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ENHANCING COMPETITION IN ON-PATENT MARKETS

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Abstract

The 2018 OECD report *Pharmaceutical Innovation and Access to Medicines* noted that fostering competition in both on- and off-patent markets can improve the efficiency of pharmaceutical spending. Various policies are used to promote competition among off-patent medicines, but generally do not induce competition in on-patent markets. While tendering, for example, is widely used for hospital and other institutional purchasing, it is less common for ambulatory care medicines, and where medicines are reimbursed rather than supplied directly. There are several factors that can be expected to promote price competition, including whether pricing and coverage policies encourage prescribers to favour certain products among a group of therapeutic alternatives. As part of its broader work agenda on "*Increasing the transparency of pharmaceutical markets to inform policies*", this paper explores how payers could harness competition to improve the efficiency of spending on medicines still subject to patent protection or regulatory exclusivity.

Résumé

Le rapport de l'OCDE de 2018 intitulé "Innovation pharmaceutique et accès aux médicaments" a noté que favoriser la concurrence sur les marchés des médicaments brevetés et non brevetés peut améliorer l'efficacité des dépenses pharmaceutiques. Diverses politiques sont utilisées pour promouvoir la concurrence parmi les médicaments non brevetés, mais ne favorisent généralement pas la concurrence sur les marchés des médicaments brevetés. Bien que les appels d'offres soient largement utilisés pour les achats hospitaliers et institutionnels, ils sont moins courants pour les médicaments utilisés en ambulatoire, et lorsque les médicaments sont remboursés plutôt que fournis directement. Plusieurs facteurs peuvent favoriser la concurrence par les prix, notamment si les politiques de tarification et de couverture encouragent les prescripteurs à favoriser certains produits parmi un groupe d'alternatives thérapeutiques. Dans le cadre de son programme de travail plus large sur "l'augmentation de la transparence des marchés pharmaceutiques pour informer les politiques", cet article explore comment les payeurs pourraient exploiter la concurrence pour améliorer l'efficacité des dépenses en médicaments encore soumis à une protection par brevet ou une exclusivité réglementaire.

Executive Summary

The 2018 OECD report *Pharmaceutical Innovation and Access to Medicines* noted that fostering competition in both on- and off-patent markets can improve the efficiency of pharmaceutical spending. Unlike generic or biosimilar versions of originator products, *patented* medicines with similar mechanisms of action may not be directly substitutable, but they may nevertheless represent reasonable therapeutic alternatives. In theory, the existence of multiple products within a therapeutic class could be expected to increase uptake and/or create downward pressure on prices. Thus far, however, there is only sparse evidence of the extent to which on-patent products compete on price for market share in OECD countries. Moreover, while certain policy settings might be expected to promote competition between alternative therapeutic products, there is currently a lack of understanding of the extent to which these settings are applied across OECD countries.

This paper presents the key findings of an analysis of the existence and extent of within-class competition between patented products representing therapeutic alternatives, assessed using data from six therapeutic classes of medicines across seven major European markets. It comprises (i) a quantitative analysis using longitudinal product sales data to assess the impact on prices and market shares of successive entrants within each of six therapeutic classes of medicines, and (ii) a review of pricing, coverage and procurement practices drawn from a survey of payers and procurement agencies and ten in-depth country case studies (the seven countries in our data sample, and three non-EU OECD member countries) to assess the extent of, and scope for promoting on patent competition.

From this analysis the following principal findings emerged:

- **There is mixed empirical evidence of the existence and impact of therapeutic competition in OECD countries.** A review of the literature revealed only very limited evidence of the impact of competition between patented products on prices or market share, with a few studies reporting that the impact may not be discernible until several competing products have entered the market;
- **No clear evidence of price competition was observed within those therapeutic classes in our sample with fewer than five therapeutic alternatives**. In fact, over the period of the analysis the countries in our sample experienced significant price increases despite the market entry of multiple therapeutic alternatives within the selected drug classes, with prices of follow-on products often higher than those of the first-in-class. Later entrants were also observed to acquire market share without any decline in sales of the first-in-class product, regardless of whether they set a price higher or lower than that of the first-in-class. These findings must be interpreted with caution however, as utilisation in five of the six therapeutic classes was undergoing significant intrinsic expansion due to concurrent changes in clinical practice. The external validity of these findings is also limited by the inability to account for confidential discounts and unobserved policy changes from within the data available for this paper; and by the characteristics of the sample used (i.e. out of the six therapeutic classes under study, only one had more than 4 entrants).
- **Policies that define coverage, pricing, prescribing and procurement practices can theoretically shape the extent to which product alternatives compete.** For instance, formulary management or tendering have the power to foster price competition between therapeutic alternatives. However, further systematic analysis would be needed to assess the impact of different practices on on-patent competition;
- **While most countries assess comparative effectiveness of alternative products within a therapeutic class, the extent to which that assessment informs policy varies widely**, and the

extent to which these analyses are used to promote on-patent competition is unclear. Most countries reported using evidence of comparative effectiveness to support coverage and pricing decisions, while a minority of countries use this information to inform procurement of medicines or guide clinical practice. However, it is unclear from the survey responses the extent to which these assessments are deployed to promote competition, and in particular, whether they are used to inform price negotiations or obtain price concessions or discounts;

- **While tendering is increasingly used for procurement of medicines**, **few countries apply it to patented products** in both inpatient and outpatient sectors;
- **Price competition does not appear to be the default dynamic resulting from successive market entries.** Policy settings around pricing, procurement and formulary management must therefore be designed to facilitate and promote competition between patented products.

Four key actions have been identified to support payers and national competent authorities seeking to promote on-patent competition in their systems:

- **Ensuring alignment of pricing and procurement policies to create a pro-competitive environment.** Countries may need to consider more iterative approaches to coverage and pricing as new products enter a therapeutic class and assessments of comparative effectiveness create scope for competition. This could also include utilising horizon scanning to anticipate the entry of potential therapeutic alternatives when negotiating the price of a first-in-class product;
- **Optimising the use of formulary management.** Payers and health insurers in only a few countries use formulary management to foster competition as leverage in price negotiations in exchange for preferred status on formularies or in clinical algorithms. Where therapeutic alternatives exist, preferred status can be used to encourage competitive pricing as it significantly impacts market share;
- **Promoting the use of tendering by class or indication for the treatment of a particular condition.** Where tendering is an accepted method of procurement, setting guiding principles for optimal competitive tender design and award criteria to both promote competition and reduce risks to continuity of supply; and,
- **Utilising evidence of comparative effectiveness to build recognition among the clinical community and competent authorities of the potential value of therapeutic alternatives in driving on-patent competition.** Experience from a few countries highlights the importance of fostering engagement with the clinical community to promote acceptance by prescribers of formulary management and the ranking of products.

Future analytical work could address:

- **Exploring the impact of pricing, reimbursement and procurement practices on competition in pharmaceutical markets**. For example, further analysis would be useful to assess how different pricing mechanisms encourage or undermine competition. It would also be valuable to develop a better understanding of the factors (e.g. advertising and promotion, the influence of key opinion leaders etc) that can potentially affect clinical practice and undermine competition; and,
- **Ensuring cohesion between competition law and pricing policies to discourage anti-competitive behaviour.** For example, further analytical work could focus on developing a better understanding of the interplay between policy settings and competition law with a view to anticipating potentially anti-competitive behaviour by companies. This could include, for example, exploring how mechanisms such as internal and external reference pricing could encourage anti-competitive practices by companies seeking to preserve market share or profit margins (e.g. vertical integration, market segmentation, creation of market entry barriers, tacit collusion on prices).

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https://www.oecd.org/health/Case-studies-Harnessing-On-Patent-Competition-2023.pdf

List of acronyms / abbreviations

AEMPS	Agencia Española de Medicamentos y Productos Sanitarios
AIFA	Agenzia Italiana del Farmaco
AMNOG	Arzneimittelmarkt-Neuordnungsgesetz
ASMR	Amélioration du service médical rendu
CEA	Cost-effectiveness analysis
CEPS	Comité économique des produits de santé
CIPM	Inter-Ministerial Pricing and Reimbursement Committee
CNPMDM	National Commission on Drug and Medical Device Prices
COP	Colombian Peso
CPI	Consumer Price Index
CPR	Comitato Prezzi e Rimborso
CTS	Commissione Tecnico Scientifica
DAA	Direct Acting Antivirals
DOAC	Direct Oral Anticoagulants
DPP4	Dipeptidyl Peptidase-4
DPS	Dynamic purchasing system
DRG	Diagnosis Related Group
EC	European Commission
EEA	European Economic Area
EMA	European Medicines Agency
ERP	External reference pricing
ERT	Enzyme replacement therapies
EU	European Union
EURIPID	European Integrated Price Information Database
EUR	Euro
FDA	Food and Drug Administration
G-BA	Gemeinsamer Bundesausschuss
GDP	Gross Domestic Product
GKV-SV	GKV-Spitzenverband
GLP-1	Glucagon-like peptide-1
GORD	Gastro-Oesophageal Reflux Disease

HAS	Haute Autorité de Santé
HE	Health expenditure
HMO	Health Maintenance Organization
HTA	Health Technology Assessment
ICER	Incremental cost-effectiveness ratio
ICS	Integrated Care System
IETS	Institute of Technological Evaluations in Health
INN	International Non-proprietary Name
INVIMA	Colombian National Food & Drug Surveillance Institute
IQWiG	Institute for Quality and Efficiency
IRP	Internal reference pricing
LIS	Norwegian Drug Procurement Cooperation
MA	Marketing authorisation
MEA	Managed entry agreement
MEAT	Most Economically Advantageous Tender
MoH	Ministry of Health
NCAPR	Network of National Competent Authorities on Pricing and Reimbursement and Public Healthcare Payers
NCE	New chemical entity
NHS	National Health System
NICE	National Institute for Health and Care Excellence
NIS	New Israel Shekel
NME	New molecular entity
NOK	Norwegian krone
NoMA	Norwegian Medicines Agency
NZD	New Zealand dollar
OECD	Organisation for Economic Co-operation and Development
OTC	Over-the-counter medicines
PAHO	Pan American Health Organization
PARP	Poly-ADP ribose polymerase
PBM	Pharmacy Benefit Manager
PCT	Pharmacy and Therapeutics Committee
PFN	Prontuario Farmaceutico Nazionale
PhMD	Pharmaceuticals and Medical Devices
POS	Plan de Beneficios en Salud

PPP	Purchasing Power Parity
PPRI	Pharmaceutical Pricing and Reimbursement Network
QALY	Quality-adjusted life-year
RFT	Requests for tender
RHA	Regional health authority
RP	Therapeutic reference pricing
R&D	Research and Development
SEK	Swedish krona
SGLT2	Sodium-glucose Cotransporter-2
SGSS	Sistema General de Seguridad Social en Salud
SHI	Statutory health insurance
SMR	Service Médical Rendu
SNS	Sistema Nacional de Salud
SU	Standard Unit
TKI	Tyrosine kinase inhibitor
TLV	Tandvårds- och läkemedelsförmånsverket
TNF	Tumour necrosis factor inhibitors
UNCAM	Union nationale des caisses d'assurance maladie
USD	United States dollar
VAT	Value-added tax
VPAS	Voluntary Scheme for Branded Medicines Pricing and Access

Country abbreviations

AUS	Australia
AUT	Austria
BEL	Belgium
BGR	Bulgaria
CAN	Canada
CHE	Switzerland
CHL	Chile
COL	Colombia
CRI	Costa Rica
CYP	Cyprus[1]
CZE	Czech Republic
DEU	Germany
DNK	Denmark
ESP	Spain
EST	Estonia
FIN	Finland
FRA	France
GBR	United Kingdom
GRC	Greece
HUN	Hungary
IRL	Ireland
ISL	Iceland
ISR	Israel
ITA	Italy
JPN	Japan

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KOR	Korea
LUX	Luxembourg
LTU	Lithuania
LVA	Latvia
MEX	Mexico
MLT	Malta
NLD	Netherlands
NOR	Norway
NZL	New Zealand
POL	Poland
PRT	Portugal
ROU	Romania
SVK	Slovak Republic
SVN	Slovenia
SWE	Sweden
TUR	Türkiye
USA	United States

1. Introduction

1.1. Background

1. In 2019, spending on retail pharmaceuticals[2] accounted for one-sixth of overall health care expenditure in OECD countries, comprising the third largest component of health spending after inpatient and outpatient care (OECD, 2021[1]). Increasing expenditure growth on pharmaceuticals (particularly in the hospital sector) in several OECD countries over the last decade has focused increasing policy attention on the pharmaceutical sector and mechanisms for managing expenditure (OECD, 2021[1]). The 2018 OECD report *Pharmaceutical Innovation and Access to Medicines* (OECD, 2018[2]) noted that fostering competition in both on- and off-patent markets was one of several approaches to improving spending efficiency.

2. While the pharmaceutical industry is structurally competitive, with relatively low overall concentration and regulated entry of manufacturers and new medicines to the market, patents and regulatory exclusivity safeguard originator products from generic or biosimilar competition and enable manufacturers to recoup their investments in research and development (R&D). During the period of exclusivity, however, a number of potential therapeutic alternatives may nevertheless enter the market. In fact, time to successive entry of new products within a given therapeutic class has been declining rapidly, with the period of effective exclusivity of first-in-class medicines falling from an average of 10.2 years in the 1970s to 1.2 years in the late 1990s (DiMasi and Paquette, 2004[3]). The potential for "therapeutic competition" or "on-patent competition"[3] between medicines with the same or similar mechanisms of action representing reasonable therapeutic alternatives for a given condition can thus arise quite quickly. However, current evidence suggests that competition is not the default dynamic resulting from successive market entry. Instead, targeted policy settings around pricing, procurement and formulary management are needed in order to promote competition between patented products.

3. Because the demand for medicines is strongly influenced by coverage rules of insurance programmes (whether public or private) and the variety of mechanisms adopted by governments to modulate the quantity and quality of pharmaceutical spending, policies can shape how product alternatives compete. Well-developed policies are widely used to promote competition among suppliers of off-patent medicines, but generally do not induce competition in on-patent markets. For example, tendering is often used for hospital and other institutional purchasing, although it is less common for medicines used in ambulatory care, or where they are reimbursed rather than supplied directly. These mechanisms, however, are generally designed to induce competition among different products containing the same molecule, rather than between different patented products within the *same therapeutic class* but containing *different active moieties.*

[2] Excluding medicines used in in-patient care.

[3] Competition can also arise between products in different therapeutic classes, with different mechanisms of action, but similar indications.

4. There are several factors that can be expected to influence whether price competition between therapeutic alternatives occurs. These include the degree of ''interchangeability[4]'' – whether prescribers *perceive and accept* products as therapeutic alternatives (known as a state of *clinical equipoise*) – and whether pricing and coverage policies encourage or require prescribers to prioritise the use of certain products among a set of therapeutic alternatives. However, it is not clear from existing evidence the extent to which these conditions are met in the markets of OECD countries, and whether therapeutic alternatives do, in fact, compete on price. Recent OECD work concluded that there is a lack of evidence of competition and its impact on prices and volumes of patented medicines (OECD, 2018[2]).

5. In 2021 the Health Committee commenced a stream of work aiming to explore whether public payers could harness competition to improve the efficiency of spending on medicines still subject to patent protection or regulatory exclusivity (see DELSA/HEA/PHMD(2021)5). The project comprised:

- A quantitative analysis exploring the extent to which therapeutic competition currently exists in on-patent markets, and, if so, how it has affected prices, volumes, and expenditure over time, based on a sample of therapeutic classes and a selected group of countries;
- A review of pricing, coverage and procurement practices to map mechanisms that promote competition for on-patent medicines, drawing on a survey of payers and procurement agencies and a series of case studies presenting in-depth policy reviews of 10 countries.

6. This paper presents the findings of those analyses and is organised as follows. Section 1. Presents a critical review of the literature. Section 2 outlines the principal findings of the quantitative analysis in exploring the extent to which therapeutic competition occurs among patented products in selected therapeutic classes. Section 3 discusses the main findings derived from an OECD member country and EU member state survey that collected data on current pricing, coverage and procurement practices for on-patent products across 35 countries, as well as in-depth case studies of 10 countries. Section 4 discusses the findings and identifies potential avenues for countries in harnessing 'on-patent' competition going forward.

1.2. Empirical evidence of on-patent competition is mixed

7. To date, there is mixed empirical evidence of the existence and impact of therapeutic competition in OECD countries. The current literature spans a variety of sources and reflects different product classes, countries, and time periods, making the comparison and generalisation of findings challenging. The Secretariat undertook an umbrella review of peer-reviewed studies and grey literature in which 49 studies were identified that explored competition in on-patent markets across OECD countries. Annex A of the Supplementary Material lists the studies reviewed, and details information about the outcomes, data, and methods. The findings of the most significant studies are summarised below.

8. Some studies have suggested that therapeutic competition has led to significant price reductions in several markets in the US and Europe (UK, Austria, Belgium, France, Germany, Italy and Spain). A recent systematic review of 10 studies from the US concluded that brand–brand (originator–originator) competition generally *lowered* the list prices of alternative within-class products across several therapeutic classes[5] (Sarpatwari et al., 2019[4]). A prior study by (Lu and Comanor, 1998[5]), which analysed launch

[4] According to the European Medicines Agency "interchangeability refers to the possibility of exchanging one medicine for another that is expected to have the same clinical effect. (European Medicines Agency, 2022[63]).

[5] The literature review includes one study in each of the following therapeutic classes: antihypertensives, anti-infectives, central nervous system stimulants for attention-deficit/hyperactivity disorder, disease-modifying therapies for multiple sclerosis, histamine-2 (H2) blockers, and tumour necrosis factor (TNF) inhibitors; the literature review also includes two studies on cancer medicines; and two studies on all marketed or new drugs.

prices and price trends of 144 new molecular entities (NMEs) authorised by the FDA between 1978 and 1987, found that after controlling for therapeutic ratings, launch prices of new entrants were *lower* than those of incumbents, and that prices of incumbents *decreased* with successive entry of competing products. Three other studies from the US showed that product alternatives competed on price in the classes of anti-infectives (Wiggins and Maness, 2004[6]), peptic ulcer and gastroesophageal reflux disease medications(GORD) (Arcidiacono et al., 2013[7]) and, more generally, over eight therapeutic classes (anti-arthritics, anti-depressants, anti-histamines, anti-hyperlipidaemics, anti-hypertensives, anti-ulcerants, cephalosporins, and macrolides) between 1995 and 1999 (Dimasi, 2000[8]). The evidence of price competition is also available for European markets. For example, in a study of launch prices of 114 of 288 newly authorised outpatient medicines in Spain between 1997 and 2005, Puig-Junoy and López-Valcárcel (2014[9]) found that launch prices of new entrants decreased as the number of competitors in the market increased. Additionally, analyses of sales data (2011-2017) for direct acting antivirals (DAAs) to treat hepatitis C in the US and seven European countries (UK, Austria, Belgium, France, Germany, Italy and Spain) showed that the market entry of two protease inhibitors followed by seven direct acting antivirals decreased prices by about 30% - 60% (Sagonowsky, 2017[10]), mitigating the budget impact and improving access to patients (Roediger et al., 2019[11]). In addition, a rare but significant example of within-class, on-patent competition, also described in the 2018 OECD Report (OECD, 2018[2]), is that of the direct acting antivirals (DAAs) for hepatitis C (see Box 1.1).

9. Other studies have suggested that therapeutic competition leads to price reductions only where there are multiple competitors. Mueller and Frenzel (2013[12]) analysed launch prices and price trends of 108 molecules in 38 therapeutic classes launched in Germany between 1993 to 2008. They concluded that the main effect of price competition lay in lowering launch prices of the third and subsequent entrants, but with little change over time in the prices of incumbents, and that this pattern was influenced by prescriber behaviour. A Canadian study found that brand-name medicines launched between 1994 and 2003 did not compete on price within class until there were at least four entrants (Lexchin, 2006[13]). Similarly, a recent study from Sweden that analysed monthly price data for 1 586 on-patent prescription-only medicines between 2002 and 2007 found that prices were predicted to decrease only with presence of a fourth alternative (Granlund, 2021[14]).

10. By contrast, several studies have reported either no clear effects or price increases**.** A recent paper by Ellyson and Basu (2021[15]) studied the effect of a "credible" threat of competitor entry (defined as a submission for FDA marketing authorisation of a competing product) on the prices of incumbents in the markets for insulins and tumour necrosis factor (TNF)-alfa inhibitors (both biologics), including biosimilars. The study found that submissions by the first and second potential entrants not only had no effect, submissions by the third and fourth entrants were associated with increases in the prices of incumbents. A recent study from the US suggested that the actual or prospective entry of a therapeutic competitor among certain cancer drugs approved for the treatment of solid tumours increased the prices of incumbents between 2009 and 2020 (Vokinger et al., 2022[16]). A paper analysing pricing data on 24 on-patent anti-cancer products receiving FDA approval between 1996 and 2012 in the US found the market entry of new competitors did not change prices (Gordon et al., 2018[17]). In another study, Kanavos et al. (2007[18]) showed no evidence of price competition between originator products prior to patent expiry in the statin market across four European countries (UK, Germany, France and the Netherlands) between 1991 and 2002. Moreover, Ekelund and Persson (2003[19]) studied 246 new chemical entities (NCEs) authorised and launched in the Swedish market between 1987 and 1997, which suggested that neither launch prices of new entrants nor price declines over time were correlated with entry of additional products into a class. Moreover, a study analysing sales data from medicines used in the Danish hospital sector from 2004 to 2009 (Hostenkamp, 2013[20]) found no evidence of price competition exerted by the entry of product alternatives in eight therapeutic classes. Finally, a US study (Liu et al., 2021[21]) examined price trends for direct oral anti-coagulants (DOACs), four sodium-glucose cotransporter-2 (SGLT2) inhibitors, four dipeptidyl peptidase-4 (DPP4) inhibitors, seven glucagon-like peptide-1 (GLP-1) receptor agonists, and

two P2Y12 inhibitors (all on-patent medicines) between 2015 and 2020 and suggested there was little price competition among the product alternatives.

11. The mix of evidence suggests that companies define their price-setting strategies differently; some use "skimming" strategies, setting initially high prices in an attempt to differentiate their products, while others pursue a "penetration" strategy by launching low priced products in order to gain market share (Lu and Comanor, 1998[22]). Beyond individual company strategies, regulatory frameworks defined by governments can limit or exclude coverage of some products, define selectively how buyers can procure medicines, set prices and prioritise the use of certain products over others. How formulary selection, coverage, pricing, procurement and prescribing policies are designed can strongly influence the competitive landscape for on-patent products (Kanavos and Vandoros, 2011[23]).

Box 1.1. On-patent competition between direct acting antivirals (DAAs) for hepatitis C

One of only a few examples of within-class, on-patent competition, also described in the 2018 OECD Report (OECD, 2018[2]), is that of the direct acting antivirals (DAAs) for hepatitis C. *Sofosbuvir* was launched in the United States in 2013 with a list price of USD 84 000, albeit with lower prices in other markets as a result of the manufacturer's tiered-pricing strategy. While the therapeutic value of the new treatment was widely acknowledged, many payers were taken aback by the potential budget impact, and in several countries the product was considered unaffordable (Iyengar et al., 2016[24]). Some OECD countries initially limited access to only the most severely affected patients (CNAMTS, 2016[25]), while in others, payers were able to negotiate lower prices or confidential discounts (IMS Institute for HealthCare Informatics, 2013[26]). Ultimately, significant downward pressure on prices was driven by competition. Between August 2013 and August 2017, five additional DAAs and six new fixed-dose combinations gained regulatory approval (Unitaid and WHO, 2017[27]); of these, the last entrant in the US market was launched with a list price of USD 26 400 per treatment course (before discounts), a price 30% - 60% below its competitors[1] (Sagonowsky, 2017[10]). If public payers had better anticipated the arrival of sofosbuvir and of its subsequent competitors, they might have responded differently. First, they could have planned and justified prioritisation of treatment of the most severely affected patients and high-risk populations. In some countries, such an approach would have been anyway justified by the system's capacity to provide treatment. This exceptional case also shows that the "willingness to pay" for a new product treating a highly prevalent disease does not only depend on its intrinsic value (or cost-effectiveness), but also on the total budget impact.

1.3. Existing evidence is scant in evaluating how policies affect competition between patented product alternatives

Coverage and pricing policies can shape competition between product alternatives

12. Certain policies can shape how product alternatives compete (see Box 1.2). In many countries, national "positive lists" confer effective market access and can constrain prescriber options to alternative treatment options. Most of the discussion in the literature focuses primarily on the impact of coverage and pricing policies when generic or biosimilar alternatives are available. For example, a study in Germany in 1989 analysed the effect of a change in the reimbursement rules (from a flat fee to a maximum amount) for prescription medicines that exposed patients to greater out-of-pocket expenses and showed price reductions of 10%-26% among patented products facing generic competition (Pavcnik, 2002[28]). The evidence is, however, very limited with respect to exploring how these policies shape competition between patented medicines. Some studies analysed the effect of specific insurance programme designs on the

coverage of patented medicines deemed equivalent to generic/biosimilar alternatives. For example, Ellyson and Basu (2021[15]) showed that incumbents in the US insulin market had incentives to increase prices in anticipation of revenue and/or market share losses caused by the entry of biosimilars, which is further exacerbated by insurance programmes that use tiered coverage rules that do not necessarily favour relatively lower priced products.

13. Pricing and coverage decisions are the culmination of various regulatory mechanisms that regulate prices and set reimbursement rules. In some circumstances these can discourage suppliers from offering substantial discounts and undermine competition between product alternatives. The literature is, however, scant in examining the impact of price regulation on on-patent competition**.** Evidence is limited to reference pricing mechanisms – both internal reference pricing (IRP[6]) and external reference pricing (ERP[7]) – but does not necessarily disentangle the effects between patented and generic medicines. For example, three studies showed the impact of IRP on price competition is mixed. One study from Germany (Stargardt, 2011[29]) showed that IRP reduced both patented and generic prices, while two studies showed no evidence that IRP encouraged price competition in Sweden in 1987-1997 (Ekelund and Persson, 2003[30]) and across five therapeutic classes[8] in Germany, the Netherlands, and New Zealand in 1998 (Danzon and Ketcham, 2004[31]). The evidence of the impact of ERP is also mixed. One study showed that prices largely remained unchanged after 458 "follow-on" drugs entered the German market in 1993–2008, which may be attributed to the importance of the German market as a major anchor point for ERP in numerous health care systems (Mueller and Frenzel, 2013[12]), while another study showed the introduction of ERP in the Netherlands in 1996 reduced prices of the classes of anti-hypertensives and anti-depressants between 1994 and 1999 (Windmeijer et al., 2005[32]). A third study found that prices decreased but substantial price differences subsisted across 14 European countries using ERP in 2007-2008 (Leopold et al., 2012[33]). Evidence is also scant with respect to assessing the effect of other mechanisms like price caps, mandatory discounts, statutory pricing or cost-effectiveness assessments on the competition dynamics of patented medicines.

Tendering is an effective mechanism for promoting competition

14. The objective of a tendering is generally to elicit the most favourable terms for the procurement of one or more products. In the case of medicines this may be either for the provision of an individual molecule, across a therapeutic class, or across multiple therapeutic classes for a particular indication. Tenders selection may be based on criteria other than price, such as product quality or reliability of supply, and need not award the entire market volume in a segment to a single supplier. This may mean encouraging competition on price alone or in combination with other conditions of supply. There is, however, scant evidence of the effective use of tendering to harness on-patent competition. Just two studies from Cyprus showed that tendering can deliver statistically significant price reductions on on-patent medicines for the public sector (Petrou, 2016[34]; Petrou and Talias, 2014[35]). Petrou and Talias (2014[35]) suggested savings of around 33%.

15. While so-called "winner-takes-all" tenders – where a single, successful tenderer becomes the sole supplier of a product within a market – are arguably the most competitive, they are not without risks. For

[6] The practice of using the price(s) of identical medicines (ATC 5 level) or similar products (ATC 4 level) or therapeutically equivalent therapies in a country in order to derive a benchmark or reference price for the purposes of setting or negotiating the price or reimbursement of the product in a given country. Generic and biosimilar price links and reference price systems are variants of internal price referencing (Pharmaceutical Pricing and Reimbursement Network, 2023[62]).

[7] External reference pricing (ERP) refers to the practice of using the price(s) of a medicine in one or several countries to derive a benchmark or reference price for the purposes of setting or negotiating the price of the product in a given country (Pharmaceutical Pricing and Reimbursement Network, 2023[62]).

[8] Anti-ulcerants, hypoglycemics, antihyperlipidemics, antidepressants, and antihypertensives.

example, clinical guidelines or formulary placement driven by the results of tendering processes may be viewed by clinicians as unreasonably limiting their therapeutic choices. Of arguably greater concern, if a sole supplier is unable to meet the demand for some reason, shortages may arise, and alternative suppliers may have exited the market altogether. This can lead to future problems of supply, and the potential for monopoly pricing. Kanavos et al (2012[36]) evaluated tendering procedures for mainly off-patent outpatient pharmaceuticals in three EU countries (the Netherlands, Germany and Belgium) and showed that while tendering can be very effective in creating downward price pressure, processes that reduce prices very aggressively risk creating market segments that become unattractive to manufacturers.

16. Multiple supplier arrangements can preserve a degree of therapeutic choice, support the retention of multiple suppliers in the market, and enhance security of supply. Competitive tenders can be offered at national level and be followed by formal and transparent processes to allocate market shares to the best bidders. This may require a trade-off between competitive prices and product availability sufficient to ensure that all patients have access to treatments based on need, particularly where products are not therapeutically equivalent. For example, Norway now procures many outpatient medicines through a centralised tender process. The Norwegian Drug Procurement Cooperation (LIS) drafts Europe-wide multi-supplier requests for tender (RFTs) by indication, thereby ensuring that physicians and patients retain choice among alternative treatments where necessary (see Section 3 for more detail). However, not limiting the number of potentially successful suppliers means there is little incentive for deep discounts. One possible approach is to limit the number of bids accepted and set the reimbursement amount at the level of the lowest unsuccessful bid. This ensures a profit margin for all successful tenderers by paying them a price higher than their tendered price (thus encouraging them to remain in the market) but retains incentives for suppliers to offer their best prices to be among the successful bidders.

Box 1.2. Different types of tendering procedures and approaches

- **Open procedure tender**: a formal procurement method where any interested supplier may submit a tender in response to a call for competition.
- **Restricted procedure tender**: a formal, two-stage procurement method where any supplier may submit a request to participate in response to a call in the first stage, but only pre-qualified suppliers may submit a tender in the second stage.
- **Competitive procedure with negotiations:** a two-stage procurement method that involves pre-selection of suitable potential suppliers by the contracting authority and negotiations of submitted tenders.
- **Negotiated procedure without prior publication**: a variant of the negotiated procedure for exceptional cases where it is known that only a specific supplier can fulfil the procurement needs.
- **Competitive dialogue**: a two-stage procurement method where the contracting authority pre-selects potential suppliers based on their initial submissions and initiates a dialogue with them to identify the best possible method to address a specified need.
- **Framework agreement**: an agreement between one or more contracting authorities and one or more economic operators, the purpose of which is to establish the terms governing contracts to be awarded during a given period, in particular regarding price and, where appropriate, the quantity envisaged.
- **Dynamic purchasing systems** (DPS): a procurement technique for making recurring purchases while allowing suppliers to join the system on an ongoing basis.
- **Single winner tender award contracts**: tender outcome allows only one supplier.
- **Multi-winner tender award agreements**: tender outcome allows for multiple suppliers.

Note: this list of types of tendering procedures and techniques has been limited to those relevant for this paper.
Source: (Vogler, Salcher-Konrad and Habimana, 2022[37]; European Parliament, 2014[38]) (OECD, 2018[2])

Formulary management can be used to facilitate competition

17. Formulary management can also be used to encourage competition among therapeutic alternatives, irrespective of patent status, by giving the cheapest or most cost-effective options preferential placement in a tiered formulary, and/or in formulary-compliant treatment guidelines (see definitions in Box 1.3). In the United States, Pharmacy Benefit Managers (PBMs) (specialists in managing pharmaceutical spending) and health insurers can negotiate rebates in some therapeutic classes in exchange for formulary listing, which results in a form of competition. The impact of this competition, however, remains unclear, as list prices of some on-patent medicines have been increasing at a rapid rate and are not directly related to proportional increases in rebates (Visante, 2017[39]). A tiered formulary can be used to promote the preferential use of certain high value products, and to discourage, through higher co-payments or narrower coverage conditions, the use of lower value products. Importantly, tier placement has the potential to send unambiguous signals to prescribers and patients alike regarding care choices that are of greater or lesser value. Where tiered formularies are determined by price rather than cost effectiveness, priority may not be given to the highest value or most effective products. Tiered formulary management is widely used by PBMs and health insurance plans in the United States (Lising et al., 2017[40]).

18. To date, studies examining the impact of formulary management strategies by PBMs in the United States have focused on use, patient adherence, and health care costs, and have not explored their effects

on on-patent competition (Huskamp et al., 2005[41]). A literature review by Morton and Boller (2017[42]) outlined barriers to effective competition in the US pharmaceutical market related to the use of formularies. Insurers use formulary design as a negotiation tool with manufacturers to decide which medicines to cover while threatening exclusion of product alternatives. Moreover, one study examined the impact of the adoption of a "close national formulary" in the Veterans Health Administration drug benefit in 1997, and found that it significantly impacted market shares and reduced the price per pill in the therapeutic classes affected by the change in the two years following implementation (Huskamp, Epstein and Blumenthal, 2003[43]). Clearly, price confidentiality is a significant obstacle to assessing the impact of formulary management.

Box 1.3. Formulary management

"Formulary management" is a term typically used in the United States to refer to the practice of constructing a reimbursement formulary that steers prescription and consumption towards certain categories of drugs. Constructing the formulary includes defining a list of products covered by a particular health insurance policy or approved for prescription in a specific health system or hospital, setting the associated co-payments for patients, and determining coverage conditions (e.g., stepped therapy, prior authorisation). The list of covered drugs (and associated co-payments) usually falls into one or more of three broad categories:

- **Open formulary**: where the insurer pays a proportion of the cost of all or virtually all marketed drugs, although some over-the-counter (OTC) or so-called life-style drugs may be excluded.
- **Closed formulary**: where the insurer only covers drugs listed on the formulary.
- **Tiered formulary**: the insurer offers differential co-payments or other financial incentives to encourage the use of preferred formulary drugs, but still pays a portion of the costs of the non-preferred drugs.

Source: (OECD, 2018[2])

2 Analysis of on-patent competition using historical sales data

19. This section explores empirically the extent to which on-patent competition occurs among different patented products within the same therapeutic class. The analysis uses quarterly sales data between Q4 1997 and Q4 2021 to estimate the impact of market entry of successive entrants on the prices of first-in-class products, as well as on the prices and sales volumes of the therapeutic class as a whole, for a selected group of classes in a subset of OECD countries. The following section defines the data and scope of the analysis, followed by a brief description of the methodology and a discussion of the results.

2.1. Scope, data, and market definition

20. The geographic scope of the analysis covers seven OECD countries - France, Germany, Italy, Norway, Spain, Sweden, and United Kingdom - reflecting a variety of approaches to national pricing and coverage policies as explored in more detail in Section 3. The analysis covers six therapeutic classes that represent significant markets for manufacturers and in which several branded therapeutic alternatives are available (see Table 2.1). Therapeutic classes were considered for inclusion if they comprised:

- three or more entrants in the class[9];
- products reflecting accepted therapeutic alternatives for the index indication; and
- single, or principal indications, to avoid confounding by indication.

21. Data were obtained from the IQVIA MIDAS™ database and comprised quarterly sales and pricing data[10] between Q4 1997 and Q4 2021 reported at ex-manufacturer level for each entrant in each therapeutic class and country, for both hospital and retail sectors. Prices of products in each therapeutic class were standardised (in Standard Units (SUs)) to comparable quantities and doses across different product pack sizes and pack volumes within each class. Standardised quarterly average prices and volumes were then aggregated by therapeutic class and country. For each therapeutic class, the analysis spanned the period from the date of market entry[11] of the first-in-class product to the date of entry of the first generic, biosimilar, or fixed dose combination of any of the products in the class, to exclude the effect of generic, biosimilar or fixed-dose combination market entry on prices[12]. The data on prices provided by IQVIA are adjusted both for inflation and currency fluctuation. For more details regarding data and standardisation see Annex B of the Supplementary Material.

[9] Enzyme replacement therapies for Gaucher's disease were selected as a class with three entrants, however, only two have marketing authorisation in the European Union.

[10] Sales and pricing data were based on invoice pricing and captured known supply-chain price concessions but did not include off-invoice discounts and rebates granted separately to payers or governments, and thus do not reflect net prices. As a result, it was not possible to capture the possible effects on net prices.

[11] Market entry is defined as the date of the first sale of a product in a country.

[12] Three molecules faced generic competition during the time of study: dasatinib, imatinib and insulin glargine. Note that generic competitors do not enter the market at the same time in all countries (for more details see Annex B of the Supplementary Material).

Table 2.1. Therapeutic classes and products included in the analysis

Class	Brand name	INN	Indication	MA in EU (year)
direct oral anticoagulant	Pradaxa	dabigatran	prevention of stroke; embolism and treatment of venous thromboembolism	2008
	Xarelto	rivaroxaban		2008
	Eliquis	apixaban		2011
	Lixiana	Edoxaban		2017
insulin analogue	Lantus	insulin glargine	diabetes	2000
	Levemir	insulin detemir		2004
	Tresiba	insulin degludec		2013
tyrosine kinase inhibitor (TKI)	Glivec	Imatinib	1st line treatment of chronic myeloid leukaemia	2001
	Sprycel	Dasatinib		2006
	Tasigna	Nilotinib		2007
	Bosulif	Bosutinib		2013
enzyme replacement therapy	Cerezyme	imiglucerase	Gaucher's disease	1997
	Vpriv	velaglucerase alfa		2010
	Elelyso[1]	taliglucerase alfa		N/A
PARP inhibitors	Lynparza	Olaparib	epithelial ovarian, fallopian tube, or primary peritoneal cancer	2014
	Zejula	Niraparib		2017
	Rubraca	Rucaparib		2018
glucagon-like peptide-1 (GLP-1) receptor analogue	Byetta/Bydureon	Exenatide	diabetes	2006/2011
	Victoza	Liraglutide		2009
	Lyxumia	lixisenatide		2013
	Trulicity	dulaglutide		2014
	Eperzan /Tanzeum	albiglutide		2014
	Ozempic	semaglutide		2018

Note: 1. Not approved in the EU. Included for completeness.
Source: Authors.

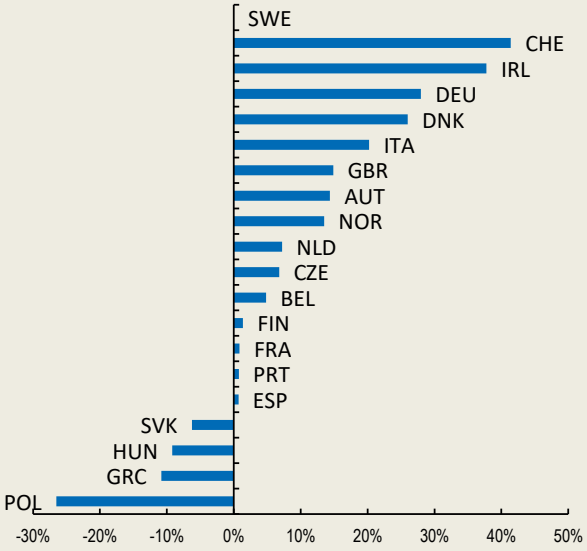
Box 2.1. International comparisons of medicine prices

Of special interest to policymakers is the international comparison of pharmaceutical prices as it can show whether some countries obtain more favourable prices than others. Countries like Italy and Sweden periodically monitor and compare pharmaceutical prices across countries, but often use different methodologies.

Figure 2.1. Price comparisons for medicines not facing competition using a basket of medicines available in Sweden, 2022

Bilateral price comparisons for pharmaceuticals without generic competition, 2022

Latest report by TLV showed that most countries had higher list medicine prices than Sweden in the period between March 2021 and March 2022. For that, TLV used a price index based on Swedish volumes for 5,108 pharmaceuticals not facing competition i.e. novel medicines enjoying patent protection, as well as older medicines not facing generic competition (TLV, 2023[44]).

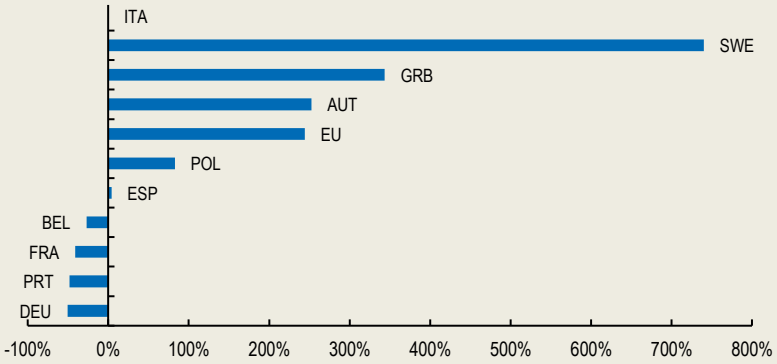


Note: Prices during Q1 2022. Volumes running 12 months up to and including March 2022 3-year average exchange rate. The figure should be understood to mean that Sweden's costs, for pharmaceuticals without competition sold, for example, in both Sweden and Switzerland, would have been 40 percent higher if they had been purchased at Swiss prices instead of at Swedish prices.
Source: (TLV, 2023[44]).

Figure 2.2. Price comparisons in the hospital sector for medicines not facing competition using a basket of medicines available in Italy, 2021

International comparison of average cost by Standard Unit in hospital setting in 2021 and 2021-2020 variation

AIFA also produces international comparisons of medicine prices and showed in their most recent report (AIFA, 2022[45]) that Italy faces higher prices than Belgium, France, Portugal and Germany, for medicines dispensed in hospital settings. The report also shows country ranking for prices of medicines sold in the retail sector, which is different.



Note: The analysis considered medicinal products that are identical or have a similar packaging to those marketed in Italy.
Source: (AIFA, 2022[45])

Trade-offs in undertaking international price comparisons of on-patent competition markets

Price comparisons across markets are often used to inform debates on competition, on the assumption that more competitive markets lead to lower prices. However, when investigating on-patent competition, rankings like the ones presented above provide limited information. To begin with, calculating a price index, as done by TLV (2023[44]) and AIFA (2022[45]), involves choosing a product basket and a set of price weights, the latter usually obtained from the consumption volumes in a reference country. For example, price comparisons shown in Figure 2.1 use price weights based on sales volumes in Sweden. As a result, only medicines available in both Sweden and the comparison country are included in the calculation (TLV, 2023[44]). Variations in the basket of goods chosen for comparison not only affect the price rankings derived from the analysis, but also mean that it is only possible to compare an individual country with the reference country. In addition, these calculations are based on a basket of medicines that may not account for the existence of therapeutic alternatives. Lastly, the calculations behind these comparisons are often done using "list" prices, failing to capture confidential discounts or rebates which might considerably lower prices.

2.2. Methodology

22. Two approaches were used to explore the extent to which therapeutic competition occurred among different patented products for each of the six selected therapeutic classes: (i) an examination of a series of visual inspections and summary statistics of trends in prices and volumes of products sold per therapeutic class and country; and (ii) a series of econometric analyses to test whether entry of successive products was correlated with changes in prices and volumes. The model specification and the estimation results of the econometric analysis are outlined in detail in Annex B of the Supplementary Material, together with the summary statistics disaggregated across countries.

Econometric analysis to estimate effects of market entry of follow-on products

23. Regression analyses using panel data models explored whether entry of successive products has a statistically significant correlation with changes in prices and product volumes in each of the countries in scope, as detailed in the Supplementary Material. Coefficients were estimated by pooling data across therapeutic classes and countries, while controlling for all unobserved temporal effects affecting prices and volumes as well as any therapeutic class and country-specific attributes that do not vary across time[13].

24. The first sale of a competing product may be expected to initiate competitive pressure within a class and can therefore be hypothesised to influence prices, though earlier events may also affect prices if incumbents adjust pricing in anticipation of competition.[14] If entrants in a class are therapeutic alternatives and engage in price competition, prices may be expected to decrease with each successive market entrant, in order for incumbents to maintain, and new entrants to acquire, market share. This effect on price may or may not coincide with an effect on volume. Conversely, if new entrants are well differentiated from incumbents or target different patient populations without engaging in price competition, prices may be

[13] Models were estimated both in aggregate, and separately, for sales in the hospital and retail sectors. Several robustness checks were also undertaken to account for changes in the market structure that differentiate entrants within a class in each country; changes in demand-side preferences over time; changes in the regulatory framework (e.g. effects of direct price regulation) that may engender price movements; and the appropriate functional form of the time trend.

[14] For example, the following earlier events were analysed in prior studies: publication/announcement of successful Phase 3 clinical trial results (Ellyson and Basu, 2021[15]); marketing authorisation in the jurisdiction (Lu and Comanor, 1998[5]; Mueller and Frenzel, 2013[12]); and a positive pricing and coverage decision in the jurisdiction (Ekelund and Persson, 2003[19]).

expected to be uncorrelated with entry of successive entrants, and new entrants can be expected to expand the market, i.e., increase the aggregate product volume sold in the class.

25. These contrasting price-setting strategies are well documented in the literature. On the one hand, later entrants may choose a "skimming" strategy and set initially high prices in an attempt to signal higher quality and differentiate their product from the competitor, or may instead launch a relatively cheaper product to gain market power, referred to as a "penetration" strategy (Lu and Comanor, 1998[22]). These two effects can be tested separately by excluding prices of new entrants from the analysis (Model 1) or including them (Model 2) as described in Annex B of the Supplementary Material. The entry of follow-on products may also increase the market size, with aggregate product volumes sold in the class increasing with the successive entry of product alternatives. Model 3 tests this hypothesis.

2.3. Main findings

26. The quantitative analysis elicited four principal findings:

1. There were large variations in time to entry of therapeutic alternatives across countries.
2. Despite the market entry of multiple therapeutic alternatives in the selected classes, countries experienced significant price increases.
3. There was no evidence of price competition with fewer than five therapeutic alternatives in the market.
4. Rather than crowding out the market of the first-in-class, later entrants in classes appear to drive market expansion.

There were large variations in time to entry of therapeutic alternatives across countries

27. The potential for price competition in on-patent markets depends on the market entry of successive therapeutic alternatives. As shown in Table A A.1 in Summary statistics , the average time on market for first-in-class products was nearly double the average time on market of follow-on products for all therapeutic classes, except for direct oral anticoagulants (DOAC).

28. However, these averages mask important delays in the availability of new therapeutic competitors across countries. Table 2.2 shows how marketing authorisation dates of a given product compare with the date of the first registered sale in each country. For example, within the class of insulin analogues, there were significant differences across countries in the dates of market entry of follow-on products. *Insulin detemir*, the second-in-class, was launched four years after the entry of the first-in-class product in Germany, Norway, Sweden and the UK, but six years later in Italy. *Insulin degludec*, the third-in-class, entered the market three years later in France and Spain than in Sweden and the UK.

29. Similar differences can be observed across countries for poly-ADP ribose polymerase (PARP) inhibitors: *niraparib*, the second-in-class, entered the market three years later in Norway than in Germany and the UK. These differences challenge the interpretation of cross-country comparisons and highlight the need for careful consideration of manufacturers' launch sequencing and the distinct market structures for each therapeutic class that result in each country. Manufacturers' launch sequencing partly reflects responses to national pricing and coverage policies, as manufacturers seek to maximise revenue by launching first in markets (countries) with highest willingness to pay (Kyle, 2007[46]; Maini and Pammolli, 2020[47]).These differences in the timing of market entry across countries also have implications for these econometric results as they are estimated by pooling data from all 7 countries.

Table 2.2. Differences in timing of market entry of therapeutic alternatives across countries

Class	INN	Date of marketing authorisation	Date of first registered sale						
			FR	DE	IT	NO	ES	SE	UK
direct oral anticoagulant	dabigatran	2008 Q1	2008 Q4	2008 Q2	2008 Q4	2008 Q3	2008 Q4	2008 Q2	2008 Q2
	rivaroxaban	2008 Q3	2009 Q2	2008 Q4	2009 Q3	2009 Q1	2009 Q2	2008 Q4	2008 Q4
	apixaban	2011 Q2	2012 Q3	2011 Q2	2012 Q4	2011 Q4	2011 Q4	2012 Q1	2012 Q1
	edoxaban	2015 Q2		2015 Q3	2016 Q3	2016 Q4	2016 Q3	2016 Q3	2015 Q3
insulin analogue	insulin glargine	2000 Q2	2003 Q2	2000 Q2	2003 Q3	2002 Q2	2003 Q4	2003 Q2	2002 Q3
	insulin detemir	2004 Q2	2005 Q2	2004 Q3	2006 Q2	2004 Q3	2005 Q2	2004 Q4	2004 Q2
	insulin degludec	2013 Q1	2016 Q1	2014 Q2	2014 Q4	2014 Q3	2016 Q4	2013 Q3	2013 Q1
tyrosine kinase inhibitor (TKI)	imatinib	2001 Q4	2001 Q3	2001 Q4	2002 Q1	2001 Q3	2002 Q2	2001 Q4	2001 Q4
	dasatinib	2006 Q4	2006 Q4	2006 Q4	2007 Q2	2007 Q1	2007 Q2	2006 Q4	2006 Q4
	nilotinib	2007 Q4	2008 Q1	2008 Q1	2008 Q3	2008 Q1	2008 Q2	2007 Q4	2008 Q2
	bosutinib	2013 Q1	2013 Q3	2013 Q2	2013 Q4	2014 Q1	2017 Q2	2013 Q3	2013 Q2
enzyme replacement therapy	imiglucerase	1997 Q4	1997 Q3	1998 Q1	1998 Q4	1998 Q3	1999 Q1	2009 Q1	1999 Q2
	velaglucerase alfa	2010 Q3	2011 Q4	2010 Q3	2011 Q2	2010 Q4	2011 Q1	2010 Q4	2012 Q1
	taliglucerase alfa								
PARP inhibitor	olaparib	2014 Q4	2015 Q1	2015 Q2	2015 Q3	2015 Q4	2016 Q1	2015 Q1	2015 Q1
	niraparib	2017 Q4	2018 Q1	2017 Q4	2018 Q4	2020 Q2	2019 Q3	2018 Q4	2017 Q4
	rucaparib	2018 Q2	2020 Q1	2019 Q1	2020 Q1		2020 Q3		2018 Q3
glucagon-like peptide-1 (GLP-1) receptor analogue	exenatide	2006 Q4	2008 Q2	2007 Q2	2008 Q1	2007 Q2	2008 Q4	2007 Q2	2007 Q2
	liraglutide	2009 Q2	2010 Q2	2009 Q3	2010 Q3	2009 Q4	2011 Q3	2010 Q1	2009 Q3
	lixisenatide	2013 Q1		2013 Q1	2014 Q1	2013 Q2	2013 Q3	2015 Q1	2013 Q1
	dulaglutide	2014 Q4	2016 Q1	2015 Q1	2016 Q1	2015 Q2	2015 Q4	2015 Q2	2015 Q1
	albiglutide	2014 Q1			2014 Q4		2015 Q2		2016 Q2
	semaglutide	2018 Q1s	2019 Q2	2019 Q2	2019 Q3	2018 Q3	2019 Q2	2018 Q4	2018 Q4

Note: Dark blue cells refer to products not available in the given country. Grey cells refer to products removed from the analysis since the first registered sale happened only after a generic entered the market.
Source: Authors based on IQVIA MIDAS™ database.

Despite the market entry of therapeutic alternatives, countries experienced significant price increases

30. For most countries, prices of therapeutic alternatives within a class tended to follow a pattern, with prices of follow-on products generally higher at market entry than those of the first-in-class products. Summary statistics in Annex B of the Supplementary Material show that average (and median) prices of first-in-class products were lower than those of follow-on products for all therapeutic classes, except for GLP-1 analogues for all seven countries in the study, while DOACs and insulin analogues did not show a consistent trend across countries, suggesting that prices have increased over time, even with multiple entrants in the class. These results hold even when the analysis is disaggregated by sector (see Annex B in the Supplementary Material). These trends are illustrated in Figure 2.3, which shows the relative average price[15] in the six therapeutic classes. The different colour-shaded areas illustrate the successive market

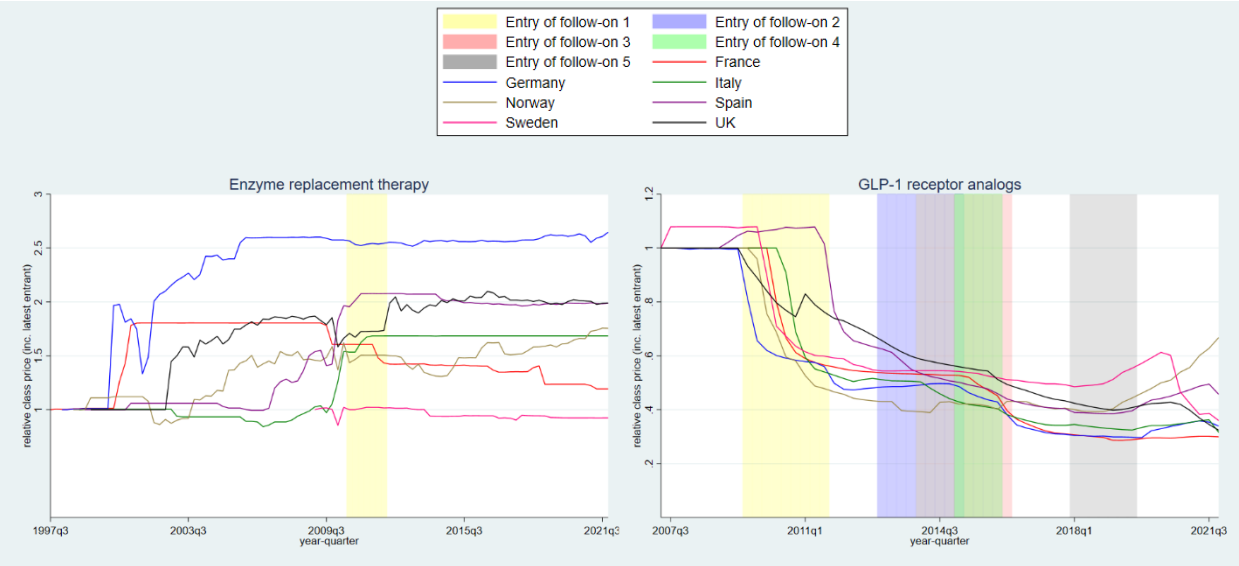
[15] The average price is a normalised price using the price of the first available quarter as the base quarter.

entrants ranked in order of arrival on the market (e.g. the entry of the first follow-on product 1 in a given class in yellow; the second in blue; etc). The width of each shaded area illustrates the variation across countries in time to entry of subsequent entrants in the class. In some classes, the timing of entry of successive product alternatives overlaps across countries. For example, in the class of GLP-1 receptor analogues successive therapeutic alternatives entered at different times across the seven countries making colour-shaded areas in blue, red and green overlap. Likewise, in the class of PARP inhibitors two therapeutic alternatives entered at different times across the seven countries making colour-shaded areas in yellow and blue overlap, while the average price of product alternatives increased significantly over time. More specifically, between 2015 and 2021 the average aggregate[16] price of the class increased four-fold and six-fold in Norway and the United Kingdom respectively.

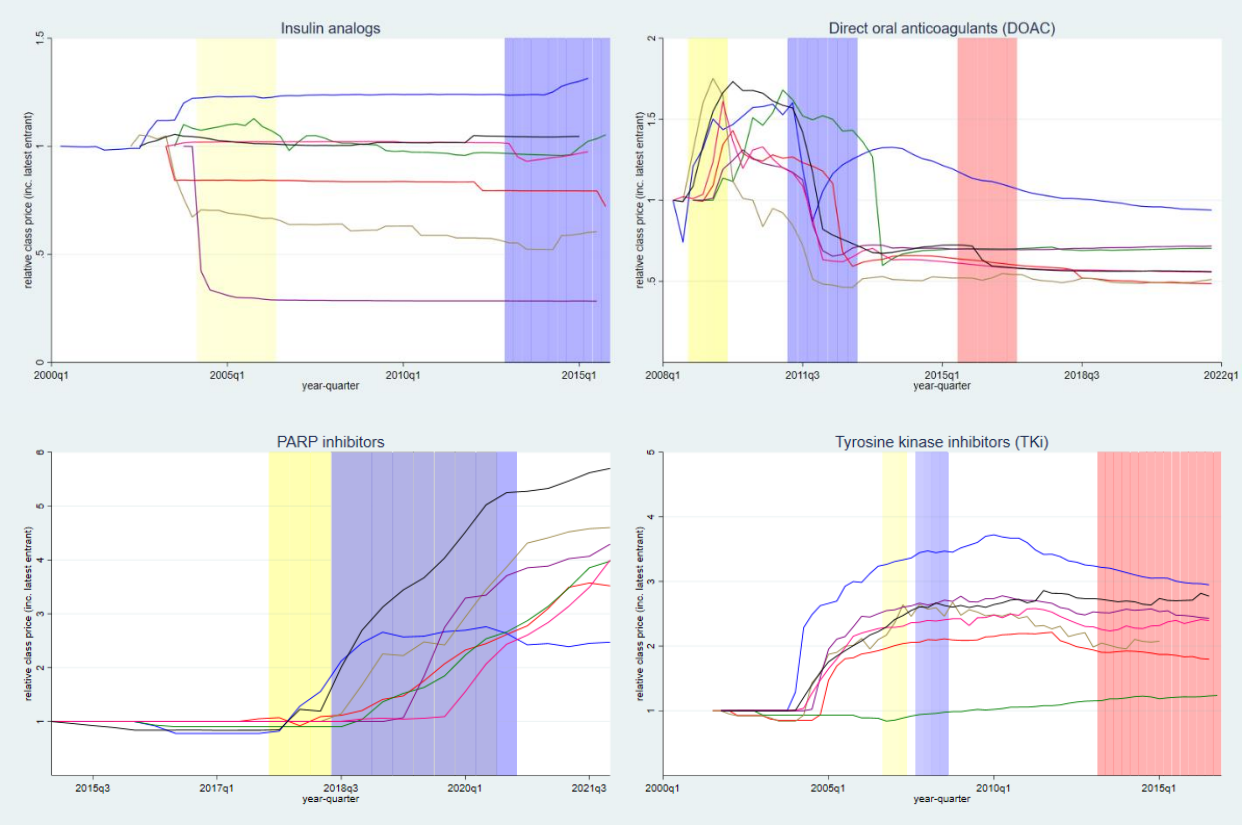
31. Other classes showed similarly significant price increases despite the market entry of therapeutic alternatives. For example, between 2001 and 2016 average prices for tyrosine kinase inhibitors (TKI) increased three-fold in Spain and Sweden, despite the entry of three alternatives to the market. Even in cases where there was an overall decrease in the average price of the class, such as with the DOACs, there were periods in which relative prices were increasing despite the entry of new alternatives.

Figure 2.3. Multiple entrants in a class did not necessarily lead to price reductions

The following series of graphs show average product prices and the variation in time to entry of subsequent entrants in the class for selected therapeutic classes and countries, beginning at the time of market entry of the first-in-class.



[16] To obtain the aggregate price per product, sales data for a given product were first aggregated using weighted averages, assigning weights based on the quarterly market shares of the different products within each therapeutic class. Then, to obtain a price per class, a weighted price of all therapeutic alternatives was calculated.



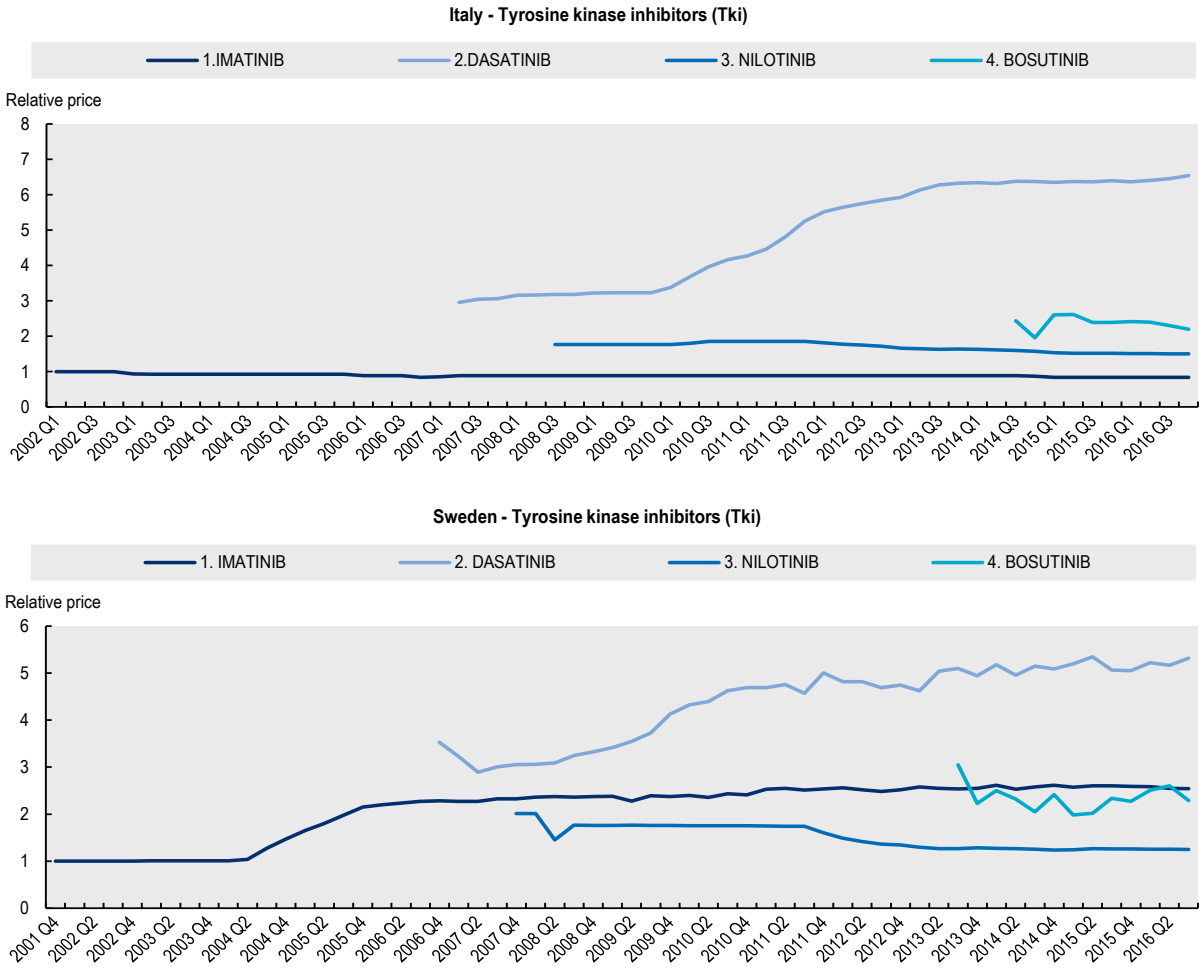
Note: Prices are displayed as relative prices using the initial price for the first-in-class product as a base. Prices are weighted averages with assigned weights based on the quarterly volume shares of different products within the therapeutic class of each class. Because of cross-country differences in the timing of market entry and the range of products available, the entry of a product in one country can overlap with the entry of the following product in another, this is illustrated by the overlapping shaded areas in the graphs for GLP-1 and PARP inhibitors.
Source: Authors based on IQVIA MIDAS™ database.

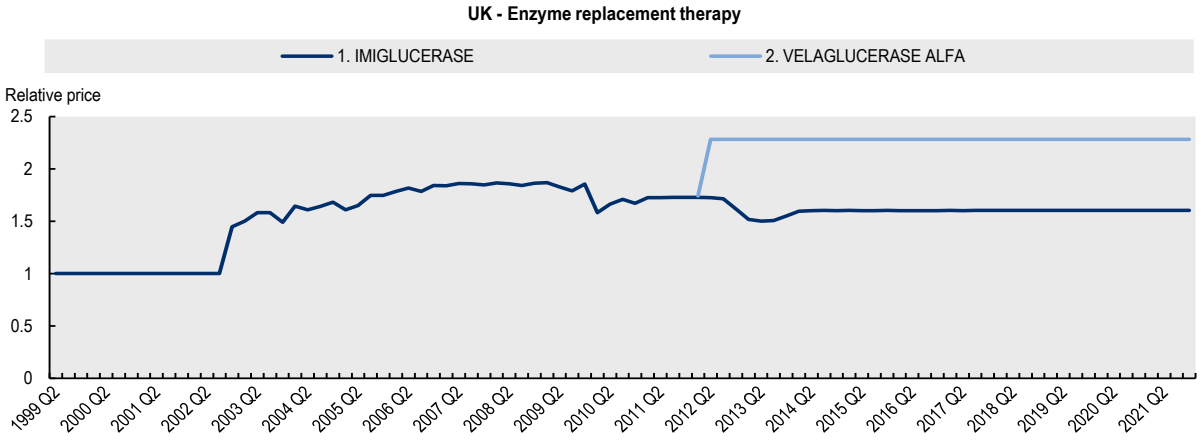
32. Notably, the therapeutic alternative with the lowest price in one country is not necessarily the lowest priced product in all countries. These variations are illustrated in Figure 2.4, which compares, across selected countries, the relative prices of the alternatives available in three therapeutic classes[17].For example, in the class of tyrosine kinase inhibitors (TKI), while the first-in-class product *imatinib* was the molecule with the lowest price in Italy, in Sweden *nilotinib* was the lowest-priced alternative. These variations in price rankings were also found in other therapeutic classes such as PARP inhibitors - where *olaparib* was the lowest-priced alternative in Italy but not in Germany. Moreover, in the class of enzyme replacement therapies (ERT) while the first-in-class product *imiglucerase* was the lowest-priced alternative in the UK market, the second-in-class *velaglucerase alfa* was the lowest-priced option in Spain throughout the period of analysis.

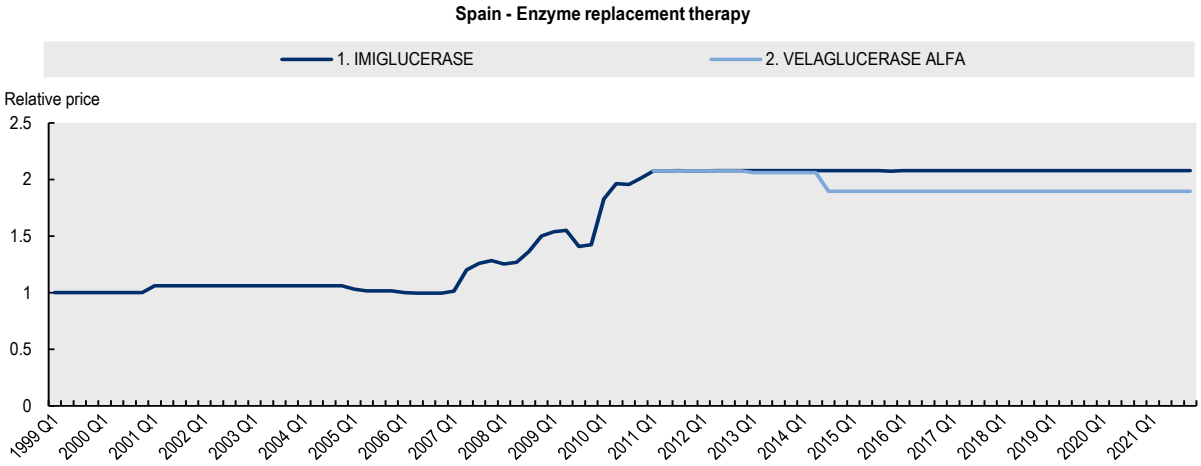
[17] The average price is a normalised price using the price of the first available quarter as the base quarter.

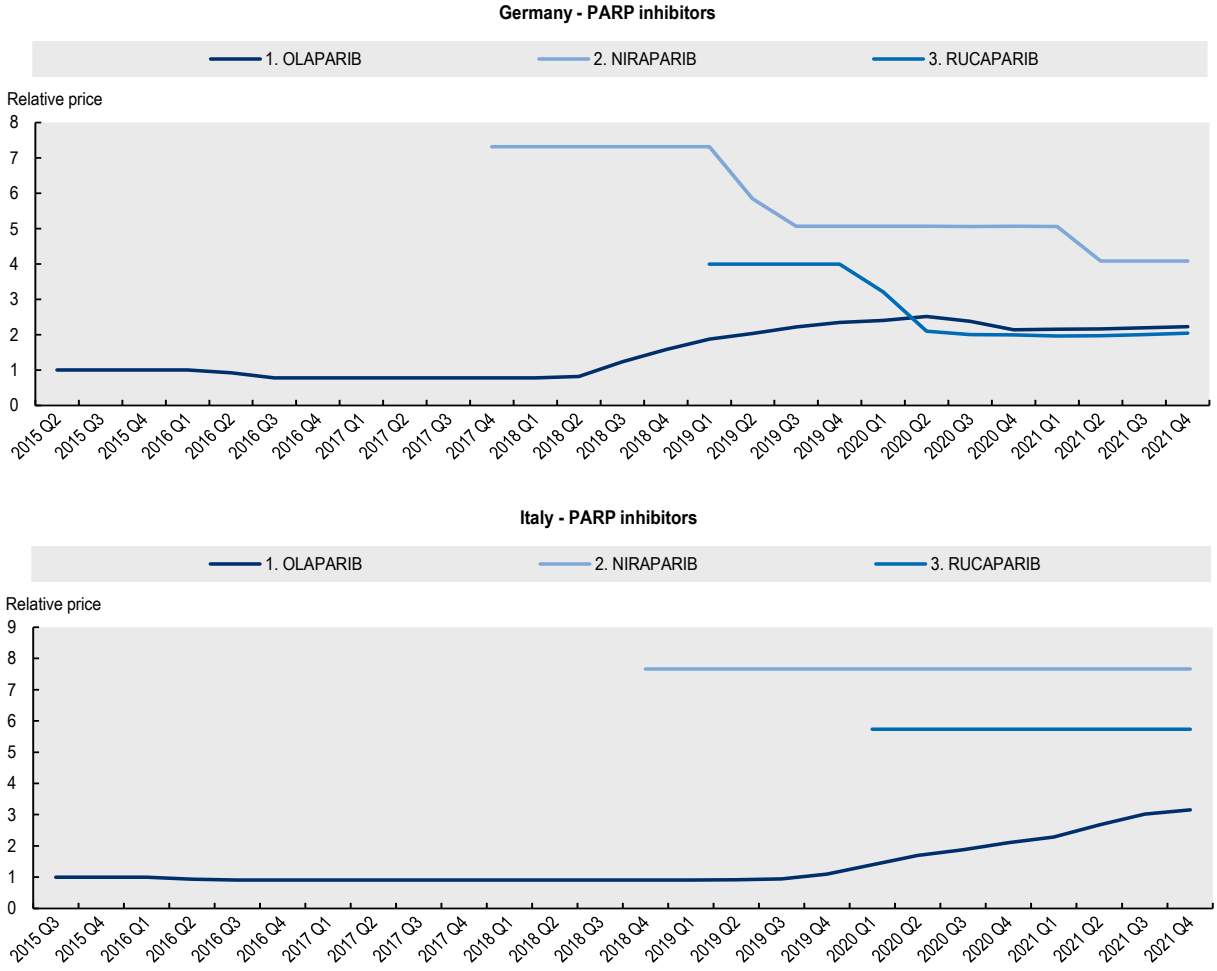
Figure 2.4. Price rankings of therapeutic alternatives within a class differ across countries

The following series of graphs show relative average product prices for selected therapeutic classes and countries, beginning at the time of market entry of the first-in-class (whose price is set to 1).




UK - Enzyme replacement therapy
1. IMIGLUCERASE
2. VELAGLUCERASE ALFA
Relative price
2.5
2
1.5
1
0.5
0
1999 Q2
2000 Q2
2001 Q2
2002 Q2
2003 Q2
2004 Q2
2005 Q2
2006 Q2
2007 Q2
2008 Q2
2009 Q2
2010 Q2
2011 Q2
2012 Q2
2013 Q2
2014 Q2
2015 Q2
2016 Q2
2017 Q2
2018 Q2
2019 Q2
2020 Q2
2021 Q2


Spain - Enzyme replacement therapy
1. IMIGLUCERASE
2. VELAGLUCERASE ALFA
Relative price
2.5
2
1.5
1
0.5
0
1999 Q1
2000 Q1
2001 Q1
2002 Q1
2003 Q1
2004 Q1
2005 Q1
2006 Q1
2007 Q1
2008 Q1
2009 Q1
2010 Q1
2011 Q1
2012 Q1
2013 Q1
2014 Q1
2015 Q1
2016 Q1
2017 Q1
2018 Q1
2019 Q1
2020 Q1
2021 Q1



Source: Authors based on IQVIA MIDAS™ database.

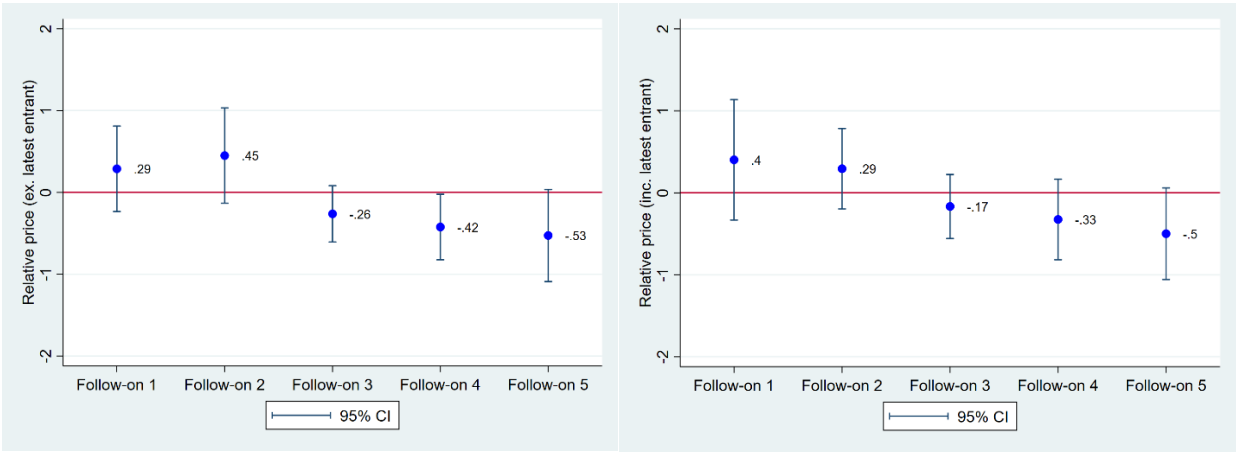
In aggregate, there was no evidence of price competition with fewer than five therapeutic alternatives in the market

33. According to econometric analyses pooling all countries and all therapeutic classes, therapeutic alternatives did not consistently exert price competition on first-in-class products. The presented analysis suggests that the market entry of therapeutic alternatives did not prompt significant price reductions of first-in-class products. Figure 2.5 shows the coefficients obtained from the results of the regression analyses for Model 1 and 2 (outlined in detail in Annex B of the Supplementary Material). As the confidence intervals overlap zero, the analysis suggests that follow-on products did not exert significant price competition on first-in-class products. For example, as shown in Figure 2.6 (and combined with detailed descriptive statistics at country level in Annex B of the Supplementary Material), across the countries studied, the average price of the first-in class PARP inhibitor increased considerably even after two therapeutic alternatives entered the market. A similar dynamic was observed with TKI inhibitors, where all countries except Italy experienced a price increase in the first-in-class product even with the entry of two alternatives. For the enzyme replacement therapies (ERT), the price of the first-in-class product *imiglucerase* remained unchanged even after the entry of *velaglucerase alfa*. Insulin analogues showed convergence in the prices of the two therapeutic alternatives in all countries except Italy, where the price of the first-in-class product declined over time.

34. In addition, the analysis suggests that only markets with five or more therapeutic alternatives within a class – in this study only the GLP-1 class – showed some significant level[18] of price competition. These results must be interpreted with caution as the analysis is based on a necessarily very limited sample[19] which will naturally have consequences for the statistical power of the estimates. However, while this finding cannot be extrapolated, similar evidence of heterogeneous competition dynamics in on-patent markets has been described in the literature (as discussed in Section 1.).

Figure 2.5. Alternatives did not consistently exert price competition

Estimated correlation of the effect of market entry of follow-on products on relative prices across therapeutic areas, 1997q4 and 2021q4



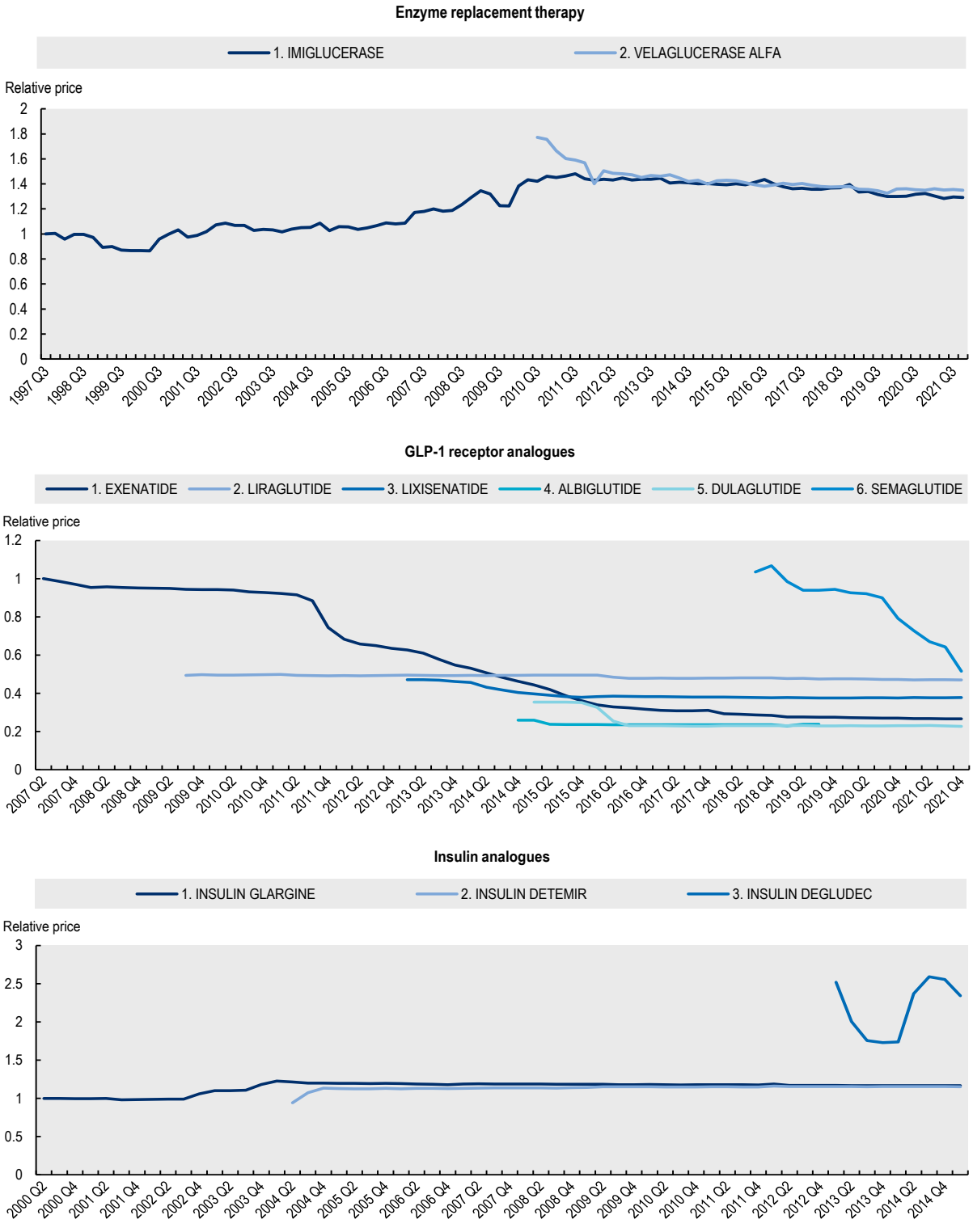
Note: The graphs display the coefficients obtained from the estimation of Model 1 (left) and 2 (right). The coefficients represent the effect associated with the entry of each additional follow-on product on the normalised class price, taking into account the price of the latest entrant (Model 2) or not (Model 1). The arrows illustrate the 95% confidence interval, meaning that when it overlaps with the 0 line, the coefficient is not statistically significant at the 95% level.
Source: Authors based on IQVIA MIDAS™ database.

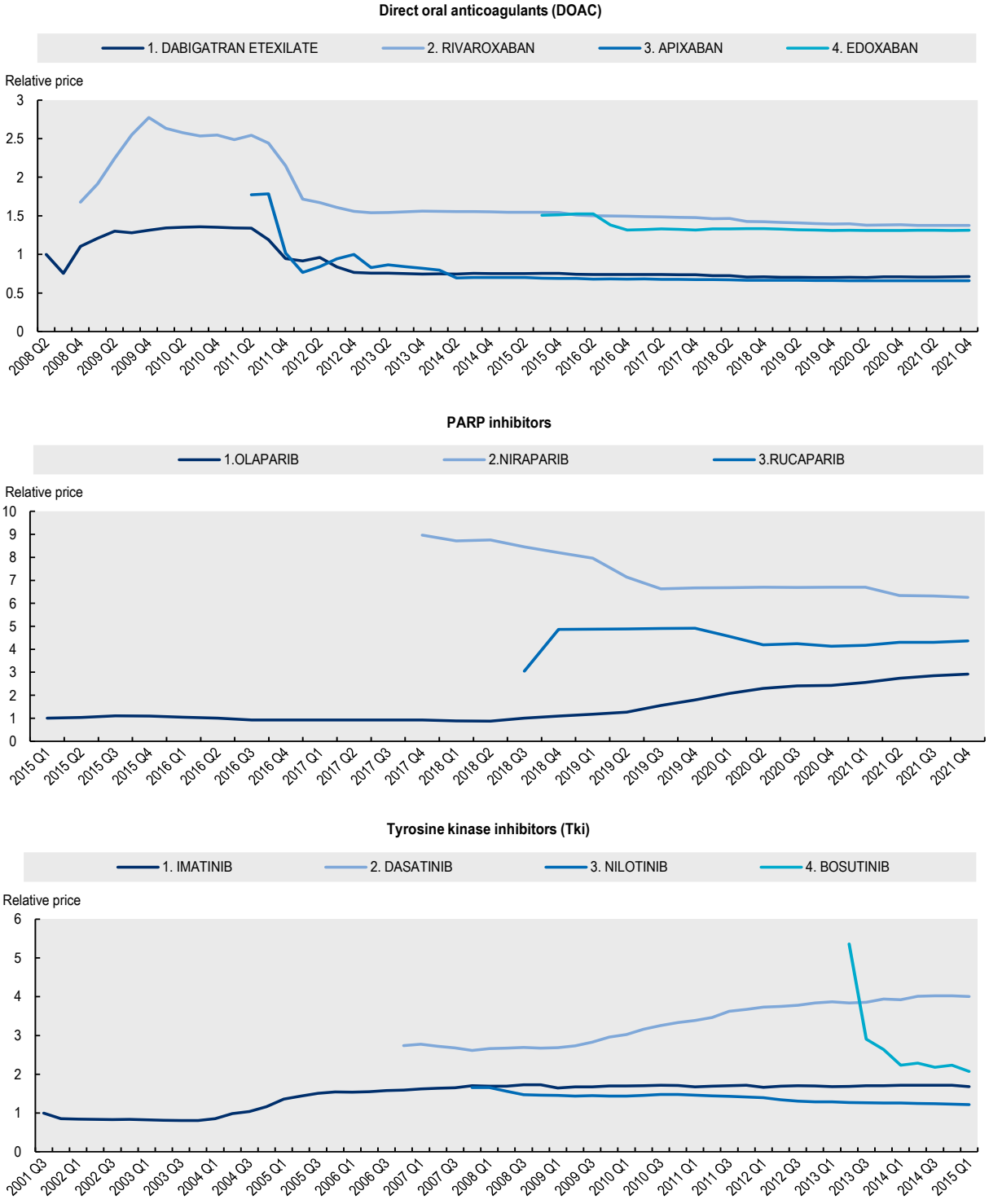
[18] As shown in column (C) of Table A B.13 of the Supplementary Material, for Model 1, the coefficient for the 4th follow-on product is significant at the 95% level, while the 5th follow-on is only significant at the 90% level. For Model 2, only the coefficient for 5th follow-on is significant at the 90% level.

[19] More specifically, the coefficients for the 4th and 5th follow-on products are based on one therapeutic class, namely GLP-1.

Figure 2.6. Prices of first-in-class products do not respond to potential competition from later entrants

The following series of graphs show relative average product prices of subsequent entrants in the class, numbered by order of market entry, starting at the time of market entry of the first-in-class.



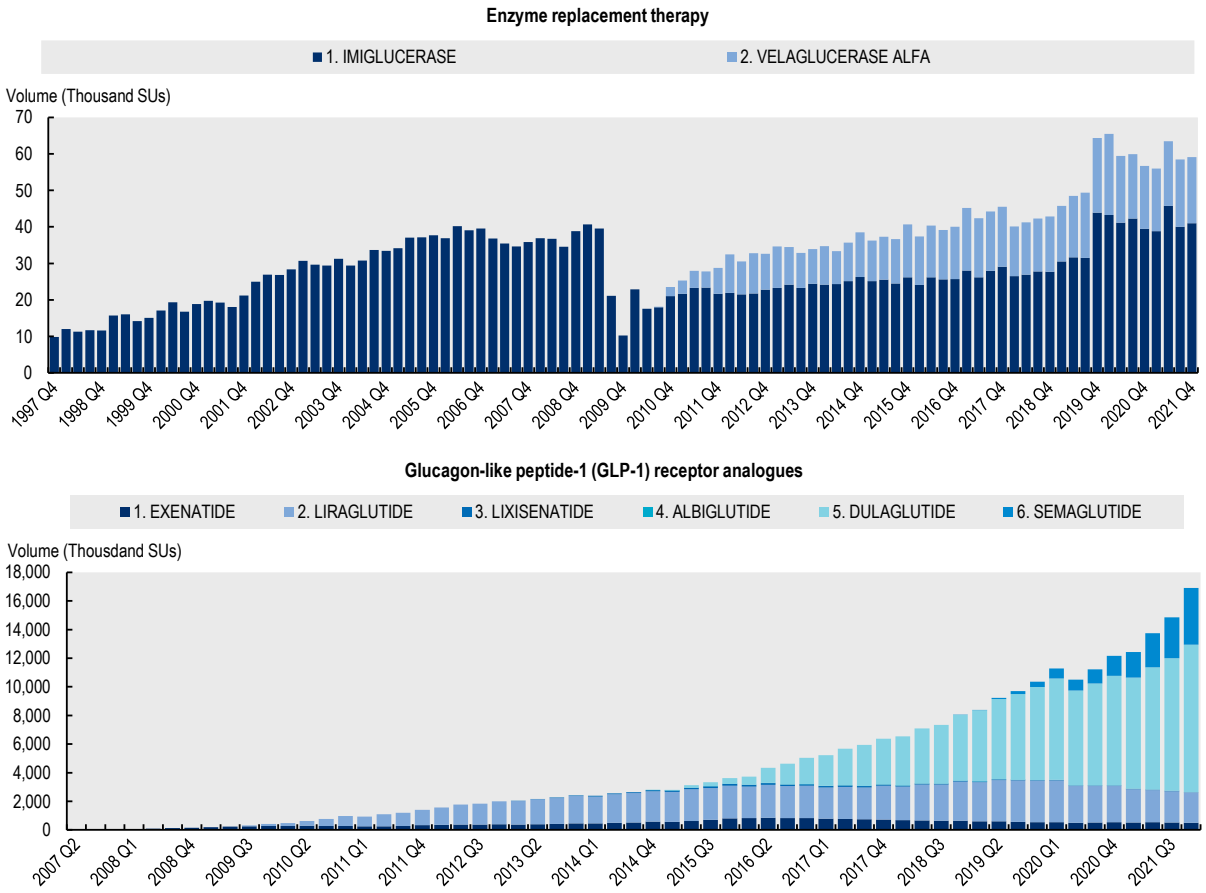


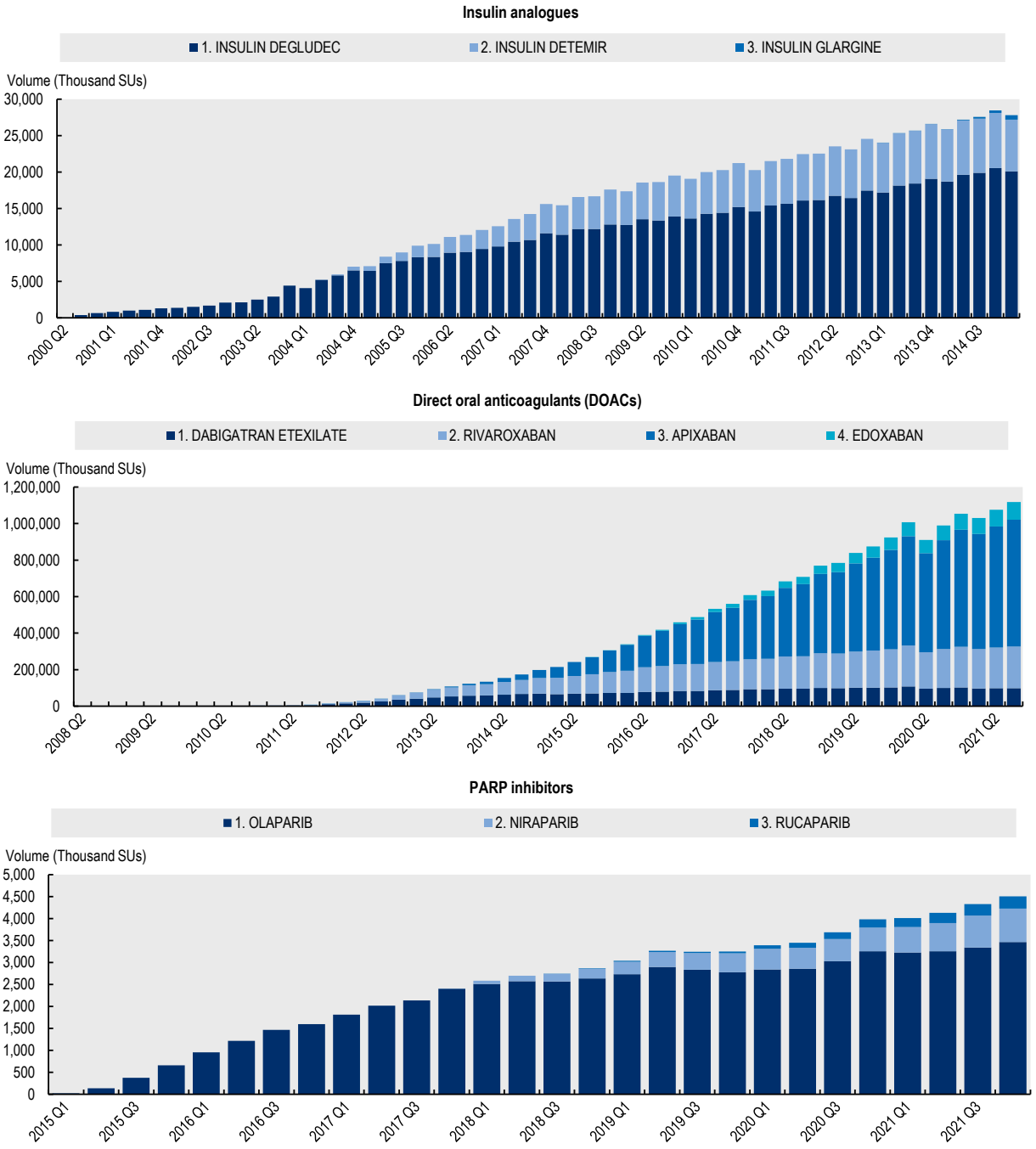
Note: Prices are displayed as relative prices using the initial price for the first-in-class product as a base. Prices are weighted averages with assigned weights based on the quarterly volume shares of different products within the therapeutic class of each class.
Source: Authors based on IQVIA MIDAS™ database.

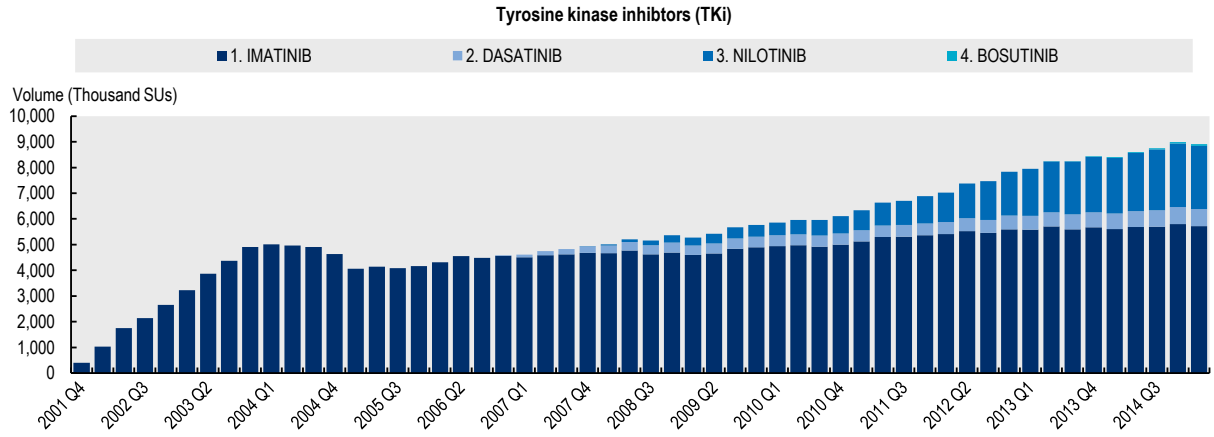
Rather than crowding out the market of the first-in-class, later entrants appear to drive market expansion

35. Later entrants were observed to acquire market share without any decrease in sales of the first-in-class product. This was observed regardless of whether new entrants set a higher or lower price than that of the first-in-class product. This can be seen in Figure 2.7 which shows quarterly volumes sold for each therapeutic class aggregated across countries. Moreover, Figure 2.8 shows the coefficients obtained from the results of the regression analyses for Model 3 (presented in detail in Annex B of the Supplementary Material). Because the confidence intervals overlap zero this analysis suggests that the number of products in a therapeutic class do not (statistically) significantly impact volumes (panel 1) or sales (price x volume) (panel 2) of the various product alternatives i.e. an increase in the number of competitors does not affect neither volumes nor sales of the product alternatives within a given therapeutic class. Similar results can be observed when disaggregating the analysis by sector (see results in Annex B in the Supplementary Material). The growth in volumes/sales may be the result of changes in reimbursement or coverage policies or modifications to prescribing guidelines or treatment protocols or may simply reflect that the market for the therapeutic class in question had not reached a steady state prior to the arrival of the later entrants.

Figure 2.7. Volumes for the selected six therapeutic classes, 1997q4 and 2021q4



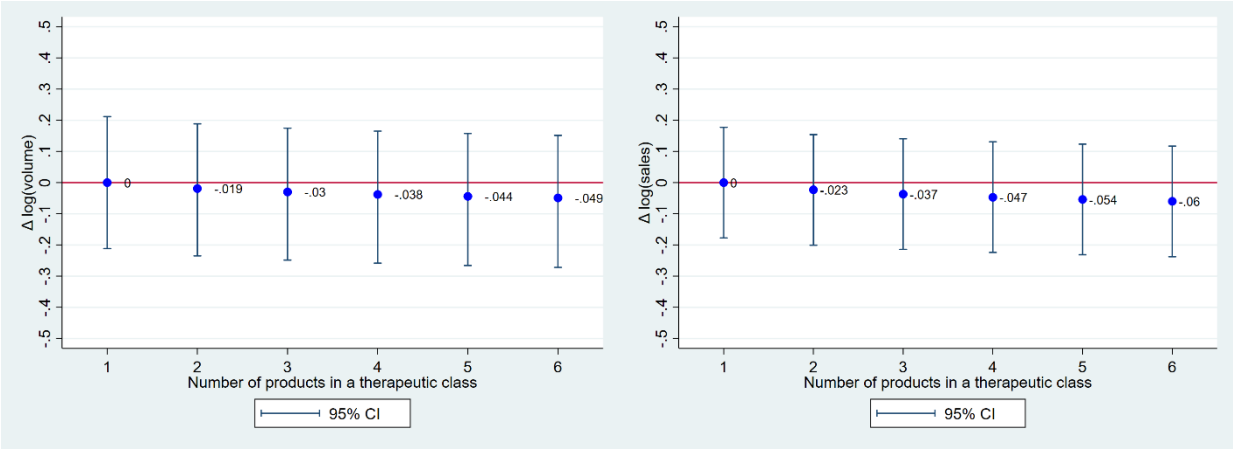

Insulin analogues
1. INSULIN DEGLUDEC
2. INSULIN DETEMIR
3. INSULIN GLARGINE
Volume (Thousand SUs)
30,000
25,000
20,000
15,000
10,000
5,000
0
2000 Q2
2001 Q1
2001 Q4
2002 Q3
2003 Q2
2004 Q1
2004 Q4
2005 Q3
2006 Q2
2007 Q1
2007 Q4
2008 Q3
2009 Q2
2010 Q1
2010 Q4
2011 Q3
2012 Q2
2013 Q1
2013 Q4
2014 Q3
Direct oral anticoagulants (DOACs)
1. DABIGATRAN ETEXILATE
2. RIVAROXABAN
3. APIXABAN
4. EDOXABAN
Volume (Thousand SUs)
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
2008 Q2
2009 Q2
2010 Q2
2011 Q2
2012 Q2
2013 Q2
2014 Q2
2015 Q2
2016 Q2
2017 Q2
2018 Q2
2019 Q2
2020 Q2
2021 Q2
PARP inhibitors
1. OLAPARIB
2. NIRAPARIB
3. RUCAPARIB
Volume (Thousand SUs)
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
2015 Q1
2015 Q3
2016 Q1
2016 Q3
2017 Q1
2017 Q3
2018 Q1
2018 Q3
2019 Q1
2019 Q3
2020 Q1
2020 Q3
2021 Q1
2021 Q3



Source: Authors based on IQVIA MIDAS™ database.

Figure 2.8. The number of alternatives did not affect the market trends in either volumes or sales within a given therapeutic class

Estimated correlation of the effect of market entry of follow-on products on the growth rate of product volumes and sales across therapeutic areas, throughout the period of analysis (1997q4 and 2021q4)



Note: The figures illustrate the predicted change in the growth rate of a product's sales (in terms of volume(left) and value(right)), as the number of therapeutic alternatives in the product's class increases. These predictions were calculated using the coefficients from Model 3 presented in detail in Annex B of the Supplementary Material and multiplying them by the log number of products available in the given class. The arrows show the 95% confidence interval, meaning that when these overlap with the red 0 line, the estimates are not statistically significant at the 95% confidence level.
Source: Authors based on IQVIA MIDAS™ database.

36. To conclude, this analysis found no clear evidence of price competition in any of the selected classes with fewer than five entrants. Over the period of the analysis, prices of follow-on products were often higher than those of first-in-class products and later entrants were also observed to acquire market share without compromising sales of the first-in-class product. One possible interpretation is that price competition is not the default dynamic resulting from successive market entrants unless policy settings are designed to promote it.

37. However, the findings of this analysis should be interpreted with caution given the limitations of both the methods and the quantum of available data:

- First, this analysis is based on “list” prices. Pricing data provided from the IQVIA MIDAS™ database do not reflect actual transaction prices, as they do not take into account confidential discounts and ex-post rebates negotiated between payers and manufacturers, or the impact of price-volume arrangements. In recent decades, actual transaction prices paid by purchasers are increasingly disconnected from list prices, in part the result of the proliferation of confidential agreements between manufacturers and health care payers (Barrenho and Lopert, 2022[48]; Wenzl and Chapman, 2019[49]). As discussed in Section 3, payers in the selected countries make extensive use of managed entry agreements (see Table A B.2 for more detailed information);
- Second, this analysis cannot determine whether the market growth observed in certain products/classes is non-steady state growth that would occur irrespective of the arrival of later entrants or other confounding effects, such as changes in reimbursement or coverage policies or to the evolution of clinical practice;
- Finally, it is not possible to discern a causal relationship between changes in prices/volumes and the entry of successive product alternatives as it is not possible to compare the observed changes with an appropriate counterfactual i.e. a control group comparable in every aspect to the selected classes and countries in analysis except for the dynamics of market entry.

3 Review of policies potentially affecting on-patent competition

38. The second part of the analysis examined the prevailing pricing, coverage and procurement policies in a subset of EU member states and OECD countries and attempted to identify potential opportunities and approaches for promoting 'on-patent' competition.

3.1. Scope and data

39. The analysis drew on two sources of data:

- A country survey on current pricing, coverage and procurement practices for on-patent products in OECD countries and non-OECD EU member states. The survey was circulated to 42 countries during spring 2022. Section 3.3 outlines the main findings of the survey data from 35 responding countries (OECD member countries: Australia, Austria, Belgium, Canada, Colombia, Costa Rica, Czech Republic, Denmark, Estonia, France, Finland, Germany, Greece, Iceland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Poland, Portugal, Netherlands, New Zealand, Norway, Slovenia, Spain, Sweden, Switzerland, United Kingdom, USA; non-OECD EU member states: Bulgaria, Cyprus, Romania, and Malta). See Annex C of the Supplementary Material for detailed analysis of the survey responses.
- In-depth policy reviews of ten countries (the seven countries included in the quantitative analysis and three non-EU OECD member countries: Colombia, Israel, and New Zealand). The policy reviews drew on pricing, procurement and reimbursement country briefs published by the European Medicine Price Database (EURIPID)[20], as well as those produced by the Pharmaceutical Pricing and Reimbursement (PPRI) Network[21]; prior OECD publications; and websites of national ministries and government agencies involved in the pricing and coverage of medicines. Section 3.3 discusses the insights derived from these policy reviews.

3.2. Methods

40. The analysis maps national pricing, coverage, prescribing and procurement processes in each country with a view to identifying those features that are considered relevant to supporting competition between patented products. Table 3.1 sets out the types of questions included in the survey.

[20] See https://euripid.eu/

[21] See https://ppri.goeg.at/ppri_pharma_profiles

Table 3.1. Types of questions included in the country survey

Therapeutic Alternatives	*Is there a process to evaluate and establish the equivalence of therapeutic alternatives for a given condition or between medicines in a given class?*
	If so, are the results of the evaluation used in the process to determine pricing and coverage by the principal health insurance/ coverage scheme?
	Are the results used to influence prescribing?
Pricing	*Is price or cost effectiveness used to influence prescribing?* *Do prescribers have financial or other incentives to give preference to cheaper / more cost-effective products?*
	Are prices in the sector regulated or determined freely between sellers and buyers?
	Which type of constraint does regulation impose? *Can sales/purchase prices deviate from the regulated price?*
	On what basis are regulated prices determined? *Do they take into account prices of therapeutic alternatives?*
	Can a regulated price be changed once determined?
	If purchase prices can deviate from the regulated price, do buyers have financial incentives to buy medicines at prices below the regulated price? *Do sellers have incentives to discount in the supply chain?*
Coverage	*On what basis is coverage determined?* *Do decisions take into account product prices and prices of therapeutic alternatives?*
	Can coverage be declined for products whose prices are considered too high?
	Are there mechanisms to give preference in coverage to cheaper or more cost-effective products?
Procurement	*What, if any, mechanisms are used to encourage price competition between treatment alternatives?*

Note: Annex C of the Supplementary Material develop in detail the analysis of the country survey responses. Source: Authors

3.3. Key findings

41. There were three principal findings from this analysis:

1. Most countries make assessments of comparative effectiveness of product alternatives; however, the extent to which they are used to inform policy varies widely and they are not necessarily deployed to promote on-patent competition;
2. Countries use a range of mechanisms to encourage prescribing of preferred products, but it is unclear how or how well they encourage on-patent competition; and,
3. Tendering is increasingly being used to procure medicines, however the practice is not generally applied to encourage competition between on-patent medicines.

Most countries make assessments of comparative effectiveness of product alternatives; however, their use in informing policy varies widely

42. OECD health systems are increasingly assessing the comparative effectiveness of novel medicines against appropriate comparators (OECD, 2018[2]). Data from the OECD Survey on On-patent Competition 2022 showed that 30 of 35 respondent countries (except Costa Rica, Denmark, Japan, Romania and the United States) routinely compare effectiveness of therapeutic alternatives to treat a given condition (Figure A C.1 of the Supplementary Material), and with the exception of six countries (Bulgaria, Colombia, Cyprus, Poland, Slovenia, and the Netherlands) may also compare the effectiveness of medicines in different therapeutic classes (Figure A C.2 of the Supplementary Material). If considered together with costs, information on comparative effectiveness can potentially increase efficiency and value in pharmaceutical spending through the promotion of on-patent competition (OECD, 2018[2]).

43. However, the use of information on comparative effectiveness of product alternatives to inform policy varies widely. While most countries use this information to support coverage and pricing decisions of the principal coverage programme (with the exception of France, Germany, and Iceland) or to support price negotiations (with the exception of Greece, Israel, Portugal, Switzerland and the UK), a smaller group of countries uses this information to inform procurement of medicines or guide prescribing decisions (Table 3.2). Twenty-two of the responding countries (out of 34[22]) reported using information on prices of therapeutic alternatives to make coverage and pricing decisions, and only Germany and Norway use this information to guide prescribing decisions. Thus, it remains unclear the extent to which countries use the identification of therapeutic alternatives to promote on-patent competition.

Table 3.2. Objectives for undertaking comparative effectiveness analysis

Country/Objectives	To determine coverage or pricing decisions	To support procurement	To support price negotiations	To support prescribing decisions
Australia	✓		✓	
Austria	✓		✓	
Belgium	✓		✓	
Canada[1]	✓	✓	✓	
Colombia	✓	✓	✓	
Czech Republic	✓		✓	
Estonia	✓	✓	✓	
Finland	✓	✓	✓	
France			✓	
Germany			✓	✓
Greece	✓	✓		
Iceland		✓	✓	
Israel	✓			
Italy	✓	✓	✓	
Korea	✓	✓	✓	
Latvia	✓	✓	✓	
Lithuania	✓	✓	✓	
Netherlands	✓		✓	
New Zealand	✓	✓	✓	
Norway	✓	✓	✓	✓

[22] The 22 countries are: Australia, Austria, Belgium, Cyprus, Czech Republic, Estonia, Finland, France, Germany, Iceland, Italy, Japan, Korea, Lithuania, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland, United Kingdom, and United States (see Figure A C.9 in Annex C of the Supplementary Material).

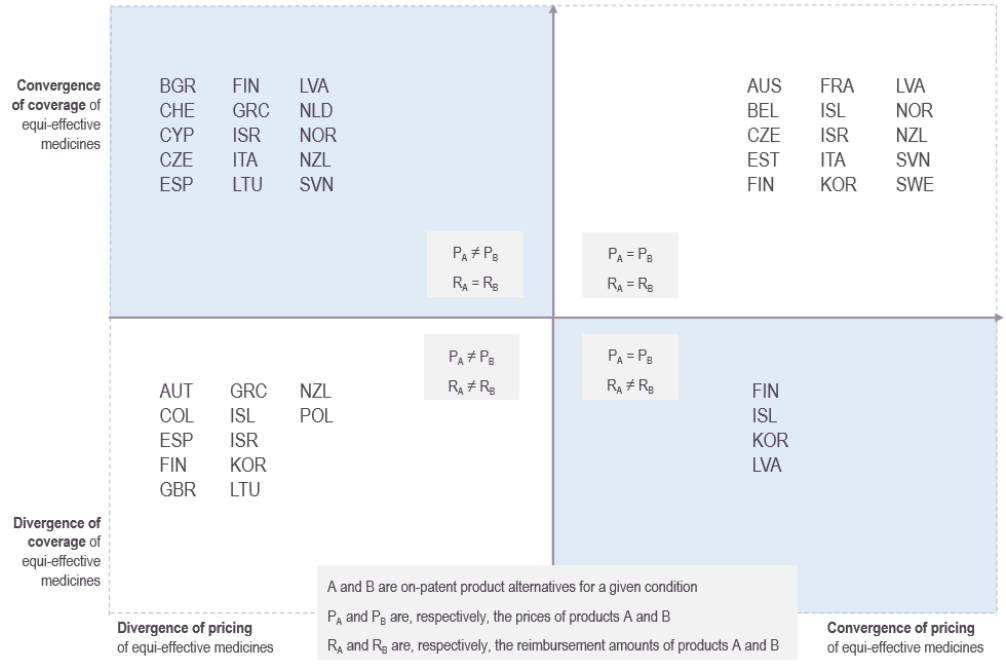
Poland	✓		✓	
Portugal	✓			
Slovenia	✓		✓	
Spain	✓	✓	✓	
Sweden	✓	✓	✓	
Switzerland	✓			
United Kingdom	✓	✓		
Non-OECD countries				
Bulgaria	✓	✓	✓	
Cyprus	✓	✓	✓	
Malta	✓	✓	✓	
Total (yes: count)	***27***	***18***	***25***	***2***

Note: 1. In Canada, assessment results are used to ensure list price is non-excessive.
Source: OECD Survey on On-Patent Competition, 2022.

44. Moreover, in many countries therapeutic alternatives may be subject to different coverage and pricing conditions. Twenty-one (of 35) respondent countries reported that they may price and/or reimburse equi-effective products differently (Figure 3.1). Countries either pay different prices for equi-effective products (countries in the superior and inferior left quadrants of Figure 3.1 i.e. Austria, Bulgaria, Colombia, Cyprus, Czech Republic, Finland, Greece, Iceland, Italy, Israel, Korea, Latvia, Lithuania, New Zealand, Norway, Netherlands, Poland, Slovenia, Spain, Switzerland, and United Kingdom) or apply different coverage and reimbursement rules to equi-effective products priced equivalently (countries in the inferior left and right quadrants of Figure 3.1, i.e. Finland, Israel, Latvia, Korea). Pricing and coverage decisions are however the culmination of various overlaying price regulations[23] (Figure A C.5 in the Supplementary Material) that shape how on-patent products compete (see discussion in Section 1.3). The ten country case studies detail *inter alia* the mix of policies established to regulate prices and condition reimbursement rules. These include direct price regulations (e.g. expenditure caps, statutory pricing, rebates), external reference pricing (ERP), and internal reference pricing (IRP) among other instruments. The approaches used in these ten countries are set out in Table A B.2.

[23] Except for Costa Rica, Denmark, Malta, New Zealand and the United States where there is no direct price regulation of medicines (for more details see Figure A C.5 in the Supplementary Material).

Figure 3.1. Pricing and reimbursement of equi-effective medicines



Source: OECD survey on On-patent competition, 2022.

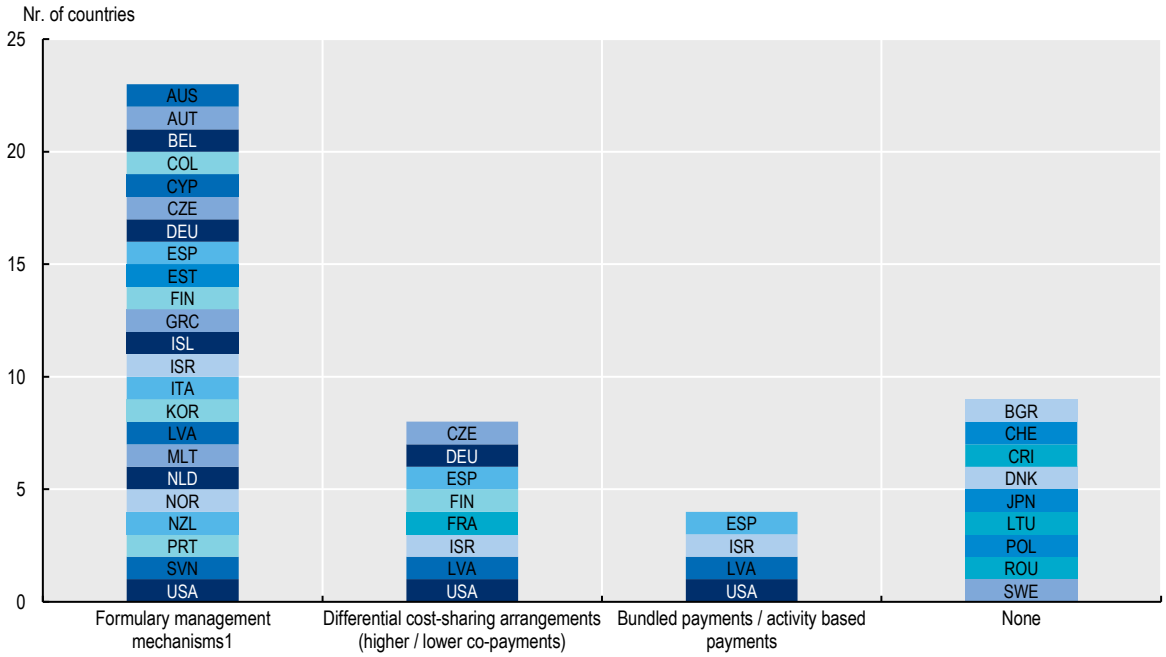
Countries use a range of mechanisms to encourage prescribing of preferred products, but the extent to which they encourage on-patent competition is unclear

45. All but 9 of the countries that responded to the OECD Survey on On-Patent Competition 2022 reported having prescribing and dispensing mechanisms in place to encourage the use of certain products *vis a vis* others[24] (Figure 3.2). Countries reported using a variety of mechanisms including tiered benefits/co-payments, 'fail-first' protocols and treatment algorithms, and prior authorisation requirements to promote the use of certain medicines (Figure 3.2). Among the ten case studies, there was a mix of prescribing policies that include mandatory or recommended prescribing, formulary management[25], use of prescribing budgets or target volumes, and other mechanisms for influencing prescribing (Table 3.3). For example, in Italy, hospitals develop drug formularies that list the medicines to be used by public entities for in-patients; listing is according to several criteria including efficacy and safety. The lists are developed at regional level and may thus differ across the country (Selletti, Putignano and Tiboni, 2022[50]; Prada et al., 2020[51]; Vogler, 2021[52]). In addition, some countries use either differential cost-sharing arrangements (i.e. variable co-payments) (the Czech Republic, Finland, France, Germany, Israel, Latvia, Spain, and the United States) or bundled/activity-based payments (Latvia, Israel, Spain and the United States) to promote the use of certain medicines (Figure 3.2). For example, in France, patients must pay a prescription fee plus a percentage co-payment (often referred to as co-insurance) that is determined by the assessed degree of therapeutic benefit. Depending on their assessed medical value (SMR rating), outpatient medicines are reimbursed at 65%, 30%, or 15% for high, moderate and low-value medicines respectively, while medicines for certain life-threatening and chronic diseases are fully reimbursed (Rahman, 2019[53]; Impact HTA, 2019[54]; Vogler, 2020[55]).

[24] The 9 countries are Bulgaria, Costa Rica, Denmark, Japan, Lithuania, Poland, Romania, Sweden, and Switzerland

[25] For definitions on formulary management mechanisms, please see Box 1.3 in section 1.3.

Figure 3.2. Mechanisms used to encourage use of certain products *vis a vis* others

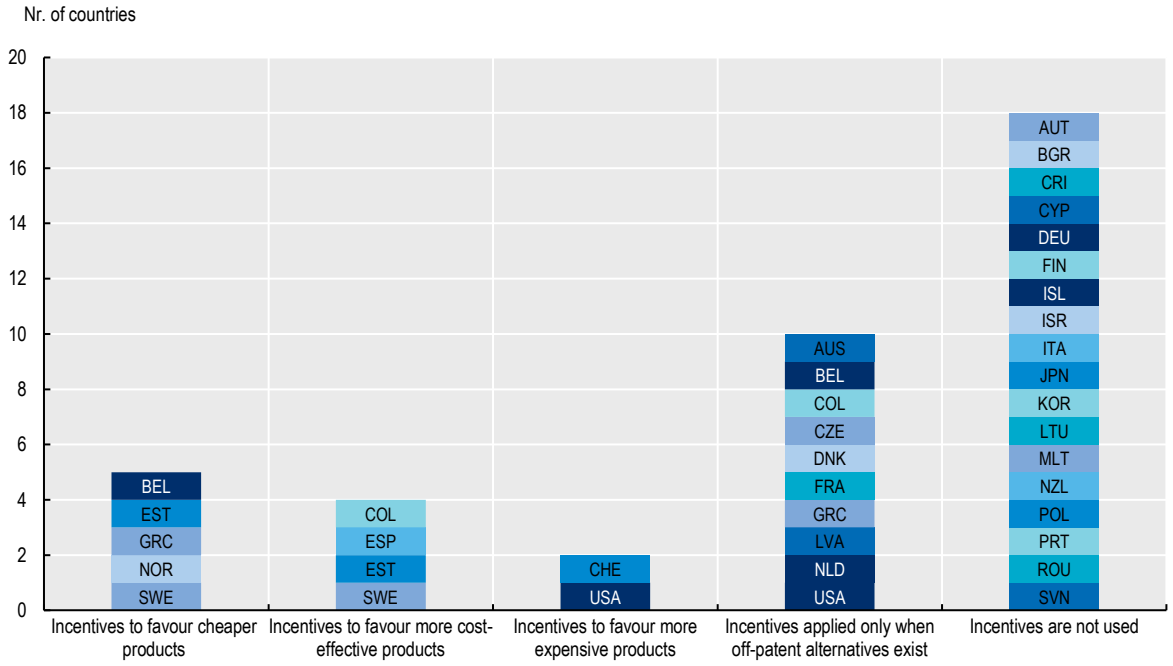


Note: 1. Formulary management mechanisms can include tiered benefits, 'fail-first' protocols and treatment algorithms, and prior authorisation requirements; 2. In Belgium, reimbursement criteria can sometimes determine the order of use; 3. In Italy, mechanisms including objectives to local managers or agreements with General Practice Associations are used.
Source: OECD survey on On-patent competition, 2022.

46. However, it remains unclear whether and if so, how these mechanisms promote on-patent competition. There is little evidence that payers or health insurers use formulary management to foster competition in on-patent markets. In Norway and the United States payers negotiate price concessions from pharmaceutical companies in exchange for "preferred status" on formularies. For example, in Norway, each regional health authority has a pharmaceutical and therapeutics committee that together with the Norwegian Drug Procurement Cooperation, defines a list of recommended products/suppliers on the preferred list of (inpatient) medicines (Weise, 2018[56]; Henning Aure and Festøy, 2022[57]). In the United States, medicine formularies of health plans use generally a tiered structure, in which lower-cost medications are placed in tiers with minimal cost sharing to encourage the use of the cheapest products (Centers for Medicare & Medicaid Services, 2023[58]).

47. Eighteen (of 35) respondent countries reported that they do not use financial or other incentives to influence prescribing (Figure 3.3). Where such incentives are present, they are used to encourage prescribers to favour cheaper and/or more cost-effective products (in Belgium, Colombia, Greece, Estonia, Norway, Spain, and Sweden), and/or they apply only when off-patent product alternatives are available (in Australia, Belgium, Colombia, Czech Republic, Denmark, France, Greece, Latvia, Netherlands, United States) (Figure 3.3). In Austria, for instance, the so called 'ÖKO-Tool' indicates to the prescriber the cheapest alternative. Only in Switzerland and the United States, prescribers have incentives to favour more expensive products. For example, in Switzerland, physician prescribers can retain a percentage of the price of the medicine (Figure 3.3).

Figure 3.3. Financial or other incentives used to encourage prescribers to favour certain products over others within the same therapeutic class



Source: OECD survey on On-patent competition, 2022.

Table 3.3.Prescribing policies in ten OECD countries

Countries	Prescribing	Formulary management	Prescribing budgets or target volumes	Others
France	• Mandatory prescribing by INN.	• N/A	• N/A	• Objectives for rational prescribing and generic substitution are linked to financial incentives • Prescription monitoring.
Italy	• Recommended prescribing by INN.	• Hospital formularies at regional level.	• Prescription targets set by some regional governments and local health authorities.	• N/A
Germany	• N/A	• Prescription guidelines of most cost-effective reimbursed medicines.	• Prescribing budgets and target volumes.	• N/A
Norway	• Recommended prescribing by INN.	• Prescription guidelines for the cheapest equivalent product for outpatient medicines. • Hospital formularies at regional level.	• N/A	• N/A
Spain	• Mandatory prescribing by INN.	• Hospital formularies at regional level.	• N/A	• N/A
Sweden	• N/A	• Treatment and prescribing guidelines at both national and regional level. • Hospital formularies at regional level.	• N/A	• N/A
United Kingdom	• Recommended prescribing by INN.	• National guidelines indicate preferred medicines for prescribers. • Hospital formularies at regional level.	• N/A	• N/A
Colombia	• Mandatory prescribing by INN.	• Prescribing guidelines recommending prescription of off-patent medicines. • Formulary management mechanisms.	• N/A	• N/A
Israel	• Recommended generic substitution at pharmacy level.	• Prescribing guidelines for generics or lower-cost branded products. • Hospital formularies at regional level.	• N/A	• N/A
New Zealand	• Recommended prescribing by INN.	• Hospital formularies at national level.	• N/A	• Switching to the fully reimbursed therapeutic alternative at pharmacy

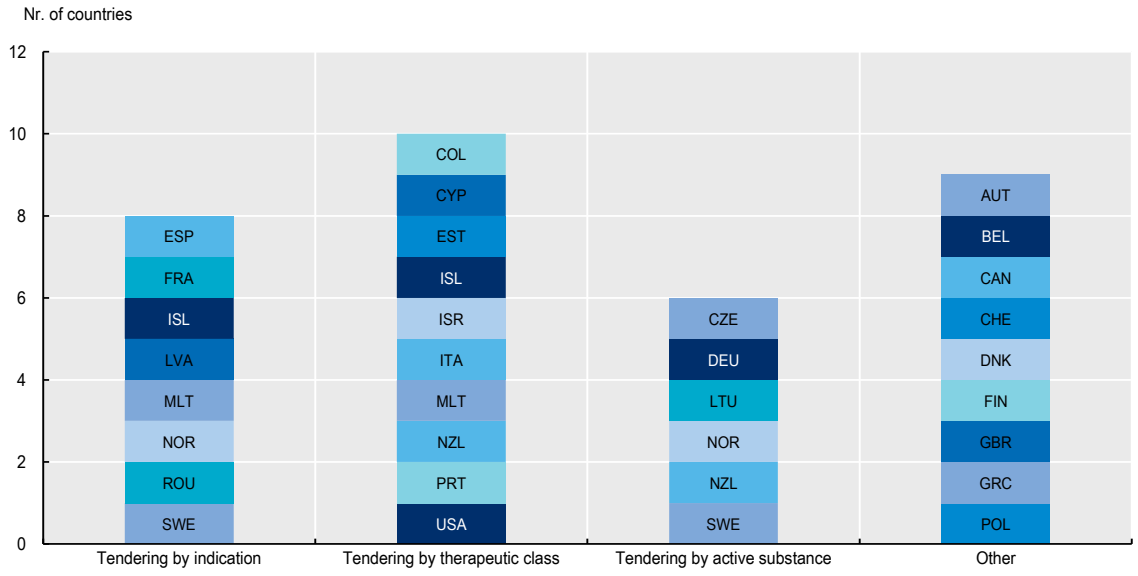
Note: INN: International Non-Proprietary Name. HTA: health technology assessment.
Source: Authors based on Country Factsheets in Annex C of this paper with information developed in the in-depth review of country profiles in Annex C of the Supplementary Material.

Tendering is increasingly used to procure medicines, but few countries use it to encourage competition between on-patent medicines

48. Tendering[26] can be an effective mechanism for promoting competition, though formal evidence is sparse, as noted in Section 1.3. Tendering has long been used in off-patent markets but is increasingly being used for patented products. From the OECD Survey on On-patent Competition 2022, 19 countries (Colombia, Cyprus, Czech Republic, Estonia, France, Germany, Iceland, Israel, Italy, Latvia, Lithuania, Malta, New Zealand, Norway, Portugal, Romania, Spain, Sweden and United States) reported using some form of tendering to encourage price competition between treatment alternatives (Figure 3.4). Five countries (Italy, Germany, Norway, Sweden, and the United Kingdom) use both facility-based and centralised procurement procedures at both regional and/or national level to tender for patented products in both inpatient and outpatient sectors (Table A B.3).

49. Tenders can be designed to promote competition by considering the number of therapeutic alternatives available. Specifically, tendering by therapeutic indication (used in France, Iceland, Latvia, Malta, Romania, Norway, Sweden and Spain) or therapeutic class (used in Colombia, Cyprus, Estonia, Israel, Iceland, Italy, Malta, New Zealand, Portugal, and United States) can promote price competition across patented products (Figure 3.4 and Table A B.3) whereas tendering by active substance (used in Czech Republic, Germany, Lithuania, Norway[27], New Zealand and Sweden) can only promote competition between off-patent products (Figure 3.4).

Figure 3.4. Tendering is used by several countries to procure patented and off-patent medicines



Note: Question B11: Which of the following mechanisms are used to encourage price competition between treatment alternatives?
Source: OECD survey on On-patent competition, 2022

50. Tendering processes and rules can shape the market conditions faced by suppliers since these determine whether price or other criteria, such as product quality or reliability of supply, are used to make a sole or multiple awards. Table A B.3 outlines the types of tendering processes used in the ten countries

[26] For definitions on tendering, please see Box 1.2 in section 1.3.

[27] For essential in-patient medicines

that are the subject of the case studies. All countries used price as the principal award criteria, but other factors such as supply security, product quality and safety, and environmental impact are becoming increasingly important. Germany and Sweden also consider the "added therapeutic value" of medicines (Table A B.3). Moreover, with the exception of Israel that uses single supplier awards only, most countries utilise both single-winner and multi-winner award tendering procedures to encourage competition among various suppliers of patented products to treat a given condition/indication and avoid the potential for monopoly pricing and discontinuity in supply.

- In Norway, tender outcomes are coupled with formulary management practices with company bids determining which medicine is recommended as the first-line treatment, thus ensuring physicians retain some choice and multiple suppliers remain in the market. Based on offers from suppliers, a specialist group – consisting of doctors, nurses, representatives of patient organisations, the Norwegian Medicines Agency (NoMA) and the Norwegian Drug Procurement Cooperation (LIS) – prepares a recommendation for the disease/indication in question with those medicines considered to be therapeutically equivalent (Weise, 2018[56]; Vogler, Salcher-Konrad and Habimana, 2022[59]; Henning Aure and Festøy, 2022[57]);
- In New Zealand, the Pharmaceutical Management Agency (Pharmac) adopted the "*Principal Supply Status*" procedure in 2020, under which the supplier winning the tender is guaranteed up to 95% of the total funded market for about 3 years (Pharmac, 2022[60]). This procurement procedure gives Pharmac more flexibility to fund small volumes of products from alternative suppliers (Pharmac, 2022[60]). New Zealand also uses multi-product tenders, negotiating price reductions with manufacturers on already reimbursed products in return for the inclusion of their newer products in the reimbursement list.

4 Discussion and conclusions

51. This project has attempted to explore the existence and extent of within-class competition between patented products representing therapeutic alternatives. A prior review of the literature revealed only very limited evidence of competition between patented products on prices or market share. While some studies suggested the potential for significant price reductions resulting from competition between on-patent products, a few studies reported that the impact may not be discernible until several competing products enter the market. Others reported either no clear effects or even price increases.

52. From the analysis, five principal findings emerged:

- The literature review shows that regulatory frameworks that define coverage, pricing, prescribing and procurement practices can be important in shaping whether products compete. This is the case in countries with national "positive lists" as these determine market access and may also determine prescriber options *vis a vis* alternative treatments. Prescribing and procurement policies and practices can be used to encourage competition among therapeutic alternatives, for example by granting preferential placement in a tiered formulary or treatment algorithm for cheaper or more cost- effective options. However, to date, evidence is limited on the impact of these different approaches on on-patent competition;
- The analysis of six therapeutic classes in seven countries found no evidence of price competition in classes with fewer than five alternative products. The market entry of therapeutic alternatives did not consistently exert price competition on first-in-class products nor on the average price across the therapeutic class. In fact, during the period of analysis (1997-2021) countries experienced significant price increases despite the existence of multiple therapeutic alternatives, with prices of follow-on products frequently higher than those of first-in-class products. Moreover, later entrants were observed to acquire market share without any decrease in sales of the first-in-class product, regardless of whether they set a price higher or lower than that of the first-in-class. However, these results may be confounded by the observation that in five of the six therapeutic classes the market is unlikely to have reached steady state following their introduction. For example, the introduction of the direct oral anticoagulants saw a wholesale shift from the previously extensive use of warfarin, creating scope for new entrants to acquire market share in a naturally expanding market, with little imperative to compete;
- Most countries undertake assessments of comparative effectiveness of product alternatives, however the extent to which that assessment informs policy varies widely and it is unclear the extent to which it is used to promote on-patent competition. While most countries use evidence of comparative assessment to support coverage and pricing decisions of the principal coverage programme, few countries use this information to inform the procurement of medicines or guide clinical practice. While several countries employ mechanisms to encourage prescribing of preferred products (inc. tiered benefits/co-payments, 'fail-first' protocols and treatment algorithms etc), it is unclear whether these mechanisms are used to obtain price concessions. In addition, these concessions may take the form of confidential discounts;
- Tendering has long been used in off-patent markets or/and for hospital purchases but few countries apply it to patented products in both inpatient and outpatient sectors. Tenders can be designed to promote competition by taking into account the extent to which products represent therapeutic

alternatives. However, only a few countries design tendering procedures and award criteria to intentionally shape the competitive environment and drive price reductions in patented products. For example, Norway uses multi award-winning tendering procedures at indication level to encourage competition among various suppliers of patented products by offering preferred status in formularies to manufacturers offering the best deal; and,

- Price competition is not the default dynamic resulting from successive market entry. Instead, targeted policy settings around pricing, procurement and formulary management must be designed to engineer and promote competition between patented products.

4.1. Policy recommendations

53. From this analysis, four key actions are identified that could be used to facilitate on-patent competition:

- **Aligning pricing and procurement policies to foster on-patent competition.** Countries may need to consider more iterative approaches to coverage and pricing as new products within a class enter the market and/or evidence of comparative effectiveness becomes available. Horizon scanning may be important in anticipating the entry of potential therapeutic alternatives, which payers can take into account when negotiating prices with manufacturers;
- **Optimising the use of formulary management.** Formulary management is used by payers in only a few countries to foster competition between patented products by utilising the potential for "preferred status" on formularies as leverage in negotiating prices with manufacturers;
- **Promoting the use of tendering by class or indication.** Utilising tendering by class would require investment in tender design and award criteria that facilitate competition while maintaining security of supply and addressing a number of other important factors referred to as the 'Most Economically Advantageous Tender (MEAT) criteria. These include factors such as product quality and safety, security of supply, and environmental standards';
- **Utilising evidence of comparative effectiveness to build recognition among the clinical community and competent authorities of therapeutic alternatives.** Experience from a few countries highlights the importance of fostering engagement with the clinical community and key opinion leaders to promote acceptance by prescribers of product alternatives and formulary rules that designate treatment algorithms. Norway established specialist groups – consisting of doctors, nurses, representatives from patient organisations, and national competent authorities on pricing and procurement the Norwegian Medicines Agency (NoMA) and the Norwegian Drug Procurement Cooperation (LIS) – to support recommendations for the use of therapeutically equivalent products for the treatment of a given disease/indication.

4.2. Further analytical work

Future analytical work could aim to:

- **Explore the impact of pricing, reimbursement and procurement practices on competition in pharmaceutical markets**. For example, further analysis would be useful to understand how different pricing mechanisms encourage or undermine competition. It would also be valuable to develop a better understanding of the factors (e.g. advertising and promotion, the influence of key opinion leaders etc) that can potentially affect clinical practice and undermine competition; and,
- **Ensure cohesion between competition law and pricing policies to avoid anti-competitive behaviour.** For example, further analytical work could focus on developing a better understanding of the interplay between policy settings and competition law with a view to anticipating potentially

anti-competitive behaviour by companies. This could include, for example, exploring how mechanisms such as internal and external reference pricing could encourage anti-competitive practices by companies seeking to preserve market share or profit margins (e.g. vertical integration, market segmentation, creation of market entry barriers, tacit collusion on prices).

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Annex A. Summary statistics

Table A A.1. Summary statistics, 1997q4 and 2021q4

Therapeutic Class	First-in-class product					Follow-on products				
	Mean	Median	S. Dev.	Min	Max	Mean	Median	S. Dev.	Min	Max
direct oral anticoagulant										
Price (USD per SU, quarterly)	1.45	1.21	0.50	0.93	2.51	2.18	2.13	1.09	0.91	5.89
Volume (Thousand SUs, quarterly)	8246.00	3255.00	9067.00	0.02	35170.00	61630.00	27030.00	81890.00	0.08	393400.00
Market share (Quarterly)	0.42	0.34	0.30	0.04	1.00	0.68	0.77	0.26	0.01	0.97
Baseline time on market (Years)	13.50	13.50	0.25	13.25	13.75	9.78	10.13	2.99	5.25	13.25
insulin analogue										
Price (USD per SU, quarterly)	11.44	11.64	2.51	7.88	40.02	11.81	11.50	3.06	8.00	27.74
Volume (Thousand SUs, quarterly)	1791.00	1797.00	1419.00	0.23	5137.00	761.43	717.66	640.57	0.24	2641.00
Market share (Quarterly)	0.78	0.76	0.13	0.55	1.00	0.27	0.27	0.08	0.00	0.46
Baseline time on market (Years)	12.75	13.00	1.10	12.00	15.25	6.92	10.13	4.72	1.25	11.25
tyrosine kinase inhibitor (TKI)										
Price (USD per SU, quarterly)	44.31	47.90	20.04	15.31	85.33	60.65	50.76	33.39	19.48	178.70
Volume (Thousand SUs, quarterly)	690.57	581.94	629.61	8.40	2553.00	306.29	223.26	280.04	0.48	1089.00
Market share (Quarterly)	0.84	0.88	0.17	0.44	1.00	0.28	0.28	0.14	0.00	0.56
Baseline time on market (Years)	14.79	15.00	0.51	13.75	15.25	7.24	8.50	2.96	1.25	10.00
enzyme replacement therapy										
Price (USD per SU, quarterly)	1,480.00	1,464.00	449.50	729.00	2,296.00	1,662.00	1,612.00	230.10	1,269.00	2,200.00
Volume (Thousand SUs, quarterly)	4.36	3.25	4.29	0.01	27.22	1.93	1.82	1.51	0.00	7.51
Market share (Quarterly)	0.83	1.00	0.22	0.05	1.00	0.34	0.26	0.20	0.00	0.95
Baseline time on market (Years)	22.00	23.25	4.01	13.00	24.50	10.86	11.00	0.56	10.00	11.50
PARP inhibitors										
Price (USD per SU, quarterly)	20.58	14.26	11.59	9.33	45.61	87.26	92.49	22.82	35.01	130.70

Volume (Thousand SUs, quarterly)	331.14	274.35	285.50	0.45	1378.00	108.23	107.91	70.61	0.00	282.76
Market share (Quarterly)	0.92	1.00	0.11	0.54	1.00	0.18	0.15	0.11	0.00	0.46
Baseline time on market (Years)	6.64	6.75	0.40	6.00	7.00	2.94	3.13	0.98	1.50	4.25
glucagon-like peptide-1 (GLP-1) receptor analogue										
Price (USD per SU, quarterly)	55.87	44.38	30.85	18.33	101.20	43.48	44.49	20.69	19.69	156.00
Volume (Thousand SUs, quarterly)	67.81	46.82	64.02	0.03	271.32	946.09	606.52	953.54	0.09	4339.00
Market share (Quarterly)	0.31	0.14	0.34	0.00	1.00	0.87	0.90	0.12	0.08	1.00
Baseline time on market (Years)	14.29	14.75	0.62	13.25	14.75	7.32	7.00	3.21	2.50	12.50

Note: Baseline time to market is defined as the number of quarters since the product's first reported sale and up until a generic or biosimilar enters the market in the respective therapeutic class. The number of products in a class can vary across countries either due to a product not being sold in a country, or because a product was launched after a generic or biosimilar had entered the market and therefore is not included in the study period.
Source: Authors based on IQVIA MIDAS™ database.

Annex B. Overview of prevailing pricing, coverage and procurement policies in ten countries

Table A B.1 Coverage and reimbursement criteria for on-patent medicines in country case-studies

Countries	Coverage and reimbursement criteria	Type of reimbursement lists
EU countries		
France	Cardinal metric system reflecting: (i) product's actual medical benefit (*Service Médical Rendu, SMR*) to determine the maximum reimbursement level; and (ii) the improvement of medical benefit (*Amélioration du service médical rendu, ASMR*) to inform pricing decisions (in the form of a price premium or a discount).	• National positive reimbursement list for outpatient medicines and for hospital medicines (likely high-priced or low-volume medicines) not included in the Diagnosis Related Groups (DRG) hospital funding system.
Italy	Several criteria, including unmet medical need, "added therapeutic benefit" and risk/benefit ratio, budget impact, cost/efficacy and prices in other countries.	• National positive reimbursement list for both outpatient and inpatient medicines. • Hospital pharmaceutical formularies.
Germany	"Added therapeutic benefit" conditions reimbursement of outpatient medicines. Medicine prices for hospital drugs informed by ceiling prices negotiated for outpatient medicines.	• National negative list for both outpatient and inpatient medicines.
Norway	Three criteria: benefit, resource, and severity. Reimbursement can only be pre-approved if the relation to the benefit and resources is reasonable. A cost-effectiveness ratio is weighted against the severity of the disease. Higher cost-effectiveness ratios for more severe diseases are accepted.	• National positive lists. • System for individual applications.
Spain	Decision based on outcome of HTA process consisting of a clinical assessment (added therapeutic value) and an economic assessment (cost-effectiveness).	• National positive and negative list for inpatient and outpatient medicines.
Sweden	Several criteria including equality of access, need, and cost-effectiveness.	• National positive list for outpatient medicines.
Non-EU countries		
United Kingdom	Incremental cost-effectiveness ratio (ICER) of a medicine against an existing appropriate reference comparator.	• Negative list for outpatient medicines. • Grey list (conditional reimbursement) for outpatient medicines.
Colombia	Clinical effectiveness and pharmacoeconomic criteria.	• National positive lists.
Israel	Several criteria, including outcome of HTA process, effectiveness, therapeutic alternatives, economic cost and added therapeutic benefit.	• National positive list for inpatient and outpatient medicines.
New Zealand	Several criteria: need, health benefits, cost and savings, and suitability.	• National positive list for outpatient and inpatient medicines.

Source: Authors based on Country Factsheets in Annex A developed with the in-depth review of ten country profiles in Annex C of the Supplementary Material.

Table A B.2. Key pricing policies across ten country case-studies

	Free pricing	Price interventions (caps, statutory pricing, …)	External Reference Pricing	Internal Reference Pricing	Principles of value-based pricing	Others (MEAs, etc)	Pricing in supply chain
EU countries							
France	For non-reimbursed medicines.	Price capping to contain spending on reimbursed medicines.	For reimbursed medicines. Calculation method: price bounded to the lowest prices among Germany, Italy, Spain and the UK.	For reimbursed medicines.	Reimbursement conditional on the "added-therapeutic value" of a new medicine.	Price-volume agreements and paybacks on reimbursed medicines. MEAs for non-reimbursed outpatient and hospital medicines.	Regressive mark-ups for wholesalers and pharmacies for reimbursed medicines. Capped commercial discounts for reimbursed medicines. Value-added tax of 2.1% on reimbursed medicines and 10% on non-reimbursed medicines.
Italy	For non-reimbursed medicines.	Price capping (inflation rate) for non-reimbursed medicines. National budget caps and paybacks to contain spending on reimbursed medicines. Mandatory discounts on ex-factory prices of reimbursed medicines.	For reimbursed medicines. Calculation method: prices based on medicine prices in 24 European countries.	For reimbursed outpatient medicines.	Reimbursement conditional on several criteria: unmet medical need, added therapeutic benefit, risk/benefit ratio, budget impact, cost/efficacy and prices in other countries.	MEAs for reimbursed outpatient and hospital medicines with a high budget impact.	Maximum mark-ups for wholesalers and community pharmacies on reimbursable medicines prices. Value-added tax of 10% on reimbursed medicines.
Germany	For medicines used in hospital setting.	Mandatory rebates on ex-factory prices of reimbursed medicines. Statutory prices and price freezes for reimbursed prescription-only medicines.	For outpatient medicines. Calculation method: prices based on medicine prices in 15 European countries.	For reimbursed medicines with no "added therapeutic benefit".	Reimbursement conditional on the "added therapeutic benefit" of a new medicine.	N/A	Mark-ups for wholesalers and pharmacies. Discount on medicines (prescription-only, generic and on-patent medicines) to sickness funds and other health insurers

Norway	N/A	Statutory maximum prices for prescription-only medicines.	For prescription-only medicines. Calculation method: prices based on the average of the three lowest prices of 9 European countries.	Stepped pricing for generics sets a maximum reimbursement amount for medicines part of the reference group.	Reimbursement conditional on CEA.	MEAs for reimbursed medicines.	Maximum mark-ups for pharmacies for prescription-only medicines.
Spain	For non-reimbursed medicines.	Mandatory discounts for all reimbursed medicines.	Yes, for reimbursed medicines. Calculation method: prices based on medicine prices in 14 European countries	For reimbursed medicines.	Reimbursement conditional on added therapeutic value and CEA.	MEAs for new, high-priced medicines for outpatient and inpatient use.	Regressive margin schemes for wholesalers and pharmacies for outpatient medicines. Claw-back systems Value-added tax of 4% on all medicines.
Sweden	For non-reimbursed medicines.	Statutory pricing for outpatient medicines. Mandatory price reductions for older, reimbursed medicines.	N/A	For reimbursed medicines facing generic competition.	Reimbursement conditional on the value a medicine delivers in terms of equality of access, need, and CEA.	MEAs for high-priced new medicines.	Pharmacy mark-ups Dispensing fees on reimbursed prescription-only medicine. Value-added tax of 25% for OTC medicines.
Non-EU countries							
United Kingdom	For generic or single sourced products.	Profit caps and price control schemes for branded reimbursed medicines.	N/A	N/A	Reimbursement conditional on CEA.	MEAs for high-cost medicines.	N/A
Colombia	For medicines with MA and not under the direct control regime.	Maximum sales prices for medicines regulated under the direct control regime.	For medicines regulated under the direct control regime. Calculation method: prices based on medicine prices in 17 OECD countries.	N/A	N/A[1]	N/A	Mark-ups for manufacturers, wholesalers and/or importers.
Israel	N/A	Statutory maximum prices for outpatient and inpatient medicines. Price capping for inpatient medicines.	For novel and biosimilar medicines. Calculation method: average of the three lowest wholesale prices of 7 European countries.	N/A	N/A	MEAs for reimbursed medicines.	Pharmacy mark-ups. Value-added tax of 17% on all medicines.

New Zealand	For non-reimbursed medicines.	Expenditure caps for reimbursed medicines.	Used only informally to support price negotiations. Calculation method: N/A.	For reimbursed medicines.	N/A	MEAs for reimbursed medicines. Unit- and volume-related discount for reimbursed medicines.	Pharmacy mark-ups. Pharmacy handling fee for dispensing; service fees and pack-price-adjusted pack fees

Note: MEAs: managed entry agreements. MA: marketing authorisation. CEA: cost-effectiveness assessment. 1. In 2022, the CNPMDM proposed to incorporate cost-effectiveness assessments undertaken by the Institute of Technological Evaluations in Health (IETS) to inform pricing and reimbursement decisions (CNPMDM, 2022[61]).
Source: Authors based on Country Factsheets in Annex A developed with the in-depth review of ten country profiles in Annex C of the Supplementary Material.

Table A B.3. Procurement and tendering practices in ten OECD countries

Countries	Types of procurement and tendering procedures	Award procedure & criteria
France	Types of medicines procured: off-patent medicines or medicines for certain therapeutic classes for both inpatient and outpatient use. Tender design: at therapeutic indication level. Level of procurement process: facility-based procurement, joint procurement across hospitals or facilities, and centralised procurement at regional and national level. Open procedure tenders and dynamic purchasing systems (DPS).	Award procedure: single and multi-winner tender awards. Award criteria: price, supply security, product quality, environmental impact. Local production (to be implemented).
Italy	Types of medicines procured: off- and on-patent medicines for inpatient and outpatient use. Tender design: at therapeutic class level. Level of procurement process: facility-based procurement, joint procurement across hospitals or facilities, and centralised procurement at national and regional level. Open procedure tenders and DPS (off-patent medicines).	Award procedure: single and multi-winner tender awards. Award criteria: price, product quality and safety.
Germany	Types of medicines procured: off- and on-patent medicines for outpatient and inpatient use. Tender design: at active substance level. Level of procurement process: facility-based procurement, joint procurement across hospitals or facilities, and centralised procurement at national and regional level. "Discount contracts" with the suppliers for off-patent outpatient medicines.	Award procedure single and multi-winner tender awards. Award criteria: price, product quality and safety, price-quality ratio and "added therapeutic value".
Norway	Types of medicines procured: off- and on-patent medicines for inpatient use. Tender design: at active substance level for essential medicines used in hospital care; disease-specific tenders per indication for in- and outpatient sector. Level of procurement process: facility-based procurement and centralised procurement at the national level. Open procedure tenders.	Award procedure: multi-winner tender awards. Award criteria: price, supply security (as well as delivery reliability and service such as training and medical enquiries), product quality and characteristics and variety, generic name; environmental criteria; and added therapeutic value.
Spain	Types of medicines procured: off- and on-patent medicines for inpatient and outpatient use. Tender design: at therapeutic indication level. Level of procurement process: facility-based, joint procurement across hospitals, and centralised procurement at the national and regional level. Open procedure tenders and DPS.	Award procedure: N/A. Award criteria: price, supply security, added therapeutic value, product quality and safety and environmental impact.
Sweden	Types of medicines procured: off- and on-patent medicines for outpatient and inpatient use. Tender design: at active substance or therapeutic indication level. Level of procurement process: centralised procurement at regional level and joint procurement across hospitals for inpatient medicines; centralised procurement at the national level for outpatient medicines. Open procedure tenders and DPS.	Award procedure: single and multi-winner tender awards. Award criteria: price, supply security, product quality and safety, environmental criteria and "added therapeutic value".
United Kingdom	Types of medicines procured: off- and some on-patented medicines for inpatient use. Tender design: at type of medication level (inc. mode of administration/dose). Level of procurement process: procurement at local or regional level, or through a national framework agreement. Open procedure tenders.	Award procedure: single and multi-winner tender awards. Award criteria: Most Economically Advantageous Tender (MEAT), including cost, product training, price, and quality.
Colombia	Types of medicines procured: N/A besides on information about tendering for Hepatitis C treatments. Tender design: at therapeutic class level. Level of procurement process: centralised procurement mechanism of PAHO for the treatment of Hepatitis C.	Award procedure: N/A. Award criteria: N/A.
Israel	Types of medicines procured: N/A. Tender design: at therapeutic class level. Level of procurement process: joint procurement by government- and HMO-owned providers.	Award procedure: single-winner awards. Award criteria: N/A.
New Zealand	Types of medicines procured: Medicines for outpatient and inpatient use. Tender design: at active substance level. Level of procurement process: national level procurement for inpatient and outpatient medicines. Multi-product tenders for reimbursed medicines. Requests to suppliers to submit proposals for tenders.	Award procedure: single and multi-winner awards. Award criteria: N/A.

Note: PAHO: Pan American Health Organization; HMO: Health Maintenance Organization. DPS: Dynamic Purchasing Systems are open tendering procedures that allow recurring purchasing from a specific supplier while new suppliers can join the procurement system on an ongoing basis (for detailed defining please see Box 1.2).
Source: Authors based on Country Factsheets in Annex A with information developed in the in-depth review of country profiles in Annex C of the Supplementary Material.

Annex C. Factsheets of country case studies

France

French pharmaceutical data at a Glance

- Health expenditure (2020): 3,555 EUR per capita (constant prices and constant PPP); 12.2% of GDP
- Retail pharmaceutical expenditure (2020)[1]: 688 EUR per capita (constant prices and constant PPP); in % of HE: 19.4%
- Pharmaceutical sales (2013): 33 billion USD (PPP)
- Generic market shares (2020)[2]: N/A in value; 29.6% in volume

Coverage and pricing

- **Pricing and reimbursement authorities**
  - The Economic Committee for Health Care Products (CEPS) negotiates medicine prices with manufacturers together with the National Union of Health Insurance Funds (UNCAM); the High Authority of Health (*Haute Autorité de Santé (*HAS)) undertakes clinical and economic evaluations for medicines seeking reimbursement by the Social Security; the National Statutory Health Insurance makes decisions about inclusion on the reimbursement list for outpatient medicines; the Ministry of Solidarity and Health makes decisions about inclusion on the reimbursement list for inpatient medicines.
- **Reimbursement lists**
  - Outpatient: reimbursement list for outpatient medicines at the national level (a positive list). Inpatient: reimbursement list for hospital medicines, usually high-priced or low-volume medicines not included in the Diagnosis Related Groups (DRG) hospital funding system.
- **Reimbursement criteria**
  - Decision on inclusion into the reimbursement list is based on the "medical value" of the medicine (*Service médical rendu*, SMR). Outpatient: decision on inclusion in the reimbursement list is taken by the National Statutory Health Insurance.
  - Inpatient: decision on inclusion into the reimbursement list taken by the Ministry of Solidarity and Health.
- **Key pricing policies**
  - **Price cap regulation, price-volume agreements, and rebates** for containing budget growth of reimbursed medicines.
  - **External reference pricing** bounded by the lowest prices among Germany, Italy, Spain and the UK.
  - **Value-based pricing** conditional on the "improvement in medical value" (*Amélioration du service médical rendu* (ASMR)).
  - **Free pricing and managed entry agreements** for non-reimbursed outpatient medicines, as well as hospital medicines not included in the reimbursement list.
  - **Internal reference pricing** to set prices and reimbursement amount for a cluster of medicines with the same active substance.
- **Pricing in the supply chain**
  - **Value-added tax** of 2.1% on reimbursed medicines and 10% on non-reimbursed medicines.
  - **Mark-ups**: for wholesalers, a regressive mark-up scheme for reimbursed medicines; capped linear mark-up, with size = 6.86% of manufacturer price, with a minimum of 0.30€ and a maximum of 30.03€; for pharmacies, a regressive mark-up scheme and dispensing fees for reimbursed medicines. Commercial discounts given by wholesalers to community pharmacies are capped at 40% for reimbursed generic medicines and at 2.5% for reimbursed non-generic medicines.
- **Patient co-payments for medicines**
  - Co-payment percentages (co-insurance) based on demonstrated benefit: outpatient reimbursable medicines are reimbursed at 65%, 30% or 15% for high-value, moderate value, and low-value medicines respectively; outpatient medicines for several life-threatening conditions and chronic diseases are 100% reimbursed.
  - Prescription fee in addition to percentage co-payments in the outpatient sector.
  - No co-payments for inpatient medicines

Procurement and tendering

- **Types of procurement procedures**
  - Tendering[3] for inpatient and outpatient off-patent medicines and medicines in certain therapeutic classes, designed at indication level.
  - Facility-based procurement (inpatient), joint procurement across hospitals or facilities (inpatient and outpatient), centralised procurement at regional and national level (inpatient and outpatient).
  - Single- and multiple-winner awards.
  - Use of open procedures and dynamic purchasing systems.
- **Tendering award criteria**: price. security of supply, quality of the product, environmental criteria and local production (to be implemented).

Prescribing and dispensing

- Mandatory **prescribing by International Non-Proprietary Name** (INN).
- **Generic substitution** at pharmacy level indicative, but not required.
- **Biosimilar substitution** allowed at pharmacy level and recommended at regional level.
- **Rational use, pay-for-performance and prescription monitoring:** objectives for rational prescribing and generic substitution are linked to financial incentives.

Note: 1. This measure includes medical non-durables (resulting in an overestimation of around 5-10%). 2. Calculated based on the reimbursed pharmaceutical market, i.e. the sub-market in which a third party payer reimburses medicines. 3. For definitions on tendering, please see Box 1.2 in section 1.3.
Source: Authors based on the review of coverage, pricing, prescribing and procurement practices of ten country case studies.

Italy

Italian pharmaceutical data at a glance

- Health expenditure (2020): 2,439 EUR per capita (constant prices and constant PPP); 9.6% of GDP
- Retail pharmaceutical expenditure (2020)[1] 506 EUR per capita (constant prices and constant PPP); in % of HE: 20.8%
- Pharmaceutical sales (2021): 36.5 billion USD (PPP)
- Generic market shares (2021)[2]: 9% in value; 28.4% in volume

Coverage and pricing

- **Pricing and reimbursement authorities**
  - Italian Medicines Agency (AIFA) is responsible for all matters regarding medicines including market authorisation, pharmacovigilance, monitoring of spending and pricing and reimbursement of medicines; the Technical Scientific Committee (*Commissione Tecnico Scientifica*, CTS) provides opinions on the classification of new medicines towards their reimbursement status; and the Pricing and Reimbursement Committee (*Comitato Prezzi e Rimborso*, CPR) offers technical support for the price negotiation with manufacturers.
- **Reimbursement lists**
  - National positive reimbursement list (*Prontuario Farmaceutico Nazionale*, PFN). Reimbursed medicines included in "**class A**" (outpatient medicines) or in "**class H**" (inpatient medicines). Non-reimbursed medicines are allocated to "**class C**" (negative list).
- **Reimbursement criteria**
  - Several criteria, including unmet medical need, added therapeutic benefit and risk/benefit ratio, budget impact, cost/efficacy and prices in other countries.
- **Key pricing policies**
  - **National budget caps and paybacks** for containing public pharmaceutical spending on reimbursed medicines.
  - **Internal reference pricing** for reimbursing outpatient medicines by the maximum amount equal to the lowest-priced generic/biosimilar medicine of a reference cluster of medicines with similar active ingredients.
  - **External reference pricing** to inform price and reimbursement based on other 24 European countries (no specific formula).
  - **Mandatory discounts**: cumulative 5% + 5% discounts on the ex-factory price of reimbursed medicines.
  - **Managed entry agreements** for reimbursed outpatient and hospital medicines with a high budget impact.
  - **Free pricing** and **price caps** for non-reimbursed medicines with price increases allowed only every second year and capped to the inflation rate.
- **Pricing in the supply chain**
  - Outpatient: maximum mark-up margins for wholesalers (3% of pharmacy retail price net) and community pharmacies (maximum pharmacy retail price net: 30-35% and pharmacy claw-backs) on reimbursable medicines prices.
  - Value-added tax of 10% on reimbursed medicines (except for therapeutic oxygen, which amounts to 4%).
- **Patient co-payments for medicines**
  - Full reimbursement for outpatient medicines after prescription fee in certain regions. No co-payments for hospital medicines.

Procurement and tendering

- **Types of procurement procedures**:
  - Tendering[3] of inpatient and outpatient medicines (both off- and on-patent medicines) designed at the therapeutic class level.
  - Facility-based procurement, joint procurement across hospitals or facilities, and centralised procurement at the national and regional level for inpatient and outpatient medicines.
  - Single and multi-winner awards procedures. Multi-award procedures are the default for biosimilars.
  - Open procedures and dynamic purchasing systems for off-patent medicines.
- **Tendering award criteria**: price and product quality and safety.

Prescribing and dispensing

- **Prescribing by International Non-Proprietary Name** (INN) recommended.
- **Generic substitution** mandatory unless exclusion of substitution indicated by prescriber.
- **Biosimilar substitution** not allowed at pharmacy level, but prescription of biosimilars is recommended at regional level.
- **Hospital formularies**[4] at regional level.
- **Prescription targets** to limit spending by some regional governments and local health authorities.

Notes: 1. This measure includes medical non-durables (resulting in an overestimation of around 5-10%).
2. Calculated based on the reimbursed pharmaceutical market, i.e. the sub-market in which a third party payer reimburses medicines.
3. For definitions on tendering, please see Box 1.2 in section 1.3.
4. For definitions on formulary management mechanisms, please see Box 1.3 in section 1.3.
Source: Authors based on the review of coverage, pricing, prescribing and procurement practices of ten country case studies.

Germany

German pharmaceutical data at a Glance

- Health expenditure (2020): 4,531 EUR per capita (constant prices and constant PPP); 12.8% of GDP
- Retail pharmaceutical expenditure (2020)[1]: 826 EUR per capita (constant prices and constant PPP); in % of HE: 18.2%
- Pharmaceutical sales (2020): 66.6 billion USD (PPP)
- Generic market shares (2020)[2]: 30.8% in value; 83.3% in volume

Coverage and pricing

- **Pricing and reimbursement authorities**
  - The Federal Joint Committee (*Gemeinsamer Bundesausschuss* G-BA) is the highest decision-making body of joint self-government in the German healthcare system consisting of representatives of associations of sickness funds, physicians, dentists and hospitals, as well as independent members; The Institute for Quality and Efficiency (IQWiG) which supports the decision-making by the G-BA by commissioning HTA and making recommendations for the in- or exclusion of health technologies into the SHI benefit basket; the National association of SHI funds (*GKV-Spitzenverband*, GKV-SV) which represents the interests of the statutory health and nursing insurance funds.
- **Reimbursement lists**
  - All marketed medicines are reimbursed by sickness funds (except if excluded by federal law or in the G-BA negative list).
- **Reimbursement criteria**
  - Outpatient medicines: conditional reimbursement after a systematic and formal assessment of the added therapeutic benefit; if shown added therapeutic value a reimbursement price is negotiated between the national association of SHI funds (GKV-SV) and the manufacturer; if no incremental therapeutic benefit, medicines are subject to a maximum reimbursement amount (reference price) (and an obligatory 10% discount applies if the comparator is an on-patent medicine). Inpatient medicines: prices negotiated for retail products under the ArzneimittelmarktNeuordnungsgesetz (AMNOG) process serve as ceiling prices.
- **Key pricing policies**
  - **Free pricing and price negotiations** for hospital medicines.
  - **Value-based pricing** to inform price and reimbursement decisions of outpatient medicines based on a formal assessment of the added therapeutic benefit within seven months after market launch.
  - **External reference pricing** considered during price negotiations of outpatient medicines.
  - **Internal reference pricing** to set the maximum reimbursement of outpatient medicines with no incremental therapeutic benefit.
  - **Mandatory rebates** for manufacturers and wholesalers to grant discounts to sickness funds.
  - **Statutory prices and price freeze** for reimbursable prescription-only drugs not subject to fixed prices.
- **Pricing in the supply chain**
  - Fixed mark-ups on manufacturers' selling prices.
  - Sickness funds pay pharmacists for prescription-only medicines a flat-rate payment of EUR 8.35 plus EUR 0.21 for the Pharmacy Emergency Service plus a fixed margin of 3% from the manufacturer's price.
  - Sickness funds receive a discount of EUR 1.77 per dispensed prescription-only drug from the pharmacies if the sickness funds pay the respective pharmacy within 10 days.
  - For on-patent medicines not clustered in reference price groups, companies must grant a 7% discount to sickness funds. For generics not clustered in reference price groups, a 6% discount applies plus an additional discount not exceeding 10%.
  - Price moratorium: obligation for manufacturers to grant a rebate equaling any price increase compared to prices on 1 August 2009.
- **Patient co-payments for medicines**
  - Prescription medicine: cost-insurance rate of 10% with a minimum of EUR 5 and a maximum EUR 10 per prescription.
  - Non-prescription medicine: pharmacies can freely determine prices, but patients must pay any difference between the market price and the maximum reimbursement amount for those medicines price referenced.

Procurement and tendering

- **Types of procurement procedures**
  - Tendering[3] in the outpatient and inpatient sector, designed at active substance level.
  - Facility-based procurement (inpatient), joint procurement across hospitals or facilities (inpatient), centralised procurement at the regional level (outpatient) and at the national level (outpatient and inpatient).
  - "Discount contracts" with the suppliers for off-patent outpatient medicines.
  - Single and multiple winner awards.
- **Tendering award criteria:** price, product quality and safety, price-quality ratio, added therapeutic value (only inpatient medicines).

Prescribing and dispensing

- **Generic substitution** mandatory for pharmacies.
- **Prescribing budgets and target volumes** mandated for sickness funds and social health insurance to contain annual expenditure.
- **Prescription guidelines** to mandate prescription of reimbursed medicines that are the most cost-effective alternatives.

Note: 1. This measure includes medical non-durables (resulting in an overestimation of around 5-10%).
2. Calculated based on the reimbursed pharmaceutical market, i.e. the sub-market in which a third party payer reimburses medicines.
3. For definitions on tendering, please see Box 1.2 in section 1.3.
Source: Authors based on the review of coverage, pricing, prescribing and procurement practices of ten country case studies.

Norway

Norwegian pharmaceutical data at a Glance

- Health expenditure (2020): 4,402 EUR per capita (constant prices and constant PPP); 11.4% of GDP
- Retail pharmaceutical expenditure (2020)[1]: 460 EUR per capita (constant prices and constant PPP); in % of HE: 10.5%
- Pharmaceutical sales (2021): 2.9 billion USD (PPP)
- Generic market shares (2021)[2]: 17.2% in value; 53.1% in volume

Coverage and pricing

- **Pricing and reimbursement authorities**
  - The Norwegian Medicines Agency (NoMA) is responsible for reimbursement decisions on behalf of the National Insurance Scheme. For medicines financed by the regional health authorities (RHAs), reimbursement decisions are taken by a Board, consisting of the CEOs of the 4 RHAs and a patient representative (with no voting power).
- **Reimbursement lists**
  - The main system is general reimbursement based on **positive lists** but there is also a system for **individual application.**
- **Reimbursement criteria**
  - Three prioritisation criteria: 1) the **benefit**, 2) **resource** and 3) **severity**. Reimbursement can only be pre-approved if the relation to the benefit and resources is reasonable. A **cost-effectiveness ratio** will be weighed against the severity of the disease. Higher cost-effectiveness ratios for more severe diseases are accepted. Budgetary impact above NOK 100M by the fifth year after approval require appraisal by the Ministry of Health and Care Services and approval by the Parliament.
- **Key pricing policies**
  - **Value-based pricing.** Cost-effectiveness assessment compares the cost of a new medicine against the fixed threshold of NOK 275 000 per QALY gained.
  - Maximum prices for prescription-only medicines based on **external reference pricing** of the average three lowest prices of nine reference countries.
  - **Internal reference pricing.** Stepped pricing for generics that sets a maximum reimbursement amount for both branded and generic pharmaceuticals within a list of products considered interchangeable. This amount is automatically reduced (in steps) following patent expiry.
  - **Tendering and price negotiations for hospital medicines** require suppliers to grant 5%-17% discounts.
- **Pricing in the supply chain**
  - Maximum **mark-up** for pharmacies for prescription-only medicines based on: 2.0% add-on from the maximum pharmacy purchase price; NOK 29.00 add-on per package; 0.5% add-on from the pharmacy purchase price if the prescription medicine requires cooling; and, NOK 19.00 add-on per package for A/B-preparations[3]. No regulation of pharmacy mark-ups for generics under stepped pricing.
- **Patient co-payments for medicines**
  - Reimbursement rate of outpatient medicines varies from 61-100% for outpatient medicines. Non-reimbursed covered after a maximum yearly threshold amount. No co-payments in the specialist care sector, i.e. medicines are purchased and paid by the RHAs.

Procurement and tendering

- **Types of procurement procedures**
  - Facility-based procurement (inpatient) and centralised procurement at the national level (outpatient and inpatient).
  - Tenders[4] based on active substance for an assortment of essential medicines used in hospital care.
  - Disease- specific tenders per indication for both in- and outpatient care.
  - All suppliers who are qualified will receive an agreement (i.e. **multi-winner tenders**).
  - Use of open procedures.
- **Tendering award criteria:** price; security of continuous supply; product characteristics (e.g. durability and ability to blend, administration form, packaging unit formulation and strength varieties, and labelling); generic name; delivery reliability and service such as training and medical enquiries; environmental criteria; and added therapeutic value.

Prescribing and dispensing

- **Generic substitution.** Doctors are allowed, but not obliged, to prescribe by International Non-proprietary Names (INN).
- **Hospital formularies**[5] at a regional level.
- **Prescription guidelines.** For outpatient medicines, primary health care doctors are expected to prescribe the cheapest equivalent product. For hospital medicines, the pharmaceutical and therapeutical committees (PCTs) in each RHAs and together with the Norwegian Drug Procurement Cooperation(LIS) define a list of recommended products/suppliers on the advisory list of medicines; deviations from the LIS recommendations must be documented.

Note: 1. This measure includes medical non-durables (resulting in an overestimation of around 5-10%).
2. Calculated based on the reimbursed pharmaceutical market, i.e. the sub-market in which a third party payer reimburses medicines.
3. A and B preparations are medicines that are addictive, and thus require specific prescriptions and personal ID prior to issuing. Preparations are the strongest and include morphine and other opiates. B preparations are addictive and include e.g. Valium and sleeping pills.
4. For definitions on tendering, please see Box 1.2 in section 1.3. 5. For definitions on formulary management mechanisms, please see Box 1.3 in section 1.3.
Source: Authors based on the review of coverage, pricing, prescribing and procurement practices of ten country case studies.

Spain

Spain's pharmaceutical data at a Glance

- Health expenditure (2020): 2,530 EUR per capita (constant prices and constant PPP); 10.7% of GDP
- Retail pharmaceutical expenditure (2020)[1]: 534 EUR per capita (constant prices and constant PPP); in % of HE: 21.1%
- Pharmaceutical sales (2021): 35.5 billion USD (PPP)
- Generic market shares (2021)[2]: 22.3% in value; 46.2% in volume

Coverage and pricing

- **Pricing and reimbursement authorities**
  - The Spanish Agency of Medicines and Medical Devices (*Agencia Española de Medicamentos y Productos Sanitarios*, AEMPS) is responsible for marketing authorisation and clinical assessments of medicines; The Ministry of Health (MoH) performs HTA and prepares pricing and reimbursement decisions; The Inter-Ministerial Pricing and Reimbursement Committee (CIPM) takes the final pricing and reimbursement decision; The 17 autonomous regions have primary jurisdiction over operational planning at the regional level, resource allocation, procurement and provision of health services.
- **Reimbursement lists**
  - A national positive and negative list for inpatient and outpatient medicines.
- **Reimbursement criteria**
  - Joint pricing and reimbursement decision based on the outcomes of an HTA process, which consists of a clinical assessment (added therapeutic value of the medicine) and an economic assessment (cost-effectiveness).
- **Key pricing policies**
  - **Price negotiations** between MoH and marketing authorisation holder for new reimbursed medicines.
  - **Internal reference price system** clusters reimbursed medicines at active substance level, subject to a reference price that is determined based on the lowest-priced medicine.
  - **External reference pricing** serves as a supplementary pricing policy to inform price negotiations for reimbursed medicines based on 14 European reference countries.
  - **Managed entry agreements** for new, high-priced medicines (for outpatient and inpatient use).
  - **Mandatory discounts** apply to all reimbursed medicines, amounting to 7.5% for new medicines, 4% for orphan medicines, and 15% for medicines older than 10 years without generic or biosimilar competition.
  - **Free pricing** for non-reimbursed medicines.
- **Pricing in the supply chain**
  - **Statutory regressive margin schemes** for wholesale price and pharmacy retail price applicable to all outpatient medicines.
  - **Two claw-back systems:**
  - Mandatory discount of 7.5% for new medicines and 4% for orphan medicines on the pharmacy retail price of all medicines sold to the Sistema Nacional de Salud (SNS) for outpatient and inpatient use;
  - Community pharmacies must make payments to the SNS based on their annual sales of SNS medicines at ex-factory price level.
  - **Value-added tax** of 4% on all medicines.
- **Patient co-payments for medicines**
  - **Percentage co-payments** on reimbursable medicines for outpatient use, usually linked to socio-economic status:
  - Working population: 40%, 50% or 60% co-payment, depending on yearly income
  - Retired population: 10% of the pharmacy retail price (with a ceiling depending on the yearly income) or 60% of the pharmacy retail price with a ceiling of € 61.75 per month
  - Medicines for chronic diseases always carry a co-payment of 10% of the pharmacy retail price, with a maximum of € 4.24 per pack.

Procurement and tendering

- **Types of procurement procedures**
  - Tendering[3] for inpatient and outpatient medicines, designed at indication level.
  - Centralised procurement at the national and regional level (inpatient and outpatient), facility-based procurement (inpatient) and joint procurement across hospitals (inpatient).
  - Use of dynamic purchasing systems.
  - Tendering-like systems in some regions for off-patent, outpatient medicines.
- **Tendering award criteria:** 'Most Economically Advantageous Tender (MEAT)', price, security of supply, added therapeutic value, product quality and safety and environmental criteria.

Prescribing and dispensing

- Mandatory **prescribing by International Non-Proprietary Name** (INN).
- **Generic substitution** mandatory at pharmacy level.
- **Biosimilar substitution** not allowed at pharmacy level but switching to biosimilars by doctors is allowed.
- **Hospital formularies**[4] at regional level.

Note: 1. This measure includes medical non-durables (resulting in an overestimation of around 5-10%).
2. Calculated based on the reimbursed pharmaceutical market, i.e. the sub-market in which a third party payer reimburses medicines.
3. For definitions on tendering, please see Box 1.2 in section 1.3.
4. For definitions on formulary management mechanisms, please see Box 1.3 in section 1.3.
Source: Authors based on the review of coverage, pricing, prescribing and procurement practices of ten country case studies.

Sweden

Sweden's pharmaceutical data at a Glance

- Health expenditure (2020): 3,858 EUR per capita (constant prices and constant PPP); 11.5% of GDP
- Retail pharmaceutical expenditure (2020)[1]: 470 EUR per capita (constant prices and constant PPP); in % of HE: 12.2%
- Pharmaceutical sales (2021): 6.2 billion USD (PPP)
- Generic market shares (2021): N/A

Coverage and pricing

- **Pricing and reimbursement authorities**
  - The Ministry of Health and Social Affairs: responsible for regulation and supervision; the regions are responsible for financing, purchasing, and providing health services; the National Board of Health and Welfare is the government's central advisory and supervisory agency for health and social services; and the Dental and Pharmaceutical Benefits Agency (TLV) is responsible for pricing and reimbursement decisions on outpatient medicines.
- **Reimbursement lists**
  - National positive list for outpatient medicines.
- **Reimbursement criteria**
  - Eligibility criteria include equality of access, need, and cost-effectiveness (i.e. value based pricing).
- **Key pricing policies**
  - **Statutory pricing** applicable to outpatient medicines.
  - **Internal reference pricing** determining lower bound prices for substitutable medicines within a reference cluster of product alternatives to 70% of the price in the period pre generic entry, and when generic competition has been ongoing for at least 6 months.
  - **Managed entry agreements** used for early access to high-priced new medicines.
  - **Mandatory price reductions** of 7.5% for reimbursed medicines older than 15 years that face weak competition.
  - **Free pricing** for non-reimbursed medicines.
- **Pricing in the supply chain**
  - **Pharmacy retail price** equals the wholesale price plus **pharmacy mark-up**, regulated by TLV. Dispensing fee on prescription-only medicine included in the reimbursement list.
  - **Standard VAT rate** of 25% for OTC medicines and medical devices. No VAT on prescribed medicines.
- **Patient co-payments for medicines**
  - Patient co-payments set by the regions for inpatient care - maximum annual amount of 1 200 SEK (€~109).
  - Co-payment percentages for outpatient medicines: 'high-cost threshold' incrementally reduces patient costs for prescription medicines and applies for a 12-month period from the first purchase, as follows:
    - Between 0 SEK and 1,300 SEK - patient pays 100% of the cost of the medicine
    - Between 1,301 SEK and 2,481 SEK - patient pays 50% of the cost of the medicine
    - Between 2,482 SEK and 4,610 SEK - patient pays 25% of the cost of the medicine
    - Between 4,611 SEK and 6,381 SEK - patient pays 10% of the cost of the medicine
    - Above 6,382 SEK - patient pays 0% of the cost of the medicine.

Procurement and tendering

- **Types of procurement procedures**
  - Centralised procurement at regional level performed by regions (main procurement route) and joint procurement by (individual) hospitals (additional route) for hospital medicines.
  - Centralised procurement for outpatient medicines at the national level.
  - Tendering[2] for outpatient and hospital medicines designed at active substance or therapeutic indication level.
  - Single and multi-winner awards.
  - Open procedure tenders and dynamic purchasing systems.
- **Tendering award criteria:** price, security of supply, environmental criteria, added therapeutic value and quality and safety of product.

Prescribing and dispensing

- Mandatory **generic substitution** at pharmacy level.
- **Hospital formularies**[3] at a regional level.
- **Treatment and prescribing guidelines** at both national and regional level.

Note: 1. This measure includes medical non-durables (resulting in an overestimation of around 5-10%).
2. For definitions on tendering, please see Box 1.2 in section 1.3.
3. For definitions on formulary management mechanisms, please see Box 1.3 in section 1.3.
Source: Authors based on the review of coverage, pricing, prescribing and procurement practices of ten country case studies.

United Kingdom

UK's pharmaceutical data at a Glance

- Health expenditure (2020): 3,286 EUR per capita (constant prices and constant PPP); 12% of GDP
- Retail pharmaceutical expenditure (2020)[1]: 438 EUR per capita (constant prices and constant PPP); in % of HE: 13.3%
- Pharmaceutical sales (2018): 29.7 billion USD (PPP)
- Generic market shares (2017)[2]: 36.2% in value; 85.3% in volume

Coverage and pricing

- **Pricing and reimbursement authorities**
  - Once a medicine is granted marketing authorisation and pricing approval, most likely will be granted automatic full reimbursement by the NHS England. In practice, reimbursement decisions are determined by the National Institute for Health & Care (NICE).
- **Reimbursement lists**
  - Most outpatient/primary care medicines are eligible for reimbursement except those products "blacklisted" in the Drug Tariff or those with conditional reimbursement (i.e. "Selected List" in the Drug Tariff).
  - For hospital medicines, from July 2022, coverage and reimbursement decisions are effectively the responsibility of approximately 42 Integrated Care Systems (ICS)[3].
- **Reimbursement criteria**
  - NICE assesses the incremental cost-effectiveness ratio (ICER) of a medicine against an existing appropriate reference comparator. Positive recommendations by NICE forces reimbursement by the NHS whereas negative recommendations do not necessarily prevent reimbursement.
- **Key pricing policies**
  - **Cost-effectiveness assessment** and v**alue-based pricing** dictating reimbursement by the NHS.
  - **Profit caps and price control schemes** for branded medicines reimbursed by the NHS subject to one of two price control schemes: the Voluntary Scheme for Branded Medicines Pricing and Access (VPAS[4]) and the "Statutory Scheme" for those manufacturers not joining VPAS.
  - **Free pricing** for generics.
  - **Price negotiations and managed entry agreements** for those cost-effective medicines likely to cost the NHS more than £20 million in any of the first three years of its use.
- **Pricing in the supply chain**
  - Prescription-only medicines are VAT-free.
- **Patient co-payments for medicines**
  - No copayment for medicines used in inpatient care. Patients in England are however charged for prescriptions in the community at a fixed flat rate of £9.35 per item as of 2022 (with exceptions). Wales, Northern Ireland, and Scotland have abolished the prescription charge.

Procurement and tendering

- **Types of procurement procedures**
  - Tendering[5] for generics and some on-patented medicines for hospital use. Separate tenders for each medication, forms of administration and doses. The decision to purchase a branded drug is ordinarily informed by the relevant NICE guidelines;
  - Procurement can be either at local level (e.g. directly with hospital), a regional framework agreement (e.g. through collective procurement hubs) or a national framework agreement (e.g. through NHS supply chain);
  - Single and multi-winner awards.
  - Use of open procedures.
- **Tendering award criteria:** 'Most Economically Advantageous Tender (MEAT)', including cost, product training, price, and quality.

Prescribing and dispensing

- **Generic/biosimilar substitution:** clinicians are encouraged to prescribe most products by their International Non-proprietary Name (INN). Also Integrated Care Systems (ICS) and Hospital Trusts encourage switching patients from originator to generic or biosimilar products.
- **Prescribing guidelines:** in principle doctors can prescribe any outpatient medicine, except those that are blacklisted or have their use restricted via the grey list (both lists are very limited in scope). However, prescribing is also constrained by (i) **NICE guidelines** and (ii) **Local formularies**[6]. In principle, prescribers can decide which hospital medicine to prescribe if this is reimbursed. However, in practice prescription is constrained in several ways namely by: (i) **NICE technology appraisals**; (ii) **early access agreements** and the **Cancer Drugs Fund for** high-priced medicines; and (iii) **Regional drug formularies**.

Note: 1. This measure includes medical non-durables (resulting in an overestimation of around 5-10%).
2. Calculated based on the reimbursed pharmaceutical market, i.e. the sub-market in which a third party payer reimburses medicines.
3. Integrated Care Systems (ICS) replaced Clinical Commissioning Groups (CCGs) in 2022.
4. For more details, please see Box 1.4 in the Ten Country Case Studies.
5. For definitions on tendering, please see Box 1.2 in section 1.3.
6. For definitions on formulary management mechanisms, please see Box 1.3 in section 1.3.
Source: Authors based on the review of coverage, pricing, prescribing and procurement practices of ten country case studies.

Colombia

Colombia's pharmaceutical data at a Glance

- Health expenditure (2020): 1201 USD per capita (constant prices and constant PPP); 9% of GDP
- Retail pharmaceutical expenditure (2017)[1]: 235 USD per capita (constant prices and constant PPP); in % of HE: 22.0%
- Pharmaceutical sales: N/A
- Generic market shares: N/A

Coverage and pricing

- **Pricing and reimbursement authorities**
  - The Colombian National Food & Drug Surveillance Institute (INVIMA), part of the Ministry of Health, has central responsibility over marketing authorisation for medicines, biologicals, and medical devices. The National Government, through the National Commission on Drug and Medical Device Prices (CNPMDM), is responsible for regulating medicine prices. The Institute of Technological Evaluations in Health (IETS) undertakes health technology assessment to inform pricing and reimbursement decisions, including to regulate medicine prices under the direct control regime. The Advisory Commission on Benefits, Costs, Fees, and Operating Conditions of Health Insurance (under the Ministry of Health) is in charge of deliberating which medicines should be included in the national reimbursement list (*Plan de Beneficios en Salud*, POS).
- **Reimbursement lists**
  - The SGSSS covers an **explicit list** of health care benefits (POS). However, all citizens have access to medicines excluded from POS by a judicial mandate.
- **Reimbursement criteria**
  - Technologies and medicines are nominated for inclusion in the POS based on changes in the epidemiological profile of the country and the population's disease burden. The Advisory Committee deliberates on the nominated technologies, using input from the IETS (in terms of **HTA and budget impact analysis**) and from civil society.
- **Key pricing policies**
  - **Free pricing or controlled freedom regime** for all medicines receiving marketing authorisation and not regulated under the direct control regime by order of the CNPMDM.
  - **Maximum sales prices** and **external reference pricing** through a direct control regime set by the CNPMDM at one or more levels of the supply chain, with a main on high-priced medicines whose sales price in the Colombian market are higher than the international reference price**.**
  - **Cost-effectiveness analysis** proposed in 2022 to set the Maximum Sales Price (not adopted yet).
- **Pricing in the supply chain**
  - In the institutional channel, the maximum sales price can be raised only by the same amount as the logistics costs for these medicines; which corresponds to up to 7% for drugs with a maximum sales price less than or equal to COP $1,000,000; or up to 3.5% for drugs with a maximum sales price greater than COP $1,000,000.
  - For commercial prices, prices are regulated through imposing a mark-up between the ex-factory price and the distributor price of no larger than 7%, approximately. For these regulated medicines, manufacturers, wholesalers and/or importers cannot set a higher price than the regulated one.
  - The readjustment of the maximum sale prices set by the CNPMDM is equivalent to the proportion of the variation of the Consumer Price Index (CPI) of the previous year.
- **Patient co-payments for medicines**
  - Co-payments applied to all medicines contained in the POS, except for i) promotion and prevention services, ii) control programmes in maternal and infant care, iii) control programmes in the care of communicable diseases, iv) catastrophic or high-cost diseases, v) initial emergency care.

Procurement and tendering

- Tendering[2] by therapeutic class.
- Use of PAHO's centralised procurement mechanism for the treatment of Hepatitis C.

Prescribing and dispensing

- **Generic substitution** with physicians required to prescribe medicines using the International Nonproprietary Name (INN).
- Use of **formulary management mechanisms**[3]
- **Prescribing guidelines** to favour the prescription of off-patent medicines.

Note: 1. This measure includes medical non-durables (resulting in an overestimation of around 5-10%).
2. For definitions on tendering, please see Box 1.2 in section 1.3.
3. For definitions on formulary management mechanisms, please see Box 1.3 in section 1.3.
Source: Authors based on the review of coverage, pricing, prescribing and procurement practices of ten country case studies.

Israel

Israel's pharmaceutical data at a Glance

- Health expenditure (2020): 2871 USD per capita (constant prices and constant PPP); 8.3% of GDP
- Retail pharmaceutical expenditure (2018)[1]: 369 USD per capita (constant prices and constant PPP); in % of HE: 14.6 %
- Pharmaceutical sales: N/A
- Generic market shares: N/A

Coverage and pricing

- **Pricing and reimbursement authorities**
  - The Ministry of Health (MoH) is responsible for setting medicine prices; the Medical Technology Policy Division performs health technology assessments (HTA), the 'Division for Assessment of Technology in the Health Basket' conducts additional analyses, 'Public Committee for the Expansion of the Basket' (Basket Committee) recommends which medicines to include in a positive reimbursement list.
- **Reimbursement lists**
  - National positive list for inpatient and outpatient medicines.
- **Reimbursement criteria**
  - Several criteria, including outcomes of HTA process, effectiveness, therapeutic alternatives, economic cost and added therapeutic benefit.
- **Key pricing policies**
  - **Statutory maximum prices** for outpatient and inpatient medicines.
  - **Price capping system** imposes discounts ranging between 18.5% and 80% of the regulated maximum prices of inpatient medicines.
  - **External reference pricing** sets the maximum prices of novel and biosimilar medicines based on the average of the three lowest wholesale prices across 7 European reference countries.
  - **Managed entry agreements** for reimbursed medicines.
- **Pricing in the supply chain**
  - **Regressive mark-ups** applied to pharmacy retail prices, with a 10% margin for medicines costing more than 1750 NIS per package.
  - **Value-added tax** of 17% on all medicines.
- **Patient co-payments for medicines**
  - For outpatient medicines, patients bear co-payments of up to 10% for generic medicines and 15% for patented medicines. No co-payments for inpatient medicines. There are also monthly cap on copayments.

Procurement and tendering

- **Types of procurement procedures**
  - Tendering[2] by therapeutic class.
  - Joint procurement performed by the government- and HMO-owned providers. Private providers may procure together with HMOs.
  - Single-winner awards.

Prescribing and dispensing

- **Generic substitution** at pharmacy level for same active ingredient, form, and medical effect.
- **Hospital formularies**[3] at regional level and **HMOs formularies** for framework of the healthcare basket.
- **Prescribing guidelines** recommend the use of generics or lower-cost branded products.

Note: 1. This measure includes medical non-durables (resulting in an overestimation of around 5-10%).
2. For definitions on tendering, please see Box 1.2 in section 1.3.
3. For definitions on formulary management mechanisms, please see Box 1.3 in section 1.3.
Source: Authors based on the review of coverage, pricing, prescribing and procurement practices of ten country case studies.

New Zealand

New Zealand's pharmaceutical data at a Glance

- Health expenditure (2020): 3890 USD per capita (constant prices and constant PPP); 9.7% of GDP
- Retail pharmaceutical expenditure[1]: N/A
- Pharmaceutical sales (2021): 1.2 billion USD (PPP)
- Generic market shares (2021)[2]: 34.8% in value; 83.1% in volume.

Coverage and pricing

- **Pricing and reimbursement authorities**
- Pharmaceutical Management Agency (Pharmac) determines positive reimbursement list for outpatient and inpatient medicines.

Reimbursement lists

- A positive reimbursement list for outpatient and inpatient medicines ('Pharmaceutical Schedule').

- **Reimbursement criteria**
  - Medicines assessed according to several criteria: need, health benefits, cost and savings, and suitability. Pharmac performs a cost-utility analysis to assess the benefits, costs, and savings criteria. The decision whether to include a medicine ultimately depends on the amount of funding available, which is fixed by the Combined Pharmaceutical Budget.
- **Key pricing policies**
  - **Managed entry agreements** and **confidential rebates** for reimbursed medicines.
  - **Expenditure caps**, and **volume- and unit- based discounts** for reimbursed medicines.
  - **External reference pricing** used only informally to support pricing negotiations.
  - **Tendering and multi-product contracting** for reimbursed medicines to establish new pricing."
  - **Free pricing** for non-reimbursed medicines.
- **Pricing in the supply chain**
  - Health providers pay the pharmacy's handling and services fees for reimbursed outpatient medicines. The **handling fee** is paid for the dispensing of a medicine, while the **service fee** is calculated using a multiplier that is applied to the base handling fee.
  - **Pharmacy mark-ups** and **pack fee**: for reimbursed medicines, the mark-up is regulated as a percentage of the reimbursement amount, while the pack fee is unit-adjusted. Pharmac does not practice partial funding anymore, although the Pharmaceutical Schedule still includes medicines that have been historically partially-funded.
- **Patient co-payments for medicines**
  - Co-payment for all fully reimbursed outpatient medicines of 5 NZD.
  - Co-payments are capped at 20 prescriptions per family per year.
  - Out-of-pocket payments for higher-risk groups through the High Use Health Cards, and for low-income earners through the Community Services Card are subsidized.

Procurement and tendering

- **Types of procurement procedures:**
  - National level procurement for inpatient and outpatient medicines.
  - Tendering[3] by active substance and therapeutic class.
  - "Principal Supply Status": supplier who is awarded the "Principal Supply Status" is guaranteed up to 95% of the total funded market for about 3 years.
  - Multi-product tenders: manufacturers offer price reductions on already reimbursed products in return for the inclusion of their newer products in the reimbursement list.
  - Requests for Proposals (RFPs): used when tendering is not appropriate (e.g. on-patent medicines). Pharmac invites suppliers to submit proposals for specific indications. Suppliers put in pricing for 1st line and 2nd line access (preferential listing).
  - Alternative Commercial Proposals (ACPs): Suppliers submit ACPs for the products they would like to exclude from the annual multi-product tender. Pharmac then decides between the ACP and launching an official tender for those products.
- **Tendering award criteria: '**Factors for Consideration' framework, used to evaluate tender bids, stresses the impact of the fixed budget on funding decisions, meaning that price is an important tender criterion.

Prescribing and dispensing

- **Prescribing by International Non-Proprietary Name** (INN) recommended.
- **Hospital formularies**[4] at a national level.
- **'Dispensing variation'.** Pharmacists may substitute the prescribed product that has no subsidy or has a manufacturer's price higher than the subsidy to the fully-subsidised alternative listed in the Schedule.

Note: 1. This measure includes medical non-durables (resulting in an overestimation of around 5-10%).
2. Calculated based on the reimbursed pharmaceutical market, i.e. the sub-market in which a third party payer reimburses medicines.
3. For definitions on tendering, please see Box 1.2 in section 1.3.
4. For definitions on formulary management mechanisms, please see Box 1.3 in section 1.3.
Source: Authors based on the review of coverage, pricing, prescribing and procurement practices of ten country case studies.

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