a thousand similar companies.

The employment effect of Chinese imports can be considered to be 15,522 person year equivalents (FTE). The figure has been obtained with a similar calculation method as above in relation to exports. The employment effects are distributed across several trade sectors: the biggest effects are in non-specialised retail stores, which include e.g. supermarkets and department stores, as well as in specialist retailers, such as hardware and clothing stores. Of the employment effects of Chinese imports, 54% is in retail sector, 0% in wholesale trade, and a small part in wholesale and retail trade of motor vehicles. The indirect employment effects of foreign trade through the subcontracting by Finnish companies are presumably much greater. Five percent of Finland's service imports in 2021 originated from China. Most of this was registered under other business services, while IT services have hardly been imported at all.

In addition to direct commodity imports, imports from China are also more broadly connected to Finland’s economic well-being. Finnish companies use imported inputs from China, especially components and other intermediate products, as part of their own exports. In this regard, dependence on China generally appears to be a limited phenomenon, although there are notable sector-specific differences.

The use of products considered to be particularly dependent on Chinese imports is most common in 1) the manufacture of textiles and leather, 2) the manufacture of electrical equipment and 3) the manufacture of computers and electronic and optical products. Dependence on China is clearly the strongest in companies of the latter sector. In 22 % of the surveyed establishments in the industry, China-dependent goods represent at least a tenth of the value of the total input use, and the share of these companies in the industry’s workforce is even greater than this.

Statistics of import inputs are based directly on country of origin, and its indirect effects through the production chains of third countries cannot be taken into account. The value recorded in the trade statistics of a component also does not reflect its importance it in the production process. A single component of low value can prevent the production of a certain machine, device or product. The question of criticality should be assessed through the intended use of the end product, whereas substitutability can be assessed by looking at alternative suppliers of the component in question.

The **BOFIT** study analyses the imports of goods from China on the basis of **Finnish Customs**’ statistics extending to the end of 2021. In terms of value, items imported from China mainly comprise of electrical machines and devices, clothes, furniture, toys, games and sporting goods. Electrical machinery and mechanical equipment alone account for more than half of the value of imports.

Measured by the value of imports, we especially import laptops and mobile phones from China, which covers a total of 2 % of the value of the entire import of goods to Finland. Two thirds of the laptops imported to Finland and almost half of the mobile phones come from China. In addition, most of the monitors and mobile phone parts are imported from China. Also, the vast majority of imports of certain electric motor cars and motorcycles come to Finland from China. However, the share of the latter in the total value of imports is not very large.

The report examines the substitutability of Chinese imports with our own domestic production. By combining the import statistics of industrial products with the statistics of domestic factory production, individual product groups can be distinguished in which China is prominent and for which our own production is small or non-existent. In those product groups that are practically not produced at all in Finland, the dependence on China is greatest in batteries, motorcycles, musical instruments and synthetic fibers. Product groups that cannot be considered strategic (for example fireworks, artificial flowers, umbrellas, mannequins, men's swimwear) have been removed from **BOFIT**'s listing. However, not all imports from China are automatically produced by Chinese companies. The complexity of the theme is illustrated by the fact that foreign multinational companies still cover about a third of China's total exports.

In the EU's imports from China, the same categories are emphasized as in Finland's bilateral imports from China. The dependencies assessed at the EU level are on average somewhat more significant than our national dependencies. The reviewed Swedish import statistics are similar to those of Finland, the most notable difference being in electrical machinery and equipment. In them, China's share of imports to Finland is twice that of Sweden.

The vulnerability of imports is more multifaceted than exports in a world of global value chains and indirect imports. The country of origin of certain goods may be China, even if it is officially recorded in the export statistics of another transit or processing country. Import interruptions can occur, for example, due to logistical reasons, increased demand or stock shortages. All of these were seen especially at the beginning of the corona pandemic in 2020.

4.3 Critical raw materials

The import of critical raw materials forms its own notable chapter in the assessment of dependencies related to China. The EU has considered a raw material to be critical when it is economically significant in the industrial ecosystem and has a high supply risk. Three years ago, the European Commission defined 30 critical raw materials, of which 19 are largely found only in China.[3] These are used in various industrial sectors as components, mixtures and manufacturing materials. They are particularly important for the industrial green transition and society, as well as for the defense industry.

Technology Industries of Finland has mapped Finnish industrial companies' supply chains and preparedness regarding critical materials through a company survey in June-July 2022. The responding companies considered cobalt and tungsten to be the most critical raw materials for their production. Among other metal compounds, magnesium emerged as the third most important. Risks in the supply chains have been identified, but no special preparation has been made for them based on the report. However, risk management methods have been developed compared to the corresponding report in 2017. Critical metals are often purchased as an alloying element of ready-made components: 65 % of the responding Finnish technology companies purchase metals and metal compounds as ready-made components and only 35 % directly from the market. A total of 83 companies, mainly from the industrial and metal product sectors took part in the survey. The Finnish Technology Industry is predominantly an assembly industry.

From **BOFIT**'s import survey, it appears that mostly fluorspar, aluminum and bauxite are imported directly from China to Finland in terms of value. However, for all of these, China's share of imports in 2020–2021 has been smaller than before in 2016–2019. In 2020–2021, we were most dependent on China for our imports of lithium, which accounted for about a quarter of the total import value. In addition to raw material imports, lithium is also found in batteries imported to Finland. Between 2016 and 2019, more than half of our magnesium imports came from China, but in recent years the share has dropped to less than a fifth. In this sense, it is important to remember that a raw material may originally come from China, even if it ends up in Finland via another country as further processed or as part of a component. China has a share of 41.7% of solar panel imports to Finland. The key raw material of the panels is silicon in its various forms.

Statistics Finland has studied the import of critical raw materials from China based on general import dependence and China's import dominance. Like the aforementioned company survey, it highlights the importance of tungsten for Finnish companies. Instead

3 https://op.europa.eu/en/publication-detail/-/publication/c0d5292a-ee54-11ea-991b-01aa75ed71a1/language-en.

of pure raw material, tungsten waste and scrap represents more than half of the imports of all critical raw materials. Scrap is used as a source of recycled raw materials and it is also forwarded through Finland. After tungsten, the value of imports of goods made of titanium emerges, as does the import of (ferro)vanadium. Each of the 30 critical raw materials defined by the EU is imported to Finland and used in Finland in some form. The number of industrial and commercial companies importing critical raw materials has increased in recent years; there are currently around 150 companies. The clear majority of companies operate in different industrial sectors.

The issue of substitutability is also central to critical raw materials. Finland has one of the most significant lithium reserves in Europe, which are being investigated. So far 14 critical raw materials have been found in Finland's mineral deposits, of which mining progress has been made in cobalt, platinum group metals and phosphate rock. Mining permit projects and further studies for several critical raw materials are pending in Finland. Occurrences of rare earth metals in Finland are also being studied. Our national battery strategy was published in 2021, and significant investments are to be made in battery metal recycling technology.

China has the most significant mining and processing operations for most critical raw materials, as well as industry-related know-how, especially in battery technology. It is, for example, the most important producer of magnesium and tungsten. In batteries, especially the most powerful lithium-ion batteries, China is the overwhelming market leader. Several critical raw materials are needed for their production and product development. The permanent magnets used in wind turbines and electric cars are an illustrative example of the double dependence on China in terms of both the end product and its ingredients: China is in a dominant market position in magnet production with a 93% global production share, and the manufacture of magnets requires various heavy rare earth metals. Electrolyzers that produce pure hydrogen also run on rare earth metals.

Despite its own soil deposits, China is a significant importer of base metals. China also owns various metal mining operations abroad. According to the customs' preliminary statistics, between January and October 2022, a record amount of nickel was exported from Finland to mainland China and Taiwan. Finland is the largest refiner of nickel of all of the EU member states.

4.4 Pharmaceuticals and medical devices

The production and supply chains of pharmaceuticals are global and very multi-threaded. Their import to Finland can be examined from the Customs statistics. Finland imports the end products of medicines mainly from other EU countries and Switzerland. Medicines, so-called active ingredients and vitamins are imported from the USA, China and India to European factories for further processing. China's share of this is about a quarter. The availability of medicines is thus largely an EU-level issue. It is worth noting that Europe can also produce more than half of the need for the active ingredients of medicines. According to the statistics of the Customs, the direct import of medicines from China to Finland has been small. There is limited pharmaceutical production in Finland, while the largest pharmaceutical producing European countries are responsible for a notable share of the entire world's pharmaceutical exports. The end products of medicines are also exported to China.

In Finland, pharmaceutical companies, pharmacies and the healthcare sector have a special obligation to stock medicines, which helps in short-term supply interruptions caused by the market situation. Situations like a global pandemic typically generate a sudden but temporary demand for certain medicines, which the existing production capacity cannot quickly respond to.

The Ministry of the Interior reminds us that Finland does not have such production of pharmaceuticals or availability of raw and packaging materials that domestic production could meet all needs of healthcare and social welfare. The production of medical devices or other critical products requires components, and are hence exposed to possible shortages in the supply chain.

4.5 Semiconductors

A particularly strategic dependence worldwide is on semiconductor components, the availability of which even temporary supply interruptions can test the ability of states and the entire global economy to recover. Microchips are one category of semiconductor components. For example, since the beginning of the corona pandemic, the production of semiconductor components has not been able to meet the demand of the automotive industry, the effects of which extend to Finland. There is a growing demand for semiconductors of different degrees of refinement in various industrial sectors. The higher the processing level, the smaller and more energy efficient the microchip is. The operation of an entire device or machine is often dependent on microchips.

China is a producer and exporter of semiconductors of lower refinement level, but also a significant importer of different types of semiconductors. In 2021, China imported electronic integrated circuits with more than 433 billion US dollars. It is the single most significant flow of goods in world trade. Finnish know-how is connected to the value chain of semiconductor components through research and development, microchip design and partial production.

According to Customs statistics, Finland imports electronic integrated circuits and their parts from China for a total of about one billion euros. About a tenth of these come from mainland China, while more than a third is registered under Taiwan imports.

Semiconductors are also imported under the customs heading of microcircuits and memories. These are different types of semiconductors, where the market leaders are two large Korean companies. Imports from China accounted for 19.7% in this category, which corresponds to approximately 12 million euros in imports.

The availability of semiconductors has been considered a critical issue in a situation where a conflict would arise in the Taiwan Strait. Almost the entire world economy would suffer from such a crisis.

4.6 Chinese investments in Finland

Statistics Finland has studied Chinese investments in Finland on the basis of data extending until the end of 2021. According to the report, 50 Chinese-owned companies operate in Finland. A company is defined as Chinese-owned if its ultimate controlling entity is located in China. These companies employed 2,600 person-years (FTE) in Finland in 2021. The value of Chinese direct investments at the end of the same year was 4.5 billion euros, which corresponds to approximately 5.9 % of all foreign direct investments in Finland. In recent years, investments in Finland have been focused especially on the technology sector and on company acquisitions.

So far, there have been no significant Chinese investments in Finnish basic or critical infrastructure. Chinese infrastructure investments have been made in the logistics sector of our port and airport traffic. Based on the national law on the monitoring of foreign investments, the authorities have the possibility to monitor the ownership base of companies considered critical for national security and, if necessary, limit foreign ownership in such companies.

4.7 The financial sector

In addition to the aforementioned report, **BOFIT** has assessed that Finland's direct financial sector ties to China are very moderate. China's own restrictions on the transfer of capital have contributed to this. Evaluating indirect financial exposures, on the other hand, is difficult. More detailed information about our national financial sector is confidential and cannot be published.

5 Surveys for Finnish companies on their supply chains

The readiness of Finnish companies for possible disruptions in global supply chains has been surveyed. According to the export manager survey (116 respondents) published by the **Chamber of Commerce** in February 2023, 26 % of the responding companies had either reduced or were about to reduce their dependence on China. 40 % of those who responded to the survey did not report critical dependencies on China. In the open answers, the companies said that they are diversifying their production and supply chains to other parts of Southeast Asia and Europe, that they are looking for alternative suppliers for raw materials, and that they are directing subcontracting more strongly to other regions.

Based on a December 2022 survey conducted by the **Confederation of Finnish Industries (EK)**, among key companies engaged in international trade, 12 % of the respondents stated that risks related to the Chinese market had caused significant changes to the company's business operations. For 14 % of the companies that responded to the survey, exports to China accounted for more than 20 % of the company's total exports. On the other hand, for 86 % of the companies, the importance of exports to China was less than 20 % of the company's total exports. A total of 710 companies engaged in international trade responded to the survey.

In November 2022, **EK** investigated the changes made by 745 key companies engaged in international trade in their global supply chains. 60 % of large companies and 53 % of industrial companies announced that they had made changes to their supply chains during 2022. A share of 44 % of the companies stated that they had distributed supply chains to several suppliers and to several countries. On the other hand, only 12 % of the companies had reshored production to Finland or nearby areas such as the Baltics. 61 % of the companies reported that the corona pandemic had caused delivery problems, which manifested itself as a shortage of containers or as the need to limit or cut production in various countries, including China.

Respondents to **Osuuspankki cooperative** bank´s january 2023 survey of large companies (139 participants) anticipate that their production capacity will shrink in China. In the 2021 survey, 19% of large companies expected an increase in production in China, now it is 9%. A quarter of respondents saw China's rise to economic power as an opportunity for their company, about a third saw it as a threat. The majority of the respondents could not yet take a strong position on the question.

According to the growth company survey collected by **Finnish Industry Investment Ltd** in November 2022, less than a fifth of the respondents have mapped the influence of China and Taiwan in their value chains. For these, the role of China and Taiwan is significant, as almost half of the companies have products that contain materials or components from mainland China or Taiwan. The phenomenon is emphasized in the information and communication industry. More than a fifth of these companies have active plans to diversify their production chains. However, it is not considered to be cheap, and almost a third do not believe that alternative suppliers for critical components can even be found. The answers have been compiled from eight industries, which include information and communication services. A total of 1517 companies responded to the survey, and companies with less than five employees were excluded from it.

6 Summary and conclusions

China is one of our most important trade partners. Political and commercial relations are stable and there are no tangible distractions in sight that would change the current situation. However, in an unpredictable geopolitical operating environment, situations can change quickly, in which case the importance of preparedness and risk diversification becomes more important.

Even a superficial report shows the extensiveness of Finland's commercial dependence on China in the same way as elsewhere in Europe. Based on various studies, a picture emerges of China's considerably increased share in our imports. Trade disruptions would be seen most quickly in industry and commerce: especially in the form of shortages of mobile phones, laptops, other electrical equipment and batteries. The import of components and other intermediate products is focused on certain industries such as the electronics industry. It is clear that the large-scale production problems of such key commodities would quickly be reflected in the everyday life of citizens and companies. It would not be possible to replace imports quickly, especially in a situation where the problems would affect several countries at the same time.

For about 300 of our companies, Chinese imports make up at least a quarter of all company purchases. Imported Chinese inputs are used significantly in Finnish electronics manufacturing. China imports can be counted on to be well over 15,000 person-years (FTE); the indirect employment effect is larger, but very difficult to calculate.

The commerce sector is emphasized in our imports from China, industrial companies in exports. 230 of the Finnish export companies have a value of goods exports exceeding one million euros. For 50 of these companies, exports to China make up at least a quarter of their turnover. Two thirds of the exporting companies are large companies, and exports are concentrated in industrial companies. The turnover of Finnish subsidiaries operating in China is significant, and companies have made large investments in Finland, such as new production lines, solely because of the profitability of their exports to China.

The risks posed by trade dependencies on China differ for exports and imports. The most likely disrupting factor in trade between our countries would be economic or logistical by nature, which would put Finland in largely the same situation as the rest of the world. This was the case, for example, during the first phase of the corona pandemic in 2020 and when the Suez Canal was blocked in 2021. Instead, the impact of a political crisis or conflict could be country or region specific and, as such, harder to predict. Even good bilateral relations do not protect Finland in the event of significant adversity.

Calculating the direct and indirect effects of an acute export interruption situation in terms of our national economy would require separate reports. In any case, the effect would be considerable and would be reflected in the employment and turnover of the export companies concerned, as described above. According to the calculation method used in the report, the employment effects of such a situation on exports would be much more moderate than those of imports.

A key part of the dependency analysis is related to critical raw materials and medicines. Both in Finland and elsewhere in Europe, the speed of the green transition of society and industry is so far tied to the availability of critical raw materials from China. This can be seen as a strategic dependency as has been defined by the European Comission. The Commission is expected to publish its critical raw materials situational update and legislative proposal (Critical Raw Materials Act) in the near future.

Regarding medicines and their active ingredients, the situation in Finland is much the same as in other EU countries. About a quarter of the effective ingredients of medicines are imported from China to European factories, from where they are imported to Finland as final products. Our own pharmaceutical production is limited.

It is practically impossible to form a complete picture of trade dependencies, as the available statistics do not allow completely seamless tracing of the origin of supply chains and investments. Drawing conclusions is always based on incomplete data, and the study of trade vulnerabilities is inevitably far from an exact science.

An examination of two difficult-to-explain aspects of dependencies would deserve its own research dimension: to what extent a particular dependency is critical or strategic, and to what extent it can be replaced by other imports, exports or own production.

The governmental action plan on China states that "It is important for companies and other Finnish interlocutors to be mindful of the changes in China's politics, society and economic development, and the business environment that may have an effect on them. It is advisable to take note of differences in values, political risks related to cooperation and the danger of economic dependence. It is essential to avoid structures and practices in collaboration that could limit the room of manoeuvre." The report now coordinated by the Ministry for Foreign Affairs is a continuation of the work aimed at strengthening national resilience, as part of which it is also important to evaluate trade dependencies. Companies' preparedness for supply chain disruptions has already partially increased, which is evident in the aforementioned company surveys.

A report on the Impacts of the superpower competition to Finnish companies summarizes: "Companies must know their clients, supply chains and financiers better than before. The situation calls for an increasingly clear understanding of the impacts of political actions on business and its risks, the maintenance of a national situation picture and exchange of information. It would be important to raise awareness of the rivalry between the superpowers especially among small and medium-sized enterprises." The superpower competition between the United States and China has intensified since the publication of the report, especially in the technology sector, the development of which should also be monitored by Finnish companies due to possible indirect effects.

Not all trade dependence is vulnerable, but identifying vulnerabilities is more necessary than before. Even a critical examination of dependencies does not mean closing the doors of cooperation. In a world of global supply and value chains, a complete commercial decoupling would not even be possible. Ultimately, each actor has to examine risks and prepare for them from their own starting points.

As a summary of what has been studied so far, the following can be stated:

1. Finland is at the median level of the EU countries with regard to the trade dependencies on China examined in this report.
2. It is important to further promote Finnish and European production and recycling capabilities of critical raw materials in a sustainable way.
3. Finnish companies are further encouraged to strengthen their commercial resilience by diversifying production and supply chains and increasing the transparency of value chains. The Ministry for Foreign Affairs for its part contributes to this goal by supporting the removal of country specific trade barriers and promoting EU trade agreements.
4. There is still ample room for growth in China for exports of finished goods and services that produce higher added value.
5. Further studies on the substitutability of sector specific trade vulnerabilities are recommendable. Additional mapping is also needed on the significance for the Finnish society´s emergency supply security.

Appendix

Web links to referred studies

https://um.fi/documents/35732/0/Finland%27s+Governmental+Action+Plan+on+China+2021.pdf/36948194-7f39-fbf1-328e-666f8fc0f192?t=1623934391697 (Governmental Action plan on China – IN ENGLISH, 07/2021)

https://julkaisut.valtioneuvosto.fi/handle/10024/163339 (China and the United States – A challenge to companies : Impacts of the superpower competition to Finnish companies – IN ENGLISH, 06/2021)

https://urn.fi/URN:NBN:fi-fe2023022828915 (Report by the Bank of Finland's Emerging Economies Research Institute, BOFIT, on Finland's imports to China, 02/2023)

https://teknologiateollisuus.fi/sites/default/files/inline-files/Kriittiset%20materiaalit_Teknologiateollisuuden%20opas.pdf (Technology industry report on the availability of critical materials and preparedness for risks, 10/2022)

https://www.businessfinland.fi/julkaisut/finlands-china-trade (Finland´s China Trade – A study. IN ENGLISH, 12/2022)

https://julkaisut.valtioneuvosto.fi/handle/10024/163583 (Value chains, international trade and the vulnerability of the economy, Etla survey by the Finnish Economic Research Institute, 11/2021)

https://www.etla.fi/julkaisut/korona-sokki-talouteen-missa-maarin-suomi-on-riippuvainen-ulkomaisista-arvoketjuista/ (Corona shock to the economy – To what extent is Finland dependent on foreign value chains? Etla the Institute for Economic Research 03/2020)

https://kriittisetmateriaalit.fi (website maintained by the National Emergency Supply Centre, where topical information on critical raw materials is gathered)

https://www.laaketeollisuus.fi (Website of the Finnish Pharmaceutical Industry Association)

https://tulli.fi/tilastot (Customs foreign trade statistics)

https://single-market-economy.ec.europa.eu/sectors/raw-materials/areas-specific-interest/critical-raw-materials_en (Critical raw materials from the perspective of the European Commission, 06/2020)

https://ec.europa.eu/docsroom/documents/48878 (EU strategic dependencies and capacities: second stage of in-depth reviews, 02/2022)

https://commission.europa.eu/document/0a5bdf82-400d-4c9c-ad54-51766e508969_en (European Commission – Strategic dependencies and capacities, 05/2021)

https://www.efpia.eu/media/602699/production-import-dependencies-and-export-vulnerabilities-of-pharmaceuticals-for-the-eu27-final.pdf (European Center for International Political Economyn, ECIPE:n, selvitys lääkkeiden tuontihaavoittuvuuksista EU:ssa, 07/2021)

https://kauppakamari.fi/tiedote/kauppakamarien-vientijohtajakysely-suomalaiset-vientiyritykset-eivat-laske-menestystaan-vain-kiinan-varaan-27-prosenttia-vahentamassa-kiina-riippuvuuttaan/ (Finland Chamber of Commerce survey 11/2022)

https://kauppakamari.fi/tiedote/kauppakamarien-vientijohtajakysely-kiina-riskit-ja-usan-kasvava-protektionismi-varjostavat-myos-yrityksia-eun-entista-tarkeampaa-pitaa-huolta-omasta-kilpailukyvystaan/ (Finland Chamber of Commerce survey 02/2023)

https://www.op.fi/documents/20556/27641318/OP-Suuryritystutkimus-2023.pdf/faa46987-ae20-0e34-8d86-2f4fd21c5d25 (OP bank large business survey 01/2023)

https://julkaisut.valtioneuvosto.fi/bitstream/handle/10024/162684/TEM_2021_2.pdf?sequence=1&isAllowed=y (National battery strategy 2025, publications of the The Ministry of Economic Affairs and Employment, 02/2021)

https://www.etla.fi/wp-content/uploads/ETLA-B276.pdf (The Lion and the Dragon - Economic relations between Finland and China – Kaitila Ville, Kotilainen Markku, 2017)

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https://www.tesi.fi/userassets/uploads/2022/12/Kasvuyrityspulssi-2022_pitka_FI.pdf (A survey by the Finnish Industry Investment Ltd, 11/2022) https://www.wto.org/english/res_e/publications_e/wtr21_e.htm (World Trade Report 2021 – Economic resilience and trade)

https://julkaisut.valtioneuvosto.fi/handle/10024/164627 (Ministry of the Interior's national risk assessment, 02/2023)

https://ek.fi/ajankohtaista/uutiset/ekn-kysely-yritykset-hajauttavat-harkiten-toimitusketjujaan-kriisin-paineessa/ (A survey by the Confederation of Finnish Industries, 11/2022)

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