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Perils & Pitfalls of Export Data



Understanding International Trade Statistics

Facts and figures on imports and exports abound in media articles; they provide the backbone of expert reports and the basis for policy decision-making. Yet compiling and understanding the data is becoming increasingly difficult due to global value chains, multinational constructions and the increasing importance of services in international trade. This increases the risk of manipulations and misconceptions of data that most people otherwise perceive with authority.

Taking a deeper look into trade statistics often pose as many questions as they answer. How can USA be Denmark's second, third and sixth largest export destination at the very same time? What is the difference between the numerous different export figures (for the same year) casually used by journalists and politicians? And – going deeper into the data – why are Danish imports from Sweden (EUR 9.7 billion) and Swedish exports to Denmark (EUR 9.3 billion) not identical? ¹

¹ Eurostat database 2017: DK imports from SE (Euro 9,746,150,564), SE exports to DK (Euro 9,289,113,756) and DK exports to SE (Euro 10,586,119,022), SE imports from DK (Euro 9,789,139,893)

Recently the British *Office for National Statistics* added some rare irony to this fog of complexity. When the World Trade Organization (WTO) calculated that global imports exceeded global exports by USD 350 billion in 2016, the *Office for National Statistics* assured that this was “not because we are importing goods from extra-terrestrial life forms”.²

Despite these difficulties, import and export data are key instruments for understanding one of the great megatrends of globalism: The rise of international trade. This Asia House briefing takes a closer look at international trade data, uncovering a domain often found to be the exclusive reserve of experts and scholars. Where can data be found? How should they be understood? And what are their limitations?

Measuring international trade

According to the Oxford Dictionary, exports are defined as “goods or services sent to another country for sale”. Yet, reality is not quite so simple; several factors contribute to muddling the picture: Seasonal variations and large single orders, demands for secrecy (aka. discretionary goods), fluctuating exchange rates, confusion in relation to re-exports and transit goods, ambiguities in relation to transport and insurance costs, and – most importantly – complexities from global value chains. Also, exports may decline if production facilities are established abroad to cater for local demand (e.g. Carlsberg breweries in China or India).

In general, international trade consists of two elements – goods and services – which routinely are measured by four different methods of calculation, as listed below.³

#	Method	Criteria	Measure
1	Foreign trade – goods 1	Border passage	Gross export
2	Foreign trade – goods 2 (Balance of Payments)	Changing ownership	Gross export
3	Foreign trade – services (Balance of Payments)	Changing ownership	Gross export
4	The Input-output model	Changing ownership	Value growth

Measuring goods

Foreign trade in goods can be measured in two different ways. Method # 1 – *Foreign trade in goods based on border passage* – is often considered the classic measure of imports and exports and includes most goods that crosses the border. The transactions are recorded by the customs offices.

The advantage of method # 1 is two-fold: the intuitive simplicity of defining foreign trade as goods crossing a border, and the transparency of the data source – the customs offices. However, method # 1 fails to handle the complexities of globalisation.

Firstly, transit goods may be added to the trade statistics of the transit country, either due to errors by the customs officials or because the goods are repackaged at the port of arrival and modified marginally. One example may be French wine exports destined for Germany but stored in a Belgian warehouse. Recording this transaction as Belgian wine imports from France, and German imports from Belgium, would be misleading. Consequently, countries with large volumes of transit goods often display inflated import/export-figures. In a European context, especially Belgium and the

² Jonathan Athow (18/7-2017): *Measuring trade – why does the world seem to import more than it exports*, National Statistical

³ *Hvor stor er dansk eksport og hvem er vores samhandelspartnere?* DST Analyse (20/12-2017), Danmarks Statistik

Netherlands with the ports of Antwerp and Rotterdam, fit this bill. In Asia the port of Singapore distorts the trade figures in the same way.

From an analytical perspective, this complicates international comparisons. For instance, based on the statistics, Belgium may seem a lot more successful in accessing the Pakistani market than Denmark. Danish policy makers may even look to Belgium for inspiration for this apparent success, which – at the end of the day – might be a delusion due to transit trade.

Other European countries may be affected by other localised conditions; the possibility of tax-havens (Luxemburg and Lichtenstein), lenient regulations for shipping (Malta, Cyprus, France FIS), the presence of large multinational companies (Ireland). Other countries may be incomparable due to size. E.g. Denmark may seem like a more export-driven country than Germany, but this is really a natural consequence of being small: Sending goods from Aarhus to Hamburg (export) is not much different from sending goods from Hamburg to Frankfurt (domestic trade). Thus, any international comparison in relation to import-export figures should be handled with care.

Secondly, method # 1 is not designed to reflect global value chains where production is handled by sub-suppliers from numerous countries. Thus, method # 1 does not include goods produced by a Danish company abroad and sold to a customer in a third country (as it does not cross the Danish border). Yet, it does include goods produced by a non-Danish subsidiary in Denmark and sold to the head office in the home country.

Global value chains call for a different method of measuring international trade, not based on the physical passage of borders, but on the changing ownership of the product. This is the basis for method # 2; *Foreign trade – goods 2 (Balance of Payments)*.

As a considerable amount of Danish exports are generated by Danish subsidiaries and partners abroad, exports based on Balance of Payments are usually higher than exports based on Foreign trade.

- Danish exports viz. method # 1: DKK 639 billion (2016).⁴
- Danish exports viz. method # 2: DKK 701 billion (2016).⁵

The complexities of method # 2 is described further below in section: *Handling Danish exports outside Denmark*.

Measuring services

According to the World Trade Organization (WTO), “services covers a wide range of intangible and heterogeneous products and activities that are difficult to encapsulate within a simple definition”. Some services are characterised by having production and consumption happening simultaneously (e.g. construction), other by the lack of physical contact between the parties (e.g. financial services).⁶

The WTO has divided trade in services into four main groups:

- Type 1 (trade across borders) covers services that are transferred from a provider in one country to a customer in another country, e.g. software, call centre services and financial services.

⁴ www.statistikbanken.dk, table UHV

⁵ www.statistikbanken.dk, table BB

⁶ *Measuring Trade in Services* (November 2010), World Trade Organization

- Type 2 (consumption abroad) covers scenarios where the consumer moves to areas where the service takes place, e.g. tourism, education and ship repairs in foreign harbours.
- Type 3 (commercial presence) covers companies that establish a foreign subsidiary from which they provide services, e.g. a multinational company establishing a local branch for consulting.
- Type 4 (physical presence of persons) covers scenarios where a person from the exporting country travels to the importing country to deliver a service.

Despite this categorisation, it is often difficult to distinguish between different types of services. Thus, “Accounting” could be defined as both type 1, 3 and 4, while “Banking” could be defined as type 1 (if handled via the internet) and type 3 (if handled via foreign branch offices).⁷ These ambiguities in turn affect the quality of service trade data, as interpretation of rules and regulations are left to individual judgements.

Furthermore, services are prone to statistical ambiguity. In some cases, it may be difficult to separate activities related to goods and services in a consistent manner. For instance, while the price of imports usually includes transportation and insurance, exports are often reported without these costs.⁸

In other cases, it may be difficult to categorize services in terms of “export” or “domestic consumption”, e.g. the purchase of hotel, restaurants, plane tickets and other services by foreign tourists. Often, type 3 services are not included in the import-export figures due to lacking data, even though it is perhaps the most important service category in terms in international trade.⁹

Finally, as services have no physical movement, they are not identified by the customs authorities. Therefore, the compiling of data is often based on surveys sent to relevant firms, relying on the accuracy of their response.

Despite these difficulties in measuring, it is evident that the importance of service-exports is increasing by the year for Denmark. In 2005 service exports accounted for DKK 263 billion, in 2017 this figure had risen to DKK 436 billion. It should be noted that services are very heterogenic in relation to exports. Some sectors, like cleaning agencies, lawyers and retailers have an export-intensity of less than 3 %, while others – engineering, research & development, shipping and aviation – have an export-intensity of 19 %, 33 %, 86 % and 91 % respectively. Thus, transportation generates two thirds of all Danish service exports, mainly due to Denmark’s strong position within shipping.¹⁰

- Danish exports viz. method # 3: DKK 406 billion (2016).¹¹

Measuring net exports

The total Danish exports of goods and services, according to the Balance of Payments (method # 2 and 3 aggregated), amounted to DKK 1,107 billion in 2016.

However, this figure – the gross export figure – may be considered misleading, as it does not reflect the actual value created and sold from Denmark. In a world of global supply chains, where

⁷ *Konkurrence, internationalisering og regulering*, Analyserapport 2 (2013), Produktivitetskommissionen, s. 80

⁸ Jonathan Athow (18/7-2017): *Measuring trade – why does the world seem to import more than it exports*, National Statistical

⁹ *Konkurrence, internationalisering og regulering*, Analyserapport 2 (2013), Produktivitetskommissionen, s. 80

¹⁰ *Konkurrence, internationalisering og regulering*, Analyserapport 2 (2013), Produktivitetskommissionen, s. 86

¹¹ www.statistikbanken.dk, table UHT

components are increasingly produced by still more specialised sub-suppliers in different countries and assembled in e.g. Denmark, the gross export and import figures have become ever more hollow concepts. Method # 4 – *Trade based on the input-output model* – seeks to address this weakness.

In 2016, about 48 % of the value of exports from the Balance of Payments method were embedded imports, an increase from 42 % at the turn of the millennium. Thus:

- Danish exports viz. method # 4: DKK 537 billion (2016).¹²

Export figures according to method # 4 is not based on statistical data, but on calculations from the input-output model. The results are not directly available on *Statistikbanken*, provided by Danmarks Statistik. However, data up to 2016 can be found here in table NIO4F. Data for 2017 will be available in November 2018.

A minor weakness with method # 4: The figure is not adjusted for imported products that are partially based on earlier Danish exports. Hence, the real net value increase for Denmark will be higher than stated above.

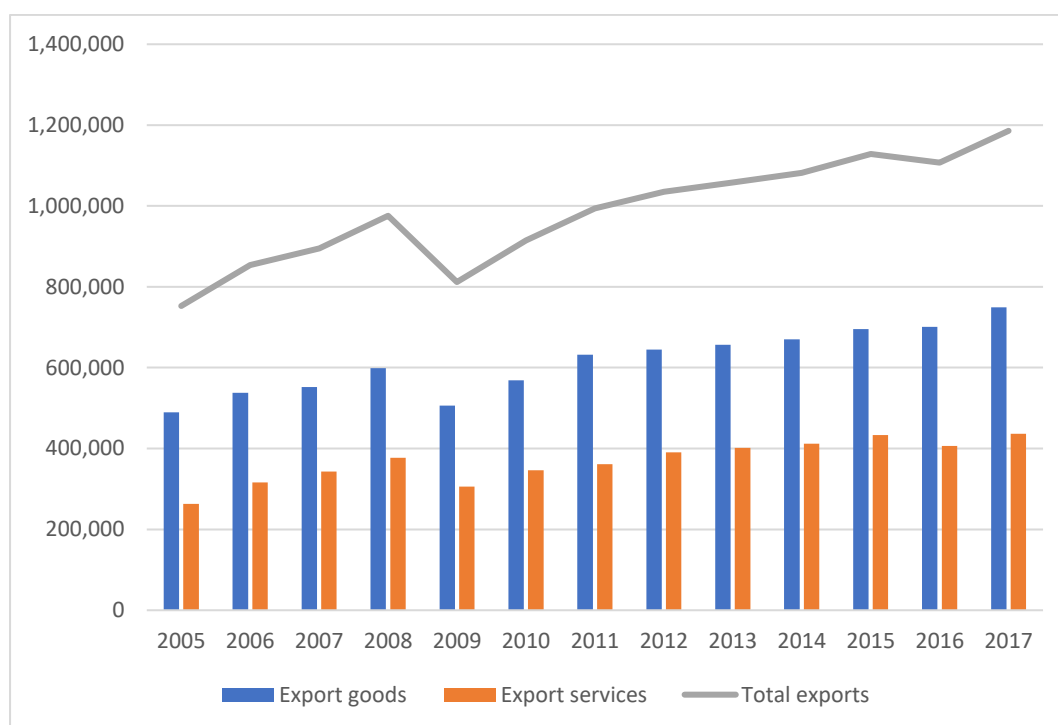


Table: Danish exports 2005-2017 based on the Balance of Payments (Source: Statistikbanken.dk)

Handling Danish exports outside Denmark¹³

Exports generated by Danish companies outside Denmark fall in two main categories:

- Goods processed abroad and resold to third country
- Goods traded from foreign subsidiary and re-sold to third country (aka. *Merchandising*)

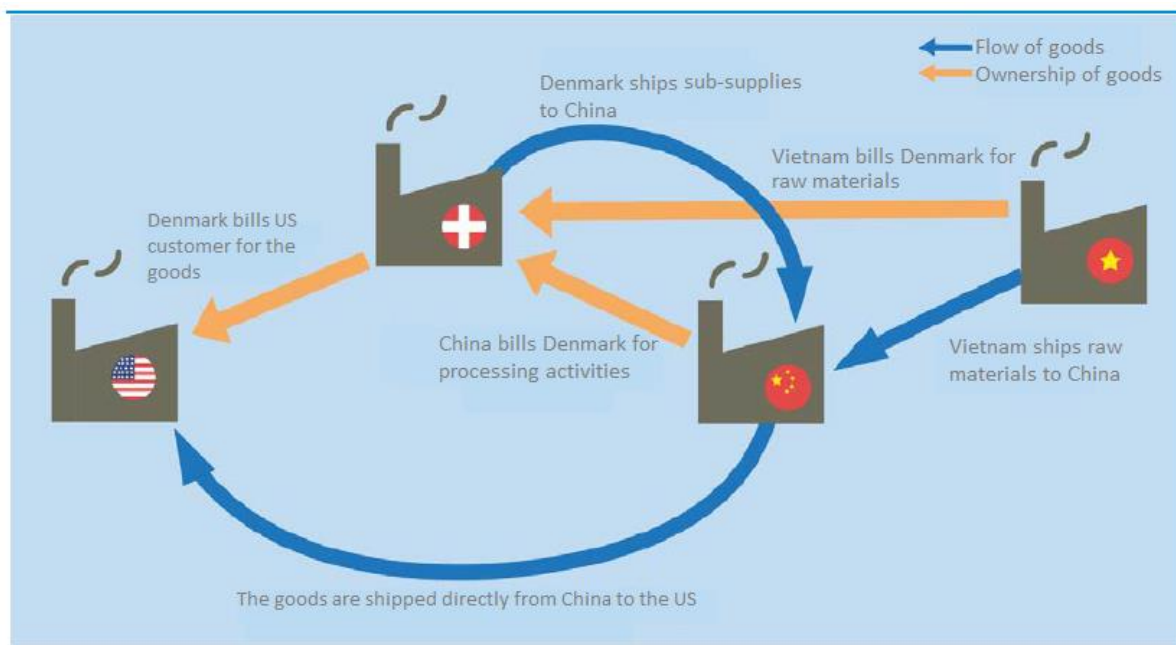
¹² *Hvor stor er dansk eksport og hvem er vores samhandelspartnere?* DST Analyse (20/12-2017), Danmarks Statistik, s. 4

¹³ This section is heavily indebted to the DST Analysis, which also have inspired the illustrations. Also thanks to Jacob Warburg from the Danish Ministry of Foreign Affairs, for valuable input to this Briefing.

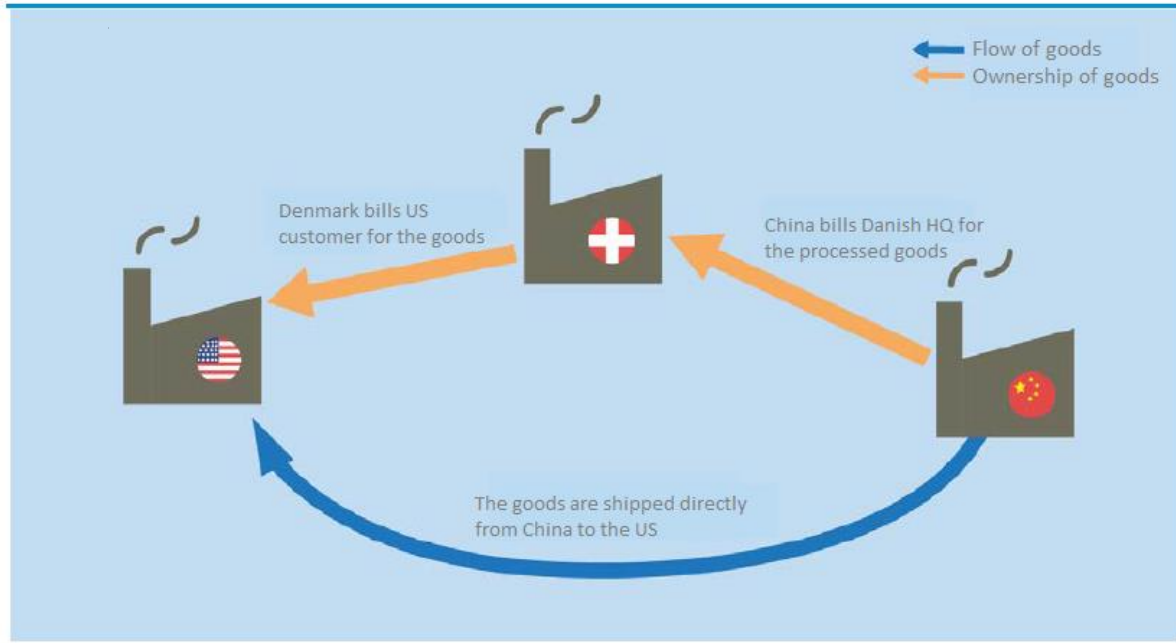
TYPE A: Danish goods processed abroad covers scenarios where Danish companies have established production facilities in foreign countries. Following the example below, a Danish company has a subsidiary in China that produces its goods based on components from Denmark and raw materials from Vietnam. The Danish head office pays its Chinese subsidiary for processing the goods and then bills its American customer. Thus, the product ownership remains with the head office in Denmark throughout the production process, resulting in the following shifts in the trade statistics:

- i. **Payments by the Danish head office to a Chinese partner** (both subsidiary or locally owned company) for producing the goods are defined as *Danish import of services viz. method # 3*. The “production service” covers all costs incurred by the Chinese subsidiary, including salaries for the Chinese workers and any raw materials which the Chinese add to the production.
- ii. **Danish goods sent to the Chinese subsidiary** are defined as *Danish export of goods viz. Border passage method # 1*, as they cross land borders but not ownership. Thus, they are not included in the exports of goods viz. the Balance of Payments method # 2.
- iii. **Vietnamese goods sent to the Chinese subsidiary** are defined as *Danish import of goods viz. the Balance of Payments method # 2* as they change from Vietnamese to Danish ownership. They are not included in the export of goods viz. Border passage method # 1, as they do not cross the Danish land border.
- iv. **Danish goods sent from the Chinese subsidiary to the US customer** are defined as *Danish export of goods viz. the Balance of Payments method # 2*, as the goods change ownership during the transaction.

In 2016 goods defined as foreign processed amounted to DKK 62.4 billion.



TYPE B: Goods re-sold without processing (aka. Merchanting) covers scenarios where the Danish head office buys the processed goods from a Chinese subsidiary and re-sells the product to a third country, e.g. USA. In this case *Danish exports of goods viz. the Balance of Payments method # 2* increases by the net export-value of the transaction, i.e. the sales price to the US customer minus the acquisition cost from the Chinese subsidiary.



In 2016 merchanting exports amounted to DKK 46.5 billion. Thus, 16 % of all Danish exports originated from outside Denmark.¹⁴

Bridging the pitfalls and looking to Denmark

The importance of international trade to the Danish economy is increasing by the year. From the early 1970ies to present, Danish exports increased from 28 % to 54 % of the GDP. In 2017, total exports exceeded DKK 1,100 billion, generating nearly 800,000 jobs and contributing DKK 90,000 to each Danish household.¹⁵ It seems clear that export promotion should remain the cornerstone of any new business development system in Denmark. What seems less clear is the ideal focus of such a system.

What do the data reveal about the Danish reality?

- **Company size:** Large and medium sized companies, constituting 1 % of all Danish companies and 14 % of Danish export companies, generate 90 % of all Danish exports. However, this analysis downplays the importance Danish SMEs, who generated 53 % of the export growth from 2008-14, and – in doing so – moved into the “Large company” category.¹⁶ In addition SMEs often provide semi-manufactures to large companies, which is thus embedded in the export of the large companies. Thus, the correct analysis is three-fold: New exports are often generated by SMEs, exports function as a main growth driver for these SMEs and part of the

¹⁴ *Hvor stor er dansk eksport og hvem er vores samhandelspartnere?* DST Analyse (20/12-2017), Danmarks Statistik, s. 5

¹⁵ *Betydning af international handel for økonomi og beskæftigelse i Danmark*, Erhvervsstyrelsen (februar 2018)

¹⁶ Eksportstatistik – 2016, Baseline og forløbsanalyse udarbejdet af eStatistik for Eksportrådet

exports of large companies originates from SMEs. In short; SMEs play a much greater role in export activities than they are often credited.

- **Sector/Geography:** The geographical areas of Denmark most dependent on exports in relation to employment is by far Central and Western Jutland, Sønderborg kommune in Southern Jutland (thanks to Danfoss and sub-suppliers), Assens, Nordfyn and Kerteminde kommune on Fyn, Kalundborg and Gladsaxe kommune on Sjælland (probably due to the presence of Novo Nordisk and Novozymes).¹⁷ Due to a high concentration of public or service related jobs, Copenhagen Area is less export-oriented than often perceived. Any export initiatives should bear these facts in mind.
- **Sector/Employment:** In terms of employment generated (including sub-suppliers), the five most important export sectors are: Manufacturing (208,512), Trade (128,603), Transport (82,180), Consulting (79,114) and Agriculture (47,908).¹⁸ These five sectors – generic as they may seem – contribute 70 % of the export-related jobs.
- **Sector/Income:** In terms of gross income generated, the five most important export sectors are (in DKK/billion): Shipping (167), Machinery (152), Chemicals (138), Food (127), Manufactured goods (109). These five product groups contribute nearly 70 % of all export-generated income.¹⁹ However, these figures must be handled with some caution. Shipping may be the highest earner in terms of gross income, but scores low on net income, as many of their activities rely on services provided by companies in local ports. Food & Agriculture and Oil & Gas, on the other hand, generate a large net income, as their production generally originate from Danish suppliers.
- **Export destinations:** An analysis carried out by the Ministry of Business and Industry, investigating Danish export potential in relation to goods, revealed the following: Denmark exploits, to a moderate degree, its trade potential (in goods) with third party countries compared to a reference group of small Western European countries. However, in relation to remote markets in America and Asia, Danish performance is substandard in relation to the reference group.²⁰

As these rather high-level examples indicate, facts and figures may provide valuable – and perhaps surprising – insights for policy decision. However, as this briefing has also shown, there is ample room for misconception and manipulation. Statistical data may be the strongest tool for understanding export trends and tendencies, and a deeper and more detailed analysis would undoubtedly provide an even more solid foundation from which to work. Yet, wandering into the realm of data driven analysis is bereft with perils and pitfalls. One should tread with care before drawing too many conclusions.

¹⁷ 775,000 jobs er tilknyttet eksport (Allan Sørensen), DI Analyse, (marts 2017). "Consulting translated from Vidensservice"

¹⁸ 775,000 jobs er tilknyttet eksport (Allan Sørensen), DI Analyse, (marts 2017). "Consulting translated from Vidensservice"

¹⁹ www.statistikbanken.dk. Shipping data form 2016, the rest from 2017

²⁰ *Konkurrence, internationalisering og regulering*, Analyserapport 2 (2013), Produktivitetskommissionen, s. 67

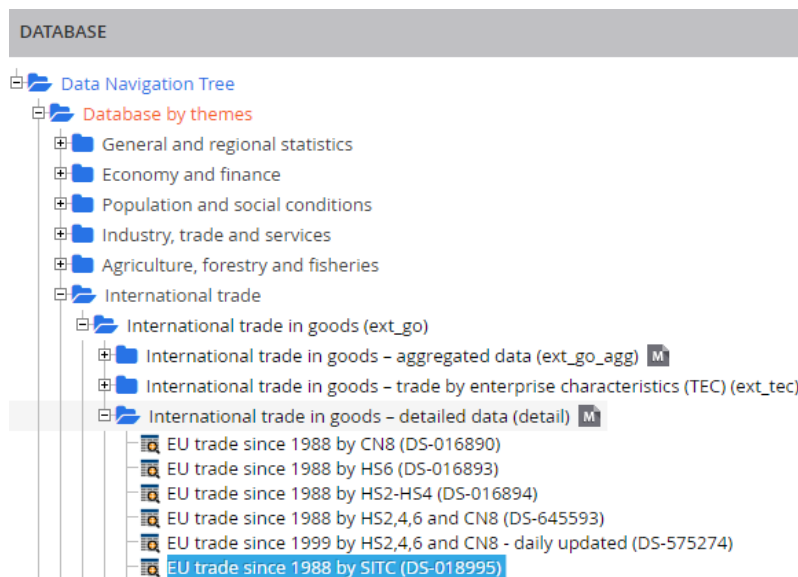
Appendix: A short guide to finding data on international trade

For Danish trade data:

- **Danmarks Statistik** (www.statistikbanken.dk) is the main source to Danish trade data.
- **eStatistik.dk**, based on data from Danmarks Statistik, but with additional analysis (especially on exports in relation to company size), combined with a user-friendly interface.

For comparative analysis for international trade data:

- **EUROSTAT** (www.ec.europa.eu/eurostat/data/database) provides the best data source for trade comparisons between European countries and EU-specific comparisons to non-European countries. Choose SITC-data, based on data from local customs offices, which also correspond with data from Danmarks Statistik.



- The **UN Comtrade database** (www.comtrade.un.org/data) provides an alternative source to international comparisons, and a more user-friendly interface than EUROSTAT. However, data is not consistent with (and generally lower than) data from EUROSTAT and Statistikbanken, and data source and methodology seem unclear.
- **World Trade Organization** (www.wto.org) provides the best overview of tariff rates.

Country profiles:

- **The Observatory of Economic Complexity** (OEC) is a tool that allows users to quickly compose a visual narrative about countries and the products they exchange. The OEC is provided by the MIT Media Lab (www.atlas.media.mit.edu).
- **French bank, Société Générale**, provides good country profiles (www.import-export.societegenerale.fr). Also, a free membership gives access to a trove of other trade related information. Unfortunately, this requires a French SIREN number.
- **The Swedish Eksport Kredit Fund** (www.ekn.se) provides excellent four-page country profiles (in Swedish). Though the trade statistics relate to Sweden, the general country analysis is sharp and concise and relevant for all interested parties.