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# The supply of generic medicines in the UK

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A study by Oxera

Prepared for  
The British Generic Manufacturers  
Association

26 June 2019

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## About this report

The British Generic Manufacturers Association (BGMA) commissioned Oxera to prepare a report on the supply of generic medicines in the UK to inform whether the existing market and regulatory mechanisms are appropriate in the current context.

To prepare this report, we have relied on a variety of sources of information including structured interviews with a selection of BGMA members; data on prices of generic medicines provided by BGMA; data from third party data providers, IQVIA, WaveData and MPA Business Services; and various publicly available information. All sources of information are mentioned in the main body of the report, where relevant.

In conducting our analysis, we have sought to adopt clear and objective criteria given the available information. Where the analysis was limited by unavailability of data and the methodology needed to be modified, we have explained the difference in approach.

For any questions about this report, please contact Oxera: [enquiries@oxera.com](mailto:enquiries@oxera.com)

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## **Executive summary**

### **Context and scope**

The UK pharmaceutical industry, and in particular the generic medicines segment within it, has grown significantly in recent years. For example, the use of generic medicines has doubled between 2005 and 2017 to reach 75% of total prescriptions. At the same time, they account for only 28% of NHS spending on drugs valued at reimbursement prices. These developments have been, to a large extent, driven by the increased focus of regulators and policymakers in the UK on reducing overall healthcare costs. At the same time, there has been a high level of scrutiny of the pricing of medicines and associated business practices of the pharmaceutical industry, including the generic medicine segment.

In this context, the British Generic Manufacturers Association (BGMA) commissioned Oxera Consulting (Oxera) to undertake a study to assess whether the existing market and regulatory mechanisms in place for the supply of generic medicines in the UK within the primary care environment are delivering benefits for patients and the government, and whether they are appropriate in the current context.

### **Approach and methodology**

For the assessment presented in this report, we adopted three broad approaches: 1. structured interviews with generic manufacturers on key drivers of business decisions; 2. quantitative analyses of prices of sets of generic medicines in the UK relative to those of the relevant branded medicine and to prices of the same products in other countries; and 3. a qualitative assessment of current regulatory arrangements.

One key feature of the quantitative analysis in this study is that it focuses, where possible, on actual selling prices charged by manufacturers of generic medicines, and not on other measures such as the reimbursement price. We find that there can be a material difference between the reimbursement price of a specific product and the actual selling price obtained by the manufacturer. Analysis of a set of Category M products shows that, on average, the actual manufacturer selling price is around half of the reimbursement price paid by the NHS. The remainder of what the NHS pays is used to cover distribution costs, as well as providing a mechanism for the payment of £800m to fund community pharmacies, as agreed between the Department of Health and Social Care (DHSC) and the Pharmaceutical Services Negotiating Committee (PSNC).

### **Main findings**

Overall, our analysis suggests that the market mechanisms for the supply of generic medicines in the UK are functioning well. Based on the above qualitative and quantitative assessments, we find that generic medicines in the UK are delivering significant price reductions following loss of exclusivity, and manufacturers of generic medicines appear to respond effectively to price signals and competition.

The qualitative assessments of the supply chain and supplier strategies provide a number of insights regarding generic entry and subsequent pricing, as follows.

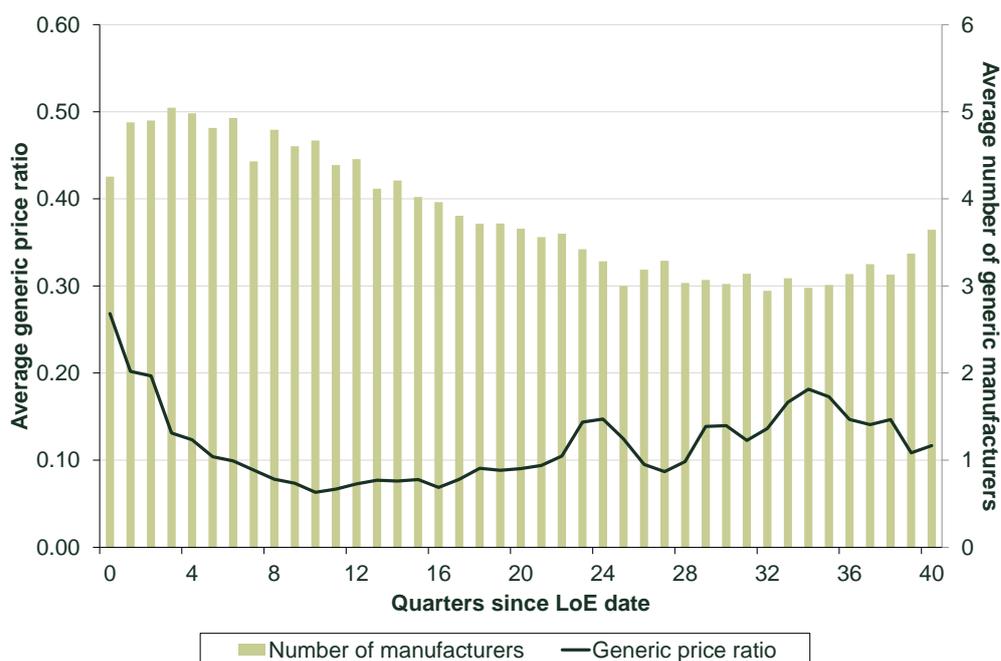
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- Generic manufacturers typically take a systematic approach when deciding whether to start supplying a particular product. Commercial expectations, and in particular profitability, are a common consideration, as are factors such as complexities of production and the size of potential upfront costs of research and development.
- Other factors such as portfolio fit can also be important, depending on the business model of the company in question. For instance, large companies producing a wide portfolio of products will attach importance to the fit of a new product with an existing portfolio even if stand-alone profitability is expected to be low.
- In addition, geographic considerations can play a role in the decision to start supplying a product in a particular country, with overall market size and profitability across multiple territories becoming important factors. In this context, despite its comparatively low prices, the UK is seen as an attractive market due to its large size and low regulatory barriers.
- Once generic entry has occurred, the price of a product is typically driven by supply and demand forces, and individual suppliers have little influence. In some instances, this can mean that prices fall below the level where production is profitable for a period of time until manufacturers adjust their strategies.
- Importantly, manufacturers have the ability to change their production levels and prices relatively easily to react to changes in market conditions. In the short term, manufacturers generally avoid exiting entirely, instead decreasing production if market conditions are adverse and increasing production if market conditions improve. This creates a self-correcting mechanism whereby short-term and significant price increases are often met with additional supply followed by a decrease in price.

The quantitative analysis of the prices of generic medicines supports the above findings.

- Analysis of prices of a sample of products under Scheme M shows that the actual selling prices charged by generic manufacturers in the UK are, on average, significantly lower than the price of the originator's branded product before the loss of exclusivity. While there is variation in the extent and speed of price changes across different products, on average, the generic price in the six months after loss of exclusivity is 70% lower, falling to 80–90% lower over a four-year period, as shown in the figure below.
  - The same analysis shows that, while generic prices can sometimes increase many years after entry, in the long run the generic price, on average across the set of products analysed, remains around 80% lower than the price of the relevant branded product before the loss of exclusivity.
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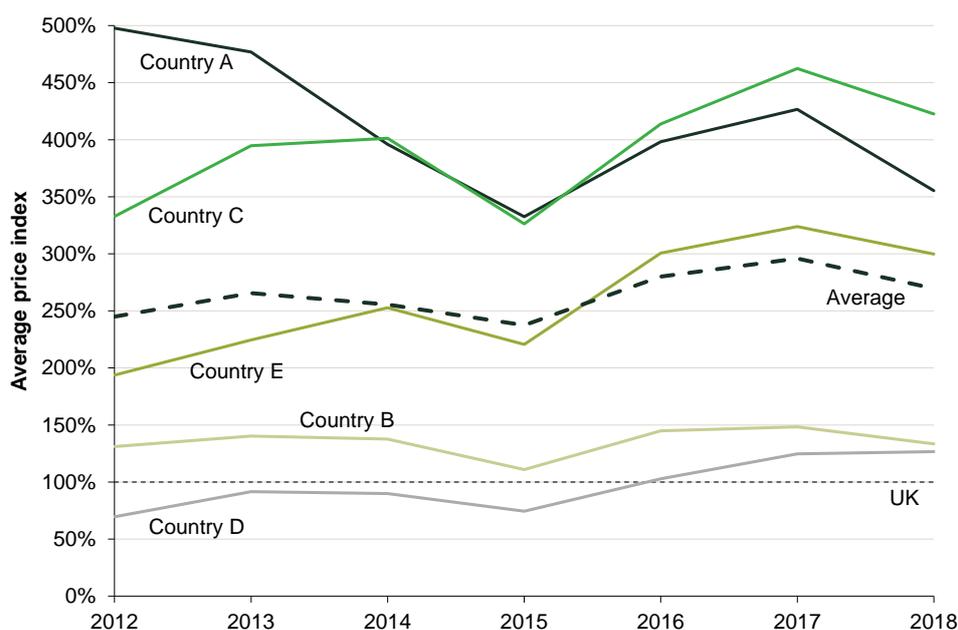
### Average generic price relative to brand price pre loss of exclusivity



Source: Oxera analysis based on data from Scheme M, BGMA members and MPA.

- A further analysis of a set of material price increases shows that many of these increases are reversed over time. In particular, in many cases where there was a significant price increase over a short time, these had largely dissipated within 12 months. The extent of reversal was lower, and slower, for price increases that occurred over a long period of time. A closer look at selected case studies suggests that prices may not be fully (or quickly) reversed due to changed market conditions such as regulatory issues and supply chain disruptions.
- A comparison of prices across five European countries suggests that prices of generic medicines in the UK are generally lower than in the other countries—and often by a large amount. The prices of the analysed products in several of these countries, are, on average, 3 to 4.5 times more expensive than in the UK. As shown in the figure below, although the relative magnitudes have changed to some extent over time, these results have broadly held since 2012, indicating that the lower prices for generic medicines in the UK may be due to long-standing features of the UK system such as freedom of pricing.

### Average selling price in other countries relative to the UK, 2012–18



Source: Oxera based on IQVIA data.

Our assessment concludes that, overall, the price regulation and market mechanisms that are currently in place in the UK are fit for purpose. This is supported by the cross-country comparison, which indicates that the higher prices of some other European countries relative to the UK are likely to be driven by national pricing regulations. In other words, the current UK system provides strong incentives for competition and delivers significant benefits relative to other systems.

Notwithstanding these findings, specific products may need a higher level of intervention to ensure that prices are fair and reasonable and that patients and the NHS are getting value from the use of generic medicines. Given the nature of the existing market-based framework, interventions should be targeted at cases where competition is not delivering the benefits that would be expected (for instance, in the presence of persistent barriers to entry), leading to worse outcomes for patients and the NHS (such as higher prices).

In such cases, it is necessary to carefully consider the nature of intervention to avoid potential unintended consequences. While the assessment will vary according to the specific product and context, we find that the key considerations in general include an analysis of entry barriers and prospective competition, cost drivers, pricing strategy of the suppliers, profitability of the specific product as well as of the portfolio, and overall value delivered to patients including non-price benefits such as patient access to medicine and choice.

## Definition of terms

Term	Definition
Active Pharmaceutical Ingredient (API)	The chemical substance responsible for the therapeutic effect of a specific medicine.
Actual selling price/manufacturer actual selling price	The price received by the manufacturer for a specific medicine.
Branded generic	A medicine that is no longer subject to patent (or other) protection but is marketed under a brand name, which is often required by MHRA for clinical reasons.
Category A/C/M	Classification used by the UK government to group different types of generic medicines for reimbursement purposes.
Data exclusivity	A period during which the originator's clinical trial data is not made available to other potential suppliers of a medicine when applying for a Marketing Authorisation.
DHSC	The Department of Health and Social Care.
Drug Tariff/Reimbursement price	The monetary amount that pharmacies receive from the NHS for a specific medicine as reimbursement for their purchase from wholesalers and/or manufacturers.
Generic medicine	A medicine that is developed to be the same as a medicine that has already been authorised and patented (the 'reference medicine' or the 'patent protected branded medicine'). A generic medicine contains the same active substance(s), and it is used at the same dose(s) to treat the same disease(s) as the reference/patent-protected branded medicine. However, the name of the medicine, its appearance (such as colour or shape) and its packaging can be different.
Loss of exclusivity	The point at which patents and/or other protection relevant to the reference medicine has expired and generic medicines can be supplied.
Marketing Authorisation (MA)	The MHRA/EMA licence required to market a particular medicine in the UK and other relevant countries in the EU
Medicines and Healthcare products Regulatory Agency (MHRA)	The government body responsible for regulating the quality, safety and efficacy of medicines in the UK
No Cheaper Stock Obtainable (NCSO) status	Where DHSC allows pharmacists to be reimbursed at a purchase price higher than the Drug Tariff reimbursement price because the pharmacist was not able to procure a medicine at the Drug Tariff price.
Originator	The supplier of the patent-protected brand of a particular medicine, on which the generic is based. The originator may

also be the relevant patent holder for the specific pharmacological substance.

Patent	The legal protection (for 20 years) granted to the developer of a new pharmacological substance or process granting exclusive rights over the substance/process for a period of time.
Price concession	Where the DHSC temporarily allows for a higher reimbursement price for a particular medicine.
Price to pharmacy	The price paid by a pharmacy for a medicine. This is typically equal to the ex-wholesaler price.
Scheme M	The voluntary scheme whereby suppliers of generic medicines submit information about sales and volumes to the DHSC.
Supplementary Protection Certificate (SPC)	A form of IP that extends the protection of patented active ingredients present in pharmaceutical or plant protection products. It is intended to compensate a patent holder for delays to using their patent associated with meeting regulatory or licencing requirements.
Voluntary Pricing and Access Scheme (VPAS)	The 2019 five-year voluntary scheme negotiated by the DHSC and the Association of the British Pharmaceutical Industry (ABPI) applicable to all branded medicines, whether patent-protected or not. VPAS replaced the PPRS, the name or abbreviation given to the series of previous voluntary branded medicines agreements negotiated between the DHSC and ABPI.

# 1 Introduction

## 1A Context and scope

- 1.1 The UK pharmaceutical industry, and in particular the generic medicines segment within it, has grown significantly in recent years. The NHS prescription database shows that the number of generic prescriptions doubled between 2005 and 2017 from 415m to 824m.<sup>1</sup> This represents an increase in the share of generically dispensed prescriptions from 59% to 75%. This level of penetration of generic products compares favourably with the OECD average of 52%.<sup>2</sup> Moreover, despite accounting for the vast majority of medicines being prescribed, generics accounted for only 28% of NHS spending on drugs at reimbursement price.<sup>3</sup>
- 1.2 These developments have been, to a large extent, driven by the increased focus by regulators and policymakers in the UK on reducing overall healthcare costs. The growth of generic prescriptions, for example, has been facilitated partly by targeted government initiatives to encourage doctors to write ‘open scripts’ which specify only the name of the chemical substance (or molecule) and not any particular brand name. The UK regulatory system for pharmacists, on the other hand, incentivises them to dispense generic medicines against these open scripts, which in turn contributes to price reductions through competition between manufacturers. More generally, there has been an increased pressure on the industry to decrease the cost of medicines and a high level of scrutiny on the pricing of medicines and other associated business practices, including scrutiny by the UK Department of Health and Social Care (DHSC), the UK Competition and Markets Authority (CMA) and, more recently, NHS England.
- 1.3 For example, since 2016, the CMA has opened more than seven investigations into alleged infringements of competition law by suppliers of generic medicines, including unfair or excessive prices. The government has also clarified DHSC’s powers to intervene in the pricing of generic medicines under the Health Service Medical Supplies (Costs) Act 2017. In particular, in 2017 the government made it clear that the DHSC could intervene at any time in the pricing of any generic medicine if it deemed it necessary.<sup>4</sup> This in turn raises questions about when these powers should be used, and, if the DHSC does decide to intervene, how it should assess whether the price of the investigated generic medicines is reasonable.
- 1.4 In this context, the British Generic Manufacturers Association (BGMA) commissioned Oxera to undertake a study to assess whether the existing market and regulatory mechanisms for the supply of generic medicines in the UK are delivering benefits for patients and government, and whether they are appropriate in the current context. Specifically, this report seeks to examine two broad issues:

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<sup>1</sup> Source: NHS Prescription data based on growth in class 1 products (prescribed and reimbursed generic products).

<sup>2</sup> Source: OECD (2017), ‘Health at a Glance 2017’.

<sup>3</sup> Source: DHSC cited in National Audit Office (2018), ‘Investigation into NHS spending on generic medicines in primary care’, 4 June. This includes £800m of retained margin paid to pharmacies through Scheme M.

<sup>4</sup> The ability of DHSC to intervene in generic medicines was present under Scheme M, which is an arrangement between the DHSC and the British Generic Manufacturers Association covering the collection of data and pricing of generic medicines. The 2017 Act clarified this and closed the gap to formally allow DHSC to set the price of all generic medicines, in particular when the manufacturer is a member of the PPRS and any subsequent voluntary branded medicines schemes.

- the competitiveness of the generic pharmaceutical sector. This includes the question of whether the supply of generic medicines is delivering value, including through lower pricing of, and/or better access to, medicines;
- the effectiveness of the current regulatory systems, including the system for pricing and reimbursement in the UK, and the current arrangements whereby the DHSC receives data on pricing and volumes from producers.<sup>5</sup>

1.5 We adopted a mix of qualitative and quantitative analyses to investigate the following questions.

- What are the key drivers of strategic decisions such as entry and pricing, and the overall competitiveness of the supply of generic medicines in the UK?
- What is the impact of generic products on the price of medicines in the UK? How do actual manufacturer selling prices of generic medicines compare with those of branded products?
- Does the generics sector witness price increases?
  - a. If so, how long do these price increases last? Are the existing market mechanisms able to limit or reverse such increases, for example by encouraging entry?
  - b. Conversely, if prices are low for a sustained period, can there be other consequences of this such as shortages?
- How do prices of generic medicines in the UK compare with those in other countries?
- Is the existing regulatory framework for the pricing of generic medicines in the UK appropriate, given established regulatory principles?

1.6 While there are past studies that have analysed the impact of generic entry, a key aspect that differentiates this report from others is its focus on the actual selling prices of the manufacturers of generic medicines—i.e. after the pharmacy margin, wholesaler margin and distribution costs have been accounted for. As explained in sections 2 and 3 of this report, it is important to distinguish between the different layers of the value chain in any assessment of the overall functioning of the supply of generic medicines in the UK. This report does so by focusing on the actual selling prices charged by manufacturers, instead of other measures such as the Drug Tariff or reimbursement price paid by the DHSC (which includes the total combined amount paid to manufacturers, wholesalers and pharmacies). Our approach is discussed further below. We note that the focus of this report is primary care and sales of medicines through community pharmacies.

## **1B Approach and methodology**

1.7 To undertake the assessment presented in this report, we adopted the following three broad approaches.

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<sup>5</sup> Currently, this arrangement is covered under Scheme M, which effectively provides for the DHSC to receive Scheme M member selling price and volume data in return for freedom of pricing, as long as prices are deemed reasonable. The data received is used to inform the setting of reimbursement prices. Scheme M will be terminated in mid-2019, although the arrangement will effectively continue under the Health Medical Supplies (Costs) Act.

- **Structured interviews with manufacturers of generic medicines on key drivers of business decisions:** to gain a good understanding of the wider context, we conducted interviews with different types of suppliers of generic medicines to inform the key drivers of business decisions. This included understanding the strategic considerations for, and the processes followed in, entry (or exit) and pricing decisions.

Such a qualitative assessment of the economic context within which business decisions are made is important for assessing the functioning of the market and existing regulations. In doing so, we sought to speak to representatives from different types of generic suppliers covering a range of business models, sizes and product portfolios.

- **Quantitative analysis of generic medicine prices:** to assess the impact of generic products on the price of medicines, we analysed actual selling prices charged by manufacturers of generic medicines in the UK. In particular, our analysis included a comparison of these prices against two benchmarks: (i) the price of the corresponding branded product before generic entry; and (ii) the price of the same product in a selected number of other countries. These analyses inform the extent of the price benefits delivered by generic medicines. We also investigated a set of price increases observed in the dataset, to inform the nature of these increases and to test whether they are reversed through the existing market and regulatory forces.

These analyses are based on a range of data sources including aggregated data returns made to the DHSC under Scheme M by manufacturers, specific datasets held by some BGMA members, specialist data providers, and publicly available data. Section 4A provides further details. Due to a lack of appropriate data, this study did not capture the impact of generic competition on the prices of the relevant branded medicine supplied by the originator following loss of exclusivity.

- **Qualitative assessment of current regulatory arrangements:** finally, we assessed the current regulatory and market arrangements in light of the evidence described above and established regulatory principles.

## 1C Structure of the report

1.8 The remainder of this report is structured as follows.

- Section 2 sets out the market background, including a brief overview of the supply chain and the current regulation of generic medicines in the UK.
- Section 3 discusses the key drivers of strategic decisions by generic manufacturers, as informed by structured interviews with manufacturers. This, together with section 2, provides the overall economic context within which the supply of generic medicines takes place in the UK.
- Section 4 sets out our quantitative analysis of the impact of generic competition in the UK on outcomes, including a comparison with selected other countries.
- Section 5 discusses our overall assessment of the existing regulatory arrangements in light of the above analysis.

1.9 A summary of our conclusions is set out below.

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## 1D Summary of conclusions

- 1.10 Overall, our analysis suggests that the market mechanisms for the supply of generic medicines in the UK are functioning well. Based on the above qualitative and quantitative assessments, we find that generic medicines in the UK are delivering significant price reductions following loss of exclusivity, and that manufacturers of generic medicines appear to respond effectively to price signals and competition.
- 1.11 The qualitative assessment of the supply chain and supplier strategies provides a number of insights regarding generic entry and subsequent pricing, as follows (see section 3).
- Generic manufacturers typically take a systematic approach when deciding whether to start supplying a particular product. Commercial expectations, and in particular profitability, are a common consideration, as are factors such as complexities of production and the size of potential upfront costs of research and development.
  - Other factors such as portfolio fit can also be important, depending on the business model of the company in question. For instance, large companies producing a wide portfolio of products will attach importance to the fit of a new product with an existing portfolio even if stand-alone profitability is expected to be low.
  - In addition, geographic considerations can play a role in the decision to start supplying a product in a particular country, with overall market size and profitability across multiple territories becoming important factors. In this context, despite its comparatively low prices, the UK is seen as an attractive market due to its large size and low regulatory barriers.
  - Once generic entry has occurred, the price of a product is typically driven by supply and demand forces, and individual suppliers have little influence. In some instances, this can mean that prices fall below the level where production is profitable for a period of time until manufacturers adjust their strategies.
- 1.12 Importantly, manufacturers have the ability to change their production levels and prices relatively easily to react to changes in market conditions. In the short term, manufacturers generally avoid exiting entirely, instead decreasing production if market conditions are adverse and increasing production if market conditions improve. This creates a self-correcting mechanism whereby short-term and significant price increases are often met with additional supply followed by a decrease in price.
- 1.13 The quantitative analysis of the prices of generic medicines supports the above findings, in the following ways.
- Analysis of prices of a sample of products under Scheme M shows that the actual selling prices charged by generic manufacturers in the UK are, on average, significantly lower than the price of the originator's branded product before the loss of exclusivity. While there is variation in the extent and speed of price changes across different products, on average, the generic price in the six months after loss of exclusivity is 70% lower, falling to 80–90% lower over a four-year period. See section 4B.2.
  - The same analysis shows that, while generic prices can sometimes increase many years after entry, in the long run the generic price, on
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average across the set of products analysed, remains around 80% lower than the price of the relevant branded product before the loss of exclusivity.

- A further analysis of a set of material price increases shows that many of these increases are reversed over time. In particular, in many cases where there was a significant price increase over a short time, these had largely dissipated within 12 months. The extent of reversal was lower, and slower, for price increases that occurred over a long period of time. A closer look at selected case studies suggests that prices may not be fully (or quickly) reversed due to changed market conditions such as regulatory issues and supply chain disruptions. See section 4B.3.
- A comparison of prices across five European countries suggests that prices of generic medicines in the UK are generally lower than in the other countries—and often by a large amount. The prices of the analysed products in several of these countries, are, on average, 3 to 4.5 times more expensive than in the UK. Although the relative magnitudes have changed to some extent over time, these results broadly hold since 2012, indicating that the lower prices for generic medicines in the UK may be due to long-standing features of the UK system such as freedom of pricing. See section 4C.

- 1.14 Our assessment concludes that, overall, the price regulation and market mechanisms that are currently in place in the UK are fit for purpose. This is supported by the cross-country comparison, which indicates that the higher prices of some other European countries relative to the UK are likely to be driven by national pricing regulations. In other words, the current UK system provides strong incentives for competition and delivers significant benefits relative to other systems. See section 5A.
- 1.15 Notwithstanding these findings, specific products may need a higher level of intervention to ensure that prices are fair and reasonable and that patients and the NHS are getting value from the use of generic medicines. Given the nature of the existing market-based framework, interventions should be targeted at cases where competition is not delivering the benefits that would be expected (for instance, in the presence of persistent barriers to entry), leading to worse outcomes for patients and the NHS (such as higher prices). See section 5B.1.
- 1.16 In such cases, it is necessary to carefully consider the nature of intervention to avoid potential unintended consequences. While the assessment will vary according to the specific product and context, we find that the key considerations in general include an analysis of entry barriers and prospective competition, cost drivers, pricing strategy of the suppliers, profitability of the specific product as well as of the portfolio, and overall value delivered to patients including non-price benefits such as patient access to medicine and choice (see further in section 5B.2).

## **2 Background to the supply of generic medicines in the UK**

2.1 This section sets out the background to the supply of generic medicines in the UK. Section 2.1 discusses the different layers of the supply chain and business models, while section 2.2 provides an overview of the key aspects of the regulatory framework.

### **2A Supply chain and business models**

2.2 The supply chain for pharmaceutical products in the UK (and worldwide) consists of a number of layers, which depend to some extent on the stage of the lifecycle of a specific medicine.

2.3 In particular, a specific medicine or treatment is typically patented by a single pharmaceutical company (referred to as the ‘originator’), following extensive research and development (R&D) and subsequent commercialisation stages. In effect, the patent grants the originator freedom from direct competition in the specific molecule for a certain period of time, in return for its investment in developing the treatment and bringing it to the market.<sup>6</sup> Originators are also awarded data exclusivity for ten years through the regulatory licensing system, whereby no other supplier may use the clinical and other data submitted by the originator for the purposes of the licence. At this stage, other potential manufacturers of generic versions of the same medicine (referred to as ‘generic manufacturers’ or ‘generic suppliers’ in this report) cannot supply.

2.4 Entry of generic versions of the medicine typically becomes possible only at a later stage, when the originator’s product is no longer protected by any relevant patent or other form of exclusivity.<sup>7</sup> Generic entry is also possible if the so-called generic product does not infringe the originator’s patents, or if the originator’s patent(s) is invalidated by the court at any point of time.<sup>8</sup> Such a loss of exclusivity effectively allows for the possibility of entry of one or more generic versions of the specific medicine/treatment. The extent of generic entry (i.e. the number of generic manufacturers that enter) depends on a range of factors, which we discuss further in section 3.

2.5 Figure 2.1 below sets out a stylised illustration of the different layers of the supply chain after the entry of at least one generic product. Following such entry, dispensers (such as pharmacies) and prescribers have the choice of the originator’s branded product (if it continues to be available), and the relevant generic product(s).

#### **2A.1 Distribution**

2.6 Typically, the originator and generic manufacturers distribute their products through wholesalers, which supply to pharmacies, dispensing doctors and hospitals.

2.7 In the UK, the two largest full-line wholesalers<sup>9</sup> are AAH Pharmaceuticals and Alliance Healthcare. For example, AAH is reported to be the UK’s largest

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<sup>6</sup> The period of exclusivity can vary, depending on a range of factors such as whether the patent is for the molecule, or for the process of making the product.

<sup>7</sup> These patents could cover the molecule itself. Even if the molecule patent has expired, the originator’s product may be protected by patents covering the specific production process required to manufacture the product. Alternatively, different patents may exist for specific indications, and these may expire at different times.

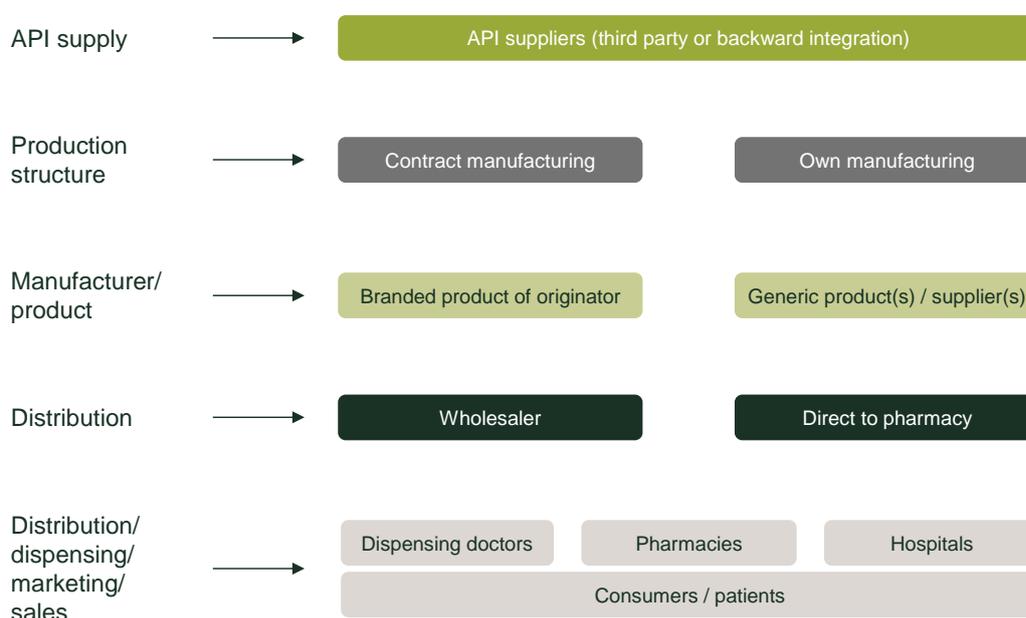
<sup>8</sup> Litigation between an originator and potential generic entrants regarding potential invalidity and/or non-infringement of patents occurs in many instances.

<sup>9</sup> Full-line wholesalers are those supplying a very wide range of products to pharmacies and other channels.

pharmaceutical wholesaler, with over 30% market share.<sup>10</sup> Overall, eight wholesalers are responsible for distributing over 92% of NHS medicines.<sup>11</sup> The largest wholesalers also own national chains of pharmacies, covering about half the 12,000 pharmacies in the UK (for example, Alliance is part of the same group as Boots Pharmacy, and AAH as Lloyds Pharmacy). This wholesale/pharmacy integration leaves the other half of the market to a large number of short-line and regional wholesalers, which supply primarily independent pharmacies.

- 2.8 Recently, there has been a move towards other distribution models such as the ‘Direct to Pharmacy’ model by pharmaceutical companies (in particular, originator companies supplying branded medicines). This is primarily to avoid excessive reliance on wholesalers.
- 2.9 Generic manufacturers are, however, generally reliant on wholesalers for further distribution to community pharmacies. We understand from BGMA that almost 80% of generic medicines are supplied via wholesale.<sup>12</sup> In this case, a generic manufacturer supplies its product to a wholesaler at a particular price, referred to as ‘**Price to Wholesaler**’. The wholesaler, in turn, accounts for its own distribution costs and margins and supplies the product to pharmacies at a higher price, referred to as ‘**Price to Pharmacy**’. As explained in section 2B.3, the pharmacy is in turn reimbursed by the NHS at the Drug Tariff price, which is typically higher than Price to Pharmacy to account for dispensing costs for pharmacies plus some margin.

**Figure 2.1 Stylised illustration of the supply chain for medicines in the UK and business models (after generic entry)**



Source: Oxera.

<sup>10</sup> Paragon, ‘Paragon software helps AAH Pharmaceuticals achieve substantial transport cost savings’, <https://www.paragonrouting.com/en-gb/case-studies/post/paragon-software-helps-aaah-pharmaceuticals-achieve-substantial-transport-cost-savings/>.

<sup>11</sup> Source: The Healthcare Distribution Association (HDA UK).

<sup>12</sup> This is slightly complicated owing to the fact that some pharmacies and wholesalers are part of a single vertically integrated business, so the differentiation between supplying direct to pharmacy and to wholesale is less defined.

## 2A.2 Manufacturing and supply

- 2.10 As for the manufacturing and supply of generic medicines, there are a range of business models used by suppliers.
- 2.11 Some generic suppliers have their own manufacturing facilities (either in the UK or elsewhere), while some outsource the manufacturing process to contract manufacturers. For example, among BGMA members,<sup>13</sup> Accord has a very large manufacturing base in the UK, Sandoz and Teva manufacture mostly in the EU, and Lupin and Glenmark have production facilities in India. Most BGMA members obtain some products from contract manufacturers. Companies such as Consilient Health, Advanz and Aspire entirely outsource manufacturing.
- 2.12 Generic suppliers may also differ in terms of whether they source the relevant active pharmaceutical ingredient (API) required for a product from a third party supplier, or whether they are ‘backwards integrated’—i.e. have their own API manufacturing division. For example, among BGMA members, Glenmark, Dr Reddy’s and Aurobindo produce most of their own API. Backward integration can be attractive due to the lower risks of supply disruptions and the higher level of control over the cost base. However, this is not feasible for many generic suppliers given the financial and logistical requirements for such a business model.

## 2A.3 Competitive dynamics

- 2.13 Overall, after generic entry, the competitive interaction between the originator and the generic supplier(s)—as well as between the different generic suppliers if there is more than one—is driven to a large extent by price. Both originators and generic suppliers compete on the basis of the price that they offer to wholesalers and/or pharmacies (depending on the business model) plus any additional rebates they may offer in order to incentivise them to supply their respective product and therefore gain share. As discussed further in section 2B below, such competitive pricing is a key dynamic in the community pharmacy segment, given the existing framework for pharmacy reimbursement.
- 2.14 In general, the pricing of the generic product and the competitive dynamics for the supply of a particular medicine depend on a range of factors. As discussed in detail in section 3, these include the business model of the generic supplier(s), the strategy of the originator, and the number of competitors. For example, some generic manufacturers focus on a narrow set of products relating to certain therapeutic areas, and these suppliers may be particularly competitive in the relevant products, relative to others who seek to produce a range of products.
- 2.15 The supply of generic medicines is also affected by the characteristics of the specific product. Generic medicines vary in the difficulty or complexity of their development and production (for example, inhalers and injectables are generally considered to be more complex), in the availability and the cost of the API (which is largely determined globally) and in the potential size of total sales (which in turn is determined by the incidence of the relevant clinical condition), among other factors. As highlighted in the interviews with manufacturers, these factors affect many strategic decisions, including whether to seek to supply, and pricing (discussed further in section 3).

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<sup>13</sup> For a complete list of BGMA members, see British Generic Manufacturers Association, ‘About us’, <https://www.britishgenerics.co.uk/about-us>.

## **2B Overview of the regulatory framework**

2.16 The regulatory framework governing the pharmaceutical sector in the UK, and particularly the generic medicines segment, is an important factor to take into account in an assessment of the functioning of the market. This includes the Voluntary Pricing and Access Scheme (VPAS) for branded medicines, Scheme M (albeit this is soon to be replaced by a similar statutory scheme)—which is another voluntary scheme for generic medicines, and the reimbursement framework for pharmacies. Below we provide an overview of the key aspects, to serve as a high-level background. It is not intended to be a comprehensive description of all the regulations in place in the sector.

### **2B.1 Voluntary Pricing and Access Scheme**

2.17 The VPAS is a five-year voluntary scheme negotiated by the DHSC and the Association of the British Pharmaceutical Industry (ABPI) that is applicable to all branded medicines, whether or not they are patent-protected.<sup>14</sup> The VPAS, which follows on from the series of PPRS-titled voluntary agreements, contains a number of provisions that create direct or indirect restrictions on the pricing of medicines, including the following.

- Pricing approval, which means that the price of a new product must be approved by DHSC (unless it contains a new API). Price increases for existing drugs are also subject to DHSC approval.
- Profit cap, which refers to the fact that members of the VPAS are subject to an overall profit cap of 6% return on sales and 21% return on capital. Members must also adhere to restrictions on certain cost categories for the purposes of the profit cap.<sup>15</sup>
- Sales growth cap. VPAS includes an overall cap of 2% on the total net sales growth for branded medicines. If total sales are expected to exceed this cap, scheme members make payments to DHSC based on their net sales of relevant medicines in order to make up the difference between allowed and forecast growth in sales to the NHS.

2.18 Companies that choose not to participate in the VPAS are subject to the shadow statutory pricing controls and rebates to the DHSC.<sup>16</sup>

2.19 In addition to the above constraints on overall drug spending and profitability under the VPAS, the National Institute for Health and Care Excellence (NICE)<sup>17</sup> plays an important role in ensuring that expenditure on medical technology (including branded medicines) is cost-effective with respect to patient outcomes. In particular, NICE uses a metric known as quality-adjusted life years (QALY) in order to measure patient outcomes. NICE's recommendations as to whether a (branded) medicine should be made available and reimbursed by the NHS are informed by a number of benchmarks for spending per QALY (among other things).

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<sup>14</sup> Department of Health and Social Care (2018), 'The 2019 Voluntary Scheme for Branded Medicines Pricing and Access - Chapters and Glossary', December, para. 2.38.

<sup>15</sup> In particular, there are limits to the share of costs that can be allocated to R&D and information, as well as an overall maximum amount that can be spent on marketing.

<sup>16</sup> The Branded Health Service Medicines (Costs) Regulations 2018.

<sup>17</sup> National Institute for Health and Care Excellence, 'NICE guidance', <https://www.nice.org.uk/guidance>.

## 2B.2 Scheme M

- 2.20 Scheme M is a voluntary scheme for generic medicines that involves provision of information by participating suppliers about sales in England.<sup>18</sup> Under Scheme M, suppliers of generic medicines that are members of the Scheme submit to the DHSC information on revenues received and volumes supplied, including any relevant rebates within the sales data, on a quarterly basis for each molecule by strength, presentation and pack size (e.g. paracetamol 500mg tablets 20tabs/pack).<sup>19</sup> We understand from BGMA that a large majority of generic suppliers that are active in the UK participate in Scheme M.
- 2.21 The information from the Scheme M returns therefore provides, at a very granular level, the actual selling prices from the majority of the relevant generic manufacturers over time.<sup>20</sup> This information is used by the DHSC to inform the amount that the NHS pays pharmacies for dispensing certain generic products (Category M products). We explain this further in section 2B.3.
- 2.22 Unlike VPAS, Scheme M does not impose direct controls over the price that a manufacturer may charge for its generic products. Any Scheme member supplying a generic medicine to the NHS may set or alter the price at which the medicine is sold to wholesalers or pharmacies at any time according to market conditions. However, Scheme M stipulates that, if requested, suppliers are obliged to provide the DHSC with sufficient information to enable the DHSC to ascertain the reasonableness of the prices.
- 2.23 Therefore, while the DHSC does not normally intervene in the market mechanisms in the pricing of generic medicines, if trends in expenditure or other major changes in price indicate that the market mechanisms have not been able to control prices, Scheme M (alongside the NHS Act 2006, as we note later) provides it with the power to intervene and limit generic prices to a 'fair and reasonable' level.
- 2.24 We note that Scheme M is in the process of being replaced by an alternative system under the Health Service Medical Supplies (Costs) Act (2017) whereby disclosure of information will be required from all unbranded generic medicine suppliers. This Act also closes a potential gap in relation to those members of Scheme M that were not also members of the PPRS historically and VPAS now, and whose prices for unbranded medicines the DHSC may have been unable to formally intervene on prior to the Act. (Despite the provision of data moving onto a statutory footing and covering the whole generic supply sector and wider supply chain, the system of collecting data and using manufacturer sales data to inform reimbursement prices remains the same.)

## 2B.3 The reimbursement framework

- 2.25 The reimbursement for dispensing medicines in the UK is regulated under Part VIII of the NHS Drug Tariff. When a dispensary (e.g. a pharmacy) supplies a product listed under Part VIII of the Drug Tariff, it is reimbursed by the NHS according to the price listed in the Drug Tariff.

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<sup>18</sup> England accounts for around 85% of the UK market.

<sup>19</sup> Scheme M was most recently updated in 2010 with some additional data requirements for participants, although the framework remains substantively the same as at its introduction in 2005.

<sup>20</sup> Where the generic manufacturers distribute through wholesalers, this price is the specific Price to Wholesaler.

2.26 Specifically, the Drug Tariff price of a branded medicine before generic entry is determined largely by the price charged by the originator to wholesalers or to pharmacies (if a direct to pharmacy model applies).

2.27 The process of determining the **Drug Tariff price** (also referred to as the **reimbursement price**) of a generic medicine depends on the category of the specific product. The key categories and the respective methods of setting the Drug Tariff price are as follows.<sup>21</sup>

- Category M medicines, which are readily available as generics. The reimbursement prices of these products are informed by the data provided by generic manufacturers under Scheme M, among other things. In particular, the reimbursement price of a product is set at the level of a specific molecule, strength, presentation and pack size (e.g. paracetamol 500mg tablets 20tabs/pack). For each such product, the DHSC takes as a starting point the volume-weighted average of the actual selling prices obtained from all the relevant generic manufacturers.

To arrive at the reimbursement price, the DHSC applies an uplift to the average actual selling price at a granular product level, such that the pharmacies are provided with a total annual margin of £800m across all products dispensed in England. This total margin of £800m is based on an agreement between the DHSC and the Pharmaceutical Services Negotiating Committee (PSNC). Our analysis of the data shows that, while the uplift factor can be different for different medicines, it is on average in the region of 100%—i.e. the Drug Tariff price is broadly double the actual selling price obtained by the generic manufacturer.

The DHSC also reviews the Drug Tariff regularly to determine whether any changes are necessary. One key consideration of any revision is whether the pharmacy margin of £800m is met. In particular, the DHSC conducts a regular survey of pharmacies regarding the margins earned, and if there are significant deviations from £800m, the Drug Tariff prices are revised. For instance, if the total margin falls short of £800m, some of the Drug Tariff prices are adjusted upwards, and vice versa.

- Category A medicines, which include generic products that are widely available but that involve smaller markets (in terms of volume, value and/or number of suppliers).<sup>22</sup> The Tariff price of a presentation in this category is based on a weighted average of the list prices of all products for the molecule available from two major wholesalers and two manufacturers (AAH, Alliance Healthcare, Teva and Accord).<sup>23</sup>

Therefore, for Category A products the reimbursement price is currently largely driven by the price quoted by all or a subset of the four companies mentioned above (depending on who is active in the supply of a specific

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<sup>21</sup> Part VIII A of the Drug Tariff.

<sup>22</sup> These include products that are available as generics, but which involve volumes of less than 200,000 items, and also where the volumes may be greater but the net ingredient cost is smaller than £1m or there is only one Scheme M member supplying the product.

<sup>23</sup> We understand from BGMA that list price refers to the spot market price charged by the above-mentioned suppliers/wholesalers, depending on who supplies. For example, if neither Teva nor Accord is active in supplying a particular product (but another generic manufacturer is), the reimbursement price is based on the prices quoted by AAH and/or Alliance. We also understand that generic manufacturers do not typically have a single list (or spot) price, and that the price charged by the same manufacturer changes according to the specific customer.

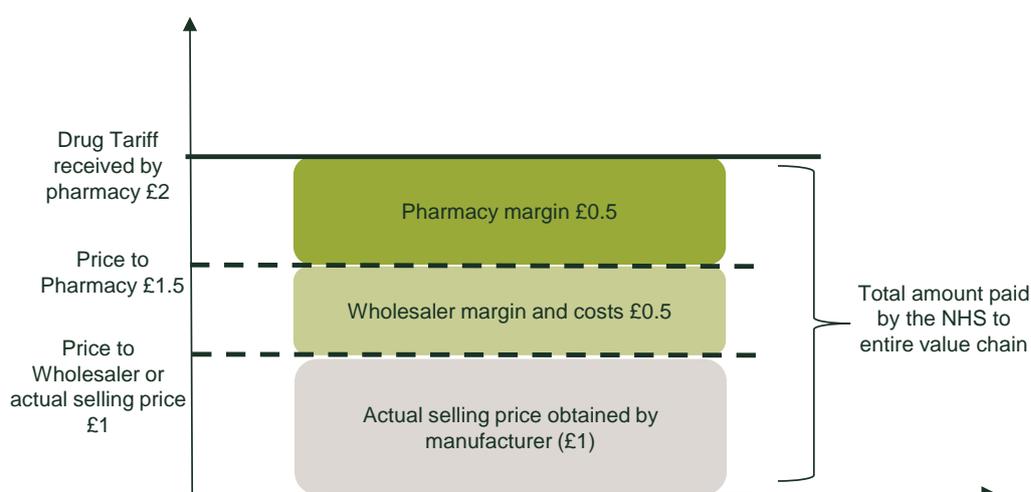
product), before any rebates or further adjustments are applied for specific sales.<sup>24</sup>

- Category C products, which include medicines that are not readily available as a generic. The reimbursement price for this category is based on the NHS list price or maximum DHSC-authorized selling price of a particular proprietary product (which is in turn set under VPAS, as explained above).

2.28 Overall, the Drug Tariff prices of Category A and Category C products are determined largely by the list price or the spot prices reported by selected manufacturers. The Drug Tariff of Category M medicines, on the other hand is determined by the actual selling prices obtained by generic manufacturers. In addition to funding the distribution of these medicines, DHSC calculates a level of uplift necessary to provide for the total pharmacy margin agreed with the PSNC, as noted explicitly in Scheme M.<sup>25</sup>

2.29 Figure 2.2 sets out a stylised example of the various components of the Drug Tariff price of generic medicines. This includes: (a) the manufacturer actual selling price (which is often same as the Price to Wholesaler, as generic manufacturers typically sell to wholesalers); (b) wholesaler costs and margin; and (c) pharmacy costs and margin.

**Figure 2.2** Stylised example of the various components of the Drug Tariff price of a generic medicine



Note: The figures in the diagram do not correspond to any particular product but are indicative of a generic product in Category M. Branded medicines involve similar broad components, although the level of margins for wholesalers and pharmacies in those cases may differ. For example, wholesalers may earn a higher margin on generic medicines relative to branded drugs (e.g. Alliance notes, in its 2018 Annual Report, that the wholesale division ‘earns equal or better gross margins on generic drugs than on branded drugs, although there are exceptions’).

Source: Oxera.

2.30 As discussed above, the difference between the reimbursement price of a specific product and the actual selling price obtained by the manufacturer can be significant—for example, it can be in the region of 100% of the actual selling

<sup>24</sup> As set out in Box 2.1 below, the available evidence suggests that the actual selling prices obtained by manufacturers for these medicines can be substantially lower.

<sup>25</sup> As explained above, the DHSC can adjust the Drug Tariff of Category M products upwards or downwards depending on the total pharmacy margin achieved relative to the agreed £800m. We understand that this is the primary mechanism that DHSC has to provide this margin, and that it does not formally apply a pharmacy margin for branded medicines.

price for Category M products as recognised by the DHSC in Scheme M—i.e. the reimbursement price can be around double the actual selling price.

- 2.31 Box 2.1 sets out a comparison of the Drug Tariff and the manufacturer actual selling prices for a set of Category M and a set of Category A products. As shown below, the gap, or ‘wedge’, is significant for both categories of generic products. This therefore reflects the margins that are accrued by other parts of the value chain—i.e. wholesalers and pharmacies.

**Box 2.1 Comparison of Drug Tariff and manufacturer actual selling prices**

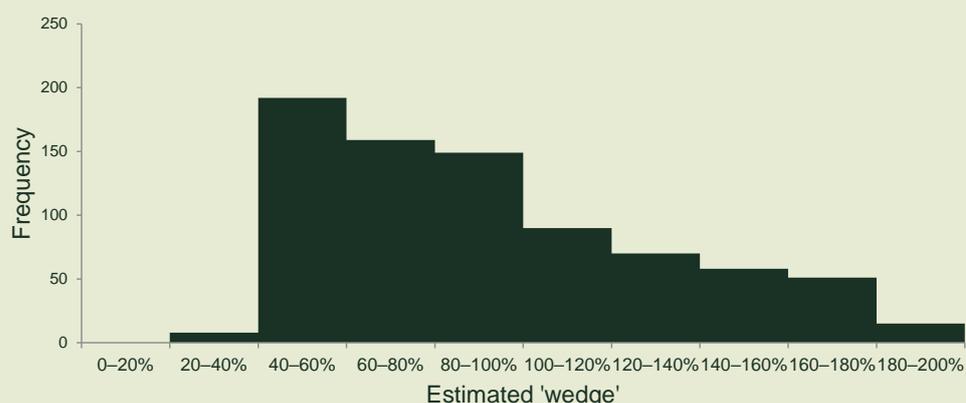
**Category M products**

We have conducted an analysis of the difference between Drug Tariff prices and manufacturers’ actual selling prices for Category M products, using data for around 485 products over 2016 and 2017 (involving around 800 data points over the two years). We have used Drug Tariff prices from the NHS Electronic Drug Tariff Data, and matched these with Scheme M data on manufacturers’ actual selling prices. Based on the quarterly manufacturer actual selling price and the monthly NHS Electronic Drug Tariff price, we calculate the average annual manufacturer actual selling price in order to compare it with the average annual reimbursement price. We compute the ‘wedge’ between the two as:

$$\text{Wedge} = (\text{Reimbursement price} - \text{Actual selling price}) / (\text{Actual selling price})$$

The results show that there is considerable variation in the size of the wedge across specific products and over time. Excluding extreme values of the wedge from the analysis, we find that the average wedge is approximately 93% of the actual selling price. In other words, the reimbursement prices for Category M products are on average 1.93 times the actual selling price that is actually received by the manufacturer.

The figure shows the distribution of the estimated wedge in our sample. It shows that, for a large proportion of observations (around 63%), the reimbursement price was 40–100% higher than the manufacturer’s actual selling price in the relevant year. It also illustrates, however, that for a sizeable proportion of observations the difference was much larger (up to around 190% higher—i.e. the reimbursement price was 2.9 times the manufacturer selling price in some cases).



**Category A products**

A similar analysis was undertaken for 30 products in Category A of the Drug Tariff. The data on actual selling prices of these products, covering 2016–18, was supplied by the relevant BGMA members. While the number of products is small, the results suggests that the Drug Tariff price is around 2.41 times the actual selling prices received by manufacturers for these products (this is equivalent to an average wedge of 141%).

Source: Oxera analysis of Drug Tariff data and Scheme M prices.

- 2.32 The reimbursement framework above also incentivises strong competition among different manufacturers of a specific product. This is because the same

level of reimbursement price applies irrespective of the cost of procurement of the specific medicines for the pharmacy at a specific point of time.

- 2.33 Using the example in Figure 2.2, if the Category M Drug Tariff price of a medicine is £2, a pharmacy dispensing it will receive £2 from the NHS, even if the pharmacy has paid £1.50 to the wholesaler—i.e. the relevant Price to Pharmacy is £1.50. The difference between the two, here £0.50, broadly reflects the revenues of the pharmacy.<sup>26</sup>
- 2.34 This means that, given a Drug Tariff price at any point of time, the lower the Price to Pharmacy offered on a specific product, the higher the revenues of the pharmacy and the higher the incentive to dispense that specific product. This implies that, when faced with an open prescription for a particular molecule, the pharmacy has the incentive to dispense the product with the lowest Price to Pharmacy. This in turn drives price competition between the various suppliers of the relevant branded and generic versions of the relevant product.
- 2.35 Therefore, while the extent of competition can vary according to the type of pharmacy (e.g. an independent pharmacy or a chain),<sup>27</sup> the number of suppliers, the therapeutic area, and other factors, the reimbursement mechanisms set up by the DHSC provide an ongoing incentive for price competition.

## **2B.4 Other provisions**

### **Provisions from the National Health Service Act 2006, section 261**

- 2.36 With respect to voluntary schemes (such as Scheme M), the Secretary of State can exercise several powers with the purpose of limiting the prices charged by manufacturers or suppliers, and the profits accruing to manufacturers or suppliers that are members of the scheme. Most notably, the Secretary of State has the power to prohibit any manufacturer or supplier from increasing any price charged and/or to request that the increases in the sums charged in violation of such prohibition be paid to the Secretary of State within a specified period.

### **Pricing concessions**

- 2.37 All drugs listed in Part VIII of the Drug Tariff are eligible for 'No Cheaper Stock Obtainable' (NCSO) status and 'price concessions' where prices of a product available to pharmacies exceed the levels specified under the Drug Tariff. This may be due to an actual shortage of the relevant product or, for example, because the cost of production and supply has increased.<sup>28</sup>
- 2.38 Under a price concession, the DHSC sets a concessionary price above the Drug Tariff level on the basis of information received from wholesalers and manufacturers, following which pharmacists are automatically reimbursed based on this concessionary price. Under the NCSO status, pharmacies are eligible for reimbursement on the basis of higher prices than they have paid for a particular presentation rather than the relevant Drug Tariff price.

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<sup>26</sup> Analysis conducted by BGMA using a selection of 50 products confirms this approximate equal division between wholesalers and pharmacies. The analysis is based on a comparison of average prices paid by independent pharmacies (obtained from WaveData) and Scheme M actual manufacturer selling prices since 2012.

<sup>27</sup> For example, larger pharmacy chains typically receive lower prices from manufacturers relative to independent pharmacies.

<sup>28</sup> This could, for example, be due to an increase in costs of API. As discussed in section 3C, there has been a significant increase in the cost of API from China in recent years.

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These mechanisms are in essence designed to avoid negative margins for pharmacies for relevant generic medicines. Typically, the PSNC is able to apply to the DHSC to request a price concession or NSCO status when the price exceeds the Drug Tariff. Concessions and NSCO status are applied for one month at a time. The implications of price concessions on overall spending on generic drugs is discussed in Box 2.2 below.

**Box 2.2      Implication of concessionary price for affordability**

The higher concessionary price could potentially have an impact on the overall spending by the NHS.

To assess this, we have reviewed an analysis on the impact of concessionary prices on total NHS spend that was prepared by one of BGMA's members (consistent with the methodology used by the National Audit Office in its 2018 review of NHS spending on generic medicines). The analysis shows that, in spite of considerable variation in the value of concessions,<sup>1</sup> overall spending on generic medicines by the NHS has remained relatively constant over the last three years.

Note: <sup>1</sup> Department of Health and Social Care (2018), 'The 2019 Voluntary Scheme for Branded Medicines Pricing and Access - Chapters and Glossary', December.

Source: BGMA member.

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### 3 Key drivers of strategic decisions

- 3.1 In order to investigate the key drivers of strategic decisions of suppliers that ultimately drive the overall competitiveness of the generic medicines sector, we conducted structured interviews with selected manufacturers of generic products. In this section, we discuss our approach (section 3A) and findings (sections 3B and 3C), and provide some final remarks (section 3D).

#### Summary

The qualitative assessment of the supply chain and supplier strategies provides a number of insights regarding generic entry and subsequent pricing.

- Generic manufacturers typically take a systematic approach when deciding whether to start supplying a particular product. Commercial expectations, and in particular profitability, are a common consideration, as are factors such as complexities of production and the size of potential upfront costs of research and development.
- Other factors such as portfolio fit can also be important, depending on the business model of the company in question. For instance, large companies producing a wide portfolio of products will attach importance to the fit of a new product with an existing portfolio even if stand-alone profitability is expected to be low.
- In addition, geographic considerations can play a role in the decision to start supplying a product in a particular country, with overall market size and profitability across multiple territories becoming important factors. In this context, despite its comparatively low prices, the UK is seen as an attractive market due to its large size and low regulatory barriers.
- Once generic entry has occurred, the price of a product is typically driven by supply and demand forces, and individual suppliers have little influence. In some instances, this can mean that prices fall below the level where production is profitable for a period of time until manufacturers adjust their strategies.
- Importantly, manufacturers have the ability to change their production levels and prices relatively easily to react to changes in market conditions. In the short term, manufacturers generally avoid exiting entirely, instead decreasing production if market conditions are adverse and increasing production if market conditions improve. This creates a self-correcting mechanism whereby short-term and significant price increases are often met with additional supply followed by a decrease in price.

#### 3A Approach

- 3.2 The primary themes explored during the interviews included how and when generic manufacturers decide to supply new products in the UK (or ‘enter’), circumstances in which they may discontinue supply (or ‘exit’), and the factors influencing pricing decisions.

- **Entry and exit decisions**—how do suppliers of generic products identify opportunities, and what are the key factors used to decide whether to supply a specific molecule? What role does the current market price play in this decision? How is the decision influenced by the existing portfolio supplied by the manufacturer, the number of other entrants, and costs of entry? What are the key factors considered in a decision to stop supplying a particular product (i.e. exit)? What determines whether the exit is permanent or temporary?
- **Price-setting decisions**—what factors are accounted for when setting the prices of a particular medicine or a set of medicines? What is the relative importance of different factors, including costs of the active ingredient, the cost of marketing and distribution, competition from the originator or other generic suppliers, and business strategies (e.g. portfolio pricing)?

3.3 As noted in section 2A, generic manufacturers operate a range of business models, which in turn affect their decisions to produce a particular product and subsequent pricing. To ensure different perspectives, the interviews were conducted with different types of manufacturers. This included: (i) those that focus on niche medicines and those supplying a large range; (ii) global generic companies and smaller companies focused on specific countries; and (iii) companies of different sizes.<sup>29</sup>

### **3B Entry decisions**

3.4 An analysis of the drivers of entry by suppliers is an important aspect of understanding the determinants of the competitive process, and any potential risks or entry barriers.

3.5 Generic medicines, by their nature, involve lower R&D costs than those incurred by originator companies where the cost of developing a new pharmaceutical molecule/treatment can be very high. Generic producers do invest in R&D, with the amount depending on the specific product involved; the cost of this will vary according to the complexity of the product in question. In general, however, R&D costs are less likely to be barriers to entry. This is why there are typically a number of generic suppliers once regulatory barriers such as patent protection expire (or when other legal barriers such as pending patent infringement issues do not exist).

3.6 The precise number of generic entrants depends on the total market size (indicated by sales of the originator before generic entry), and the characteristics of the product itself, as well as the wider market context and the business model of potential suppliers. Our discussions with generic suppliers suggest that the key factors that influence whether a company will seek to produce a product include:

- the size and global reach of the supplier;
- the (expected) number of other suppliers;
- expectations of profitability of the product;
- the existing product portfolio of the supplier;
- the existing geographic portfolio of the supplier;
- available capacity within the business;
- complexity and difficulty of developing the product.<sup>30</sup>

3.7 For example, if a molecule is supplied by a large number of generic suppliers, a small or medium-sized supplier is less likely to enter due to the low potential sales and profits that it can earn. This consideration is less important for larger global companies that are likely to be active in numerous major molecules and are likely to attain a material market share. We discuss some of the key insights below.

<sup>29</sup> The interviewees included companies with annual revenues in the following ranges: £10m–£25m, £25m–£75m, and more than £75m.

<sup>30</sup> This includes the technical challenges of producing or supplying the product itself as well as complexity due to other factors such as IP issues.

### **Horizon-scanning**

- 3.8 In general, the companies that we spoke to have a formal business case approval process when deciding whether to develop a new product. This process can begin several years prior to patent expiry, starting with an ongoing horizon-scanning exercise to monitor which products will come off patent up to ten years in the future, with development taking three to five years depending on the complexity of developing the generic version of the product and any other technical or manufacturing difficulties.

### **Relevance of individual product profitability**

- 3.9 Whether or not the product is expected to be profitable can be a decisive factor in the decision to supply, but this is not always the case. This will depend, for example, on whether the company focuses on large-volume generic products (such as cardiovascular or diabetes medicines) or on niche products (e.g. those with small patient populations or specialised delivery mechanisms). Companies focusing on niche products are more likely to consider the expected profits from the specific product, and also to consider the therapeutic area and seek to supply a number of products in the same therapeutic area. In this case, they may supply a specific product despite the probability of low profits if it matches their existing portfolio or focal area.
- 3.10 Larger generic companies are less likely to consider profitability at the level of specific products, focusing instead on the broad offering across the whole portfolio. These companies usually consider most or all of the products in the patent expiry pipeline. This is driven by the fact that customers, and specifically pharmacies, often have a preference for sourcing a significant proportion of their products from few suppliers.

### **Implications of the regulatory framework and legal aspects**

- 3.11 The Medicines and Healthcare products Regulatory Agency (MRHA) regulates the quality, safety and efficacy of medicines in the UK by requiring that each company obtains a Marketing Authorisation (MA) for each medicine that it supplies. Under EU legislation,<sup>31</sup> an MA application can be made to market a medicine in a single country, a specific set of EU countries or all EU countries. This process typically takes 12–18 months, but can be longer for more complex products. There is also a ‘mutual recognition’ process that can be used by the supplier if the generic product already has an MA in another EU member state.
- 3.12 The EU regulatory system provides the originator with 10 or 11 years of exclusivity, which runs in parallel to (and is separate from) the relevant patent term. This ‘data exclusivity’ prevents the generic applicant from using the clinical trial and safety data generated by the originator to bring its own product to the market. Sometimes this regulatory protection (i.e. the data exclusivity) extends beyond the expiry of the relevant patent(s). For example, in the case of the antidepressant Duloxetine, the data exclusivity expired in August 2014 but generic entry occurred five months later. Similarly, in the case of Aripiprazole, the regulatory processes following loss of data exclusivity delayed generic entry by six months.
- 3.13 In addition, in some cases generic entry may be delayed beyond loss of exclusivity due to other reasons. For example, even if the basic patent on the

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<sup>31</sup> See UK government (2019), ‘Guidance: Apply for a licence to market a medicine in the UK’, <https://www.gov.uk/guidance/apply-for-a-licence-to-market-a-medicine-in-the-uk>, accessed 18 March 2019.

molecule itself has expired, unexpired secondary patents (for example, relating to formulation ingredients, the manufacturing process or a different therapeutic indication) could prevent or reduce generic entry due to greater levels of complexity of entry and the possibility of legal challenge.<sup>32</sup>

- 3.14 In general, products losing exclusivity generate significant interest from multiple generic suppliers, and the horizon-scanning process described above enables prospective producers to be ready to enter from the day of loss of exclusivity (provided there are no other barriers as noted above). As such, the generic entry can occur rapidly and there are many instances of immediate entry followed by significant price decreases. For example, Atorvastatin came off patent in May 2012 and saw price falls of around 90% almost immediately.<sup>33</sup> More broadly, the European Commission's sector inquiry found that generic entry occurred on average around four months after loss of exclusivity in the UK, which was significantly faster than the average across the EU.<sup>34</sup> On average, the number of entrants in the UK was also higher than in the EU as a whole—within two years of loss of exclusivity there were on average over seven generic producers in the UK.

### **Relevance of geographic portfolio**

- 3.15 In the case of larger companies with international operations, their activities and prospects in other countries also play a role in the decision to enter the UK. The interviews highlighted that, while some companies develop a separate business case for each country of interest, others take a Europe-wide approach. In any event, where the cost of product development can be spread by selling the product in multiple territories, the profitability of a product in one specific territory becomes less important. One company also commented that there was a degree of priority afforded to the larger national markets, such as the UK and Germany.
- 3.16 The UK was cited by interviewed manufacturers as having low entry barriers and a favourable regulatory framework in relation to the pricing of generic medicines relative to other countries.
- 3.17 In particular, the harmonised MA application process provides a consistent process for licensing suppliers across EU member states, and facilitates entry within a short period of time. In addition, and importantly, in the UK suppliers are free to set prices of generic products without direct and systematic control by the DHSC (as discussed in section 2B). As discussed further below, this freedom of pricing allows suppliers to respond relatively quickly to changes in market conditions, such as increasing supply in response to an increase in prices.
- 3.18 In contrast, in some other European countries where pricing is subject to direct price regulation, producers can face delays of many months in receiving approvals of pricing and reimbursement.

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<sup>32</sup> In addition, patent holders seek, and can be granted, supplementary protection certificates (SPCs) that compensate originators for delays between development of the product and receiving an MA.

<sup>33</sup> See Pulse, 'Price of atorvastatin plummets 93% as patent ends', 8 May, <http://www.pulsetoday.co.uk/clinical/clinical-specialties/cardiovascular/price-of-atorvastatin-plummets-93-as-patent-ends/13908795.article>, accessed 6 March 2019. This is supported by our own analysis of generic prices based on Scheme M pricing data (see section 4B.2), which shows that the generic price of Atorvastatin in the first quarter of generic entry was 6% of the average originator list price in the year before entry.

<sup>34</sup> Source: European Commission (2009), 'Pharmaceutical Sector Inquiry: Final Report', 8 July.

- 3.19 Companies commented that this regulatory environment means that the UK remains an attractive geography in spite of having generally lower margins than other European countries.<sup>35</sup>

### **3C Pricing and supply decisions**

- 3.20 In addition to entry, it is relevant to understand the drivers of pricing decisions by suppliers of generic medicines.

#### **Focus on price**

- 3.21 Companies report that price is the main determinant of the sales they achieve, particularly for commoditised generic products where there are a number of manufacturers. In such cases, suppliers of generic medicines are not able to use brand value or product quality to differentiate themselves. For those products, the price that each supplier receives will be driven by the market as a whole and will therefore be largely out of their control.

#### **Flexibility in prices, volumes and number of suppliers**

- 3.22 Interviewees also reported that prices following generic entry are more volatile than prices before loss of exclusivity, as suppliers respond to demand and supply shocks in the market.
- 3.23 For example, market prices can decline significantly when excess volume is being supplied by a large number of players. Similarly, prices can increase during shortages. Such volatility is driven partly by a supplier's ability to reduce production volumes during a period of excess supply as both their anticipated sales and the price are low in this period, and similarly increase production volumes when the level of price and expected sales justifies the supply. Such 'dialling down' is practiced by many manufacturers, particularly smaller companies that have lower sales and hence cannot sustain prolonged periods of low or no profits.
- 3.24 Companies also raised the fact that MAs contain MHRA regulatory sunset clauses, which mean that in order to maintain the option to increase production in the future, an MA holder cannot cease supplying a product indefinitely. Manufacturers therefore generally avoid exiting completely (i.e. stopping supply), and instead maintain low levels of production to give them the option to respond to changed market conditions at a later stage.
- 3.25 Furthermore, increasing production and supply volumes after a period of relative inactivity can take three months or more, with API availability and manufacturing capacity important determinants of the length of this lag. In particular, API availability and the number of API sources for a specific molecule can affect entry (as well as price) to a material degree, as some molecules have a very limited number of well-established API suppliers, which increases the risk of disruption to the supply chain.<sup>36</sup>
- 3.26 These regulatory and supply chain aspects mean that, at any given time, the number of MA holders is likely to exceed the number of active producers (or producers supplying significant volumes).

<sup>35</sup> Section 4C discusses the cross-country comparison of generic prices and shows that prices in the UK are systematically lower than in most of other selected European countries.

<sup>36</sup> For example, the antibiotic Dapsone has only one well-established API supplier with a European Pharmacopoeia Certificate of suitability.

3.27 Box 3.1 sets out the case study of Olanzapine as an illustration of the market mechanism.

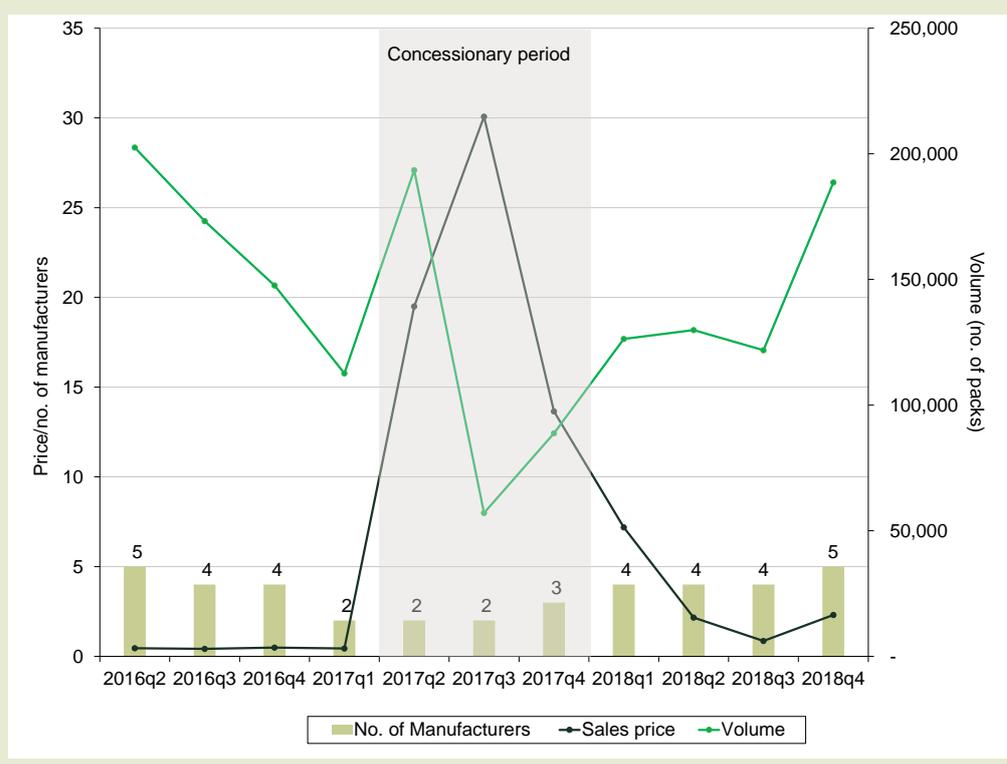
### Box 3.1 Case study: evolution of prices and supply of Olanzapine

The information on the actual selling price and number of manufacturers for Olanzapine 10mg tablets, available from Scheme M returns, illustrates how pricing variations affect supply, as discussed above.

In particular, it shows that, in 2016, the average actual selling price reported in Scheme M was very low (around £0.45 per pack). BGMA members report that this is a complex product, and it is unattractive to continue to make and supply it for such a price level. Subsequently, the number of generic suppliers reported in the Scheme M returns reduced from five to two by Q1 2017.

The data shows that, following this, the average actual selling price increased significantly to £30 by Q3 2017 and a concessionary price was granted by the DHSC (which was over double the average actual selling price at its height). The increase in price was then followed by entry over Q4 2017 and Q1 2018, bringing the actual selling prices back down to levels similar to the pre-concession period.

It is not surprising that it took some time for suppliers to re-enter once they had discontinued supplying the medicine. The speed of re-supplying depends on a range of factors including the availability of global stock levels of the relevant suppliers (which may be influenced by demand in other countries) and the availability of cost-effective API, which is a major driver of the cost of goods.



Source: Oxera, based on Scheme M returns data.

### Drivers of price including costs and portfolio considerations

3.28 In general, prices are influenced by a number of supply and demand factors, including the cost and availability of the API (this often being the major driver of costs of goods), other costs of production, the number of suppliers of a specific molecule, and unexpected events such as supply disruptions.

3.29 Molecule-specific factors such as API cost, the nature of the product and difficulties in production and supply disruptions are also important drivers. There have been reports within the industry that the cost of API has increased

in recent years. Data on API prices for 62 molecules provided by one BGMA member shows that API price is projected to increase by an average of 19% in 2019/20 relative to 2018/19 (and, in some cases, will more than double). We understand from BGMA that one driver of this is the increase in price of API sourced from China, where more stringent regulatory controls (such as environmental standards) have increased the cost of API manufacture.<sup>37</sup>

3.30 Another feature that has relevance in the context of price formation is the portfolio of drugs produced by suppliers, which in turn is influenced by factors such as strategic decisions to enter and/or target a specific therapeutic area.

3.31 For example, manufacturers use a portfolio approach to pricing where prices are driven by the pricing and business costs of the overall portfolio being supplied to the customer (wholesaler or pharmacy) and not individual product profitability. In many instances, manufacturers—particularly larger companies that are active in multiple therapeutic areas and that supply mass market products—continue to supply products that individually are loss-making or have low profit margins for a prolonged period of time. This is due to the importance of having a portfolio of offerings for customers. Intervention in one area might therefore have a knock-on effect of reducing competition elsewhere, where manufacturers could be forced to make decisions on low margin/loss making products—namely discontinuation.

3.32 There are, however, limits to even larger companies tolerating losses on individual products. If these become too large, a company may seek to limit its exposure by unilaterally increasing its own price for a particular product, accepting that this is likely to result in a reduced market share.

### **3D Implications for market functioning**

3.33 Overall, the above market features and manufacturer strategies suggests that the generic manufacturing sector in the UK has well-functioning mechanisms to support a high level of competition.

3.34 In particular, price regulation and other entry barriers are low, leading generic manufacturers to actively pursue opportunities to enter subject to commercial attractiveness and their fit within the manufacturer's strategic objectives. The large size of the UK market provides strong incentives to enter (which is also consistent with the high level of generic entry in the UK relative to other European countries).

3.35 The competitive process among suppliers is further supported by the flexibility of supply conditions after entry. Once a generic manufacturer has made an investment in developing a product, the reluctance to exit permanently and the relative ease of adjusting supply means that there can be a range of potential suppliers that are well-positioned to exert competitive pressure in the event of a significant price increase. This feature of the market also provides a degree of robustness to supply should any particular supplier experience production problems.

3.36 While there are factors that could limit the supply of generic products in specific cases (such as clinical or regulatory barriers, or small market size), the extent of these appears to be largely an empirical question rather than a structural

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<sup>37</sup> CPhI China (2018), 'China's evolving API industry and the impact of GMP regulations', 30 November, <https://www.cphi.com/china/visit/news-and-updates/chinas-evolving-api-industry-and-impact-gmp-regulations>.

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problem with the market framework. We explore the empirics of market functioning in more detail in the next section.

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## 4 Impact of generic entry on market outcomes in the UK

- 4.1 To assess the impact of generic competition on market outcomes and in particular on prices, we have conducted a number of analyses for various pharmaceutical products. In particular, we investigate the following questions.
- What is the impact of generic products on the price of medicines in the UK? How do actual manufacturer selling prices of generic medicines compare with those of branded products?
  - Does the generics sector witness price increases?
    - a. If so, how long do these price increases last? Are the existing market mechanisms able to limit or reverse such increases, for example by encouraging (re-) entry?
    - b. Conversely, if prices are low for a sustained period, can there be other consequences of this such as shortages?
  - How do prices of generic medicines in the UK compare with those in other countries?
- 4.2 In doing so, this study uniquely focuses on the actual selling prices of the manufacturers of generic medicines—i.e. after the discounts to wholesalers and retailers have been accounted for—for a sample of products for which the relevant data was available. To assess these, we consider two benchmarks: (i) the price of the corresponding branded product before generic entry; and (ii) the price of the same product in a selected number of other countries.
- 4.3 Below, we set out the data used for the analysis (section 4A) and the analysis of generic prices relative to the originator, followed by an assessment of price increases observed in the data (section 4B). We discuss the generic prices in the UK in comparison with other countries in section 4C.

### Summary

Our assessment of prices of generic medicines in the UK highlights the following.

- Analysis of prices of a sample of products under Scheme M shows that the actual selling prices charged by generic manufacturers in the UK are, on average, significantly lower than the price of the originator's branded product before the loss of exclusivity. While there is variation in the extent and speed of price changes across different products, on average, the generic price in the six months after loss of exclusivity is 70% lower, falling to 80–90% lower over a four-year period.
- The same analysis shows that, while generic prices can sometimes increase many years after entry, in the long run the generic price, on average across the set of products analysed, remains around 80% lower than the price of the relevant branded product before the loss of exclusivity.
- A further analysis of a set of material price increases shows that many of these increases are reversed over time. In particular, in many cases where there was a significant price increase over a short time, these had largely dissipated within 12 months. The extent of reversal was lower, and slower, for price increases that occurred over a long period of time. A closer look at selected case studies suggests that prices may not be fully (or quickly) reversed due to changed market conditions such as regulatory issues and supply chain disruptions.
- A comparison of prices across five European countries suggests that prices of generic medicines in the UK are generally lower than in the other countries—and often by a large amount. The prices of the analysed products in several of these countries, are, on average, 3 to 4.5 times more expensive than in the UK. Although the relative magnitudes have changed to some extent over time, these results have broadly held since 2012,

indicating that the lower prices for generic medicines in the UK may be due to long-standing features of the UK system such as freedom of pricing.

#### 4A Data and scope of the analysis

4.4 With assistance from BGMA, we collected information on volumes, number of suppliers, actual sales prices by generic companies, Drug Tariff prices and prices set by originators from a variety of sources, including the following.

- Scheme M returns—which include information on products for which suppliers have submitted information to the DHSC under Scheme M. This constitutes an especially useful data source, since it contains actual manufacturer selling prices, net of discounts and rebates. It also includes volumes and numbers of suppliers for Scheme M products after they entered Scheme M.<sup>38</sup>
- WaveData—this provides information on prices to independent pharmacies.
- IQVIA—this provides volume and price data for the UK as well as five other countries.<sup>39</sup>
- Prescription Cost Analysis (PCA) data—this includes data on volumes and the net ingredient cost of generic prescriptions dispensed in England, providing information on the cost incurred by the NHS for prescriptions of generic medicines.
- MPA Business Services—these provided information on patent expiry dates and dates of loss of exclusivity.

4.5 The information from the sources listed above was used to derive several sets of products for the analysis. The sets of products analysed were identified based on objective and verifiable criteria, as set out below. As such, the products analysed are likely to be representative of the generic medicine segment as a whole. These include the following.

- ‘Scheme M entrants’—products that have entered Scheme M between Q2 of 2012 and Q2 of 2018.<sup>40</sup> This set of products is useful to assess the impact of widespread generic entry on market outcomes, and therefore whether the market mechanism is working as expected to deliver value for patients and the NHS, relative to the period before generic entry. We have used this list for an analysis of generic prices relative to pre-entry originator

<sup>38</sup> Since Scheme M is a voluntary scheme, the Scheme M returns do not include information from all suppliers in the market. However, we understand from BGMA that the returns aggregate information from the vast majority of active players (more than 85% of the market by volume) and therefore provide a good representation of the market.

<sup>39</sup> For the UK, IQVIA has provided the Drug Tariff price data before applying an average reduction figure to provide the estimated average manufacturer actual selling price, on the basis of our and BGMA’s comparison between data from Scheme M returns and Drug Tariff. For the other countries, IQVIA has provided the spot price that manufacturers set for supply to wholesalers and pharmacies at a granular product level (before any rebates), as well as country-specific adjustment factors in order to estimate the actual selling price obtained by manufacturers after rebates.

<sup>40</sup> Starting from the Scheme M returns between Q2 of 2012 and Q2 of 2018, we have defined Scheme M entrants as those products for which information on prices was not compiled initially, but then started being collected (and therefore appeared on the returns), and was then collected continuously for each remaining quarter. This results in an initial list of 213 products (considering all presentations, strengths and pack sizes). For the purposes of the analysis, we then selected one product for each combination of molecule and presentation (solid, liquid, cream). We selected the product with the largest total sales volumes after entry into Scheme M. This resulted in a final set of 99 products for the analysis.

prices (section 4B.2) and for an assessment of price increases (section 4B.3).

- ‘Most costly products’—products on which the NHS spends the most, based on their reimbursement price and sales volumes.<sup>41</sup> These products therefore have a high impact on the NHS budget. We have used this list for an analysis of generic prices in the UK relative to other countries (as discussed in section 4C).
- ‘Highest priced products’—products with the highest reimbursement price per pack. Considering this set is important in assessing whether the market mechanism is working for products where the budgetary impact on the NHS is disproportionately high for a generic medicine; or for which widespread generic entry may not be observed.<sup>42</sup> We have used this list for an analysis of generic prices in the UK relative to other countries.

#### **4B Price effects of generic entry in the UK**

- 4.6 The economic and market context discussed above would suggest that once exclusivity on a pharmaceutical product is lost, generic producers would enter and the price would decrease. However, as discussed in section 3, the extent of the reduction may vary depending on a number of characteristics of the specific product. For example, the specific therapeutic area and the formulation (i.e. liquid or solid dose) can influence the total number of generic suppliers, which in turn affects the extent of the price reduction. The identity of the suppliers, including the originator, may also be relevant as different originators respond differently to competition. As indicated by the interviews, in some cases, price competition can be sufficiently strong as to reduce the price to below a manufacturer’s cost of sales, at least in the short-term.
- 4.7 In addition to expected generalised decreases in the price of medicines after loss of exclusivity, section 3 also highlights that the supply of generic medicines in the UK is, in general, dynamic and prices can change quickly in response to changing market conditions (e.g. excess supply or shortages). Under a well-functioning market-based system, we would expect that significant price changes are reversed when previous market conditions are reinstated, or that prices stabilise at a new equilibrium level that reflect changed market conditions where relevant.
- 4.8 To explore these aspects, we discuss below the evidence on:
- price evolution following loss of exclusivity (section 4B.2);
  - the extent of reversals of significant price changes, when these occur (section 4B.3).

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<sup>41</sup> The PCA data was used to identify the most costly medicines, based on the net ingredient cost (NIC) for each product (at molecule and strength level). The ranking of products in terms of their NIC was based on PCA data for 2012. This was to allow us to analyse the evolution of prices of the same set of products for a certain period of time. Based on MPA data, we then excluded all medicines that were still protected by a patent as at June 2018. The final list contained 288 products (at molecule, strength and pack size level), representing 58 molecules. We then obtained information from IQVIA for 286 products (for the UK and the comparator countries if available) to perform the comparator analysis.

<sup>42</sup> The Drug Tariff for 2012 was used to identify the most expensive medicines. The initial list was derived based on the top 150 medicines with the highest reimbursement price (excluding Category C products). Based on MPA data, we then excluded all medicines that were still protected by a patent as at June 2018, resulting in a final list of 101 medicines (at molecule, strength and pack size level), representing 66 molecules. We then obtained information from IQVIA on those 101 medicines (for the UK and the comparator countries if available) to perform the comparator analysis.

- 4.9 Section 4B.1 first provides some preliminary comments on past studies of the impact of generic entry.

#### **4B.1 Evidence from past studies**

- 4.10 A number of past studies highlight that that generic entry in general leads to a reduction of prices and that this result holds across countries, albeit with some differences across countries and across products in the extent and speed of reduction.

- 4.11 For example, the European Commission's 2009 inquiry into the pharmaceutical sector found that:<sup>43</sup>

[...] based on a sample of medicines that faced generic entry in the period from 2000-2007, [...] generic medicines [in the EU] enter the market at a price that was, on average, about 25% lower than the price set by originator companies prior to loss of exclusivity (e.g. due to patent expiry and loss of data exclusivity). Prices of generic medicines, after they have been available on the market for two years, are on average 40% lower than the former price of the medicine of the originator company.

- 4.12 On the basis of this evidence, the Commission concluded that:<sup>44</sup>

The overall impact of generic entry is significant, offering European patients better access to safe, innovative and affordable medicines, as well as reducing the burden carried by national health systems.

- 4.13 A recent study by the OECD/European Commission also recognises this benefit, citing a number of academic studies relating to the impact of generic medicines overall.<sup>45</sup>

It is widely recognised that the development of competitive generics markets are an important mechanism for reducing expenditure without compromising benefits to patients (Seeley, E, 2008). The use of a cheaper generic equivalent (or in some cases, a cheaper, therapeutically interchangeable drug from the same therapeutic class) in lieu of an originator medicine can generate significant cost savings. Moreover, the market entry of generics can also enhance patient access, particularly in lower-income countries (Elek et al., 2017).

- 4.14 Many of these studies have used the UK Drug Tariff to analyse the impact of generic competition. However, as discussed in section 2, this includes the pharmacy margin, distribution costs and wholesaler margins and is not reflective of the price obtained by the generic manufacturers.<sup>46</sup>

- 4.15 In this study, we have sought to use the actual selling prices of suppliers of generic medicines where available. In particular, we use information from Scheme M returns which provide the actual selling prices of manufacturers. These prices are available only from the entry of products into Scheme M and not for the entire period of time since loss of exclusivity of individual molecules.

#### **4B.2 Analysis of actual selling prices relative to pre-entry originator price**

- 4.16 Analysis of actual selling prices of generic medicines, as available under Scheme M, provides insights into the impact of generic competition in the UK.

<sup>43</sup> European Commission (2009), 'Pharmaceutical Sector Inquiry – Preliminary Report', Fact Sheet 'Prices, time to generic entry and consumer savings', p. 1.

<sup>44</sup> European Commission (2009), 'Pharmaceutical Sector Inquiry – Preliminary Report', Fact Sheet 'Prices, time to generic entry and consumer savings', p. 2.

<sup>45</sup> OECD/European Commission (2018), 'Health at a Glance: Europe 2018, state of health in the EU cycle', p. 63.

<sup>46</sup> The European Commission inquiry, for example, relied on data provided by IMS (now IQVIA).

As set out in detail below, our analysis of prices for a sample of products under Scheme M shows that, on average, prices of the generic versions of medicines in the UK over a four-year period after entry are 70–90% lower than the prices of the originator’s branded product before the loss of exclusivity, illustrating the significant price benefits relative to the pre-entry branded product.

- 4.17 To compare generic prices with the pre-entry originator price, we use a set of products covering 56 different molecules, for which we could obtain the most complete set of information. This information includes: actual selling prices of the generic versions of the products from 2012 to 2018 obtained from Scheme M; list prices of the corresponding originator brands provided by one BGMA member;<sup>47</sup> and the date of loss of exclusivity (LoE) obtained from MPA and BGMA members to determine the point at which to compare the originator and generic prices.<sup>48</sup>
- 4.18 The analysis involves a comparison between the originator price before the LoE, and the generic prices available from Scheme M, using 56 molecules. It is worth noting that for some molecules there is a gap between the LoE date (for example, 2010) and the first date for which the generic prices are available from Scheme M (which is 2012 or after). This is because actual selling prices before 2012 are not available for the purposes of this study.<sup>49</sup>
- 4.19 To compare the prices, we compute the **generic price ratio** of each product, which is defined as the generic price for a given molecule in a given quarter since the LoE, divided by the average originator price in the year before a reference date. We then compute the average generic price ratio across all 56 molecules.
- 4.20 Figure 4.1 shows the average generic price ratio when using the LoE date as the reference date for the generic price ratio. While there is variation across molecules, this shows that on average across the selected products, the generic price is 30% of the pre-LoE originator price immediately following the loss of exclusivity. The reduction in prices continues further and the generic price is, on average, below 10% of the originator price for two to five years after the LoE date. Figure 4.1 also shows that, on average across the 56 molecules, there are 4 to 5 generic manufacturers providing Scheme M data over the four-year period after LoE.<sup>50</sup>

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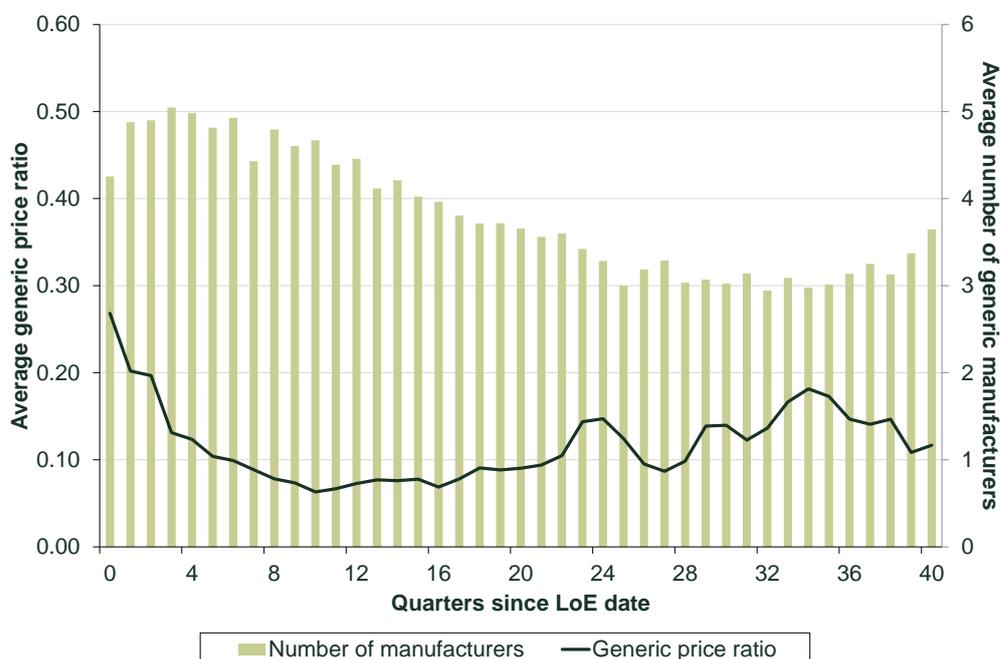
<sup>47</sup> We understand that the BGMA member obtained this information from public sources, in particular the Drug Tariff, and this information is a part of its regular monitoring activity. Oxera has not conducted primary verification of the list prices of each molecule included in this data.

<sup>48</sup> There were a number of steps followed to arrive at the final dataset of 56 molecules. First, we matched the product names from the Scheme M data and that from the BGMA member to determine the products for which both the prices of the originator and the generics are available. This led to a set of 163 molecules. Among these, we were provided with loss of exclusivity (LoE) dates for 60 molecules, of which four could not be used as originator price information for these molecules did not extend back far enough to cover the period before loss of exclusivity.

<sup>49</sup> For five of the 56 molecules (Aripiprazole, Clopidogrel, Pregabalin, Valsartan and Ibandronic Acid), the recorded LoE date occurs after generic sales returns in Scheme M are made. There are several reasons for why generic sales may be recorded before the date provided on the loss of exclusivity. For example, because suppliers have different entry strategies and information available to them; and in the case of Clopidogrel and Pregabalin, some indications may still have been protected, while some were not.

<sup>50</sup> We note that not all generic manufacturers participate in Scheme M, and hence, there might be other small manufacturers active in supplying a specific product that are not included in the Scheme M data.

**Figure 4.1 Average generic price ratio (relative to originator price before loss of exclusivity)**



Source: Oxera analysis based on data from Scheme M, BGMA members and MPA.

- 4.21 The analysis above also shows that, around four years after the LoE date, the average generic prices across the set of products used, start to increase from below 10% of the originator price and reaches 15–20% of the originator price six to nine years after the LoE. At the same time, the average number of generic manufacturers providing Scheme M data decreased from 4 to around 3.
- 4.22 While there are a variety of reasons for why generic prices could increase and the individual products could involve different levels of price changes, the overall finding is consistent with some of the market dynamics noted by manufacturers in the interviews. As discussed in section 3, manufacturers noted that, following loss of exclusivity, a large number of generic producers could often enter in the short term, resulting in a high level of competition and a significant decrease in prices of generic products.
- 4.23 However, in many cases, some producers exit subsequently (i.e. stop actual supply, although they may continue to hold an MA). This is because the intense competition could lead to a combination of low sales and low prices for some suppliers, such that total margins are low enough that supplying the product is not commercially viable for them. In such cases, there is a decrease in the number of generic suppliers and an increase in price, as the market reaches a more stable long-run position. Figure 4.1 shows that, while the consequent increase in generic prices at this stage is material (around 100% increase from 10% of originator price to 20% as noted in paragraph 4.21), in the broader context the generic price is still, on average, one-fifth of the originator price before the LoE date.

### Sensitivity analysis

- 4.24 If the LoE date is not used in the analysis, there is a larger set of molecules (163 molecules) for which information on both the originator price and the actual selling price of generic versions, are available. To test whether the

above results are robust to a larger set of products, we carry out the above comparison using a different reference date. In particular, we use as the reference date the date when the first Scheme M price is recorded for a particular molecule. For example, if for a molecule the first Scheme M generic price is for Q1 2013, we compare the generic prices after this date with the average originator list price in the year before this date (i.e. Q1–Q4 2012). The LoE date for this molecule is however unknown and may be Q4 2012 or much earlier. This method allows us to use a larger set of 163 molecules for which both the originator and generic prices are available.

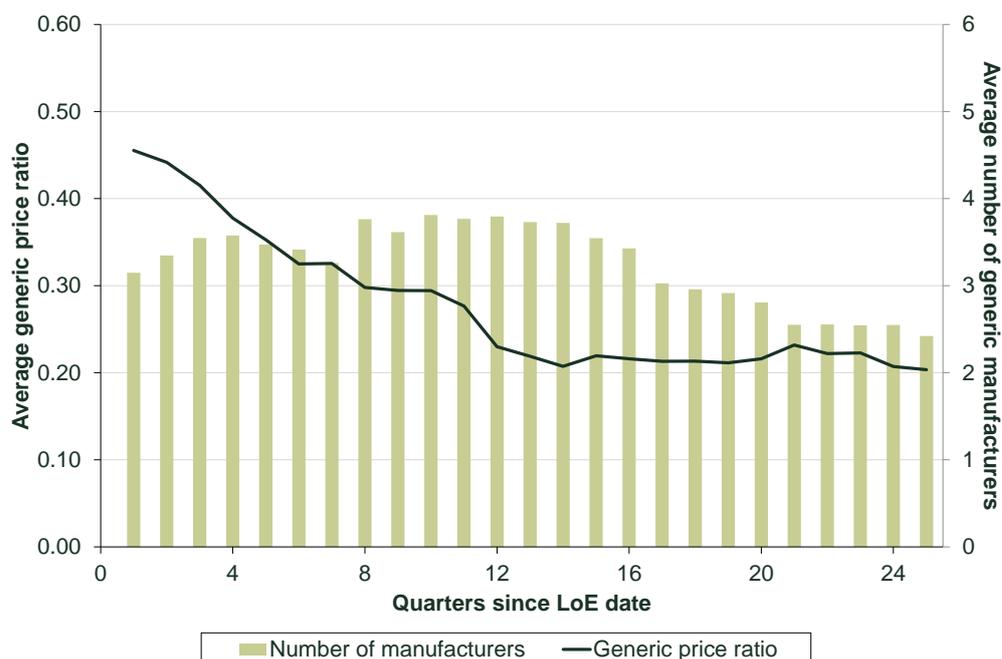
- 4.25 In theory, this comparison may not reflect the full impact of generic competition. Using the above example, if the LoE date is in 2010 and generic entry occurred before 2012, the list price of the originator brand may have already decreased by Q4 2012. Therefore, this will underestimate the impact of generic competition relative to the pre-entry world, if the list price of the brand has decreased after entry.
- 4.26 In practice, however, this method serves as a useful cross-check on the analysis above based on a larger set of products. This is because the originator list price information shows that list prices are stable across years—the difference between the maximum and minimum list price available for each product is less than 20% for a large majority (90%) of products, and for over 50% of the products there is no variation at all in list price of the brand across all quarters for which data is available. Therefore, the list price of the originator's brand even after the LoE date will often be similar to the list price before LoE. To the extent the originator list price decreases, this sensitivity analysis provides a conservative view of the benefits of generic entry relative to the pre-entry price of the branded product.<sup>51</sup>
- 4.27 Figure 4.2 below shows that the average generic price in the first quarter of Scheme M is around 45% relative to the average originator list price (calculated in the year before the first Scheme M price). The generic price subsequently decreases steadily, stabilising at around 20% of the relevant originator price.
- 4.28 It is notable that Figure 4.2 does not exhibit the increase in generic prices that occurred from around 4 years after the LoE date in Figure 4.1. This may be due to the selection of products, given that Figure 4.2 is based on a larger set of molecules.<sup>52</sup> As noted above, if the LoE date was known for all of these 163 molecules, the generic price relative to the pre-LoE brand price would be lower than presented above.

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<sup>51</sup> This study does not capture the impact of generic competition on the prices of the relevant branded medicine supplied by the originator (for example, through brand equalisation deals) due to lack of appropriate data.

<sup>52</sup> To test whether these differences are driven by the choice of the reference date (LoE date versus first Scheme M price) or by the different molecule sets, we applied the alternative method in the sensitivity analysis to the 56 molecules for which we have LoE dates. This produced a similar picture to that shown in Figure 4.1. This suggests that it is some feature(s) of these 56 molecules, as opposed to the choice of the reference date, which is driving the differences between Figure 4.1 and Figure 4.2.

**Figure 4.2** Average generic price relative to average originator price in the year before first Scheme M price



Source: Oxera analysis based on data from Scheme M, BGMA member and MPA.

- 4.29 Overall, the above analysis indicates that generic prices 2–4 years after entry are, on average across the set of products analysed, between 10% and 30% of the originator price before entry. As discussed above, while the extent and speed of reductions can vary and prices could increase at a later stage (for example, from 10% to 20% of the originator price as in the case in Figure 4.1, which is a 100% increase), the overall average price remains at around 20% of the price of the originator branded product before loss of exclusivity. (In section 4B.3 below we investigate the market dynamics of cases where significant price increases are observed.)
- 4.30 In the broader context of supply of medicines, the above indicates the substantial price benefits delivered by generic medicines to the UK healthcare system.<sup>53</sup>
- 4.31 We understand from BGMA that the above result is in line with separate analysis conducted by BGMA, based on a sample of 33 products, covering 14 different molecules.<sup>54</sup> It compared the average manufacturer selling price for the relevant generic products across the entire period in which at least one Scheme M member sold a generic version, with the Tariff price of the originator’s branded product pre-patent expiry (in particular, as at December 2013). This analysis shows that the price of generic products after they enter

<sup>53</sup> It is notable that very low prices of manufacturers may lead to an increase in the total amount paid by the NHS for medicines for a period of time due to an increase in the number of concessions. In particular, assuming that the retained margin earned by pharmacies is maintained, if actual selling prices are too low, manufacturers may reduce supply and/or exit the market (as discussed in section 3C). If this entails a significant reduction in supply and leads to shortage, this may trigger a need for concessionary pricing, which in turn increases the total amount paid by the NHS.

<sup>54</sup> BGMA analysed originator medicines which had lost exclusivity between January 2014 and July 2018 (nearly the duration of the last PPRS). This data was obtained from MPA Services. The products included were those where data was found on the originator product in the PCA data and on an equivalent generic medicine in Scheme M. The original sample covered 36 products (16 molecules), of which originator prices were not available for three products.

Scheme M is, on average, 89% lower than the price of the branded product before patent expiry.

### **4B.3 Analysis of observed price increases**

- 4.32 As discussed in section 3, the supply of generic medicines in the UK is dynamic and generic prices can change in response to market conditions. These market conditions could include a shortage or an excess supply of a specific product. Under a well-functioning market-based system, we would expect that significant price changes are reversed when previous market conditions are reinstated, or that prices stabilise at a new equilibrium level that reflect changed market conditions where relevant.
- 4.33 In particular, from an economic perspective, a significant increase in price (where it does not reflect permanent cost shocks) should, in principle, create incentives for existing participants to increase supply of the relevant product or for new suppliers to enter. This in turn is likely to reduce the price in a well-functioning market. As noted in section 3, suppliers of generic medicines do respond to such short-term changes. Suppliers hold MAs for the range of products that is consistent with their business model and are accordingly able to reduce production volumes during a period of excess supply, and similarly increase production volumes when the level of price and expected sales justifies the supply.
- 4.34 To assess how this market mechanism affects observed price increases, we have analysed a set of instances of price increases of generic medicines in the Scheme M list during 2012–18. In particular, we assess whether such price increases are reversed and if so, to what extent and the time it takes for such a reversal. We conduct this analysis with prices from WaveData which provides the prices charged to independent pharmacies at a product level over a number of years, including before 2012.<sup>55</sup>

#### **Price increases observed**

- 4.35 The analysis identifies a number of case studies based on visual inspection and quantitative analysis of trends. We consider and analyse two types of price increases:
- price increases above 50% occurring within a short period of time (over 1–12 months), which we refer to as ‘price spikes’. These could be due to factors such as shortages, temporary issues in the supply chain or exits or, potentially, due to lack of competitive constraints;<sup>56</sup>
  - slower price increases, which involve small monthly increases over a longer period of time (1–3 years). These could be due to cost increases or increases in the level of concentration in the market.

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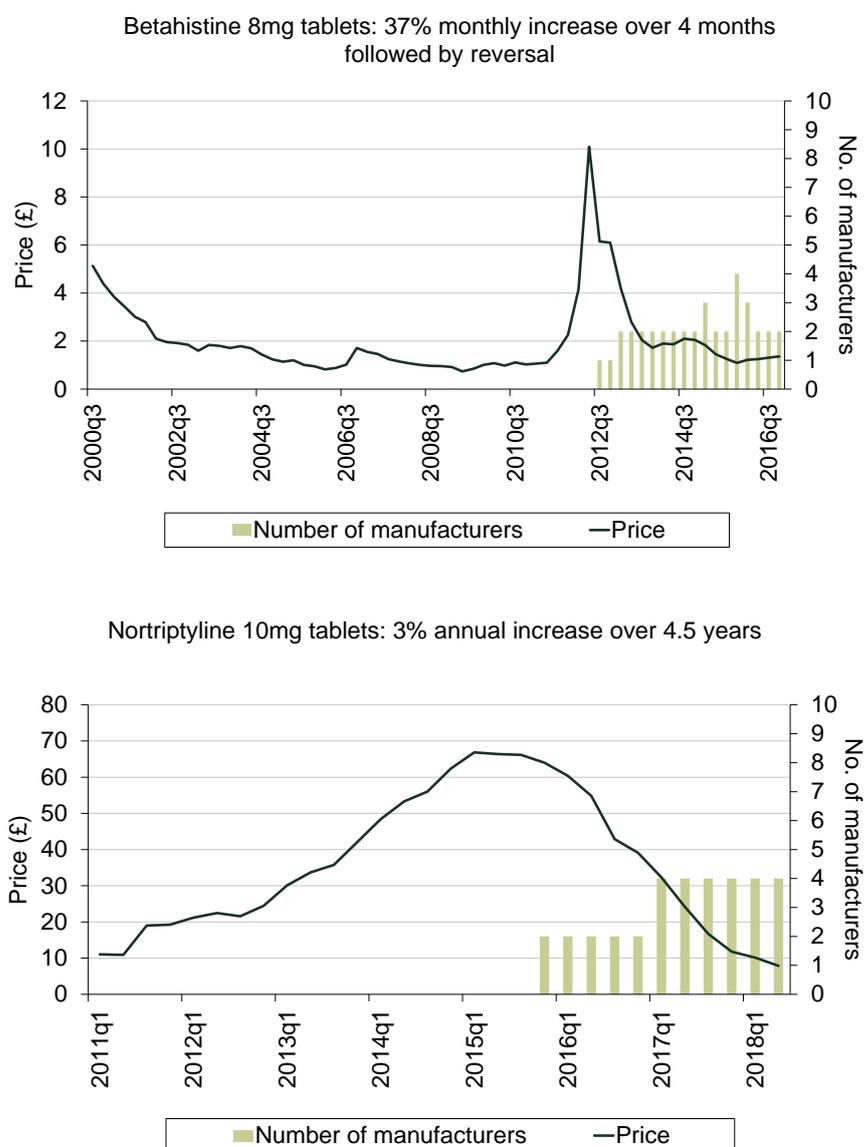
<sup>55</sup> We do not use the actual selling prices available from the quarterly Scheme M returns for this analysis. It would not be possible to identify a sufficient number of case studies with this data, because: (i) the price series after Scheme M entry are often short; (ii) in the vast majority of cases, the price of a product declines after entry into Scheme M (consistently with the evidence presented in section 4B). In contrast, using monthly price information from WaveData enables us to construct a longer, more detailed price series, going further back in time. This has the advantage of providing a more reliable view of the market dynamics at different stages of the lifecycle of a product and puts any price increase into the long-term context of the specific product. In any event, it is notable that for the period of overlap between Scheme M returns data and WaveData prices (i.e. the period after Scheme M entry), the trends in the Scheme M and WaveData price are very similar in most cases.

<sup>56</sup> Cumulative increases of 50% over 1–12 months.

4.36 Figure 4.3 below provides one example for each of the two types of price increases.

- The chart on the left shows a product that experienced a sharp price increase at the end of 2011. The price increased, on average, by 37% every month over a four-month period. The increase was then followed by a rapid and almost complete reversal over a period of approximately one year.
- The chart on the right shows a product that experienced a slower price increase. The price increased, on average, by 3% every month over a period of four years and a half. The increase was then followed by a complete reversal over a period of approximately three years.

**Figure 4.3 Examples of price spikes and slower price increases**



Source: Oxera analysis based on WaveData prices and no. of manufacturers from Scheme M returns (for products that entered Scheme M between 2012 and 2018).

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## Reversal rates

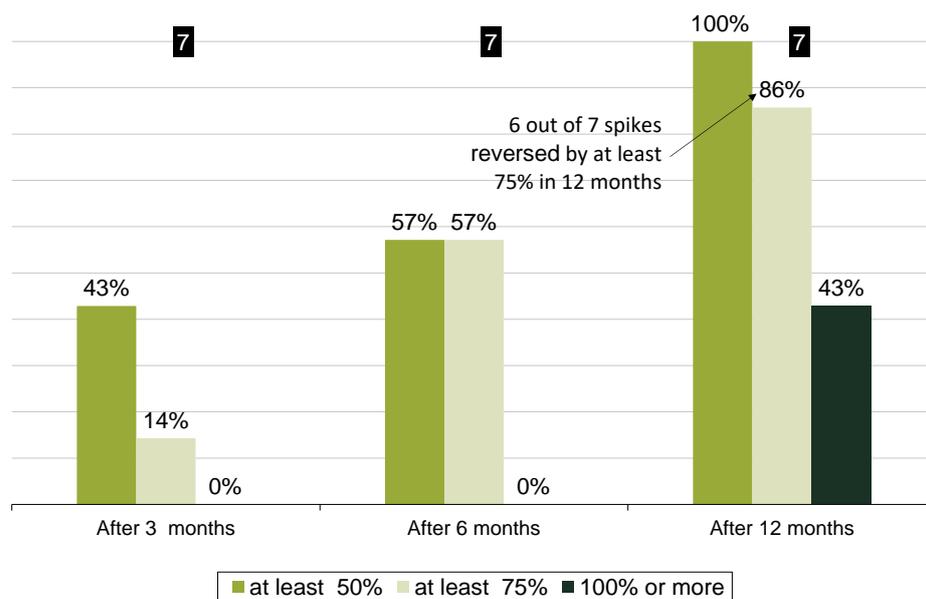
- 4.37 Figures 4.4 and 4.5 summarise the results of the price increase analysis for all the case studies considered (seven instances of price spikes and 20 instances of slower price increases).<sup>57</sup> We analyse two aspects:
- reversal rates—i.e. the extent to which a price increase is reversed over time (as a percentage of the total price increase);
  - speed of reversal—i.e. how long it takes to achieve a specific reversal rate.
- 4.38 Figure 4.4 presents the results for price spikes. It shows that:
- for 3 out of 7 instances of price spikes (43% of all spikes considered), there is full reversal of the price increase (i.e. a reversal of at least 100%) within 12 months of the spike reaching its peak. The fact that it takes a few months for prices to reverse may be due to lead times required to increase supply of the product following a price increase. As discussed in section 3, interviews with generic manufacturers highlighted that increasing production and supply volumes after a period of relative inactivity can take three months or more (e.g. depending on API availability, manufacturing capacity and sometimes MHRA approvals), nearer a year for a new supplier to enter;
  - although not all spikes are reversed fully, we observe that, for 6 out of 7 instances of price spikes (86% of all spikes considered), the increases are reversed by at least 75% within 12 months.

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<sup>57</sup> While there are other instances of price increases in the data, these were either smaller increases or part of a series of fluctuations which makes systematic analysis intractable. This is also the reason we had to adopt a mix of quantitative analysis and visual inspection to identify the clear cases of price spikes or slower price increases. The prices of the remaining molecules obtained from WaveData showed a declining or stable trend. Given that the focus of the reversal analysis is on price increases, we have not analysed in detail these other trends.

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**Figure 4.4 Reversal rates for price spikes**

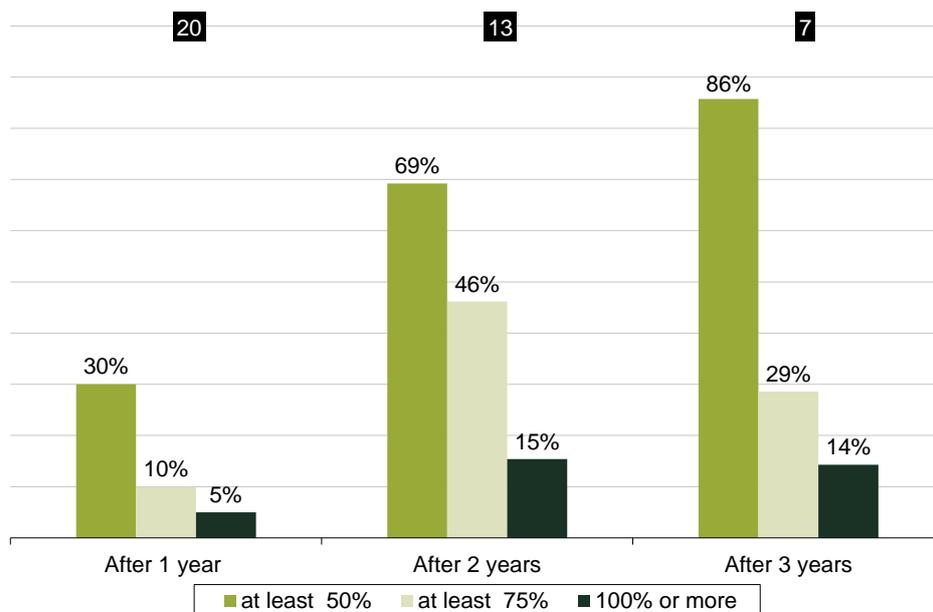


Note: The black box at the top of the bars indicates sample size. The sample size may vary if the price series does not extend beyond the relevant number of months after the price increase.

Source: Oxera analysis, based on WaveData prices for products that entered Scheme M between 2012 and 2018.

4.39 Figure 4.5 shows the results for slower price increases. It indicates that the rate of reversal is generally smaller than for price spikes and reversals take a longer time to materialise. For example, while 46% of these slow price increases are reversed by 75% or more in two years, around 30% are reversed by less than 50% in two years.

**Figure 4.5 Reversal rates for slower price increases**



Note: The black box at the top of the bars indicates sample size. This may vary if the price series does not extend beyond the relevant number of months after the peak of the price increase.

Source: Oxera analysis, based on WaveData prices for products that entered Scheme M between 2012 and 2018.

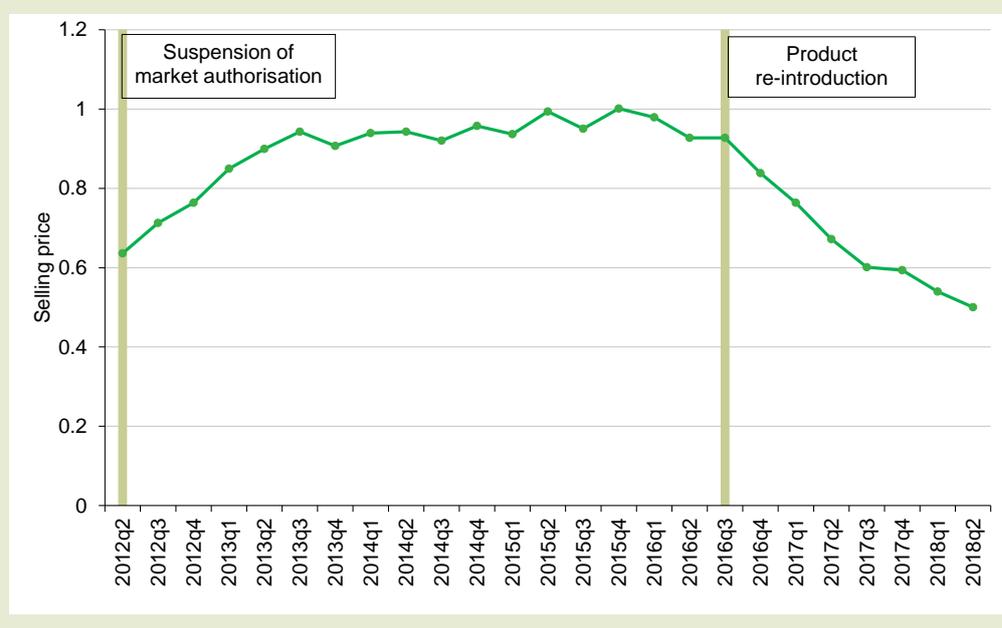
- 4.40 The fact that slower price increases are not always fully reversed over the course of two to three years may be explained by the possibility of more permanent changes in these instances. For example, the cost base is more likely to change over the course of a longer period (which may have been the cause of the price increase in the first place). As noted in section 3, the industry reports that API costs of some products have increased.
- 4.41 The lack of full reversal may also be due to changed market structure, such as the exit of one or more generic suppliers due to changed market conditions. Box 4.1 provides an example of a product where an exit by a key supplier caused price increases which persisted for a number of years before being fully reversed.

#### Box 4.1 Long-term market dynamics for Levothyroxine

In February 2012 the Commission on Human Medicines (CHM) advised the suspension of the marketing authorisation for Levothyroxine 100 microgram tablets manufactured by a large generic company, following reports of reduced efficacy when patients switched to the company's levothyroxine product from other levothyroxine products.

As the R&D required to supply the product is higher than for most generic medicines,<sup>1</sup> entry by alternative suppliers did not take place following the company's withdrawal from supplying the product. As a result, the average manufacturer selling price increased by c.50% over one year and remained at these higher levels for several years (as shown in the figure below).<sup>2</sup>

Following the suspension, the company undertook an extensive reformulation of the 50 and 100 microgram tablets, along with manufacturing process improvements to provide assurances of product consistency. As a result, in February 2016, CHM advised that the products had an acceptable level of efficacy and safety and could be re-introduced. As shown in the figure below, this resulted in a full reversal of the price increase within one year of the CHM's decision.



Note: <sup>1</sup> Establishing bioequivalence and its correlation to therapeutic equivalence for endogenous substances like Levothyroxine poses particular challenges. Therefore, more stringent quality standards and additional clinical studies are required to improve assurance of interchangeability between different Levothyroxine products. <sup>2</sup> The manufacturer selling price is based on Scheme M returns data for Levothyroxine 100mcg, 28-tablet pack (best-selling pack for the molecule and by far the one with the largest impact on NHS spend).

Source: MHRA (2013), 'Levothyroxine Tablet Products: A Review of Clinical & Quality Considerations', 7 January; News story, <https://www.gov.uk/government/news/teva-levothyroxine-tablets-re-entry-to-market-and-introduction-of-new-tablet-strengths>, accessed 14 June 2019.

#### **4C Generic prices in the UK relative to other countries**

- 4.42 In addition to the comparison of the pre-LoE originator price, it is also useful to compare the prices of generic medicines in the UK to that in a selected set of European countries. General industry commentary suggests that the UK generics sector performs well relative to many other European countries in terms of, for example, the rate of generic prescribing by doctors, incentives for pharmacists to dispense generic medicines, and, consequently, the growth of generic medicines in general.
- 4.43 The UK has one of the highest penetration rates of generic medicines across Europe. A recent OECD/European Commission study notes that:<sup>58</sup>
- Across Europe, prices, market shares and timing of market entry of generic medicines vary widely (Rémuzat et al., 2017; Kanavos, 2014). In 2016, generics accounted for more than 75% of the volume of medicines covered by basic health coverage in Germany and the United Kingdom, but made up less than 30% in Switzerland and Italy, and less than 15% in Luxembourg. A recent study also reported that prices of generics in Switzerland were more than six times higher than in the United Kingdom (Wouters, Kanavos and Mckee, 2017).
- 4.44 Importantly, the study acknowledges the policy and institutional framework is an important driver of generic uptake.<sup>59</sup>
- Although some of the observed differences in uptake across countries may reflect differences in the timing of patent expiries, generic uptake depends very much on policies implemented at the national level (Belloni, Morgan and Paris, 2016; EvaluatePharma®, 2015). In addition to promoting competitive procurement and pricing, these include encouraging rapid market entry of follow-on product on loss of market exclusivity of originator medicines; promoting or mandating prescribing by international non-proprietary name (INN), encouraging and incentivising pharmacists to substitute at the point of dispensing; and incentivising and educating patients.
- 4.45 In addition, the European Commission's pharmaceutical sector inquiry shows that generic entry in the UK is more extensive (in terms of number of entrants and market shares captured) and occurs at a significantly faster rate than the EU average. The inquiry also found that the average generic price in the UK is lower than that of countries such as the Netherlands, Ireland, Greece and Hungary. A study by the OECD notes similar findings. For example, the study states that 'the differential price between brand-name and generic drugs is much higher in the United Kingdom and Germany than in Austria'.<sup>60</sup>
- 4.46 To test relative pricing in the UK of generic medicines in recent years, we use IQVIA data to compare average manufacturer net selling prices for a set of products in five European countries. The countries each exhibit a mature generic medicine segment, are of different sizes, have different pricing and reimbursement mechanisms, and comprise a significant share of the European market. A detailed description of the data and methodology is provided in Appendix A1.
- 4.47 We present the results of the analysis below.

<sup>58</sup> OECD/European Commission (2018), 'Health at a Glance: Europe 2018, state of health in the EU cycle', p. 63.

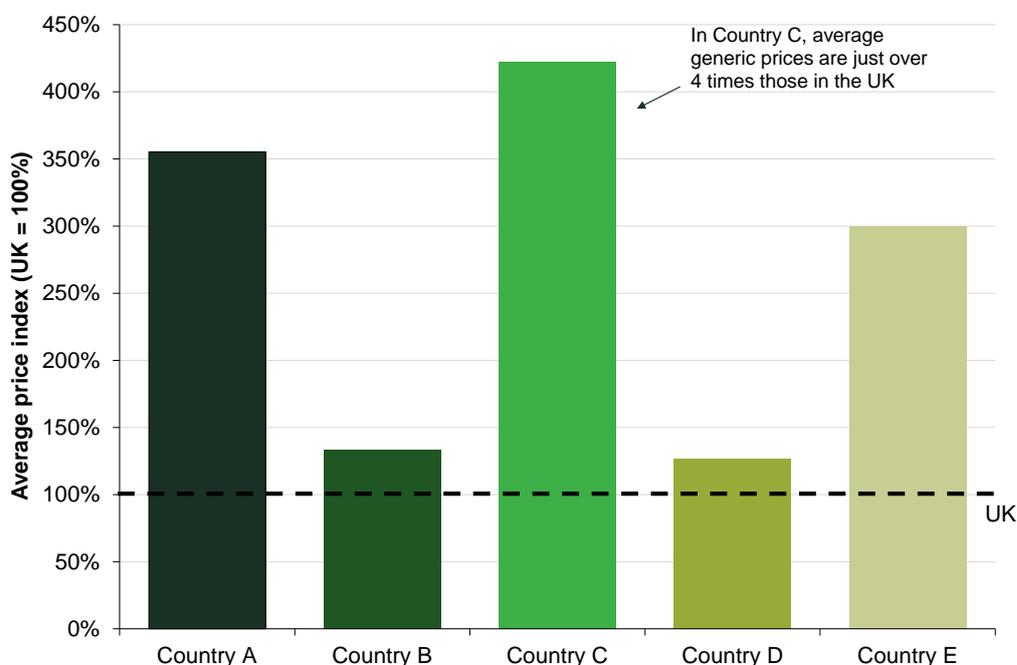
<sup>59</sup> OECD/European Commission (2018), 'Health at a Glance: Europe 2018, state of health in the EU cycle', p. 63.

<sup>60</sup> OECD/European Commission (2016), 'Health at a Glance: Europe 2016, state of health in the EU cycle', p. 182.

#### 4C.1 Results

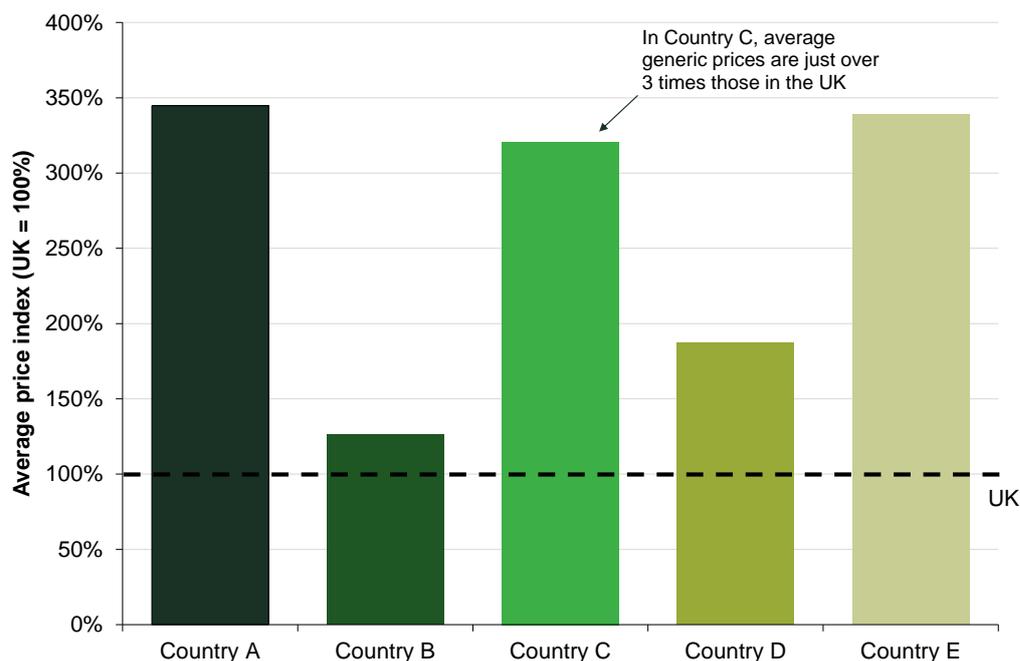
- 4.48 Figure 4.6 and Figure 4.7 present the aggregate ratio between average actual manufacturer selling prices in each of the selected European countries and those in the UK for Q2 2018, for molecules of the highest priced and most costly products, respectively.
- 4.49 In particular, Figure 4.6 shows that, for products that are among the highest priced in the UK and which are sold in other countries, the average manufacturer selling prices for all but two countries are significantly greater (3 to 4.5 times) than that of the corresponding products in the UK. The results are broadly similar in the case of most costly products in the UK.
- 4.50 While it is hard to say with precision on a specific product basis owing to the variability of rebate levels, overall these results suggest that prices for a given molecule in Q2 2018 tended to be higher in other countries than in the UK.

**Figure 4.6** Average actual generic selling price relative to the UK, Q2 2018, molecules of highest priced products



Source: Oxera based on IQVIA analysis.

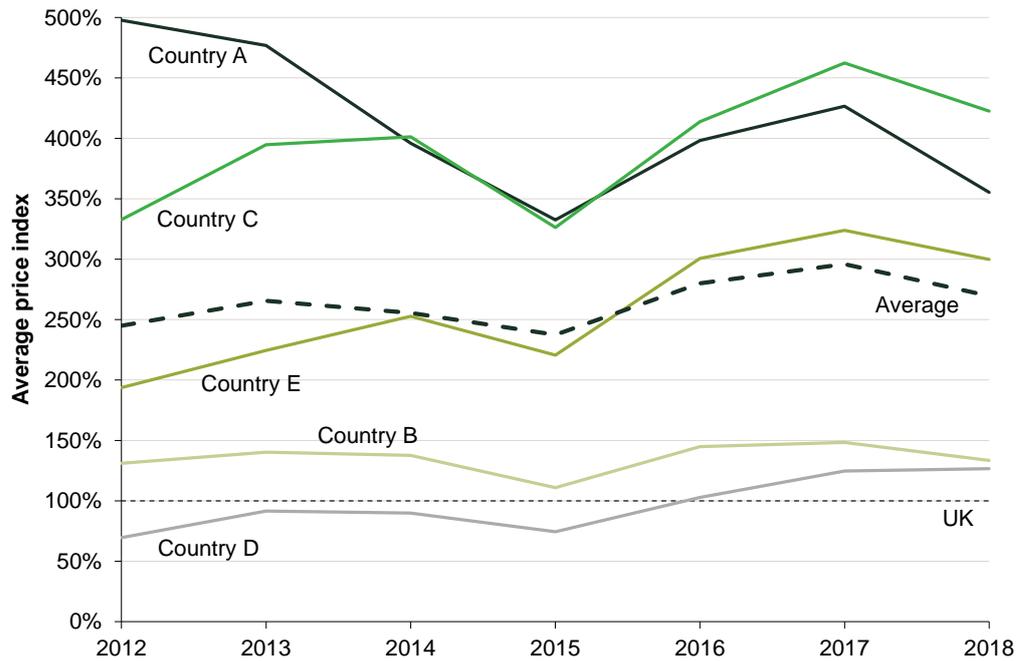
**Figure 4.7** Average actual generic selling price relative to the UK, Q2 2018, molecules of most costly products



Source: Oxera based on IQVIA analysis.

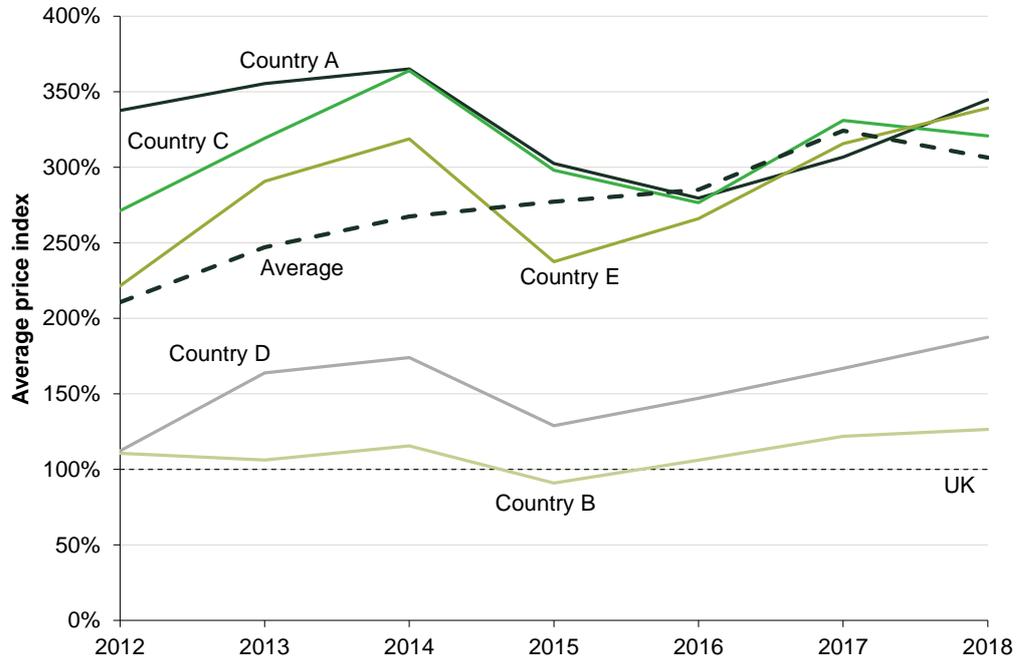
- 4.51 Analysis of the actual selling price indices over the period 2012-18 suggests that this has been broadly true since 2012 (see Figure 4.8 and Figure 4.9). Average actual selling prices in three countries have been consistently higher than in the UK. Selling prices in the other two countries have been similar or slightly higher than in the UK depending on the year and products considered.
- 4.52 The results below also show that the relative actual selling price index has increased over time for some countries. For example, the price index for Country C for the highest priced products (see Figure 4.8) has increased from 330% in Q2 2012 (implying prices were 3.3 times that in the UK) to over 420% in Q2 2018 (i.e. 4.2 times that of the UK). Figure 4.9 shows similar increases in the index for three European countries for the most costly products.
- 4.53 We note that the systematic decrease in relative price index for all European countries in 2015 was driven by a significant change in the GBP/EUR exchange rate.

**Figure 4.8** Average actual selling price in other countries relative to the UK, 2012–18, molecules of highest priced products



Source: Oxera based on IQVIA data.

**Figure 4.9** Average actual selling price in other countries relative to the UK, 2012–18, molecules of most costly products



Source: Oxera based on IQVIA data.

- 4.54 One of the main factors that is likely to be driving these price differentials is the regulatory system guiding the pricing of generic medicines in each country, notwithstanding of course the impact of different healthcare models.
- 4.55 In particular, the UK price regulation system provides strong incentives to all key players to encourage generic medicines use. Doctors are incentivised to

write open scripts without brand names. Pharmacies are provided incentives to dispense the least expensive generic product, given the reimbursement structure, which in turn incentivises generic suppliers to offer competitive prices to pharmacies, thereby driving prices down. The system in this way creates certainty in the formation of the generics market, allowing low price offerings on the basis of securing volume. The pressure on generic prices is supported by the regular revisions (typically, reductions) of the Drug Tariff price which is used to reimburse pharmacists.<sup>61</sup>

- 4.56 In some European countries (like Country B and D), a tender system is used to establish the generic retail price, with the healthcare system reimbursing patients only at the lowest price among all available products. Similar to the UK, competition plays an important role in this system, which may explain why generic prices in these two countries tend to be closer to those in the UK. Tender systems can produce low prices, if the volumes are attractive. While shortages can and do of course impact on all markets, tender systems by their nature involves a single or few suppliers and can be less responsive to shortages since non-contracted players have no clear and predictable long-term opportunity, meaning there is less incentive to produce or hold product.<sup>62</sup>
- 4.57 In contrast, in some European countries (Countries A, C and E) the reimbursement price for generic medicines is regulated, usually with reference to the originator's price.<sup>63</sup> This can lead to lower prices for branded versions of off-patent medicines, but provides weaker incentives for generic producers to compete. In Country A and Country E in particular, price competition among generics is almost non-existent. In Country A, there is a single, common price for generic versions of a given molecule, preventing price competition.<sup>64</sup> In Country E, patients cannot pay the difference if the actual generic price is above the reference price (based on the lowest-priced generic from a reference group), so reimbursement is only available for medicines priced at the reference price. This creates an incentive for all medicines, including branded versions, to be priced the same.<sup>65</sup>
- 4.58 A further factor could be that, from the day of application, it takes an average of 180 days and 300 days in Country C and Country A respectively for a generic to receive pricing and reimbursement approval.<sup>66</sup> This is likely to reduce the number of generic entrants for a molecule in these countries relative to the UK and Country B, where no such application is necessary.

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<sup>61</sup> IMS (2015), 'The Role of Generic Medicines in Sustaining Healthcare Systems: A European Perspective', June, [https://www.medicinesforeurope.com/wp-content/uploads/2016/03/IMS\\_Health\\_2015\\_-\\_The\\_Role\\_of\\_Generic\\_Medicines\\_in\\_Sustaining\\_Healthcare\\_Systems\\_-\\_A\\_European\\_Perspective.pdf](https://www.medicinesforeurope.com/wp-content/uploads/2016/03/IMS_Health_2015_-_The_Role_of_Generic_Medicines_in_Sustaining_Healthcare_Systems_-_A_European_Perspective.pdf).

<sup>62</sup> For example, see reports of shortages at Melck, B. (2018), 'Drug supply shortages in Germany', IHS Markit, 17 May, <https://ihsmarkit.com/research-analysis/drug-supply-shortages-in-germany.html>; and Pieters, J. (2019), 'Netherlands facing increasing medicine shortage', 14 January, <https://nltimes.nl/2019/01/14/netherlands-facing-increasing-medicine-shortage>.

<sup>63</sup> Ibid.

<sup>64</sup> Generic Medicines (2016), 'Market Review – European Generic Medicines Markets', <https://www.medicinesforeurope.com/wp-content/uploads/2016/11/Market-Review-2016-Generic-medicines-policies.pdf>.

<sup>65</sup> Ibid.

<sup>66</sup> Ibid.

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## **5 Overall assessment of current framework**

5.1 In this section, we assess the current framework governing the supply of generic medicines to inform whether it is fit for purpose, in light of the evidence discussed above and given established regulatory principles. We first provide some remarks on the functioning of the current market and regulatory mechanisms to inform the need (or lack thereof) for any changes (section 5A). We then discuss the key considerations in any intervention that may be required in specific circumstances (section 5B).

### **5A Assessment of the current framework and need for change**

5.2 To assess whether there is need for change, the first step is to assess whether the market outcomes are consistent with well-functioning competitive dynamics. This involves analysing a range of aspects, including:

- whether competition is working among existing suppliers (i.e. existing competition);
- whether entry barriers are low and the market is contestable (i.e. potential competition);
- whether there are other factors that constrain suppliers, such as the buyer power of customers and regulatory obligations.

5.3 In the context of the generic manufacturing sector in the UK, the evidence discussed in sections 3 and 4 suggests that the market mechanisms are likely to be working effectively for most products.

5.4 Generic entry typically involves a number of manufacturers and increased price competition at the manufacturer level. As discussed in section 4, this leads to a significant reduction in the actual selling price obtained by manufacturers in many cases. More generally, manufacturers have the ability to respond to changed market conditions (such as shortages or excess supply) and to competition from others promptly by changing their supply and pricing decisions. In addition, new suppliers have the ability and incentive to enter the UK market given the regulatory framework and the importance and size of the UK as a market.

5.5 Other relevant factors constraining manufacturers are existing regulations relating to pricing and countervailing buyer power—i.e. the constraints imposed on the supplier due to the negotiating power of customers. In this case, customers include wholesalers and pharmacies, as well as the DHSC as the ultimate payer. As noted in section 2, the two largest wholesalers account for a significant proportion of the wholesale level, which improves their bargaining position vis-à-vis an individual generic supplier. The big pharmacy chains also impose constraints on suppliers, all of which can result in substantial discounts.

5.6 In addition, the various components of the regulatory framework for pricing of generic medicines—the reimbursement system, the current system of revision of Drug Tariff and the provision of data in return for freedom of pricing through Scheme M (and successor arrangements through the Health Medical Supplies (Costs) Act 2017)—strongly incentivise competition. These also allow the DHSC to reduce the total financial burden, which is consistent with the reductions in Drug Tariff price over time for Category M medicines.

5.7 The effectiveness of the UK system is further shown by a comparison with other countries, as discussed in section 4C.

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5.8 Notwithstanding the above, there may be specific cases where existing and potential competition is non-existent or limited—for example, because of clinical, regulatory or economic barriers. In these cases, the DHSC may deem it necessary to intervene using its clarified powers under the Health and Medical Supplies (Costs) Act (2017) to set a price that it considers fair and reasonable. As discussed, when doing so, it is important to consider the actual selling prices obtained by the manufacturer, and not the reimbursement or Drug Tariff prices.

5.9 We discuss below the key considerations in any such intervention.

## **5B Key factors relevant for intervention**

5.10 As discussed in section 2, the pharmaceutical sector, and the generic medicines sector specifically, faces a number of regulations relating to the pricing of medicines. In particular, the combination of the reimbursement mechanism and Scheme M (and the successor statutory scheme)<sup>67</sup> provides for an effective way for the DHSC to incentivise, and benefit from, competition in the supply of generic medicines and to reduce its financial burden. In this context, additional intervention in the sector needs to be carefully considered using established regulatory principles.

### **5B.1 Regulatory principles and options**

5.11 Best practice in economic regulation highlights two well-established principles in this respect:

- the expected benefits of any intervention should be weighed against any potential unintended consequences such as potential distortions to existing incentives;
- any intervention should be proportionate to the issue it is intended to address.

5.12 It is also relevant to consider the trade-off between ‘ex ante’ economic regulation (i.e. that which is applied in advance to prevent certain behaviour before it can occur) and ‘ex post’ regulation (i.e. that which is applied after the event to address any perceived failures of behaviour that have already occurred).

5.13 Ex ante regulation is typically used in markets where there is no effective competition due to, for example, absolute entry barriers. The price-setting of branded medicines under the VPAS is a form of ex ante price regulation in the pharmaceutical sector. The current Scheme M system and the reimbursement mechanism is also a form of ex ante regulation which is specifically designed to encourage generic competition rather than control prices of generic products directly.

5.14 Ex post regulation is typically used where there is already some degree of competition in a market (even if it is not yet fully effective). These tools are typically backward-looking and are therefore applied after a suspected transgression has occurred with the intention of applying redress for past actions. Competition law is a form of ex post regulation, as are the DHSC’s clarified powers to intervene in the pricing of generics if it considers that an instance of pricing is not fair and reasonable. It is worth noting that ex post

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<sup>67</sup> Health Service Medical Supplies (Costs) Act 2017.

regulatory tools may have an ex ante effect through deterrence—i.e. affecting a firm’s incentives to undertake a particular course of action.

- 5.15 Table 5.1 below sets out some examples of regulatory tools. As noted, one ex ante regulatory tool that is highly interventionist is price or profit caps, such as under the VPAS. These are typically used when there is a higher scope for market power, such as in the case of originator companies before any generic entry has occurred. While the originator may not actually have market power—for example, due to competition from other molecules used for the same therapeutic indication—the existence of such a risk may, in itself, warrant such regulation. This approach, however, is not appropriate for the generic medicines sector, which typically faces high levels of competition.
- 5.16 The other options listed in Table 5.1 are less interventionist, and some of these are already in place in the generic medicines sector. For example, Scheme M reflects the option of asking companies to provide the relevant information to enable monitoring of prices. This tool typically provides a good balance between the ability to monitor and intervene, while avoiding unintended consequences of excessive intervention, and is used commonly across industries.<sup>68</sup>

**Table 5.1 Spectrum of regulatory tools**

Regulatory option	Type of intervention	Description
Predefined price or profit caps	Ex ante	This is the most interventionist of the options. It involves the ex ante definition of forward-looking limits on prices and or returns. It is typically used when there is scope for a company to have a significant degree of market power
Following pre-agreed pricing principles	Ex ante principle, ex post enforcement	For example, similar to the ‘fair, reasonable and non-discriminatory’ (FRAND) pricing principle applied in some other sectors such as in standard essential patents. This approach is likely to be an attractive option provided that the principles are clearly agreed. (One of the issues in FRAND is that there is often significant ambiguity surrounding the basis for assessment)
Information disclosure and regulatory monitoring	Ex ante, ex post	Similar to what has been included in Scheme M and is now a statutory requirement
Competition for the market (tendering)	Ex ante	Remedies aimed at reducing entry barriers/facilitating competition. These include the NHS encouraging entry by using tendering (as it does for the supply of medicines to hospitals)
Competition law interventions	Ex post	Investigations in response to specific complaints—i.e. as done in the case of Flynn

Source: Oxera.

- 5.17 In general, regulatory principles dictate that interventions should be limited to light-touch approaches unless there is clear evidence that the market is not working well, given that stronger interventions (such as a price or profit cap) have greater scope to affect the incentives of relevant suppliers. This light-touch approach is likely to be particularly important in the generic

<sup>68</sup> For example, Ofcom (the UK telecoms regulator) considers that an ongoing monitoring regime is an effective safeguard for outcomes in the UK postal sector. Similarly, the UK Civil Aviation Authority (CAA) applies a price monitoring regime to some airports where it deems that full regulatory interventions would be disproportionate (e.g. Aberdeen Airport). Monitoring regimes are also widely applied in a range of sectors in other countries, such as Australia (airports) and New Zealand (telecoms).

pharmaceuticals sector, where manufacturers require appropriate incentives to enter, invest and compete effectively.

- 5.18 Indeed, a recent OECD/European Commission study cites evidence that supports this view:<sup>69</sup>

[...] Evidence also suggests that direct regulation of generics prices, for example, by imposing fixed discounts relative to originator products (or using reference prices) is less effective in reducing prices than where prices are established through competitive mechanisms such as tendering or negotiation.

- 5.19 This is particularly the case for the UK, where the market appears to be delivering good outcomes relative to other countries. As discussed in sections 3 and 4, the higher generic prices in some of the other countries are likely to be driven to some extent by more interventionist regulations on the pricing of generic medicines.

## **5B.2 Relevant considerations for intervention**

- 5.20 Overall, the above suggests that the current system of information disclosure from generic manufacturers is an appropriate regulatory tool given the wider context. It allows the competitive mechanisms to work, while still providing DHSC with the chance to monitor and investigate specific cases and, where necessary, intervene in the price-setting process.
- 5.21 When intervening in the pricing of generic medicines, it is important to keep in mind the strategic considerations of manufacturers in their entry and pricing decisions. This is important for both the decision to intervene to set prices, and in the assessment of what is a fair and reasonable price. For example, in deciding whether to intervene, it is important to consider the long-term dynamics of the specific case—i.e. the existing levels of competition as well as the prospective level of competition and likelihood of entry in the future. Similarly, in assessing the fairness and reasonableness of a price, it is relevant to consider the wider context within which a generic manufacturer sets its price, including portfolio-level pricing and geographic considerations.
- 5.22 Overall, given the evidence discussed in the rest of the report, we consider the following considerations to be key in any formal intervention into the setting of prices for specific generic medicines, as provided for by the HSCA 2017. These are relevant both for the decision to intervene more formally, and in the assessment of the price levels should the DHSC decide to do so.
- Existing competition: this includes the consideration of competition between products of different strengths or presentations within the same molecule, as well as the availability of alternative molecules that may be considered to be therapeutic substitutes and which clinicians are willing to switch to if there is a price increase for a specific product. The need for any intervention is likely to be weaker if there are alternatives that patients can switch to. Depending on the context of the specific case, the existence of alternatives and the corresponding prices could also be a relevant factor in the assessment of whether the price of the specific product is fair or reasonable.<sup>70</sup>

<sup>69</sup> OECD/European Commission (2018), 'Health at a Glance: Europe 2018, state of health in the EU cycle', p. 63.

<sup>70</sup> For example, in a recent investigation by the CMA into the price of Phenytoin Sodium capsules, the debate centred around whether the price of an alternative presentation, Phenytoin Sodium tablets, is relevant to the assessment of whether the capsule price was too high. While the debate is ongoing, the UK Competition

- Entry barriers and long-term dynamics: even if existing competition is limited, a significant price increase may not always warrant intervention, depending on whether there are entry barriers. This is because an increase in price in turn increases the economic incentives for additional entry (in the form of new suppliers, or additional supply from existing MA holders who may have been inactive for a period of time). As discussed in sections 3 and 4, generic manufacturers can often change supply quickly depending on market conditions, and this can reverse price increases. This assessment also includes a consideration of whether suppliers that are active in other countries can enter the UK, given the low regulatory barriers in the UK and other factors that make the UK an attractive market.
- Cost drivers, and in particular the evolution of the cost of API and other aspects such as complexities in production processes and associated risks: a detailed analysis of cost drivers is one of the important aspects of an assessment of prices and price increases.
- Pricing strategy: as discussed in section 3, the pricing strategies of different generic suppliers vary according to their size, business model and geographic considerations. While some manufacturers use individual product pricing, many consider the profitability of the portfolio (or a subset of the portfolio) overall. Therefore, in assessing whether the price of a particular product is too high, it is important to consider the context of any price increase. For example, this could include an assessment of the broader pricing strategy of the particular firm, and an analysis of whether the price increase of a particular product is accompanied by a price decrease of another product, and more generally, the impact on overall portfolio profitability.

As a part of this, it is also relevant to assess the increased price of the generic product in the context of the long-term price evolution of the product, including the period prior to loss of exclusivity. For example, if the price of a generic medicine increases significantly from a very low level, the increased price may nonetheless be a small percentage of the originator price before loss of exclusivity (as discussed in section 4B.2).<sup>71</sup>

- Value to patients: the overall value delivered to patients is also an important consideration. While price is an important indicator of competition and market functioning, a key aspect in this sector is access to medicines. This is particularly the case for medicines with complexities in production or a small market size, where the incentives for widespread generic entry may be limited by these natural characteristics of the product. Here, it is important to consider the risk of excessively low prices, which as discussed

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Appeal Tribunal found that the CMA 'did not take sufficient account of the situation of other, comparable, products, in particular of the Phenytoin Sodium tablet', and hence it considered the tablet form to be, in principle, a relevant comparator. In this particular case, other molecules were not considered as alternatives. See judgement on June 2018, [https://www.catribunal.org.uk/sites/default/files/2018-08/1275-1276\\_Flynn\\_Judgment\\_CAT\\_11\\_070618.pdf](https://www.catribunal.org.uk/sites/default/files/2018-08/1275-1276_Flynn_Judgment_CAT_11_070618.pdf). In other cases, alternative molecules could be relevant. For example, in another recent case involving Servier, the General Court of the European Union found that the European Commission did not have sufficient evidence to rule out competitive constraints on Perindopril from other molecules (ACE inhibitors) addressing the same therapeutic condition. See judgment of December 2018, <https://curia.europa.eu/jcms/upload/docs/application/pdf/2018-12/cp180194en.pdf>.

<sup>71</sup> The reference point of the originator price is informative in this analysis, given that the originator price is to some extent determined by the evaluation by NICE of the benefit delivered by the specific medicine to the patient (in terms of QALY, as noted in section 2). If the originator's price is considered to be a potential benchmark, it will also be important to take account of other considerations such as the price-setting process under VPAS, and in particular the process of setting prices of a broad portfolio of products of the same originator. In some cases, the price of a particular branded product pre-entry may have been too low relative to its costs or the value delivered to patients.

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in sections 3 and 4 could increase the chance of there being unserved markets.

- 5.23 As such, any intervention needs to carefully consider the specific circumstance of each case to ensure that it is proportionate and does not lead to adverse impacts on the long-term functioning of the existing mechanisms in the generic medicines sector, such as unserved markets, reduced entry incentives, and reduced dynamism more broadly.

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## A1 IQVIA data and methodology

- A1.1 The data for this analysis, provided by IQVIA, includes information on volumes and the value of sales for Q2 for the years 2012 to 2018 inclusive (one quarter analysed for each year). To make the data comparable across countries, IQVIA has applied different factors to available information on prices across countries to arrive at the average manufacturer selling price.
- A1.2 In particular, for the UK, IQVIA has provided both the Drug Tariff price index and an estimate of the average manufacturer actual selling price index. The average manufacturer selling price of these products in the UK has been estimated by applying a downward adjustment factor, reducing the Drug Tariff price by 48%. This matches the analysis undertaken by BGMA and Oxera, which provides the average margin of difference between UK reimbursement prices and average manufacturer selling prices for Category M products (as noted in Box 2.1, the margin of difference for Category A products is larger).
- A1.3 For the other countries, IQVIA has used as a starting point either: (i) the publicly available manufacturer spot sales price to pharmacy and wholesalers; or (ii) the spot price that manufacturers set for supply to wholesalers. Both channels offer product information at a granular product level (before any rebates). To estimate the actual selling price obtained by manufacturers after rebates, IQVIA has applied country-specific adjustment factors (all apart from one country, where the tender prices that are offered are in the public domain and no further adjustment was confirmed as needed). We understand that these adjustment factors are based on average rebate figures from IQVIA's in-market experts for these countries.
- A1.4 To facilitate the comparison across countries, IQVIA calculated the average price index for each country relative to that of the UK. This price index of a particular country is computed using the data across products (by molecule, form and strength) which are sold only in both the UK and the country being considered. Therefore, the average relative price index of country A may include a different set of presentations and molecules to the relative price index of country B. Since pack sizes vary across countries, the comparison is made at the molecule, form and strength level. Prices are calculated using a volume-weighted average price per counting unit (e.g. per tablet or dose). The volumes will vary from country to country depending on prescribing practice and usage.
- A1.5 We note that, while the level of rebate could vary by product in any given country, the average adjustment factor for each country is reasonable in the absence of further information, particularly as the index is an average across a wide set of products. The broad level of adjustment factors across the countries was validated by BGMA members, particularly with those individuals with a responsibility for, or past experience of, those markets, as well as provided to the relevant national associations for review and comment.
- A1.6 The data covers a selection of molecules that are 100% reimbursable in the UK, and are derived from one of two lists of products prepared by Oxera:
- 'Highest priced products'—based on highest average reimbursement price in the 2012 NHS Drug Tariff (excluding Category C medicines);
  - 'Most costly products'—products on which the NHS has the highest expenditure (based on net ingredient cost set out in the PCA data from 2012).
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