Nordic Council of Ministers

THE VALUE CHAINS OF THE NORDICS

Tracking Resilience and Vulnerabilities

Contents

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Abstract

The global economy is rapidly moving into a geo-economic era defined by increasing geopolitical tensions and rising protectionism, directly challenging the fundamental open economic model of the Nordic countries. Analysis confirms a substantial reliance on imported intermediate goods and raw materials, with supply chains deeply anchored within Europe, supplemented by robust intra-Nordic trade. However, this reliance introduces vulnerabilities, defined by high sourcing concentration, extra-European origin, and limited domestic substitution capacity. Significant disparities exist, with Norway and Denmark showing the highest exposure to vulnerable inputs, while Sweden and Iceland demonstrate greater resilience. Crucially, the sources of the most vulnerable inputs dominated by the US for Denmark and Sweden, and China for Finland and Iceland. Strategic critical raw materials, essential for green and digital transitions, also exhibit pronounced concentration patterns, often relying heavily on non-European partners. While exports remain foundational, the threat of rising trade barriers poses an immediate risk to export destinations across the Atlantic and beyond. Large firms are the central actors in each Nordic country, both importing the majority of intermediate goods, but also vulnerable goods, and driving the bulk of exports.

Key Words: Value chains, Resilience, Nordic, Imports, Vulnerability

JEL codes: F15 Economic Integration

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Executive Summary

The global economic landscape is rapidly transforming, shifting away from deep globalization towards an environment heavily influenced by geopolitical and geo-economic factors. This new era is characterized by escalating geopolitical tensions and a rising apprehension regarding the dense economic dependencies forged through international trade and value chains.

Geo-economics – the use of economic instruments like tariffs, subsidies, and restrictions to achieve foreign policy goals – is becoming pervasive, often subtly integrated into regular economic activities. This proliferation of trade barriers and national industrial state support by large countries poses a significant challenge to the small, open Nordic countries. For these nations, international trade is exceptionally vital for overcoming limited domestic market size, enabling specialization, and achieving essential economies of scale. Therefore, assessing the state of Nordic value chains is critical.

Nordic reliance on intermediate goods

Nordic economies exhibit a fundamental and necessary reliance on the imports of intermediate goods, such as raw materials and components, which is economically effective given that small countries cannot produce all required inputs domestically. These imports account for a substantial portion of the region's total goods imports. Finland shows the highest dependency on these intermediate goods, while Denmark and Iceland record the lowest regional reliance.

The supply structure of these inputs is overwhelmingly Europe-centric, built on deep regional integration. Major global powers such as the US and China, however, play a role in supplying necessary intermediate inputs.

Imports are often concentrated in specific products that reflect national industrial needs; for example, energy-related products like crude petroleum oils are dominant imports for Denmark, Finland, and Sweden. The high reliance on established European supply corridors demands continuous scrutiny to assure their stability and resilience. The choice of sourcing regions and countries rests ultimately with individual companies.

Assessing vulnerabilities in imports

To pinpoint specific supply chain risks, a precise methodology was used, classifying imports as vulnerable only if they simultaneously meet three challenging criteria: high sourcing concentration, significant dependence on non-European supply, and low potential for domestic substitution.

Our vulnerability analysis reveals significant disparities across the Nordic region. Norway and Denmark face the highest exposure, while Sweden and Iceland demonstrate remarkably low vulnerability shares, suggesting more resilient sourcing patterns. A key finding across the region is that the most critical supply chain risks – the vulnerable inputs – overwhelmingly originate from outside Europe, signaling that the risks are inherently geopolitical.

The specific origin of these vulnerabilities varies by country. The US is the overwhelmingly dominant source of vulnerable goods for Denmark and Sweden, indicating critical reliance on US supply chains for sensitive inputs. Conversely, China is the primary source of vulnerable goods for Finland and Iceland. Norway exhibits the most globally dispersed risk profile, relying heavily on the rest of the world and other BRIC regions for its vulnerable inputs.

Vulnerability is highly concentrated in a small selection of products; for instance, petroleum products constitute a major majority of Denmark's vulnerable imports, while lithium-ion accumulators are the largest share for Finland.

Strategic importance of critical raw materials

Critical raw materials (CRMs) are strategically vital for sectors driving the green and digital transitions, as well as for defense. Finland and Norway show the greatest reliance on CRMs relative to their total intermediate imports.

CRM sourcing reveals specific concentration patterns: Iceland sources most of its CRMs from China, while Norway relies overwhelmingly on the Rest of the World. For Denmark, Norway, and Sweden, strong European supply chains secure the majority of their CRMs.

Our analysis is limited to the direct importation of unprocessed CRMs. This means we do not factor in critical raw materials when they are imported as part of more complex components, refined parts, or other intermediate products.

Destinations of goods' exports

Exports are fundamental for Nordic economic growth and specialization, but this open model is increasingly threatened by rising geo-economics and protectionism, including significant tariff increases originating in the United States. Europe remains the main destination for the majority of Nordic goods exports. However, Denmark is exceptional, directing a substantial portion of its exports to extra-European regions. The importance of the US market varies considerably, being most crucial for Iceland and least significant for Norway.

Large companies (with at least 250 employees) are the dominant importers of intermediate goods and the primary drivers of goods exports across the region, particularly in Sweden and Finland. Conversely, smaller companies contribute proportionally much more to the total exports of Iceland and Norway than they do in Finland and Sweden.

Policy considerations and implications

The findings have several implications for policymakers and businesses in the Nordic region.

First, the reliance on external, extra-Nordic imports is a shared aspect that call for a coordinated response. Since the average intra-Nordic trade of intermediate goods is 21%, the possibility and appropriateness of increasing this share to improve the resilience of the Nordic industries should be discussed. Are there already national measures in place to improve the conditions for promoting Nordic trade of intermediate goods which could be copied and implemented at the Nordic level? And are such measures aligned with EU regulation?

Second, in contrast to the import pattern of intermediate goods, we can identify huge differences in the import pattern of vulnerable goods across the Nordic countries. The identified differences in sourcing regions of vulnerable goods – the US for Denmark and Sweden versus China for Finland and Iceland – mean that a one-size-fits-all strategy for mitigating risk is not feasible. Policymakers in these countries must tailor their resilience strategies in relation to their specific dependencies.

The Swedish economy seems more resilient and less vulnerable than the other Nordics as only 2% of Swedish import of intermediate goods can be characterized as vulnerable – compared to 15% of the Norwegian import. What are the reasons for these differences and are there possible lessons to be learned?

Third, as the current critical geopolitical situation probably will continue and could even worsen, there is a need for continuous and systematic monitoring of the complexity of global value chains and their impact in Nordic economies.

Development of monitoring methods and tools in Nordic countries/common Nordic level are needed in order to assess the development of vulnerabilities and secure economic and security-related stability.

Fourth, the Top 5 vulnerable products are different across countries, suggesting that no common pattern was found. The high concentration of vulnerable products in a few key categories presents both a challenge and an opportunity. The challenge is that a disruption to just one or two of these product lines could have a cascading effect on the entire economy. The opportunity, however, is that a targeted approach can be highly effective.

Fifth, other Nordic countries are quite important export destinations for each Nordic country. Policymakers could actively seek to deepen intra-Nordic trade relations.

A more integrated Nordic market could act as a buffer against external shocks and leverage the collective economic strength of the region. In addition to Nordic region, for small countries it is important to find also bigger markets from larger economies. Furthermore, more diversified exports and export markets can also improve export resilience. Could such diversification be supported not only by national marketing initiatives but also for joint Nordic initiatives?

Finally, it is companies that engage in international trade, not countries. This fact makes it difficult to devise policy measures that could resolve problems concerning import or export vulnerabilities. Despite this challenge, we believe it is important to identify in advance bottlenecks that could cause major issues in this era of greater geopolitical tensions than we have seen in decades.

1. Introduction

1.1 Background

The global economy is transitioning into a new phase that impacts both governments and businesses. There are several indications that the global economy is shifting from a period of globalization to a new era marked by geopolitical and geo-economic factors. This new phase is defined by increased geopolitical tensions and a growing wariness of the dependencies formed through international trade, value chains, and investments. The discussion around national resilience and vulnerability has increased since the Covid-19 crisis that disrupted the operations of global value chains. Then Russia invaded Ukraine in early 2022 and later the Nord Stream gas pipelines were blown up. As a result, many countries became concerned about the critical dependencies they had.

Countries can leverage economic tools to pursue foreign policy objectives, engaging in geo-economics. This includes a variety of instruments such as tariffs, foreign trade restrictions, export subsidies, and market access conditions. It also encompasses strategic ownership, dependency creation, and industrial policy. Generally, the application of geo-economic power is subtle and sometimes ambiguous, making it challenging to distinguish from regular economic activities. Even when geo-economic power is identified, those employing these methods often do not acknowledge it. Sanctions and asset freezes, however, are exceptions, typically used in wars or other overt conflict situations.

Early signs of the shift in course appeared after the financial crisis. The change began to be reflected in international trade and the trade restrictions implemented, and also extended to foreign direct investment and restrictions on foreign ownership.

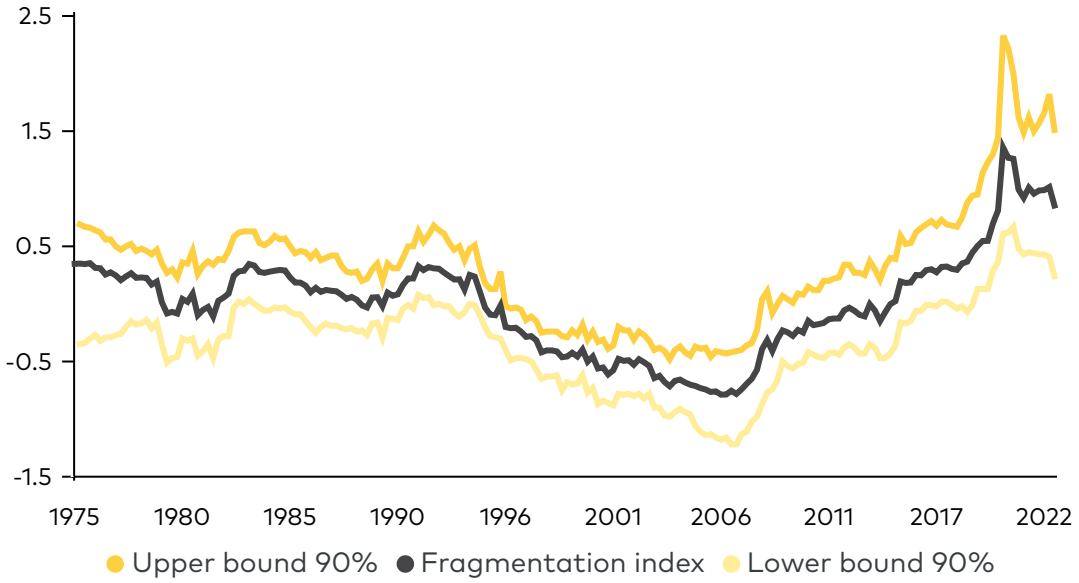

Figure 1.1 The change in the world economy

Note: The estimated fragmentation index (y-axis) is based on 14 indicators of geopolitical fragmentation, shown alongside 90% credible intervals. An increasing index signifies fragmentation, while a decreasing index indicates global economic integration. Source: Fernandéz-Villaverde, Mineyama and Song (2024).

In the light of geopolitical tensions, increasing trade barriers and national industrial state subvention, the conditions for the current openness of the Nordic economies are threatened. Due to limited domestic resources and market size, the importance of international trade is more important for small countries than large countries. This also means that small countries are typically more specialized than large countries as they benefit more on international trade (see e.g., Soo, 2011). The period of economic integration witnessed a geographical fragmentation of production processes and international trade (Hummels et. al., 2001; Timmer et. al., 2019).

During the past decades, the general discussion on international trade has strongly focused on exports and left out imports. The role of exports has been seen as a source of growth and necessity particularly for Nordic countries and other small open economies.

However, imports are often as important as exports because small countries are not able make everything by themselves. Imports include not only final goods but also raw materials, components and other intermediate goods that companies source to use in their production.

Disruptions in international trade and intensified geopolitical tensions have raised the call for better resilience of global value chains. As a part of better resilience, initiatives have been made to diminish dependencies (White House, 2021; CRMA, 2024; Alcidi, C. ja Kiss-Gálfalvi, 2023).

1.2 Goals and research questions

The shift from the era of globalization to the era of geo-economics with increased geopolitical tensions has been rapid. Consequently, there is now a pressing demand for a deeper understanding of these intricate dependencies. A comprehensive analysis of the current state of Nordic value chains is essential to identifying vulnerabilities, mitigating risks, and ultimately bolstering the Nordic region's economic security and stability in an increasingly volatile world.

This goal of this project is to respond these needs and provide new and innovative insights to inform strategic decision-making and foster a more robust and resilient economic future for the Nordic countries. Our purpose is to answer the following questions:

- What kind of dependencies do the Nordic countries have on different countries and regions?
- To what extent do Nordic countries rely on global value chains?
- What kind of differences and similarities exist in Nordic countries' dependencies?
- What kind of vulnerabilities are associated with imports?
- Based on the findings of this study, what policy recommendations can be proposed?

This report is structured as follows. Chapter 2 focuses on Nordic imports of raw materials, components, and other intermediate goods, providing an analysis of the most important imported intermediate goods in each Nordic country. Chapter 3 delves deeper into these imports by considering the vulnerability of the imported goods. Chapter 4 concentrates on unprocessed critical raw materials and their sources of import. Shifting the perspective from imports to exports, Chapter 5 considers the destinations of exports. Finally, Chapter 6 presents the conclusions and associated policy considerations.

2. Nordic imports of intermediate goods

Nordic economies rely substantially on the importation of intermediate goods, a necessity given that small countries cannot domestically produce all required inputs. On average, these inputs account for a significant portion of the region's total goods imports. Finland exhibits the highest dependency on these imports, whereas Denmark and Iceland show the lowest regional reliance. European partners, both the immediate Nordic neighbors and the wider European continent, are the primary suppliers for all five countries, highlighting deep regional integration in value chains.

Trade within the Nordic region is the second most important source of inputs. Major global powers like the US and China play a smaller, supporting role in supplying intermediate goods. Energy-related products like crude oil are dominant imports for Denmark, Finland, and Sweden. Notably, Norway, being a significant energy producer itself, imports considerably fewer energy-related intermediate goods compared to its neighbors.

2.1 Intermediate goods' imports in Nordics

Nordic companies utilize a significant volume of imported materials, components, and other inputs in their manufacturing processes. These materials and semi-finished products –defined as intermediate goods – serve as inputs for the production of further goods or services. This report focuses exclusively on these intermediate goods, excluding final goods that have completed the production cycle and are ready for consumption or investment. To identify intermediate goods, we utilize BEC (Broad Economic Categories) classification.[1]

In the Nordic countries, intermediate goods account for, on average, 47% of the total goods' imports. The share of intermediate goods is highest in Finland (57%) and the lowest in Denmark and Iceland (42%).

1. The products with the following BEC codes are defined to be intermediate goods: 111, 121, 21, 22, 31, 322, 42 and 53.

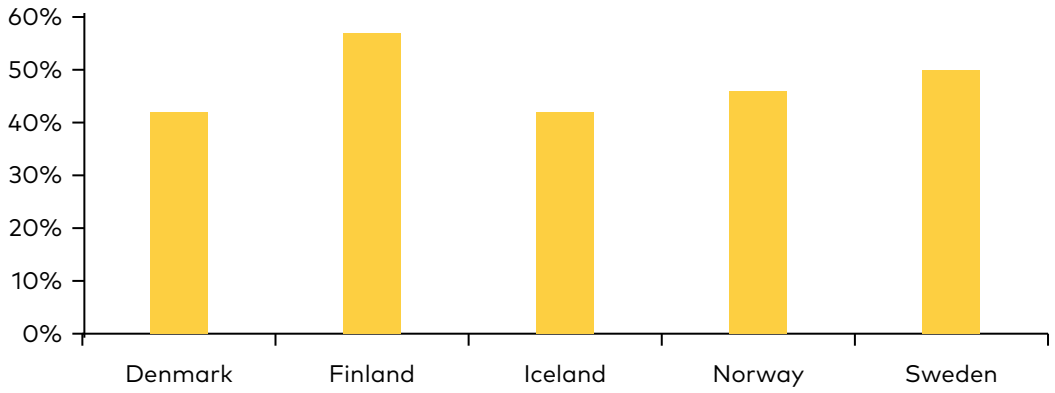

Figure 2.1 Share of intermediate products in total imports of goods, % (2024)

Imports themselves are not inherently a cause for concern, quite the opposite, in fact. It is practically impossible for small Nordic countries – or in fact any country – to produce all necessary intermediate products domestically.

Thus, it is natural and economically efficient to import intermediate goods from elsewhere. In the current era of heightened geopolitical tensions, however, the critical question is less about the necessity of imports and more about the specific source regions or countries from which those goods originate.

Next, we consider from which countries or regions the Nordic countries import intermediate goods.

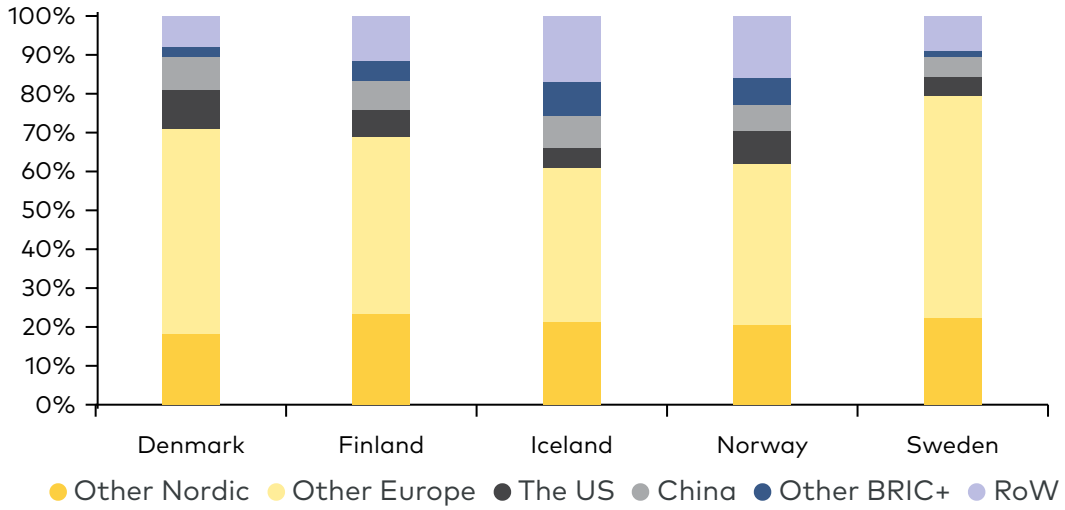

Figure 2.2 Nordic countries import of Intermediate goods by regions/countries, % (2024)

Note: Due to rounding errors, the numbers may not necessarily total 100%. Regions are defined in Appendix.

The analysis of intermediate goods imports by Nordic countries reveals a strong, primary reliance on European partners (excluding Nordic countries) and, secondarily, significant trade within the Nordic region itself. Imports from major non-European economies, while present, play a smaller role in supplying the necessary intermediate inputs (Figure 2.2).

Trade within the Nordic region serves as the second most important source for all five Nordic countries, underscoring the importance of regional supply chains. However, almost four-fifths of imported intermediate products originate from outside the Nordic countries, leaving the Nordic share at an average of 21%. In Finland, the Nordic share is the highest at 23.4%, while in Denmark it is the lowest at 18.4%. In this respect, the differences between the Nordic countries appear to be rather small.

The role of China and the US as sourcing countries varies between Nordics. Nordic countries import, on average, 7.1% of intermediate goods from the US, peaking in Denmark at 10.1% and Norway at 8.6%. For Iceland and Sweden, the share drops to a low of 4.9%. China's share is also moderate and relatively consistent, ranging from 8.4% for Denmark to a low of 5.0% for Sweden.

Next, we present more detailed figures for each Nordic country regarding the imports.

2.2 Country-Level analysis regarding imports of intermediate goods

2.2.1 Denmark

The role of intermediate goods in total imports

In 2024, the Danish import of intermediate goods amounted to EUR 41.5 billion accounting for 42% of the total import of goods. During the past few years, the share has slightly decreased.

Table 2.2.1 Denmark's total imports and imports of intermediate goods

Year	The total imports of goods, billion euros	Imports of intermediate goods, billion euros	Share of intermediate goods, %
2022	114.2	53.8	47.2%
2023	99.8	43.1	43.2%
2024	99.4	41.5	41.2%

Sourcing regions

Of Denmark's imports of intermediate goods, which amounted to EUR 41.5 billion in 2024, 18.4% were imported from other Nordic countries and a further 52.5% from other European countries. Thus, as much as 70.9% of all intermediate goods were imported from Europe. (Figure 2.2.1).

BRICS+ stood for 11.2% of which China represented the majority (8.1 percentage points). 10.1% of the imported intermediate goods came from the US. The remaining part (7.8%) was imported the rest of the world.

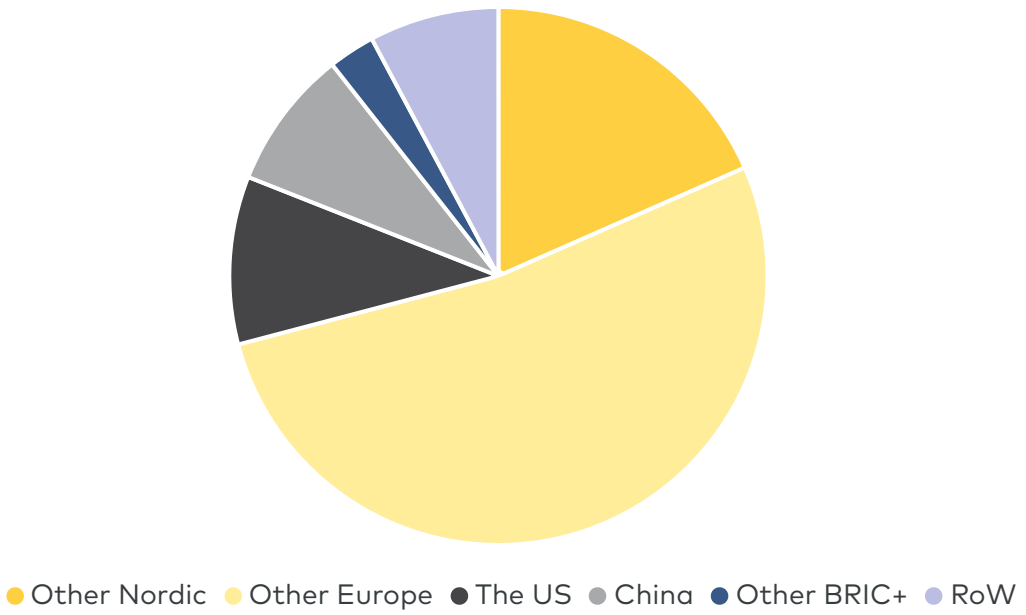

Figure 2.2.1 Geographic distribution of Denmark's intermediate goods' imports (2024)

Of the total Nordic import of intermediate goods EUR 7.6 billion, the majority came from Sweden (48.2%) and Norway (41.9%), while Finland and Iceland represented 9.5% and 0.5%, respectively.

Top 10 imported intermediate goods

We proceed by analyzing in terms of the value the most important intermediate goods that Denmark imports (Table 2.2.2). In Denmark, the Top 10 imported intermediate goods amounted to EUR 8.3 billion in 2024, corresponding to 19.9% of total imports of intermediate goods in 2024.

Table 2.2.2 Top 10 imported intermediate goods. Denmark (2024)

Product code (HS)	Product category	Import value, EUR million	Share of total intermediate goods' imports
270900	Petroleum oils and oils obtained from bituminous minerals, crude	2,625	6.3%
2716	Electrical energy	1,216	2.9%
300215	Immunological products	747	1.8%
293719	Polypeptide hormones, protein hormones and glycoprotein hormones	616	1.5%
760120	Unwrought aluminium alloys	581	1.4%
2304	Oilcake and other solid residues, from the extraction of soya-bean oil	539	1.3%
440131	Wood pellets	509	1.2%
732690	Articles of iron or steel, n.e.s.	490	1.2%
270799	Oils and other products of the distillation of high temperature coal tars	486	1.2%
848180	Appliances for pipes, boiler shells, tanks, vats or the like	472	1.1%
Total		8,281	19.9%

Note: Top 10 intermediate goods based on the value of imports, 2024.

We also analyzed from which regions these Top 10 goods were imported. In turned out that the other Nordic countries accounted for 26.3% and the other European countries for 28.7% of the Top 10 imported intermediate goods. The import from US accounted for 32.7%, China 2.6% and the other BRICS+ 3.0% and RoW 6.8%.

2.2.2 Finland

The role of intermediate goods in total imports

In 2024, the total Finnish import of intermediate goods amounted to EUR 40.1 billion accounting for 56.9% of the total import of goods.

Table 2.2.3 Finland's total imports and imports of intermediate goods

Year	The total imports of goods, billion euros	Imports of intermediate goods, billion euros	Share of intermediate goods, %
2022	89.3	55.8	62.5%
2023	73.0	41.7	57.1%
2024	70.5	40.1	56.9%

Sourcing regions

Finland's imports of intermediate goods are dominated by Europe, establishing a clear regional focus in its value chains. The largest single source is Other European countries, accounting for 45.5% of the total imports. This is closely followed by the Other Nordic countries at 23.4%, highlighting the significance of intra-regional trade. Combined, the European regions supply nearly seven out of every ten imported intermediate inputs (Figure 2.2.2).

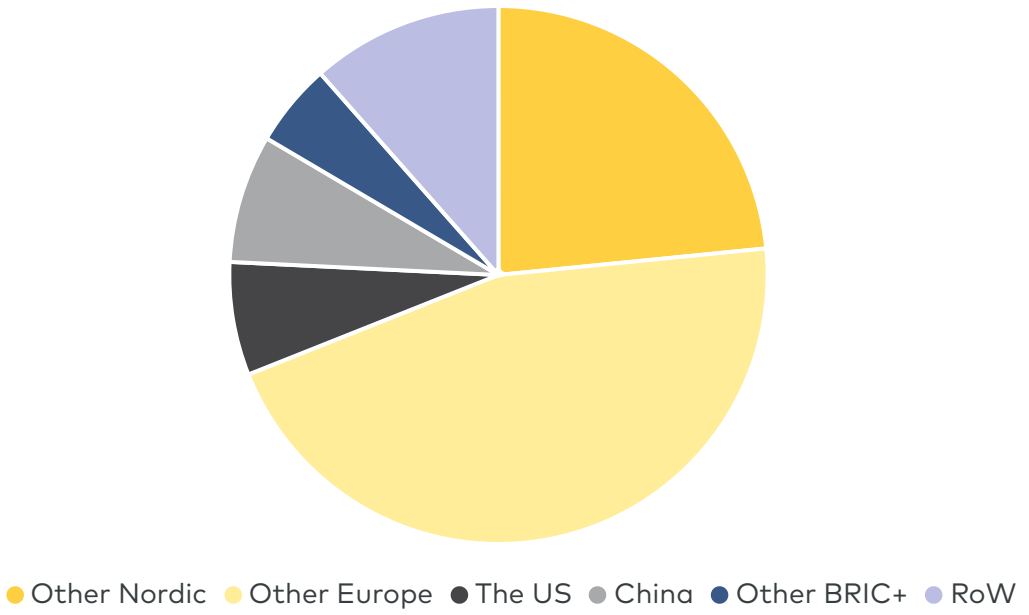

Figure 2.2.2 Geographic distribution of Finland's intermediate goods imports (2024)

Outside of Europe, the Rest of the World (RoW) makes up the most significant portion at 11.5%. Global powers like China (7.7%) and the US (6.8%) contribute a relatively modest and similar share. Finally, the Other BRIC+ countries represent the smallest category, providing only 5.0% of Finland's intermediate goods. Overall, the analysis underscores Finland's high reliance on its immediate European neighborhood for value chain inputs (Figure 2.2.2).

Finnish companies imported intermediate goods valued at 9.4 billion EUR from other Nordic countries in 2024. More than half (52.9%) that import came from Norway and close to 40% from Sweden, while Denmark and Iceland represented smaller shares (7.4% and 0.1%, respectively).

Top 10 imported intermediate goods

We proceed by analyzing in terms of the value the most important intermediate goods that Finland imports (Table 2.4). In Finland, the Top 10 imported intermediate goods amounted to EUR 12 billion in 2024. These 10 most imported intermediate goods accounted close to 30% of the total imports of intermediate goods in 2024.

Table 2.2.4 Top 10 imported intermediate goods. Finland (2024)

Product code (HS)	Product category	Import value, EUR million	Share of total intermediate goods' imports
270900	Petroleum oils and oils obtained from bituminous minerals, crude	5,035	12.6%
720421	Waste and scrap of stainless steel (excl. radioactive, and batteries' waste etc.)	1,221	3.0%
850760	Lithium-ion accumulators (excl. spent)	1,167	2.9%
2603	Copper ores and concentrates	984	2.5%
271111	Natural gas, liquefied	826	2.1%
750110	Nickel mattes	636	1.6%
841112	Turbojets of a thrust > 25 kN	582	1.5%
2608	Zinc ores and concentrates	566	1.4%
730890	Structures and parts of structures, of iron or steel, n.e.s. (excl. bridges etc.)	493	1.2%
7402	Copper, unrefined; copper anodes for electrolytic refining	461	1.1%
Total		11,970	29.8%

Note: Top 10 intermediate goods based on the value of imports, 2024.

2.2.3 Iceland

The role of intermediate goods in total imports

Iceland's total imports remained relatively stable between 2022 and 2024, slightly decreasing from EUR 9.2 billion in 2022 to 8.7 in 2023, before rebounding to 9.1 in 2024 (Table 2.2.5).

Table 2.2.5 Iceland's total imports and imports of intermediate goods

Year	The total imports of goods, billion euros	Imports of intermediate goods, billion euros	Share of intermediate goods, %
2022	9.2	3.8	41.2%
2023	8.7	3.6	41.0%
2024	9.1	3.8	42.1%

Correspondingly, imports of intermediate goods followed a similar trend, dropping from 3.8 to 3.6 before returning to 3.8 by 2024. Consequently, the share of intermediate goods as a percentage of total imports remained consistently high, hovering around 41% to 42% throughout the period, indicating that intermediate goods constitute a substantial and steady portion of Iceland's total import basket.

Sourcing regions

Iceland's intermediate goods imports show a clear European and regional focus, but with a notable diversity in its non-European sourcing (Figure 2.2.3).

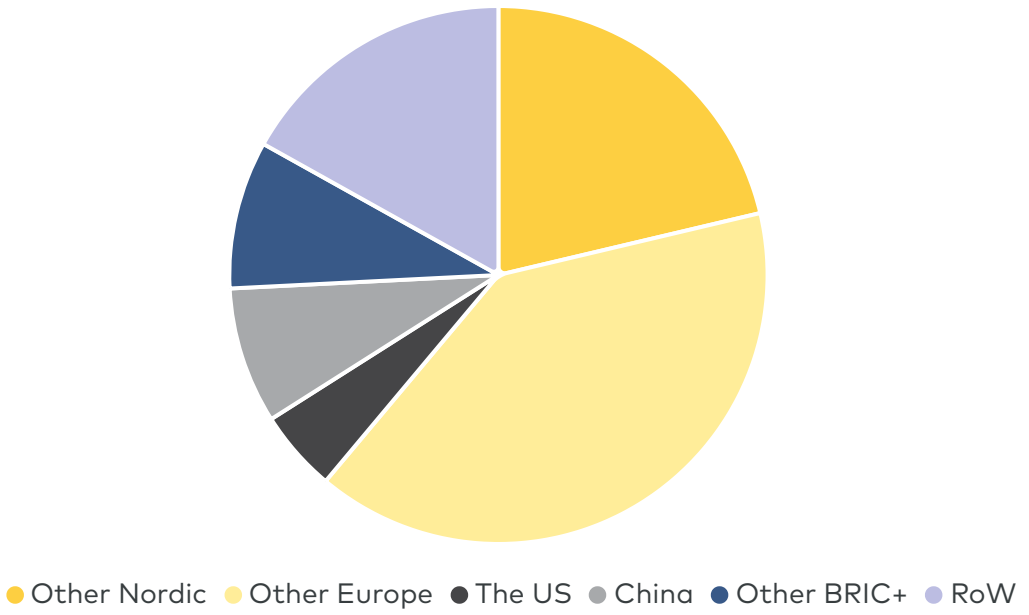

Figure 2.2.3 Geographic distribution of Iceland's intermediate goods imports (2024)

The primary source for these goods is Other European countries, which account for 39.8% of the total imports. The other Nordic countries follow as the second largest source, supplying a substantial 21.3%, underscoring the importance of regional trade partnerships (Figure 2.2.3).

When looking outside of Europe, the Rest of the World (RoW) represents a significant import source at 16.9%, indicating varied global supply chains. This is followed by the Other BRIC+ category, which provides 8.9% of the imports, making it a more important partner for Iceland than it is for other Nordic nations. China is the fifth largest source at 8.2%. In contrast, imports from the US are the smallest share among all listed categories, contributing only 4.9% of the intermediate goods.

Overall, Iceland's supply structure is heavily European-oriented, yet it demonstrates a comparatively higher reliance on diverse Rest of World and developing economies than its Nordic peers.

In 2024, EUR 0.8 billion of intermediate goods were sourced by Icelandic companies from other Nordic countries. More than half (50.3%) of these imports came from Norway, a quarter (24.9%) from Denmark and close to one fifth (18.7%) from Sweden. Finland is less important in this respect, as only 6.1% of intermediate goods imports came from Finland.

Top 10 imported intermediate goods

In Iceland, the Top 10 imported intermediate goods amounted to EUR 1.5 billion in 2024. These 10 most imported intermediate goods accounted for slightly more than 40% of the total imports of intermediate goods in 2024.

Table 2.2.6 Top 10 imported intermediate goods. Iceland (2024)

Product code (HS)	Product category	Import value, EUR million	Share of total intermediate goods' imports
281820	Aluminium oxide (excl. artificial corundum)	675	17.6%
854511	Electrodes of graphite or other carbon, for electric furnaces	217	5.7%
230990	Preparations of a kind used in animal feeding (excl. dog or cat food put up for retail sale)	166	4.3%
854519	Electrodes of graphite or other carbon, for electrical purposes (excl. for furnaces)	163	4.2%
150420	Fats and oils of fish and their fractions (excl. liver oils and chemically modified)	68	1.8%
730890	Structures and parts of structures, of iron or steel, n.e.s. (excl. bridges etc.)	66	1.7%
841112	Turbojets of a thrust > 25 kN	61	1.6%
880730	Parts of aeroplanes, helicopters or unmanned aircraft, n.e.s. (excl. those for gliders)	45	1.2%
382600	Biodiesel and mixtures thereof	39	1.0%
051191	Products of fish or crustaceans, molluscs or other aquatic invertebrates; dead fish etc.	38	1.0%
Total		1,537	40.1%

Note: Top 10 intermediate goods based on the value of imports, 2024.

In Iceland, energy-related intermediate goods belonging to the top 10 group account for 1 per cent of Iceland's total intermediate goods imports. The reason being mainly that in Icelandic economy at least 66% of all consumed energy comes from renewable natural resources and secondly, the energy-related products imported are imported as final goods.

2.2.4 Norway

The role of intermediate goods in total imports

Norway's total imports experienced a significant drop from EUR 102.1 billion in 2022 to 92.1 in 2023, followed by a slight recovery to 93.6 in 2024. These swings can largely be attributed to fluctuations in the NOK-EUR exchange rate. Actually, in NOK, the total value of imports was higher in 2024 than in 2022.The value of intermediate goods imports followed a similar trajectory, decreasing from EUR 48.1 billion to 42.0 before stabilizing at 42.1 by 2024 (Table 2.2.7).

Table 2.2.7 Norway's total imports and imports of intermediate goods

Year	The total imports of goods, billion euros	Imports of intermediate goods, billion euros	Share of intermediate goods, %
2022	102.1	48.1	47.1%
2023	92.1	42.0	45.6%
2024	93.6	42.1	45.0%

Despite these fluctuations in absolute value, the share of intermediate goods as a proportion of total imports remained remarkably steady, around 46–47% throughout the three-year period, indicating that these goods consistently form almost half of Norway's entire import basket.

Sourcing regions

Norway's sourcing of intermediate goods is heavily concentrated in Europe, although it shows significant reliance on diverse global partners as well (Figure 2.2.4). The largest source is Other European countries, which supply 41.3% of the total intermediate imports. The Other Nordic countries follow as the second-most important source, contributing approximately 20%, emphasizing the strong regional supply links.

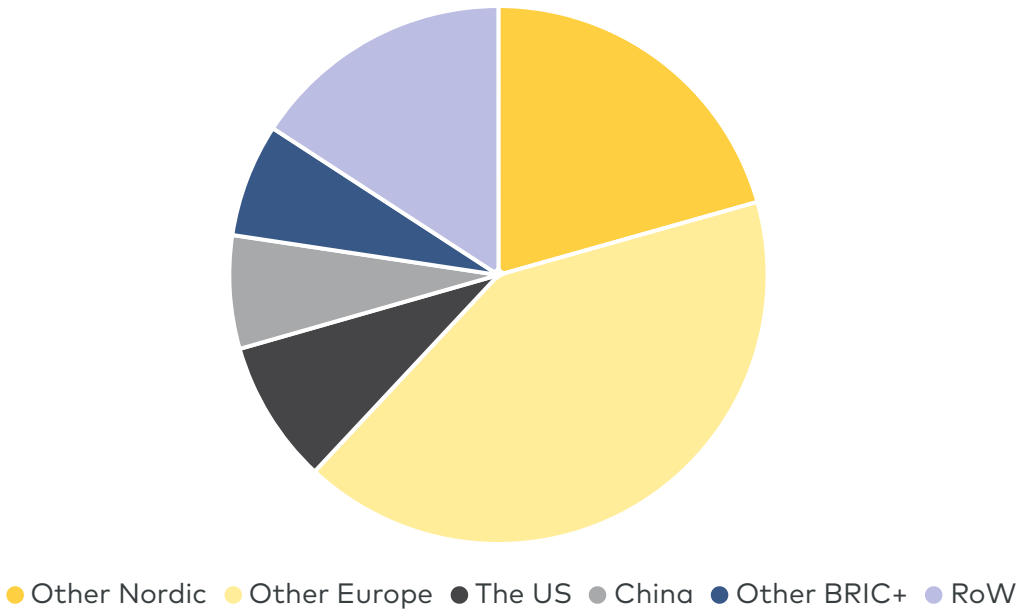

Figure 2.2.4 Geographic distribution of Norway's intermediate goods imports (2024)

Together, the European regions account for nearly two-thirds (61.9%) of Norway's total intermediate goods imports. The Rest of the World (RoW) represents the third largest single category at 15.8%, indicating a substantial set of diverse global supply chains outside the main blocs.

Among the major global economies, The US is the largest source at 8.6%. Both China and the Other BRIC+ countries contribute an equal share of 6.8% each. This distribution highlights a supply profile that is European-centric while maintaining strong, varied connections to the broader global market.

In 2024, Norway imported intermediate goods from other Nordic countries worth 8.7 billion euros. Clearly more than half (56.9%) of these imports came from Sweden. Denmark is the second most important with 21.8%, while the roles of Finland (16.7%) and Iceland (3.5%) are smaller.

Top 10 imported intermediate goods

In Norway, the 10 most important products account for almost a fifth of Norway's total intermediate goods imports. In 2024, the total import value of these 10 most important products was €8.3 billion (Table 2.2.8).

Table 2.2.8 Top 10 imported intermediate goods. Norway (2024)

Product code (HS)	Product category	Import value, EUR million	Share of total intermediate goods' imports
750110	Nickel mattes	1,853	4.4%
281820	Aluminium oxide (excl. artificial corundum)	1,120	2.7%
730890	Structures and parts of structures, of iron or steel, n.e.s. (excl. bridges etc.)	953	2.3%
150420	Fats and oils of fish and their fractions, whether or not refined (excl. liver oils etc.)	944	2.2%
230990	Preparations of a kind used in animal feeding (excl. dog or cat food put up for retail sale)	656	1.6%
270900	Petroleum oils and oils obtained from bituminous minerals, crude	666	1.6%
732690	Articles of iron or steel, n.e.s. (excl. cast articles or articles of iron or steel wire)	561	1.3%
848180	Appliances for pipes, boiler shells, tanks, vats or the like (excl. pressure-reducing valves etc.)	538	1.3%
843143	Parts for boring or sinking machinery of subheading 8430.41 or 8430.49, n.e.s.	528	1.3%
760110	Aluminium, not alloyed, unwrought	453	1.1%
Total		8,275	19.7%

Note: Top 10 intermediate goods based on the value of imports, 2024.

Since Norway is itself a significant producer of energy products, it does not need to import these products as much. In contrast, in Finland and Sweden, energy-related imports are considerably greater than in Norway.

2.2.5 Sweden

The role of intermediate goods in total imports

Sweden's total imports dropped from EUR 181.5 billion in 2022 to EUR 167.9 billion in 2023. Sweden's imports dropped further in 2024 to EUR 164.5 billion (table 2.2.9). The drop was mainly caused by a decline of the exchange rate of the Swedish currency.

Table 2.2.9 Sweden's total imports and imports of intermediate goods

Year	The total imports of goods, billion euros	Imports of intermediate goods, billion euros	Share of intermediate goods, %
2022	181.5	91.8	50.6%
2023	167.9	81.9	48.7%
2024	164.5	80.6	50.1%

The share of intermediate goods imports out of total imports remained largely unchanged during the period. In 2022 intermediate goods made up 50.6% of total imports and in 2024 the share stood at 50.1% after having fallen to 48.7% in 2023.

Sourcing regions

Sweden's sourcing of intermediate goods is characterized by an exceptionally high concentration in Europe, with a smaller reliance on major global partners (Figure 2.2.5).

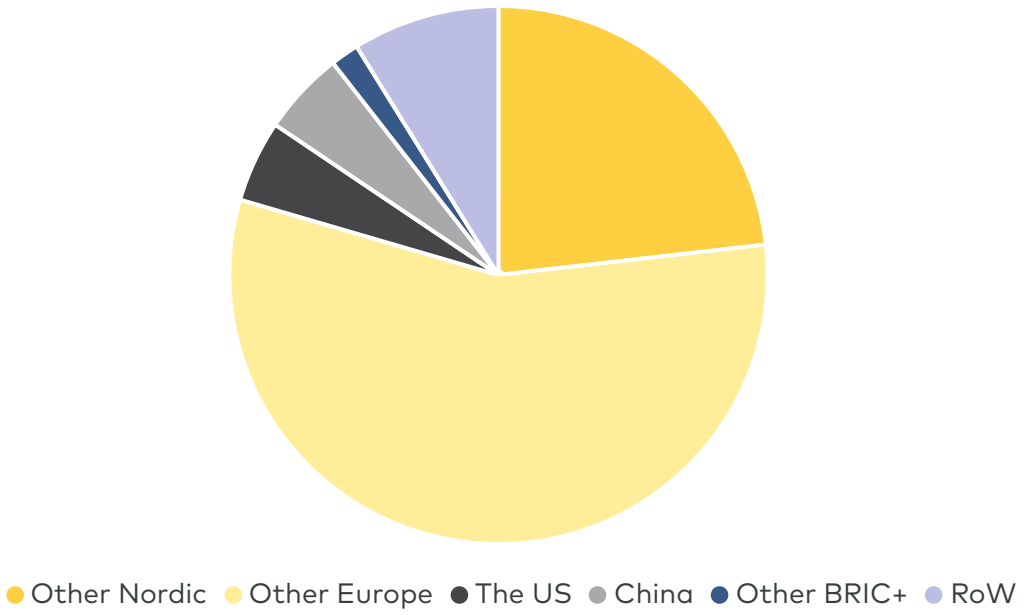

Figure 2.2.5 Geographic distribution of Sweden's intermediate goods imports (2024)

The Other European countries are the overwhelmingly dominant source, supplying 56.1% of all imported intermediate goods – the highest share among the Nordic nations. The Other Nordic countries follow as the second most important source, contributing a significant 23.1% of the imports. Together, Europe account for nearly four-fifths (79.2%) of Sweden's total intermediate goods imports, demonstrating deep regional integration.

The Rest of the World (RoW) makes up the next largest share at 8.8%. Imports from the major global economies are notably small: China contributes only 4.9%, while the US supplies a marginally smaller share of 5.3%. Finally, the Other BRIC+ category is the smallest of all sources, representing a mere 1.7% of the total. This import profile confirms that Sweden's manufacturing and supply chains are heavily dependent on immediate European neighbors.

Swedish companies imported intermediate goods valued at EUR 18.6 billion from other Nordic countries in 2024. In this respect, Norway was the most important country, accounting for 52.4% of these imports. Finland also played an important role with a share of 27.0%. Denmark's share was 20.5% and Iceland's 0.2%.

Top 10 imported intermediate goods

In Sweden, the 10 most important products account for more than quarter of Sweden's total intermediate goods imports. In 2024, the total import value of these 10 most important products was EUR 20.6 billion (Table 2.2.10).

Table 2.2.10 Top 10 imported intermediate goods. Sweden (2024)

Product code (HS)	Product category	Import value, EUR million	Share of total intermediate goods' imports
270900	Petroleum oils and oils obtained from bituminous minerals, crude	10,411	12.9%
870899	Parts and accessories, for tractors, motor vehicles for the transport of ten or more, etc.	1,819	2.3%
850760	Lithium-ion accumulators (excl. spent)	1,657	2.1%
300215	Immunological products, put up in measured doses or in forms or packings for retail sale	1,204	1.5%
284420	Uranium enriched in U 235 and its compounds: plutonium, etc.	1,094	1.4%
740311	Copper, refined, in the form of cathodes and sections of cathodes	1,037	1.3%
870829	Parts and accessories of *bodies* for tractors, motor vehicles for the transport of 10 or more	984	1.2%
840999	Parts suitable for use solely or principally with compression-ignition piston engine, etc.	849	1.1%
853710	Boards, cabinets and similar combinations of apparatus for electric control, etc.	778	1.0%
300212	Antisera and other blood fractions	757	0.9%
Total		20,589	25.6%

Note: Top 10 intermediate goods based on the value of imports, 2024.

Two of Sweden's 10 most important imported intermediate goods are energy related. Their share of Sweden's total intermediate goods imports is substantial (14.3%).

2.3 Intermediate goods and the importing firm landscape

The final analysis of this Chapter concerns the question of which types of companies import intermediate goods in each Nordic country.

The results show that within the Nordic region, large companies with more than 250 employees import, on average, 53.1% of intermediate goods (Table 2.3.1). The role of large companies is highest in Sweden and Finland, while lowest in Denmark and Norway.

Table 2.3.1 Imports of intermediate goods by company size, % (2023).

	Denmark	Finland	Iceland	Norway	Sweden	Average
0–9 employees	8.3%	6.3%	11.8%	13.5%	6.1%	9.2%
10–49 employees	21.5%	12.8%	17.7%	18.0%	11.5%	16.3%
50–249 employees	27.0%	18.5%	20.1%	25.2%	16.5%	21.5%
250+ employees	43.3%	62.4%	50.4%	43.3%	65.9%	53.1%
Sum	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Note: Shares of total intermediate goods imports in each Nordic country, broken down by the number of employees (full-time equivalent).

The variations are also evident when examining the role of the smallest companies. In both Finland and Sweden, firms with fewer than ten employees contribute only marginally – just over 6% – to total intermediate goods imports. Conversely, the contribution of these smallest firms is markedly higher in Norway and Iceland.

3. Vulnerability of Imports

This chapter defines import vulnerability based on three criteria met simultaneously: high concentration of sourcing, reliance on regions outside Europe, and low capacity for domestic substitution. The results reveal large disparities in the reliance on potentially vulnerable imports across the Nordic region. Norway and Denmark face the highest proportion of vulnerable imports, suggesting greater exposure to supply chain shocks. In sharp contrast, Iceland and Sweden show remarkably low shares of vulnerable intermediate goods.

The sourcing regions for these critical, vulnerable inputs differ significantly from general trade patterns, as they typically originate outside of Europe. The US is the leading source of vulnerable goods for Denmark and Sweden, while China holds this position for Finland and Iceland. Norway's risk exposure is the most globally dispersed, relying heavily on the Rest of the World and Other BRIC+ countries for these sensitive materials. Vulnerability is often highly concentrated in a small selection of products, such as petroleum products for Denmark or lithium-ion accumulators for Finland.

3.1 How to track vulnerabilities in imports?

In this chapter, our goal is to analyze foreign sourcing by Nordic countries that may become vulnerable in geopolitical or other crises. To reach this goal, we build on a data driven bottom-up approach and use the imports data of Nordic countries in high granularity.

To track the potentially vulnerable imported products, we rely on the methodology proposed originally by European Commission (2021) and further enhanced by Arjona et. al. (2023). Both these previous studies analyzed imports at the EU level and did not make distinction between final and intermediate goods. From the perspective of global value chains in a single country, Ali-Yrkkö et. al. (2025) enhanced the method by focusing only on a single country and distinguishing intermediate goods from final goods.

Our analysis is based on the trade of goods data on annual level from the Nordic NSIs. This data includes detailed information on bilateral trade flows of each Nordic country with virtually all countries in the world. As mentioned before, we concentrate on the upstream value chains by analyzing how the imports of intermediate goods have developed. To examine value chains, we use the data in HS6 digit level.[2]

2. Harmonized System (HS) codes are commonly used throughout the import and export process for the classification of goods.

Following the previously mentioned studies, we use three criteria to identify products whose imports may prove vulnerable in crisis situations. These criteria are the concentration of imports, the share of extra-Europe imports and import substitution by domestic production. The method is described in detail in Box 3.1.

Box. 3.1. Method to measure vulnerability

The first criterion is a low level of import diversification which describes the concentration of imports from few countries. To reduce the dependence on a single or a few countries, importers may seek to decentralize their supplier base. We utilize Herfindahl-Hirchman index to measure concentration of intermediate goods' imports. For each intermediate product (*p*) that Nordic country *c,* we calculate the index ($HHI\_M_{i,c}^{p}$) as follows (Equation 1):

1. $$HHI\_M_{i,c}^{p} = \sum_{i=1}^{n} (s_{i,c,p})$$

, where $s_{i,c,p}$ is the share of exporter country *i* of the product's *p* total imports to the Nordic importer country *c.*

The second indicator ($EXT\_EUR\_SHARE_{c}^{p}$) describes what share of product's *p* imports to country *c* is imported from outside of Europe. This indicator is calculated as follows (Equation 2):

2. $$EXT\_EUR\_SHARE_{c}^{p} = \frac{EXT\_EUR\_IMP_{c}^{p}}{IMP_{c}^{p}}$$

The third criterion ($SUBST_{c}^{p}$) indicates to what degree extra-Europe imports could be substituted by domestic production (Equation 3). To proxy the available domestic capacity for domestic use, we use exports.

3. $$SUBST_{c}^{p} = \frac{EXT\_EUR\_IMP_{c}^{p}}{EXP_{c}^{p}}$$

where $EXT\_EUR\_IMP_{c}^{p}$ is the imports of product *p* to Nordic country *c* which is imported outside Europe, and EXP_{c}^{p} is Nordic country *c*'s total exports of product *p.*

Each of the 5,200 traded goods (HS 6-digit level) was evaluated based on these criteria, and products that satisfied thresholds were selected. To define the vulnerable imports, we used the same limits as Arjona et. al. (2023) and Ali-Yrkkö et.al. (2025). It should be noted, however, that in our case criteria 2 and 3 were calculated by using Europe and not the EU, as in the studies by Arjona et. al. (2023) and Ali-Yrkkö et.al. (2025). Any product *p* is classified as vulnerable if the following thresholds are met:

Concentration: $HHI\_M_{i,c}^{p}$>0.4
Share of Extra-Europe imports: $EXT\_EUR\_SHARE_{c}^{p}$>50%
Substitution: $SUBST_{c}^{p}$≥1.

In other words, all three of these thresholds must be met for a product to be classified as vulnerable.

Note: To define Europe, we include all EU countries, EFTA countries (Iceland, Liechtenstein, Norway, and Switzerland) and the UK.

3.2 Vulnerability differences and similarities between Nordic countries

When we sum up the import values of vulnerable products, it turned out that a significant share of imports of intermediate goods can be seen as vulnerable. However, not all Nordic countries are similar for there are rather large differences between Nordics (Figure 3.1).

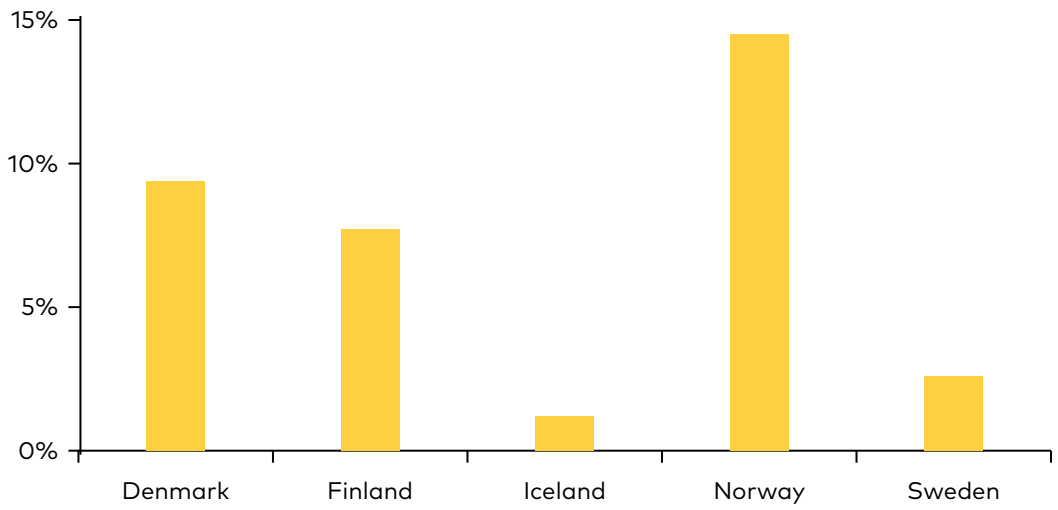

Figure 3.1 Share of vulnerable intermediate goods imports in Nordic countries, % (2024)

Note: Share of vulnerable intermediate goods' imports of the total intermediate goods' imports.

The vulnerability of intermediate goods imports in 2024 varies significantly across the Nordic countries, with Norway and Denmark showing the highest shares. Norway has the largest exposure, with 14.5% of its total intermediate goods imports being categorized as vulnerable, closely followed by Denmark at 9.4%. This suggests that a substantial portion of their imported supply inputs is potentially susceptible to external disruptions.

In contrast, Iceland and Sweden demonstrate remarkably low vulnerability shares, at 1.2% and 2.6% respectively, indicating much more resilient or diversified sourcing for their intermediate goods. Finland falls in the middle range with 7.7%. The wide disparity in these figures suggests varying degrees of value chain risk across the Nordic region.

To provide more detailed information on the vulnerabilities, we also present the fulfillment of vulnerability criteria separately (Table 3.1).

Table 3.1 Fulfilment of vulnerability criteria, % of imports value of intermediate products (2024)

	(a) Concentration criterion is met		(b) Extra-Europe criterion is met		(c) Substitution criterion is met		(d) All 3 criteria are met	
	%	Number of goods	%	Number of goods	%	Number of goods	%	Number of goods
Denmark	26.1%	1,664	28.7%	902	19.9%	654	9.4%	262
Finland	38.4%	1,484	22.0%	734	46.8%	1,122	7.7%	232
Iceland	35.5%	1,488	32.4%	584	38.2%	643	1.2%	44
Norway	28.7%	1,316	34.0%	698	55.8%	1,308	14.5%	170
Sweden	16.7%	1,447	8.7%	490	28.7%	684	2.6%	61
Average	**29.1%**		**25.2%**		**37.9%**		**7.3%**	

The breakdown of the vulnerability measure reveals rather high shares across its different criteria (Table 3.1). These individual shares are significantly higher than the final vulnerability measure, which requires all three criteria to be met in order to classify a product as vulnerable.

The imports of intermediate goods are rather concentrated in all Nordic countries except for Sweden. In Finland, for instance, as much as 38% of the total intermediate goods imports can be classified as concentrated (column a, Table 3.1).

Sweden also differs concerning the role of extra-European sources. More than 30% of Iceland's and Norway's intermediate imports originate from outside the European region, while in Sweden the corresponding share is remarkably lower (column b, Table 3.1). Regarding the substitution criterion, close to 56% of Norway's intermediate goods imports would be hard to replace with domestic production (column c, Table 3.1).

But where exactly are the Nordic countries sourcing these vulnerable products? This is the question we address next.

The analysis reveals that the primary sourcing regions for vulnerable intermediate goods imports differ sharply between Nordic countries (Figure 3.2).

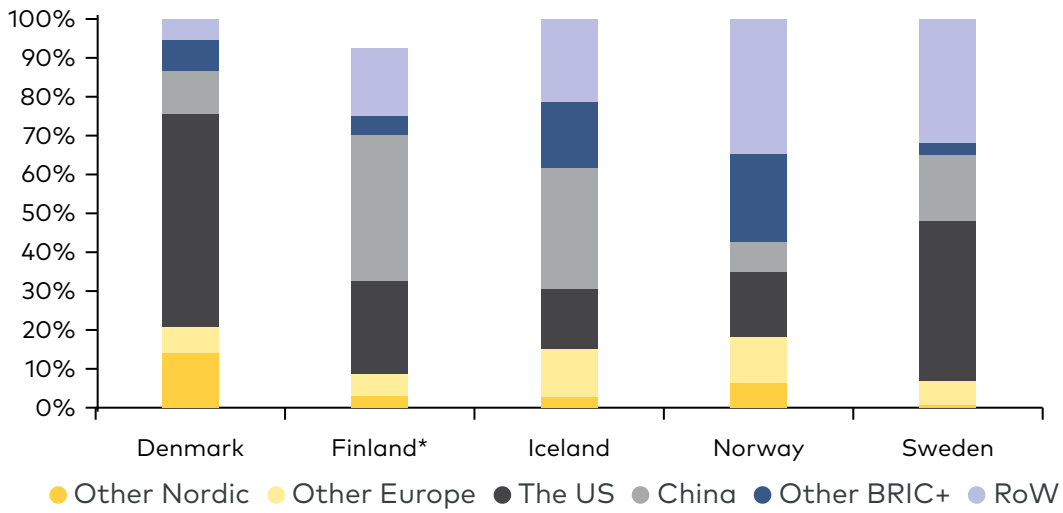

Figure 3.2 Import of vulnerable goods broken down by region/country, % (2024)

*Due to confidentiality the percentages do not add to 100%.

The US is the overwhelmingly dominant source of vulnerable goods for Denmark (55.0%) and Sweden (41.3%), indicating these countries' critical reliance on US supply chains for sensitive inputs. In contrast, China is the primary source of vulnerable goods for Finland (37.8%) and Iceland (31.3%), suggesting their specific vulnerability lies more with supply chain issues originating in China.

Norway exhibits the most diversified and least dependent profile on a single country, with the Rest of the World (RoW) being its largest source at 34.7%, followed by Other BRIC (22.7%), suggesting its vulnerable imports are highly dispersed globally.

Imports from Other Nordic and Other European countries contribute relatively small shares to the vulnerable goods basket across most countries, rarely exceeding 15%. This suggests that while Europe is the main source of *total* imports, the most *vulnerable* inputs are sourced from non-European global powers.

Sweden shows the most concentrated sourcing, with the US alone accounting for roughly half of its vulnerable goods. Conversely, Norway and Iceland rely heavily on the RoW and Other BRIC regions for their vulnerable inputs, signaling more complex global dependencies.

3.3 Vulnerabilities in the Nordics

Next, we delve deeper into vulnerabilities by examining them at the country and product level. We will find out which vulnerable import products are the most significant in terms of import value and where they are imported from.

3.3.1 Denmark

Of all 3,268 intermediate goods imported by Danish enterprises in 2024, 262 can be characterized as vulnerable goods. The import amounted to EUR 3.9 billion or 9.4% of total intermediate goods' imports to Denmark in 2024.

Of the import of vulnerable goods, the imports from non-European countries constituted EUR 3.1 billion or 79.4% of all imported vulnerable goods. The dominant export country of vulnerable goods to Denmark was the US (55,0%), followed by the other Nordic countries (14.1%), China (11.1%), BRICS+ (except China) (8.0%), other Europe (6.6%) and the Rest of World (5.2%).

Table 3.2 Top 5 vulnerable products imported by Denmark (2024)

Product	HS code	Imports, million EUR	Share of total imports of vulnerable products, %
Petroleum oils and oils obtained from bituminous minerals, crude	270900	2,625	67.3%
Semi-finished products of iron or non-alloy steel containing, by weight, < 0,25% of carbon	720712	358	9.2%
Cyclic amides, incl. cyclic carbamates, and their derivatives; etc.	292429	144	3.7%
Photovoltaic cells assembled in modules or made up into panels	854143	130	3.3%
Ball bearings	848210	91	2.3%
Total		**3,347**	**85.9%**

The Danish import of vulnerable goods is highly concentrated, as the Top 5 imported vulnerable goods constituted as much as 85.9% of total imported vulnerable goods. Petroleum products are by far Denmark's most significant vulnerable product group, as they account for over two-thirds of Denmark's total vulnerable intermediate goods imports.

Denmark imports one-fifth (20%) of its petroleum oils from other Nordic countries, but the vast majority originates from the US (Table 3.3). In contrast to the sourcing patterns of other Nordic countries, China is the most important sourcing region for three of Denmark's five most important vulnerable goods.

Furthermore, from the Danish perspective, other BRIC+ countries are a particularly important region for sourcing semi-finished products of iron or non-alloy steel.

Table 3.3 Imports of Denmark's Top 5 vulnerable goods by region, % (2024)

Product	Nordic	Other Europe	The US	China	Other Bric+	Rest of the World
Petroleum oils etc.	20.1%	2.5%	73.5%	0.0%	0.0%	3.9%
Semi-finished products of iron or non-alloy steel etc.	0.0%	15.0%	0.0%	11.0%	74.0%	0.0%
Cyclic amides, incl. cyclic carbamates etc.	0.2%	7.1%	22.1%	70.6%	0.0%	0.0%
Photovoltaic cells assembled in modules etc.	0.2%	18.3%	0.0%	81.1%	0.0%	0.4%
Ball bearings	0.9%	30.6%	1.7%	65.5%	0.0%	1.3%
Average	4.3%	14.7%	19.5%	45.6%	14.8%	1.1%

3.3.2 Finland

In 2024, Finland imported vulnerable intermediate products worth 3.1 billion euros, representing 7.7% of total imports of intermediate goods.

The great majority of these vulnerable imports came from non-European countries. [3] The major sourcing areas are China (40.9%) and the US (25.7%). Finland sourced only few per cent (3.5%) of vulnerable imports from other Nordic countries, and 5.9% from other Europe. Close to one-fifth (18.8%) of vulnerable intermediate goods were imported from the rest of the world.

Notwithstanding Finland's import of vulnerable goods is not as concentrated as in Denmark, the share of Top5 vulnerable goods is substantial accounting for two-thirds (65.9%) of total imports of vulnerable goods.

Table 3.4 Top 5 vulnerable products imported by Finland (2024)

Product	HS code	Imports, million EUR	Share of total imports of vulnerable products, %
Lithium-ion accumulators (excl. spent)	850760	1,167	38.0%
Precious-metal ores and concentrates (excl. silver ores)	261690	284	9.2%
Saturated acyclic hydrocarbons	290110	246	8.0%
Tall oil, whether or not refined	380300	180	5.8%
Butanes, liquefied (excl. of a purity of >= 95% of N-butane or isobutane)	271113	147	4.8%
Total		**2,023**	**65.9%**

Notwithstanding, the US is the most important sourcing region for tall oil imported by Finland; however, nearly one-fourth of its import volume comes from other Nordic countries (Table 3.5). Other Nordic countries also play a role in the sourcing of liquefied butane.

3. Due to confidentiality, only 92.5% of Finland's total imports of vulnerable intermediate goods can be broken down by country/region. In this report, we assumed that unidentified imports were distributed in the same way as imports of identified vulnerable goods.

Out of the Top 5 vulnerable imported goods for Finland, China has a significant direct role only in lithium-ion accumulators. The US, in turn, plays a significant role in three of these products. Furthermore, one hundred percent of imported precious-metal ores and concentrates comes from the rest of the world region.

Table 3.5 Imports of Finland's Top 5 vulnerable goods by region, % (2024)

Product	Nordic	Other Europe	The US	China	Other Bric+	Rest of the World
Lithium-ion accumulators (excl. spent)	1.4%	4.7%	1.3%	81.1%	0.0%	11.5%
Precious-metal ores and concentrates	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Saturated acyclic hydrocarbons	0.0%	0.5%	99.4%	0.0%	0.0%	0.0%
Tall oil, whether or not refined	23.6%	3.5%	72.9%	0.0%	0.0%	0.0%
Butanes, liquefied	14.2%	16.7%	68.8%	0.0%	0.0%	0.3%
Average	7.8%	5.1%	48.5%	16.2%	0.0%	22.4%

3.3.3 Iceland

In 2024, vulnerable imported intermediate goods worth EUR 46 million were imported into Iceland, accounting for 1.2% of total imports of intermediate goods. Compared to other Nordic countries, in Iceland, the share of vulnerable goods is substantially lower.

The largest single source of potential vulnerability is China, which supplies a substantial 31.3% of these inputs. This is closely followed by the rest of the world, contributing 21.3%, the other BRIC+ countries at 17.0%, and the US at 15.2%.

Other European countries (12.5%) and the Other Nordic region (2.8%) play only a minor role in supplying these vulnerable goods.

Table 3.6 Top5 vulnerable products imported by Iceland (2024)

Product	HS code	Imports, million EUR	Share of total imports of vulnerable products, %
Parts of telephone sets, telephones for cellular networks or for other wireless networks	851779	8	18.2%
Bars or rods, of iron or non-alloy steel, cold-formed or cold-finished and further worked	721590	5	11.2%
Under-carriages and parts thereof, for aircraft, n.e.s.	880720	5	10.9%
Aerials and aerial reflectors of all kinds, of telephone sets, telephones for cellular networks	851771	5	10.0%
Coniferous wood in chips or particles	440121	4	7.9%
Total		**27**	**58.3%**

Among the Top 5 vulnerable goods imported by Iceland, there are two products where China plays a particularly important direct role (Table 3.7). In four of these product categories, other Nordic countries have some involvement, though their role is generally small.

Other BRIC+ countries constitute a crucial import sourcing region for iron/steel bars and rods, while the US remains critical for undercarriages for aircraft. Finally, close to 85% of coniferous wood in chips is imported from the rest of the world region.

Table 3.7 Imports of Iceland's Top 5 vulnerable goods by region, % (2024)

Product	Nordic	Other Europe	The US	China	Other Bric+	Rest of the World
Parts of telephone sets, telephones etc.	4.9%	11.7%	7.7%	73.0%	0.0%	2.7%
Bars or rods, of iron or non-alloy steel etc.	0.2%	3.5%	0.0%	0.0%	96.2%	0.0%
Under-carriages and parts thereof, for aircraft, n.e.s.	0.0%	22.4%	68.2%	0.0%	0.1%	9.3%
Aerials and aerial reflectors, of telephone sets etc.	3.5%	9.1%	1.8%	81.1%	0.0%	4.5%
Coniferous wood in chips or particles	5.6%	9.6%	0.0%	0.0%	0.0%	84.7%
Average	2.8%	11.3%	15.6%	30.8%	19.3%	20.2%

3.3.4 Norway

Norway's import profile for vulnerable intermediate goods is notably more globally diverse than that of its Nordic neighbors, with risks broadly distributed across several non-European regions.

Unlike Denmark and Sweden, Norway's largest source of vulnerable inputs is the Rest of the World (RoW), accounting for 34.7% of the total. The second most significant source is the other BRIC+ category, which supplies 22.7%, underscoring a high reliance on emerging and developing economies for vulnerable goods.

The United States and China contribute similar, moderately high shares: The US is responsible for 17.8% and China for 15.2% of these vulnerable imports. Both the other European countries (7.5%) and the other Nordic region (2.1%) play a minimal role.

Table 3.8 Top 5 vulnerable products imported by Norway (2024)

Product	HS code	Imports, million EUR	Share of total imports of vulnerable products, %
Nickel mattes	750110	1,853	4.4%
Aluminium oxide (excl. artificial corundum)	281820	1,121	2.7%
Parts of turbojets or turbopropellers, n.e.s.	841191	431	1.0%
Turbojets of a thrust > 25 kN	841112	394	0.9%
Saturated acyclic hydrocarbons	290110	272	0.6%
Total		**4,070**	**9.7%**

The imports of Norway's imports of vulnerable goods are not as concentrated as in other Nordic countries (Table 3.8). In Norway, Top 5 vulnerable goods account for less than 10% of the total vulnerable goods' imports. This is remarkably less than the Nordic average (57.6%).

Nickel is the only Top 5 vulnerable good imported by Norway where other Nordic countries play a significant role (Table 3.9). The US is the most important import source for three of the goods, while China has no direct role in sourcing these particular products. Furthermore, the BRIC+ region is a particularly important sourcing area for aluminum oxide.

Table 3.9 Imports of Norway's Top 5 vulnerable goods by region, % (2024)

Product	Nordic	Other Europe	The US	China	Other Bric+	Rest of the World
Nickel mattes	19.7%	0.0%	0.0%	0.0%	0.0%	80.3%
Aluminum oxide (excl. artificial corundum)	0.0%	21.3%	0.1%	0.0%	78.6%	0.0%
Parts of turbojets or turbopropellers, n.e.s.	0.7%	21.4%	75.1%	0.0%	0.3%	3.1%
Turbojets of a thrust > 25 kN	0.0%	37.2%	57.7%	0.0%	0.0%	5.1%
Saturated acyclic hydrocarbons	0.0%	4.1%	95.9%	0.0%	0.0%	0.0%
Average	4.1%	16.6%	45.7%	0.0%	15.8%	17.7%

3.3.5 Sweden

In contrast to other Nordic countries, the United States is by far the dominant source of these vulnerable inputs, accounting for 41.3% of the total, making Sweden highly exposed to vulnerable inputs originating in the US.

The second largest source is the rest of the world, contributing a substantial 31.7%. China is the third largest source at 16.9%, while Other European countries account for only 6.0%. The contributions from Other Nordic (0.9%) and Other BRIC+ (3.1%) are minimal.

The Swedish import of vulnerable goods is quite concentrated, as the Top 5 imported vulnerable goods constituted 65.3% of total imported vulnerable goods (Table 3.10).

Table 3.10 Top 5 vulnerable products imported by Sweden (2024)

Product	HS code	Imports, million EUR	Share of total imports of vulnerable products, %
Human blood; animal blood prepared for therapeutic, prophylactic or diagnostic uses	300290	449	27.9%
Bituminous coal, whether or not pulverized, non-agglomerated	270112	444	27.7%
Saturated acyclic hydrocarbons	290110	312	14.8%
Sulphates of nickel	283324	73	4.5%
Plates, separators and other parts of electric accumulators, n.e.s.	850790	64	3.1%
Total		**1,332**	**65.3%**

The source regions for these Top 5 most vulnerable imported goods vary significantly (Table 3.11). Almost 100% of blood imported to Sweden originated in the US (97.1%) in 2024. This dependence is less pronounced when averaging over the top five vulnerable goods, but the US remained the single most important source representing 44.5% of the import of these five vulnerable intermediate goods.

Table 3.11 Imports of Sweden's Top 5 vulnerable goods by region, % (2024)

Product	Nordic	Other Europe	The US	China	Other Bric+	Rest of the World
Human blood etc.	0.1%	0.2%	97.1%	0.0%	2.6%	0.0%
Bituminous coal	0.0%	7.9%	25.7%	1.3%	0.0%	65.2%
Saturated acyclic hydrocarbons	0.4%	1.3%	98.3%	0.0%	0.0%	0.0%
Sulphates of nickel	0.2%	7.1%	22.1%	70.6%	0.0%	0.0%
Plates, separators etc.	7.4%	15.3%	1.3%	74.2%	0.0%	1.8%
Average	1.6%	5.4%	44.5%	15.1%	0.5%	32.9%

4. Imports of critical raw materials

Critical Raw Materials (CRMs) are vital imports due to their strategic importance for sectors undergoing green and digital transitions, as well as for defense. Finland and Norway show the greatest reliance on CRMs relative to their total intermediate imports, a much higher degree than Denmark and Iceland.

Analysis of CRM sourcing reveals distinct concentration patterns: Iceland sources most of its CRMs from China, while Norway overwhelmingly relies on the Rest of the World. For Denmark, Norway, and Sweden, the majority of CRMs are secured through combined European supply chains, emphasizing strong regional preference. Finland's sourcing of CRMs is the most geographically scattered, with its largest single share coming from the Rest of the World. The composition of CRM imports is specialized by country; for example, Nickel mattes represents over half of Norway's CRM imports. In contrast, Copper is the primary imported CRM for both Finland and Sweden.

Recently, there has been an active debate on so-called Critical Raw Materials (CRM) which are critical raw materials of strategic importance for technologies for the green and digital transition, as well as for defense and space industries. Examples of critical raw materials and their use are: *Rare earth metals* are key components of permanent magnets used in wind turbines motors, *lithium, cobalt and nickel* are used in battery manufacturing and *silicon* is used for semiconductors.

In order to secure Europe to meet its 2030 climate and digital objectives, EU has approved the Critical Raw Materials Act (CRM Act) in 2024.[4] The legal act identifies 34 raw materials as being critical. The criteria for being classified as critical are due to their high economic importance and their exposure to high supply risk, often caused by a high concentration of supply from a few countries outside the EU.

In 2024, CRM imports constituted, on average, 6.2% of the imports of intermediate goods to the Nordics (Figure 4.1). The share of CRM imports is the highest in Finland (12.6%) and Norway (8.6%), and the lowest in Iceland (1.2%) and Denmark (2.8%).

4. Regulation (EU) 2024/1252 of the European Parliament and of the Council of 11 April 2024 establishing a framework for ensuring a secure and sustainable supply of critical raw materials and amending Regulations (EU) No 168/2013, (EU) 2018/858, (EU) 2018/1724 and (EU) 2019/1020 (OJ L, 2024/1252, 3.5.2024, ELI: http://data.europa.eu/eli/reg/2024/1252/oj).'

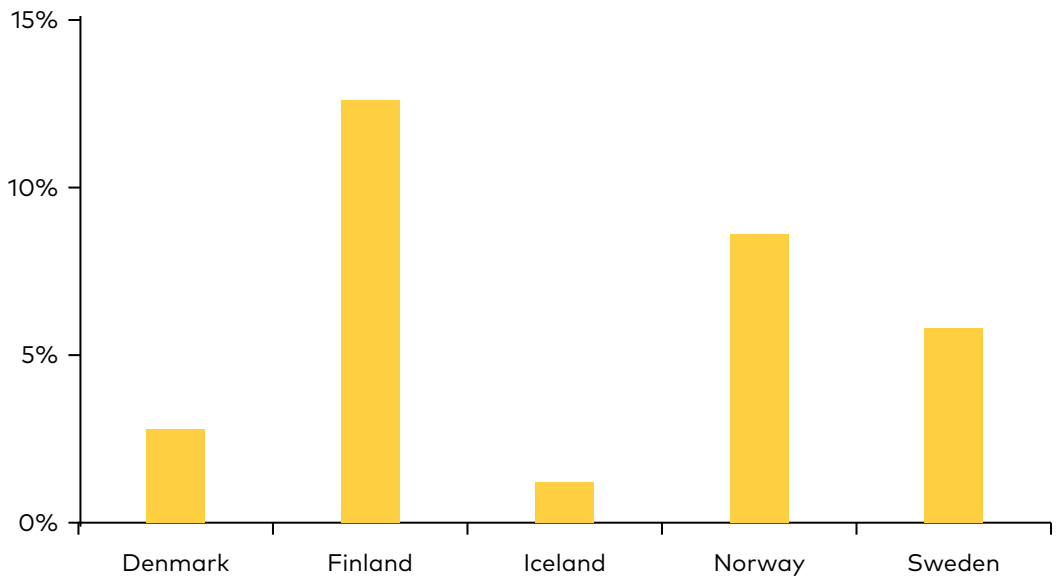

Figure 4.1 Share of CRM of the total intermediate goods imports, % (2024)

From the resilience perspective, it is important to consider from which regions critical raw materials are imported from (Figure 4.2).

The analysis reveals two distinct patterns of high single-source dependency: Iceland sources over half of its critical raw materials from China, at 51.9%, while Norway relies overwhelmingly on the rest of the world (RoW) category, which accounts for a dominant 55.4% of its total imports (Figure 4.2).

For the three largest Nordic economies, Denmark, Norway, and Sweden, the "Other Nordic" and "Other European" regions combined represent a significant majority of their sourcing, emphasizing a strong intra-European supply chain preference.

Specifically, Denmark's regional focus is the strongest, with 68.1% of its CRM imports coming from Europe, underpinned by the highest reliance on its immediate neighbors, the other Nordic countries, which supply 53.4% of its materials. Denmark also shows the highest percentage sourced from the other BRIC+ category at 24.1%.

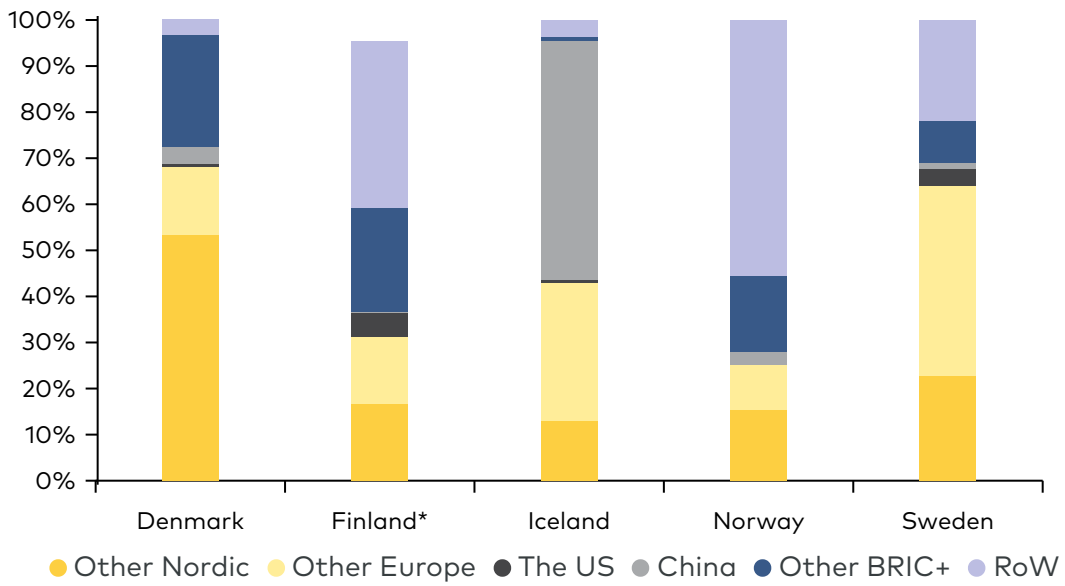

Figure 4.2 Import of Critical Raw Materials broken down by region/country 2024 (%)

Sweden follows a similar pattern of regional focus, with its combined Nordic and Other European sourcing reaching 63.3%. In contrast, Finland displays the most geographically dispersed import profile among the group. While its European reliance is moderate at 31.3% combined, the largest single share is from the rest of the world (36.2%), closely followed by the other BRIC+ (22.6%) group, indicating a broad global search strategy for these essential materials.

However, it should be noted that instead of raw materials, the Nordic countries are likely to import CRMs in a more refined form as part of components. These are missed in the previous analysis.

4.1 Denmark

Denmark's imports of critical raw materials were valued at €1.161 million in 2024, which accounted for 2.8% of the country's total intermediate imports. The share has decreased significantly, falling from 6.4% in 2022 to 3.5% in 2023.

Denmark imports more than 50% of CRMs from other Nordic countries, followed by BRICS+ (27.9%) and the other European countries (14,7%). Since 2022, the role of Nordic countries as a source of CRMs has increased substantially.

The most important imported critical raw material in 2024 (and also in 2022 and 2023) was hydrogen (Table 4.1).

Table 4.1 Top 5 CRMs imported by Denmark (2024)

Critical raw material	Imports, million EUR	Share of total CRM imports, %
Hydrogen	491	42.3%
Iron ore	419	36.0%
Pebbles and gravel	70	6.1%
Broken or crushed stone	53	4.5%
Zinc	15	1.2%
Top 5 in total	1,046.9	90.2%
Total CRM import	1,161	

4.2 Finland

In 2024, Finland imported critical raw materials worth EUR 5.0 billion accounting for 12.6% of the total imports of intermediate goods. The share is substantially higher than in other Nordic countries. Compared to 2022, the share of CRMs has slightly declined from 15.2%.

Of the CRMs imported by Finland, 16.7% originated from other Nordic countries. Sweden dominates this regional trade, supplying 88% of Finland's total CRM imports from the Nordic region.

Five the most important CRM (based on the value of imports) accounted for 78% of Finland's total imports of CRMs (Table 4.2). Within the top five list, the imports are relatively diversified in terms of materials.

Table 4.2 Top 5 CRMs imported by Finland (2024)

Critical raw material	Imports, million EUR	Share of total CRM imports, %
Copper	1,771.9	35.1%
Nickel mattes	775.4	15.3%
Zinc	571.0	11.3%
Nickel	448.9	8.9%
Coking coal	367.1	7.3%
Top5 in total	3,934.4	77.9%
Total CRM import	5,039	

4.3 Iceland

Iceland imports only a small volume of CRMs, with a total value of just €45 million in 2024. Consequently, their share of total intermediate goods imports was low (1.2%). This figure has declined since 2022, when the corresponding share was 2.2%.

A distinguishing characteristic of Iceland's CRM imports is the significant share held by silicon, which comprises more than 40% of the total (Table 4.3).

Table 4.3 Top 5 CRMs imported by Iceland (2024)

Critical raw material	Imports, million EUR	Share of total CRM imports, %
Silicon containing < 99,99% by weight of silicon	20	44.3%
Coke and semi-coke of coal, lignite or of peat	5	10.7%
Unwrought magnesium, containing >= 99,8% by weight of magnesium	4	10.0%
Petroleum coke, non-calcined	3	6.5%
Gravel for concrete and for road metaling and the like	2	5.1%
Top5 in total	34	76.6%
Total CRM import	45	

4.4 Norway

Norway has the second-highest share of CRMs in its total intermediate goods imports across the Nordic region. In 2024, CRMs constituted 8.6% of intermediate goods imported by Norway, a decrease from 11.5% recorded in 2022.

The uniqueness of Norway's CRM imports lies in the major contribution of Nickel mattes, which accounts for over half of the total CRM imports (Table 4.4).

Table 4.4 Top 5 CRMs imported by Norway (2024)

Critical raw material	Imports, million EUR	Share of total CRM imports, %
Nickel mattes	1,858.7	51.3%
Aluminum	453.3	12.5%
Zinc	279.8	7.8%
Manganese	260.8	7.2%
Phosphate Rock	..	..
Top 5 in total	..	..
Total CRM import	3,620	

4.5 Sweden

In 2022, CRMs accounted for 2.7% of the total intermediate goods' imports of Sweden. Since then, the CRM import only increased marginally to 2.9% in 2024.

Much like Denmark, Finland, and Norway, Sweden exhibits a high concentration of CRMs in its imports. The top five critical raw materials comprised almost 70% of the country's total CRM imports (Table 4.5).

Table 4.5 Top 5 CRMs imported by Sweden (2024)

Critical raw material	Imports, million EUR	Share of total CRM imports, %
Copper	1,752.5	37.0%
Iron ore	402.8	8.5%
Nickel	383.4	8.0%
Coking coal	378.2	8.0%
Zinc	365.9	7.7%
Top 5 in total	3,282.8	69.4%
Total CRM import	4,731	

5. Bridging the Atlantic and Beyond: Destinations of Nordic Exporters

Exports are foundational to the economic growth of the small Nordic countries, providing the necessary scale and opportunity for specialization that their limited domestic markets cannot offer. However, this openness is threatened by the current global shift towards geoeconomics and protectionism, including rising tariffs. Europe remains the central destination for the majority of goods exports across all Nordic nations. Danish companies stand out by directing a substantial portion of their total goods exports to regions outside of Europe.

The importance of the US as an export market varies significantly, being most crucial for Iceland and least significant for Norway. Large companies are the primary drivers of goods exports in all Nordic countries, especially in Sweden and Finland. Conversely, smaller companies play a proportionally greater role in the total exports of Iceland and Norway compared to their Nordic peers.

Exports are vital for Nordic and other small countries because with limited domestic markets, these nations cannot rely on domestic consumption to secure economic growth as much as larger countries.

Exporting allows companies to access a much larger global market, providing the economics of scale necessary for the industries to thrive. In large countries, the domestic market is often large enough to allow companies to obtain these economies of scale without significant sales abroad.

Small countries, however, cannot be world leaders in everything. Through exports, companies gain access to broader markets, which allows them to focus on niche sectors where they have a comparative advantage.

Geopolitics and protectionism

In recent years, geopolitical tensions have increased, leading to a rise in protectionism. The biggest surprise, however, may have come from the United States. The United States has raised and is raising tariffs significantly, which will also hit the Nordic countries.

The importance of the US as a destination for exports of goods varies however between Nordics (Figure 5.1). Over 11% of Iceland's goods exports go to the United States, but the corresponding figure for Norway is just under 3.5%. The figures for Finland (9.6%), Sweden (9%) and Denmark (7.2%) fall between these extremes.

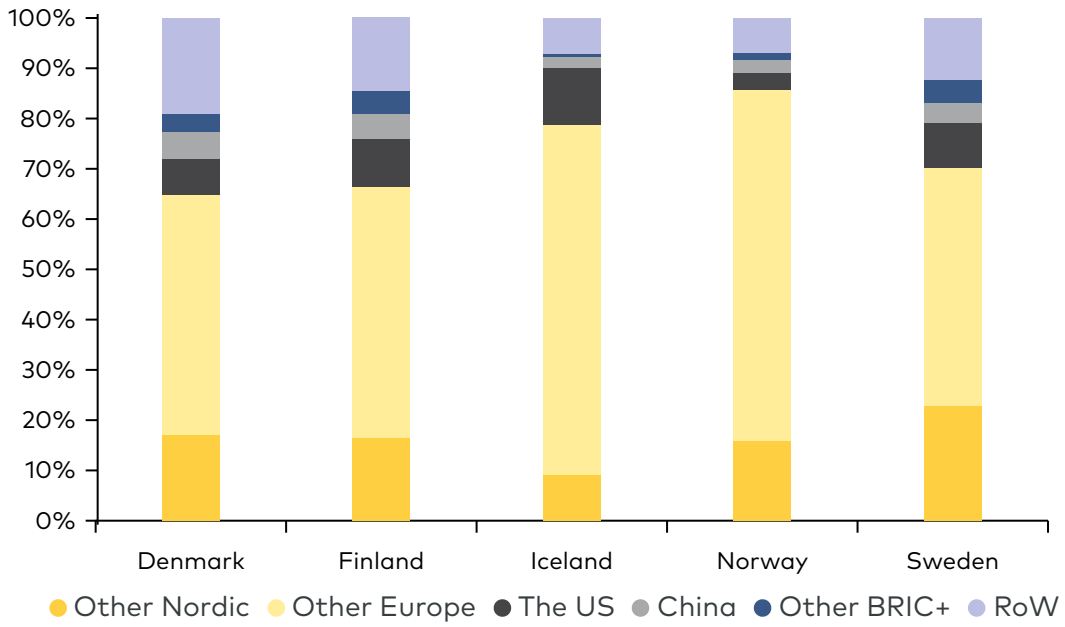

Figure 5.1 The shares of destination regions/countries for Nordic goods exports, % (2024)

Nordics and Europe as exports' destinations

In all Nordic countries, the majority of goods' exports go to Europe, including intra Nordic exports. The share is highest in Norway (85.8%) and the lowest in Denmark (64.8%). In Finland, Iceland and Sweden, the corresponding shares are 66.4%, 78.7% and 70.0%, respectively.

Consequently, the regions outside Europe are important destinations for Danish exports since extra-Europe region accounts for more than 35 % of the Danish total exports of goods. In contrast, the extra-Europe region accounts less than 15% of Norwegian goods of exports.

Furthermore, about 19% of Danish exports go to countries beyond the EU, the US, and the BRICS+ regions while the corresponding figure in Finland, Iceland, Norway and Sweden are 14.7%, 7%, 6.8% and 12.3%, respectively.

Exports by firm sizes

Not surprisingly, in all Nordic countries, large firms (at least 250 employees) account for a large share of exports (Figure 5.2). The share of large companies is the highest in Sweden (70.6%) and lowest in Norway (46.5%).

There are also substantial differences across Nordics in the opposite direction meaning the role of smallest companies. In Finland, companies with less than 50 employees accounts for only 9.8% of the total exports of goods. This is substantially less than in every other Nordic country. In Iceland, companies with less than 50 employees export 32.6% of the total exports and in Norway 26.8%.

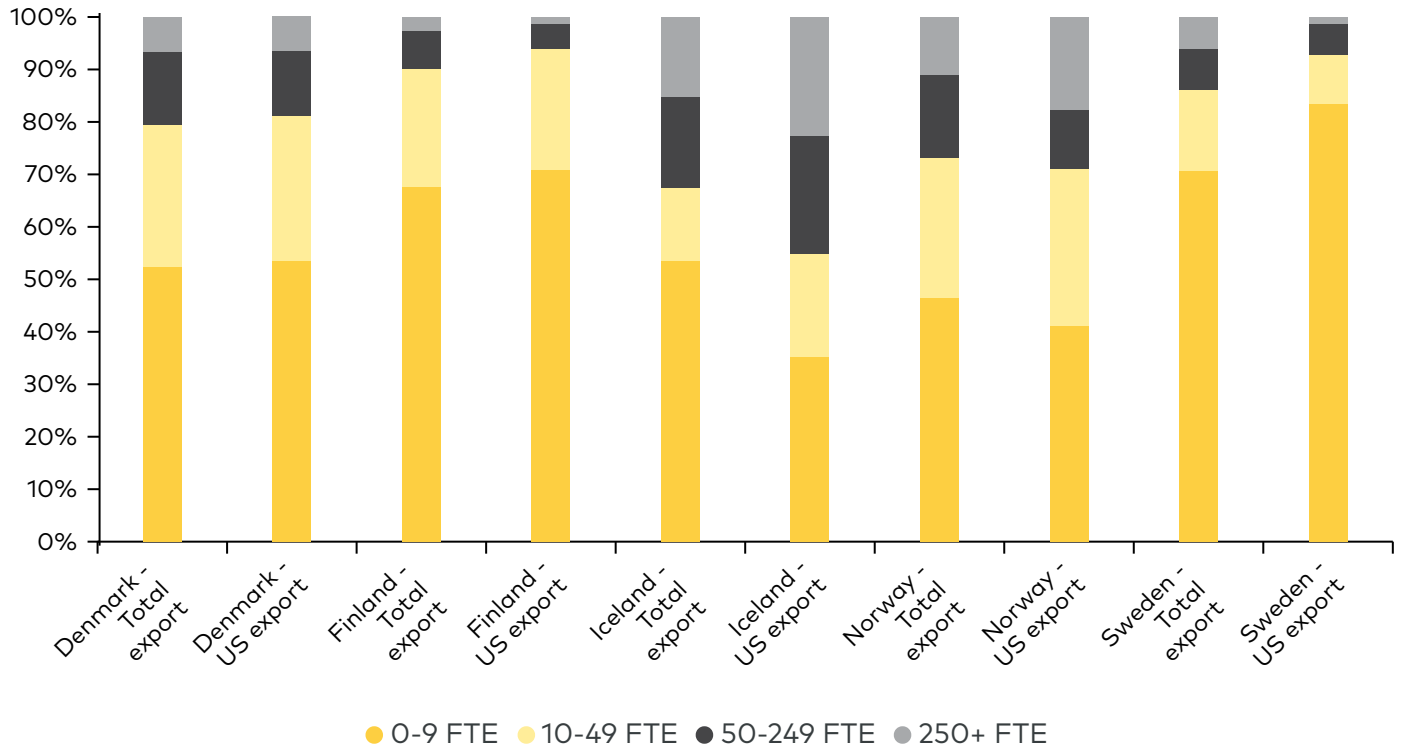

Figure 5.2 The role of different company sizes in exports of goods, % (2023)

Note: Figures are based on the exports of goods solely excluding service exports. Shares of goods' exports, broken down by the number of employees (full-time equivalent).

In the context of the US export destination, large companies play a bigger role particularly in Finland (71%) and Sweden (83.5%). In Iceland and Norway, the situation is reversed: large companies have lower shares in the US exports than in the total exports.

6. Conclusions

The geo-economic shift and resilience in Nordic value chains

The global economy is undergoing a profound structural transition, moving rapidly from an era of deep globalization toward a new phase defined by geopolitical and geo-economic dynamics. This shift is marked by escalating geopolitical tensions and a heightened suspicion regarding the deep dependencies forged through international trade and value chains. Events such as the war in Ukraine, which exposed vulnerabilities in supply chains, and subsequent geopolitical conflicts have dramatically increased the focus on national resilience and economic security.

In this environment, economic tools are increasingly being leveraged to pursue foreign policy objectives – a practice known as geo-economics. This subtle exercise of power includes instruments such as tariffs, trade restrictions, subsidies, and strategic dependency creation, making it difficult to differentiate from regular economic activity. This rise in trade barriers and national industrial state subventions by large countries poses a challenge to the core economic model of the Nordic countries. For these small, open economies, international trade is exceptionally vital, allowing them to overcome the limitations of their domestic market size and achieve specialization and essential economies of scale. A comprehensive understanding of their value chains is therefore crucial for strategic decision-making and ensuring a robust economic future.

Nordic reliance on intermediate goods

A fundamental characteristic of the small Nordic economies is their reliance on imports of intermediate goods – raw materials, components, and other inputs – which is both necessary and economically efficient. Small nations cannot feasibly produce all components required for their sophisticated industries. Across the region, intermediate goods account for a substantial portion of total goods imports. Our results show that Finland exhibits the highest reliance on these imports, whereas Denmark and Iceland show the lowest dependency.

The analysis of sourcing regions reveals a deeply integrated, Europe-centric supply structure. The primary source of intermediate goods for all Nordic countries is other European partners, followed closely by robust intra-Nordic trade, which serves as the second most important source. This strong regional integration suggests a high degree of reliance on European supply chain stability. Beyond Europe, the

involvement of major global economies, such as the US and China, is smaller, though variable. Denmark and Norway source relatively more from the US, while China's supply share remains moderate across the region.

Product-level imports are often highly concentrated, reflecting the specialized needs of national industries. For instance, energy-related products, such as crude petroleum oils, are among the top imports for Denmark, Finland, and Sweden. Conversely, Norway, a significant energy producer, imports considerably less in these categories compared to its neighbors. The high reliance on established European supply corridors requires continuous scrutiny to ensure their resilience. Strategic attention is also warranted for diversifying the sourcing of specific, concentrated critical products. From the policy perspective, the challenge remains that sourcing regions and countries are ultimately determined by individual company decisions.

Identifying and addressing import vulnerabilities

Vulnerability in upstream value chains is tracked using a precise methodology, classifying imports as vulnerable if they simultaneously meet three challenging criteria: high sourcing concentration, significant reliance on non-European supply, and low potential for domestic substitution.

Our results show a stark contrast in vulnerability levels across the region. Norway and Denmark demonstrate the highest exposure. In these countries, vulnerable imports account for 14.5% and 9.4% of total intermediate imports, respectively. In contrast, Sweden (2.6%) and Iceland (1.2%) show much lower vulnerability levels, suggesting more diversified or internally resilient supply chains. A key finding is that the inputs classified as most vulnerable overwhelmingly originate *outside* Europe, indicating that critical supply chain risks are potentially geopolitical in nature.

The specific geopolitical origins of vulnerability differ geographically across the Nordics. For Denmark and Sweden, the US is the overwhelmingly dominant source of vulnerable goods. Conversely, Finland and Iceland's major vulnerability exposure lies with China. Norway exhibits a more globally dispersed risk profile, relying heavily on the rest of the World and other BRIC regions for its vulnerable inputs.

Our analysis reveals that vulnerability is frequently concentrated in a small number of critical product categories. For example, Denmark's vulnerability is largely tied to petroleum products, which constitute a significant majority of its vulnerable imports. For Finland, lithium-ion accumulators represent the largest share of its vulnerable inputs. Strategies should seek to reduce single-country dependencies on major global powers – whether the US or China — for these sensitive materials, which are crucial for industrial stability.

Strategic importance of critical raw materials

Critical raw materials (CRMs) are of paramount strategic importance, underpinning the technological transition toward green energy, digitization, and the defense sector.

The analysis of CRM sourcing reveals severe concentration patterns. Iceland sources over half of its CRMs from China, while Norway demonstrates overwhelming dependency on the rest of the World category. For Denmark, Norway, and Sweden, however, European supply chains (Nordic and other European) secure the majority of these materials. Denmark has the strongest regional sourcing focus, with a significant amount of its CRMs coming from its immediate Nordic neighbors. In contrast, Finland's sourcing is the most geographically scattered. The specific materials imported are highly specialized; for example, Nickel accounts for over half of Norway's total CRM imports, while Copper is crucial for Finland and Sweden.

It should be noted that our analysis is based solely on the direct imports of CRMs. Consequently, it does not account for imports where CRMs are embedded within more refined parts, components, or other intermediate goods.

Companies are trading, not countries

It is important to note that large companies, defined as those with over 250 employees, are the primary importers of intermediate goods across the Nordic region. These large firms are the key actors managing supply chain risks.

Contribution rates from the smallest companies – those with fewer than ten employees – demonstrate clear variations across the Nordics. This group accounts for only slightly over 6% of total intermediate goods imports in both Finland and Sweden, a share that is significantly exceeded by the contributions observed in Norway and Iceland.

Unsurprisingly, large firms (more than 250 employees) are also the main drivers of goods exports across the Nordics. Sweden and Finland show a particularly high dependency on these large firms for their overall export performance. Conversely, smaller enterprises (fewer than 50 employees) play a proportionally much greater role in the total exports of Iceland and Norway compared to Finland and Sweden.

Export dynamics

Exports are the lifeblood of Nordic economic growth, enabling firms to achieve necessary economies of scale and specialize internationally. This reliance on open markets, however, is being challenged by the current global shift towards geo-economics and protectionism, including significant tariff increases, notably originating from the United States.

For all Nordic countries, Europe remains the main destination for the majority of goods exports. Denmark is exceptional in its reliance on markets outside of Europe, directing a substantial share of its total exports to extra-European regions.

The importance of the US as a destination for exports of goods varies however between Nordics Over 11% of Iceland's goods exports go to the United States, but the corresponding figure for Norway is just under 3.5% (in 2024). The figures for Finland (9.6%), Sweden (9%) and Denmark (7.2%) fall between these extremes.

Compared to other Nordic countries, China is more important destination for Danish and Finnish companies, accounting for 5% of their total goods exports. Furthermore, an additional 4.5% of Finnish goods exports are directed to other BRIC+ countries. These other BRIC+ nations account for close to 5% of Swedish companies' goods exports. In contrast, both China and the other BRIC+ countries are less significant export destinations for Norwegian and Icelandic companies.

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8. Appendix

Micro data linking and Nordic databases

The foundation of the project is national register databases established in each of the Nordic statistical offices containing a number of harmonized statistical variables and enterprise populations covering a range of annual business and trade statistics. The databases cover all active enterprises in the non-financial business economy (NACE Rev.2 sections B to N, excl. K) for the period 2022 to 2024, the latter being the most recent year available across the Nordic countries, when it comes to annual business and trade statistics.

Core to micro data linking (MDL) is the unique enterprise ID, operating as key for identifying the same enterprises across statistical registers, e.g., Structural Business Statistics and International Trade in Goods Statistics, and matching the data from the different registers.

To the extent possible, the project tailored MDL databases use input data for the reference period 2022–2024 from the Structural Business Statistics, International Trade in Goods Statistics and the Statistical Business Register for each of the Nordic countries.

For the above sources, annual micro- level datasets are created. For the purpose of producing output smoothly yearly dataset are stored for each reference years and register included in the MDL database. These are stored locally at each NSI and identifiable data will not be exchanged.

Shared syntax

One of the major benefits of the applied design and coherent MDL databases at the Nordic NSI is the possibility of applying centrally scripted SAS syntax locally at each NSI. This ensures a similar approach to the tailoring of panel data for each country and a consistent output.

Definition of regions

Europe includes all EU member states, EFTA countries (Iceland, Liechtenstein, Norway, and Switzerland) and the UK.

Other BRICS+ r includes the following countries: Brazil, Russia, India, South Africa, Egypt, Ethiopia, Iran, Saudi Arabia, the United Arab Emirates and Indonesia.

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