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Accessibility
Effect of the economic recession on pharmaceutical policy and medicine sales in eight European countries

Christine Leopold, Aukje K Mantel-Teeuwisse, Sabine Vogler, Silvia Valkova, Kees de Joncheere, Hubert GM Leufkens, Anita K Wagner, Dennis Ross-Degnan & Richard Laing

Objective To identify pharmaceutical policy changes during the economic recession in eight European countries and to determine whether policy measures resulted in lower sales of, and less expenditure on, pharmaceuticals.

Methods Information on pharmaceutical policy changes between 2008 and 2011 in eight European countries was obtained from publications and pharmaceutical policy databases. Data on the volume and value of the quarterly sales of products between 2006 and 2011 in the 10 highest-selling therapeutic classes in each country were obtained from a pharmaceutical market research database. We compared these indicators in economically stable countries; Austria, Estonia and Finland, to those in economically less stable countries, Greece, Ireland, Portugal, Slovakia and Spain.

Findings Economically stable countries implemented two to seven policy changes each, whereas less stable countries implemented 10 to 22 each. Of the 88 policy changes identified, 33 occurred in 2010 and 40 in 2011. They involved changing out-of-pocket payments for patients in 16 cases, price mark-up schemes in 13 and price cuts in 11. Sales volumes increased moderately in all countries except Greece and Portugal, which experienced slight declines after 2009. Sales values decreased in both groups of countries, but fell more in less stable countries.

Conclusion Less economically stable countries implemented more pharmaceutical policy changes during the recession than economically stable countries. Unexpectedly, pharmaceutical sales volumes increased in almost all countries, whereas sales values declined, especially in less stable countries.

Abstract in العربية, 中文, Français, Русский and Español at the end of each article.

Introduction

European public authorities struggle to maintain a high level of access to health care while restraining increases in expenditure associated with an ageing population and higher demand.1–4 The recent global economic recession has put additional pressure on public budgets.5,6

In 2008, Europe was affected by the financial crisis. As the recession in Europe continued, the effect was felt especially in southern European countries and Ireland in 2010 and 2011. Soon the problem of financial debt for individual European countries developed into a crisis in the Eurozone, which then became a high priority for the European Central Bank and the European Parliament. All countries were urged to implement cost-saving measures that affected public financing for health care.7

Recession, which is defined as two successive quarters of negative growth in gross domestic product (GDP), can have a detrimental effect on the health of the population because economic downturns are strongly associated with a decline in health-care utilization and a deterioration in health outcomes.8 For example, suicides and homicides increased among working-age men and women when unemployment rose rapidly during past recessions in Europe.9 In the current recession, the number of uninsured non-elderly Americans increased by 5.6 million between 2007 and 200910 and over a quarter of Americans reported reduced routine use of medical care.11 Over the same period, insurance policy deductibles and copayments for visits to physicians and for prescription medicines increased, leading to a greater cost burden for patients.12–14 Similar effects were seen in Greece. Studying the health effects of the economic crisis in the country it was found that patients had less access to care and preventive services and, consequently, faced higher risks of infection with sexually transmitted diseases.15 The World Health Organization examined the influence of the recession on expenditure on, and the sales and prices of, medicines between 2007 and 2009 in 84 countries. It found that the economic recession had mixed effects and that the largest declines in medicine sales occurred in high-income countries and in Europe, particularly in the Baltic states.16

It has been shown that countries that were seriously affected by the crisis, such as the Baltic countries, Greece, Portugal and Spain, abruptly implemented several pharmaceutical policy measures between 2010 and 2011. This included price cuts, changes in reimbursement rates and the imposition of value-added tax on medicines.17 In other European countries, such as Italy, in which cost-containment measures were already in place when the crisis began, the implementation of planned policy changes was accelerated.18

Because different countries were affected differently by the recession and attempted to overcome budgetary constraints in different ways, we decided to analyse systematically how European pharmaceutical policies were affected by the recesi-
sion by comparing changes in pharmaceutical pricing and reimbursement policies between economically stable and economically less stable countries. In addition, we investigated changes in the sale of pharmaceuticals in major therapeutic classes before and after the recession in these two types of countries. We expected that some of the cost-containment policies, such as those affecting out-of-pocket payments, would shift the financial burden of medicines onto patients and hypothesized that pharmaceutical sales would decline during this period, especially in less economically stable countries.

Methods

Data sources

For this longitudinal study, we used data from two sources to derive information on pharmaceutical policies: (i) the Pharmaceutical Pricing and Reimbursement Information Network (Austrian Health Institute, Vienna, Austria), which collects information from experts in national pharmaceutical pricing and from authorities responsible for reimbursement – the latter provide regular pharmaceutical policy updates; and (ii) the PharmaQuery database (IMS Health, Philadelphia, United States of America), which contains data on pharmaceutical policies. In addition, we included information on policy changes reported in the published literature. We grouped policy changes into 6-month implementation periods from January 2008 until December 2011 and we categorized policy as relating to one of three main areas: (i) pricing; (ii) reimbursement; and (iii) generic drugs. Table 1 defines the policy measures in these three areas.

Quarterly pharmaceutical sales data for the period January 2006 to December 2011 were obtained from the IMS MIDAS (Multinational Integrated Data Analysis System) Quantum pharmaceutical market research service (IMS Health, Philadelphia, USA). Data were expressed in standard units for the volume of sales and in constant United States dollars (US$) for the value of sales. A standard unit, as defined by IMS Health, is the smallest dose of a product – it may be one tablet or capsule for oral preparations, one teaspoon (i.e. 5 mL) for a syrup or one ampoule or vial for an injectable product. The value of sales was derived from the price deemed most accurate for the relevant country and was expressed in constant US$, which were calculated by converting the local currency into United States dollars at a constant exchange rate. In most countries, the price used was the ex-factory price; in Estonia, Finland, Greece and Ireland, ex-factory prices were derived from wholesale prices. Average standard conversion factors, which were determined with the co-operation of the pharmaceutical industry for each country, were applied to estimate prices at various points along the distribution chain. The price calculations did not take into account any discounts between manufacturers, wholesalers and payers and were not adjusted for inflation.

Our study considered only prescription medicines, whether on or off patent, that were available in the retail market for the 10 highest-selling therapeutic classes. We identified the 10 highest-selling classes by ranking therapeutic classes according to their sales volume in each country. Together the combined sales volume of products in these 10 classes accounted for at least 50% of the total sales volume of all medicines in each of the eight countries from 2008 to 2011 (Table 2). Data were aggregated by therapeutic class for each country. We had no data on individual drugs.

Country groups

We considered eight European countries in which the majority of the population was covered by a social security system or national health service: Austria, Estonia, Finland, Greece, Ireland, Portugal, Slovakia and Spain. We selected these countries because they represented a variety of geographical regions and levels of economic wealth and stability and had been affected by the recession to different degrees. We classified them as either economically less stable or economically stable using categories defined by the Organisation for Economic Co-operation and Development (OECD) for the level of fiscal consolidation in 2012. Fiscal consolidation was judged according to whether the country had adopted either concrete policies aimed at stabilizing general government gross debt or a long-term target for the debt-to-GDP ratio of 60%. There were four categories of country: (i) those that had adopted either concrete policies aimed at stabilizing general government gross debt or a long-term target for the debt-to-GDP ratio; (ii) those that were under clear market pressure (e.g. Belgium, Hungary, Italy, Slovakia and Spain); (iii) those that had a substantial deficit or debt but which were under less market pressure (e.g. Austria, Denmark, Finland, France and Germany); and (iv) those that had no or only a marginal need for consolidation (e.g. Norway, Sweden and Switzerland). In this study, we regarded economically less stable countries as those belonging to the first two categories (i.e. Greece, Ireland, Portugal, Slovakia and Spain) and economically stable countries as those belonging to the third and fourth categories (i.e. Austria, Estonia and Finland).

Data analysis

First, we described and analysed the number of policy measures implemented per year, per country group and per policy category. Next, we determined the volume and value of the sales of drugs in each therapeutic class between 2006 and 2011 in each country and, then, we calculated the combined volume and value of the sales of drugs for all 10 therapeutic classes for each country. Since our findings for individual therapeutic classes and for all therapeutic classes combined were similar, we present only the results for all therapeutic classes combined.

For this analysis, we divided the volume and value of sales by the size of the country’s population to control for population growth; annual population figures were obtained from the OECD. We derived the annual and average growth rates over the study period using both the volume and value of pharmaceutical sales per capita:

\[
\text{AGR} = \left( \frac{S_n}{S_1} - 1 \right) \times 100 \tag{1}
\]

\[
\text{AAGR} = \frac{\sum \text{AGR}}{n} \tag{2}
\]

where AGR is the annual growth rate, \( S_1 \) is the per capital sales in a year, \( S_{n} \) is the per capital sales in the previous year, AAGR is the average annual growth rate and \( n \) is the number of years.

To compare changes in the volume and value of sales, we calculated the dif-
### Table 1. National policy measures influencing pharmaceutical sales

| Policy measure | Definition |
|----------------|------------|
| **Pricing** | |
| Price cut | A cost-containment measure whereby the set price of a medicine is reduced by the authorities. |
| External price referencing | External price referencing is the practice whereby the price of a medicine in one or several other countries is used to derive a benchmark or reference price for the purpose of setting or negotiating the medicine's price in a given country. Policy changes in external price referencing include the introduction or abolition of this pricing policy and altering the methodology (e.g. changing the basket of reference countries or the way of calculating the benchmark price). |
| Distribution remuneration (i.e. mark-ups, margins and fees for service) | Distribution remuneration is the payment of a health-care provider, whether an individual or an organization, for the services provided. In the distribution of pharmaceuticals, wholesalers and pharmacies are remunerated using mark-ups or regressive margin schemes or, for pharmacies alone, by paying a “fee for service”. With mark-ups, a defined linear or percentage amount is added to the cost of a good to ensure a profit at the wholesale or retail level or both. With regressive margin schemes, the margin is expressed as a percentage of the selling price. Policy changes in distribution remuneration include adjusting the mark-ups or margins used for wholesalers or pharmacies or changing the type of distribution remuneration for a defined actor. Changes may also be made to the types of medicines (e.g. reimbursable medicines or prescription-only medicines) to which distribution remuneration applies. |
| VAT on medicine | VAT is a sales tax on products that is collected in stages. It is a wide-ranging tax that is usually designed to cover most or all goods and services, including medicines. Policy changes in VAT include the introduction or abolition of VAT on medicines and altering the VAT rate on medicines. |
| Extraordinary price review | Price reviews involve reviewing the process by which the set price of a medicine was established. Reviews may or may not be performed in combination with reimbursement reviews. Reviews can be performed systematically (e.g. once a year) for all reimbursed medicines or for a group of medicines (e.g. for a specific indication) or at any time. |
| **Reimbursement** | |
| Reference price system | With a reference price system, which is also referred to as internal or therapeutic reference pricing, the third party payer determines a reference price for the reimbursement of medicines with a particular active ingredient or in a given therapeutic class. If the price of the medicine exceeds the reference price, the health-care consumer must pay the difference between the fixed reimbursed amount (i.e. the reference price) and the actual pharmacy retail price in addition to any copayments (e.g. prescription costs and percentage copayment rates). Policy changes in the reference price system include the introduction or abolition of a reference price system and changing the methodology by which clusters of medicines are established for determining a reference price (e.g. by grouping identical or similar medicines). |
| Out-of-pocket payments | Out-of-pocket payments are payments made by health-care consumers that are not reimbursed by a third-party payer. They include cost-sharing, fixed or percentage copayments and informal payments to health-care providers. |
| Delisting | Delisting is the exclusion of a medicine from a reimbursement list (e.g. a positive list), which often results in exclusion from reimbursement. |
| **Generic drugs** | |
| INN prescribing | With INN prescribing, prescribers (e.g. physicians) are required to prescribe medicines using the INN for the pharmaceutical (i.e. the name of the active ingredient) instead of a brand name. Policy changes in INN prescribing include its introduction or abolition, changing the way INN prescribing is organized (e.g. by imposing or eliminating financial incentives) and changing from indicative to obligatory INN prescribing. |
| Generic substitution | Generic substitution is the practice of substituting a medicine, whether marketed under a trade name or generic name (i.e. a branded or unbranded drug), by a less expensive medicine (e.g. a branded or unbranded generic drug), which often contains the same active ingredients. Generic substitution may be encouraged (i.e. indicative generic substitution) or required (i.e. mandatory generic substitution). Policy changes in generic substitution include its introduction or abolition, changing the way generic substitution is organized (i.e. imposing or eliminating financial incentives) and moving from indicative to obligatory generic substitution. |
| Public campaigns | Policies, regulations, measures and initiatives promoting the use of generic drugs or licensed, off-patent medicines are typically undertaken by government authorities. Policy on generic drugs may be targeted at prescribers, pharmacists, patients or consumers, or other stakeholders. |

INN: international nonproprietary name; VAT: value-added tax.
ference between the annual growth rate in the value of pharmaceutical sales and the annual growth rate in the volume of sales for each country.

Results

Changes in policy

Table 3, Table 4 and Table 5 (available at: http://www.who.int/bulletin/volumes/92/9/13-129114) summarize the 88 policy changes we identified in pricing, reimbursement and generic drugs, respectively. Economically stable countries implemented 7 or fewer policy changes each between 2008 and 2011; the lowest number was 2 in Finland (Table 6). Less economically stable countries implemented between 10 and 22 changes each; the highest number was 22 in Portugal. The greatest number of policy adjustments occurred in 2010 (33) and 2011 (40) and the most frequently used policy measures involved changes in out-of-pocket payments by patients (16), changes in regulations controlling the mark-up of prices (13) and price reductions (11). Some countries implemented several pricing measures. For example, Spain enacted four price cuts between 2008 and 2011. Most changes concerned reimbursable medicines and built on existing policies; only a few changes involved newly implemented policies, such as the introduction of internal reference pricing in Finland.17

Changes in sales

The small increase in the volume of pharmaceutical sales in all countries between 2006 and 2011 is shown in Fig. 1, Fig. 2, Fig. 3, Fig. 4 and Table 7; the average annual per capita growth in sales volume ranged from 0.8% in Greece and 1.0% in Portugal to 3.7% in Ireland, 4.0% in Slovakia and 4.6% in Estonia. However, annual growth rates were much more variable: from 2006 to 2007 the growth rate was over 3.7% for all countries, with Estonia having the highest rate at 12.2%. Between 2007 and 2009, growth remained fairly stable in Austria and Finland but there was a sharp decline in Estonia: the annual growth rate was −0.5% from 2007 to

Table 2. Ten highest-selling therapeutic drug classes in eight European countries, 2008–2011

| Third-level code of the ATC classification | Therapeutic class |
|------------------------------------------|-------------------|
| A10C, A10H, A10J, A10K, A10L, A10N, A10S and A10X | Antidiabetes products |
| A02B | Antiulcer products |
| B01C | Platelet aggregation inhibitors |
| C10A, C10C and C11A | Lipid regulators |
| C09A and C09B | ACE inhibitors, either as single agents or in combination with other antihypertensives |
| M01A and M02A | Antirheumatics |
| N02A | Non-narcotic analgesics |
| N06A | Antidepressants |
| R01A6, R01B and R06A | Antiallergy drugs: systemic and nasal preparations and topical products |
| R03A, R03B, R03C, R03D, R03E, R03F, R03G, R03H, R03I, R03J and R03X | Respiratory agents |

ACE: angiotensin-converting enzyme; ATC: Anatomical Therapeutic Chemical.

a Together the products in these classes accounted for at least 50% of sales by volume in each country under investigation.

b Austria, Estonia, Finland, Greece, Ireland, Portugal, Slovakia and Spain.

Table 3. Thirty-three measures implemented in the years 2008–2011

| Policy measure | No. of measures implemented between 2008 and 2011a | Total |
|----------------|---------------------------------------------|-------|
| Grazing | | |
| Price cuts | 0 0 0 | 2 2 3 0 4 11 |
| External price referencing | 0 0 0 | 3 0 2 2 1 8 |
| Distribution remuneration | 0 1 0 | 3 3 3 0 3 13 |
| VAT on medicines | 1 1 0 | 1 1 1 0 1 6 |
| Extraordinary price review | 0 0 0 | 2 2 1 1 1 7 |
| Reimbursement | | |
| Internal reference pricing | 0 1 1 | 1 0 2 2 1 8 |
| Out-of-pocket payments | 4 1 0 | 0 1 5 3 2 16 |
| Delisting | 0 0 1 | 2 0 1 0 1 5 |
| Generics | | |
| INN prescribing | 0 1 0 | 0 1 1 1 1 4 |
| Generic substitution | 0 0 0 | 0 0 0 0 0 0 |
| Public campaigns and other generic policies | 1 2 0 | 0 1 3 1 2 10 |
| Total | 6 7 2 | 14 10 22 10 17 88 |

a INN: international nonproprietary name; VAT: value-added tax.

b The number of measures implemented in each year was: 4 in 2008; 11 in 2009; 33 in 2010; and 40 in 2011.

c The three economically stable countries implemented 15 measures during 2008–2011 compared with 73 in the five economically less stable countries.
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2008 and −9.0% from 2008 to 2009. The growth rate declined in all economically less stable countries but more gradually. After the steep year-on-year decline in Estonia in 2009, the volume of sales grew 17.1% from 2009 to 2010. In contrast, the volume continued to decline in economically less stable countries: for example, from 2009 to 2010, there was a decline of −4.1% in Greece and −0.5% in Portugal. From 2010 to 2011, two of the less economically stable countries experienced a high growth in sales volume (5.5% in Spain and 7.8% in Ireland), while the growth rate was between 1.0% and 3.1% in most other less economically stable countries. The exception was Portugal, which experienced a decline of −3.7%.

The average annual per capita growth in the value of sales between 2006 and 2011 varied between −2.1% in Portugal and 6.0% in Estonia. After 2009, all countries except Austria experienced a decrease in the value of sales in at least one year. The largest annual declines were observed in Greece (−13.5% from 2009 to 2010) and Portugal (−11.1% from 2010 to 2011). Moreover, the value of sales declined from 2010 to 2011 in all economically less stable countries.

**Discussion**

Although countries adjust their pharmaceutical policy frameworks continuously, a surge of policy changes seems to have taken place during the economic recession, particularly in 2010 and 2011. Unexpectedly, both economically stable and economically less stable countries...
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experienced a slight increase in the consumption of pharmaceuticals in the 10 highest-selling therapeutic classes, as measured in standard units per capita. As expected, the annual growth in the per capita value of medicine sales decreased in economically less stable countries in 2010 and 2011.

Our study shows that economically stable countries implemented fewer policy measures between 2008 and 2011 than economically less stable countries. The most frequently implemented policy changes targeted out-of-pocket payments for patients. Previous studies have shown that increases in copayments, such as prescription fees, tend to lead to lower medicine utilization, especially in times of economic recession and increased unemployment.23–30

Policy measures such as the medicine price cuts (also applied in the form of discounts) that were implemented in Greece, Portugal and Spain could have had a negative effect on the availability of medicines if they caused pharmaceutical companies to withdraw their products from national reimbursement lists.31 Contrary to our expectations, however, we did not observe a major decline in the consumption of pharmaceuticals during the recession in the therapeutic categories studied as most countries continued to experience a moderate positive annual growth in sales volume. However, in line with media reports of drug shortages in Greece and Portugal, our data showed that the sales volumes of important medicines for chronic diseases, such as angiotensin-converting enzyme inhibitors and antidepressants, dropped drastically in these two countries in 2010.31 Hence, although the overall growth in sales volume was positive, the rate of growth appears to have fallen to below the prerecession level, which ranged from 5% to 12%.

In contrast, the rate of growth in the value of pharmaceutical sales declined, especially in economically less stable countries. This decrease may have been due partly to inflation: the average inflation rate in 2010 and 2011 generally ranged between 2.0% and 3.4%, although it was as low as −1.6% in 2010 in Greece and as high as 5.1% in 2011 in Estonia.32 Our analysis did not take inflation into account. The decrease may also have occurred because the

Table 7. Per capita growth in pharmaceutical sales for the 10 highest-selling therapeutic classes in eight European countries, by volume and value, 2006–2011

| Country   | Per capita annual sales growth (%) | Volume of sales | Value of sales |
|-----------|-----------------------------------|----------------|---------------|
|           | Average for 2006–2011              | 2006–2007      | 2007–2008      | 2008–2009      | 2009–2010      | 2010–2011      | 2006–2011      |
|           |                                   | Average for      | Average for      | Average for      | Average for      | Average for      |
|           |                                   | 2006–2007      | 2007–2008      | 2008–2009      | 2009–2010      | 2010–2011      | 2006–2011      |
| Economically stable countries | | | | | | | |
| Austria   | 4.6                                | 4.0            | 2.7            | 1.5            | 1.1            | 2.8            | 2.5            | 2.8            |
| Estonia   | 12.2                               | −0.5           | −9.0           | 17.1           | 3.1            | 4.6            | 5.2            | 4.6            |
| Finland   | 3.7                                | 3.8            | 2.3            | 3.4            | 1.0            | 2.8            | 2.7            | 2.8            |
| Economically less stable countries | | | | | | | |
| Greece    | 5.6                                | 0.3            | 0.7            | −4.1           | 1.5            | 0.8            | 0.9            | 0.8            |
| Ireland   | 4.1                                | 1.4            | 4.3            | 0.8            | 7.8            | 3.7            | 3.7            | 3.7            |
| Portugal  | 6.1                                | 1.8            | 1.1            | −0.5           | −3.7           | 1.0            | 1.0            | 1.0            |
| Slovakia  | 6.1                                | 7.1            | 1.7            | 4.1            | 1.0            | 4.0            | 3.7            | 3.7            |
| Spain     | 6.4                                | 0.2            | 1.5            | 0.7            | 5.5            | 2.9            | 2.9            | 2.9            |
| Economically stable countries | | | | | | | |
| Austria   | 7.3                                | 6.3            | 2.2            | 0.4            | 1.5            | 3.5            | 2.1            | 2.1            |
| Estonia   | 20.5                               | 5.2            | 0.3            | 7.0            | −3.2           | 6.0            | 5.0            | 5.0            |
| Finland   | 3.1                                | 6.3            | −2.2           | −2.6           | 0.7            | 1.1            | 0.9            | 0.9            |
| Economically less stable countries | | | | | | | |
| Greece    | 13.3                               | 7.0            | 6.8            | −13.5          | −2.4           | 2.2            | 2.2            | 2.2            |
| Ireland   | 7.6                                | 7.2            | 3.6            | −1.9           | −3.4           | 2.6            | 2.6            | 2.6            |
| Portugal  | 5.4                                | 2.0            | −2.2           | −4.6           | −11.1          | −2.1           | −2.1           | −2.1           |
| Slovakia  | 12.0                               | 14.6           | 0.6            | 0.5            | −0.9           | 5.4            | 5.4            | 5.4            |
| Spain     | 6.1                                | 3.1            | 2.7            | −0.4           | −3.7           | 1.6            | 1.6            | 1.6            |

a The volume of sales was measured in standard units per capita (IMS Health, unpublished data, 2012).
b The value of sales was measured in constant United States dollars per capita (IMS Health, unpublished data, 2012).
pharmaceutical policies implemented in economically less stable countries had the desired effect of lowering public spending while maintaining access to medicines at a relatively stable level. For example, utilization could have shifted to less expensive or generic medicines. Nevertheless, even if sales volumes were maintained at lower prices, since several policy measures probably increased out-of-pocket payments for patients, the financial burden on patients may have increased.

The case of Estonia needs to be discussed separately. After a decade of rapid growth before the recession, during which public sector expenditure grew 6.5 times, Estonia experienced a major decline in GDP in 2009. Public sector spending was cut by 6.6% – a reduction of 100 million euros compared with 2008 – and there was a 50 million euros reduction in health insurance expenditure. A previous study identified a large decline in the consumption of pharmaceuticals of –18% between 2008 and 2009, which was mirrored in our data. In response, Estonia implemented strict cost-saving measures with respect to medicines, reduced sick leave coverage and increased the workload of clinical staff without increasing their salaries. Our data show that, by 2010, the consumption of pharmaceuticals had returned to a level similar to that before the recession, which paralleled Estonia’s relatively quick recovery from the recession overall.

Early in the recession, countries not only implemented few policies changes overall but also implemented no policies that targeted consumption by specific patient groups or in specific therapeutic areas. Recent studies show that fewer policy changes were implemented in 2012 and 2013 than during the recession and that there was a trend towards policies that targeted high-cost medicines. Several countries have explored alternative policies for sharing the financial risk of selected, new, high-cost medicines, such as value-based pricing models or risk-sharing agreements. The effect of these new approaches still needs to be determined.

Our study had several limitations. We did not take into account the differences in pharmaceutical policy frameworks that existed between all countries before the economic recession or between regions within some countries (e.g. Italy or Spain). Moreover, it was not always clear whether a country implemented a policy as a short-term reaction to recession-related budgetary constraints or whether the policy was part of a planned long-term change to the system. For instance, in Finland, the implementation of internal refer-
of new pharmaceutical policies should monitor access to medicines and look for potential barriers to access.

In conclusion, the ways in which countries responded to the recession differed greatly, with less economically stable countries implementing a larger number of policies that affected the pharmaceutical sector than economically stable countries. Our evidence shows that, despite numerous policy changes and contrary to our expectations, overall consumption of pharmaceuticals in the 10 highest-selling therapeutic classes continued to increase in most countries; there was no clear difference between economically stable and less stable countries. The observation that the value of sales declined while the volume was maintained may indicate that pharmaceutical purchasing became more efficient. However, since many policies were designed to shift the financial burden to patients, future research should investigate the effect of changes in pharmaceutical policy, expenditure and utilization on equitable access to medicines, on the affordability of essential medicines for households, on the appropriate use of medicines and on health outcomes.

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La información sobre los cambios en las políticas farmacéuticas se obtuvo de publicaciones y bases de datos sobre políticas farmacéuticas. Los datos sobre el volumen y valor de las ventas trimestrales de productos entre 2006 y 2011 en las 10 clases terapéuticas más vendidas en cada país se obtuvieron de una base de datos de investigación del mercado farmacéutico. Comparamos estos indicadores en las bases de datos de investigación del mercado farmacéutico. Comparamos estos indicadores en los países económicamente estableables (Austria, Estonia y Finlandia) con los de los países económicamente menos estableables (Grecia, Irlanda, Portugal, Eslovaquia y España) para determinar si las medidas de política dieron lugar a una reducción en las ventas y a un descenso en el valor de las ventas. Como resultado, los datos de ventas aumentaron en casi todos los países, excepto en Grecia y Portugal, que experimentaron descensos ligeros a partir de 2009. El valor de las ventas disminuyó en ambos grupos de países, aunque en menor medida en los países económicamente estableables. Conclusión Los países económicamente estableables implementaron más cambios en las políticas farmacéuticas durante la recesión que los países económicamente estableables. Sorprendentemente, los volúmenes de ventas de productos farmacéuticos aumentaron en casi todos los países, mientras que el valor de las ventas disminuyó, especialmente en los países menos estableables.
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| Policy measure | 1st half of 2008 | 2nd half of 2008 | 1st half of 2009 | 2nd half of 2009 | 1st half of 2010 | 2nd half of 2010 | 1st half of 2011 | 2nd half of 2011 |
|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Price cut     | None           | Portugal: 30% price cut for generics | Portugal: 5–12% price cut for generics | None           | None           | Portugal: 7.5% price cut for biological medicines and HIV products | Ireland: price cuts | Greece: 35% price cut for on-patent medicines before patent expiry and 15% price cut for generics | Spain: gradual price decreases |
| External price referencing | None | None | None | None | Greece: calculation method changed. Portugal: calculation method changed. Spain: calculation method changed | None | Greece: calculation method changed. Slovakia: calculation method changed | Greece: calculation method changed. Portugal: reference countries changed | (continues . . .) |
### Economic recession and pharmaceutical policies

Research

| Policy measure                             | Implementation date of change in policy                                                                 |
|--------------------------------------------|--------------------------------------------------------------------------------------------------------|
|                                            | 1st half of 2008 | 2nd half of 2008 | 1st half of 2009 | 2nd half of 2009 | 1st half of 2010 | 2nd half of 2010 | 1st half of 2011 | 2nd half of 2011 |
| Distribution remuneration                  | None            | None            | None            | None            | Ireland: wholesale remuneration changed (i.e. the linear margin for nonreimbursable medicines was increased); pharmacy remuneration changed (i.e. the linear margin for nonreimbursable medicines was increased) | Spain: pharmacy remuneration changed (i.e. part of the pharmacy remuneration for expensive medicines was increased) | Portugal: wholesale remuneration changed | None            | Estonia: wholesale remuneration changed. Greece: wholesale remuneration decreased; supply chain discounts abolished. Ireland: wholesale remuneration for high-cost medicines changed (the High-Tech Scheme); wholesale remuneration for the general scheme for low-income patients decreased. Spain: wholesale remuneration changed; pharmacy remuneration changed. |
| VAT on medicine                            | None            | None            | None            | None            | None            | None            | None            | None            |
| Extraordinary price review                 | None            | Ireland: review of reimbursed medicines                                                               | None            | None            | Portugal: review of selected active substances. Spain: price review, taking price cuts into account | Greece: review of new price lists, taking price cuts into account. Ireland: review of brands and parallel imports. Slovakia: review of reimbursed medicines | None            | Greece: review resulted in a new price list that included an average 10.2% price reduction |

**Notes:**

- HIV: human immunodeficiency virus; VAT: value-added tax.
- A parallel import is the import of a patented or trademarked product from a country where it is already marketed, often at a lower cost.
- Austria, Estonia, Finland, Greece, Ireland, Portugal, Slovakia, and Spain.

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 continues
### Table 4. Policy changes on pharmaceuticals reimbursement in eight European countries, 2008–2011

| Policy measure | Implementation date of change in policy |
|----------------|----------------------------------------|
| **Reference price system** | | |
| | 1st half of 2008 | 2nd half of 2008 | 1st half of 2009 | 2nd half of 2009 | 1st half of 2010 | 2nd half of 2010 | 1st half of 2011 | 2nd half of 2011 |
| Finland | None | None | Finland: introduction of internal reference pricing | None | Portugal: price–volume agreement specified | Estonia: calculation method changed. Slovakia: reference price system changed to take Greek price cuts into account | Portugal: price calculation method changed and new generic groups introduced. Slovakia: new clusters of medicines established. Spain: price calculation changed to use lowest daily treatment costs as a basis | Greece: pricing changed to be at or below the reference price |
| Austria | None | None | Austria: prescription fee increased. Portugal: reimbursement rate increased from 95% to 100% for generics for low-income pensioners; reimbursement rate increased from 37% to 69% for infertility drugs | None | Austria: prescription fee increased. Portugal: abolition of out-of-pocket payments for organ, tissue and stem cell transplant procedures | Ireland: introduction of €0.50 payment per prescription medicine. Portugal: reimbursement rates changed for all medicines, including antipsychotics. Spain: underprivileged patients in Madrid given free access to products for seven rare diseases | Austria: prescription fee increased. Estonia: elimination of copayment limit. Slovakia: cost-sharing agreements implemented. Spain: copayment linked to patient’s income | Portugal: faster reimbursement reviews. Slovakia: limits imposed on certain reimbursement categories; reimbursement list to be published more frequently |
| Greece | None | None | None | None | None | Greece: introduction of a negative list of excluded products that included contraceptives and lifestyle medicines. Portugal: delisting of 16 branded nonprescription medicines, including paracetamol, oral omeprazole, contraceptives and antihistamines. Spain: delisting of selected medicines | Greece: 49 medicines were delisted after a price review |

1. Austria, Estonia, Finland, Greece, Ireland, Portugal, Slovakia, and Spain.
Table 5. Policy changes on generic drugs in eight European countries, a 2008–2011

| Policy measure | Implementation date of change in policy |
|----------------|----------------------------------------|
|                | 1st half of 2008 | 2nd half of 2008 | 1st half of 2009 | 2nd half of 2009 | 1st half of 2010 | 2nd half of 2010 | 1st half of 2011 | 2nd half of 2011 |
| INN prescribing| None            | None            | None            | None            | None            | None            | None            | None            |
| Generic substitution | None | None | None | None | None | None | None | None |
| Public campaigns and other generic policies | Austria: generics information campaign | None | None | None | None | Estonia: generic campaign | None | None |
|                | Estonia: change from optional to compulsory generic prescribing | None | None | None | None | None | None | None |
|                | Slovakia: optional generic prescribing introduced | None | None | None | None | None | None | None |
|                | Spain: optional generic prescribing introduced | None | None | None | None | None | None | None |
|                | Portugal: compulsory generic prescribing specified | None | None | None | None | None | None | None |
|                | Portugal: entry of 25 active generic substances into the market to be expedited subject to resolution of patent disputes | None | None | None | None | None | None | None |

INN: international nonproprietary name.

a Austria, Estonia, Finland, Greece, Ireland, Portugal, Slovakia and Spain.