**Illicit Trade**

Counterfeiting and Piracy and the Swedish Economy

MAKING SURE "MADE IN SWEDEN" ALWAYS IS

OECD

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BETTER POLICIES FOR BETTER LIVES

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Foreword

Sweden is an advanced, knowledge-based economy that produces highly valued products and services that benefit significantly from intellectual property. Sweden has an open economy, actively participating in global value chains. While these are features of a modern, dynamic economy, they also make Sweden vulnerable to the global risks of counterfeiting and piracy.

Illicit trade in counterfeit goods is a vital threat to Swedish industry, government and society. To provide policy makers with solid empirical evidence for taking action against this risk, this OECD report measures the direct economic effects of counterfeiting on consumers, retail and manufacturing industries, and government. It assesses both the impact of imports of fake products to Sweden and the impact of the global trade in fake products on Swedish intellectual property rights holders.

The results are alarming. In 2016, world trade in counterfeit and pirated goods that infringe on Swedish brands reduced sales of legitimate Swedish right owners by at least USD 2 billion, or 2% of their annual sales, and lowered the tax revenue of Swedish government by about USD 900 million, or 0.2% of Swedish GDP. A vast majority of losses – including more than two-thirds of lost jobs, and three-quarters of foregone tax revenue – is due to trade in fake goods outside of Sweden that infringe on Swedish intellectual property (IP) rights. These results underscore the need for co-ordinated international action against IP crime in general and trade in counterfeits in particular.

This report is designed to deepen our understanding of the vital risk that counterfeiting poses for global economy, and should help support policy makers as they shape effective solutions to counter this threat.

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Executive summary

This report presents the findings of the Swedish case study of trade in counterfeit and pirated goods. It looks at the problem from two perspectives. First, it analyses the scale and product composition of counterfeit and pirated products smuggled into Sweden and the effect on consumers, industries and the Swedish government. Second, it studies the magnitude and effects of global trade in counterfeit goods that infringe on the rights of Swedish trademark holders.

This dual analysis is based primarily on a quantitative assessment of global trade in counterfeit products within and outside Sweden, using the tailored statistical methodologies developed by the OECD, together with a large dataset on customs seizures of IP-infringing goods.

The findings can help both public and private sector decision makers better understand the nature and scale of the problem for the Swedish economy, and develop appropriate, evidence-based policy responses.

Key findings

- The total value of world trade in fake goods that infringed on Swedish IP amounted to as much as SEK 28.3 billion (USD 3.4 billion) in 2016, equivalent to 2% of total Swedish manufacturing sales (domestic plus exports).

- Products where Swedish IP rights were particularly targeted, in terms both of the absolute value of trade and of percentage of total trade in a given product category, include automotive spare parts, machinery (bearings), clothing, toys and watches.

- Counterfeit and pirated goods that infringe on the intellectual property rights (IPRs) of Swedish right holders come mainly from China; Hong Kong, China; Singapore and Turkey.

- The results indicate that in 2016, over one-half of the goods traded worldwide that infringed Swedish IPRs were offered to consumers who knew they were buying fake goods.

- Imports of counterfeit and pirated goods to Sweden accounted for as much as SEK 18.3 billion (USD 2.2 billion) in 2016 – the equivalent of 1.6% of Swedish imports.

- Regarding the degree of counterfeiting in Sweden, ICT devices were the most counterfeited type of goods followed by watches, clothing, and toys and games.

- The analysis shows that more than a half of imported counterfeit and pirated goods in Sweden in 2016 were sold to consumers who believed they were buying genuine products, with the remaining purchased wittingly. The share of fakes bought knowingly in Sweden varies significantly by product, ranging from 20% for automotive spare parts to 55% for perfumery and cosmetics.

Impact on Sweden

- The estimates for consumer detriment – that is, the price premium unjustly paid by consumers in the belief they are buying a genuine product – in Sweden amounted to almost SEK 4.5 billion (USD 540 million) in 2016.

- The total volume of Swedish companies' forgone sales due to infringement of their IP rights in global trade amounted to SEK 17.1 billion (USD 2 billion), or 2.4 % of total sales by these Swedish companies in 2016.

- Lower sales reduce the demand for jobs, either in the retail and wholesale sector or in Swedish industries due to the global infringement of their trademarks. Altogether, at least 7 100 jobs were lost in Sweden due to counterfeiting and piracy, which represents 0.7% of full-time equivalent employees in Sweden.

Lower sales due to counterfeiting in Sweden mean lower revenues for the Swedish government from value-added tax (VAT), corporate income tax (CIT), personal income tax and social security contributions. Altogether, trade in counterfeit and pirated goods resulted in a reduction in Swedish public revenues equal to almost SEK 7.54 billion (USD 905 million) or 0.2% of Swedish GDP.

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Chapter 1. The economic context of counterfeiting and piracy

Illicit trade in fake goods[1] is a longstanding problem that keeps growing in scope and magnitude. These practices have negative effects on the sales and profits of affected firms while raising adverse revenue, economic, health, safety and security effects for governments and consumers. Organised criminal groups are seen as playing an increasingly important role in these activities, benefiting significantly from highly profitable counterfeiting and piracy operations.

In order to improve the factual understanding of counterfeit and pirated trade, and to formulate evidence-based policy messages the OECD has been carrying out a comprehensive economic assessment of the problem and of the main governance gaps that facilitate it or act as a driver. To perform this task, it has built a comprehensive database on seized counterfeit and pirated products, which can serve as a basis for case studies (see Box 1.1)

Box 1.1. Database on seized counterfeit and pirated products

The database on customs seizures is the critical quantitative input to this study. It was constructed from three separate datasets received from the World Customs Organization, from DG TAXUD of the European Commission and the US Customs and Border Protection. The database includes detailed information on seizures of IPR-infringing goods made by customs officers in 99 economies around the world between 2011 and 2016. Altogether there are about 900 000 observations in the database (in most cases 1 observation corresponds to 1 customs' seizure).

The database contains a wealth of information about the intellectual property rights (IPR)-infringing goods that can be used for quantitative and qualitative analysis. In most cases, for each seizure, the database reports the date of seizure, the mode of transport of fake products, departure and destination economies, the general statistical category of seized goods as well as their detailed description, the name of the legitimate brand owner, the number of seized products and their approximate value.

Counterfeiting and piracy – The Swedish context

Sweden is a well-developed, knowledge-based economy that produces innovative, IP-intense products. This is supported by existing indicators. In 2016, Swedish gross domestic product (GDP) per capita amounted SEK 408 333 (USD 49 000), above the OECD average (SEK 354 166 or USD 42 500). In terms of IP intensity, Swedish IP-intensive industries contributed on average to 39.1% of the Swedish gross domestic product (GDP) (42.3% for the European Union [EU]) and accounted for 31.8% of employment in Sweden (27.8% for the EU) between 2011 and 2013 (EUIPO/EPO, 2016). Concerning trademarks, Sweden is the 8th country in the EU in terms of the total number

of trademarks registered. Between 2011 and 2013, Swedish trademark-intensive industries contributed to 32.4% of the Swedish GDP and to 24.5% of employment in Sweden (EUIPO/EPO, 2016).

Swedish competitiveness relies on high levels of education, and on intense investments in all sorts of intellectual assets including research and development (see OECD, 2016). In 2016, the Swedish research and development spending represented 3.3% of GDP, a level higher than the OECD average (2.3%) or the United States (2.7%) and Japan (3.1%).

Sweden is also a highly globalised economy and characterised by the internationalisation of large Swedish companies and excellent integration in global value chains. Swedish exports, including engines and other machines, motor vehicles and telecommunications equipment, accounted for almost 45% of GDP in 2016. The Swedish exports intensity is largely above the OECD average (28%). These top exporting manufacturing industries in Sweden are in particular highly IPR-intensive. In addition, Sweden is a significant contributor to global value chains: in 2015, the Swedish exports represented more than 0.6% of total world exports in value-added terms (see OECD Trade in Value Added database).

To reiterate, the Swedish economy is well-developed, innovative and intellectual property (IP)-intense. It is also well integrated into the global economy through active participation in global value chains. These characteristics make Sweden particularly susceptible to the damaging effects of counterfeiting and piracy. This is especially relevant when the threats of counterfeiting and piracy are growing worldwide (OECD/EUIPO, 2019).

According to the OECD/EUIPO (2019), Sweden belongs to the top 15 countries whose companies are most affected by counterfeiting. In 2016, Sweden ranks 12th on the list of economies whose right holders suffer from counterfeiting. This means that 1% of the total seized value of fake goods worldwide concerned goods infringing Swedish IP.

The damaging effects of trade in counterfeit and pirated goods on the Swedish economy are analysed in this study from two perspectives:

1. the effects of smuggling of counterfeit products into Sweden
2. the effects of infringements of IP rights of Swedish right holders in world trade.

Regarding smuggling of fakes into Sweden, it will impact four areas analysed in this report: i) loss of consumers' welfare; ii) loss of sales; iii) loss of jobs for the retail and wholesale sector; and iv) lower tax revenues. These four categories are described in detail in Chapter 2.

With respect to global trade in counterfeit and pirated products that infringe Swedish IPRs, it impacts the following areas described in Chapter 3: i) lower sales for IPR owners; ii) job losses for the Swedish manufacturing industries; and iii) lower tax revenues.

The methodological framework developed to calculate all these effects as well as the data used is presented below and discussed in detail in Annex A. Importantly, this framework takes account the "double-counting" issue, which arises from the sale of fake products in Sweden that infringe the IPRs of its own residents.

Chapter 4 summarises the main findings of the report and provides suggestions for future research.

Three important things should be kept in mind when analysing these impacts:

- First, the methodology refers to the notion of *primary and secondary markets* for counterfeit and pirated goods. That is to say, it distinguishes between fake products that deceive consumers (primary markets) and those that are openly sold as fakes to consumers (secondary markets – see OECD/EUIPO, 2016). The markets for deceptive and non-deceptive products have significantly different characteristics, and these differences have important implications in the overall assessment.

- Second, whereas in primary markets consumers pay the full (or approximately full) retail price for a fake product thinking it is genuine, consumers knowingly purchasing IPR-infringing products in secondary markets are likely to pay a lower price and would not necessarily have substituted the fakes for the genuine goods given the choice. Obviously, these differences in price and substitution rates have different implications for estimating lost sales and lost taxes, and for the valuation of consumer detriment (the price premium unjustly paid by consumers in the belief they are buying a genuine product).[2]

- Third, there are other impact areas that are hard to measure quantitatively or are likely to occur only in the long term; these are therefore excluded from the analysis. They include, for example, the negative effects of counterfeiting and piracy on consumer health and safety, on the environment, on the proliferation of criminal networks and on long-term innovation and growth.

Data and methodology

Given the clandestine nature of counterfeiting, data on this threat are scarce and incomplete. Consequently, there are two major methodological issues that should be kept in mind when developing and applying a methodological framework to quantify the effects of counterfeit trade.

1. First, there is a wide myriad of impacts of trade in counterfeit goods and the framework developed here does not claim to quantify all of them. Rather, it looks at areas where quantification was possible while identifying areas of work needed to better understand how counterfeit and pirated trade affects economies and societies overall.

2. In areas where quantification was possible, the framework relies on a set of methodological assumptions. For transparency purposes, all are clearly spelt out in the text.

In addition, the framework leaves scope for further methodological amendments subject to future data improvements. These are discussed in the last chapter.

Data

Quantitative analysis in this report relies on three types of data inputs:

- seizures data of IP-infringing products from customs
- world import statistics
- other data, mainly Swedish background macro- and firm-level indicators.

The trade statistics are based on the United Nations (UN, n.d.) Comtrade database (landed customs value). With 171 reporting economies and 247 partner economies (76 economies in addition to reporting economies), the database covers the largest part of world trade and

is considered the most comprehensive trade database available. Products are registered on a two-digit Harmonised System (HS)[3] basis (see UN Trade Statistics, 2017). Data used in this study are based on landed customs value, which is the value of merchandise assigned by customs officials. In most instances, this is the same as the transaction value appearing on accompanying invoices. Landed customs value includes the insurance and freight charges incurred when transporting goods from the economy of origin to the economy of importation.

Data on customs seizures originate from national customs administrations. These data are aggregated and harmonised at the national or regional level and then submitted to international agencies that hold datasets on seizures. Two agencies and two datasets will be used as inputs into the analysis of this study. These datasets were received from:

- The World Customs Organization (WCO).

- The European Commission's Directorate-General for Taxation and Customs Union (DG TAXUD).

- The analysis in this study also uses a dataset received from the United States Department of Homeland Security (DHS) containing the seizure data from the US Customs and Border Protection (CBP), the customs agency of the United States and from the US Immigration and Customs Enforcement (ICE).

Other statistical information was used to develop a methodology to gauge the economic impact of trade in fake goods. This includes firm-level data on Swedish sectorial production, sales, jobs and wages, extracted from the Eurostat database (Eurostat, 2018).[4] It also includes statistical information on Swedish taxes extracted from the OECD TAX database.

Methodology

The assessment builds on the general methodology, developed in-house to study the economic impact of trade in counterfeit goods based on customs data. The general, so-called GTRIC (General Trade-Related Index of Counterfeiting) statistical methodology to analyse the scope and magnitude of trade in fakes has been developed in the 2008 OECD report *The Economic Impact of Counterfeiting and Piracy* and elaborated in OECD/EUIPO (2016), *Trade in Counterfeit and Pirated Goods: Mapping the Economic Impact*. Building on this statistical framework, a general methodology to study country-specific impacts of counterfeiting was prepared for the 2017 OECD report *Trade in Counterfeit Products and the UK Economy* (2017b) and elaborated in OECD (2018), *Trade in Counterfeit Goods and the Italian Economy*.

This methodology is applied separately to gauge i) the scale and effects of imports of fakes to Sweden and ii) the effects of trade in fake goods that infringe Swedish IP.

Gauging of the scale and effects of imports of fakes on Sweden is carried out in the following steps.[5]

First, the databases on customs seizures of IP-infringing products and on imports of genuine goods are tailored, to estimate the value of counterfeit imports in Sweden by product category and provenance economy. This results in economy- and industry-specific indices of the propensity of imports of fakes to Sweden (see Annex B for more details).

Based on the estimates of flows of imports of counterfeits into Sweden, the values of those products sold in the primary and secondary markets are estimated for each industry. This

is done based on an assumption that every sale of a fake item on a primary market represents a direct loss for the retail and wholesale industry. For secondary markets, where only a share of consumers would have deliberately substituted their purchases of counterfeit products for legitimate ones, the analysis is based on proxies of consumers' substitution rates, i.e. the extent to which every knowing illegal purchase displaces a legal sale (see OECD, 2017b). The estimates for substitution rates used in this analysis are presented in Table 1.1.

Table 1.1. Assumed consumer substitution rates in the main scenario

Sector	Substitution rate (%)
Perfumery and cosmetics	49
Watches and jewellery	27
Clothing, accessories, leather and related products	39
Other sectors	32

Sources: Anti-Counterfeiting Group (2007), *Consumer Survey*, http://www.wipo.int/ip-outreach/en/tools/research/details.jsp?id=691; Tom, G. et al. (1998), "Consumer demand for counterfeit goods", *Psychology & Marketing*, Vol. 15/5, pp. 405-421.

Once the volumes of primary markets at the industry level are established for each industry, the aggregated values of consumer detriment are calculated. The individual consumer detriment is the price premium unjustly paid by the consumer in the belief they are buying a genuine product.

Volumes of primary and secondary markets at the industry level are used to estimate lost sales for retailers and wholesalers. First, the estimated value of counterfeit products smuggled into Sweden combined with the share of the primary market gives the total volume of lost sales for Swedish retailers and wholesalers due to the unsuspecting purchase of counterfeit products. Second, the estimated value of counterfeit goods smuggled into Sweden together with the shares of the secondary market and consumers' substitution rates, equals the total volume of lost sales for Swedish retailers and wholesalers due to the knowing purchase of counterfeit products. This takes into account the fact that those consumers would not necessarily have bought genuine alternatives if the fakes had not been available. Finally, the sum of both estimates reveals the total value of lost sales for wholesalers and retailers due to counterfeit imports.

The next step uses lost sales to calculate jobs lost in Swedish retail and wholesale industries. This relies on transmission rates between lost sales and lost jobs for each industry, which are calculated as in OECD (2017b). The industry-specific estimates of the elasticity of employment with respect to sales and calculated based on this methodology are presented in Table 1.2 below. Importantly, a decrease in sales does not translate into the same proportion of lost jobs in each sector. For example, while a 1% decline in sales in the Swedish wholesale and retail sector of machinery and industrial equipment induces a 0.47% decline in the number of employees within this sector, it induces a 0.39% decrease for chemicals and pharmaceuticals products.

Table 1.2. Elasticity of employment with respect to sales in the Swedish wholesale and retail sector

Estimates for 2014-16

HS category	Sales elasticity of employment
Food, beverages and tobacco	0.423
Chemical and allied products; except pharmaceuticals, perfumery and cosmetics	0.390
Pharmaceutical and medicinal chemical products	0.431
Perfumery and cosmetics	0.383
Textiles and other intermediate products (e.g. plastics; rubbers; paper; wood)	0.417
Clothing, footwear, leather and related products	0.401
Watches and jewellery	0.375
Non-metallic mineral products (e.g. glass and glass products, ceramic products)	0.418
Basic metals and fabricated metal products (except machinery and equipment)	0.414
Electrical household appliances, electronic and telecommunications equipment	0.417
Machinery, industrial equipment; computers and peripheral equipment; ships and aircrafts	0.469
Motor vehicles and motorcycles	0.418
Household cultural and recreation goods; including toys and games, books and musical instruments	0.416
Furniture, lighting equipment, carpets and other manufacturing n.e.c	0.428

Once estimated, these transmission rates between sales and jobs can be used to estimate the share of lost jobs due to counterfeit products smuggled into Sweden in terms of total employment. For each Swedish retail and wholesale sector, this is done by multiplying the transmission rate with the share of lost sales by the total sales of genuine products.

Lower genuine sales due to counterfeit and pirated imports reduce several sources of revenue for the Swedish Government:

- value-added taxes (VAT) that would have been collected on consumption at purchase

- corporate income taxes (CIT) that would have been collected from firms in the wholesale and retail industry

- social security contributions (SSC) from employees and employers in the retail and wholesale industry

- personal income taxes (PIT) from employees and employers in the retail and wholesale industry.

In order to calculate the lost VAT, one simply needs to apply the VAT rates on the estimated amount of total lost sales due to counterfeit and pirated imports.

The amount of government taxes lost from CIT is calculated by multiplying the average profit rates within each category of retail and wholesale industry by the average rate of corporation tax taking into account the estimated value of lost sales.

To calculate losses in social security contributions, the share of the actual average amount of SSC paid by employees and employers for one unit of employment is multiplied by the amount of estimated lost jobs due to counterfeit and pirated imports.

The PIT foregone is calculated by multiplying the average salary in a given industry by the average income tax rate times the number of lost jobs.

Note that in order to estimate the results as accurately as possible, these four types of lost revenues were calculated by industry. The final result at the national level was obtained by adding the estimated amounts of foregone tax revenues across industries.

Estimation of scale and effects of trade in fake goods that infringe Swedish IP is calculated following a number of steps:

The first step is to estimate the value of counterfeit goods traded worldwide that infringe trademarks or patents held by Swedish rights owners. For this purpose, observations in the database that refer to trademarks or patents whose rights holders' address is registered in Sweden were selected. Note that the identification of rights holders' locations was done using the Global Brand Database WIPO (2016) and the PATENTSCOPE database WIPO (2017), both provided by the World Intellectual Property Organization.

From this data selection, the value of global counterfeiting targeting the IPR of Swedish industry is assessed by product and economy, by adapting the GTRIC methodology developed in OECD/EUIPO (2016) for exports and domestic sales. The indices included in the GTRIC matrix refer to the likelihood that a given type of counterfeit product of a brand or patent whose rights holder's location is registered in Sweden is sold in a given destination economy. The methodological note can be found in Annex B.

The second step checks what share of these counterfeit products is traded on primary versus secondary markets worldwide. This is analysed with exactly the same methodology as described in the case of imports of fakes to Sweden. Second, within secondary markets, the substitution rates are applied. This yields lost sales of Swedish right holders, by industry. In other words, the estimated value of products sold worldwide that are fake versions of these Swedish brands combined with information on: i) the share of primary and secondary markets for these products by destination economy; and ii) consumers' substitution rates. The total value of lost sales for Swedish rights owners is given by adding the value of sales of fake products on primary markets to the value of sales on the secondary market, adjusted for consumers' substitution rates.

The next step estimates job losses in the Swedish manufacturing sector as a response to changes in sales on export markets and on the domestic market. This is done by applying the econometric model presented in the case of imports of fakes to Sweden and outlined in detail in the OECD report on the UK economy (2017b).

The estimates of the sales elasticity of employment for each Swedish manufacturing industry are reported in Table 1.3. Again, a decrease in sales does not translate into the same proportion of lost jobs in each one of them. For instance, a decline of 1% in sales for the Swedish wholesale and retail sector of machinery and industrial equipment induces a 0.51% decline in the number of employees within this sector while it induces a 0.41% decrease for chemicals and pharmaceuticals products.

Table 1.3. Elasticity of employment with respect to sales in the Swedish manufacturing sector

Estimates for 2014-16

HS category	Sales elasticity of employment
Food, beverages and tobacco	0.4805
Chemical and allied products; except pharmaceuticals, perfumery and cosmetics	0.4197
Pharmaceutical and medicinal chemical products	0.4130
Perfumery and cosmetics	0.4870
Textiles and other intermediate products (e.g. plastics, rubbers, paper, wood)	0.5083
Clothing, footwear, leather and related products	0.4750
Watches and jewellery	0.4571
Non-metallic mineral products (e.g. glass and glass products, ceramic products)	0.5052
Basic metals and fabricated metal products (except machinery and equipment)	0.5049
Electrical household appliances, electronic and telecommunications equipment	0.4940
Machinery, industrial equipment; computers and peripheral equipment; ships and aircrafts	0.5103
Motor vehicles and motorcycles	0.4923
Household cultural and recreation goods, including toys and games, books and musical instruments	0.4294
Furniture, lighting equipment, carpets and other manufacturing n.e.c	0.5092

These transmission rates between sales and jobs can be used to estimate the share of lost jobs due to infringements in global trade of Swedish IP in total employment. For each Swedish manufacturing industry, this is done by multiplying the transmission rate with the share of lost sales for Swedish IPR owners.

Three types of tax revenues occur in Sweden due to infringement of Swedish IP: corporate income taxes of rights holders; social security contributions; and personal income taxes paid by employers and employees in the manufacturing sector. The methodologies applied to calculate each of these foregone tax revenues are exactly the same as those described in the case of imports of fakes to Sweden. It is done industry by industry in order to obtain estimates as accurate as possible.

Notes

[1] Counterfeit and pirated goods are defined as goods that infringe trademarks, copyrights, patents or design rights.

[2] For more discussion on substitution rates see OECD (2017b), *Trade in Counterfeit Products and the UK Economy*.

[3] The Harmonised System (HS) is an international commodity classification system, developed and maintained by the WCO.

[4] Correspondence tables between the classification of economic activities for manufacturing and wholesale and retail industries used by Eurostat (NACE) and the Harmonized System (HS) classification, used to calculate both infringements of Swedish IPR in global trade and fake imports in Sweden, are provided in Annex B.

[5] For a more formal presentation of these steps see OECD (2017b) and OECD (2018).

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Chapter 2. Imports of fakes to Sweden

Markets for fakes in Sweden

Before calculating the economic consequences of imports of counterfeit and pirated products in Sweden, the first step consists in quantifying the volume and the scope of these imports into Sweden. This analysis relies on a database of seized counterfeit and pirated products provided by customs (see Box 1.1 in Chapter 1).

Where do these goods come from?

Counterfeit and pirated products imported to Sweden between 2014 and 2016 came mainly from China and Hong Kong (China) representing respectively around 46% and 32% of the total value seized. They were followed by Thailand (12%), Turkey (5%) and Iraq (2%).

In terms of volume, the ranking of top provenance economies remains comparable to that of the value of fakes, with China and Hong Kong (China) ranking first and second.

Figure 2.1. Top provenance economies for counterfeit imports in Sweden, 2014-16
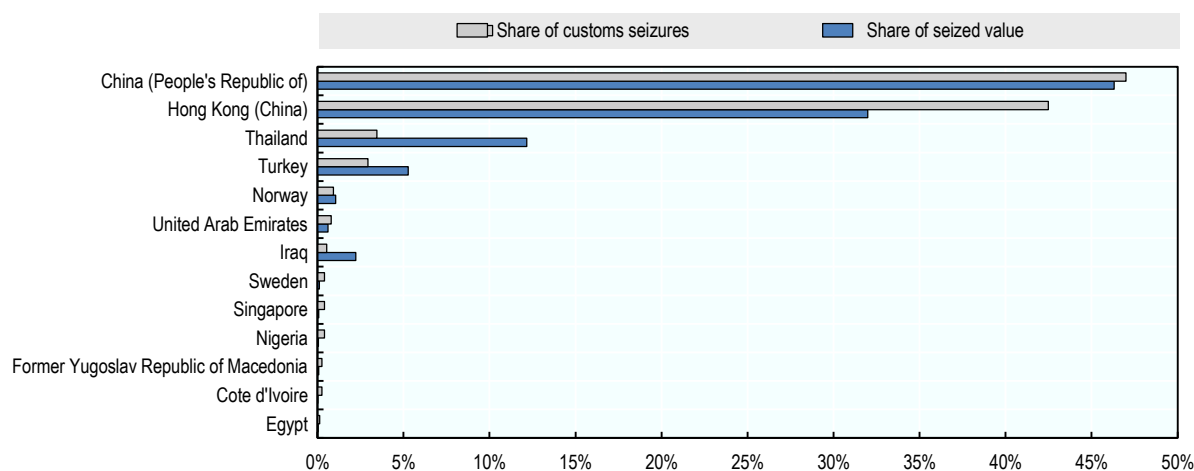
Initially (i.e. between 2011 and 2013), the top four provenance economies for counterfeit imports in Sweden were already China, Hong Kong (China), Singapore and Turkey. Over time, these economies remained the most prominent provenances of fakes coming into Sweden. However, it is worth noting that Turkey moved back while Hong Kong (China) moved up in the ranking in terms of both seized value and customs seizures.

Figure 2.2. Top provenance economies for counterfeit imports in Sweden, change between 2014-16 and 2011-13

A. In terms of seized value
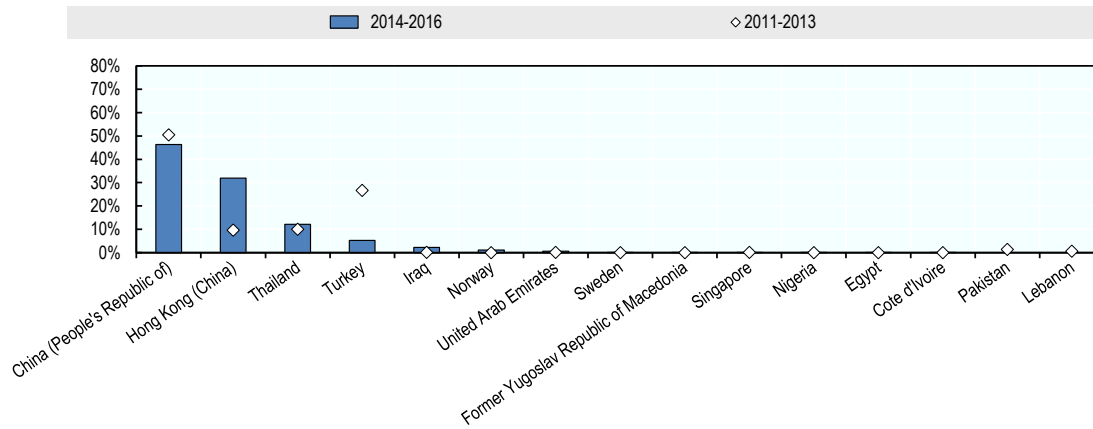
B. In terms of customs seizures
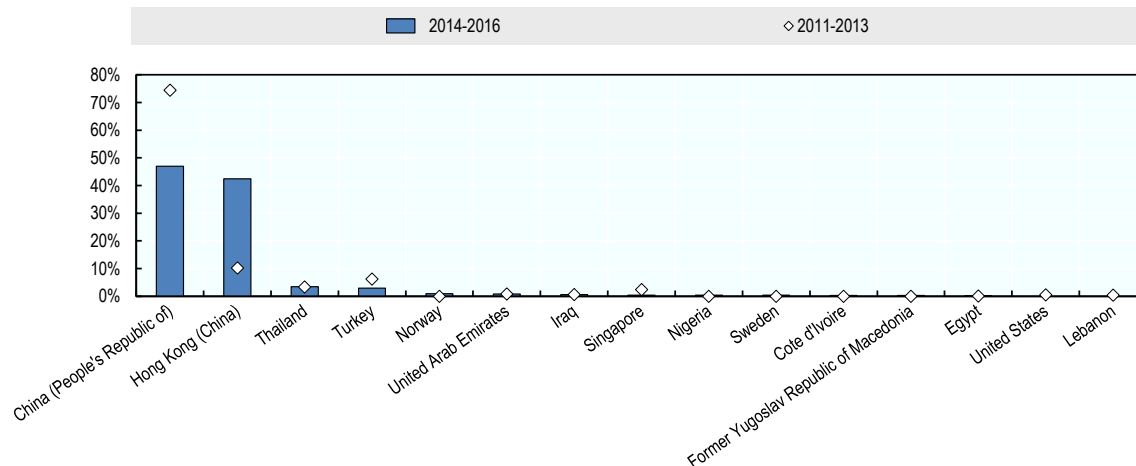
Which product types are most likely to be counterfeited?

Regarding infringed products categories, one can see that counterfeit products smuggled into Sweden are especially concentrated in a limited number of industries. Relating to both the number of customs seizures and the seized value, these include electrical machinery, footwear, leather goods, clothing and watches (see Figure 2.3).

Looking at specific products, a very wide range of counterfeit goods has been imported to Sweden. For example, for the general category "clothing", fakes include dress shirts, sweat suits, t-shirts, jackets, jumpers, socks and sport jackets. The electrical machinery and equipment category includes seized goods such as earphones, mobile phone parts, batteries, chargers and TVs. Counterfeit belts, gloves, handbags, jackets and travel trolleys belong to the articles of leather category destined for the Swedish market.

Figure 2.3. Share of seizures of counterfeit goods in Sweden by product type, 2014-16
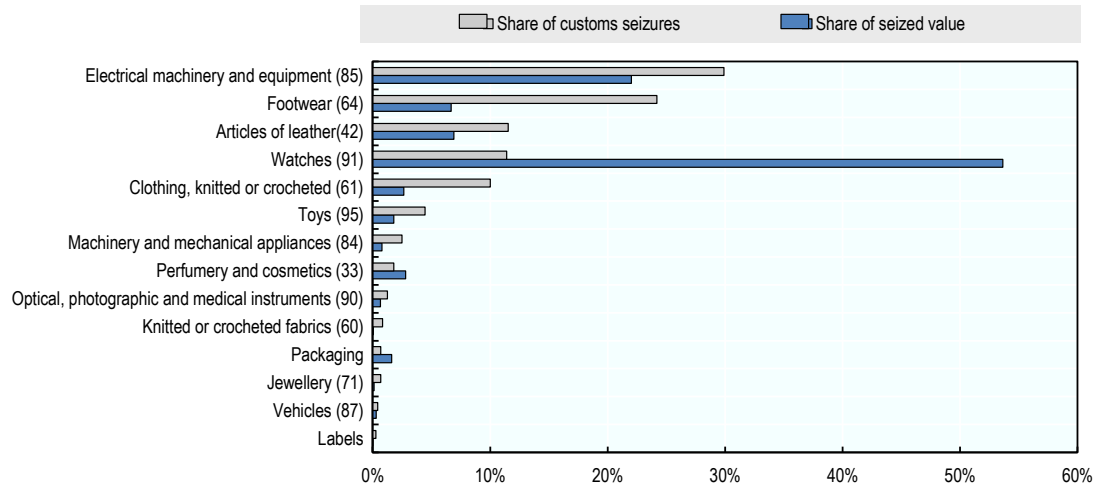
Note: Figures in parenthesis are Harmonized System (HS) codes as defined by the United Nations Trade Statistics (UN Trade Statistics, 2017).

Concerning changes between 2011-13 and 2014-16, the top five product categories of counterfeit goods in Sweden remains composed the same way but changes have to be noted. In terms of seizures, the share of electrical machinery and watches increased in 2014-16 while the share of footwear, leather goods and clothing tended to decrease over this period (Figure 2.4).

Findings relating to seized value are very similar: the share of watches and information and communication technology (ICT) devices increased while the share of leather products and footwear decreased.

Figure 2.4. Share of seizures of counterfeit goods in Sweden by product type, change between 2014-16 and 2011-13

A. In terms of seized value
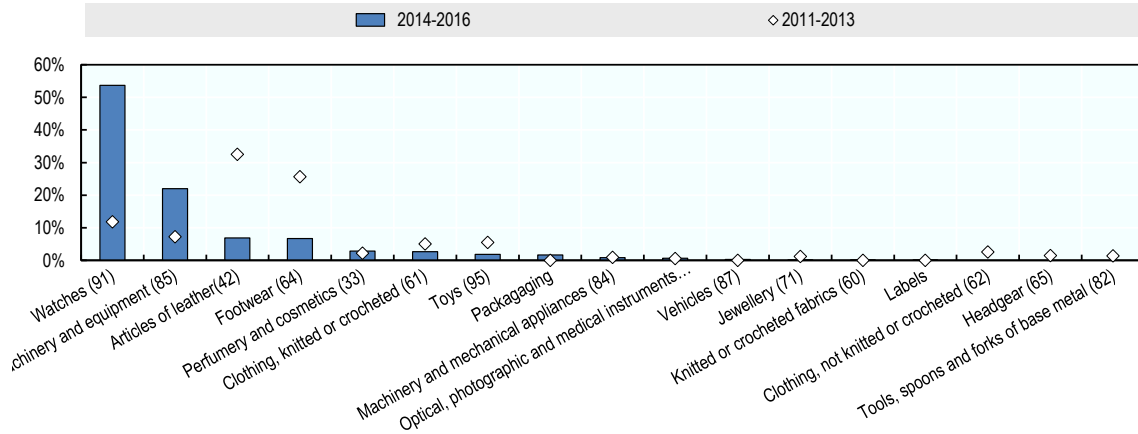
B. In terms of customs seizures
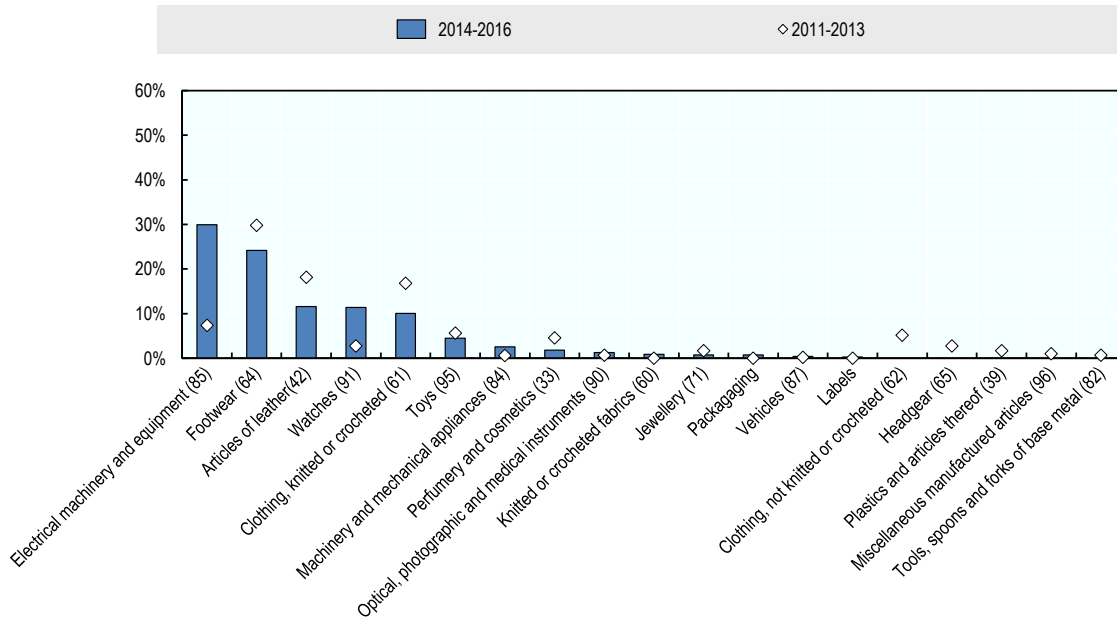
What are the conveyance methods used to ship fake Swedish imports?

In terms of their value, in 2014-16, counterfeit goods imported into Sweden were mainly transported by air (82% of the seized value), followed by sea (17%). This also means that 90% of customs actions involving seizures of Swedish fake imports were shipped by air, followed by sea (8%) and road (2%).

Figure 2.5. Transport modes of fake goods imported to Sweden, 2014-16

A. In terms of seized value

2014-16
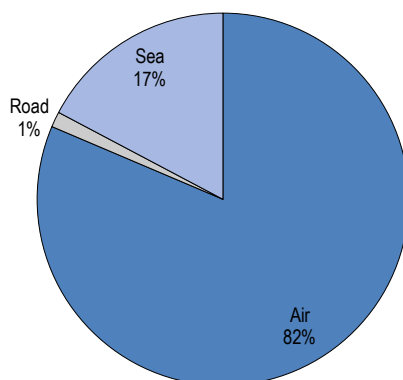
B. In terms of customs seizures

2014-16
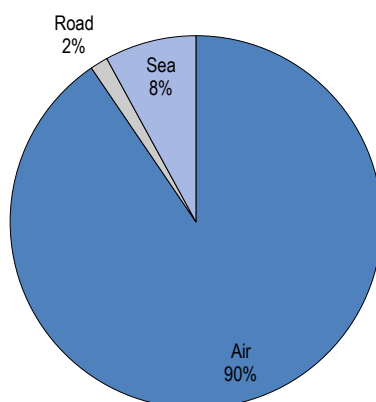
Regarding the size of shipments, around 57% of the seizures involved 10 or less items. More than 40% of seized goods were shipped in small packages which counted less than 6 items. These figures are in line with the worldwide trend since a majority (63%) of global customs seizures of counterfeit and pirated goods involved small parcels (OECD/EUIPO, 2018). The increasing use of small shipments is a mean for counterfeiters to reduce losses in the event of customs interception. It also reflects the sharp growth in e-commerce and particularly the increase in items shipped directly to consumers by parcel post or letter packets. (Figure 2.5).

Figure 2.6. Size of shipments of counterfeit imports to Sweden, 2014-16

As a percentage of customs seizures
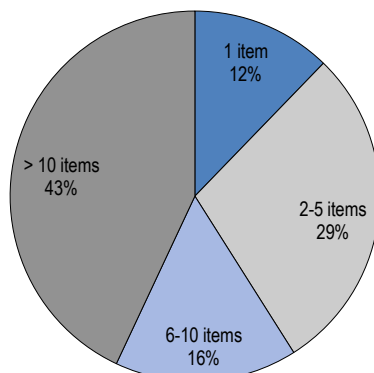
What is the total value of counterfeit products sold in Sweden?

The best estimates, based on the data provided by customs authorities and on the GTRIC methodology, indicate that imports of counterfeit and pirated goods in Sweden accounted for as much as SEK 18.3 billion (USD 2.2 billion), the equivalent of 1.6% of Swedish imports of genuine goods. The term "as much as" is important since it refers to the upper limit of counterfeit and pirated products imported in Sweden. In addition, this amount does not include domestically produced and consumed counterfeit and pirated products and pirated digital products that are distributed via the Internet.

The analysis also shows that the degree of counterfeiting in Sweden varies across product categories. Watches and jewellery as well as toys and games were the most affected categories by counterfeiting. Indeed, 14.3% and 12.2% of goods imported to Sweden in these respective categories were fakes. This was followed by clothing (8.9%) and electronic appliances (5.9%). Categories relating to vehicles (0.2%) and machinery (0.9%) were affected by counterfeiting to a lesser extent.

Table 2.1. Top product categories subject to counterfeiting in Swedish imports in relative terms, 2016

In terms of share within the product category

HS category	Share of fake imports (%)
Watches and jewellery	14.3
Household cultural and recreation goods; including toys and games, books and musical instruments	12.2
Clothing, footwear, leather and related products	8.9
Electrical household appliances, electronic and telecommunications equipment	5.9
Perfumery and cosmetics	1.5
Machinery, industrial equipment; computers and peripheral equipment; ships and aircrafts	0.9
Motor vehicles and motorcycles	0.2

In absolute terms, ICT devices are by far the most counterfeited types of goods (see Table 2.2 for the top categories). The estimated value of fake ICT devices imported into Sweden amounted SEK 10 billion (USD 1.2 billion) in 2016. This category includes a wide range of products such as phone batteries, chargers and earphones. The clothing category followed, whose value of fake goods imported into Sweden amounted to around SEK 4.6 billion (USD 550 million).

The high estimate value of fake ICT devices reflects the strong and growing demand for this kind of goods. In addition, ICT products are knowledge-intensive and protected with intellectual property, and consequently particularly subject to counterfeiting (see the OECD report on trade in counterfeit ICT goods, 2017).

Table 2.2. Top product categories subject to counterfeiting in Swedish imports in absolute terms, 2016

HS category	Value in USD million
Electrical household appliances, electronic and telecommunications equipment	1210.0
Clothing, footwear, leather and related products	551.0
Machinery, industrial equipment; computers and peripheral equipment; ships and aircrafts	165.0
Household cultural and recreation goods; including toys and games, books and musical instruments	160.0
Watches and jewellery	74.0
Motor vehicles and motorcycles	39.8
Perfumery and cosmetics	13.3

The primary and secondary markets for counterfeit products sold in Sweden

The distinction between primary and secondary market is crucial for the analysis of the economic impacts of counterfeit products smuggled into Sweden. The primary market refers to the consumers that bought fakes unknowingly. On this primary market, every sale of a fake item represents a direct loss for the Swedish retail and wholesale industry. The secondary market refers to the consumers who buy fakes consciously. On this secondary market, only a share of consumers would have deliberately substituted their purchases of counterfeit products for genuine ones.

Table 2.3 identifies the share of secondary and consequently primary markets for counterfeit products sold in Sweden by sector. This shows that 49.8% of imported counterfeit and pirated products sold in Sweden in 2014-16 were sold to consumers who actually knew they were buying fake products while the remaining share purchased unwittingly. The share of fakes destined for secondary markets varies significantly by sector, ranging from 20% for vehicles to 57.8% for toys and games. Logically, consumers tend to buy fakes unknowingly for product categories with a potential high-security issue (i.e. vehicles and machinery).

Table 2.3. Share of secondary markets for counterfeit products in Sweden

Sector	Share of secondary market (%)
Household cultural and recreation goods; including toys and games, books and musical instruments	57.8
Perfumery and cosmetics	55.0
Watches and jewellery	53.8
Electrical household appliances, electronic and telecommunications equipment	52.3
Clothing, footwear, leather and related products	48.3
Machinery, industrial equipment; computers and peripheral equipment; ships and aircrafts	37.5
Furniture, lighting equipment, carpets and other manufacturing n.e.c	33.3
Motor vehicles and motorcycles	20.0
Total	49.8

Once the share of primary and secondary markets is identified, the next step is to calculate the consumer's substitution rate on the secondary market, i.e. the extent to which every illegal purchase replaces a legal sale. Academic research on consumers' socio-economic behaviour and consumers themselves are the two different sources to obtain information on substitution rates.

There are several studies that report estimates on consumers' substitutions rates. The first one is the Anti-Counterfeiting Group's (2007) consumer survey that looked at various product categories. It assessed a 39% substitution rate for clothing and footwear, meaning that every UDS 2.5 spent on fake clothes, accessories or footwear in secondary markets translates into USD 1 in lost sales for the retail and wholesale industry. The same survey determined the 49% substitution rate for products related to the perfumery and cosmetics sector and 27% for products belonging to the watch and jewellery industries. Another study on substitution rates was a survey by Tom et al. (1998) that determined the rate of 32% for all other fake products sold on secondary markets. All these substitution rates are displayed in Table 1.1.

To what extent are Swedish consumers overpaying for fake products?

For deceived Swedish consumers who purchased fakes on primary markets, counterfeit product smuggling may reduce the value or satisfaction they derive from the products concerned. This is based in large measure on differences from similarly priced products in terms of quality and/or performance. Such differences are likely to be noticed, for instance when a consumer buys a low-quality fake product on the primary market believing it to be a high-quality genuine article.

Of course, counterfeit products dramatically increase the potential for negative effects on the health and safety of consumers. However, the regulatory control of supply chains in Sweden is efficient and there were no major reported instances of fakes posing a potential threat to the supply chain of genuine goods. In addition, even if such damages occur, they cannot be simply quantified and so fall outside the scope of this report.

In 2016, the total detriment due to consumer deception amounted to almost SEK 4.5 billion (USD 540 million). The highest detriment was recorded for electrical appliances, electronic equipment (SEK 2.3 billion or USD 271 million) followed by clothing (SEK 1.3 billion or USD 159 million).

Table 2.4. Estimate of consumer detriment in Sweden by sector, 2016

Sector	Value in USD million
Electrical household appliances, electronic and telecommunications equipment	271
Clothing, footwear, leather and related products	159
Machinery, industrial equipment; computers and peripheral equipment; ships and aircrafts	55.8
Household cultural and recreation goods; including toys and games, books and musical instruments	36.5
Watches and jewellery	13.3
Perfumery and cosmetics	3.9
Total	539.5

The effect of fake goods on sales in the Swedish retail and wholesale sector

Overall, the total volume of foregone sales in the Swedish wholesale and retail sector due to counterfeit imports in 2016 was SEK 4.3 billion (USD 521 million) equivalent to 1.5% of the total sales of the wholesale and retail sectors affected by counterfeiting.

In absolute terms, the highest sales losses to the Swedish wholesale and retail industries were for electrical household appliances, electronic and telecommunications equipment (SEK 2.3 billion or USD 275.4 million), followed by clothing, footwear, leather and related products (SEK 1.1 billion or USD 136.8 million), and machinery, industrial equipment, computers and peripheral equipment, ships and aircrafts (SEK 361.7 million or USD 43.4 million).

In relative terms, the sector of electrical household appliances, electronic and telecommunications equipment experienced the highest losses (6% of sales), followed by the sector of watches and jewellery (3.5%) and that of clothing, footwear, leather and related products (1.5%).

Table 2.5. Lost sales for the Swedish retail and wholesale sector due to fake imports in Sweden, 2016

Sector	Value in USD million	Share of sales (%)
Electrical household appliances, electronic and telecommunications equipment	275.4	6.0
Watches and jewellery	15.8	3.5
Clothing, footwear, leather and related products	136.8	1.5
Household cultural and recreation goods; including toys and games, books and musical instruments	34.2	1.2
Machinery, industrial equipment; computers and peripheral equipment; ships and aircrafts	43.4	0.6
Perfumery and cosmetics	3.4	0.4
Motor vehicles and motorcycles	12.1	0.1
Total	521.1	1.5

The effect of the counterfeiting market on jobs in the Swedish retail and wholesale industry

Total job losses in the wholesale and retail sector due to counterfeit imports into Sweden amounted to around 2 500 in 2016, equivalent to 1% of all people employed in the sectors affected by counterfeiting.

In absolute terms, the highest job losses due to counterfeiting were found in the electrical household appliances, electronic and telecommunications equipment sector (1 190 people). This was followed by the clothing and toys and games industries where job losses were experienced by 726 people and 245 people respectively.

In relative terms, the ICT devices industry experienced the highest job losses (around 4% of employees). It was followed by the watches and jewellery, and clothing industries where job losses represented 2.1% and 1.1% of their employees respectively.

Table 2.6. Lost jobs in the Swedish retail and wholesale sector due to fake imports in Sweden, 2016

Sector	Number of employees	Share of employees (%)
Electrical household appliances, electronic and telecommunications equipment	About 1 200	3.9
Watches and jewellery	About 100	2.1
Clothing, footwear, leather and related products	About 700	1.1
Household cultural and recreation goods; including toys and games, books and musical instruments	About 250	0.8
Machinery, industrial equipment; computers and peripheral equipment; ships and aircrafts	About 200	0.4
Perfumery and cosmetics	Less than 100	0.2
Motor vehicles and motorcycles	Less than 100	0.1
Total wholesale and resale sector	About 2 500	1

The effect of the counterfeiting market on Swedish government revenues

Lower sales in the wholesale and retail sector due to counterfeit and pirated imports in Sweden mean lower tax revenues for the Swedish government from value-added tax (VAT), corporate income tax (CIT), personal income tax (PIT) and social security contributions.

Table 2.7 presents this foregone revenue by type of taxes, which amounted to SEK 1.8 billion (USD 222 million) in 2016. Within this overall figure, the largest component was foregone value-added taxes, amounting to around SEK 1 billion (USD 130 million).

Table 2.7. Foregone taxes for the Swedish government due to fake imports into Sweden, 2016

Tax type	Value in USD million
Value-added taxes	130.3
Personal income taxes and social security contributions	61.9
Corporate income taxes	30.0
Total	222.2

References

Anti-Counterfeiting Group (2007), *Consumer Survey*, Commissioned from independent survey specialists, http://www.wipo.int/ip-outreach/en/tools/research/details.jsp?id=691.

OECD (2017), *Trade in Counterfeit ICT Goods*, OECD Publishing, Paris, http://oe.cd/fakeICTs.

OECD/EUIPO (2018), *Misuse of Small Parcels for Trade in Counterfeit Goods: Facts and Trends*, Illicit Trade, OECD Publishing, Paris, https://doi.org/10.1787/9789264307858-en.

Tom, G. et al. (1998), "Consumer demand for counterfeit goods", *Psychology & Marketing*, Vol. 15/5, pp. 405-421.

UN Trade Statistics (2017), *Harmonized Commodity Description and Coding Systems (HS)*, United Nations, Geneva, https://unstats.un.org/unsd/tradekb/Knowledgebase/50018/Harmonized-Commodity-Description-and-Coding-Systems-HS.

Chapter 3. Infringement of Swedish IP in world trade

Scope and volume of infringement of Swedish IP worldwide

Where do fakes that infringe Swedish IP come from?

The highest number of counterfeit shipments infringing Swedish intellectual property (IP) originated from China and Hong Kong (China), representing 92.4% and 6.1% of total seized value respectively. In terms of customs seizures, China and Hong Kong (China) are also the two main provenance economies, followed by Singapore, Turkey and Malaysia.

Figure 3.1. Top provenance economies of fake goods infringing Swedish IP, 2014-16
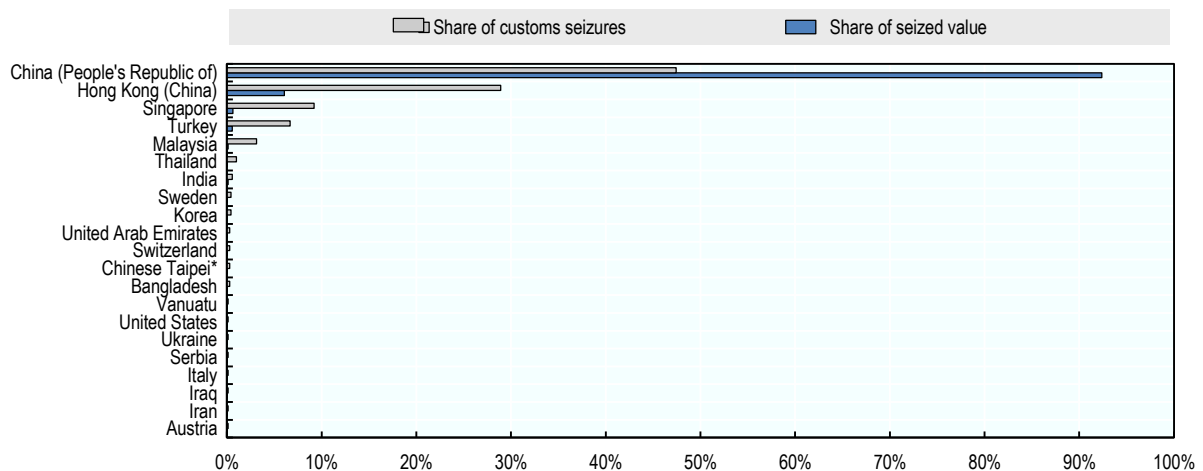
Figure 3.2 displays the changes that occurred between 2011-13 and 2014-16 in terms of provenance economies for fake goods infringing Swedish intellectual property rights (IPR).

In terms of seized value, one can see that Turkey has stepped back while China and Hong Kong (China) moved up. In 2011-13, Turkey represented around 10% of the seized value of fake imports while it represented almost 0% in 2014-16. As a result, provenance economies of fake Swedish imports were very much concentrated around China and Hong Kong (China) in 2014-16.

In terms of customs seizures, more changes have to be noted. The two most noticeable are the sharp fall of Turkey and the high growth of Hong Kong (China) and Singapore. China and Malaysia also grew during the two periods but to a lesser extent.

Figure 3.2. Top provenance economies of fake goods infringing Swedish IP, change between 2011-13 and 2014-16

A.   In terms of seized value
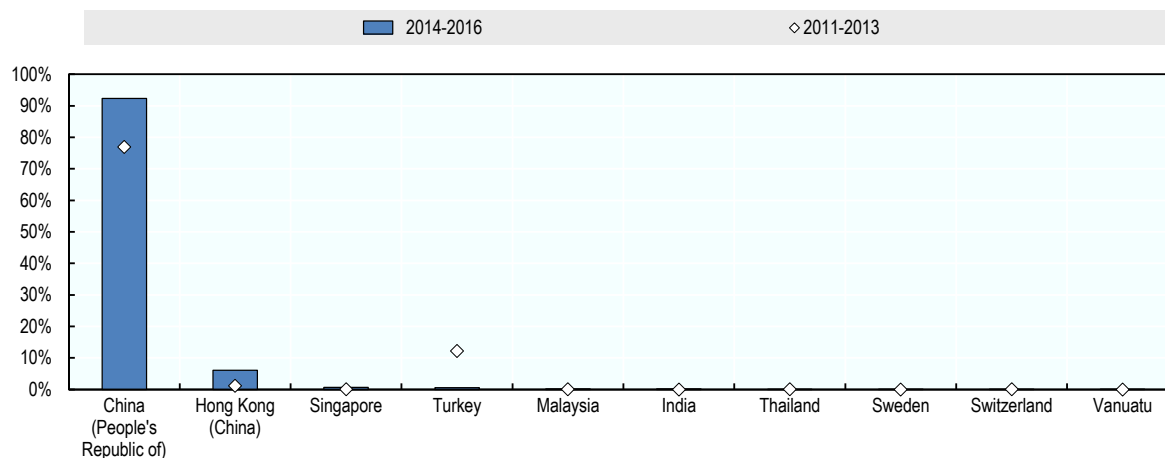
B.   In terms of customs seizures
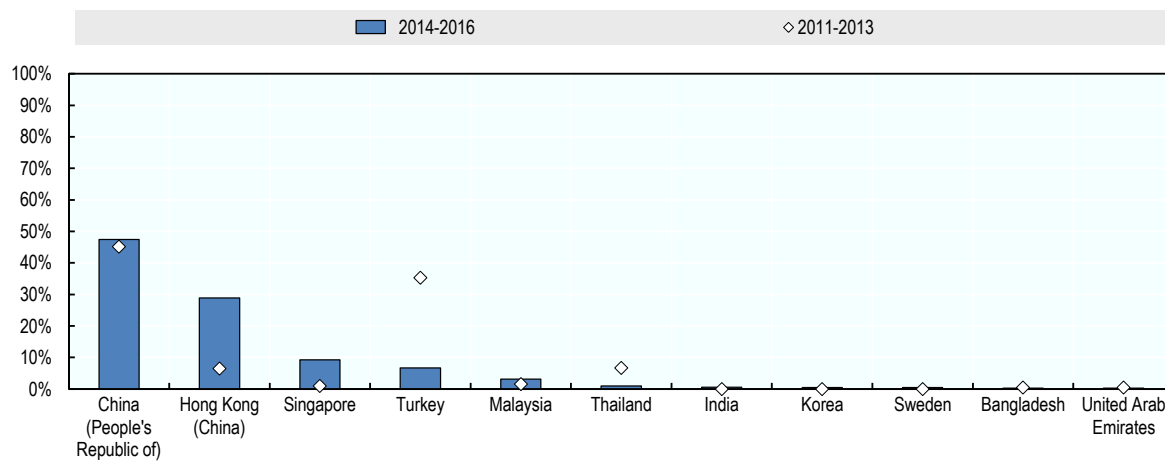
What are the impacted industries?

Seizures statistics reported in Figure 3.3 indicate that worldwide Swedish-related IPR infringements are especially concentrated in a limited number of industries. Relating to both the number of customs seizures and the seized value, these include vehicles, watches, toys, clothing, machinery and mechanical appliances. It is worth noting that the toys category concentrated almost 50% of the seized value while it concentrates 10% of the customs seizures.

Figure 3.3. Top product categories of fake goods infringing Swedish IP, 2014-16
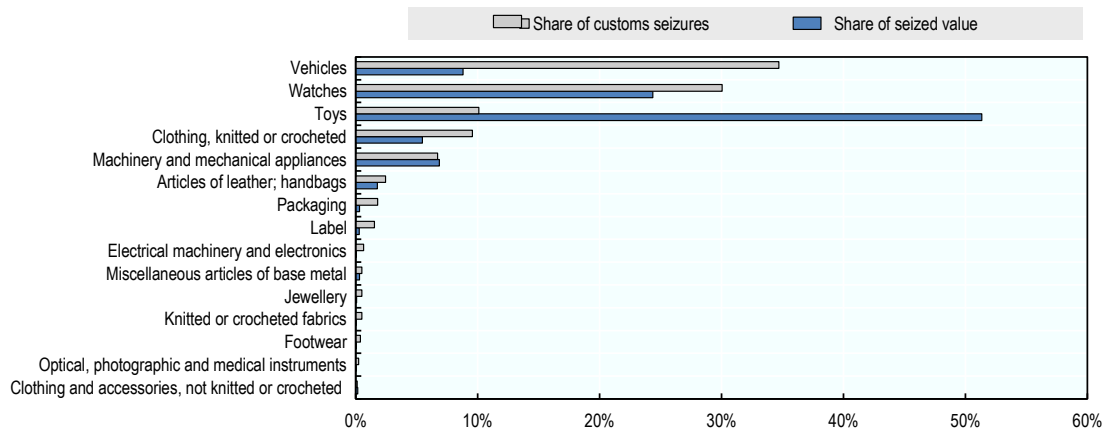
With respect to the seized value, the main changes that occurred between 2011-13 and 2014-16 are the increase in toys and watches and the decrease of machinery and clothing.

In terms of the number of seizures, the categories pertaining to vehicles, watches and toys increased strongly between 2011-13 and 2014-2016 while clothing and electrical machinery categories decreased.

Changes concerning toys and watches are quite significant since these industries represented almost 0% of both seized value and customs seizures in 2011-13.

Figure 3.4. Top product categories of fake goods infringing Swedish IP, change between 2011-13 and 2014-16

A. In terms of seized value
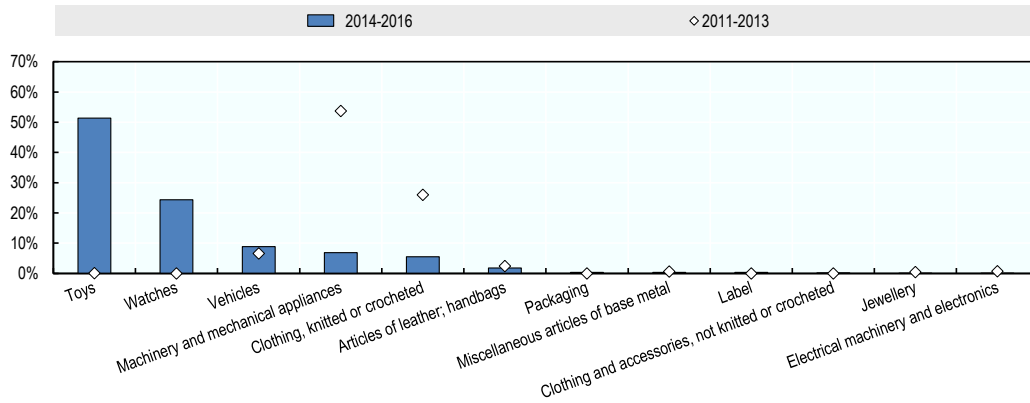
B. In terms of customs seizures
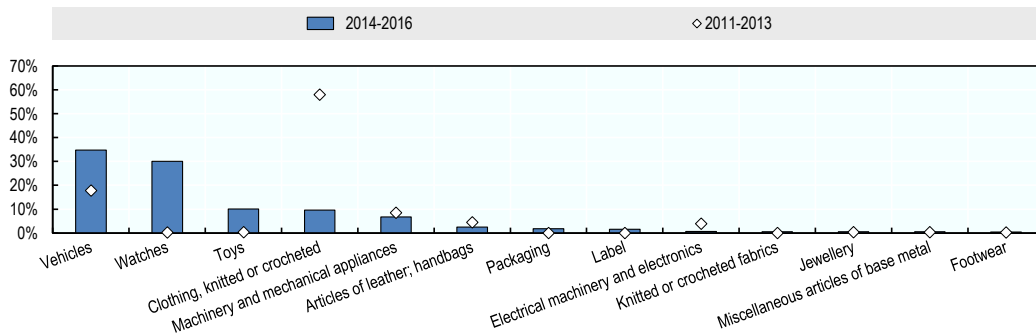
Concerning specific Swedish products target, the analysis shows a wide range of goods counterfeited worldwide. For example, in the clothing category, counterfeit products infringing a Swedish IP included cardigans, coats, sweaters and sportswear. Bearings are the main counterfeit product for the machinery and mechanical appliances category. For the vehicles category, fake goods are also diversified and include seat covers, mats for cars, disc brakes and brake pads.

Importantly, some fake goods pose health and safety threats. This refers mostly to goods sold on primary markets to unaware consumers. This includes not only such fake goods as bearings, chainsaws and spare parts, but also cosmetics and outdoor clothing (see Box 3.1).

Box 3.1. Fjällräven products targeted by counterfeiters

Representatives from the Swedish clothing producer Fjällräven provided knowledge about their counterfeiting experience during an interview. The Swedish brand suffers from counterfeiting; their backpacks are particularly affected.

Production of fakes takes place in Asia (mainly in China) but also in Turkey. Different channels are used to distribute fake goods but online distribution seems to be preeminent. E-commerce via website platforms is one of them. Distribution can also be made via social media or real market places.

Regarding the quality of fake products, the tests made on some fake jackets revealed that they were filled with bloody feathers. This anecdote is a good illustration of low-quality material used by counterfeiters. Water resistant-products are also a source of concerns. Cheapest products used by counterfeiters are neither health nor environmentally friendly. In addition to low-quality material concerns, the methods of production have been raised. Indeed, counterfeiters are driven by profits and are not engaged in a sustainable approach with respect to the use of resources for example.

What are the conveyance methods used to ship fakes infringing Swedish IP?

As can be seen in Figure 3.5, postal parcels (61%) are the most popular way of shipping counterfeit and pirated products infringing Swedish IP. Air and sea transport followed with 26% and 9% of seizures respectively.

In terms of value, the sea is the main mode of transport for counterfeit goods infringing Swedish IP. Almost 95% of the seized value of fake goods infringing Sweden IP concerned shipments by sea.

Figure 3.5. Counterfeit goods infringing Swedish IP by transport modes, 2014-16

In terms of seized value

In terms of customs seizures

2014-2016

2014-2016
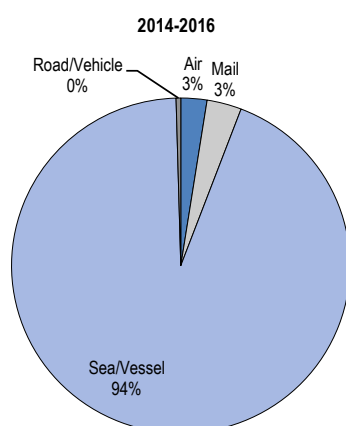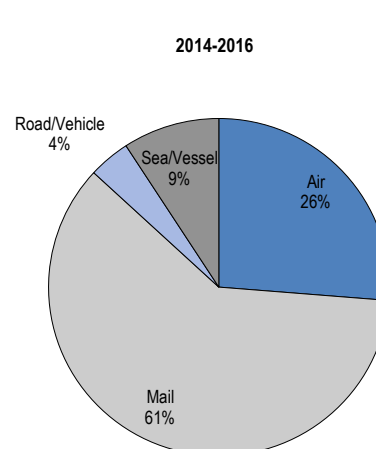
Small shipments (i.e. less than six items) of fake goods infringing Swedish IP tend to predominate whereas the share of large parcels including at least 10 items represented 41% of customs seizures. In 2011-13, the structure of the size of shipments was comparable (see

Figure 3.6). As previously mentioned, the prominence of small parcels can be partly Explained by the fast growth of e-commerce as highlighted in the OECD/EUIPO joint report on small parcels (OECD/EUIPO, 2018).

Figure 3.6. Size of shipment of goods infringing Swedish IP, 2014-16 and 2011-13

As a percentage of total customs seizures
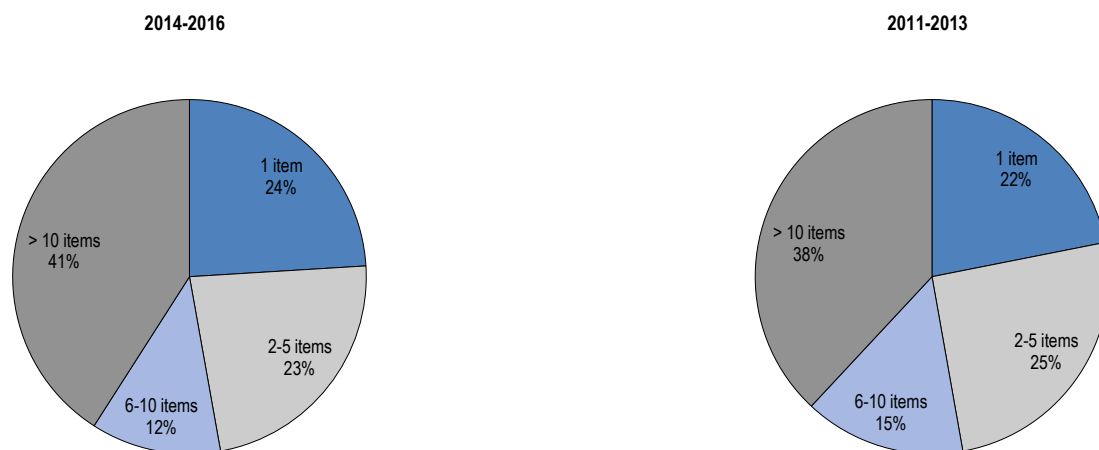
What is the value of global trade in counterfeit products that infringe Swedish IPRs?

As explained in Annex A, applying the GTRIC-e and GTRIC-p indices to data on Swedish exports and domestic sales allows the absolute values to be gauged for trade in counterfeit and pirated goods infringing the IPR owned by Swedish residents. These absolute values are expressed as upper limits of trade counterfeit and pirated goods, in percentage of exports and sales.

To calculate the ceiling values (upper limits of trade counterfeit and pirated goods, in percentage of exports and sales), and to translate the results from relative values to absolute ones (e.g. in monetary terms), a "fixed point" must first be established. This "fixed point" is the percentage of counterfeit goods in total imports in a selected product category from a given trade partner, for which reliable data are available.

The fixed point has been established with certain credibility through interviews with enforcement officials for the pairs "product category–destination economy" that are the most intense in terms of trade in counterfeit and pirated goods (for more discussion see OECD/EUIPO, 2016 and OECD/EUIPO, 2019). In these studies, the fixed point corresponds to the imports of shoes from China.

Unfortunately, this value of fixed point cannot be directly applied to infringements of Swedish IP, as shoes are not among the most intensely counterfeit Swedish product. Instead, a lower value of 20% gauged during interviews with industry representatives and enforcement official is chosen. In addition, to verify if values of the "fixed point" determined during the interviews with customs officials and experts result in robust results, some additional checks are carried out. To do so, the empirical application is based on three scenarios, with selected values of 10%, 15% and 20%. Note that all of these scenarios take much more conservative values of fixed points than the actual fixed points applied to imports in OECD/EUIPO (2016) and (2019).

Table 3.1 below reports the estimated value of global trade in counterfeit products infringing Swedish trademarks and patents for 2014, 2015 and 2016, for these three alternative ceiling values.

Table 3.1. Estimated value of global trade in counterfeit products infringing Swedish IPR, 2014-16

Year	2014		2015		2016	
Unit	Value in USD billion	Share of sales (%)	Value in USD billion	Share of sales (%)	Value in USD billion	Share of sales (%)
Ceiling value 20%	**1.5**	**0.88**	**2.4**	**1.30**	**3.4**	**1.80**
Ceiling value 15%	*1.1*	*0.66*	*1.8*	*0.97*	*2.5*	*1.35*
Ceiling value 10%	*0.8*	*0.44*	*1.2*	*0.65*	*1.7*	*0.90*

The best estimates based on the data provided by customs authorities worldwide, and on the GTRIC methodology, indicate that global trade in counterfeit and pirated products infringing Swedish trademarks and patents amounted to as much as SEK 28.3 billion (USD 3.4 billion) in 2016, equivalent to 1.8% of total sales (domestic plus exports) of Swedish manufacturing sectors affected by counterfeiting. This means that around 0.7% of global trade in counterfeit and pirated goods is related to goods infringing Swedish IPR (USD 3.4 billion over the USD 509 billion estimated in the OECD/EUIPO 2019 report).

Figure 3.7 breaks down the amount of estimated value of global trade in counterfeit products infringing Swedish trademarks and patents by product category in absolute terms (i.e. in millions of USD). This means that Swedish trademarks and patents related to motor vehicles and motorcycles; machinery, industrial equipment; computers and peripheral equipment were particularly targeted by counterfeiters in global trade.

In relative terms, motor vehicles were the most often counterfeited type of products worldwide, with fakes representing more than 8% of all goods within the category. It was followed by toys and games and machinery, industrial equipment with fakes making up around 6% of all goods of each category.

Figure 3.7. Top product categories subject to infringements of Swedish IPR in global trade, 2016

A. In terms of seized value

Value in USD mn

B. In terms of customs seizures
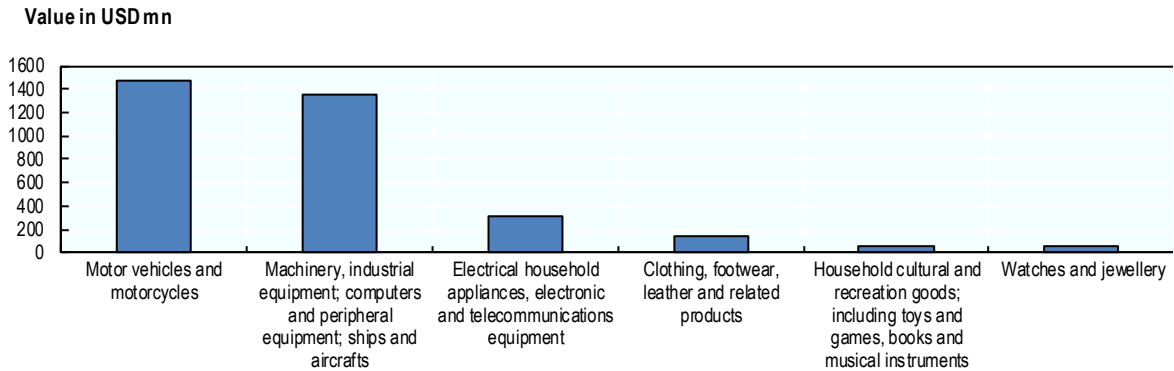
Share of sales (exports plus domestic sales)
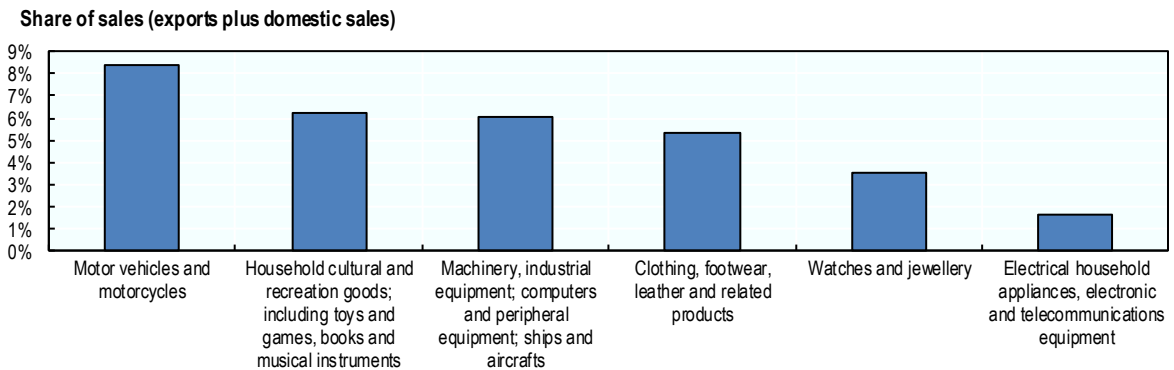
The secondary market

Regarding consumer deception, the analysis shows that around 40% of Swedish IPR infringing fakes traded worldwide were sold on primary market, i.e. they were sold to consumers who actually did not know they were buying fake products (see Table 3.2). The share of fakes destined for secondary markets varies significantly by sector, ranging from 9% for games and toys to 64.2% for vehicles.

Fake machinery products that could potentially have huge effects on security and consequently on health are rarely bought knowing they are not genuine. This is partly due to the purchase decision of these products is driven by demand while clothing or watches are supply-driven products (see Box 3.2).

Box 3.2. SKF ball bearings, a demand-driven business model

An interview with representatives from SKF gave some interesting insights on business models employed by suppliers of fake ball bearings.

Fake ball bearing production follows a specific business model driven by demand. Distributors, which are the key element of fake ball bearing production, gather customers' requests. They then place orders on online websites that sell fake ball bearings by imitating SKF's genuine websites. Once ordered, ball bearings are produced in legitimate factories. In most cases production of fake ball bearings takes place in Shandong Province of China. Once the "no name" ball bearings are produced, the next step is to label them in a dedicated branding workshop. Importantly, production and branding of fake ball bearings are two completely separate activities. Once labelled, fake ball bearings are ready to be distributed to consumers.

The quality of fake ball bearings is absolutely unpredictable and unstable. Customers who mostly buy fakes unknowingly can be often disappointed because they will not enjoy the high and stable quality offered by genuine goods. Technical diagnostics show that genuine goods can last 10 to 20 time longer than the fake ones. In some cases fake ball bearings were just old and used ball bearings that have been cleaned, polished and rebranded.

Table 3.2. Share of secondary markets for counterfeit products infringing Swedish IP

Sector	Share of secondary market (%)
Motor vehicles and motorcycles	64.2
Clothing, footwear and leather related products	36.6
Watches and jewellery	12.7
Household cultural and recreation goods; including toys and games, books and musical instruments	9.1
Machinery, industrial equipment; computers and peripheral equipment; ships and aircrafts	6.0
Total	59.8

The effect of counterfeiting on sales by Swedish IPR owners

The total volume of foregone sales by Swedish companies due to infringement of their IP rights amounted SEK 16.7 billion (USD 2 billion) in 2016, equivalent to 2.4% of their total sales (domestic sales plus exports). The manufacturing industries of motor vehicles; machinery, industrial equipment, computers and peripheral equipment experienced the highest losses in absolute terms (respectively SEK 6.9 billion or USD 830 million and SEK 6.8 billion or USD 818 million).

In terms of shares of sales, the highest losses were recorded by the manufacturing industries for clothing, footwear, leather and related products, and watches and jewellery which lost 19.5% and 17% of their sales respectively.

Table 3.3. Estimated lost sales for Swedish manufacturing industries, 2016

Sector	Value in USD million	Share of sales (%)
Clothing, footwear, leather and related products	83.84	19.5
Watches and jewellery	22.94	16.9
Household cultural and recreation goods; including toys and games, books and musical instruments	35.18	15.3
Electrical household appliances, electronic and telecommunications equipment	241.39	4.0
Machinery, industrial equipment; computers and peripheral equipment; ships and aircrafts	818.31	2.3
Motor vehicles and motorcycles	830.10	1.9
Total	2031.76	2.4

The effect of counterfeiting on jobs in the Swedish manufacturing industry

Lower sales of genuine Swedish patented and trademarked products imply fewer jobs in the Swedish manufacturing sectors affected. In order to estimate the number of jobs lost due to the infringement of Swedish trademarks and patents in global trade, the basic econometric model presented in Annex A.3 was used. This drew on estimates of the transmission rates (elasticities) between lost sales and lost jobs (Table 1.3).

Table 3.4 displays the total number of job losses in the Swedish manufacturing industry. The total loss due to infringement of Swedish IPR amounted to more than 4 500, equivalent to 2.2% of the total employment of employees in these branches.

Table 3.4. Estimated lost jobs in Swedish manufacturing industries, 2016

Sector	Number of employees	Share of employees (%)
Clothing, footwear, leather and related products	About 300	12.5
Watches and jewellery	Less than 100	10.3
Household cultural and recreation goods; including toys and games, books and musical instruments	About 100	8.7
Electrical household appliances, electronic and telecommunications equipment	About 600	3.3
Machinery, industrial equipment; computers and peripheral equipment; ships and aircrafts	About 2 000	1.9
Motor vehicles and motorcycles	About 1 000	1.8
Total	About 4 000	2.2

The effect of Swedish IPR infringement on government revenues

Lower sales and lower profits for Swedish rights holders mean they pay lower corporate income tax to the government. Moreover, fewer employees led to low personal income tax revenues and lower social security contributions. Finally, lost sales on the Swedish domestic market reduce the value-added taxes on consumption. Overall, the foregone tax revenue amounted to SEK 5.7 billion (USD 682 million) in 2016. The highest loss concerned the value-added tax, amounting to more than SEK 4 billion (USD 508 million)

Table 3.5. Public revenue losses due to Swedish IPR infringements in global trade, 2016

Tax type	Value in USD million
Value-added	507.9
Personal income tax and social security contributions	134.2
Corporate taxes	40.3
Total	682.5

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Chapter 4. The overall effect of counterfeiting on Sweden

Trade in fake goods: The overall impact on Sweden

This report has assessed two particular categories of effects of counterfeiting and piracy on Sweden: those of imports of counterfeit and pirated products in Sweden; and those of global trade in goods that infringe Swedish IP.

Concerning the total impact of counterfeit trade in Sweden, the best available statistics show that the total consumer detriment due to consumer deception by counterfeiters in 2016 amounted to almost SEK 4.5 billion (USD 540 million). The sales losses to Swedish wholesale and retail industries in 2016 amounted to SEK 4.3 billion (USD 521 million), or 0.7% of total sales of retail industries affected by counterfeiting in that year. The total volume of foregone sales by Swedish rights owners due to infringement of their IP in 2016 amounted to SEK 16.7 billion (USD 2 billion), or 2.4% of their total sales in that year. These sale losses subsequently translate into lost jobs and lower tax returns (see Table 4.1).

Table 4.1. Total direct impact of counterfeit and pirated trade in the Swedish context, 2016

Total lost sales (wholesale and retail)		Total lost sales (Swedish IP right owners)		Total lost jobs		Total lost taxes	
USD 0.521 billion	1.5% of sales	USD 2 billion	2.4% of sales	About 7.1 thousand lost jobs	0.7% of full-time equivalent employees	USD 0.905 billion	0.2% of Swedish GDP

A comparison of the scale of losses due to counterfeiting in Sweden on the one hand and due to infringement of IP rights of Swedish firms on the other yields some relevant observations.

In absolute terms, losses experienced due to infringement of Swedish IP abroad are much greater than those due to imports of fakes to Sweden. In terms of damage to Swedish revenue, they amounted to SEK 5.7 billion (USD 682 million) of foregone taxes versus SEK 1.8 billion (USD 222 million) caused by imports of fakes to Sweden. This is for at least two main reasons:

- Sweden is a relatively small economy with high dependence on exports of IP intensive goods. In addition, these goods enjoy an excellent reputation worldwide becoming attractive targets for counterfeiters. This means that globally, trade in counterfeit and pirated goods poses a vital threat to Swedish companies and can undermine their innovative efforts and investment.

- Second, Sweden has an efficient governance response system that seems to be effective in reducing the overall damage of counterfeit imports to Sweden, and temper the demand for fakes in Sweden.

Regarding IP infringement of Swedish products worldwide, it should be also noted that it varies significantly between impacted sectors. In cases of fake clothes or watches, it is

supply driven, whereas for fake bearings it is driven by final consumers. In addition, structured interviews conducted with the Swedish industry reveal a need for stronger international engagement to counter this scourge. This calls for continued strong involvement of Sweden in international, plurilateral and multilateral initiatives to counter the risk of trade in counterfeit and pirated goods.

The magnitude of the issue and the scale of its impact should remain of high priority to both Swedish policymakers and the country's private sector. There are significant implications for the future, including those for activities that generate high value-added and those for innovation potential, both of which are sources of long-term economic growth.

Next steps

The unique methodology developed for this report can lend itself to a number of additional exercises. These could include other country studies, which could eventually lead to a benchmarking exercise. The potential for additional case studies is particularly fruitful where the data are abundant and where there is evidence of significant impact by infringements.

The methodology could also be successfully and repetitively re-applied to determine the relative changes in the scale and effects of counterfeiting and piracy in Sweden. In addition, the methodology offers some flexibility in accommodating improvements in research, for example on substitution rates. This could lead to a more detailed analysis that would produce a more complete picture of trade in counterfeit and pirated goods, and its negative impact on rights holders, governments and consumers in Sweden.

Annex A. Methodological notes

A.1. Construction of the GTRIC for the counterfeit market in Sweden

Construction of GTRIC-p

GTRIC-p is constructed in three steps:

1. For each product category, the seizure percentages for sensitive goods are formed.

2. From these, a counterfeit source factor is established for each industry, based on the industries' weight in terms of Swedish imports.

3. Based on these factors, the GTRIC-p is formed.

Step 1: Measuring product seizure frequencies

v_p and m_p are, respectively, the seizure and import values of product type p (as registered according to the HS on the two-digit level) sold in Sweden from *any* provenance economy in a given year. The relative seizure frequencies (seizure percentages) of good p, denoted below by γ_p, is then defined by:

$$\gamma_p = \frac{v_p}{\sum_p v_p}, \text{ such that } \sum_p \gamma_p = 1$$

Step 2: Measuring industry-specific counterfeiting factors

$M = \sum_p m_p$ is defined as the total registered imports of all sensitive goods into Sweden.

The share of good p in Swedish imports, denoted by s_p, is therefore given by:

$$s_p = \frac{m_p}{M}, \text{ such that } \sum_p s_p = 1$$

The counterfeiting factor of product category p, denoted by C_p, is then determined as the following.

$$C_p = \frac{\gamma_p}{s_p}$$

The counterfeiting factor reflects the sensitivity of product infringements occurring in a particular product category, relative to its share in Swedish imports. These constitute the foundation for forming GTRIC-p.

Step 3: Establishing GTRIC-p

GTRIC-p is constructed from a transformation of the counterfeiting factor; it measures the relative likelihood of different types of product categories being subject to counterfeiting and piracy in Swedish imports. The transformation of the counterfeiting factor is based on two main assumptions:

1. The first (A1) is that the counterfeiting factor of a particular product category is positively correlated with the actual degree of trade in counterfeit and pirated goods covered by that chapter. The counterfeiting factors must thus reflect the real intensity of actual counterfeit trade in the given product categories.

2. The second (A2) acknowledges that the assumption A1 may not be entirely correct. For instance, the fact that infringing goods are detected more frequently in certain categories could imply differences in counterfeiting factors across products merely reflect that some goods are easier to detect than others, or that some goods, for one reason or another, have been specially targeted for inspection. The counterfeiting factors of product categories with lower counterfeiting factors could, therefore, underestimate actual counterfeiting and piracy intensities in these cases.

In accordance with assumption A1 (positive correlation between counterfeiting factors and actual infringement activities) and assumption A2 (lower counterfeiting factors may underestimate actual activities), GTRIC-p is established by applying a positive monotonic transformation of the counterfeiting factor index using natural logarithms. This standard technique of linearisation of a non-linear relationship (in the case of this study, between counterfeiting factors and actual infringement activities) allows the index to be flattened and gives a higher relative weight to lower counterfeiting factors (Verbeek, 2008).

In order to address the possibility of outliers at both ends of the counterfeiting factor index – i.e. some categories may be measured as particularly susceptible to infringement even though they are not, whereas others may be measured as unsusceptible although they are – it is assumed that GTRIC-p follows a left-truncated normal distribution, with GTRIC-p only taking values of zero or above.

The transformed counterfeiting factor is defined as:

$$c_p = \ln(C_p + 1)$$

Assuming the transformed counterfeiting factor can be described by a left-truncated normal distribution with $c_p \geq 0$; then, following Hald (1952), the density function of GTRIC-p is given by:

$$f_{LTN}(c_p) = \begin{cases} 0 & if\, c_p \leq 0 \\ \dfrac{f(c_p)}{\int_0^\infty f(c_p)\, dc_p} & if\, c_p \geq 0 \end{cases}$$

where $f(c_p)$ is the non-truncated normal distribution for c_p, specified as:

$$f(c_p) = \frac{1}{\sqrt{2\pi\sigma_p^2}} \exp\left(-\frac{1}{2}\left(\frac{c_p - \mu_p}{\sigma_p}\right)^2\right)$$

The mean and variance of the normal distribution, here denoted by μ_p and σ_p^2, are estimated over the transformed counterfeiting factor index, c_p, and given by $\hat{\mu}_p$ and $\hat{\sigma}_p^2$. This enables the calculation of the counterfeit import proneness index (GTRIC-p) across product categories, corresponding to the cumulative distribution function of c_p.

Construction of GTRIC-e

GTRIC-e is also constructed in three steps:

1. For each provenance economy, the seizure percentages are calculated.

2. From these, each provenance economy's counterfeit source factor is established, based on the provenance economies' weight in terms of Swedish total imports.

3. Based on these factors, the GTRIC-e is formed.

Step 1: Measuring seizure intensities from each provenance economy

v_e is Sweden's registered seizures of all types of infringing goods (i.e. all p) originating from economy e during a given year in terms of their value.

γ_e is Sweden's relative seizure frequency (seizure percentage) of all infringing items that originate from economy e in a given year:

$$\gamma_e = \frac{v_e}{\sum_e v_e}, \text{ such that } \sum_e \gamma_e = 1$$

Step 2: Measuring economy-specific counterfeiting factors

m_e is defined as the total registered Swedish imports of all sensitive products from e and $M = \sum_e m_e$ is the total Swedish import of sensitive goods from all provenance economies.

The share of imports from provenance economy e in total Swedish imports of sensitive goods, denoted by s_e, is then given by:

$$s_e = \frac{m_e}{M}, \text{ such that } \sum_e s_e = 1$$

From this, the economy-specific counterfeiting factor is established by dividing the general seizure frequency for economy e with the share of total imports of sensitive goods from e.

$$C_e = \frac{\gamma_e}{s_e}$$

Step 3: Establishing GTRIC-e

Gauging the magnitude of counterfeiting and piracy from a provenance economy perspective can be undertaken in a fashion similar to that for sensitive goods. Hence, a general trade-related index of counterfeiting for economies (GTRIC-e) is established along similar lines and assumptions:

1. The first assumption (A3) is that the frequency with which any counterfeit or pirated article from a particular economy is detected and seized by customs is positively correlated with the actual amount of counterfeit and pirate articles imported from that location.

2. The second assumption (A4) acknowledges that assumption A3 may not be entirely correct. For instance, a high seizure intensity of counterfeit or pirated articles from a particular provenance economy could be an indication that the provenance economy is part of a customs profiling scheme or that it is specially targeted for investigation by customs. The role that provenance economies with low seizure intensities play regarding actual counterfeiting and piracy activity could, therefore, be underrepresented by the index and lead to an underestimation of the scale of counterfeiting and piracy.

As with the product-specific index, GTRIC-e is established by applying a positive monotonic transformation of the counterfeiting factor index for provenance economies using natural logarithms. This follows from assumption A3 (positive correlation between seizure intensities and actual infringement activities) and assumption A4 (lower intensities tend to underestimate actual activities). Considering the possibilities of outliers at both ends of the GTRIC-e distribution – i.e. some economies may be wrongly measured as being particularly susceptible sources of counterfeit and pirated imports, and vice versa – GTRIC-e is approximated by a left-truncated normal distribution as it does not take values below zero.

The transformed general counterfeiting factor across provenance economies on which GTRIC-e is based is therefore given by applying logarithms onto economy-specific general counterfeit factors (Verbeek, 2008):

$$c_e = \ln(C_e + 1)$$

In addition, following GTRIC-p, it is assumed that GTRIC-e follows a truncated normal distribution with $c_e \geq 0$ for all e. Following Hald (1952), the density function of the left-truncated normal distribution for c_e is given by

$$g_{LTN}(c_p) = \begin{cases} 0 & if\, cf_e \leq 0 \\ \dfrac{g(e)}{\int_0^\infty g(c_e)\, dc_e} & if\, cf_e \geq 0 \end{cases}$$

where $g(c_e)$ is the non-truncated normal distribution for c_e, specified as:

$$g(c_e) = \frac{1}{\sqrt{2\pi\sigma_e^2}} \exp\left(-\frac{1}{2}\left(\frac{c_e - \mu_e}{\sigma_e}\right)^2\right)$$

The mean and variance of the normal distribution, here denoted by μ_e and σ_e^2, are estimated over the transformed counterfeiting factor index, c_e and given by $\hat{\mu}_e$ and $\hat{\sigma}_e^2$. This enables the calculation of the counterfeit import propensity index (GTRIC-e) across provenance economies, corresponding to the cumulative distribution function of c_e.

Construction of GTRIC

The combined index of GTRIC-e and GTRIC-p, denoted by GTRIC, is an index that approximates the relative proneness of particular product types, imported by Sweden from specific trading partners, to be counterfeit and/or pirated.

Step 1: Establishing intensities for products and provenance economies

In this step, the proneness to contain counterfeit and pirated products will be established for each trade flow from a given provenance economy and in a given product category.

The general proneness of product category p to be infringed, from any economy, is denoted by P_p and given by GTRIC-p so that:

$$P_p = F_{LTN}(c_p)$$

where $F_{LTN}(c_p)$ is the cumulative probability function of $f_{LTN}(c_p)$.

Furthermore, the general propensity of infringing goods of any type from economy e is denoted by P_e and given by GTRIC-e, so that:

$$P_e = G_{LTN}(c_e)$$

where $G_{LTN}(c_e)$ is the cumulative probability function of $g_{LTN}(c_e)$.

The general likelihood of items of type p originating from economy e to be counterfeit or pirated is then denoted by P_{ep} and approximated by:

$$P_{ep} = P_p P_e$$

Therefore, $P_{ep} \in [\varepsilon_p \varepsilon_e ; 1]$, $\forall e, p$, with $\varepsilon_p \varepsilon_e$ denoting the minimum average counterfeit export rate for each sensitive product category and each provenance economy. It is assumed that $\varepsilon_e = \varepsilon_p = 0.05$.

Step 2: Calculating the absolute value

α is the fixed point, i.e. the maximum average counterfeit rate of a given type of infringing good p originating from a given economy e. α can therefore be applied onto likelihood of goods of type p from trading partner e to be infringed (αP^{jk}).

As a result, a matrix of counterfeit proneness C is obtained.

$$C = \begin{pmatrix} \alpha P_{11} & \alpha P_{12} & & \alpha P_{1P} \\ \alpha P_{21} & \ddots & & \\ & & \alpha P_{ep} & \\ & & & \ddots & \\ \alpha P_{E1} & & & \alpha P_{EP} \end{pmatrix} \text{ with dimension } E \times P$$

The matrix of Swedish imports is denoted by M. Applying C on M yields the absolute volume of counterfeit and pirated imports in the Sweden. In particular, the imports matrix M is given by:

$$M = \begin{pmatrix} m_{11} & m_{12} & & m_{1P} \\ m_{21} & \ddots & & \\ & & m_{ep} & \\ & & & \ddots & \\ m_{E1} & & & m_{EP} \end{pmatrix} \text{ with dimension } E \times P$$

Hence, the element m_{ep} denotes Swedish imports of product category p from partner e, with $e = [1, ..., E]$ and $p = [1, ..., P]$.

Denoted by Ψ, the product-by-economy percentage of counterfeit and pirated imports can be determined as the following:

$$\Psi = C'M \div M$$

The value of total imports of counterfeit and pirated goods, denoted by the scalar TC, is then given by:

$$TC = I_1' \Psi I_2$$

where I_1 is an identity matrix with dimension $E \times 1$, and I_2 is an identity matrix with dimension $P \times 1$.

By denoting total world trade by the scalar $TM = I_1 M' I_2$, the share of imports of counterfeit and pirated products into total Swedish imports, S_{TC}, is determined by:

$$S_{TC} = \frac{TC}{TM}$$

A.2. Construction of the GTRIC for products infringing Swedish IPR

Construction of Swedish GTRIC-p

Swedish GTRIC-p is constructed in three steps:

- For each product category, the seizure percentages for sensitive goods are formed.

- From these, a counterfeit source factor is established for each industry, based on the industries' weight in terms of total trade.

- Based on these factors, the GTRIC-p is formed.

Step 1: Measuring product seizure frequencies

w_q is the seized value of product type q infringing Swedish residents' IPR from *any* provenance economy in a given year. The relative seizure frequency (seizure percentages) of good q, denoted below as η_q, is then defined by:

$$\eta_q = \frac{w_q}{\sum_q w_q}, \quad \text{such that} \sum_q \eta_q = 1$$

Step 2: Measuring product-specific counterfeiting factors

e_q is the global sales value (exports plus domestic sales) of all Swedish branded products of type q, so that $E = \sum_q e_q$ is defined as the global registered sales by Swedish manufacturing industries of *all* sensitive goods.

The share of good q in Swedish total sales, denoted by ς_q, is therefore given by:

$$\varsigma_q = \frac{e_q}{E}, \quad \text{such that} \sum_q \varsigma_q = 1$$

The counterfeiting factor of product category q, denoted C_q, is then determined as the following:

$$C_q = \frac{\eta_q}{\varsigma_q}$$

The counterfeiting factor reflects the sensitivity of infringements of Swedish trademarks and patents occurring in a particular product category, relative to its share in Swedish global sales. These constitute the foundation for forming GTRIC-p.

Step 3: Establishing Swedish GTRIC-p

GTRIC-p is constructed from a transformation of the counterfeiting factor; it measures the relative proneness with which Swedish trademarks and patents in different types of product categories are subject to counterfeiting and piracy. The transformation of the counterfeiting factor is based on two main assumptions, described in OECD/EUIPO (2016):

1. The first (A5) is that the counterfeiting factor for goods infringing Swedish IPR of a particular product category is positively correlated with the actual degree of trade in counterfeit and pirated goods covered by that chapter. The counterfeiting factors must thus reflect the real intensity of actual counterfeit trade for products infringing Swedish IPR in the given product categories.

2. The second (A6) acknowledges that the assumption A5 may not be entirely correct. For instance, the fact Swedish IPR infringing goods are detected more frequently in certain categories could imply that differences in counterfeiting factors across products merely reflect that some goods infringing Swedish IPR are easier to detect than others, or that some of these goods, for one reason or another, have been specially targeted by customs worldwide. The counterfeiting factors of product categories with lower counterfeiting factors could, therefore, underestimate actual counterfeiting and piracy intensities in these cases.

In accordance with assumptions A5 and A6, GTRIC-p for products infringing Swedish IPR traded worldwide is established by applying a positive monotonic transformation of the counterfeiting factor index using natural logarithms. This standard technique of linearisation of a non-linear relationship – in the case of this study between counterfeiting factors and actual infringement activities – allows the index to be flattened and gives a higher relative weight to lower counterfeiting factors (Verbeek, 2008).

In addition, in order to address the possibility of outliers at both ends of the counterfeiting factor index – i.e. some categories may be measured as particularly susceptible to infringement even though they are not, whereas others may be measured as unsusceptible although they are – it is assumed that GTRIC-p follows a left-truncated normal distribution, with GTRIC-p only taking values of zero or above.

The transformed counterfeiting factor is defined as:

$$c_q = \ln(C_q + 1)$$

Assuming that the transformed counterfeiting factor can be described by a left-truncated normal distribution with $c_k \geq 0$, then, following Hald (1952), the density function of GTRIC-p is given by:

$$h_{LTN}(c_q) = \begin{cases} 0 & if\, c_q \leq 0 \\ \dfrac{h(c_q)}{\int_0^\infty h(c_q)\, dc_q} & if\, c_q \geq 0 \end{cases}$$

where $h(c_q)$ is the non-truncated normal distribution for c_k, specified as:

$$h(c_q) = \frac{1}{\sqrt{2\pi\sigma_q^2}} \exp\left(-\frac{1}{2}\left(\frac{c_q - \mu_q}{\sigma_q}\right)^2\right)$$

The mean and variance of the normal distribution, here denoted by μ_q and σ_q^2, are estimated over the transformed counterfeiting factor index, c_q, and given by $\hat\mu_q$ and $\hat\sigma_q^2$. This enables calculation of the counterfeit propensity index (GTRIC-p) across HS chapters, corresponding to the cumulative distribution function of c_q.

Construction of GTRIC-e

GTRIC-e is also constructed in three steps:

- For each provenance economy, the seizure percentages are calculated.

- From these, each provenance economy's counterfeit source factor is established, based on the provenance economies' weight in terms of Swedish total sales.

- Based on these factors, the GTRIC-e is formed.

Step 1: Measuring seizure intensities for each destination economy

w_d is the registered seized value of all types of goods infringing Swedish residents' IP rights (i.e. all q) exported to destination economy d from any provenance economy at a given year. η_d is the relative seizure intensity (seizure percentage) of all products infringing Swedish trademarks and patents that are shipped to country d in a given year:

$$\eta_d = \frac{w_d}{\sum_d w_d}, \text{ such that } \sum_d \eta_d = 1$$

Step 2: Measuring destination-specific counterfeiting factors

e_d is defined as the global registered sales value of Swedish branded or patented products (exports plus domestic manufacturing sales) shipped to d (including Sweden) and $E = \sum_d e_d$ is the global value of Swedish sales of sensitive goods to all destination economies.

The share of sales to destination economy d in Swedish global sales of sensitive goods, denoted ς_d, is then given by:

$$\varsigma_d = \frac{e_d}{E}, \text{ such that } \sum_d \varsigma_d = 1$$

From this, the economy-specific counterfeiting factor is established by dividing the seizure intensity for economy d by the share of total sales of sensitive goods to d:

$$C_d = \frac{\eta_d}{\varsigma_d}$$

Step 3: Establishing GTRIC-e

GTRIC-e is constructed from a transformation of the counterfeiting factor; it measures the relative proneness with which counterfeit products infringing Swedish trademarks and patents are shipped to a given destination economy. The transformation of the counterfeiting factor is based on two main assumptions, described in OECD/EUIPO, (2016):

1. The first assumption (A7) is that the frequency with which any counterfeit Swedish branded or patented article shipped to a particular destination economy is detected and seized by customs is positively correlated with the actual amount of counterfeit and pirated Swedish products exported to that location.

2. The second assumption (A8) acknowledges that assumption A7 may not be entirely correct. For instance, a high seizure intensity of products infringing Swedish IPR in a particular destination economy could be an indication that the destination economy implements a particular customs profiling scheme or that these products are specially targeted for investigation by customs in that locale. The role some destination economies with low seizure intensities of Swedish IPR infringing products play regarding actual counterfeiting and piracy activity could, therefore, be underrepresented by the index and lead to an underestimation of the scale of counterfeiting activities and piracy targeting Swedish branded or patented products there.

Following assumptions A7 and A8, GTRIC-e for products infringing Swedish IPR is established by applying a positive monotonic transformation of the counterfeiting factor index using natural logarithms. This standard technique of linearisation of a non-linear relationship (in the case of this study, between counterfeiting factors and actual infringement activities) allows the index to be flattened and gives a higher relative weight to lower counterfeiting factors (Verbeek, 2008).

In addition, in order to address the possibility of outliers at both ends of the counterfeiting factor index – i.e. some destination economies may be measured as particularly susceptible to infringement even though they are not, whereas others may be measured as unsusceptible although they are – it is assumed GTRIC-e follows a left-truncated normal distribution, with GTRIC-e only taking values of zero or above.

The transformed general counterfeiting factor across destination economies on which GTRIC-e is based is therefore given by applying logarithms onto economy-specific general counterfeit factors (Verbeek, 2008):

$$c_d = \ln(C_d + 1)$$

In addition, following GTRIC-p, it is assumed that GTRIC-e follows a truncated normal distribution with $c_d \geq 0$ for all d. Following Hald (1952), the density function of the left-truncated normal distribution for c_d is given by:

$$i_{LTN}(c_d) = \begin{cases} 0 & if\, c_d \leq 0 \\ \dfrac{i(c_d)}{\int_0^\infty i(c_d)\, dc_d} & if\, c_d \geq 0 \end{cases}$$

where $i(c_d)$ is the non-truncated normal distribution for c_d specified as:

$$i(c_d) = \frac{1}{\sqrt{2\pi\sigma_d^2}} \exp\left(-\frac{1}{2}\left(\frac{c_d - \mu_d}{\sigma_d}\right)^2\right)$$

The mean and variance of the normal distribution, here denoted by μ_d and σ_d^2, are estimated over the transformed counterfeiting factor index, c_d, and given by $\hat{\mu}_d$ and $\hat{\sigma}_d^2$. This enables the calculation of the counterfeit propensity index (GTRIC-e) across destination economies, corresponding to the cumulative distribution function of c_d.

Construction of GTRIC

The combined index of GTRIC-e and GTRIC-p, denoted GTRIC, is an index that approximates the relative proneness for goods associated with Swedish residents' IP rights in a given product category and a given destination economy to be counterfeit and/or pirated.

Step 1: Establishing proneness for products and destination economies

The general proneness of Swedish trademarks and patents to be counterfeit or pirated in product category q is denoted by P_q and is given by GTRIC-p, so that:

$$P_q = H_{LTN}(c_q)$$

where $H_{LTN}(c_q)$ is the cumulative probability function of $h_{LTN}(c_q)$.

Furthermore, the general proneness of all Swedish trademarks and patents to be infringed and shipped to economy d is denoted by P_d and is given by GTRIC-e, so that:

$$P_d = I_{LTN}(c_d)$$

where $I_{LTN}(c_d)$ is the cumulative probability function of $i_{LTN}(c_d)$

The general proneness of Swedish residents' IP rights to be counterfeit or pirated in a given product category q and to be shipped to a given destination d from any provenance economy is then denoted by P_{kd} and approximated by:

$$P_{qd} = P_q \times P_d$$

Therefore, $P_{qd} \in \left[\varepsilon_q \varepsilon_d ; 1 \right]$, $\forall k, d$, with $\varepsilon_q \varepsilon_d$ denoting the minimum average counterfeit export rate for each sensitive product category and each destination economy. It is assumed that $\varepsilon_q = \varepsilon_d = 0.05$.

Step 2: Calculating the absolute value

β is the fixed point, i.e. the maximum average counterfeit rate of Swedish trademarks and patents for a given product type q, shipped to a given trading partner d. β can therefore be applied onto the proneness of Swedish-related IP rights of type q to be counterfeit and shipped to destination partner d ($\beta \times P_{qd}$).

As a result, a matrix of counterfeit import propensities Λ is obtained.

$$\Lambda = \begin{pmatrix} \beta P_{11} & \beta P_{12} & & \beta P_{1Q} \\ \beta P_{21} & \ddots & & \\ & & \beta P_{dq} & \\ & & & \ddots \\ \beta P_{D1} & & & \beta P_{DQ} \end{pmatrix} \text{ with dimension } D \times Q$$

The matrix of Swedish global sales is denoted by E. Applying Λ on E yields the absolute volume of counterfeit and pirated trade in products that infringe Swedish residents' IPR. In particular, the sales matrix E is given by:

$$E = \begin{pmatrix} e_{11} & e_{12} & & e_{1Q} \\ e_{21} & \ddots & & \\ & & e_{dq} & \\ & & & \ddots \\ e_{D1} & & & e_{DQ} \end{pmatrix} \text{ with dimension } D \times Q$$

Hence, the element e_{dq} denotes Swedish sales of products in category q to destination d, including Sweden, with $d = [1, \dots, D]$ and $q = [1, \dots, Q]$.

Denoted by Z, the product-by-economy percentage of counterfeit and pirated imports can be determined as the following:

$$Z = \Lambda' E \div E$$

Total trade in counterfeit and pirated goods that infringe Swedish trademarks and patents, denoted by the scalar $T\Lambda$, is then given by:

$$T\Lambda = I_1' Z I_2$$

where I_1 is an identity matrix with dimension $D \times 1$, and I_2 is an identity matrix with dimension $Q \times 1$.

Then, by denoting global Swedish sales by the scalar $TE = I_1'ZE_2$, the share of counterfeit and pirated products infringing Swedish residents' IPR in Swedish global manufacturing sales, $\varsigma_{T\Lambda}$, is determined by:

$$\varsigma_{T\Lambda} = \frac{T\Lambda}{TE}$$

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Annex B. Tables and figures

Table B.1. Likelihood of economies to be the source of counterfeit and pirated imports in Sweden

GTRIC-e, 2014-16

Provenance economy	2014	2015	2016
China (People's Republic of)	0.948	0.960	0.798
Egypt	0.000	0.000	0.836
Hong Kong (China)	0.995	0.996	0.961
Iraq	0.000	1.000	0.999
Nigeria	0.000	0.407	0.000
Norway	0.000	0.000	0.448
Singapore	0.692	0.000	0.387
Thailand	0.995	0.997	0.963
Turkey	0.870	0.896	0.633
United Arab Emirates	0.963	0.973	0.842

Note: A high GTRIC-e score indicates that an economy is highly prone to be a source of counterfeit products sold in Sweden, either in absolute terms or as a share of Swedish imports.

Table B.2. Likelihood of product categories to be affected by counterfeiting and piracy

GTRIC-p, 2014-16

HS category	2014	2015	2016
Perfumery and cosmetics (33)	0.937	0.829	0.844
Articles of leather; handbags (42)	1.000	1.000	1.000
Knitted or crocheted fabrics (60)	0.830	0.648	0.670
Clothing, knitted or crocheted (61)	0.931	0.816	0.832
Footwear (64)	1.000	0.999	0.999
Articles of stone, plaster and cement (68)	0.000	0.000	0.000
Jewellery (71)	0.538	0.317	0.339
Machinery and mechanical appliances (84)	0.354	0.171	0.187
Electrical machinery and electronics (85)	0.901	0.760	0.779
Railway (86)	0.000	0.000	0.000
Vehicles (87)	0.243	0.101	0.113
Optical; photographic; medical apparatus (90)	0.485	0.272	0.292
Watches (91)	1.000	1.000	1.000
Toys and games (95)	0.948	0.851	0.865

Note: A high GTRIC-p score signals a product category that is more likely to be counterfeit – that is to say, it contains high values for counterfeit products, or a large share of Swedish sales in that product category is counterfeit. Figures in parenthesis are Harmonized System (HS) codes as defined by the United Nations Trade Statistics (UN Trade Statistics, 2017). GTRIC-p values are zero for HS categories not displayed in this table.

Table B.3. Likelihood of economies to import counterfeit products infringing Swedish IPR

GTRIC-e for destination economies, 2014-16

Provenance economy	2014	2015	2016	Provenance economy	2014	2015	2016
Afghanistan	0.000	0.000	0.000	Croatia	0.334	0.365	0.574
Albania	0.000	0.000	0.000	Cuba	0.000	0.000	0.000
Algeria	0.000	0.000	0.000	Curaçao	0.000	0.000	0.000
American Samoa	0.000	0.000	0.000	Cyprus*	0.000	0.000	0.000
Andorra	0.000	0.000	0.000	Czech Republic	0.000	0.000	0.000
Angola	0.000	0.000	0.000	Democratic People's Republic of Korea	0.000	0.000	0.000
Anguilla	0.000	0.000	0.000	Democratic Republic of the Congo	0.000	0.000	0.000
Antarctica	0.000	0.000	0.000	Denmark	0.271	0.300	0.502
Antigua and Barbuda	0.000	0.000	0.000	Djibouti	0.000	0.000	0.000
Argentina	0.000	0.000	0.000	Dominica	0.000	0.000	0.000
Armenia	0.000	0.000	0.000	Dominican Republic	0.000	0.000	0.000
Aruba	0.000	0.000	0.000	Ecuador	0.000	0.000	0.000
Australia	0.000	0.000	0.000	Egypt	0.000	0.000	0.000
Austria	0.444	0.477	0.682	El Salvador	0.000	0.000	0.000
Azerbaijan	0.000	0.000	0.000	Equatorial Guinea	0.000	0.000	0.000
Bahamas	0.000	0.000	0.000	Eritrea	0.000	0.000	0.000
Bahrain	0.000	0.000	0.000	Estonia	0.171	0.193	0.368
Bangladesh	0.000	0.000	0.000	Ethiopia	0.000	0.000	0.000
Barbados	0.000	0.000	0.000	Falkland Islands (Malvinas)	0.000	0.000	0.000
Belarus	0.000	0.000	0.000	Faroe Islands	0.000	0.000	0.000
Belgium	0.165	0.187	0.360	Fiji	0.000	0.000	0.000
Belize	0.000	0.000	0.000	Finland	0.275	0.304	0.507
Benin	0.000	0.000	0.000	Former Yugoslav Republic of Macedonia	0.000	0.000	0.000
Bermuda	0.000	0.000	0.000	France	0.373	0.405	0.614
Bhutan	0.000	0.000	0.000	French Polynesia	0.000	0.000	0.000
Bolivia	0.000	0.000	0.000	French Southern and Antarctic Lands	0.000	0.000	0.000
Bonaire	0.000	0.000	0.000	Gabon	0.000	0.000	0.000
Bosnia and Herzegovina	0.000	0.000	0.000	Gambia	0.000	0.000	0.000
Botswana	0.000	0.000	0.000	Georgia	0.000	0.000	0.000
Bouvet Island	0.000	0.000	0.000	Germany	0.329	0.360	0.568
Brazil	0.000	0.000	0.000	Ghana	0.000	0.000	0.000
British Virgin Islands	0.000	0.000	0.000	Gibraltar	0.000	0.000	0.000
Brunei Darussalam	0.000	0.000	0.000	Greece	0.000	0.000	0.000
Bulgaria	0.998	0.999	1.000	Greenland	0.000	0.000	0.000
Burkina Faso	0.000	0.000	0.000	Grenada	0.000	0.000	0.000
Burundi	0.000	0.000	0.000	Guam	0.000	0.000	0.000
Cabo Verde	0.000	0.000	0.000	Guatemala	0.000	0.000	0.000
Cambodia	0.000	0.000	0.000	Guinea	0.000	0.000	0.000
Cameroon	0.000	0.000	0.000	Guinea-Bissau	0.000	0.000	0.000
Canada	0.000	0.000	0.000	Guyana	0.000	0.000	0.000
Cayman Islands	0.000	0.000	0.000	Haiti	0.000	0.000	0.000
Central African Republic	0.000	0.000	0.000	Heard Island and McDonald Islands	0.000	0.000	0.000
Chad	0.000	0.000	0.000	Holy See	0.000	0.000	0.000
Chile	0.000	0.000	0.000	Honduras	0.000	0.000	0.000
China (People's Republic of)	0.000	0.000	0.000	Hong Kong (China)	0.000	0.000	0.000
Christmas Island	0.000	0.000	0.000	Hungary	0.993	0.994	0.999
Cocos (Keeling) Islands	0.000	0.000	0.000	Iceland	0.000	0.000	0.000
Colombia	0.000	0.000	0.000	India	0.000	0.000	0.000
Comoros	0.000	0.000	0.000	Indonesia	0.000	0.000	0.000

Provenance economy	2014	2015	2016	Provenance economy	2014	2015	2016
Congo	0.000	0.000	0.000	Iran	0.000	0.000	0.000
Cook Islands	0.000	0.000	0.000	Iraq	0.000	0.000	0.000
Costa Rica	0.000	0.000	0.000	Ireland	0.110	0.127	0.270
Côte d'Ivoire	0.000	0.000	0.000	Israel	0.000	0.000	0.000
Italy	0.209	0.234	0.422	Panama	0.000	0.000	0.000
Jamaica	0.000	0.000	0.000	Papua New Guinea	0.000	0.000	0.000
Japan	0.000	0.000	0.000	Paraguay	0.000	0.000	0.000
Jordan	0.000	0.000	0.000	Peru	0.000	0.000	0.000
Kazakhstan	0.000	0.000	0.000	Philippines	0.000	0.000	0.000
Kenya	0.000	0.000	0.000	Pitcairn	0.000	0.000	0.000
Kiribati	0.000	0.000	0.000	Poland	0.209	0.234	0.423
Korea	0.000	0.000	0.000	Portugal	0.181	0.204	0.382
Kuwait	0.000	0.000	0.000	Qatar	0.000	0.000	0.000
Kyrgyzstan	0.000	0.000	0.000	Romania	0.843	0.862	0.948
Lao People's Democratic Republic	0.000	0.000	0.000	Russia	0.000	0.000	0.000
Latvia	0.062	0.073	0.178	Rwanda	0.000	0.000	0.000
Lebanon	0.000	0.000	0.000	Saint Barthélemy	0.000	0.000	0.000
Lesotho	0.000	0.000	0.000	Saint Helena	0.000	0.000	0.000
Liberia	0.000	0.000	0.000	Saint Kitts and Nevis	0.000	0.000	0.000
Libya	0.000	0.000	0.000	Saint Lucia	0.000	0.000	0.000
Lithuania	0.157	0.178	0.347	Saint Pierre and Miquelon	0.000	0.000	0.000
Luxembourg	0.000	0.000	0.000	Saint Vincent and the Grenadines	0.000	0.000	0.000
Macau (China)	0.000	0.000	0.000	Samoa	0.000	0.000	0.000
Madagascar	0.000	0.000	0.000	San Marino	0.000	0.000	0.000
Malawi	0.000	0.000	0.000	Sao Tome and Principe	0.000	0.000	0.000
Malaysia	0.000	0.000	0.000	Saudi Arabia	0.000	0.000	0.000
Maldives	0.000	0.000	0.000	Senegal	0.000	0.000	0.000
Mali	0.000	0.000	0.000	Serbia	0.000	0.000	0.000
Malta	0.882	0.897	0.964	Seychelles	0.000	0.000	0.000
Marshall Islands	0.000	0.000	0.000	Sierra Leone	0.000	0.000	0.000
Mauritania	0.000	0.000	0.000	Singapore	0.000	0.000	0.000
Mauritius	0.000	0.000	0.000	Saint Maarten	0.000	0.000	0.000
Mexico	0.000	0.000	0.000	Slovak Republic	0.458	0.492	0.695
Micronesia	0.000	0.000	0.000	Slovenia	0.102	0.118	0.256
Moldova	0.000	0.000	0.000	Solomon Islands	0.000	0.000	0.000
Mongolia	0.000	0.000	0.000	Somalia	0.000	0.000	0.000
Montenegro	0.000	0.000	0.000	South Africa	0.000	0.000	0.000
Montserrat	0.000	0.000	0.000	South Sudan	0.000	0.000	0.000
Morocco	0.000	0.000	0.000	Spain	0.330	0.361	0.569
Mozambique	0.000	0.000	0.000	Sri Lanka	0.000	0.000	0.000
Myanmar	0.000	0.000	0.000	Sudan	0.000	0.000	0.000
Namibia	0.000	0.000	0.000	Suriname	0.000	0.000	0.000
Nauru	0.000	0.000	0.000	Swaziland	0.000	0.000	0.000
Nepal	0.000	0.000	0.000	Switzerland	0.000	0.000	0.000
Netherlands	0.778	0.802	0.916	Syrian Arab Republic	0.000	0.000	0.000
New Caledonia	0.000	0.000	0.000	Tajikistan	0.000	0.000	0.000
New Zealand	0.000	0.000	0.000	Tanzania	0.000	0.000	0.000
Nicaragua	0.000	0.000	0.000	Thailand	0.000	0.000	0.000
Niger	0.000	0.000	0.000	Timor-Leste	0.000	0.000	0.000
Nigeria	0.000	0.000	0.000	Togo	0.000	0.000	0.000
Niue	0.000	0.000	0.000	Tokelau	0.000	0.000	0.000
Northern Mariana Islands	0.000	0.000	0.000	Tonga	0.000	0.000	0.000
Norway	0.091	0.106	0.236	Trinidad and Tobago	0.000	0.000	0.000

Provenance economy	2014	2015	2016	Provenance economy	2014	2015	2016
Oman	0.000	0.000	0.000	Tunisia	0.000	0.000	0.000
Pakistan	0.000	0.000	0.000	Turkey	0.000	0.000	0.000
Palau	0.000	0.000	0.000	Turkmenistan	0.000	0.000	0.000
Palestinian Authority*	0.000	0.000	0.000	Turks and Caicos Islands	0.000	0.000	0.000
Tuvalu	0.000	0.000	0.000	Vanuatu	0.000	0.000	0.000
Uganda	0.000	0.000	0.000	Venezuela	0.000	0.000	0.000
Ukraine	0.000	0.000	0.000	Viet Nam	0.000	0.000	0.000
United Arab Emirates	0.000	0.000	0.000	Wallis and Futuna	0.000	0.000	0.000
United Kingdom	0.350	0.381	0.590	Western Sahara	0.000	0.000	0.000
United States	0.000	0.000	0.000	Yemen	0.000	0.000	0.000
United States Minor Outlying Islands	0.000	0.000	0.000	Zambia	0.000	0.000	0.000
Uruguay	0.000	0.000	0.000	Zimbabwe	0.000	0.000	0.000
Uzbekistan	0.000	0.000	0.000				

Note: A high GTRIC-e score indicates that an economy is highly prone to be a destination market for counterfeit products infringing Swedish trademarks and patents, either in absolute terms or as a share of Swedish sales.

Note by Turkey: The information in this document with reference to "Cyprus" relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Turkey shall preserve its position concerning the "Cyprus issue".

Note by all the European Union Member States of the OECD and the European Union: The Republic of Cyprus is recognised by all members of the United Nations with the exception of Turkey. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.

Table B.4. Likelihood that product categories will be targeted by infringements of Swedish IPR

GTRIC-p for goods infringing Swedish IPR, 2014-16

HS category	2014	2015	2016
Articles of leather; handbags (42)	0.556	0.786	0.715
Knitted or crocheted fabrics (60)	0.219	0.451	0.363
Clothing, knitted or crocheted (61)	0.836	0.949	0.920
Footwear (64)	0.138	0.332	0.254
Jewellery (71)	0.148	0.348	0.269
Machinery and mechanical appliances (84)	0.425	0.679	0.594
Electrical machinery and electronics (85)	0.084	0.234	0.171
Vehicles (87)	0.469	0.717	0.636
Optical; photographic; medical apparatus (90)	0.080	0.227	0.165
Watches (91)	0.951	0.989	0.981
Toys and games (95)	0.902	0.974	0.957

Note: A high GTRIC-p score implies either that a given product category contains high values of Swedish trademarks or patents that are sensitive to global counterfeiting and piracy in absolute terms (e.g. in euros); or, that a large share of the production of goods associated with a Swedish trademark or patent registered in this product category is counterfeit or pirated. Figures in parenthesis are Harmonized System (HS) codes as defined by the United Nations Trade Statistics (UN Trade Statistics, 2017). Values are zero for HS categories not displayed in this table.

Table B.5. Industries by Harmonised System (HS) codes

HS code	Description
01	Live animals.
02	Meat and edible meat offal.
03	Fish and crustaceans, molluscs and other aquatic invertebrates.
04	Dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere specified or included.
05	Products of animal origin, not elsewhere specified or included.
06	Live trees and other plants; bulbs, roots and the like; cut flowers and ornamental foliage.
07	Edible vegetables and certain roots and tubers.
08	Edible fruit and nuts; peel of citrus fruit or melons.
09	Coffee, tea, mate and spices.
10	Cereals.
11	Products of the milling industry; malt; starches; inulin; wheat gluten.
12	Oilseeds and oleaginous fruits; miscellaneous grains, seeds and fruit; industrial or medicinal plants; straw and fodder.
13	Lac; gums, resins and other vegetable saps and extracts.
14	Vegetable plaiting materials; vegetable products not elsewhere specified or included.
15	Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes.
16	Preparations of meat, of fish or of crustaceans, molluscs or other aquatic invertebrates.
17	Sugars and sugar confectionery.
18	Cocoa and cocoa preparations.
19	Preparations of cereals, flour, starch or milk; pastrycooks' products.
20	Preparations of vegetables, fruit, nuts or other parts of plants.
21	Miscellaneous edible preparations.
22	Beverages, spirits and vinegar.
23	Residues and waste from the food industries; prepared animal fodder.
24	Tobacco and manufactured tobacco substitutes.
25	Salt; sulphur; earths and stone; plastering materials, lime and cement.
26	Ores, slag and ash.
27	Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes.
28	Inorganic chemicals; organic or inorganic compounds of precious metals, of rare-earth metals, of radioactive elements or of isotopes.
29	Organic chemicals.
30	Pharmaceutical products.
31	Fertilisers.
32	Tanning or dyeing extracts; tannins and their derivatives; dyes, pigments and other colouring matter; paints and varnishes; putty and other mastics; inks.
33	Essential oils and resinoids; perfumery, cosmetic or toilet preparations.
34	Soap, organic surface-active agents, washing preparations, lubricating preparations, artificial waxes, prepared waxes, polishing or scouring preparations, candles and similar articles, modelling pastes, "dental waxes" and dental preparations
35	Albuminoidal substances; modified starches; glues; enzymes.
36	Explosives; pyrotechnic products; matches; pyrophoric alloys; certain combustible preparations.
37	Photographic or cinematographic goods.
38	Miscellaneous chemical products.
39	Plastics and articles thereof.
40	Rubber and articles thereof.
41	Raw hides and skins (other than fur skins) and leather.
42	Articles of leather; saddlery and harness; travel goods, handbags and similar containers; articles of animal gut (other than silk-worm gut).

HS code	Description
43	Fur skins and artificial fur; manufactures thereof.
44	Wood and articles of wood; wood charcoal.
45	Cork and articles of cork.
46	Manufactures of straw, of esparto or of other plaiting materials; basketware and wickerwork.
47	Pulp of wood or of other fibrous cellulosic material; recovered (waste and scrap) paper or paperboard.
48	Paper and paperboard; articles of paper pulp, of paper or of paperboard.
49	Printed books, newspapers, pictures and other products of the printing industry; manuscripts, typescripts and plans.
50	Silk.
51	Wool, fine or coarse animal hair; horsehair yarn and woven fabric.
52	Cotton.
53	Other vegetable textile fibres; paper yarn and woven fabrics of paper yarn.
54	Man-made filaments.
55	Man-made staple fibres.
56	Wadding, felt and nonwovens; special yarns; twine, cordage, ropes and cables and articles thereof.
57	Carpets and other textile floor coverings.
58	Special woven fabrics; tufted textile fabrics; lace; tapestries; trimmings; embroidery.
59	Impregnated, coated, covered or laminated textile fabrics; textile articles of a kind suitable for industrial use.
60	Knitted or crocheted fabrics.
61	Articles of apparel and clothing accessories, knitted or crocheted.
62	Articles of apparel and clothing accessories, not knitted or crocheted.
63	Other made up textile articles; sets; worn clothing and worn textile articles; rags.
64	Footwear, gaiters and the like; parts of such articles.
65	Headgear and parts thereof.
66	Umbrellas, sun umbrellas, walking-sticks, seat-sticks, whips, riding-crops and parts thereof.
67	Prepared feathers and down and articles made of feathers or of down; artificial flowers; articles of human hair.
68	Articles of stone, plaster, cement, asbestos, mica or similar materials.
69	Ceramic products.
70	Glass and glassware.
71	Natural or cultured pearls, precious or semi-precious stones, precious metals, metals clad with precious metal and articles thereof; imitation, jewellery; coin.
72	Iron and steel.
73	Articles of iron or steel.
74	Copper and articles thereof.
75	Nickel and articles thereof.
76	Aluminium and articles thereof.
77	(Reserved for possible future use in the Harmonised System)
78	Lead and articles thereof.
79	Zinc and articles thereof.
80	Tin and articles thereof.
81	Other base metals; cermets; articles thereof.
82	Tools, implements, cutlery, spoons and forks, of base metal; parts thereof of base metal.
83	Miscellaneous articles of base metal.
84	Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof.
85	Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles.
86	Railway or tramway locomotives, rolling-stock and parts thereof; railway or tramway track fixtures and fittings and parts thereof; mechanical (including electro-mechanical) traffic signalling equipment of all kinds.
87	Vehicles other than railway or tramway rolling-stock, and parts and accessories thereof.

HS code	Description
88	Aircraft, spacecraft and parts thereof.
89	Ships, boats and floating structures.
90	Optical, photographic, cinematographic, measuring, checking, precision, medical or surgical instruments and apparatus; parts and accessories thereof.
91	Clocks and watches and parts thereof.
92	Musical instruments; parts and accessories of such articles.
93	Arms and ammunition; parts and accessories thereof.
94	Furniture; bedding, mattresses, mattress supports, cushions and similar stuffed furnishings; lamps and lighting fittings, not elsewhere specified or included; illuminated signs, illuminated nameplates and the like; prefabricated buildings.
95	Toys, games and sports requisites; parts and accessories thereof.
96	Miscellaneous manufactured articles.
97	Works of art, collectors' pieces and antiques.
98	(Reserved for special uses by Contracting Parties).

Table B.6. Correspondence between HS categories and sectors

Sector	HS category
Food, beverages and tobacco	Foodstuffs (02-21)
	Beverages (22)
	Residues from the food industries (23)
	Tobacco (24)
Chemical and allied products; except pharmaceuticals, perfumery and cosmetics	Fertilisers (31)
	Miscellaneous chemical products (38)
	Tanning or dyeing extracts (32)
	Organic and inorganic chemicals (28/29)
	Soap; albuminoidal substances; glues; explosives (34-37)
Pharmaceutical and medicinal chemical products	Pharmaceutical products (30)
Perfumery and cosmetics	Perfumery and cosmetics (33)
Textiles and other intermediate products (e.g. plastics; rubbers; paper; wood)	Man-made filaments and staple fibres (54/55)
	Wadding; cordage; ropes and articles thereof (56)
	Wood and articles thereof (44)
	Other textiles n.e.c. (59)
	Cork; straw and articles thereof (45/46)
	Finishing of textiles (58)
	Pulp and paper (47/48)
	Fur skins and artificial fur (43)
	Raw hides, skins and leather (41)
	Silk; wool; and other vegetable textile fibres (50-53)
	Plastic and articles thereof (39)
	Rubber and article thereof (40)
Clothing, footwear, leather and related products	Other made-up textile articles (63)
	Clothing and accessories, not knitted or crocheted (62/65)
	Clothing, knitted or crocheted (61)
	Footwear (64)
	Knitted or crocheted fabrics (60)
	Articles of leather; handbags (42)

Sector	HS category
Watches and jewellery	Jewellery (71)
	Watches (91)
Non-metallic mineral products (e.g. glass and glass products, ceramic products)	Ceramic products (69)
	Articles of stone, plaster and cement (68)
	Glass and glassware (70)
Basic metals and fabricated metal products (except machinery and equipment)	Copper; nickel; aluminium; lead; zinc; tin; and articles thereof (74-81)
	Tools and cutlery of base metal (82)
	Iron and steel; and articles thereof (72/73)
	Miscellaneous articles of base metal (83)
Electrical household appliances, electronic and telecommunications equipment	Electrical machinery and electronics (85)
	Optical; photographic; medical apparatus (90)
Machinery, industrial equipment; computers and peripheral equipment; ships and aircrafts	Railway (86)
	Aircraft (88)
	Ships (89)
	Machinery and mechanical appliances (84)
Motor vehicles and motorcycles	Vehicles (87)
Household cultural and recreation goods; including toys and games, books and musical instruments	Toys and games (95)
	Printed articles (49)
	Musical instruments (92)
Furniture, lighting equipment, carpets and other manufacturing n.e.c	Carpets and rugs (57)
	Arms and ammunition (93)
	Furniture (94)
	Miscellaneous manufactured articles (66/67/96)

Note: Figures in parenthesis are Harmonized System (HS) codes as defined by the United Nations Trade Statistics (UN Trade Statistics, 2017). "Sectors" have been built for the purpose of this study, in order to merge HS product categories, NACE C (manufacturing activities) and NACE G (wholesale and retail activities) in a unified analytical framework.

Table B.7. Correspondence between NACE C categories and sectors

Sector	NACE Rev. 2 code	NACE Rev.2 description
Food, beverages and tobacco	C1000	Manufacture of food products
	C1100	Manufacture of beverages
	C1200	Manufacture of tobacco products
Chemical and allied products; except pharmaceuticals, perfumery and cosmetics	C2011	Manufacture of industrial gases
	C2012	Manufacture of dyes and pigments
	C2013	Manufacture of other inorganic basic chemicals
	C2014	Manufacture of other organic basic chemicals
	C2015	Manufacture of fertilisers and nitrogen compounds
	C2016	Manufacture of plastics in primary forms
	C2017	Manufacture of synthetic rubber in primary forms
	C2020	Manufacture of pesticides and other agrochemical products
	C2030	Manufacture of paints, varnishes and similar coatings printing ink and mastics
	C2041	Manufacture of soap and detergents
	C2051	Manufacture of explosives
	C2052	Manufacture of glues
	C2059	Manufacture of other chemical products n.e.c

Sector	NACE Rev. 2 code	NACE Rev.2 description
Pharmaceutical and medicinal chemical products	C2100	Manufacture of basic pharmaceutical products and pharmaceutical preparations
Perfumery and cosmetics	C2042	Manufacture of perfumes and toilet preparation
	C2053	Manufacture of essential oils
	C2500	Manufacture of fabricated metal products
Electrical household appliances, electronic and telecommunications equipment	C2610	Manufacture of electronic components and boards
	C2630	Manufacture of communication equipment
	C2640	Manufacture of consumer electronics
	C2651	Manufacture of instruments and appliances for measuring, testing and navigation
	C2660	Manufacture of irradiation, electromedical and electrotherapeutic equipment
	C2670	Manufacture of optical instruments and photographic equipment
	C2680	Manufacture of magnetic and optical media
	C2720	Manufacture of batteries and accumulators
	C2731	Manufacture of fibre optic cables
	C2732	Manufacture of other electronic and electric wires and cables
	C2733	Manufacture of wiring devices
	C2740	Manufacture of electric lighting equipment
	C2790	Manufacture of other electrical equipment
Machinery, industrial equipment; computers and peripheral equipment; ships and aircrafts	C2620	Manufacture of computers and peripheral equipment
	C2711	Manufacture of electrical motors generators and transformers
	C2712	Manufacture of electricity distribution and control apparatus
	C2750	Manufacture of domestic appliances
	C2800	Manufacture of machinery and equipment n.e.c
	C3000	Manufacture of other transport equipment
Motor vehicles and motorcycles	C2900	Manufacture of motor vehicles
Textiles and other intermediate products (e.g. plastics; rubbers; paper; wood)	C1300	Manufacture of textiles
	C1600	Manufacture of wood and of products of wood and cork
	C1700	Manufacture of paper and paper products
	C1800	Printing and reproduction of recorded media
	C2060	Manufacture of man-made fibres
	C2200	Manufacture of rubber and plastic products
Clothing, footwear, leather and related products	C1400	Manufacture of wearing apparel
	C1500	Manufacture of leather, footwear and related products
Watches and jewellery	C2652	Manufacture of watches and clocks
	C3210	Manufacture of jewellery and related articles
Basic metals and fabricated metal products (except machinery and equipment)	C2400	Manufacture of basic metals
	C2500	Manufacture of fabricated metal products
Non-metallic mineral products (e.g. glass and glass products, ceramic products)	C2300	Manufacture of other non-metallic mineral products
Machinery, industrial equipment; computers and peripheral equipment; ships and aircrafts	C2620	Manufacture of computers and peripheral equipment
	C2711	Manufacture of electrical motors generators and transformers

	C2712	Manufacture of electricity distribution and control apparatus
	C2750	Manufacture of domestic appliances
	C2800	Manufacture of machinery and equipment n.e.c
	C3000	Manufacture of other transport equipment
Household cultural and recreation goods; including toys and games, books and musical instruments	C3220	Manufacture of musical instruments
	C3230	Manufacture of sports goods
	C3240	Manufacture of games and toys
Motor vehicles and motorcycles	C2900	Manufacture of motor vehicles
Furniture, lighting equipment, carpets and other manufacturing n.e.c	C3100	Manufacture of furniture
	C3250	Manufacture of medical and dental instruments and supplies
	C3290	Manufacture n.e.c

Note: NACE C is the statistical classification of economic activities for manufacturing industries in the European Community. It is a four-digit classification, which provides the framework for collecting and presenting a large range of statistical data according to economic activity in the fields of economic statistics (e.g. production, employment and national accounts) and in other statistical domains developed within the European statistical system (ESS). For additional information, see http://ec.europa.eu/eurostat/statistics-explained/index.php/Main_Page. "Sectors" have been built for the purpose of this study, in order to merge HS product categories, NACE C (manufacturing activities) and NACE G (wholesale and retail activities) in a unified analytical framework.

Table B.8. Correspondence between NACE G categories and sectors

Sector	NACE code	NACE description
Food, beverages and tobacco	G4617	Agents involved in the sale of food, beverages and tobacco
	G4723	Retail sale of fish, crustaceans and molluscs in specialised stores
	G4638	Wholesale of other food, including fish, crustaceans and molluscs
	G4634	Wholesale of beverages
	G4721	Retail sale of fruit and vegetables in specialised stores
	G4726	Retail sale of tobacco products in specialised stores
	G4632	Wholesale of meat and meat products
	G4633	Wholesale of dairy products, eggs and edible oils and fats
	G4635	Wholesale of tobacco products
	G4729	Other retail sale of food in specialised stores
	G4781	Retail sale via stalls and markets of food, beverages and tobacco products
	G4631	Wholesale of fruit and vegetables
	G4636	Wholesale of sugar and chocolate and sugar confectionery
	G4724	Retail sale of bread, cakes, flour confectionery and sugar confectionery in specialised stores
	G4722	Retail sale of meat and meat products in specialised stores
	G4637	Wholesale of coffee, tea, cocoa and spices
	G4639	Non-specialised wholesale of food, beverages and tobacco

	G4711	Retail sale in non-specialised stores with food, beverages or tobacco predominating
	G4725	Retail sale of beverages in specialised stores
Chemical and allied products; except pharmaceuticals, perfumery and cosmetics	G4675	Wholesale of chemical products
Pharmaceutical and medicinal chemical products	G4646	Wholesale of pharmaceutical goods
Perfumery and cosmetics	G4775	Retail sale of cosmetic and toilet articles in specialised stores
	G4645	Wholesale of perfume and cosmetics
Textiles and other intermediate products (e.g. plastics; rubbers; paper; wood)	G4676	Wholesale of other intermediate products
	G4751	Retail sale of textiles in specialised stores
	G4641	Wholesale of textiles
	G4673	Wholesale of wood, construction materials and sanitary equipment
Clothing, footwear, leather and related products	G4771	Retail sale of clothing in specialised stores
	G4782	Retail sale via stalls and markets of textiles, clothing and footwear
	G4642	Wholesale of clothing and footwear
	G4616	Agents involved in the sale of textiles, clothing, fur, footwear and leather goods
	G4773	Dispensing chemist in specialised stores
	G4772	Retail sale of footwear and leather goods in specialised stores
Watches and jewellery	G4648	Wholesale of watches and jewellery
	G4777	Retail sale of watches and jewellery in specialised stores
Non-metallic mineral products (e.g. glass and glass products, ceramic products)	G4752	Retail sale of hardware, paints and glass in specialised stores
	G4644	Wholesale of china and glassware and cleaning materials
Basic metals and fabricated metal products (except machinery and equipment)	G4613	Agents involved in the sale of timber and building materials
	G4672	Wholesale of metals and metal ores
	G4677	Wholesale of waste and scrap
	G4674	Wholesale of hardware, plumbing and heating equipment and supplies
Electrical household appliances, electronic and telecommunications equipment	G4743	Retail sale of audio and video equipment in specialised stores
	G4742	Retail sale of telecommunications equipment in specialised stores
	G4774	Retail sale of medical and orthopaedic goods in specialised stores
	G4754	Retail sale of electrical household appliances in specialised stores
	G4652	Wholesale of electronic and telecommunications equipment and parts
	G4643	Wholesale of electrical household appliances
Machinery, industrial equipment; computers and peripheral equipment; ships and aircrafts	G4614	Agents involved in the sale of machinery, industrial equipment, ships and aircraft
	G4651	Wholesale of computers, computer peripheral equipment and software
	G4661	Wholesale of agricultural machinery, equipment and supplies
	G4663	Wholesale of mining, construction and civil engineering machinery
	G4666	Wholesale of other office machinery and equipment

	G4741	Retail sale of computers, peripheral units and software in specialised stores
	G4669	Wholesale of other machinery and equipment
	G4662	Wholesale of machine tools
	G4664	Wholesale of machinery for the textile industry and of sewing and knitting machines
Motor vehicles and motorcycles	G4511	Sale of cars and light motor vehicles
	G4540	Sale, maintenance and repair of motorcycles and related parts and accessories
	G4520	Maintenance and repair of motor vehicles
	G4532	Retail trade of motor vehicle parts and accessories
	G4531	Wholesale trade of motor vehicle parts and accessories
	G4519	Sale of other motor vehicles
Household cultural and recreation goods; including toys and games, books and musical instruments	G4764	Retail sale of sporting equipment in specialised stores
	G4763	Retail sale of music and video recordings in specialised stores
	G4649	Wholesale of other household goods
	G4765	Retail sale of games and toys in specialised stores
	G4761	Retail sale of books in specialised stores
	G4762	Retail sale of newspapers and stationery in specialised stores
Furniture, lighting equipment, carpets and other manufacturing n.e.c	G4690	Non-specialised wholesale trade
	G4665	Wholesale of office furniture
	G4719	Other retail sale in non-specialised stores
	G4753	Retail sale of carpets, rugs, wall and floor coverings in specialised stores
	G4759	Retail sale of furniture, lighting equipment and other household articles in specialised stores
	G4615	Agents involved in the sale of furniture, household goods, hardware and ironmongery
	G4647	Wholesale of furniture, carpets and lighting equipment
	G4778	Other retail sale of new goods in specialised stores

Note: NACE is the statistical classification of economic activities for wholesale and retail industries in the European Community. It is a four-digit classification, which provides the framework for collecting and presenting a large range of statistical data according to economic activity in the fields of economic statistics (e.g. production, employment and national accounts) and in other statistical domains developed within the European statistical system (ESS). For additional information, see http://ec.europa.eu/eurostat/statistics-explained/index.php/Main_Page. "Sectors" have been built for the purpose of this study, in order to merge HS product categories, NACE C (manufacturing activities) and NACE G (wholesale and retail activities) in a unified analytical framework.

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Illicit Trade

Counterfeiting and Piracy and the Swedish Economy
MAKING SURE "MADE IN SWEDEN" ALWAYS IS

The Swedish economy is innovative and rich in intellectual property (IP), with nearly every industry either producing or using IP. Swedish innovative industries are also export-dependent and very deeply integrated in the global economy, through active participation in global value chains. At the same time, the threats of counterfeiting and piracy are growing – and Sweden is vulnerable. This report measures the direct economic effects of counterfeiting on Swedish industry, government and consumers. It examines both the impact of the imports of fake products to Sweden and – more importantly – the impact of the global trade in fake products that infringe on the IP rights of Swedish innovative companies.

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