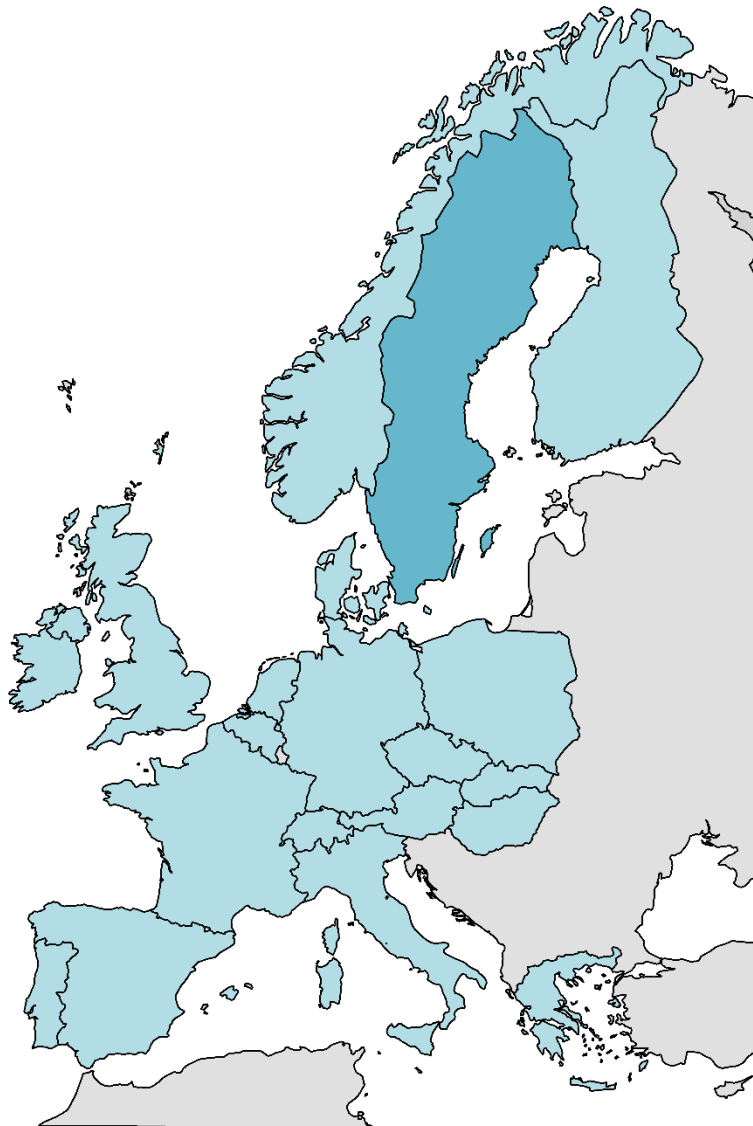


International price comparison 2023

An analysis of Swedish pharmaceutical prices in relation to
19 other European countries



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Preface

The Dental and Pharmaceutical Benefits Agency's (TLV's) mandate includes monitoring and analysing the development of prices on pharmaceuticals in an international perspective.

The purpose of this report is to compare, from different perspectives, the development of Swedish pharmaceutical prices in relation to those in other countries. To achieve this, price and volume data for pharmaceuticals in Sweden and 19 other European countries were analysed. These data encompass the first quarter of the years 2014 to 2023, and include pharmaceuticals both with and without generic competition.

The report should be seen as a basis for TLV's continuous monitoring of the dynamics of Swedish prices and how Swedish prices relate to prices in other countries. The report has been published annually since 2014, making this year's edition the tenth reiteration.

The working group for this report consisted of Christoffer Karlsson, Martin Löwing Jensen, Jonas Nilsson and Marie Orre.

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Summary

Swedish pharmaceutical prices are comparatively low in an international perspective. In 2023, prices in Sweden were the lowest for pharmaceuticals with generic competition, and the sixth lowest among pharmaceuticals without generic competition, compared to the 19 other European countries. Swedish prices for pharmaceuticals with generic competition, which in Sweden are included in the product-of-the-month system, have been among the lowest throughout the period 2014–2023. The prices of pharmaceuticals without generic competition have become lower in relation to prices in other countries throughout the period.

Weak Swedish krona behind falling prices

One important explanation for pharmaceutical prices in Sweden continuing to fall in relation to prices in other countries, especially for pharmaceuticals without generic competition, is the weakened Swedish krona (SEK). In 2023, the Swedish krona fell in relation to most other currencies, including the euro. Since the pharmacy purchase prices are set in SEK, a weaker exchange rate leads to lower prices in Sweden compared to other countries for pharmaceuticals for which the prices have already been determined. If the exchange rate effect is removed, Swedish prices are largely unchanged over time, in relation to the prices in other countries.

The cost of pharmaceuticals sold within the pharmaceutical benefits scheme in Sweden has increased by an average of almost five percent a year over the past ten years. This is mainly due to increased sales of pharmaceuticals already in the benefits scheme, but also to new pharmaceuticals entering the market. In total, the cost of pharmaceuticals within the pharmaceutical benefits scheme for outpatient care amounted to SEK 37 billion in 2022, not accounting for repayments from managed entry agreements [1].

Sweden has the lowest prices for older pharmaceuticals

The report includes analyses on how prices develop over a pharmaceutical's life cycle – from its introduction to the market and onwards. The results show that it primarily is Swedish prices on older pharmaceuticals, those which have been on the market for more than 15 years, that are relatively low. Prices in Sweden are higher than the average for slightly younger pharmaceuticals, those aged 10 to 15 years.

Falling prices in some pharmaceutical classes

The results also show clear reductions in Swedish relative prices for TNF-alpha inhibitors and for pharmaceuticals used in the treatment of ADHD. Although TNF-alpha inhibitors are not subject to competition within the Swedish product-of-the-month system, prices within the class have dropped after the introduction of other alternatives, so-called biosimilars. When interpreting the results, it is important to note that until 2021, Sweden had managed entry agreements concerning these pharmaceuticals, which reduced costs significantly. This report

only considers list prices, meaning that such agreements, which reduce the actual costs of using pharmaceuticals, are not considered. This is because data on such agreements and their impact are lacking for the other countries included in the price comparison.

Pharmaceuticals used in treatment of ADHD, however, are sold both within and outside the competitive product-of-the-month system. Within the class, it is primarily the prices of pharmaceuticals with generic competition in Sweden that have become lower compared to other countries. This is due to more substances becoming subject to generic competition as a result of expiring patents as well as increased competition in some previously existing substitution groups.

Terms and concepts

Active substance – The substance in a pharmaceutical product that gives it its medical effect.

ATC – *Anatomical Therapeutic Chemical Classification* (ATC) is a pharmaceutical classification system. The ATC system has 14 main groups into which pharmaceuticals are classified based on their main indication.

- A Alimentary tract and metabolism
- B Blood and blood forming organs
- C Cardiovascular system
- D Dermatologicals
- G Genito urinary system and sex hormones
- H Systemic hormonal preparations, excluding sex hormones and insulins
- J Anti-infectives for systemic use
- L Anti-neoplastic and immunomodulating agents
- M Musculoskeletal system
- N Nervous system
- P Anti-parasitic products, insecticides and repellents
- R Respiratory system
- S Sensory organs
- V Various

Bilateral price index – The same product needs to be available in both Sweden and one of the comparison countries to be included in the price index against that country.

Ceiling price – The maximum accepted price (pharmacy purchase price/unit) of a pharmaceutical in a pack size group.

Cross-sectional price index – The same product needs to be available in several countries to be included in any of those countries' price indices. The threshold, known as the matching rate, has been set at 40 percent in cases where cross-sectional indices are used. This means that a pharmaceutical (substance, dosage form and strength) needs to be available in at least eight other countries in addition to Sweden. For years for which a country does not have sales of a pharmaceutical available in Sweden, an average of the countries for which price data are available is used.

Dosage form – Different methods for administering a pharmaceutical to the body, such as by tablet, injection or patch.

ERP – **External reference pricing** – See IRP.

Ex factory – Sales price from the marketing authorisation holder. Does not include costs for transport from the factory or other taxes and surcharges.

Generic pharmaceutical – Pharmaceuticals that contain the same active substance as the original pharmaceutical and are used in the same doses to treat the same illnesses, but are sold under a different name and normally marketed by a company other than the producer of the original pharmaceutical.

Generic substitution/product-of-the-month system – The pharmaceutical substitution that pharmacies must offer their customers when the pharmaceutical benefits scheme includes generic competition. Generic competition means that at least two pharmaceuticals which are substitutable pursuant to Section 21(1) of the Act (2002:160) on Pharmaceutical Benefits, etc. in a particular substitution group are offered for sale to retail pharmacies in the Swedish market. See also Product-of-the-month.

Hospital pharmaceuticals – Pharmaceuticals procured by regions and administered within hospitals. In previous reports, these were called "inpatient pharmaceuticals".

INN – Generic name – Like the chemical name, this describes a substance. INN stands for *international non-proprietary name*. The purpose of generic names is to enable brand-independent communication about pharmaceutical substances. Generic names are established by several different countries and by the WHO.

IRP – international reference price – Pricing method in which the price(s) of a pharmaceutical in one or more countries is/are taken into account in the national pricing of pharmaceuticals. Common synonymous terms are *international reference pricing* (IRP), *external price reference* (EPR), *external reference pricing* (ERP) or simply reference pricing. The pricing method can be formal or informal/supportive, and can be combined with another method (e.g., assessment of benefit or value). Some countries employ the concept of *internal* reference pricing, which is why, in some literature, the acronym IRP is used differently than in this report.

List price – Price paid without regard to discounts or repayments. Corresponds in this report to the pharmacy purchase prices (AIP), which in Sweden is determined by TLV. When countries, including Sweden, are referred to as a group, list prices are also used to describe Sweden's prices (AIP).

Managed entry agreement – Defined in this report as a general term for agreements by which the cost of using a pharmaceutical is reduced, such as risk-sharing, discount and repayment agreements. In Sweden, a managed entry agreement is an agreement between a pharmaceutical company and individual regions that is drawn up within the framework of, or as a result of, TLV's case management. A managed entry agreement regulates one or more circumstances related to the use of a pharmaceutical and can, for example, mean that the cost of treatment is reduced to decrease the health-economic uncertainty.

Managed introduction – In Sweden, this is known as national managed introduction of new pharmaceuticals and is coordinated by the New Therapies Council. Sweden's regions collaborate on which new pharmaceuticals to introduce in healthcare, which mainly encompasses hospital pharmaceuticals.

NOAC – A group of pharmaceuticals with blood-thinning properties. NOAC is an acronym for *non-vitamin K oral anticoagulants*. See appendix for substance definitions.

Original pharmaceutical – The first pharmaceutical on the market that contains a particular active substance. These pharmaceuticals are under patent protection and are thus not subject to competition from generic equivalents for a number of years.

Pharmaceutical benefits – A pharmaceutical included in the pharmaceutical benefits scheme is subsidised and included in the high-cost protection system, which limits how much a patient has to pay for their pharmaceuticals. The provisions on pharmaceutical benefits can be found in the Act (2002:160) on Pharmaceutical Benefits, etc. and in statutes enacted pursuant to that Act.

PPP – Pharmacy purchase price (Sw. AIP) – The pharmacy purchase price in SEK. Determined by TLV for prescription medicines covered by the benefits scheme.

Prescription medicines – Pharmaceuticals that have been prescribed and are dispensed at retail pharmacies.

Product – A pharmaceutical with the same substance, dosage form and strength.

Product-of-the-month – The pharmaceutical pack that is available, that has the lowest price within each substitution group and pack size group, and that pharmacies must offer their customers. The product-of-the-month is decided on by TLV. See also Generic substitution/product-of-the-month system.

PRP – Pharmacy retail price (Sw. AUP) – The pharmacy retail price in SEK. Determined by TLV for prescription medicines covered by the benefits scheme.

Relative prices – Prices in relation to average prices in other countries. If relative prices in Sweden rise, this means that Sweden has become more expensive in relation to average prices. This may be due to prices in Sweden rising or prices in other countries falling while prices in Sweden remain the same.

Repayment – A form of reimbursement paid in arrears. In Sweden, pharmaceutical companies disburse repayments to the regions based on the stipulations of the associated managed entry agreements. Internationally, this is often referred to as a discount.

Risk-sharing agreements – Agreements in which the final cost of using a pharmaceutical depends on future outcomes. Often used for new expensive pharmaceuticals for which the therapeutic benefit is uncertain.

Substitutable pharmaceuticals – Pharmaceuticals that contain the same active substance, in the same dosage form and with the same strength, that give the same medical effect and that the Swedish Medical Products Agency has determined are substitutable for one another.

The segment Pharmaceuticals with competition (within the product-of-the-month system) – Includes all pharmaceuticals included as substitutes within

the product-of-the-month system during the corresponding period in the time series.

The segment Pharmaceuticals without competition – Includes products for which there has been no generic competition between two different substitutable pharmaceuticals in Sweden. Note, however, that competitive conditions may vary between the various countries in the price comparison.

UFBLI – Swedish acronym for selected mainly biological, anti-inflammatory compounds. Does not include TNF-alpha inhibitors. See appendix for substance definitions.

UFBLI (TNF-alpha inhibitors) – Selected mainly biological, anti-inflammatory compounds that are TNF-alpha inhibitors. See appendix for substance definitions.

1 Introduction

1.1 Assignment

The Swedish Ordinance (SFS 2007:1206) with instructions for Sweden's Dental and Pharmaceutical Benefits Agency (TLV) states that the Agency shall:

- Monitor and analyse developments in other countries and make use of their experiences;
- Compare price levels in Sweden with prices in other countries for relevant products in the pharmaceutical sector; and
- Monitor price developments in the sector in an international perspective.

This report, in which pharmaceutical prices in Sweden are compared with prices in 19 other European countries, is a response to these instructions. The price comparison is based on list prices (pharmacy purchase prices, AIP), which means that any effects of agreements on discounts and repayments on pharmaceuticals in any of the countries were not taken into account in the analyses. A division has also been made based on the competitive situation of a pharmaceutical, as conditions vary greatly depending on whether it is subject to generic competition or not.

1.1.1 Delimitation

The analyses in the report aim to provide a picture of Swedish pharmaceutical prices in an international perspective. The assignment does not include determining whether Swedish pharmaceutical prices are at the desired level, nor how such a level should be achieved.

The price comparison encompasses prescription medicines for human use included in the pharmaceutical benefits scheme and dispensed at retail pharmacies. This means that hospital pharmaceuticals (those procured by regions and administered to patients within hospitals), OTC medicines, prescription medicines not covered by the benefits scheme and infection control pharmaceuticals are not included in the analyses. In total, the share of pharmaceutical sales stemming from prescriptions within the pharmaceutical benefits scheme accounts for more than 64 percent of all sales [1]. The share of pharmaceuticals managed via prescriptions and hospitals varies between the countries included in the price comparison, which may affect the countries for which comparable prices are available.

1.2 Outline

The report consists of a summary, four main chapters, a list of the references cited in the report and two appendices.

The following section, Methodology and data (Section 1.3), provides a summary of the data sources, the selected pharmaceuticals and comparison countries, and the methods used. This is followed by Chapter 2, The pharmaceutical market, in which

a general description of the pharmaceutical market in Sweden as well as general information on pricing and subsidy systems in the comparison countries is provided. The chapter also includes a section (Section 2.1) on how the countries included in the comparison differ in terms of the proportion of pharmaceuticals dispensed as prescription medicines and hospital pharmaceuticals.

Chapter 3, Price comparisons, is divided into four sections. The first section (Section 3.1) concerns analyses on the prices of pharmaceuticals at different stages of the life cycle. Prices in Sweden are compared with prices in other countries for pharmaceuticals at different ages, calculated as the number of years after market introduction. This is followed by two separate sections (3.2 and 3.3) in which the prices of pharmaceuticals *without* and *with* generic competition are analysed separately. The chapter ends with a bilateral price comparison (Section 3.4) in which the sales volumes of all countries are used to calculate volume-weighted averages. The report concludes with a discussion (Chapter 4) of the main results from this year's price comparison and information on TLV's work going forward.

The report has two appendices. The first appendix (Appendix 1: Sensitivity analyses) presents a number of sensitivity analyses. The second appendix (Appendix 2: Methodology and data) contains detailed descriptions of the analytical methods and data used. This information is summarised in the following section.

1.3 Methodology and data

1.3.1 Description of data sources

The report is based mainly on pricing and sales statistics sourced from the company IQVIA, with the data spanning the years 2014 to 2023. The price data are from the first quarter of each year, while the data on sold units and packs refer to the period covering March of that year and the preceding 11 months. The prices are list prices, which in Sweden are the pharmacy purchase prices (AIP) determined by TLV. The data on the number of units sold are used to calculate the annual sales value and to weight pharmaceutical prices when calculating the various price indices used in the report. Section 1.3.4 describes the various price indices used in the report.

In addition to the official prices analysed in the report, confidential agreements regulating the cost of certain pharmaceuticals are found in both Sweden and other countries. Where found, such agreements result in lower realised costs than would be the case if the pharmaceuticals were purchased at list price. These agreements, which in Sweden are entered into between a pharmaceutical company and individual regions, regulate, among other things, repayments of part of the costs of a pharmaceutical. As a result, society's pharmaceutical costs are affected by repayments from these agreements. Similar agreements are also found in other countries, including those in this comparison, but their impact is not considered in the report.

In cases where data other than those described above are used in the report, the sources are cited.

1.3.2 Selection of pharmaceuticals

The selected pharmaceuticals consist of those prescription medicines for human use that are included in the Swedish pharmaceutical benefits scheme, and which have exhibited the highest sales volumes. In addition, substances which have relatively low sales in Sweden but high sales in Europe, as well as new substances [2], are included. Supplementing the selected pharmaceuticals with European top sellers makes for a fairer comparison, as more relevant pharmaceuticals are compared.

There are sales data for a total of 887 substances and 7,397 pharmaceuticals over the entire time series and across all comparison countries.¹ The analyses will mainly be based on pharmaceuticals that have been sold in Sweden. The analyses in which other countries' price dynamics or relative prices are examined also include pharmaceuticals that have not been sold in Sweden.

The market has been divided into pharmaceuticals *without* and *with* generic competition. Pharmaceuticals with generic competition are defined as pharmaceuticals included in the Swedish product-of-the-month system, which means that a pharmaceutical has generic competition and is substitutable at pharmacies [3]. Organised in accordance with this definition, the analysis includes:²

- **Pharmaceuticals *without* generic competition that had sales in 2023:**
 - All countries: 849 substances and 5,438 pharmaceuticals.
 - Sweden: 546 substances and 1,318 pharmaceuticals.
- **Pharmaceuticals *with* generic competition that had sales in 2023:**
 - All countries: 229 substances and 719 pharmaceuticals.
 - Sweden: 228 substances and 704 pharmaceuticals.
- **All pharmaceuticals over the entire time series:**
 - All countries: 887 substances and 7,397 pharmaceuticals.
 - Sweden: 723 substances and 2,497 pharmaceuticals.

During the first quarter of 2023, pharmaceuticals without generic competition accounted for 82 percent of the total sales value in Sweden. Pharmaceuticals with generic competition accounted for 18 percent. The selected pharmaceuticals encompass around 90 percent of sales of prescription medicines covered by the benefits scheme in Sweden in 2023.

¹ A pharmaceutical is defined as a combination of substance, dosage form and strength.

² A substance can be found in both segments, for pharmaceuticals with and without competition. This is because the competition status of different forms and strengths of the same substance may differ. This means that the sum of the two segments' unique substances will be greater than the total number of unique substances across both segments.

1.3.3 Selection of countries

The 19 European countries included in the comparison group have remained the same since the 2015 international price comparison. These countries show both similarities and differences in the financing and distribution of pharmaceuticals, and in the structure of the pharmaceutical market. All countries are European, and the majority are also members of the European Union and share, to a certain extent, both legislation and markets within the pharmaceutical sector.³ The group of countries includes examples of collaborations within the field of HTA⁴ and negotiations with companies on agreements to reduce the realised costs of pharmaceuticals. All in all, comparisons between the selected countries are considered to provide a relevant picture of Swedish pharmaceutical prices in an international perspective. Retaining the same selection also facilitates comparisons between the years.

It is not possible to determine how the picture of Swedish pharmaceutical prices would be affected if other countries were included in the analysis. However, a sensitivity analysis of the impact of individual countries on the results has been conducted; see the Sensitivity analyses appendix (Appendix 1, Section 5.1.6). The 20 countries included in the selection are presented in Table 1.

Table 1. Countries included in the selection.

Belgium	Portugal
Denmark	Switzerland
Finland	Slovakia
France	Spain
Greece	United Kingdom
Ireland	Sweden
Italy	Czechia
Netherlands	Germany
Norway	Hungary
Poland	Austria

1.3.4 Methodology

Matching rate

One fundamental challenge with price comparisons between different countries is that not all countries use the same pharmaceuticals. For example, countries may use different pharmaceuticals to treat the same condition, or a pharmaceutical may be approved for subsidy in only some of the countries in the selection. In this report, the proportion of the same pharmaceuticals used in two countries is called the matching rate. The higher the matching rate Sweden has with another country, the higher the proportion of pharmaceuticals in Sweden are found in the comparison

³ Norway, Switzerland and the United Kingdom (see note below) are not members of the EU. Norway and Switzerland, however, are part of the European single market.

⁴ HTA is an acronym for *health technology assessment*, which involves the evaluation of medical technology.

country. The matching rate does not take into account differences in prescriptions per capita between the countries, only the overlap between Sweden's and the other countries product baskets.

Three methods for comparing prices are used in the report. Although the methods are similar in some respects, they differ in cases where one or more pharmaceuticals are not found in the sales statistics of all countries:

Bilateral comparison

Prices are compared only for the pharmaceuticals available in both the comparison country and Sweden. For example, if Finland uses 59 percent of the pharmaceuticals used in Sweden, the price comparison only covers these pharmaceuticals. Pharmaceuticals with very low sales in relation to the reference country's local market are excluded. Accordingly, the bilateral comparison is affected by the fact that Swedish volumes are used. This is because pharmaceuticals used a great deal in Sweden usually have a relatively low Swedish price.

Bilateral average

In addition to the bilateral comparison described above, an alternative measure that includes information from all countries' pharmaceutical use is also calculated. This measure, called the bilateral average, is calculated in such a way that the bilateral comparison is repeated for all combinations of paired countries, i.e., a bilateral index is calculated for each country based on that country's particular product basket. Then, an overall average index is calculated, giving an index that takes into account the use of pharmaceuticals in all countries. The average is unweighted, which means that each country's index has an equal impact on the overall average index.

Cross-sectional comparison

This comparison assumes that all countries in the study have all the pharmaceuticals used in Sweden. If a country does not use a pharmaceutical, it is assumed that this country's price is the same as the average price of the pharmaceutical in the countries that do use it. To ensure that enough countries use a particular pharmaceutical, it must have been sold in at least eight countries to be included in the comparison.

The cross-sectional comparison is used to calculate the development of Swedish prices in relation to the average among the selected countries. The bilateral price comparison, on the other hand, describes price differences between individual countries and Sweden. Both the bilateral and cross-sectional price comparisons are based on the Swedish volumes of each pharmaceutical. The bilateral average analysis takes the volumes of all countries into account. For more detailed information on the methodology, see the Methodology and data appendix (Appendix 2, Section 5.2).

In the analyses examining Sweden's relative pharmaceutical prices with the selected countries, pharmaceuticals are generally limited to those with sales in Sweden. If a

pharmaceutical is sold on prescription in Sweden but not in any of the other 19 countries, it will not be included in these analyses either.

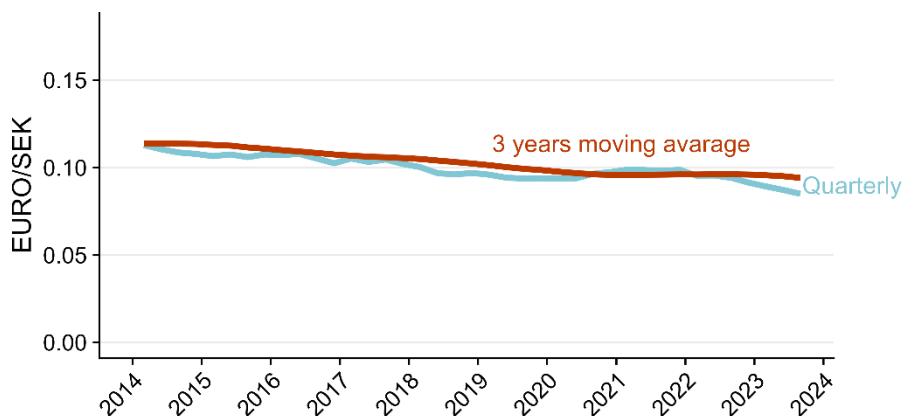
1.3.5 Exchange rate

To enable comparisons between countries, prices must be converted into a common currency, in this case the Swedish krona (SEK). Data on exchange rates are retrieved from Eurostat, the statistical office of the European Union. Over the past few years, the Swedish krona has been falling in value against the euro and other currencies. This has affected the relationships between pharmaceutical prices in Sweden and other countries.

To avoid temporary exchange rate differences affecting the picture of Swedish relative prices from one year to the next, a three-year moving average is used in the report. The method aims to underline longer-term trends in exchange rate developments by spreading short-term fluctuations over a longer period. For example, the fall in the moving average is smaller than the fall in the quarterly series for 2023, which was a result of the temporary increase in the exchange rate between 2020 and 2021. Similarly, the use of a moving average has contributed to keeping the Swedish relative prices low for pharmaceuticals at times when the Swedish krona strengthened its position relative to the euro.

Figure 1 below shows the development of the Swedish krona against the euro. The figure includes both quarterly and moving average data to highlight the difference between the two methods. The figure also shows that the Swedish krona has continued to fall in value relative to the euro.

Figure 1. The value of the Swedish krona (SEK) against the euro (EUR), quarterly and moving average, number of euros per krona, 2014–2023.



Source: Eurostat.

Over the same period, the value of the Swedish krona has fallen against the majority of the currencies used in the selected countries. The only exceptions are the Norwegian krone (NOK) and the Hungarian forint (HUF). On average, among the exchange rates included measured at the first quarter of 2023, the Swedish krona has fallen by 23 percent (quarterly) and 13 percent (moving average) compared to

the baseline year 2014. Figure 25 (Appendix 1, Section 5.1.1) shows the percentage change in the value of all included countries' currencies against the Swedish krona.

In some analyses, the exchange rate is fixed at that of 2014, calculated as a three-year moving average. This means that, for each currency, the same exchange rate is used for all years in the time series to convert prices to a common currency. Fixed exchange rates enable an assessment of whether there are price dynamics other than the exchange rate in each country. When a fixed exchange rate is used, it is stated in the texts referring to the figures. See Section 5.1.1: Exchange rate in Appendix 1 for further details.

2 The pharmaceutical market

The pharmaceutical pricing and subsidy systems used in the selected countries exhibit both similarities and differences. This concerns aspects such as transparency in how list prices are determined, whether discounts are incorporated into list prices, and whether there are other agreements which result in certain list prices not fully reflecting the actual price of a pharmaceutical. Another fundamental way in which the systems differ is whether, as in Sweden, so-called value-based pricing is employed or whether prices are mainly determined in relation to prices in other countries – so-called international reference pricing.

The total costs of pharmaceuticals within the pharmaceutical benefits scheme for outpatient care, excluding repayments under agreements between the regions and pharmaceutical companies, amounted to SEK 37 billion in 2022. In addition to this, there are costs – for both society and the individual – for hospital pharmaceuticals, OTC medicines, prescription medicines not covered by the benefits scheme and infection control pharmaceuticals. In total, these costs amounted to almost SEK 21 billion during that same year [1].

Globally, pharmaceuticals sales amounted to approximately SEK 13,000 billion in 2022, calculated as the price from the manufacturer. North America dominates the pharmaceutical market and accounts for 52 percent of total sales in the world market; Europe accounts for 22 percent; Africa, Asia (excluding Japan and China) and Australia combined account for 8 percent; China 8 percent; Japan 5 percent; and Latin America 4 percent [4].⁵

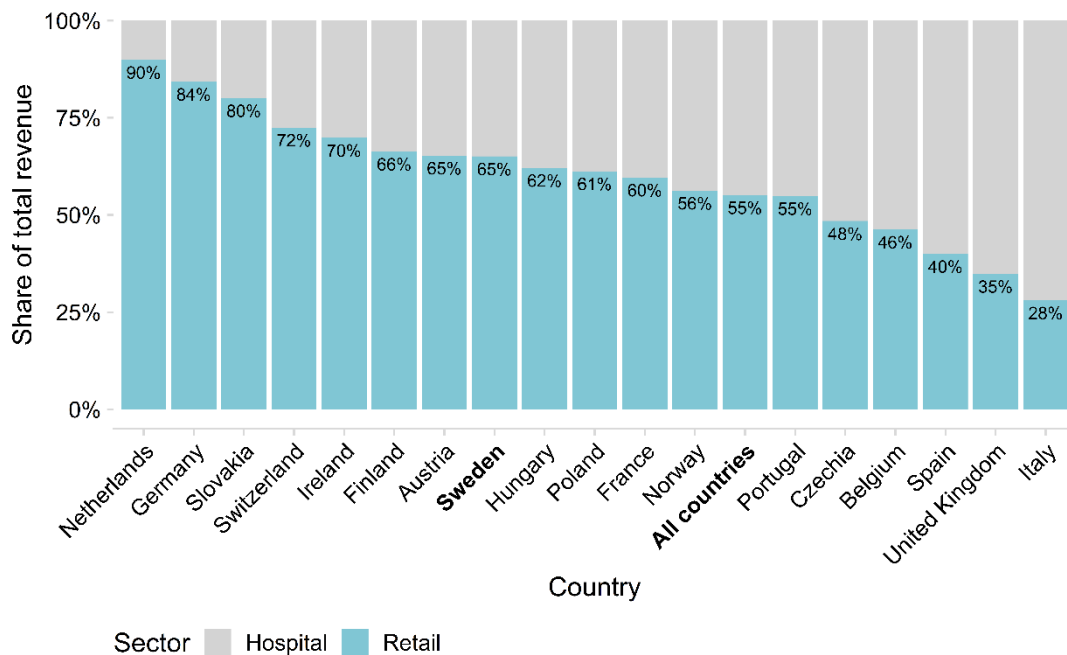
2.1 Prescription medicines and hospital pharmaceuticals

In Sweden, the majority of the pharmaceutical use consists of prescription medicines that are dispensed at retail pharmacies. The proportions of pharmaceuticals dispensed at retail pharmacies and in hospitals differ between the countries, complicating this type of analysis. This section compares the specific conditions found in each country.

Figure 2 shows the percentage of total pharmaceutical sales in each country dispensed via prescription at retail pharmacies and in hospitals (outside pharmacies). On average, among these countries, 55 percent of the total sales comprise prescribed pharmaceuticals dispensed at retail pharmacies. In terms of monetary value, Italy, the United Kingdom, Spain and Belgium have the lowest proportion of prescription medicines dispensed at retail pharmacies and a significantly higher proportion of hospital pharmaceuticals. In Sweden, about two-thirds comprise prescriptions and one-third hospital pharmaceuticals.

⁵ Global sales amounted to EUR 1,222,921 million in 2022. The average exchange rate for 2022 (10.63) was used to convert the figure to SEK.

Figure 2. Sales value in AIP as hospital pharmaceuticals and prescription medicines by country, 2023, percentage.



Source: IQVIA and TLV analysis.

Notes: The proportions are based on sales in March 2023 and the preceding 11 months, a value referred to in the report as a moving 12-month average. Greece has been excluded as there is no available information on hospital pharmaceuticals. Data for Denmark are not available. "All countries" is calculated as a weighted average of the countries included in the figure.

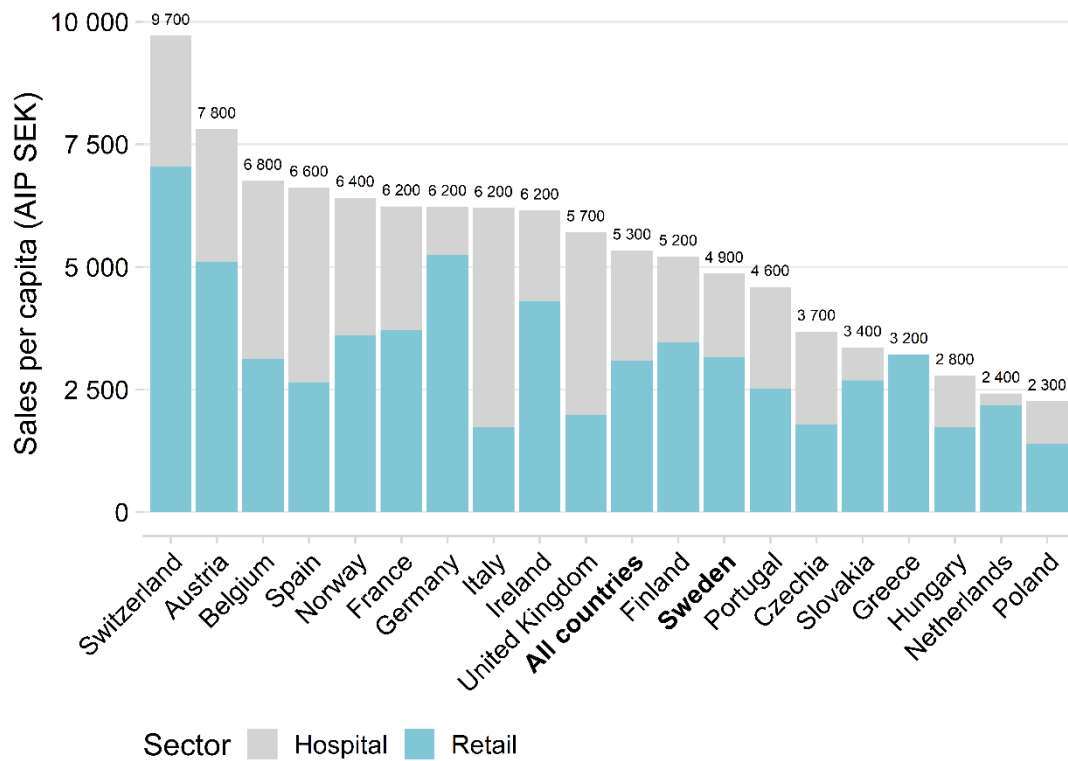
Figure 3 shows the total sales value per capita in each country, broken down into prescription pharmaceuticals and hospital pharmaceuticals. The average sales value per capita among the included countries amounts to just over SEK 5,300.

Total sales value per capita is highest in Switzerland (just over SEK 9,700), followed by Austria (just over SEK 7,800). Sweden has the twelfth highest sales of all countries at just under SEK 4,900 per capita.⁶ In terms of total sales value per capita, two of our Nordic neighbours – Norway and Finland – have higher costs than Sweden.

Figure 3 includes both pharmaceuticals dispensed at retail pharmacies and hospital pharmaceuticals. The remainder of the report concerns only prescription medicines dispensed at retail pharmacies. The reason for this is that TLV determines prices for prescription pharmaceuticals, while hospital pharmaceuticals are procured by the regions.

⁶ Data for Denmark are lacking in this part of the data set for this year. In last year's report, which included data for Denmark, Denmark had higher total sales per capita than Sweden. The analyses presented in Section 3 onwards are based on another part of the data set that includes data for Denmark.

Figure 3. Sales value in AIP as hospital pharmaceuticals and prescription medicines by country, 2023, SEK per capita.



Source: IQVIA and TLV analysis.

Notes: The value is based on sales in March 2023 and the preceding 11 months, a value referred to in the report as a moving 12-month average. No information on hospital pharmaceuticals is available for Greece. Data for Denmark are lacking. "All countries" is calculated as a weighted average of the countries included in the figure.

3 Price comparisons

This chapter presents several analyses in which pharmaceutical prices in Sweden are compared with prices in the selected countries. The results are presented in four sections. In the first section (Section 3.1), Swedish pharmaceutical prices are analysed in relation to the average for all countries over the life cycle of a pharmaceutical, i.e., based on the number of years after marketing authorisation.

In the next sections (Section 3.2 and Section 3.3), the pharmaceuticals are divided into two segments based on the competitive situation in Sweden. The segment with generic competition is defined as pharmaceuticals which are sold within the Swedish product-of-the-month system. The distinction is made since the price dynamics and market situation differ between pharmaceuticals with and without generic competition. The chapter concludes with a section (Section 3.4) in which we introduce an alternative method for addressing the differences in the countries' product baskets – the bilateral average. This method takes into account each countries' unique mix of pharmaceuticals when calculating the price index (see Appendix 2: Methodology and data).

3.1 Prices over a pharmaceutical's life cycle

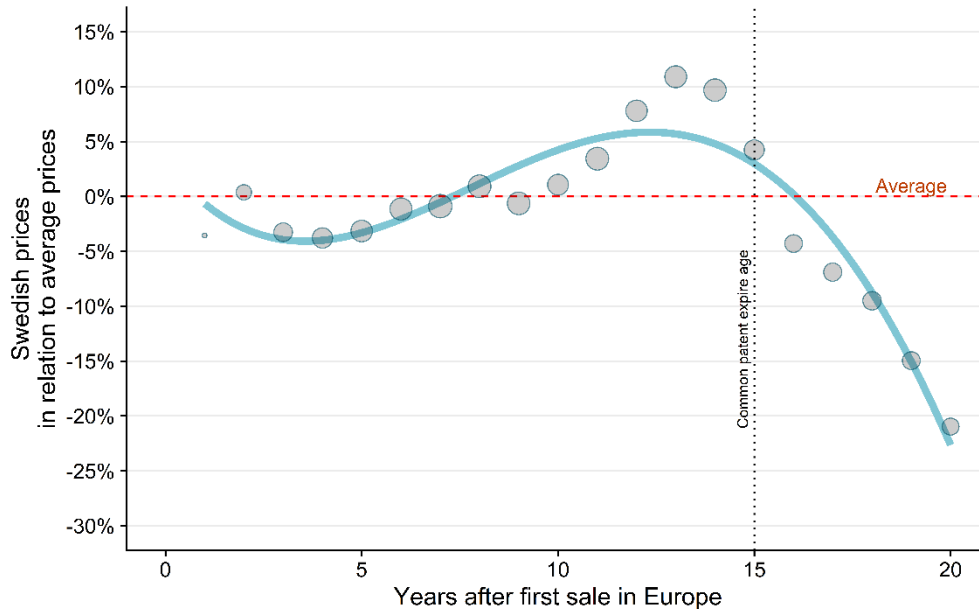
The following section compares prices in Sweden with the averages of other countries included in the price comparison over the life cycle of a pharmaceutical. All pharmaceuticals sold in Sweden during the period 2014–2023 are included in the data set. The prices of pharmaceuticals can change significantly over time, due to changes in the competitive situation or different types of interventions, such as reassessments. This makes it interesting to compare the prices of pharmaceuticals at different ages.

3.1.1 Life cycle analysis including data from every year

Figure 4 covers the entire period 2014–2023, which means that a single pharmaceutical may be included at several ages (calculated as years after marketing authorisation). The sales value for each year is indicated by the sizes of the circles in the figure, with larger circles reflecting larger values. The light blue curve is a model adaptation of the circles to show the trend over the life cycle.

On average, prices in Sweden are slightly lower than the average price during the first five years after marketing authorisation. During the next five years, Swedish pharmaceutical prices hover around the average, before then rising above the average between year 10 and year 15. Finally, after 15 years on the market, which corresponds to the time when many patents expire, Swedish pharmaceutical prices are below the average. Twenty years after market introduction, pharmaceuticals in Sweden are generally priced 20 percent lower than the average price for all countries.

Figure 4. Swedish pharmaceutical prices compared with the average price for the 20 countries in the report, by year after marketing authorisation, percentage of the average. Data for the years 2014–2023.



Source: IQVIA and TLV analysis.

Note 1: The red dashed line shows the average prices for 20 European countries. The positions of the circles show the actual deviation from the average prices, while their sizes indicate the sales value in Sweden of pharmaceuticals of that age. The light blue line is a model adaptation of the circles (fourth degree polynomial regression) used to illustrate the trend over the life cycle. Sales data for the period 2014–2023.

Note 2: The figure should be interpreted as Sweden's average relative price per pharmaceutical age for all years 2014–2023. Accordingly, it only indicates Sweden's relative price level for the entire period.

Although the circles and the light blue curve eventually rise above the average, most clearly for those aged 10–15 years, this is not due to increases in Swedish pharmaceutical prices. Instead, the explanation is that Swedish prices remain at their original level while the prices of the same pharmaceuticals fall in the other countries (see Figure 8, which visualises the price dynamics of each country separately). For pharmaceuticals older than 15 years, Swedish pharmaceutical prices are below the average. The most important explanation for this is that patents on pharmaceuticals generally expire after about 15 years on the market, which in many cases means lower prices in conjunction with generic competition arising.

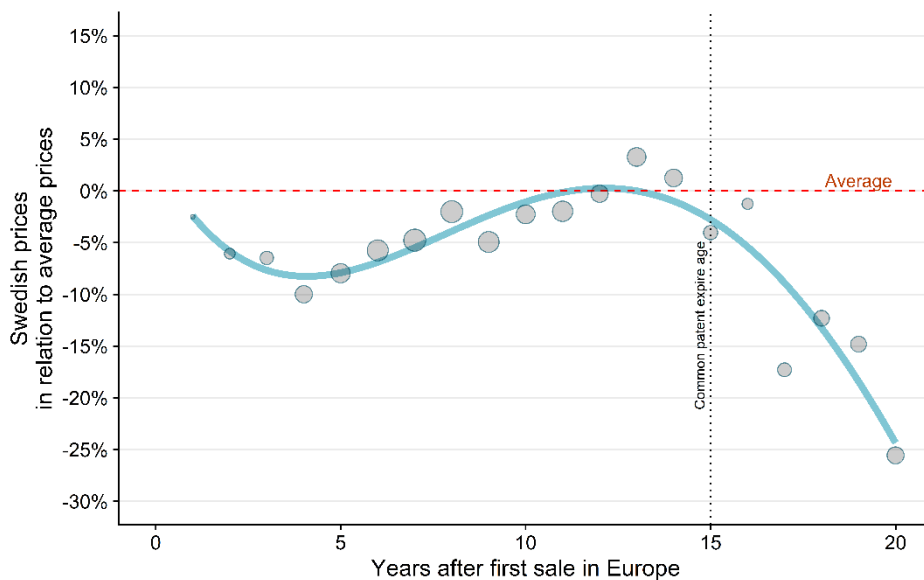
Sweden applies the product-of-the-month system to pharmaceuticals with generic competition. This means that the prescribed pharmaceutical is switched to the lowest priced alternative in the applicable substitution group during the month in question (provided that neither the patient, prescriber or pharmacist objects to the switch) [3]. Certain pharmaceuticals that have lost their patents, but that the Swedish Medical Products Agency has not deemed to be substitutable at pharmacies, have also contributed to Sweden's low position after age 15. This is especially true for biological pharmaceuticals, and for TNF-alpha inhibitors in particular.

Another part of the explanation is the so-called 15-year rule, which is a rule-based price reduction of 7.5 percent for pharmaceuticals (substance forms) that have had marketing authorisation for 15 years and where no or weak generic competition has arisen [5]. Pharmaceuticals older than 5 years but younger than 15 years accounted for more than 39 percent of the costs of prescription medicines in Sweden during the period 2014–2023. Younger pharmaceuticals, those that have been on the market for up to 5 years, account for 15 percent, while pharmaceuticals that are 15 years or older comprise the remaining 46 percent of the market.

3.1.2 Life cycle analysis for a limited period

This section presents the same analysis as above but limited to the period 2020–2023. This version provides a more recent picture, albeit with the consequence that fewer observations are included for each individual pharmaceutical age. Yet another version of this analysis, based on price data limited to 2023, can be found in Appendix 1, under Section 5.1.8. For further sensitivity analyses, see Appendix 1, Section 5.1.6 and Section 5.1.7, where individual pharmaceutical classes and comparison countries, respectively, are excluded to map their impact on outcomes and identify the classes with the greatest impact on outcomes at different stages of the life cycle.

Figure 5. Swedish pharmaceutical prices compared with the average price for the 20 countries in the report, by year after marketing authorisation, percentage of the average. Data for the years 2020–2023.



Source: IQVIA and TLV analysis.

Note 1: The red dashed line shows the average prices for 20 European countries. The positions of the circles show the actual deviation from the average prices, while their sizes indicate the sales value in Sweden of pharmaceuticals of that age. The light blue line is a model adaptation of the circles (fourth degree polynomial regression) used to illustrate the trend over the life cycle. Sales data for the period 2020–2023.

Note 2: The figure should be interpreted as Sweden's average relative price per pharmaceutical age for all years 2020–2023. Accordingly, it only indicates Sweden's relative price level for the entire period.

A shorter time interval focusing on the years closest in time has the advantage that the list prices in the analysis are centred on the most recent ones. The disadvantage

is that fewer pharmaceuticals are included and that a pharmaceutical can be observed at fewer ages over the life cycle. The profile of the curve in Figure 5 is similar to that in Figure 4, but with a downward offset, i.e., Sweden's relative price level was lower during the period 2020–2023. This is largely due to the exchange rate (see Figure 26 in Appendix 1 where different exchange rates are used for the life cycle analysis), but also to the fact that top sellers in the TNF category have lost their patent protection and become relatively cheaper in Sweden in recent years (see Figure 33 in Appendix 1, where the pharmaceutical class TNF-alpha inhibitors is excluded from the life cycle analysis).

The above analysis illustrates that the choice of time period influences the outcome of the analysis, although the general conclusions remain the same. Sweden's relative pharmaceutical prices are highest in the 10 to 15 year age range. After this, for pharmaceuticals older than 15 years, Swedish relative pharmaceutical prices fall rapidly. The most important explanation for this is the competition that often arises at this age in conjunction with patent expiration. Accordingly, it is interesting to split the life cycle analysis into pharmaceuticals with and without generic competition.

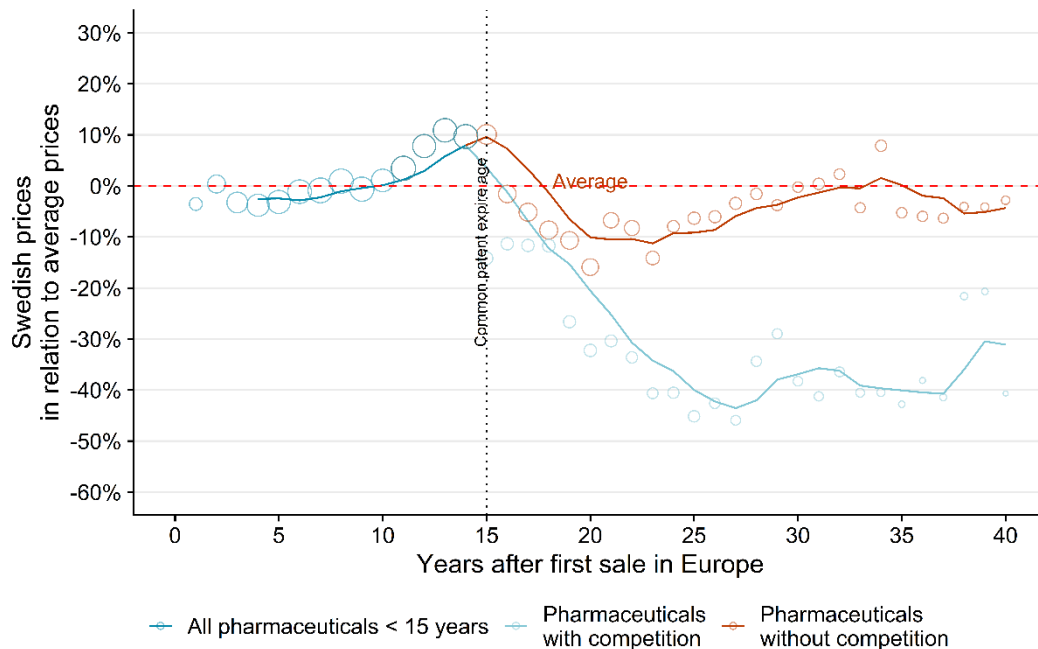
3.1.3 Life cycle analysis on pharmaceuticals with and without generic competition

Figure 6 shows a clear difference in relative prices between pharmaceuticals with and without generic competition. Pharmaceuticals with generic competition⁷ are defined as those pharmaceuticals which, at a certain age, are included in the Swedish product-of-the-month system. The difference in relative prices between the two segments is seen immediately when certain pharmaceuticals become subject to generic competition, although these differences become increasingly pronounced once the pharmaceuticals have been on the market for more than 20 years.

For pharmaceuticals with generic competition that have been on the market for 25–35 years, Swedish prices are much lower than the average (approximately 40 percent). The product-of-the-month system means that the product (within a group of substitutable pharmaceuticals with comparable pack sizes) that is available and has the lowest price becomes the "product-of-the-month" for one month. Accordingly, the product receives almost all sales that month. The system results in significant pricing pressure within the segment.

⁷ The figures show the segments pharmaceuticals with and without competition. The competition status of a pharmaceutical is based on whether it is subject to generic competition in the Swedish market.

Figure 6. Swedish pharmaceutical prices compared with the average price for the 20 countries in the report, by year after marketing authorisation, total and by segment (with or without generic competition), percentage of the average. Data for the years 2014–2023.



Source: IQVIA and TLV analysis.

Note 1: The red dashed line shows the average prices for 20 European countries. The positions of the circles show the actual deviation from the average prices, while their sizes indicate the sales value in Sweden of pharmaceuticals of that age compared to other ages. The dark blue, light blue and red curves are model adaptations of the circles (fourth degree polynomial regression) used to illustrate the trend over the life cycle. Sales data for the period 2014–2023.

Note 2: The figure should be interpreted as Sweden's average relative price per pharmaceutical age for all years 2014–2023. Accordingly, it only indicates Sweden's relative price level for the entire period.

Swedish prices for pharmaceuticals without generic competition are generally slightly lower than the European average for the age group 16 to 30 years. This is mainly driven by pharmaceuticals in the TNF category. For pharmaceuticals that are a few years older, the prices are on a level with the average.

3.1.4 Life cycle analysis for all countries

Figure 7 presents data in a similar manner to Figure 4 but for all countries included in the comparison. The figure shows that the different pricing and subsidy systems among the countries compared lead to large differences in the way relative price levels develop over time.

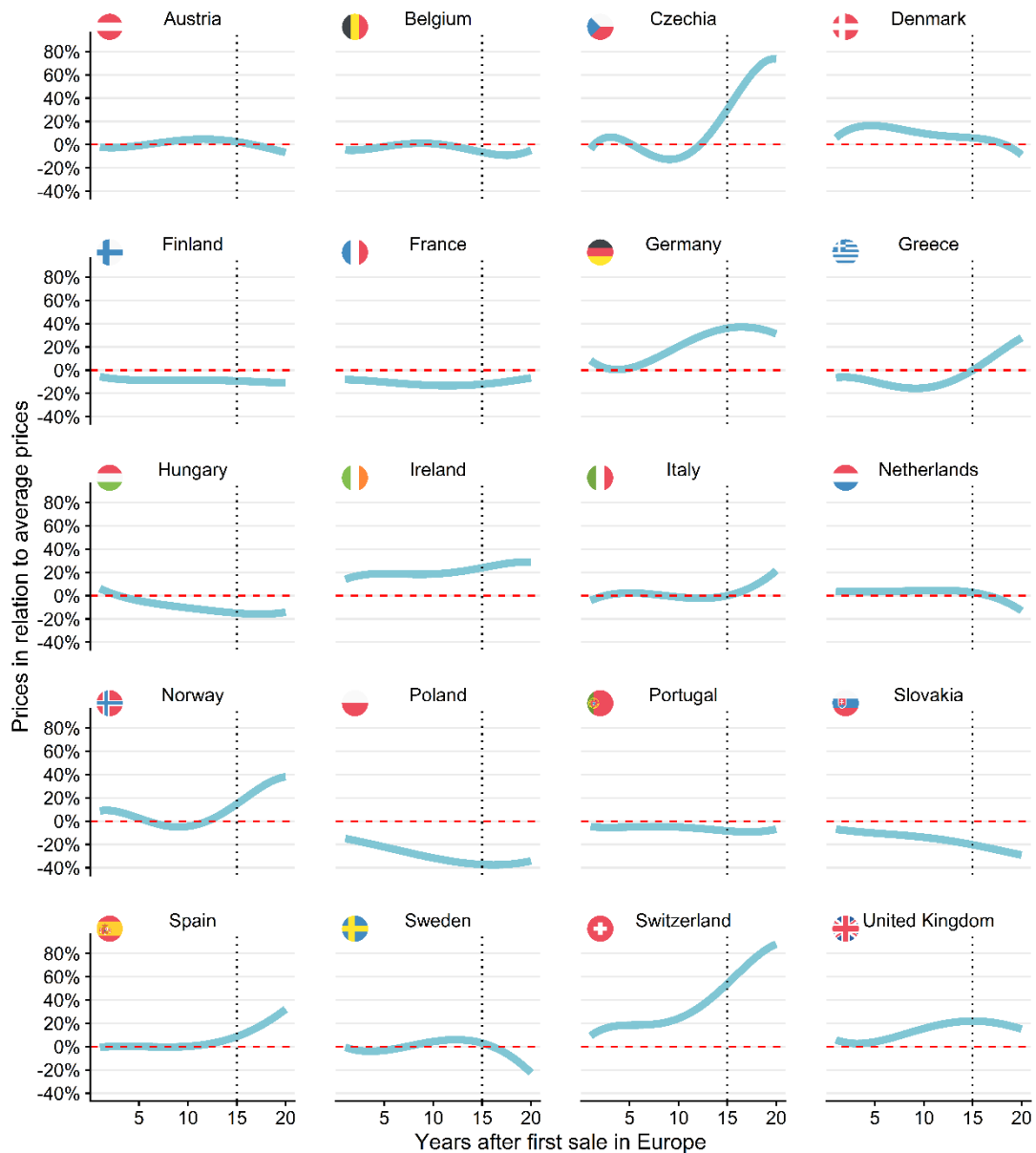
In Sweden, decisions on subsidies are made based on whether the cost of a pharmaceutical is considered reasonable in relation to the benefit of the treatment it provides, referred to as value-based pricing [6]. Several countries have regulatory frameworks that address pharmaceutical prices once a pharmaceutical has been on the market for a few years. One example is Finland, which has time-limited subsidy decisions that are valid for a maximum of three years for new active substances and up to five years for other pharmaceuticals, after which companies must re-apply for the subsidy [7]. Finland has lower prices than Sweden for pharmaceuticals between

5 and 15 years old. Another example is France, which regularly reassesses pricing and subsidy status after five years [8]. France also employs volume agreements for market entry, which are then converted into list price reductions after a number of years based on framework agreements with manufacturers. Compared to Sweden, France has lower prices for pharmaceuticals that have been on the market between 5 and 15 years.

Another country with a system that differs from Sweden's is Norway, where reference prices from nine other countries, including Sweden, are used for pricing pharmaceuticals. An annual review is conducted to ensure that local prices are on a desirable level in relation to the reference countries. This price review reflects both exchange rate changes and local price changes among the reference countries [9]. Such price adjustments are not made under the Swedish model, which can be seen as a contributing factor to Sweden's low pharmaceutical prices in an international perspective.

Sweden's low prices, relative to the average, for pharmaceuticals over 15 years old can largely be explained by the product-of-the-month system, which promotes pricing competition [5]. Denmark and the Netherlands are examples of countries displaying a similar development to Sweden after 15 years on the market, and which – like Sweden – apply a generic substitution system for off-patent pharmaceuticals.

Figure 7. Pharmaceutical prices compared with the average price for the 20 countries in the report, by year after marketing authorisation, by country, percentage of the average. Data for the years 2014–2023.



Source: IQVIA and TLV Analysis.

Note 1: Norway and Czechia should be interpreted with caution for pharmaceuticals older than 15 years. This is because the structure of their subsidy systems means that list prices and transaction prices differ significantly. The observations in this figure only show list prices.

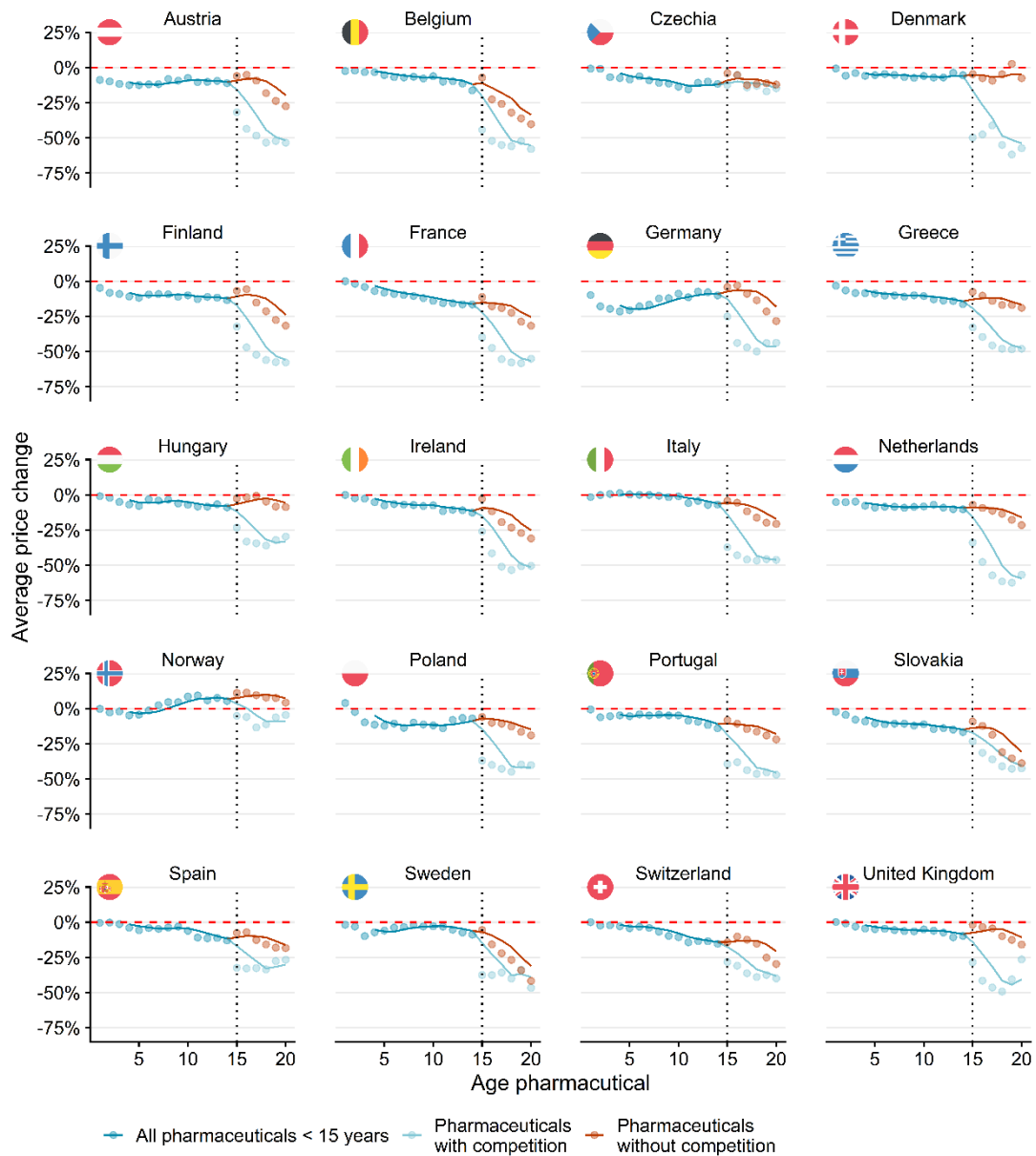
Note 2: The red dashed line shows the average prices for 20 European countries. The light blue curve in the figures is a polynomial regression (fourth degree polynomial), i.e. a model adapted to the data points. Sales data for prescription medicines, 2014–2023.

3.1.5 Domestic price developments in all countries

Figure 8 illustrates how prices develop, on average, over the life cycle of a pharmaceutical product for each of the included countries. Unlike Figure 7, which compared price levels between countries, this figure focuses on price dynamics over the life cycle within each country. As before, the price data for the pharmaceuticals cover the period 2014–2023, meaning that the initial price we identify for each

pharmaceutical and country are found at different stages of the life cycle. Accordingly, older pharmaceuticals will have an index price taken from a later stage of their life cycle. This analysis only includes pharmaceuticals for which a price can be observed before pharmaceutical age 15.

Figure 8. All countries' domestic price development by year after marketing authorisation, percentage of first observed list price in the country. Data for the years 2014–2023.



Source: IQVIA and TLV analysis.
 Note 1: Norway and Czechia should be interpreted with caution for pharmaceuticals older than 15 years. This is because the structure of their subsidy systems means that list prices and transaction prices differ significantly. The observations in this figure only show list prices.
 Note 2: Only pharmaceuticals for which prices and volumes can be observed at pharmaceutical age 15 or earlier are included. As each country is analysed separately, all pharmaceuticals available in that country are included, regardless of the Swedish product basket. The classification of pharmaceuticals into those with and without competition is based on their competition status in Sweden.
 Note 3: Combinations of pharmaceuticals and pharmaceutical age where the price change exceeds 200 percent are excluded from the analysis.

In this analysis, top-selling pharmaceuticals in Europe as well as new and innovative pharmaceuticals that are included in the WAIT study [2] are included, regardless of whether Sweden had sales of these products. The average price change since the first observed price is weighted based on the sales value of the pharmaceutical in question, country and year. This means that changes over time can be associated with changes in price, the pharmaceutical's sales share versus other pharmaceuticals in a given period and the product basket. In the analysis, pharmaceuticals aged 15 years or older are divided into pharmaceuticals with and without generic competition. Pharmaceuticals with generic competition include pharmaceuticals which, at a certain age, were included in the Swedish product-of-the-month system. Accordingly, the competition status is defined for all countries on the basis of Swedish conditions.

Most countries show a clear reduction in prices after pharmaceutical age 15. Differences between countries can mainly be seen in the size of the price changes and prices during the period prior to pharmaceutical age 15. The Netherlands shows the largest reduction in prices after pharmaceutical age 15, with a reduction of 60 percent for pharmaceuticals with generic competition (as defined in Sweden). This can be compared to Sweden, where the average price reduction was 40 percent.

Prior to pharmaceutical age 15, differences in price dynamics can be seen between countries. Germany shows a clear reduction in initial prices between pharmaceutical ages 1–5, where the average price change is at most around 20 percent below the initial price. The fact that we then see the curve rise slightly does not necessarily mean that prices are increasing. Instead, this may be due to the fact that the product basket varies over the life cycle. Similar trends as in Germany can also be seen in France, Switzerland, Finland and Slovakia. In Figure 7, which shows the relative price change compared to the European average over the life cycle of pharmaceuticals, Germany is one of the countries that is highest above the European average (3rd highest at pharmaceutical age 15). This means that Germany's prices at entry are relatively high, but that the price dynamics over time follow the trend of falling prices. In Norway, the prices increase between pharmaceutical age 7 and 11, averaging around 10 percent above the initial prices. The dynamics illustrated in Figure 8 reflect, among other things, the price adjustments of pharmaceutical prices that the Norwegian authorities regularly implement to ensure that prices are on a desirable level in relation to the reference countries [9].

In Sweden, a clear price reduction can be seen after pharmaceutical age 15 for pharmaceuticals both with and without generic competition. In Sweden, rule-based price reductions of 7.5 percent are made for pharmaceuticals that have been on the market for 15 years but where no or limited generic competition has arisen. For those pharmaceuticals where generic competition arises, the Swedish product-of-the-month system creates incentives for price reductions among the companies competing within a substitution group.

3.2 Pharmaceuticals without generic competition

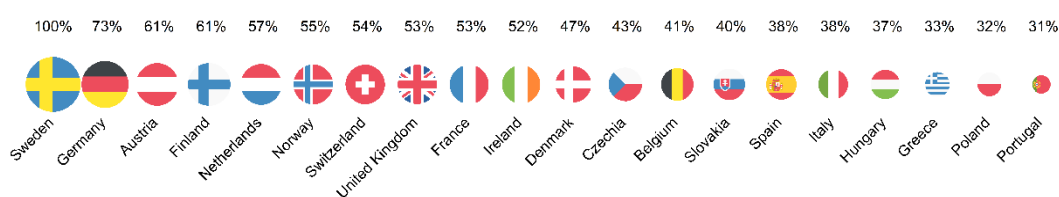
The segment pharmaceuticals without generic competition consists mainly of newer pharmaceuticals that still have active patents, but also older pharmaceuticals that lack generic competition. The latter is the case, for example, for those pharmaceuticals that the Swedish Medical Products Agency has deemed to be non-substitutable, including biological medicines and epilepsy medicines.

In Sweden, there are a total of 1,318 pharmaceuticals with sales in the first quarter of 2023 in the selection for this segment. These pharmaceuticals form the basis of the price comparison with the other countries. Accordingly, sales of pharmaceuticals in other countries that do not match those found in Sweden have been excluded (even if the substance itself is available in other countries). As such, the number of pharmaceuticals available in Sweden is the maximum number of pharmaceuticals included from other countries. If a large proportion of the pharmaceuticals available in Sweden are also available in the comparison country, the comparison is more robust. This proportion is termed the matching rate, a concept described in greater detail in the following section.

3.2.1 Matching rate

The matching rate illustrates the proportion of prescription medicines sold at pharmacies in Sweden that are also available in other countries with the same sales criteria (see Figure 9). Combinations of pharmaceuticals, countries and years where the sales volume per capita was less than 0.5 percent of the observed value in Sweden are also excluded. See Figure 30 in Appendix 1 for an analysis of the matching rate over time.

Figure 9. Swedish matching rate for pharmaceuticals without generic competition, percentage, 2023.



Source: IQVIA and TLV analysis.

For pharmaceuticals without generic competition, the highest matching rate is for Germany, where 73 percent of the pharmaceuticals used in Sweden are also used. This is followed by Austria, Finland, the Netherlands, Norway and Switzerland, with matching rates between 54 and 61 percent. The lowest matching rates are those for Portugal, Poland, Greece, Hungary, Italy and Spain, all of which have a matching rate below 40 percent. Accordingly, a comparison between Germany and Sweden is based on 73 percent of the pharmaceuticals available in Sweden while a comparison with Portugal is based on only 31 percent. As a result, the bilateral price comparisons that follow can only compare each country with Sweden, not other countries with each other. Differences in the matching rate may, for example, be due to the fact that some countries use different pharmaceuticals than in Sweden, or

that pharmaceuticals handled as prescription medicines in Sweden are handled as hospital pharmaceuticals in other countries or vice versa.

A high matching rate and pharmaceutical use similar to that in Sweden makes the price comparison more robust. Comparisons with countries that have a very low matching rate will be more difficult to generalise as the comparison is only relevant for the small number of products that are common to both. Accordingly, differences in matching rate are important to consider when taking a closer look at the results of bilateral price comparisons.

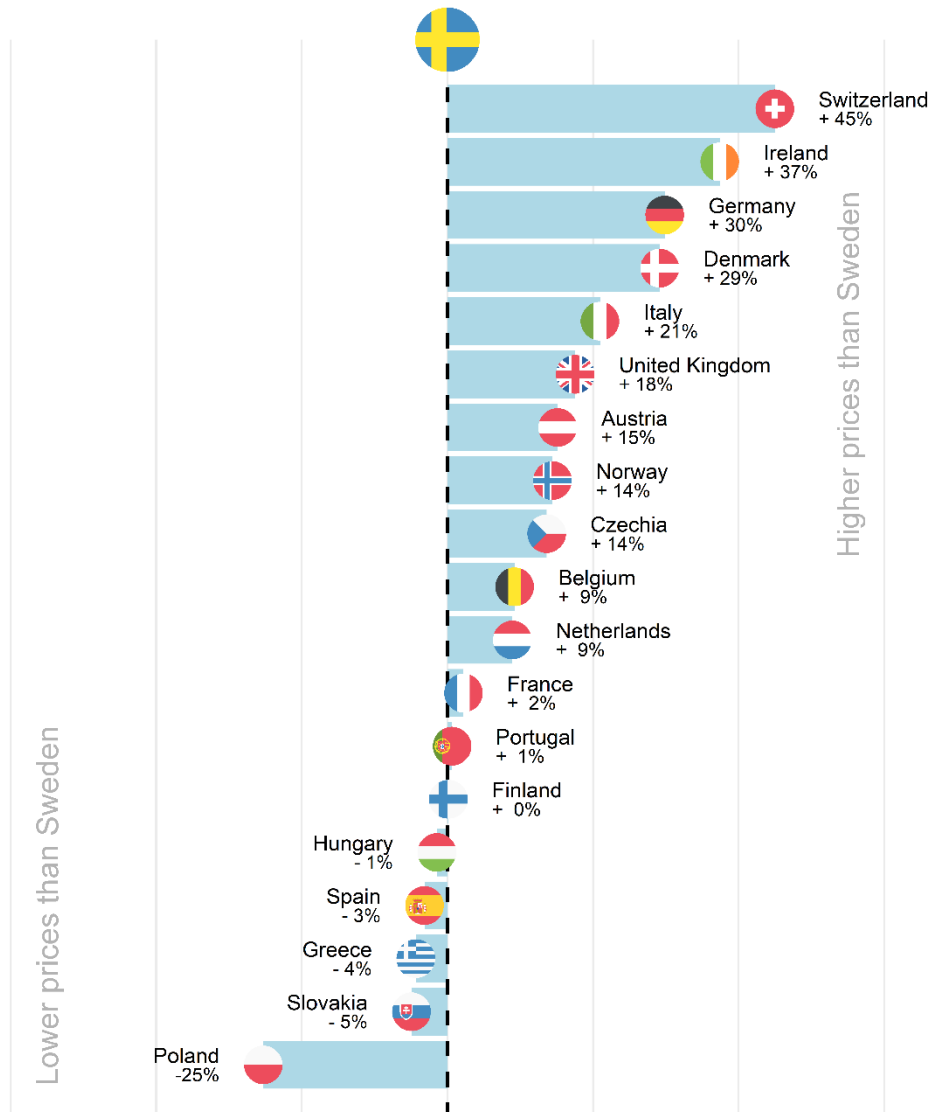
3.2.2 Bilateral price comparison

Figure 10 shows that Swedish list prices for pharmaceuticals without generic competition are the sixth lowest among the included countries. The figure shows that Sweden's costs for pharmaceuticals without generic competition sold in, for example, both Sweden and Switzerland would have been 45 percent higher had they been purchased at Swiss rather than Swedish prices. Similarly, the cost of pharmaceuticals without generic competition sold in both Poland and Sweden would have been 25 percent lower had they been purchased at Polish rather than Swedish prices.

Sweden has higher prices than five of the comparison countries, and is on a comparable level with Portugal, Finland and Hungary. The countries with lower prices than Sweden generally have a low matching rate to Swedish use, which means that the results should be interpreted with caution. Countries with higher prices than Sweden generally have higher matching rates.

Swedish sales volumes are used to weight the bilateral price comparisons. Only pharmaceuticals available in both Sweden and the comparison country are included in the calculation. In other words, the range of pharmaceuticals included in the analysis differs depending on the comparison country, which affects the interpretation. Accordingly, the pharmaceuticals included in the comparison between Sweden and Norway may differ from those in the comparison between Sweden and Spain. As such, it would be inappropriate to use Figure 10 to compare prices between, say, Norway and Spain.

Figure 10. Bilateral price comparison for pharmaceuticals without generic competition, 2023, percentage in relation to Swedish prices.



Source: IQVIA and TLV analysis.

Notes: Prices during Q1 2023. Volumes refer to March 2023, 12-month moving average.

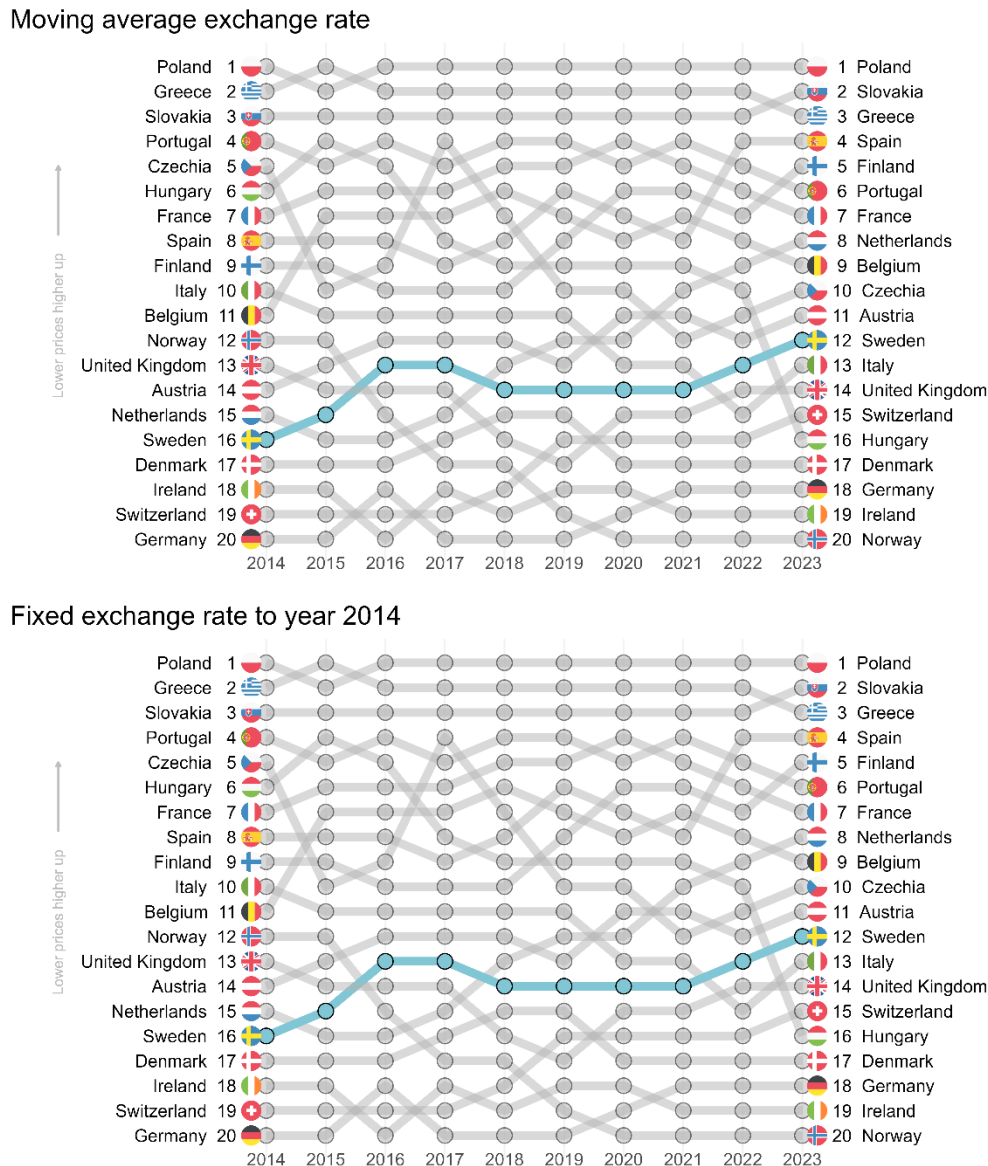
3.2.3 Historical development

In recent years, pharmaceutical prices in Sweden have fallen in relation to other countries. This is mostly explained by the fact that the Swedish krona has declined in value compared to the euro.

The top graph in Figure 11 shows how Sweden's prices have changed relative to other countries between 2014 and 2023. During this period, Sweden has gone from having the sixteenth to the sixth lowest prices. The main explanation for this change has been the exchange rate. In the bottom graph, where the exchange rate is kept constant, Sweden has moved from sixteenth to twelfth place. Sweden's prices fell in

relation to other countries between 2015 and 2016 as a result of TLV conducting many reassessments that led to lower list prices during this period.

Figure 11. Bilateral price comparison for pharmaceuticals without generic competition, change in rank over time, 2014–2023. The three-year moving average is used in the upper panel while the three-year average exchange rate for 2014 (fixed exchange rate) is used in the lower panel.



Source: IQVIA and TLV analysis.
 Note 1: Rank 1 means that the country has the lowest prices.
 Note 2: Since the bilateral comparison uses Sweden's volume weights, comparisons that do not include Sweden should not be made.
 Note 3: Some countries have general discount systems that do not affect list prices.

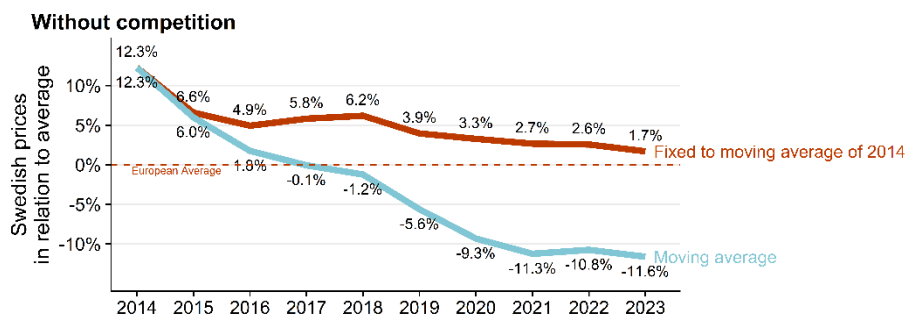
In many cases, the percentage difference in price level between the countries is small. Accordingly, Sweden's position in the top graph in Figure 11 may be shifted downward, i.e. Swedish relative prices will increase, if the Swedish krona gains in

value. A general observation is that the countries whose currency is not tied to the euro have a greater variation in position than other countries.

Figure 12 shows the percentage deviation between prices in Sweden and the average prices in other countries between 2014 and 2023. As in Figure 11, the analysis includes two series, each represented by a line. One of these lines is based on an exchange rate calculated using a moving three-year average, while the other uses an exchange rate fixed at the 2014 level. This analysis shows that, compared to the average, Swedish prices have fallen since 2014 regardless of the type of exchange rate adjustment used. To get a better understanding of the development, it is also worth looking at the size of this change.

In the first quarter of 2014, Sweden's prices were 12.3 percent higher than the average for all countries. The relative prices, which are based on prices converted at an exchange rate calculated as a moving average, then fell each subsequent year until 2021. By then, the relative prices had fallen by a total of more than 20 percentage points compared to 2014. In the first quarter of 2023, the prices are 11.6 percent below the average, which is a drop compared to the previous year. If a fixed exchange rate is used for the comparison, then by the first quarter of 2023 Sweden's relative prices had fallen by more than ten percentage points.

Figure 12. Swedish relative prices for pharmaceuticals without generic competition compared to annual cross-section, percentage, 2014–2023. Blue line: three-year moving average; red line: three-year moving average from 2014 (fixed exchange rate). Pharmaceuticals without generic competition.



Source: IQVIA and TLV analysis.

The price change is largely driven by the exchange rate change. From 2014 to 2016, reassessments and the introduction of rule-based price reductions for pharmaceuticals 15 years old and older also came into play. This change can be seen in Figure 13. More reassessments have been conducted since 2016, but they have resulted in limited reductions in list prices. Instead, the primary focus has been on managed entry agreements on repayments from companies to regions, resulting in reduced costs that are not seen when list prices are analysed [10].

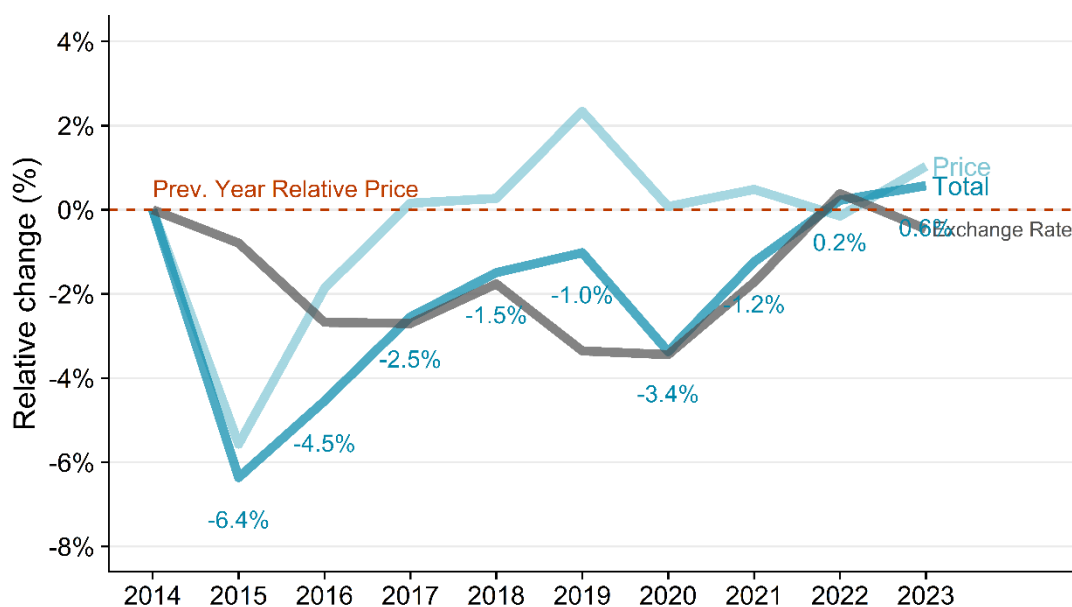
As previously mentioned, if the Swedish krona was to rise in value again, Sweden's relative prices would likely also rise. The following section provides a more detailed analysis of the reasons behind this price development.

3.2.4 Price and currency effects

Figure 13 breaks down the annual change in relative prices into two components, currency change and price change. The aim is to illustrate how much of the change between each year that can be attributed to either changes in the exchange rate or actual changes in relative prices. *Currency* includes the part of Sweden's relative price level that is driven entirely by changes in the value of the Swedish krona. The *Price* category is affected by changes in pharmaceutical prices in both Sweden and other countries. Accordingly, the negative price change effects seen in Figure 13 could be due to falling prices in Sweden *or* rising prices in other countries (and vice versa).

The 2015 price reduction effect is largely due to price reductions as a result of reassessments during this period in Sweden and the introduction of the 15-year rule, as mentioned above.⁸ Note that cost changes as a result of managed entry agreements are not included in either Figure 13 or the other analyses in the report.

Figure 13. Annual change in Swedish prices in relation to the average for pharmaceuticals without generic competition, by reason (price change or currency change), percentage of the previous year's value, weighted by Swedish use in 2014, 2014–2023.



Source: IQVIA and TLV analysis.

To isolate the price and currency effects from the cost changes arising as a result of different pharmaceuticals being used to different extents between the years, the analysis has been limited to include only those pharmaceuticals that have been used in all years between 2014 and 2023. For the same reason, relative prices are weighted according to how these pharmaceuticals were used in 2014. As in previous analyses based on cross-sections, the price category is weighted according to how much use a particular pharmaceutical had in Sweden. Accordingly, price changes

⁸ This work was done in the context of the previous savings plan 2014–2017, as set out in the 2014 budget proposal.

for pharmaceuticals with high use have a greater effect than an equally large price change for a pharmaceutical with lower use. A more detailed description of the calculations and methodology behind Figure 13 is presented in Appendix 2.

The sum of the two components, price and currency, comprises the *total relative price change*. A total effect that is negative and below the red dashed line means that Swedish relative prices are *lower* than in the previous year. On the whole, Swedish relative prices for pharmaceuticals increased compared to the previous year for all observed years. Last year's report also showed an increase in the relative prices of these pharmaceuticals due to a temporary improvement in the exchange rate (moving average). However, this year's increase is explained not by a stronger exchange rate, but by the fact that prices in Sweden have actually fallen, only not as fast as prices in the other countries.

3.2.5 Pharmaceutical classes

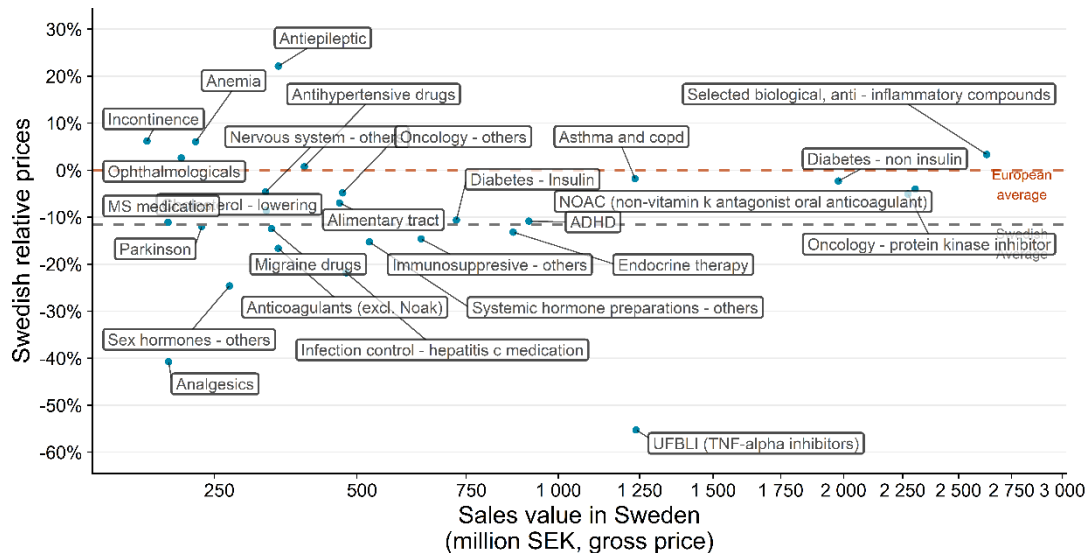
The relationship between Swedish and foreign prices differs within the various pharmaceutical classes. Figure 14 shows Sweden's relative prices and total sales in Sweden in 2023 (total AIP) divided into different pharmaceutical classes. Only the classes with the highest sales are shown in the figures below.

The pharmaceutical classes with the highest sales in Sweden within this segment are "Selected biological, anti-inflammatory compounds"⁹, "NOACs", "Oncology – protein kinase inhibitors", "Diabetes – non-insulin", "Asthma and COPD" and, finally, "UFBLI (TNF-alpha inhibitors)". Of these six top-selling pharmaceutical classes, the average price for "Selected biological, anti-inflammatory compounds" is just above the European average, while the others are below. The figure shows that Swedish relative prices were highest (22 percent above the average) in the class "Antiepileptic drugs" and lowest (56 percent below the average) in the class "UFBLI (TNF-alpha inhibitors)".

One perspective not captured in Figure 14 is how Sweden's relative prices within the various pharmaceutical classes have changed over time. This is illustrated in Figure 15. The coloured lines and points each represent a different year, from 2015 to 2023, with every other year represented in the figure. The position of a point relative to the grey dashed line shows how much the average Swedish price of the pharmaceutical class is above or below the European average. The size of a point indicates the proportion of the sales value that the class accounted for in Sweden during that year. The outer perimeter of the circle categorises the pharmaceutical classes based on the outcome for 2023. The pharmaceutical classes found within the green section of the perimeter include those that are below the average (more than two percent), the grey section those that are around the average (between two percent below and two percent above) and the red section those that are above average (more than two percent).

⁹ UFBLI is a Swedish acronym for *Utvalda, främst biologiska, läkemedel vid inflammatoriska sjukdomar*, which is translated as selected mainly biological, anti-inflammatory compounds. See Appendix 2 – Pharmaceutical classes for a list of the substances included in the class. TNF-alpha inhibitors are also classified under UFBLI but are reported separately.

Figure 14. Swedish prices relative to the average (y-axis, percentage) in relation to total AIP (x-axis, SEK millions), pharmaceuticals without generic competition, by pharmaceutical class, 2023.



Source: IQVIA and TLV analysis.

Notes: The x-axis intervals increase exponentially. This is so that all pharmaceutical classes can be shown together. Pharmaceutical classes with AIP sales of less than SEK 150 million have been excluded for the same reason.

Based on the pharmaceutical classes with the highest sales in 2023, "Selected biological, anti-inflammatory compounds" and "Diabetes – non-insulin" have relatively low fluctuations over time. "Oncology – protein kinase inhibitors" shows a gradual decline in relative price over time, from 8 percent above the average in 2015 to 5 percent below the average in 2023.

The "UFBLI (TNF-alpha inhibitors)" class shows one of the largest changes over time for the period. Within this class, the relative prices have fallen from around 14 percent above the average in 2015 to around 55 percent below the average in 2023. One contributing factor is that biosimilars are now available on the market at significantly lower prices than the original pharmaceuticals. Price developments among TNF-alpha inhibitors are discussed further in Section 4.2.

Figure 15. Swedish prices in relation to the average for pharmaceuticals without generic competition, by pharmaceutical class, percentage, every other year 2015–2023.



Source: IQVIA and TLV analysis.

Note 1: Green: Prices below the European average 2023 (more than two percent below); grey: Prices around the European average 2023 (between two percent below and two percent above); and red: Prices above the European average 2023 (more than two percent above).

Note 2: 1 indicates that active managed entry agreements existed for the pharmaceutical class in 2023. 2 indicates that managed entry agreements existed in one of the other years for the pharmaceutical class.

The changes are small in most pharmaceutical classes. As shown in Figure 12, Swedish average relative prices fell marginally compared to the average of the other countries between years, a drop that is largely explained by the changing prices of TNF-alpha inhibitors. Measured in SEK, list prices do not change much until generic competition arises in the product-of-the-month system, or when prices are reduced following reassessments conducted by TLV. Without intervention or regulatory price reductions, spontaneous pharmaceutical price reductions are rarely seen in the Swedish market.

Many of the pharmaceutical classes shown in Figure 15 have or have had active managed entry agreements in Sweden during the included years. These are marked with a 1 or a 2 in the figure. For these classes, the price levels shown in Figure 14

and Figure 15 are actually lower for society after taking into account repayments from managed entry agreements. As other countries may also have agreements with confidential content or confidential pharmaceutical procurement processes, it is not possible to make a statement on the actual price level in Sweden compared to other countries for these classes, even if the list prices are lower.

3.3 Pharmaceuticals with generic competition

The report defines pharmaceuticals with generic competition as those that are available in the Swedish product-of-the-month system, i.e. pharmaceuticals that the Swedish Medical Products Agency has classified as substitutable and for which generic competition has arisen. These are older pharmaceuticals for which the patents have expired, which in most cases occurs about 15 years after market introduction. However, there are many pharmaceuticals older than 15 years that do not have generic competition. These may be pharmaceuticals for which no competition has arisen. There are also pharmaceuticals that are not classified as generically substitutable by the Swedish Medical Products Agency, such as biosimilars and epilepsy medicines.

The Swedish product-of-the-month system

In the Swedish product-of-the-month system, substitutable pharmaceuticals are divided into substitution groups based on substance, dosage form, strength and pack size. The pack (a so-called NPL pack ID) with the lowest price within a pack size group and for which the responsible company has confirmed availability in the Swedish market during the month in question becomes the 'product-of-the-month' for that month. Since the pack that is made the product-of-the-month receives most of the sales in that pack size group during the month in question, this encourages pricing competition between companies.

Ceiling prices in the product-of-the-month system

Sweden also has a system of ceiling prices for the segment pharmaceuticals with generic competition. When the unit price in a substitution group has fallen below 30 percent of the original price, a ceiling price is set at 35 percent of the highest price in the group when generic competition arose. Ceiling prices mean that the price within a group can be freely increased up to the ceiling price level. Sweden's pricing model creates scope for price dynamics, as can be seen, for instance, in the fact that pharmaceuticals with and without generic competition have been affected to different extents by exchange rate changes.

The current ceiling price system has, since its introduction in 2011, contributed to consistent and low prices for substitutable pharmaceuticals and thereby cost-effective pharmaceutical use. However, for the system to remain relevant even in times of economic and market disruption, the regulatory framework needs to be reviewed and revised.

In 2023, TLV initiated a review of the Swedish ceiling price system. This review will continue in 2024. The purpose of the review is to create a system that contributes to effective generic competition for substitutable pharmaceuticals covered by the

pharmaceutical benefits scheme and that also provides both pricing pressure and room for price increases when needed. During the first half of 2023, TLV increased the ceiling prices for the substitution groups that have demonstrated the greatest need. The purpose of these increases is to provide room for companies to manage external factors affecting costs during the review period.

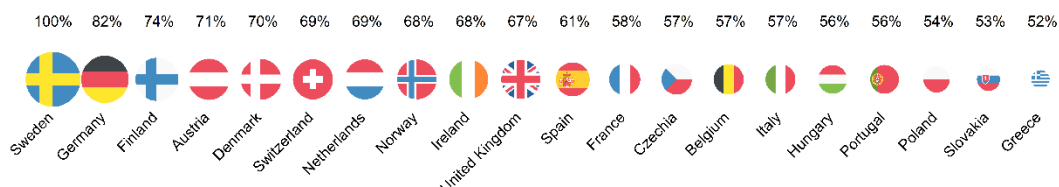
In Sweden, there are a total of 704 pharmaceuticals in the selection of pharmaceuticals with generic competition that had sales in the first quarter of 2023. These pharmaceuticals form the basis of the bilateral price comparison that is made with the included comparison countries. Just as in the corresponding section on pharmaceuticals without generic competition, a pharmaceutical must have had sales in both Sweden and the comparison country for which the index is being calculated. If a large proportion of the pharmaceuticals available in Sweden are also available in the comparison country, the comparison is more robust. This proportion is termed the matching rate, a concept described in greater detail in the following section.

3.3.1 Matching rate

The matching rate illustrates the proportion of prescription medicines sold at pharmacies in Sweden that are also available in other countries with the same sales criteria. For pharmaceuticals with generic competition, the matching rate is, on average, significantly higher than for pharmaceuticals without generic competition.

Figure 16 shows that the matching rate differs between the comparison countries in this segment as well. Germany has the highest matching rate with Sweden at 82 percent, while Greece and Slovakia have the lowest matching rates with Sweden at 52 and 53 percent, respectively. The matching rate for all countries is higher in the segment pharmaceuticals with generic competition. When the matching rate is studied over time, the rate is relatively stable for both segments, with only minor fluctuations between years (see Figure 30 in Appendix 1).

Figure 16. Swedish matching rate for pharmaceuticals with generic competition, percentage, 2023.



Source: IQVIA and TLV analysis.

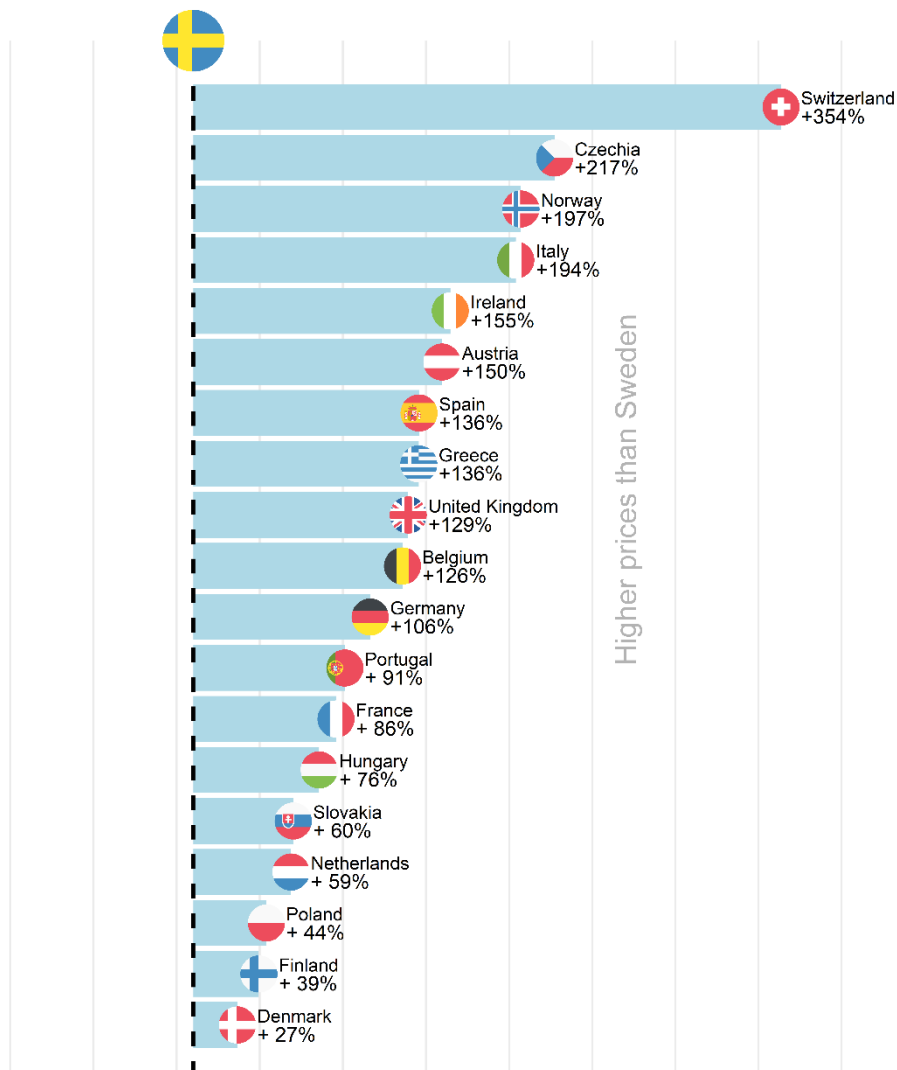
As mentioned in the corresponding section on the segment pharmaceuticals without generic competition (Section 3.2.1), the matching rate affects how much of the Swedish basket can be compared with each comparison country. This means that a comparison between Germany and Sweden is based on 82 percent of the pharmaceuticals available in Sweden, while a comparison with Greece is based on 52 percent.

Differences in the matching rate may, for example, be due to the fact that some countries use different pharmaceuticals than in Sweden, or that pharmaceuticals handled as prescription medicines in Sweden are handled as hospital pharmaceuticals in other countries and vice versa.

3.3.2 Bilateral price comparison

Figure 17 shows that relative prices differ significantly depending on which country Sweden is compared with. The figure compares the prices of pharmaceuticals available in Sweden and the comparison country weighted by Swedish sales volumes in 2023. As the pharmaceuticals used when Sweden is compared with, say, Norway, are not the same as when it is compared with Spain, these data cannot be used to compare the different countries with each other.

Figure 17. Bilateral price comparison for pharmaceuticals with generic competition, 2023, percentage in relation to Swedish prices.



Source: IQVIA and TLV analysis.

Notes: Prices during Q1 2023. Volumes refer to March 2023, 12-month moving average.

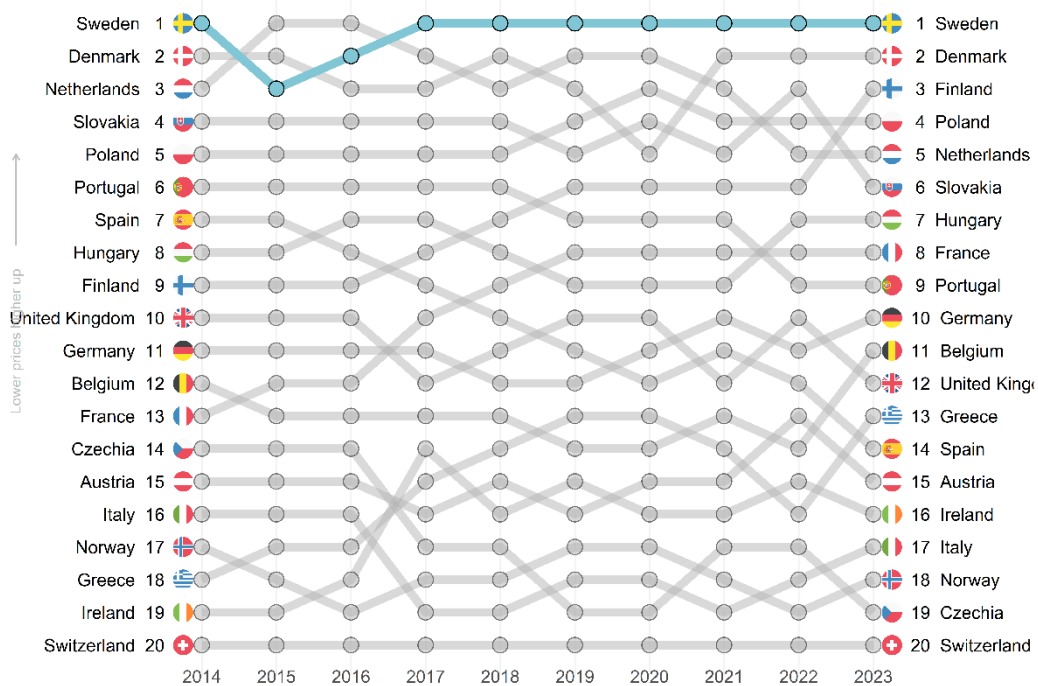
Figure 17 shows that Switzerland has list prices that are more than three times higher than Sweden for the pharmaceuticals with generic competition used in both countries. Denmark has 27 percent higher prices than Sweden and is closest to Swedish price levels. For pharmaceuticals with generic competition, Denmark has the fourth highest matching rate, which can be compared with the pharmaceuticals without generic competition segment where Denmark had the tenth highest.

Denmark has a system similar to the Swedish product-of-the-month system. However, the systems differ in some respects. For example, Denmark uses sales periods of two weeks as opposed to the sales periods of one calendar month used in Sweden. In addition, Denmark does not have a ceiling price system like that of Sweden [11]. The Swedish ceiling price system discourages price increases and helps lower the prices of pharmaceuticals that retain high prices even after generic competition has arisen. The ceiling price system has kept pharmaceutical prices down in Sweden in recent years when inflation has been high, which may have contributed to the widening gap between Swedish and Danish prices over the past two years.

3.3.3 Historical development

Figure 18 shows the development of the bilateral price comparison over time for pharmaceuticals with generic competition. As the weighting is based on sales in Sweden, comparisons with countries other than Sweden should be avoided. Throughout the period 2014–2023, Sweden's prices have been among the lowest.

Figure 18. Bilateral price comparison for pharmaceuticals with generic competition, change in rank over time, 2014–2023. Exchange rate as per three-year moving average.



Source: IQVIA and TLV analysis.
 Note 1: Rank 1 means that the country has the lowest prices.

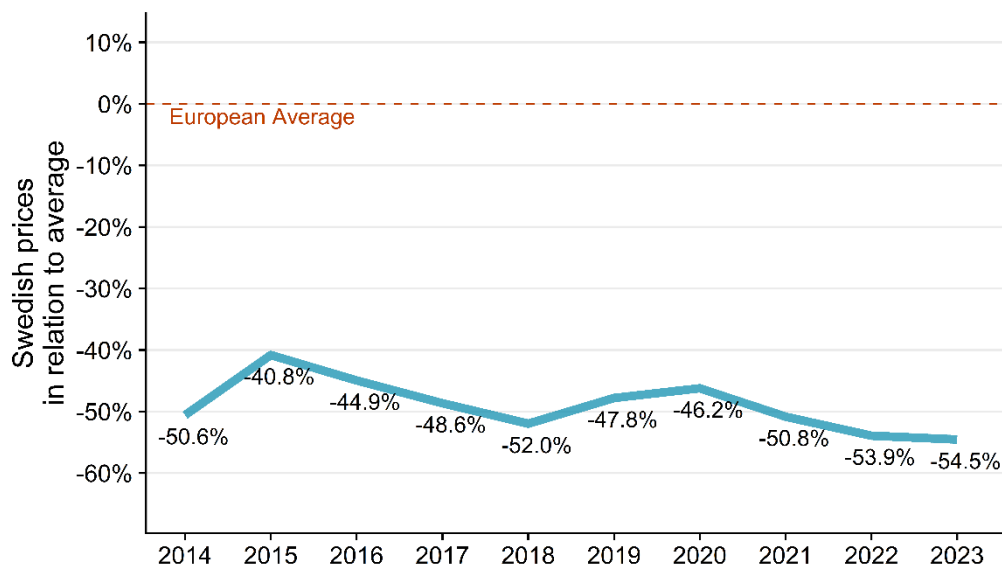
Note 2: Since the bilateral comparison uses Sweden's volume weights, comparisons that do not include Sweden should not be made.

Note 3: Some countries have general discount systems that do not affect list prices.

Figure 18 shows that Denmark has been closest to Swedish price levels for much of the period, with the exception of 2019–2020 when Denmark fell to fifth place at its lowest. Finland has moved from ninth to third place. Meanwhile, Switzerland has had the highest prices among the 20 countries included in the comparison throughout the time series. In the pharmaceuticals with generic competition segment, the Swedish exchange rate has less impact than on pharmaceuticals without generic competition. On the other hand, the competition encouraged by the product-of-the-month system has a significant impact. (See Figure 20, where the change in Sweden's relative price over time is divided into currency and price effects.)

Figure 19 shows how Swedish prices for pharmaceuticals with generic competition compare with the average for all countries. In 2023, Sweden's prices for pharmaceuticals with generic competition were almost 55 percent lower than the average for all countries. This is slightly lower than the level for 2014. Both the exchange rate and the competitive situation in the different substitution groups changed during the period. The competitive situation is constantly changing. A larger number of companies in a substitution group tends to increase pricing competition, while a smaller number tends to do the opposite.

Figure 19. Swedish relative prices for pharmaceuticals with generic competition compared to annual cross-section, percentage, 2014–2023. Exchange rate as per three-year moving average.



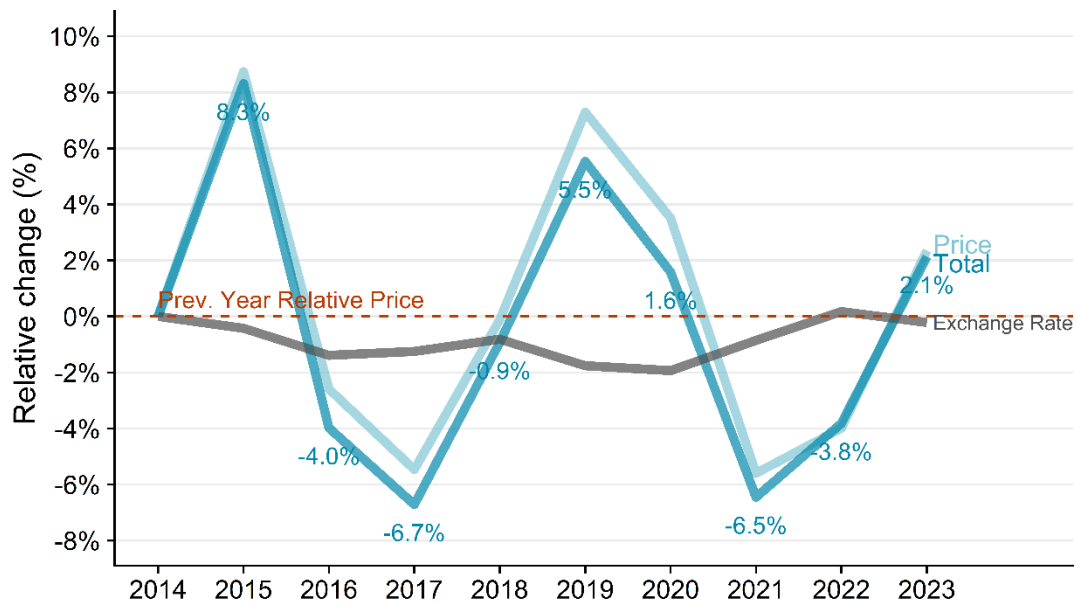
Source: IQVIA and TLV analysis.

3.3.4 Price and currency effects

Figure 20 breaks down the annual change in relative prices into two components, currency change and price change. The aim is to attempt to illustrate how much of the change between each year can be attributed to either changes in the exchange

rate or actual changes in relative prices. *Currency* includes the part of Sweden's relative price level that is driven entirely by changes in the value of the Swedish krona. The *Price* category is affected by changes in pharmaceutical prices in both Sweden and other countries. Accordingly, the negative price change effects seen in Figure 13 could be due to falling prices in Sweden or rising prices in other countries (and vice versa).

Figure 20. Annual change in Swedish prices in relation to the average for pharmaceuticals with generic competition, by reason (price change or currency change), percentage of the previous year's value, weighted by Swedish use in 2014, 2014–2023.



Source: IQVIA and TLV analysis.

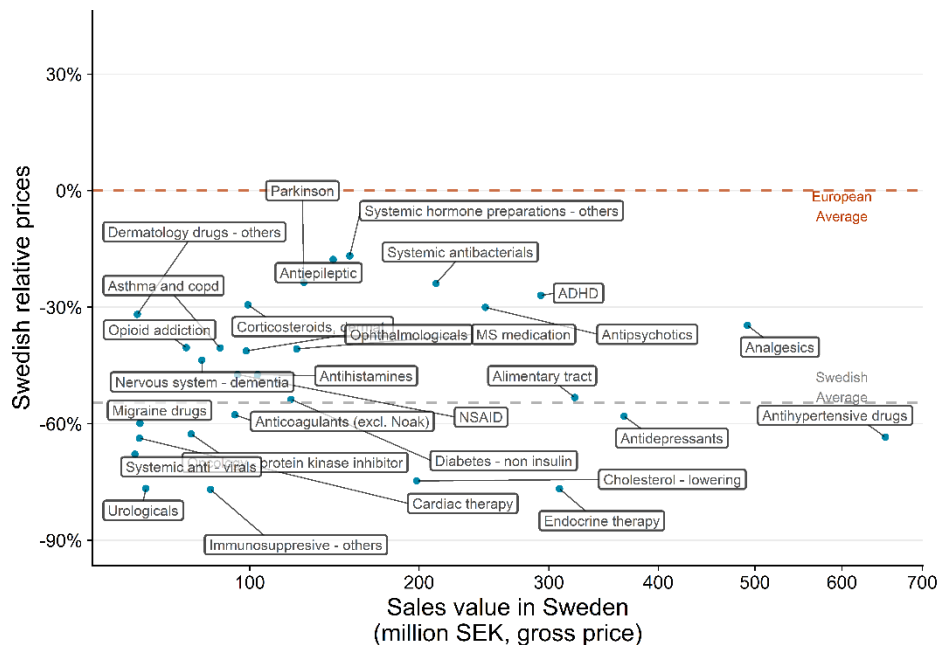
The currency effect is smaller than for pharmaceuticals without generic competition, which is also reasonable given that there is some scope to adjust the prices of pharmaceuticals with generic competition due to a changed exchange rate. For pharmaceuticals in the product-of-the-month system, the price can be increased up to the ceiling price without the company having to provide evidence justifying the need for a price increase in its application to TLV. Accordingly, in this segment, the exchange rate effect – which has such a strong impact on the pricing of pharmaceuticals without generic competition – can be compensated for by higher prices, which is one of the reasons why the exchange rate effect is not as strong for pharmaceuticals with generic competition.

The price effect is greater, which can be explained by the competition encouraged by the product-of-the-month system. For 2023, we can see that Sweden's relative prices have increased by just over 2 percent compared to the previous year. Price changes in either Sweden or the comparison countries drive this development, while exchange rate changes have a slight damping effect. Compared to Figure 19, where Sweden's relative prices continue to show a drop compared to the previous year, the analysis in Figure 20 only includes pharmaceuticals for which sales can be observed in Sweden every year between 2014 and 2023.

3.3.5 Pharmaceutical classes

Swedish prices for pharmaceuticals subject to generic competition are generally lower than the prices in the other countries in the comparison. Figure 21 shows Sweden's prices in comparison with the average, as well as sales in Sweden in 2023, broken down by pharmaceutical class. Only the classes with the highest sales are shown in the figures below. The figure shows that Swedish relative prices do not exceed the average prices of the included countries within any pharmaceutical class. The prices were highest (17 percent below the average) within the class "Systemic hormonal preparations other" and lowest (79 percent below the average) in "Immunosuppressants other".

Figure 21. Swedish prices relative to the average (y-axis, percentage) in relation to total AIP (x-axis, SEK millions), pharmaceuticals with generic competition, by pharmaceutical class, 2023.



Source: IQVIA and TLV analysis.

Notes: The x-axis intervals increase exponentially. This is so that all pharmaceutical classes can be shown together. Pharmaceutical classes with AIP sales of less than SEK 50 million have been excluded for the same reason.

In certain pharmaceutical classes, substitution is limited by the prescriber, pharmacist or patient objecting to the prescribed medicine being substituted at the pharmacy. Within the pharmaceutical class for the treatment of ADHD, for example, substitution of the prescribed medicine is prevented in 40 percent of cases. This is a relatively high proportion, although similar patterns exist within other pharmaceutical classes as well.

Figure 22 shows how the relative prices within each pharmaceutical class have developed over time. The coloured lines and points each represent a different year, from 2015 to 2023, with every other year represented in the figure. The position of a point relative to the grey dashed line shows how much the average Swedish prices of the pharmaceutical class are above or below the European average. The size of a point indicates the proportion of the sales value that the class accounted for in

Sweden during that year. The outer perimeter of the circle categorises the pharmaceutical classes based on the outcome for 2023.

The largest change compared to the previous year, and also over the most recent years, is the decrease in the price of pharmaceuticals used to treat ADHD. The drop in relative prices is due to the drop in average prices in Sweden for pharmaceuticals in this class. This is due to more substances becoming subject to generic competition as a result of expiring patents and increased competition in some previously existing substitution groups.

The relative prices within the pharmaceutical class "Immunosuppressive others" have also fallen considerably. Within this class, it is mainly products belonging to the substance lenalidomide that affect the results. Since becoming subject to generic competition, the prices of some dosage forms have fallen considerably not only in Sweden, but also in some of the other countries. In those countries where no competition has arisen, prices remain at significantly higher levels. The change is also explained in part by changes in which products can be observed over the years.

Figure 22. Swedish prices in relation to the average for pharmaceuticals with generic competition, by pharmaceutical class, percentage, every other year 2015–2023.



Source: IQVIA and TLV analysis.

Note 1: Green: Prices below the European average 2023 (more than two percent below); grey: Prices around the European average 2023 (between two percent below and two percent above); and red: Prices above the European average 2023 (more than two percent above).

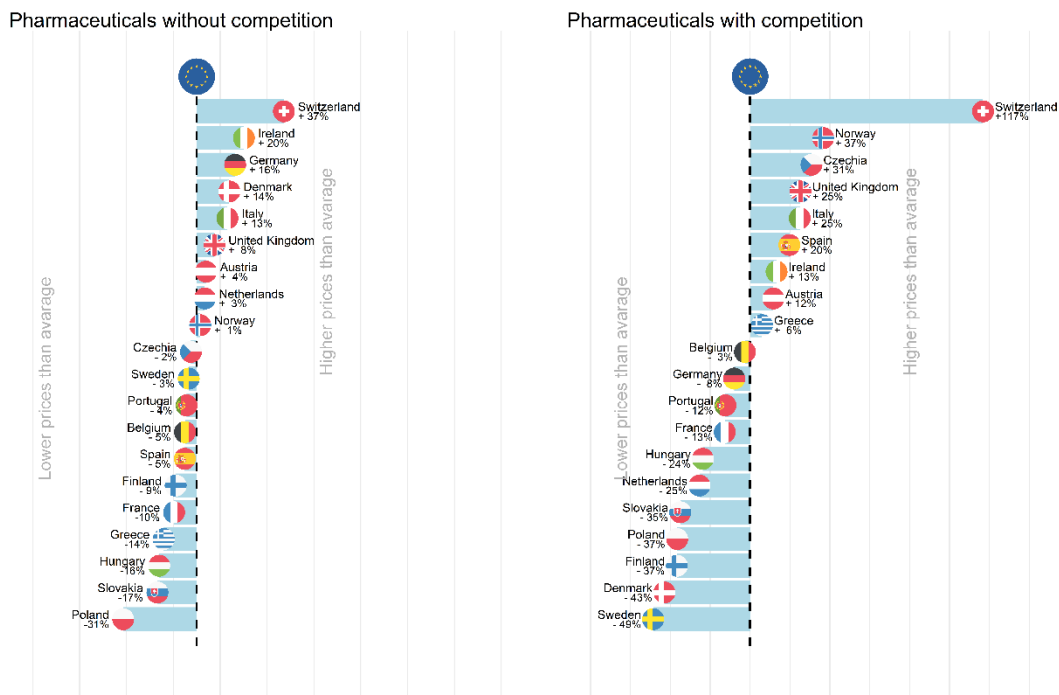
Note 2: 1 indicates that active managed entry agreements existed for the pharmaceutical class in 2023. 2 indicates that managed entry agreements existed in one of the other years for the pharmaceutical class.

3.4 Bilateral average – price comparison given other countries' volumes

The analyses presented in the previous sections are mainly based on Swedish conditions and prices. The prices of pharmaceuticals with high use in Sweden have been given greater weight than the prices of pharmaceuticals with low use in Sweden, even if use has been high in other countries. This means that Swedish prices may appear low as Sweden may have lower prices for pharmaceuticals that are widely used domestically. The correlation may also be the reverse, i.e., Swedish healthcare tends to prescribe low-priced rather than high-priced pharmaceuticals.

Figure 23 presents an alternative analysis in which the bilateral index is calculated using all countries' pharmaceutical use. Bilateral indices have been created for all countries based on each country's product basket and use. An average of these indices is then calculated. See Appendix 2 for a more detailed description of the methodology.

Figure 23. Price comparison with bilateral average for pharmaceuticals without and with generic competition, percentage, 2023. Exchange rate as per three-year moving average.



Source: IQVIA and TLV analysis.

For pharmaceuticals without generic competition, Sweden's prices are three percentage points lower than the average. This puts Sweden in tenth place on the list of the lowest prices in all 20 countries. This can be compared to Figure 10, which shows the bilateral index weighted by Swedish sales volumes. According to this index, Sweden, together with Finland, has the sixth lowest prices. In other words, Sweden's price level looks slightly higher when taking into account the use of pharmaceuticals in other countries compared to when only Swedish sales volumes are taken into account. This indicates that pharmaceuticals which are widely used in Sweden tend to have lower relative prices.

For pharmaceuticals with generic competition, Sweden has the lowest prices in 2023. This is in line with the bilateral index in Figure 17, where Sweden has the lowest price when only Swedish sales volumes are taken into account. The gap is generally smaller between Sweden and other countries compared to the bilateral index in Figure 17.

4 Discussion

The results show that, compared to the other countries, Sweden has relatively low prices for pharmaceuticals. This is particularly true in the case of pharmaceuticals with generic competition, where Swedish prices are among the lowest. For pharmaceuticals without generic competition, Sweden has the sixth lowest prices in the analysis, with Spain overtaking Sweden in the ranking compared to the previous year [12]. It should be noted that three other countries besides Sweden are within two percentage points of each other, which means that relatively small changes in relative prices can cause both upward and downward movement in the rankings. In relation to the average, Swedish prices for pharmaceuticals – both with and without generic competition – have become slightly lower compared to last year.

Swedish pharmaceutical prices and the exchange rate

The downward trend in prices is largely explained by the declining value of the Swedish krona, against the euro in particular. If the effect of the changed exchange rate is removed, Swedish prices – relative to other countries – are only marginally lower over time. The fact that the analysis is greatly influenced by changes in exchange rates means that the low relative price level reported in this year's report, and also identified in previous years' reports [13, 14, 12], may change in the future, should the exchange rate change.

Calculating the exchange rate as a three-year moving average spreads the effects of changing exchange rates over time. For example, the Swedish krona rose against the euro in late 2020 and early 2021. As a result, the moving average exchange rate is also higher than the current exchange rate this year, making Swedish pharmaceutical prices appear slightly higher than they otherwise would.

In the Swedish system, which is based on value-based pricing, exchange rates are not taken into account. Instead, prices are determined based on Swedish conditions. Accordingly, in the Swedish system, prices do not automatically increase when the exchange rate falls. If the Swedish krona strengthens its value in relation to other currencies, then the prices of pharmaceuticals that have a determined price in SEK will increase relative to other European countries, provided that all other factors remain unchanged. A falling exchange rate, as seen today, results in the opposite.

Limited information on agreements in other countries

The report does not take into account any agreements that reduce the final cost of certain pharmaceuticals. In Sweden, the total value of such agreements, so-called managed entry agreements, was SEK 2.5 billion [10] in 2022. There is currently no comprehensive data on which countries have similar agreements and their impact on costs. Even though it is not possible to incorporate such agreements, it is likely that the results in the report provide a reliable indication of price level differences between countries. In cases where Sweden does not have a managed entry agreement for a pharmaceutical and has a higher list price than other countries, we

know with certainty that Swedish prices are higher. Moreover, if the other countries also have agreements that reduce the realised costs of a pharmaceutical, the price difference is even greater, although it is not possible to show the exact amount. In cases where Swedish list prices are relatively low and other countries have agreements that reduce the realised pharmaceutical costs, we cannot know whether prices in Sweden are actually lower.

4.1 Life cycle analysis

The results of the life cycle analyses show that Sweden's relative pharmaceutical prices are in line with those of other countries throughout the first five years following a pharmaceutical's market introduction. Thereafter, for pharmaceuticals that have been on the market between 5 and 15 years, Swedish relative prices are above the average. For pharmaceuticals of these ages, Swedish prices are often stable and do not change much from year to year. As a result, successive price reductions in other countries lead to an increase in our relative prices.

After about 15 years on the market, the pharmaceuticals' patent protection expires and some of the original pharmaceuticals can be replaced by generic alternatives. The Swedish product-of-the-month system [3], with generic substitution at pharmacies, creates significant pricing pressure that leads to Swedish prices generally falling. For pharmaceuticals for which generic competition does not arise, Swedish relative prices are generally in line with the average for all countries in the comparison.

Limiting the analysis to only include data from the last four years does not change the general conclusions. The curve is shifted downward, which should be interpreted as Swedish relative prices at all ages becoming lower in relation to the average. For the most part, this can be attributed to the increasingly weak Swedish krona. The shape of the curve, however, remains the same as when data from all years are included in the data set.

4.2 Pharmaceutical classes

In 2019, Swedish relative prices for the segment with generic competition within the ADHD pharmaceutical class were 30 percent above the European cross-section. By 2023, however, they are 30 percent below it. Between 2015 and 2023, the relative prices of TNF-alpha inhibitors¹⁰ fell from 15 percent above to 55 percent below the cross-section. In other words, within these two pharmaceutical classes, we see relatively large changes in Sweden's relative price levels. This section focuses on explaining why this is the case.

In Sweden, the total sales value of TNF-alpha inhibitors has decreased somewhat in recent years, while the sales value of pharmaceuticals for the treatment of ADHD has remained relatively stable. Treatment with TNF-alpha inhibitors is considerably more expensive per patient compared to treatment with ADHD medicines.

¹⁰ "UFBLI (TNF-alpha inhibitors)" in the analyses

The pharmaceutical classes differ regarding generic competition. The Swedish Medical Products Agency's current assessment is that biological medicines, such as TNF-alpha inhibitors, are not substitutable at pharmacies, which means that they are only found in the segment without generic competition. ADHD medicines, on the other hand, are sold both within and outside the product-of-the-month system.

Pharmaceuticals for treating illnesses in both these groups have been on the market for different lengths of time. The first TNF-alpha inhibitor was approved for use in Sweden in 2003, while pharmaceuticals for the treatment of ADHD have been on the Swedish market for much longer.

Managed entry agreements for TNF-alpha inhibitors

Up until 2021, several managed entry agreements were in place between the regions and companies for TNF-alpha inhibitors. While they reduced the cost of using these pharmaceuticals, the regions chose not to renew them. As seen in the report on cost developments [1], from when the agreements ended in mid-2021 to the beginning of 2023, costs increased by somewhere around SEK 700 million despite lower list prices.

In cases where other countries have similar confidential agreements regulating the costs of pharmaceuticals in this class, the comparison will be affected such that Swedish prices will appear lower than they actually are. In Sweden, there has not been any managed entry agreements regarding pharmaceuticals for the treatment of ADHD.

Increased competition

The price reductions for TNF-alpha inhibitors coincide with an increasing number of biosimilars becoming available in the Swedish market following patent expirations in 2016 and 2018. In connection with the regions' agreements with the companies expiring, TLV conducted reassessments, which resulted in all TNF-alpha inhibitors remaining within the benefits scheme at unchanged price levels. Since then, the regions have gradually transitioned to using less expensive biosimilars, which in turn have led to lower costs.

In an interim report[15] that the Swedish Medical Products Agency recently submitted to the Swedish Government, the agency states that there is nothing to indicate that repeated switches between biosimilars and reference pharmaceuticals, so-called multiple switches, should pose a problem in terms of efficacy or patient safety. This could pave the way for more patients switching their medication during treatment, which in turn could lead to a larger share of prescriptions specifying the pharmaceutical with the lowest price at the time. Ultimately, this should have a positive impact on the price dynamics of biological medicines.

Pharmaceuticals for the treatment of ADHD are prescribed and sold both within and outside the pharmaceutical benefits scheme, and it is mainly the relative prices of pharmaceuticals with generic competition that have fallen. The product Strattera, with the active substance atomoxetine, became subject to generic competition in 2020, leading to a significant price reduction in several countries.

Methylphenidate, another substance with high sales volumes, is available in different formulations and not all products are substitutable with each other. In Sweden, generic competition for the methylphenidate formulation modified-release capsules arose in 2020, resulting in lower prices. Another methylphenidate formulation, prolonged release tablets, also saw a significant price reduction in 2020 when another product entered the market, resulting in increased competition. To the extent that price reductions have been observed in other countries, they have not been as large, increasing the relative price difference between Sweden and the comparison countries.

Within both pharmaceutical classes, relatively large price reductions have coincided with the availability of larger numbers of alternatives. This is despite differing conditions for competition. It may not be particularly surprising that prices are affected when competition first arises, as in the case of TNF-alpha inhibitors. In addition to lower relative list prices in an international perspective, the introduction of biosimilars led to a decrease in the total costs for TNF-alpha inhibitors and an increase in their use. The comparison is made more difficult by the fact that Sweden previously had agreements that reduced these costs. Similar agreements may also have been, or remain, in place in other countries included in the comparison. Competition also increased within pharmaceuticals for the treatment of ADHD. This indicates that increased competition can have a significant price-reducing effect even on older product groups included in the product-of-the-month system. This interpretation is in line with the results seen when the price development of pharmaceuticals in the product-of-the-month system was analysed on the basis of the number of active competitors [1].

4.3 TLV's work going forward

In order to create the optimum conditions for the cost-effective use of pharmaceuticals over time, TLV monitors and evaluates the decisions taken within the pharmaceutical benefits scheme and, if necessary, adjusts the price and benefit status of pharmaceuticals. The price considered reasonable when a pharmaceutical is first introduced into the benefits scheme does not necessarily remain so throughout the entire life cycle of the pharmaceutical. This may be due to a number of reasons, such as changes in the pharmaceutical market following the introduction of new treatment options, competition between pharmaceuticals, or the fact that the pharmaceutical does not demonstrate the same efficacy in everyday clinical practice as assumed at the time of the subsidy decision. TLV also adjusts prices through the use of regular price adjustments via the 15-year rule, the product-of-the-month system and the ceiling price system. In an ongoing government assignment, *Making data available for the evaluation of pharmaceutical use and efficacy*, TLV is developing methods to make it possible to monitor drug treatment, in terms of both use and efficacy, in clinical practice [17]. In another government assignment, *Long-term sustainable financing of pharmaceuticals*, TLV is investigating the options for implementing cost-containment measures that will lead to more cost-effective pharmaceutical use.

In 2023, TLV initiated a review of the Swedish ceiling price system, which encompasses pharmaceuticals for which generic competition has arisen in the Swedish market. This review work will continue in 2024. The purpose of the review is to create a system that contributes to effective generic competition for substitutable pharmaceuticals covered by the pharmaceutical benefits scheme, while also providing low prices where possible and room for price increases when needed. During the first half of 2023, TLV increased the ceiling prices for the package size groups that have demonstrated the greatest need. The purpose of these increases is to provide room for companies to manage external factors affecting costs during the review period.

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5 Appendices

5.1 Appendix 1: Sensitivity analyses

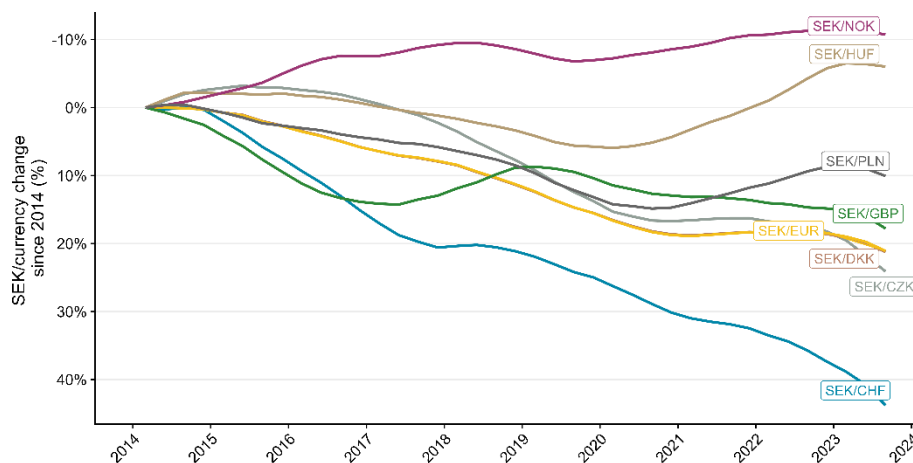
The following section presents the results of a number of sensitivity analyses. The purpose of these is to validate the robustness of our results.

5.1.1 Exchange rate

The exchange rate has a major impact on how Swedish pharmaceutical prices compare to those of other countries in an international perspective. When a new pharmaceutical is introduced on the Swedish market with a determined price in SEK, the cost of this product relative to countries with other currencies will decrease if the Swedish krona weakens, all else being equal.

Figure 1 illustrated how the value of the Swedish krona has evolved over time against the euro. Figure 24 shows how the Swedish krona has evolved over time against all currencies of the comparison countries. Each colour is associated with an exchange rate. As the y-axis is inverted, a falling line means that the Swedish krona has declined in value compared to the reference currency (i.e. more expensive to convert to the currency in question), while a rising line means the opposite. Each exchange rate is compared to the 2014 rate, so the y-axis shows the percentage change since 2014.

Figure 24. Exchange rate change over time. Includes all currencies among the countries present in the price comparison. Percentage change, baseline year 2014, 2014–2023.



Source: Eurostat.

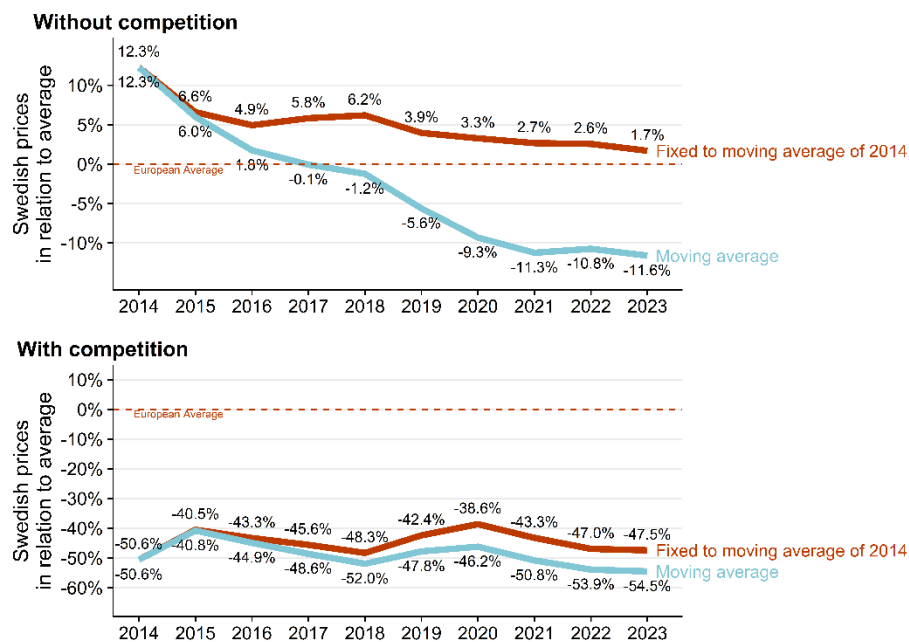
Notes: SEK/currency change since 2014 (%); percentage change in the number of SEK per currency since Q1 2014. Exchange rate as per three-year moving average.

The value of the Swedish krona has increased against the Norwegian krone (NOK) by around 11 percent and the Hungarian forint (HUF) by 6.5 percent in Q1 2023 compared to the index year 2014. For other currencies, the Swedish krona has depreciated in value since the index year 2014, with the krona showing the largest

decline against the Swiss franc (CHF). On average, the Swedish krona has depreciated by 13 percent in Q1 2023 compared to the index year 2014.

In recent years, the Swedish krona has weakened against the euro. After the Swedish krona strengthened its position against the euro between Q3 2020 and Q4 2021, we saw a consistent decline during the subsequent periods. One way to determine the impact of the exchange rate is to fix the exchange rate between, say, SEK and EUR at an exchange rate prevailing at a certain point in time and then compare prices.

Figure 25. Sweden's relative prices compared to the average per year, calculated as a cross-section, percentage development since 2014, pharmaceuticals without and with generic competition, 2014–2023.



Source: IQVIA and TLV analysis.

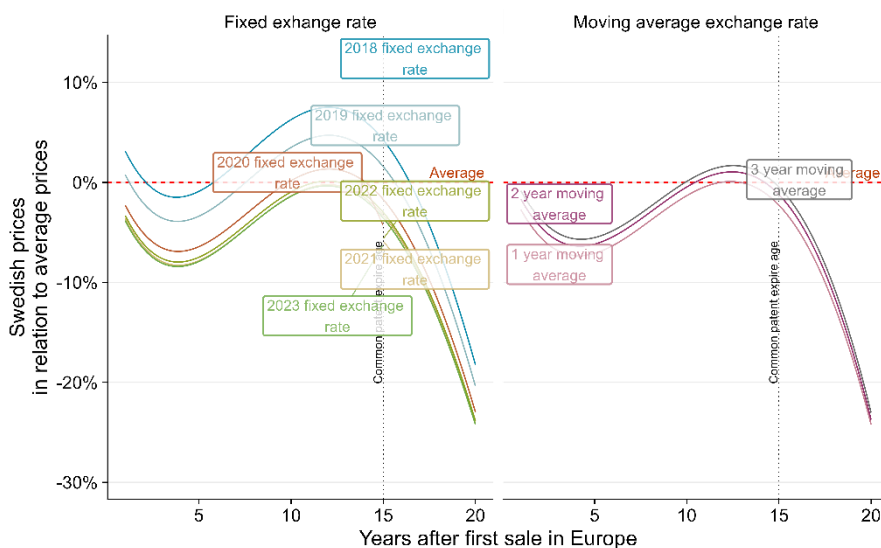
Notes: Exchange rate broken down into three-year moving average and three-year moving average fixed at the 2014 rate.

Figure 25 (top graph also shown in Figure 12) shows how Sweden's relative pharmaceutical prices developed between 2014 and 2023 with a moving exchange rate and a moving average fixed at the 2014 rate for pharmaceuticals with and without competition. Fixing the exchange rate at the 2014 level means that prices for all years are converted using the average exchange rate of the Swedish krona against the various European currencies between the years 2011 and 2014. For pharmaceuticals without generic competition with the exchange rate calculated as a three-year moving average, Sweden's relative prices have shifted from just over 12 percent above the average in 2014 to around 11.6 percent below the average in 2023 (see Section 3.2 for a more detailed description regarding pharmaceuticals without competition). If the currency is instead fixed at the three-year moving average from 2014, Sweden's relative prices fall to 1.7 percent above the average. This means that

if the exchange rate were to return to the 2014 level, all else being equal, Swedish prices would be around 1.7 percent above the European average.

Figure 26 provides an additional sensitivity analysis to illustrate the effect of the choice of exchange rate on Sweden's relative pharmaceutical prices compared to the European average. The figure has two panels: one with fixed exchange rates for which the year varies, and one with a moving exchange rate for which the number of years used to calculate the average varies. The fixed exchange rate panel clearly shows that a more recent fixed exchange rate generates a lower position relative to the European average. Fixing the exchange rate at a three-year moving average for 2023 generates a curve that is below the average for all ages included in the figure. We see a similar trend when we vary the scope of the moving average, where an average spanning fewer years (and so a more recent average) generates a curve with a lower position relative to the European average.

Figure 26. Swedish pharmaceutical prices compared to the average price for the 20 countries included in the report, with different exchange rate adjustment methods.



Source: IQVIA and TLV analysis.

Note 1: The red dashed line shows the average prices for 20 European countries. The lines are model adaptations (fourth degree polynomial regression) used to illustrate the trend over the life cycle. Sales data for the period 2014–2023.

Note 2: The figure should be interpreted as Sweden's average relative price per pharmaceutical age for all years 2014–2023. Accordingly, it only indicates Sweden's relative price level for the entire period.

5.1.2 Alternative price measures

Comparing the list prices of pharmaceuticals is difficult, because which pharmaceuticals are used and in which quantities vary between countries. So far in the report, we have used bilateral price comparisons and bilateral averages to compare prices between Sweden and the 19 other European countries included in the analyses.

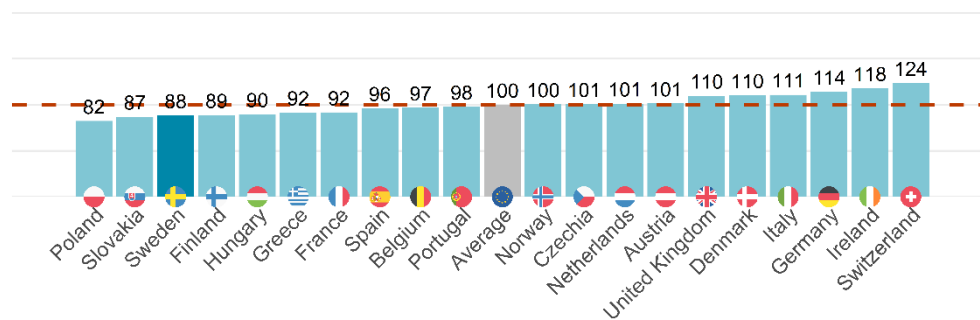
While the selected pharmaceuticals remain those used in Sweden, they also include pharmaceuticals from the WAIT-study and top sellers in Europe that have low or no sales in Sweden. The baseline is the average price level in Europe, which is assigned

an index value of 100. An index higher than 100 indicates a pharmaceutical price higher than the average price in Europe. A pharmaceutical must be available in at least eight countries to be included in the comparison.

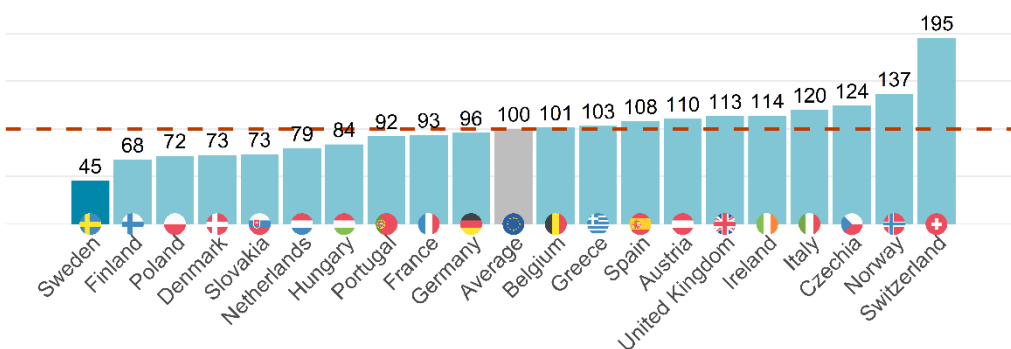
One alternative way to compare pharmaceutical prices is to use a cross-sectional index. If a pharmaceutical is not found in a particular country, the average of all the other countries is imputed instead. This results in the price distribution relative to the average being compressed toward the average, especially for countries in which many of the pharmaceuticals available in the others are lacking.

Figure 27. Cross-sectional index of relative pharmaceutical prices, percentage deviation from cross-section, 2023. Exchange rate as per three-year moving average.

Pharmaceuticals without generic competition



Pharmaceuticals with generic competition



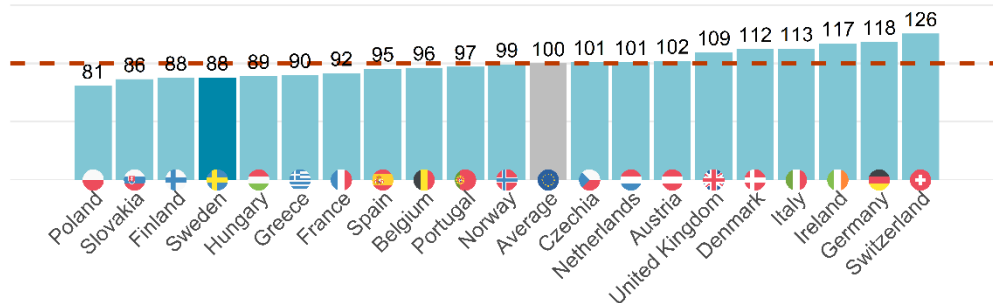
Source: IQVIA and TLV analysis.

According to Figure 27, Sweden has 12 percent lower prices for pharmaceuticals without generic competition than the average for all countries. For pharmaceuticals with generic competition, Sweden has 55 percent lower prices than the average.

5.1.3 The impact of managed entry agreements

Figure 28 excludes pharmaceuticals covered by managed entry agreements in Sweden, i.e. pharmaceuticals for which companies make repayments to the regions for part of the pharmaceutical costs. Repayment levels are confidential, and as such cannot be compared or reported.

Figure 28. Cross-sectional index of relative pharmaceutical prices, percentage deviation from cross-section, pharmaceuticals without generic competition or managed entry agreements, 2023. Exchange rate as per three-year moving average.



Source: IQVIA and TLV analysis.

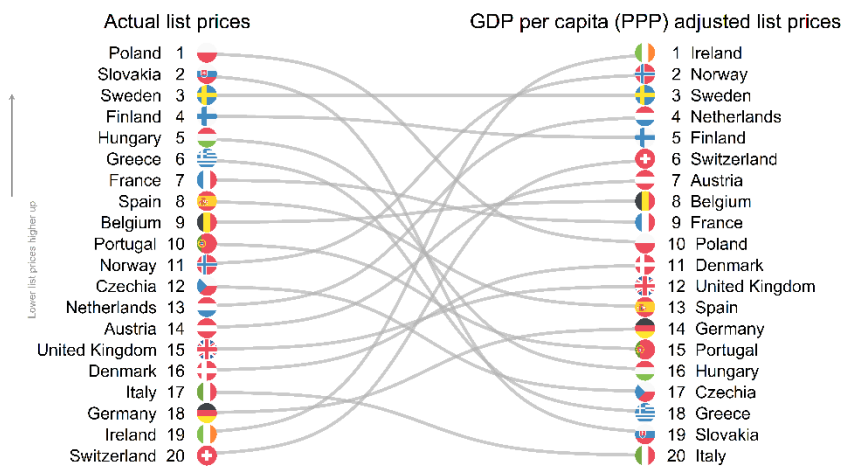
Notes: Prices during Q1 2023. Volumes as moving 12-month totals from March 2023. Excluding pharmaceuticals with managed entry agreements in Sweden. European average = index 100.

After excluding pharmaceuticals with managed entry agreements in Sweden (about five percent of pharmaceuticals), Sweden is in fourth place with the same percentage, but now with Finland just below Sweden compared to Figure 27.

5.1.4 Purchasing power parity (PPP) benchmark

As a country's GDP (PPP) per capita can be assumed to impact the population's perception of a pharmaceutical's cost in relation to disposable income or the cost of other types of goods, the analysis is repeated with PPP-adjusted prices.

Figure 29. Change in the cross-sectional index at nominal pharmaceutical prices and adjusted pharmaceutical prices based on PPP-adjusted GDP per capita. Pharmaceuticals without generic competition, 2023.



Source: IQVIA, IMF and TLV analysis.

Notes: Rank 1 means that the country has the lowest prices.

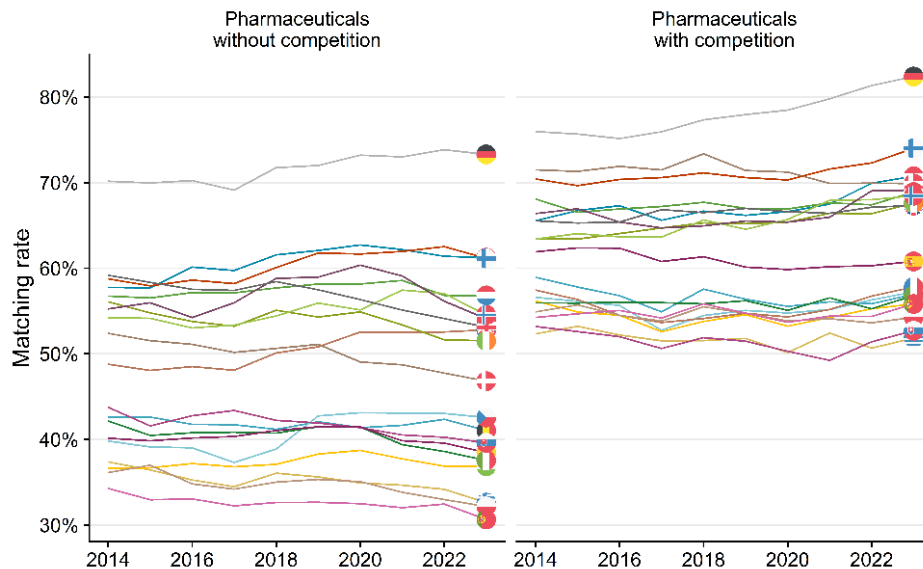
Figure 29 shows that when using PPP-adjusted prices, some countries move a great deal in relation to Sweden. This is because GDP (PPP) per capita differs greatly between the countries. For example, Poland moves from first to tenth place, while

Ireland moves from nineteenth to first place. Sweden, however, remains in the same position, i.e. third, even with PPP-adjusted prices.

5.1.5 Matching rate over time

The majority of the analyses in this report compare the prices of pharmaceuticals with sales in Sweden with the prices of the same pharmaceuticals in other countries. Figure 30 shows how the matching rate varies over time for all countries included in the comparison. The matching rate shows the proportion of prescription medicines sold at pharmacies in Sweden that are also available in other countries with the same limitation. The figure shows a relatively stable matching rate for each country over time, for pharmaceuticals both with and without generic competition. Generally speaking, the comparison countries have a higher matching rate within the segment pharmaceuticals with generic competition.

Figure 30. Matching rate for pharmaceuticals sold in Sweden compared to other countries. Broken down by year, country and the pharmaceutical's competition status.



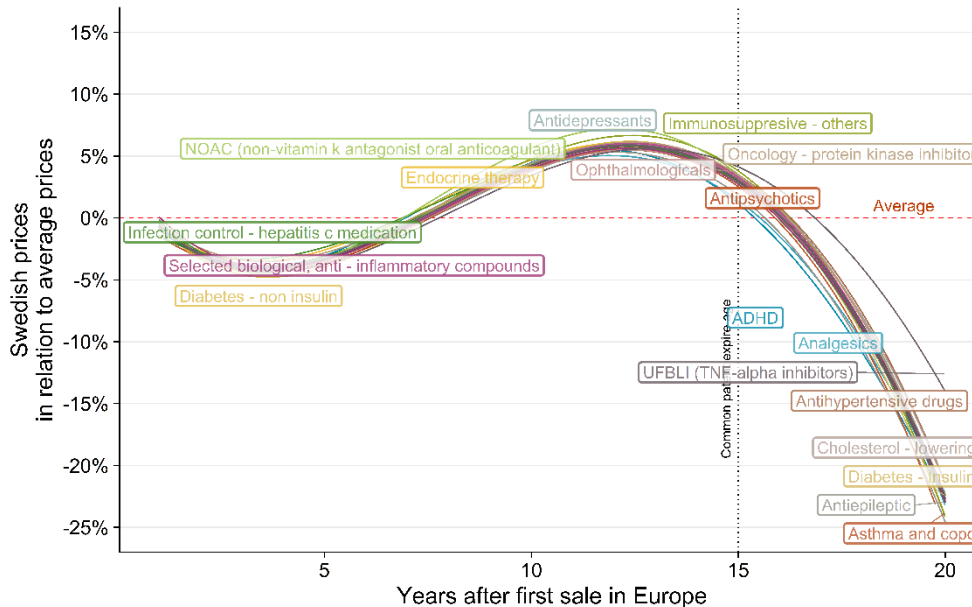
Source: IQVIA and TLV analysis.

5.1.6 Life cycle analysis in which pharmaceutical classes and countries are excluded one by one

To study how Sweden's relative prices over the life cycles of the pharmaceuticals are affected by different pharmaceutical classes, each pharmaceutical class has been excluded from the analysis one at a time. Figure 31 shows each life cycle analysis with a specific pharmaceutical class excluded. Moreover, the pharmaceutical classes that, on average, affect Sweden's relative prices the most have their names visualised at the age where the difference is greatest. The curve follows similar trends to the one seen in Figure 4. The greatest impact on the curve is seen between year 15 and year 20, where the exclusion of pharmaceutical classes such as "UFBLI (TNF-alpha inhibitors)" reduces the distance of the average Swedish relative prices from the EU average, while classes such as "ADHD", "Antiepileptic drugs" and "Asthma and COPD" do the opposite. This shows, for example, that "UFBLI (TNF-

alpha inhibitors)" are so much cheaper in Sweden, measured in list prices, that if this class is excluded from the analysis, Sweden's relative prices rise.

Figure 31. Swedish pharmaceutical prices compared to the average price for the 20 countries in the report, 2014–2023, with one pharmaceutical class excluded in each estimate. The comparison is by year after marketing authorisation.



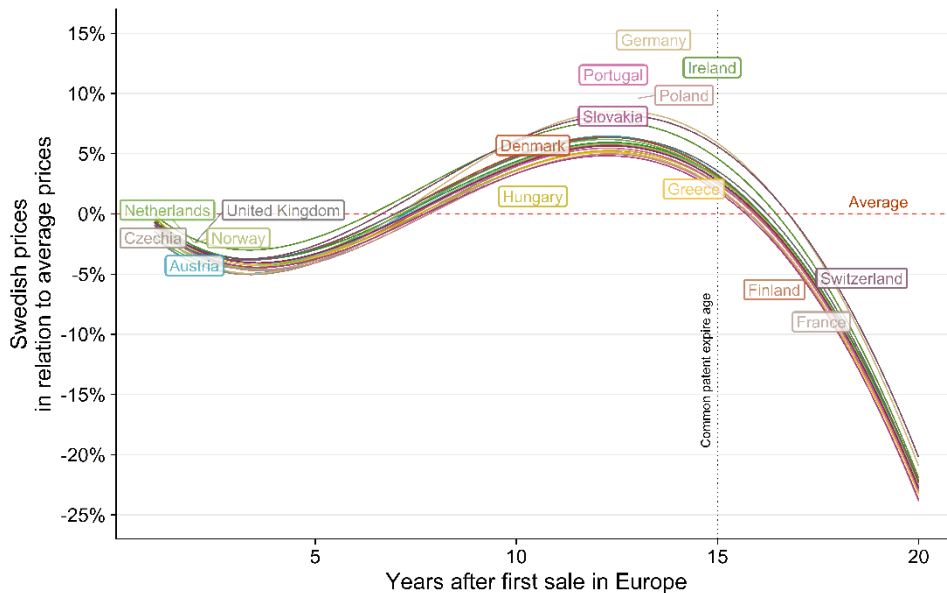
Source: IQVIA and TLV analysis.

Note 1: The red dashed line shows the average prices for 20 European countries. The lines are model adaptations (fourth degree polynomial regression) used to illustrate the trend over the life cycle. Sales data for the period 2014–2023.

Note 2: The figure should be interpreted as Sweden's average relative price per pharmaceutical age for all years 2014–2023. Accordingly, it only indicates Sweden's relative price level for the entire period.

Figure 32 shows the same analysis, but here, instead of excluding specific pharmaceutical classes, all comparison countries are excluded one by one. Only those countries whose exclusion from the analysis generates the greatest average difference compared to the analysis in Figure 4 have their names included in the figure at the age where the difference was greatest. The countries with the greatest impact on the average Swedish relative price over the life cycle at later pharmaceutical ages follow the ranking presented in Figure 28, where the exclusion of Poland and Slovakia reduces the distance of the average Swedish relative prices from the EU average, while the exclusion of Switzerland and Germany has the opposite effect.

Figure 32. Swedish pharmaceutical prices compared to the average price for the 20 countries in the report, 2014–2023, with one comparison country excluded in each estimate. The comparison is by year after marketing authorisation.



Source: IQVIA and TLV analysis.

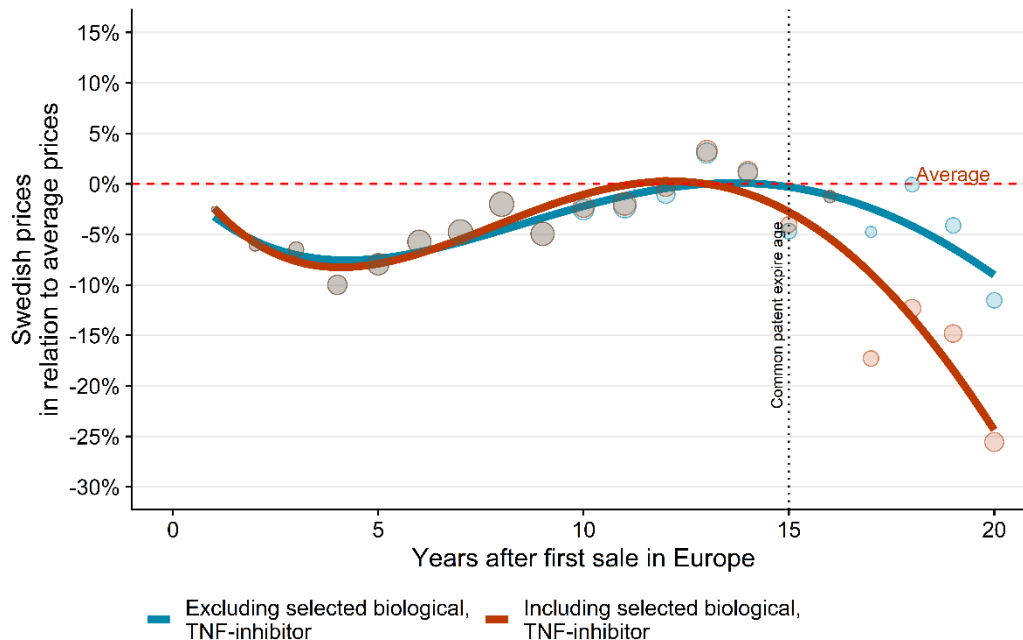
Note 1: The red dashed line shows the average prices for 19 European countries (one country excluded in each analysis). The lines are model adaptations (fourth degree polynomial regression) used to illustrate the trend over the life cycle. Sales data for the period 2014–2023.

Note 2: The figure should be interpreted as Sweden's average relative price per pharmaceutical age for all years 2014–2023. Accordingly, it only indicates Sweden's relative price level for the entire period.

5.1.7 Life cycle analysis with TNF-alpha inhibitors excluded and limited time period

Section 3.1.2 analysed the impact of limiting the period included in the analyses of Sweden's relative prices over the life cycle of a pharmaceutical. One of the pharmaceutical classes that had a major impact on Sweden's position in the report is TNF-alpha inhibitors, which could also be considered the class generating the greatest impact on Sweden's relative prices over the life cycle between year 15 and year 20. Figure 33 excludes TNF-alpha inhibitors and the time interval is limited to the period 2020–2023, as in Figure 5. When excluding TNF-alpha inhibitors, the drop is between 10 to 15 percentage points smaller between the age 15 and 20.

Figure 33. Swedish pharmaceutical prices compared to the average price for the 20 countries included in the report, 2020–2023, excluding TNF-alpha inhibitors. The comparison is by year after marketing authorisation.



Source: IQVIA and TLV analysis.

Note 1: The red dashed line shows the average prices for 20 European countries. The positions of the circles show the actual deviation from the average prices, while their sizes indicate the sales value in Sweden of pharmaceuticals of that age. The light blue and red lines are model adaptations of the circles (fourth degree polynomial regression) used to illustrate the trend over the life cycle. Sales data for the period 2014–2023.

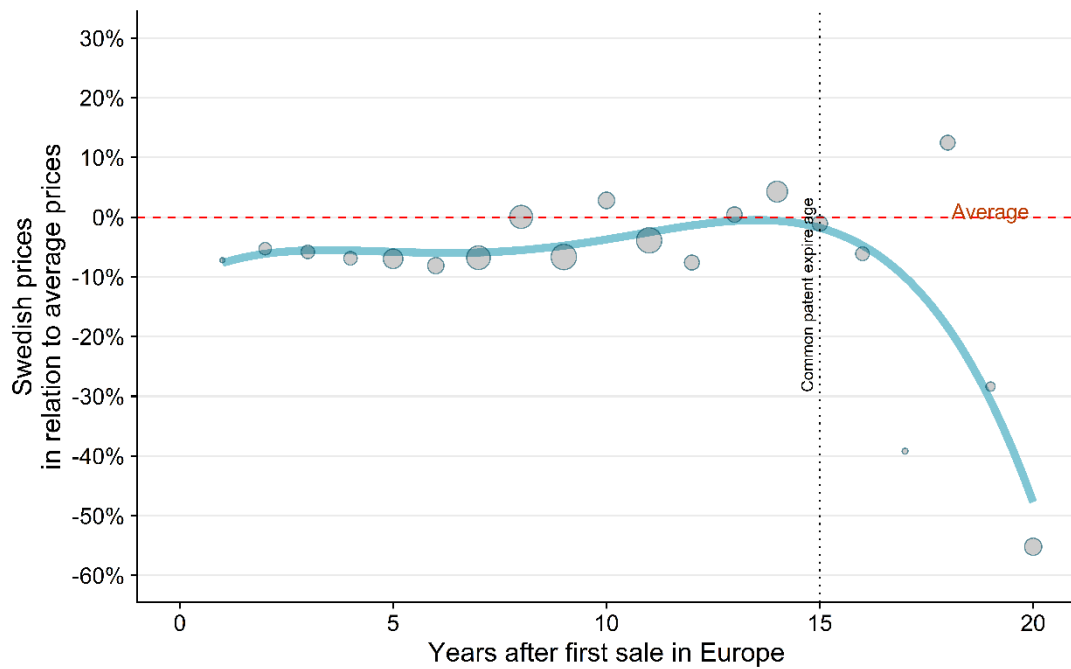
Note 2: The figure should be interpreted as Sweden's average relative price per pharmaceutical age for all years 2014–2023. Accordingly, it only indicates Sweden's relative price level for the entire period.

5.1.8 Life cycle analysis limited to price data for 2023

As a final sensitivity analysis focusing on Swedish relative prices over the life cycle of a pharmaceutical, the prices compared are limited to those pharmaceuticals for which sales can be observed in 2023, as illustrated in Figure 34. Note that the y-axis differs from the previous life cycle analyses as a larger interval is used. Between years 1 and 10, Sweden's pharmaceutical prices are, on average, somewhat closer to the European average, but thereafter they remain below the average for most ages. Between years 10 and 15, Sweden's prices are closer to the European average. Between year 15 and year 20, Sweden has, on average, pharmaceutical prices below the European average, with lower levels than the previous life cycle analyses

showed. At most, Swedish prices are, on average, around 55 percent below the European average at pharmaceutical age 19.

Figure 34. Swedish pharmaceutical prices compared to the average price for the 20 countries included in the report, 2023. The comparison is by year after marketing authorisation.



Source: IQVIA and TLV analysis.

Note 1: The red dashed line shows the average prices for 20 European countries. The positions of the circles show the actual deviation from the average prices, while their sizes indicate the sales value in Sweden of pharmaceuticals of that age. The light blue line is a model adaptation of the circles (fourth degree polynomial regression) used to illustrate the trend over the life cycle. Sales data for the period 2014–2023.

Note 2: The figure should be interpreted as Sweden's average relative price per pharmaceutical age for all years 2014–2023. Accordingly, it only indicates Sweden's relative price level for the entire period.

It is important to point out that only one year is observed for each unique pharmaceutical in Figure 34. This means that this figure contains fewer observations over the life cycle and only includes pharmaceuticals for which price data are available for 2023.

5.2 Appendix 2: Methodology and data

This appendix provides details of the methods and data sets used to produce the report. A summary of the information in this appendix is provided in the report, under Methodology and data (Section 1.3).

5.2.1 Segmentation based on competition status

The pharmaceuticals have been divided into segments based on competitive conditions in Sweden. Pharmaceuticals that can be substituted with generic drugs are considered subject to competition. These segments are:

- Pharmaceuticals without generic competition (outside the product-of-the-month system)
- Pharmaceuticals with generic competition (within the product-of-the-month system)

The pharmaceuticals without generic competition segment includes pharmaceuticals for which there has been no competition between at least two different substitutable pharmaceuticals in Sweden. The segment includes patented pharmaceuticals as well as pharmaceuticals whose patent protection has expired but no competition between two substitutable pharmaceuticals has arisen. In general, this segment also includes biosimilars as they are not directly substitutable for the reference product. These pharmaceuticals are included in the same segment because the Swedish Medical Products Agency considers these pharmaceuticals to be original pharmaceuticals, making pricing conditions the same as for original pharmaceuticals. Note, however, that competitive conditions can differ between the countries in the comparison. The segment pharmaceuticals with generic competition (within the product-of-the-month system) includes all pharmaceuticals that, for a given year, were included in the generic substitution in the product-of-the-month system for Q1 that same year.

5.2.2 Data set and selected pharmaceuticals

The starting point for the analysis is the prescription medicines in Sweden with the highest sales and covered by the benefits scheme. The data set also includes the top selling pharmaceuticals in Europe and new pharmaceuticals included in the latest edition of the EFPIA WAIT study on time-to-market in different countries.

Prior to TLV's first report in 2014, IQVIA was commissioned to supply data for 200 substances in the patent-protected pharmaceuticals segment, 180 substances in the off-patent original pharmaceuticals without competition segment and 200 substances in the off-patent pharmaceuticals with generic competition segment with the highest sales. Following this, each year the data set has been updated and supplemented to include new pharmaceuticals with high sales. This also means that the figures may vary between the annual reports as the selected pharmaceuticals grow in number with each new report.

The price indices presented in the study are based on list prices and the pharmacy purchase price (AIP) or equivalent. The reason for using AIP as a price measure is

that it does not include the pharmacy's trade margin, which may vary between countries depending on how the pharmacies in each country are reimbursed.

Portugal, Germany and Spain are countries with general discount systems that are not reflected in list prices. The lack of comprehensive information on any discounts is a weakness of all price surveys. However, the analysis of changes over time and, specifically in this report, a comparison of the development of the same products from 2014 to 2023, provide clear advantages. Assuming that any discounts remain similar from one year to the next, the latter provides a good comparison of relative price developments between different countries.

The table below shows how much of Sweden's sales are covered by the data set on which the analysis is based. The data set used for this report was provided by IQVIA.

Table 2. Contribution margin of sales totals.

Year	Total AIP IQVIA (SEK billions)	Total AIP EHM (SEK billions)	Contribution margin
2014	4.01	4.54	88%
2015	4.56	4.78	95%
2016	4.89	5.04	97%
2017	5.19	5.35	97%
2018	5.51	5.72	96%
2019	5.84	6.25	94%
2020	6.75	7.26	93%
2021	6.37	7.05	90%
2022	6.84	7.49	91%
2023	7.28	8.18	89%

Note 1: Data from IQVIA in relation to data from EHM. Sales of pharmaceuticals during Q1 between 2014 and 2023. Totals at AIP level.

Note 2: Pharmacy preparations are not included in the comparison.

The sales value does not cover all sales of prescription medicines dispensed at retail pharmacies in Sweden, as only the top-selling substances in Sweden and Europe are included.

In the price comparison, the aggregated prices of different product baskets of pharmaceuticals are analysed. The definition of a pharmaceutical may vary. Pharmaceuticals can be matched in various ways with different consequences for accuracy and the number of countries to which sales of a pharmaceutical are attributed.

In this analysis, a pharmaceutical is defined as a unique combination of substance, dosage form and strength. The definition does not include pack size, as the choice of pack size varies between countries.

In Sweden, pharmaceuticals are normally collected from the pharmacy for a period of three months, while in southern Europe, this is normally a period of one month. This means that larger packs are normally sold in Sweden, compared to countries where pharmaceuticals are collected more frequently. If the pack sizes that are sold often have a lower price than those with fewer sales, this would mean that large packs would be given more weight and this would favour Sweden in a price index.

To correct for this, the price has been calculated as the unit cost of a given substance, dosage form and strength. This allows different pack sizes to be compared with each other and makes for fairer price indices. This approach increases the matching rate with other countries, although the accuracy of the comparison suffers somewhat compared to when matching at pack level.

One alternative would be to match at pack level, which would mean that the exact same pack – in terms of substance, dosage form, strength and size – would need to be available in both Sweden and the comparison country to be included. This method has a high degree of accuracy, as the pharmaceuticals are identical in terms of pack properties. At the same time, there is a good chance that such a specific pack will not be available in very many countries. Pack size can often be linked to dispensing frequency. The longer the time between dispensing, the more likely it is that larger packs are common, and vice versa.

Yet another alternative would be to measure the costs incurred by each country for a particular therapeutic group, regardless of the pharmaceuticals used, and then weight these costs together to see what a particular country pays to treat various diagnoses. The problems with such a price comparison are the difficulty in qualifying which pharmaceuticals belong to a particular therapeutic group and the fact that treatment traditions may differ between countries.

5.2.3 Pharmaceuticals with very low volumes in a country are excluded

Some countries that have a match with a pharmaceutical in Sweden may have sales volumes that are considerably lower than in Sweden. If the volume per capita is less than 0.5 percent of the Swedish value, the pharmaceutical has been excluded from the calculation of the bilateral indices for that year. This is to avoid attributing a pharmaceutical that is used very little in the comparison country disproportionate weight in the price comparison and thereby potentially overestimating the relative price level. The calculation uses moving 12-month volumes as measured in March 2023.

5.2.4 Sales volume and weighting

It is common practice to weight the different pharmaceutical prices in a price index by volume. This ensures that the price differences for high-selling pharmaceuticals are given more consideration than low-selling pharmaceuticals and vice versa.

A price index is a weighted average of a number of pharmaceuticals, usually calculated over time. If we have two periods (period 0 and period t) and n pharmaceuticals, a general price index can be formulated as:

$$I_p = \frac{p_1^t w_1 + p_2^t w_2 + \dots + p_n^t w_n}{p_1^0 w_1 + p_2^0 w_2 + \dots + p_n^0 w_n} \times 100$$

Where p_i^t denotes the price of pharmaceutical i at the time t and w_i denotes the weight of pharmaceutical i . To calculate the relative importance of a pharmaceutical price, the sales volume q of the pharmaceutical is normally used as the weight. In this analysis, the index is calculated for one time period at a time, meaning that

period 0 and period t are the same. Time is replaced by country, abroad U and Sweden S.

The weight can be either sales volume abroad or sales volume in Sweden. The choice determines whether the price index is to be interpreted from a Swedish perspective. The standard for price analyses in the pharmaceutical sector is to calculate the Laspeyres price index, i.e. to use the country from which price differences are to be measured as the baseline, in this case Sweden:

$$L_p = \frac{p_1^U q_1^S + p_2^U q_2^S + \dots + p_n^U q_n^S}{p_1^S q_1^S + p_2^S q_2^S + \dots + p_n^S q_n^S} \times 100$$

Where p^U refers to price abroad and q^S to quantity in Sweden. If the price is the same in Sweden and abroad, the index value is 100. If the index is <100 (or >100), this means that the pharmaceutical has a lower (or higher) price abroad than in Sweden. Several figures in the report use percentages rather than indices, for example to show that a country has a price that is a certain number of percentage points above the average. In this case, the average of the indices for all countries is calculated and each country's index is divided by this average index. For example, if Sweden has an index of 100 and the average of the countries is 107, Sweden has just under seven percent lower prices than the average.

A price index lower (or higher) than 100 means a theoretical cost increase (or saving) that can be achieved if Swedish prices change in relation to prices abroad, provided that Swedish consumption is assumed to be unchanged. This is a bold and unlikely assumption that requires perfectly inelastic demand. If demand is not inelastic, a change in demand will either strengthen or weaken a theoretical cost increase or saving. The supply of pharmaceuticals, i.e. the entry of competing pharmaceuticals and improvements to existing ones, is also important.

The price index provides a good idea of the price level in comparable countries in relation to Sweden's price level during the period in question. Absolute price index numbers should be interpreted with caution, as they are influenced by both volume and currency effects. This study uses a moving exchange rate for the past three years throughout.

If another country's volume weight is used as a baseline instead of the volume weight of the country in question, the absolute level of the price index is altered but not necessarily the rankings between countries.

5.2.5 Definition of product baskets

To calculate a price index, whether bilateral or cross-sectional, a product basket needs to be defined. A bilateral price index requires that the pharmaceutical is available in both Sweden and the comparison country to be included in the price comparison with that country.

The analyses based on cross-sectional indices require that the pharmaceuticals included in the comparison basket are used in at least eight of the countries being compared. In addition, the pharmaceutical must have sales in the reference country, which is Sweden in all figures that use a cross-sectional index outside the

appendices. The product basket providing the basis for a cross-sectional index is more limited than the bilateral basket, which is due to the fact that a price needs to be determined for the same basket in all countries. For those countries that do not use a particular pharmaceutical, the European average price is imputed. If the basket is not strictly defined, there is a risk of the average price not being representative.

5.2.6 Drivers of relative price

Swedish pharmaceutical prices relative to the rest of Europe are influenced by several different factors. To determine which effects have the greatest impact on the relative price level, the total relative price change presented in Sections 3.2.4 and 3.3.4 is divided into price and currency change effects, respectively.

The analysis is based on the average price level p for pharmaceuticals used in Sweden throughout the period 2014–2023, weighted by the use of each pharmaceutical v in 2014. In this way, a weighted average price for each year's basket of pharmaceuticals is calculated:

Let the relative cost of pharmaceutical b at the time t between country i and country j , at exchange rate $\frac{c_i}{c_j}$, be calculated as:

$$\frac{p_{bit}v_{bit}c_{it}}{p_{bjt}v_{bjt}c_{jt}} = \frac{p_{bit}}{p_{bjt}} \cdot \frac{v_{bit}}{v_{bjt}} \cdot \frac{c_{it}}{c_{jt}}$$

The relative cost change between the time $(t - 1)$ and t is then calculated as:

$$\text{Relative cost change} = \frac{p_{bit}v_{bit}c_{it}}{p_{bjt}v_{bjt}c_{jt}} - \frac{p_{bi(t-1)}v_{bi(t-1)}c_{i(t-1)}}{p_{bj(t-1)}v_{bj(t-1)}c_{j(t-1)}}$$

In the present analysis, Swedish volumes are used throughout to calculate costs in different countries. In this way, the relative cost is converted into a relative price, weighted according to Swedish use:

$$v_{bjt} = v_{bit} \quad \forall t \in T, \forall b \in B, \forall j \in I \Rightarrow$$

$$\frac{p_{bit}v_{bit}c_{it}}{p_{bjt}v_{bjt}c_{jt}} - \frac{p_{bi(t-1)}v_{bi(t-1)}c_{i(t-1)}}{p_{bj(t-1)}v_{bj(t-1)}c_{j(t-1)}} = \frac{p_{bit}}{p_{bjt}} \cdot \frac{c_{it}}{c_{jt}} - \frac{p_{bi(t-1)}}{p_{bj(t-1)}} \cdot \frac{c_{i(t-1)}}{c_{j(t-1)}}$$

The factoring of price and currency components results in:

$$\begin{aligned} \text{Relative cost difference} &= \frac{p_{bit}}{p_{bjt}} \cdot \frac{c_{it}}{c_{jt}} - \frac{p_{bi(t-1)}}{p_{bj(t-1)}} \cdot \frac{c_{i(t-1)}}{c_{j(t-1)}} \\ &= \left(\frac{p_{bit}}{p_{bjt}} - \frac{p_{bi(t-1)}}{p_{bj(t-1)}} \right) \frac{c_{i(t-1)}}{c_{j(t-1)}} + \text{price component} \\ &\quad \left(\frac{c_{it}}{c_{jt}} - \frac{c_{i(t-1)}}{c_{j(t-1)}} \right) \frac{p_{bit}}{p_{bjt}} \quad \text{currency component} \end{aligned}$$

The above example describes how the relative cost difference is calculated for a particular pharmaceutical $b \in B$, where B represents a product basket of various pharmaceuticals. The total cost difference for the entire basket B at the time t is calculated as a weighted average of all differences, weighted according to the use v_{b2014} of pharmaceutical b in 2014:

$$\text{Relative cost difference} = \frac{\sum_{b \in B} \left[\left(\frac{p_{bit}}{p_{bjt}} - \frac{p_{bi(t-1)}}{p_{bj(t-1)}} \right) \frac{c_{i(t-1)}}{c_{j(t-1)}} + \left(\frac{c_{it}}{c_{jt}} - \frac{c_{i(t-1)}}{c_{j(t-1)}} \right) \frac{p_{bit}}{p_{bjt}} \right] v_{b2014}}{\sum_{b \in B} v_{b2014}}$$

5.2.7 Life cycle analysis

In the analyses where Swedish prices are compared with the European average over the life cycle of a pharmaceutical (Section 3.1), we use a different methodology based on a cross-sectional index. Each country's pharmaceutical prices, at a given age during the life cycle, are calculated in relation to the average for that pharmaceutical at the same age. These relative price levels are then aggregated by pharmaceutical age in the reference country, weighted by the sales value in SEK. Accordingly, the data set for the figures only includes the weighted average of the reference country's relative price for each pharmaceutical age. Only pharmaceuticals that can be observed in at least eight of the countries included in the price comparison are included in the analysis. A pharmaceutical is usually included in several data points, one for each age that can be observed during the period 2014–2023.

5.2.8 Pharmaceutical classes

Below is a compilation of the defined pharmaceutical classes and which substances fall into each class. The compilation is based on the classification made by Sweden's National Board of Health and Welfare in conjunction with forecasting pharmaceutical costs. TLV has since revised the classification and mainly categorised more pharmaceuticals.

Pharmaceutical class	Substances
ADHD	Atomoxetine, Dexamfetamine, Guanfacine, Lisdexamfetamine, Methylphenidate
Alimentary tract	Agalsidase Alfa, Agalsidase Beta, Alglucosidase Alfa, Asfotase Alfa, Balsalazide, Benzydamine, Bisacodyl, Budesonide, Bupropion, Naltrexone, Carglumic Acid, Cerliponase Alfa, Cromoglicic Acid, Domperidone, Eliglustat, Elosulfase Alfa, Eluxadolone, Esomeprazole, Fidaxomicin, Galsulfase, Givosiran, Glycerol Phenylbutyrate, Granisetron, Idursulfase, Imiglucerase, Lansoprazole, Laronidase, Linaclotide, Loperamide, Mercaptamine, Mesalazine, Methylnaltrexone Bromide, Migalastat, Miglustat, Misoprostol, Naloxegol, Netupitant, Palonosetron, Nitisinone, Nystatin, Obeticholic Acid, Olsalazine, Omeprazole, Ondansetron, Orlistat, Pantoprazole, Phenylbutyrate, Potassium, Prucalopride, Racecadotril, Rifaximin, Sapropterin, Sebelipase Alfa, Sulfasalazine, Teduglutide, Telotristat Etiprate, Trientine, Vancomycin, Velaglucerase Alfa

Pharmaceutical class	Substances
Analgesics	Acetylsalicylic Acid, Caffeine, Codeine, Codeine, Paracetamol, Fentanyl, Gabapentin, Ibuprofen, Paracetamol, Morphine, Naloxone, Oxycodone, Oxycodone, Paracetamol, Pregabalin, Tapentadol, Tramadol, Ziconotide
Anemia	Darbepoetin Alfa, Epoetin Alfa, Epoetin Beta, Epoetin Theta, Epoetin Zeta, Iron Ferric, Luspatercept, Methoxy Polyethylene Glycol-Epoetin Beta, Roxadustat
Anesthetics	Lidocaine, Lidocaine, Prilocaine
Antibiotics and chemo, dermat	Imiquimod, Mupirocin, Penciclovir
Anticoagulants (excl. Noak)	Acetylsalicylic Acid, Cangrelor, Caplacizumab, Clopidogrel, Dalteparin Sodium, Enoxaparin Sodium, Epoprostenol, Fondaparinux Sodium, Heparin, Iloprost, Selexipag, Ticagrelor, Tinzaparin, Treprostinil, Warfarin
Antidepressants	Amitriptyline, Bupropion, Citalopram, Clomipramine, Duloxetine, Escitalopram, Esketamine, Fluoxetine, Mirtazapine, Moclobemide, Nortriptyline, Paroxetine, Reboxetine, Sertraline, Venlafaxine, Vortioxetine
Antiepileptic	Brivaracetam, Cannabidiol, Carbamazepine, Cenobamate, Clonazepam, Eslicarbazepine Acetate, Felbamate, Lacosamide, Lamotrigine, Levetiracetam, Oxcarbazepine, Perampanel, Phenobarbital, Retigabine, Rufinamide, Stiripentol, Topiramate, Valproic Acid, Vigabatrin, Zonisamide
Antihistamines	Alimemazine, Azelastine, Fluticasone, Clemastine, Desloratadine, Ebastine, Emedastine, Fluticasone Furoate, Levocabastine, Meclozine, Olopatadine, Phenylpropanolamine, Promethazine, Promethazine, Thiourea
Antihypertensive drugs	Ambrisentan, Amlodipine, Atenolol, Bendroflumethiazide, Bisoprolol, Bosentan, Bumetanide, Candesartan Cilexetil, Candesartan Cilexetil, Hydrochlorothiazide, Diltiazem, Doxazosin, Enalapril, Enalapril, Hydrochlorothiazide, Eplerenone, Eprosartan, Eprosartan, Hydrochlorothiazide, Felodipine, Felodipine, Metoprolol, Furosemide, Hydralazine, Hydrochlorothiazide, Hydrochlorothiazide, Losartan, Hydrochlorothiazide, Quinapril, Hydrochlorothiazide, Valsartan, Irbesartan, Lercanidipine, Losartan, Macitentan, Metoprolol,

Pharmaceutical class	Substances
	Nifedipine, Nimodipine, Propranolol, Ramipril, Riociguat, Sacubitril, Valsartan, Spironolactone, Tolvaptan, Valsartan, Verapamil
Antiparasitic agents - others	Artemether, Lumefantrine, Atovaquone, Chloroquine, Hydroxychloroquine, Mebendazole, Mefloquine, Metronidazole, Pentamidine, Tinidazole
Antipsychotics	Aripiprazole, Cariprazine, Chlorprothixene, Clozapine, Haloperidol, Lurasidone, Melperone, Olanzapine, Paliperidone Palmitate, Paliperidone, Perphenazine, Quetiapine, Risperidone, Sertindole, Zuclopenthixol
Anxiolytics and sedatives	Clomethiazole, Melatonin, Midazolam, Nitrazepam, Propiomazine, Remimazolam, Zolpidem, Zopiclone
Asthma and copd	Aclidinium Bromide, Aclidinium Bromide, Formoterol, Beclometasone, Formoterol, Beclometasone, Formoterol, Glycopyrronium, Budesonide, Formoterol, Budesonide, Formoterol, Glycopyrronium, Ciclesonide, Fluticasone Furoate, Umeclidinium Bromide, Vilanterol, Fluticasone Furoate, Vilanterol, Fluticasone, Formoterol, Fluticasone, Salmeterol, Formoterol, Formoterol, Glycopyrronium, Glycopyrronium, Glycopyrronium, Indacaterol, Glycopyrronium, Indacaterol, Mometasone, Indacaterol, Indacaterol, Mometasone, Montelukast, Olodaterol, Olodaterol, Tiotropium Bromide, Salbutamol, Salmeterol, Terbutaline, Tiotropium Bromide, Umeclidinium Bromide, Umeclidinium Bromide, Vilanterol
Blood coagulation factors	Avatrombopag, Damoctocog Alfa Pegol, Efmoroctocog Alfa, Eftrenonacog Alfa, Eltrombopag, Emicizumab, Eptacog Alfa (Activated), Fostamatinib, Lonoctocog Alfa, Moroctocog Alfa, Nonacog Alfa, Nonacog Beta Pegol, Nonacog Gamma, Octocog Alfa, Romiplostim, Rurioctocog Alfa Pegol, Simoctocog Alfa, Susoctocog Alfa, Turoctocog Alfa Pegol, Turoctocog Alfa, Vonicog Alfa
Cardiac therapy	Amiodarone, Dronedarone, Etilefrine, Flecainide, Isosorbide Mononitrate, Mexiletine, Midodrine, Nitroglycerin, Propafenone, Vericiguat
CFTR - modulators	Elexacaftor, Ivacaftor, Tezacaftor, Ivacaftor, Ivacaftor, Lumacaftor, Ivacaftor, Tezacaftor
Cholesterol - lowering	Alirocumab, Atorvastatin, Atorvastatin, Ezetimibe, Bezafibrate, Colesevelam, Colestipol, Colestyramine,

Pharmaceutical class	Substances
	Ethyl-Eicosapent, Evolocumab, Ezetimibe, Fenofibrate, Gemfibrozil, Inclisiran, Rosuvastatin, Simvastatin
Contraceptives	Desogestrel, Dienogest, Estradiol, Dienogest, Ethinylestradiol, Drospirenone, Ethinylestradiol, Ethinylestradiol, Levonorgestrel, Etonogestrel, Levonorgestrel
Corticosteroids, dermat.	Betamethasone, Clioquinol, Betamethasone, Salicylic Acid, Clobetasol, Clobetasone, Fluticasone, Fusidic Acid, Hydrocortisone, Hydrocortisone, Oxytetracycline, Mometasone
Dermatology drugs - others	Abrocitinib, Adapalene, Adapalene, Benzoyl Peroxide, Alitretinoin, Azelaic Acid, Betamethasone, Calcipotriol, Clindamycin, Tretinoin, Econazole, Econazole, Triamcinolone Acetonide, Hydrocortisone, Miconazole, Isotretinoin, Ivermectin, Pimecrolimus
Diabetes - Insulin	Insulin Aspart, Insulin Aspart, Insulin Aspart Protamine Crystalline, Insulin Degludec, Insulin Degludec, Liraglutide, Insulin Detemir, Insulin Glargine, Insulin Glargine, Lixisenatide, Insulin Glulisine, Insulin Human Base, Insulin Human Base, Insulin Human Isophane, Insulin Human Isophane, Insulin Lispro, Insulin Lispro, Insulin Lispro Protamine
Diabetes - non insulin	Acarbose, Canagliflozin, Dapagliflozin, Dapagliflozin, Metformin, Dapagliflozin, Saxagliptin, Dulaglutide, Empagliflozin, Empagliflozin, Linagliptin, Empagliflozin, Metformin, Ertugliflozin, Ertugliflozin, Metformin, Ertugliflozin, Sitagliptin, Exenatide, Glibenclamide, Linagliptin, Linagliptin, Metformin, Liraglutide, Lixisenatide, Metformin, Metformin, Pioglitazone, Metformin, Saxagliptin, Metformin, Sitagliptin, Metformin, Vildagliptin, Saxagliptin, Semaglutide, Sitagliptin, Vildagliptin
Endocrine therapy	Abiraterone Acetate, Anastrozole, Apalutamide, Bicalutamide, Buserelin, Darolutamide, Degarelix, Enzalutamide, Fulvestrant, Goserelin, Letrozole, Leuprorelin, Medroxyprogesterone, Tamoxifen, Toremifene, Triptorelin
Eyes and ears - others	Hydrocortisone, Oxytetracycline, Polymyxin B
Gynecological agents	Bromocriptine, Quinagolide

Pharmaceutical class	Substances
Hematology - others	Bertralstat, C1 Inhibitor (Human), Conestat Alfa, Crizanlizumab, Icatibant, Lanadelumab, Tranexamic Acid
Immunoglobulins	Bezlotoxumab
Immunostimulatory	Filgrastim, Lenograstim, Lipegfilgrastim, Pegfilgrastim, Peginterferon Alfa-2a
Immunosuppressive - others	Azathioprine, Canakinumab, Ciclosporin, Diroximel Fumarate, Eculizumab, Imlifidase, Lenalidomide, Methotrexate, Mycophenolate Mofetil, Mycophenolic Acid, Ozanimod, Pirfenidone, Pomalidomide, Ravulizumab, Satralizumab, Siltuximab, Sirolimus, Tacrolimus, Thalidomide
Incontinence	Darifenacin, Fesoterodine, Mirabegron, Oxybutynin, Tolterodine
Infection control - hepatitis c medication	Dasabuvir, Elbasvir, Grazoprevir, Glecaprevir, Pibrentasvir, Ledipasvir, Sofosbuvir, Ombitasvir, Paritaprevir, Ritonavir, Sofosbuvir, Sofosbuvir, Velpatasvir, Sofosbuvir, Velpatasvir, Voxilaprevir
Infection control - hiv medication	Abacavir, Abacavir, Dolutegravir, Lamivudine, Abacavir, Lamivudine, Abacavir, Lamivudine, Zidovudine, Atazanavir, Cobicistat, Bictegravir, Emtricitabine, Tenofovir Alafenamide, Cabotegravir, Cobicistat, Darunavir, Cobicistat, Darunavir, Emtricitabine, Tenofovir Alafenamide, Cobicistat, Elvitegravir, Emtricitabine, Tenofovir Alafenamide, Dolutegravir, Dolutegravir, Lamivudine, Dolutegravir, Rilpivirine, Doravirine, Doravirine, Lamivudine, Tenofovir Disoproxil, Emtricitabine, Emtricitabine, Rilpivirine, Tenofovir Alafenamide, Emtricitabine, Rilpivirine, Tenofovir Disoproxil, Emtricitabine, Tenofovir Alafenamide, Emtricitabine, Tenofovir Disoproxil, Etravirine, Lamivudine, Lamivudine, Zidovudine, Raltegravir, Rilpivirine, Ritonavir, Tenofovir Alafenamide, Tenofovir Disoproxil, Zidovudine
Migraine drugs	Dihydroergotamine, Erenumab, Fremanezumab, Galcanezumab, Rizatriptan, Sumatriptan, Zolmitriptan
MS medication	Cladribine, Dimethyl Fumarate, Fampridine, Fingolimod, Glatiramer Acetate, Interferon Beta-1a, Interferon Beta-1b, Natalizumab, Ocrelizumab,

Pharmaceutical class	Substances
	Ofatumumab, Peginterferon Beta-1a, Ponesimod, Siponimod, Teriflunomide
Muscle relaxant	Chlorzoxazone, Orphenadrine, Paracetamol
Musculoskeletal drugs - others	Allopurinol, Ataluren, Febuxostat, Nusinersen, Risdiplam
Nervous system - dementia	Donepezil, Galantamine, Memantine, Rivastigmine
Nervous system - others	Acamprosate, Ambenonium, Buspirone, Cinnarizine, Dimenhydrinate, Diazepam, Disulfiram, Hydroxyzine, Idebenone, Inotersen, Modafinil, Oxazepam, Patisiran, Pilocarpine, Piracetam, Pitolisant, Pyridostigmine, Tafamidis, Varenicline
NOAC (non-vitamin k antagonist oral anticoagulant)	Apixaban, Dabigatran Etxilate, Edoxaban, Rivaroxaban
NSAID	Dexibuprofen, Diclofenac, Diclofenac, Misoprostol, Etoricoxib, Ibuprofen, Ketoprofen, Nabumetone, Naproxen, Piroxicam Betadex, Tenoxicam
Oncology - others	Aflibercept, Aminolevulinic Acid, Amivantamab, Anagrelide, Atezolizumab, Avelumab, Belantamab Mafodotin, Bevacizumab, Bexarotene, Blinatumomab, Brentuximab Vedotin, Busulfan, Cabazitaxel, Capecitabine, Carboplatin, Carfilzomib, Cemiplimab, Cetuximab, Chlorambucil, Chlormethine, Cytarabine, Daratumumab, Dostarlimab, Durvalumab, Elotuzumab, Epirubicin, Eribulin, Estramustine, Etoposide, Fedratinib, Fludarabine, Fluorouracil, Fluorouracil, Salicylic Acid, Gemtuzumab Ozogamicin, Gimeracil, Oteracil, Tegafur, Idarubicin, Inotuzumab Ozogamicin, Ipilimumab, Irinotecan, Isatuximab, Ixazomib, Melphalan, Mercaptopurine, Methyl-5-Aminolevulinic Acid, Mitotane, Mogamulizumab, Niraparib, Nivolumab, Obinutuzumab, Olaparib, Paclitaxel, Panitumumab, Panobinostat, Pegaspargase, Pembrolizumab, Pertuzumab, Pertuzumab, Trastuzumab, Polatuzumab Vedotin, Ramucirumab, Rituximab, Sacituzumab Govitecan, Sonidegib, Sotorasib, Talazoparib, Talimogene Laherparepvec, Temozolomide, Tioguanine, Tipiracil, Trifluridine, Topotecan, Trabectedin, Trastuzumab Deruxtecan, Trastuzumab Emtansine, Trastuzumab, Treosulfan, Venetoclax, Vinorelbine, Vismodegib
Oncology - protein kinase inhibitor	Abemaciclib, Acalabrutinib, Afatinib, Alectinib, Alpelisib, Axitinib, Binimetinib, Bosutinib,

Pharmaceutical class	Substances
	Brigatinib, Cabozantinib, Ceritinib, Cobimetinib, Crizotinib, Dabrafenib, Dacomitinib, Dasatinib, Encorafenib, Entrectinib, Erlotinib, Everolimus, Gefitinib, Gilteritinib, Ibrutinib, Idelalisib, Imatinib, Lapatinib, Larotrectinib, Lenvatinib, Lorlatinib, Midostaurin, Neratinib, Nilotinib, Nintedanib, Osimertinib, Palbociclib, Pazopanib, Pemigatinib, Ponatinib, Pralsetinib, Regorafenib, Ribociclib, Ruxolitinib, Selpercatinib, Sorafenib, Sunitinib, Tivozanib, Trametinib, Tucatinib, Vandetanib, Vemurafenib
Ophthalmologicals	Acetazolamide, Apraclonidine, Betaxolol, Bimatoprost, Bimatoprost, Timolol, Brimonidine, Brimonidine, Brinzolamide, Brimonidine, Timolol, Brinzolamide, Brinzolamide, Timolol, Brolucizumab, Dorzolamide, Dorzolamide, Timolol, Latanoprost, Latanoprost, Timolol, Nepafenac, Ranibizumab, Tafluprost, Tafluprost, Timolol, Timolol, Timolol, Travoprost, Tobramycin, Travoprost, Verteporfin, Voretigene Neparvovec
Opioid addiction	Buprenorphine, Buprenorphine, Naloxone, Levomethadone, Methadone
Osteoporosis	Alendronic Acid, Alendronic Acid, Calcium, Colecalciferol, Burosumab, Clodronic Acid, Denosumab, Dibotermine Alfa, Pamidronic Acid, Risedronic Acid, Romosozumab, Teriparatide
Others	Acetylsalicylic Acid, Caffeine, Citric Acid, Codeine, Sodium, Afamelanotide, Albutrepenonacog Alfa, Alogliptin, Angiotensin 2 (Human), Artesunate, Asparaginase Escherichia Coli, Asparaginase, Atidarsagene Autotemcel, Autologous Limbal Stem Cells, Avapritinib, Axicabtagene Ciloleucel, Bempedoic Acid, Bempedoic Acid, Ezetimibe, Betibeglogene Autotemcel, Brexpiprazole, Brexucabtagene Autoleucel, Caffeine, Orphenadrine, Propyphenazone, Canagliflozin, Metformin, Cenegermin, Chenodeoxycholic Acid, Chondrocyte, Conjugated, Bazedoxifene, Estrogenic Substances, Cytarabine, Daunorubicin, Darvadstrocel, Deferasirox, Deferiprone, Deferoxamine, Delafloxacin, Delamanid, Dihydroergotamine, Etilefrine, Duvelisib, Eravacycline, Evinacumab, Factor X, Fenfluramine, Fosnetupitant, Palonosetron, Glasdegib, Ibalizumab,

Pharmaceutical class	Substances
	Idecabtagene Vicleucel, Inhaler Device, Isavuconazonium, Latanoprost, Netarsudil, Levosulpiride, Lumasiran, Lusutrombopag, Mecillinam, Metreleptin, Naldemedine, Naloxone, Necitumumab, Odevixibat, Onasemnogene Abeparvovec, Oritavancin, Osilodrostat, Ospemifene, Padeliporfin, Patiromer Calcium, Pegcetacoplan, Pegvaliase, Polystyrene Sulfonate, Ranolazine, Ripretinib, Ropeginterferon Alfa-2b, Rucaparib, Selinexor, Selumetinib, Setmelanotide, Sevelamer, Solriamfetol, Somapacitan, Sucroferric Oxyhydroxide, Sugammadex, Tafasitamab, Tagraxofusp, Tasimelteon, Tildrakizumab, Tirbanibulin, Tisagenlecleucel, Velmanase Alfa, Vestronidase Alfa, Volanesorsen, Vosoritide, Zanubrutinib, Zirconium Cyclosilicate
Otologicals	Ciprofloxacin, Fluocinolone Acetonide, Clioquinol, Flumetasone
Parkinson	Apomorphine, Benserazide, Levodopa, Biperiden, Carbidopa, Entacapone, Levodopa, Carbidopa, Levodopa, Opicapone, Pramipexole, Ropinirole, Rotigotine, Safinamide, Selegiline, Tolcapone
Respiratory system - others	Acetylcysteine, Dornase Alfa
Selected biological, anti-inflammatory compounds	Abatacept, Anakinra, Apremilast, Baricitinib, Belimumab, Benralizumab, Bimekizumab, Brodalumab, Dupilumab, Filgotinib, Guselkumab, Ixekizumab, Mepolizumab, Omalizumab, Reslizumab, Risankizumab, Sarilumab, Secukinumab, Tocilizumab, Tofacitinib, Tralokinumab, Upadacitinib, Ustekinumab, Vedolizumab
Sex hormones - estrogen	Estradiol, Medroxyprogesterone, Estradiol, Norethisterone, Norethisterone, Progesterone
Sex hormones - others	Choriogonadotropin Alfa, Corifollitropin Alfa, Cyproterone, Estradiol, Follitropin Alfa, Follitropin Beta, Follitropin Delta, Prasterone, Testosterone, Ulipristal Acetate, Urofollitropin
Systemic anti-virals	Adefovir Dipivoxil, Baloxavir Marboxil, Bulevirtide, Entecavir, Famciclovir, Fostemsavir Trometamol, Letemovir, Nirmatrelvir, Ritonavir, Remdesivir, Ribavirin, Valaciclovir, Valganciclovir, Zanamivir
Systemic anti-infectives - others	Aminosalicylic Acid, Amphotericin B, Bedaquiline, Ethambutol,

Pharmaceutical class	Substances
	Ethambutol, Isoniazid, Pyrazinamide, Rifampicin, Fluconazole, Isavuconazole, Isoniazid, Isoniazid, Rifampicin, Posaconazole, Rifabutin, Rifampicin, Voriconazole
Systemic antibacterials	Amoxicillin, Amoxicillin, Clavulanic Acid, Ampicillin, Avibactam, Ceftazidime, Aztreonam, Cefiderocol, Ceftazidime, Ceftolozane, Tazobactam, Ceftriaxone, Cilastatin, Imipenem, Relebactam, Ciprofloxacin, Clindamycin, Colistin, Dalbavancin, Doxycycline, Flucloxacillin, Fusidic Acid, Levofloxacin, Linezolid, Lyme cycline, Meropenem, Vaborbactam, Methenamine, Nitrofurantoin, Norfloxacin, Penicillin V, Pivmecillinam, Tedizolid, Teicoplanin
Systemic hormone preparations - others	Betamethasone, Cetrorelix, Cinacalcet, Desmopressin, Dexamethasone, Estradiol, Norethisterone, Relugolix, Etelcalcetide, Fludrocortisone, Ganirelix, Glucagon, Hydrocortisone, Ketoconazole, Lanreotide, Lidocaine, Methylprednisolone, Mecasermin, Nafarelin, Octreotide, Parathyroid Hormone, Paricalcitol, Pasireotide, Pegvisomant, Prednisolone, Somatogon, Somatropin
Thyroid disease	Levothyroxine Sodium, Thiamazole
UFBLI (TNF-alpha inhibitors)	Adalimumab, Certolizumab Pegol, Etanercept, Golimumab, Infliximab
Urologicals	Alfuzosin, Alprostadil, Aviptadil, Phentolamine, Finasteride, Sildenafil, Tadalafil, Terazosin