Funding the Global Benefits to Biopharmaceutical Innovation

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Executive Summary

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This report examines how the costs and benefits of medical innovation are distributed across developed nations. The U.S. Government and the biopharmaceutical industry have been critical to improving health worldwide by leading the way in the research and development (R&D) that enables drug discovery. In contrast, foreign countries often do not make equal investments in the R&D that is necessary to fuel innovation and ensure the economic viability of biopharmaceutical products. In this report, we find that foreign "free-riding" on U.S. investments and innovation in drug development has increased over the past 15 years. The prices of many high sales volume pharmaceutical drugs in European countries have decreased from costing on average 51 percent of U.S. prices in 2003 to about 32 percent of U.S. prices in 2017. Many other developed nations with monopoly government insurance plans can push prices down below the value of the treatment as reflected by U.S. prices paid by private insurers in a free market. In the U.S., private insurance plans compete and make decisions that reflect the value to pharmacy benefit managers or individuals selecting plans. Foreign governments have implemented stricter price controls, enabling these products to be sold below fair market value, with Americans picking up the tab for making their availability feasible in the first place.

Medical R&D investment allows for the development of new treatments and cures. R&D investment is typically supported by returns from total international sales, rather than the sales of a single domestic market. A Swedish company does not innovate solely for the nation's 10 million residents; rather, it hopes to make its products available for the world—especially in large economies like the United States, with prices that reflect competitive market values. Reimbursements from both public and private insurers provide the incentives to invest in new treatments and bring products to the market.

U.S. patients and taxpayers have largely financed the international returns to medical R&D. Consequently, CEA has previously estimated that more than 70 percent of patented pharmaceutical profits in Organization for Economic Co-operation and Development (OECD) countries come from sales to U.S. patients even though the United States only represents about one third of the OECD's gross domestic product (GDP). Thus, U.S. patients and taxpayers finance most global medical R&D and company profits that make those investments economically feasible.

In this report, we find evidence that for the past 15 years, stringent government underpricing in foreign countries has substantially increased foreign free-riding on the United States. Our main finding is that prices are much lower in other developed nations than would have been predicted by income differences alone and that this discrepancy is substantially widening. A 2004 U.S. Department of Commerce report documented that prices for top-selling patented drugs in select countries were roughly half of the corresponding prices in the United States. In this report, we find that the prices for today's top-selling patented drugs in many of those same countries are even lower, costing 17 percent to 43 percent of the corresponding prices in the United States. This is not due to their lower incomes as those countries have per-capita incomes around 80 percent of that in the United States. In a recent analysis of a narrower set of physician-administrated drugs covered under Medicare Part B, the Department of Health and Human Services found that foreign prices were roughly 56 percent of the corresponding prices in the United States.

These practices abroad disproportionately cost U.S. patients and taxpayers because they prevent the United States from undertaking domestic policies to lower drug prices without slowing down the pace at which new and better products enter the market. We find that that if free-riding abroad was reduced and foreign relative drug prices reflected relative GDP per capita, total innovator revenues from those countries would have been $194 billion higher in 2017, raising global revenues by 42 percent. Reducing foreign price controls would increase profits and innovation, thereby leading to greater competition and lower prices for U.S. patients.

Introduction

Both the U.S. Government and biopharmaceutical industry have been central engines for developing new medical treatments and cures, thereby lowering the effective price of better health for patients worldwide. The sector has done so by being both the world leader in these biopharmaceutical cures and treatments as well as the source of the returns that are required to fund new medical R&D investments. In a previous CEA report, we documented that the U.S. market makes up 46 percent of brand-name innovative drug sales in OECD countries, funds about 44 percent of world medical research and development (R&D), invests 75 percent of global medical venture capital, and holds the intellectual property rights for most new medicines (BMI 2017; Moses et al. 2015; TEC 2017). Furthermore, publicly funded medical research in the United States has produced two-thirds of the top-cited medical articles in 2009, underscoring that university research often leads to medical breakthroughs (Moses et al. 2015).

Research and development as well as medical innovation are driven by global returns rather than returns from a given domestic market. Profits create the incentive to bring cures and treatments to the market. However, healthcare and drugs are unique in that most developed countries depress profits by controlling prices of these products through, for example, national reimbursement policies.

U.S. patients and taxpayers have largely financed global revenue for the biopharmaceutical industry. Unlike developed countries with single payer systems, the U.S. drug market is less financed by the public sector and more open to market forces. In a free market, prices of products reflect their value as opposed to a centrally controlled government system, in which prices reflect political tradeoffs. This has led to the suppression of prices below their value to patients and their families. In a previous report, CEA estimated that more than 70 percent of OECD patented pharmaceutical profits come from the United States even though the United States only represents 34 percent of OECD's GDP at Purchasing Power Parity (OECD 2016). Thus, not only does the U.S. finance most of the world's medical R&D, it also provides the returns required to make those investments feasible.

Because global returns drive the innovation of treatments and cures that are enjoyed by patients across the world, government funding of these returns eventually leads to a public-goods problem. The taxation that funds reimbursements involves a private domestic cost with an international benefit of better treatments and cures through higher global returns that makes medical R&D viable. This public goods problem induces free riding, particularly so by other countries with limited impact on world returns. Put differently, a country with very minor

drug market share has nothing to gain from raising its reimbursements as long as companies remain willing to sell at those levels.

Many developed nations with monopoly government insurance plans can push prices down below the value of the treatment as reflected by its free market price. In the U.S., private insurance plans compete and make decisions that reflect the value to pharmacy benefit managers or individuals selecting plans. In contrast, if a government-run monopoly plan's employees decide not to cover a drug, there is no risk of losing a customer because the customers cannot leave. Moreover, drug companies would often rather sell drugs at prices below the value of their products than not sell at all. The result is a slower pace of overall innovation, less competition from new entrants, and thus higher prices paid for patented drugs that lack therapeutic competition. Free-riding abroad, therefore, may indirectly raises prices in the United States by limiting competition of new entrants that compete on price.

The report is outlined as follows. The first section discusses the unique economics of the international market for innovative prescription drug (biopharmaceutical) products[1] and the role played by the United States in enabling new treatments and cures enjoyed by patients across the world.

The second section provides estimates of the differences in prices for the top-selling prescription drug in the United States compared to other developed countries. Our main finding is that prices are much lower in other developed nations than would have been predicted by factors such as income differences alone and that this discrepancy appears to have increased over the last 15 years. A 2004 Department of Commerce report found that in a sample of top-selling patented drugs available both in select wealthy foreign countries and in the United States in 2003, the foreign drug prices cost roughly half of what they were in the United States—a finding which could not be explained by differences in per-capita income. In this report, we conduct a similar analysis using a larger set of top-selling patented drugs available in select wealthy foreign countries in 2017. We find that foreign prices are roughly one-third of what they were in the United States in 2017 and that income differences still cannot account for the disparity. This suggests that foreign free-riding on the United States increased during the last 15 years. In addition, we find that if free-riding abroad was reduced, then the United States could institute domestic pricing policies that could save its patients and taxpayers $194 billion a year.

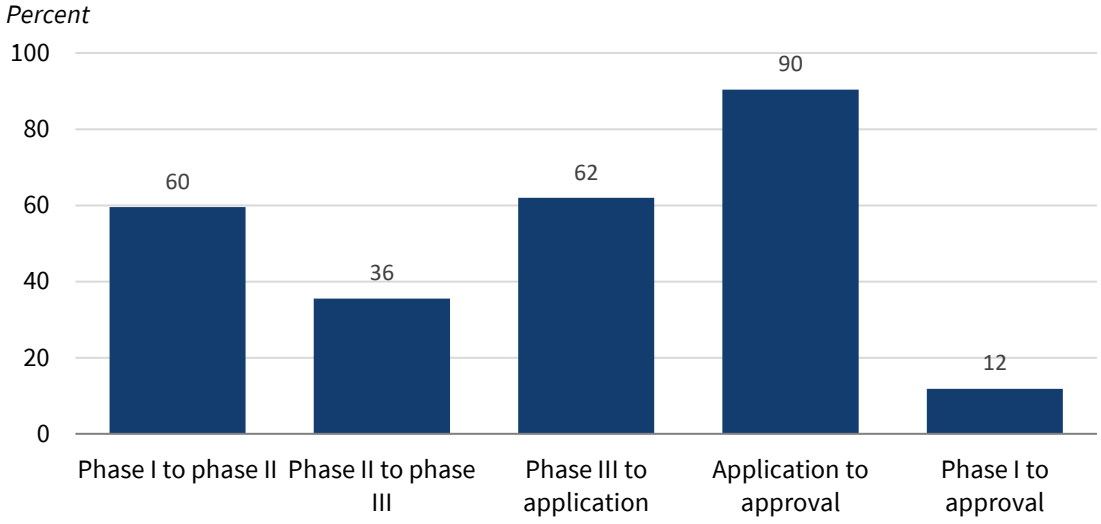
[1] Throughout this report, the word "drugs" includes small molecules and biologics.

The Economics of Funding the Worldwide Benefits of Medical Innovation

The purpose of intellectual property (IP) protection is to provide an economic incentive to bring new, innovative products to the marketplace. IP protection for biopharmaceuticals is provided by patents, which grant the holder the right to exclude others from making and selling the invention for a period of 20 years. However, in order to bring the product to market, regulatory approval is required. Because the patent is generally conferred prior to obtaining that approval, the effective period for producing and marketing the product under the patent usually lasts 10 to 14 years. In addition, IP protection is also provided by regulatory data protection and market exclusivity incentives, which encourage innovation in bio pharmaceutical R&D by helping to ensure that new drug development is an attractive investment.

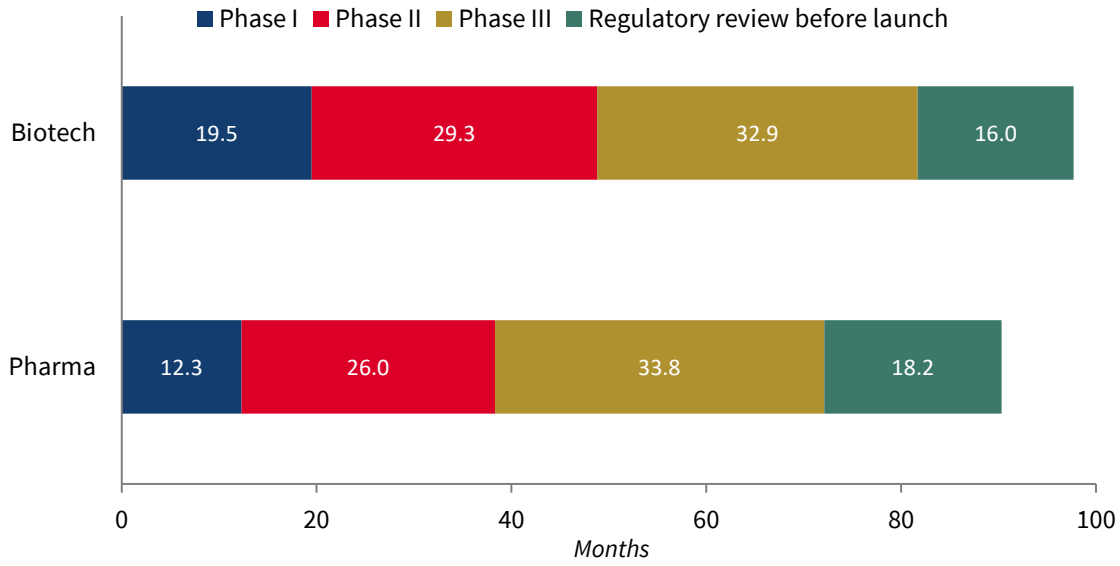
Decisions on whether to undertake costly clinical trials are made in the face of scientific uncertainty. And the overwhelming majority of drug compounds examined never reach the market. Accordingly, R&D investments are only undertaken when there is a reasonable prospect of profits in cases that are scientifically successful and meet regulatory approval. Innovator firms use a portfolio approach in drug development decisions in which the whole portfolio must earn normal returns given the high failure rates of the various components. From 1995 to 2007, the overall success rate for new molecular entities (NMEs)—that is, from Phase I clinical trials through a New Drug Application—was 11.83 percent (See figure 1).

Figure 1. Drug Development Phase Transition Probability



Source: DiMasi, Grabowski, and Hansen (2016).
Note: DiMasi, Grabowski, and Hansen (2016) examined 1442 compounds from top 50 pharmaceutical firms to estimate the probability of success for each phase of drug development. These compounds were first tested in humans from 1995 to 2007.

Figure 2. Clinical Development and Approval Times

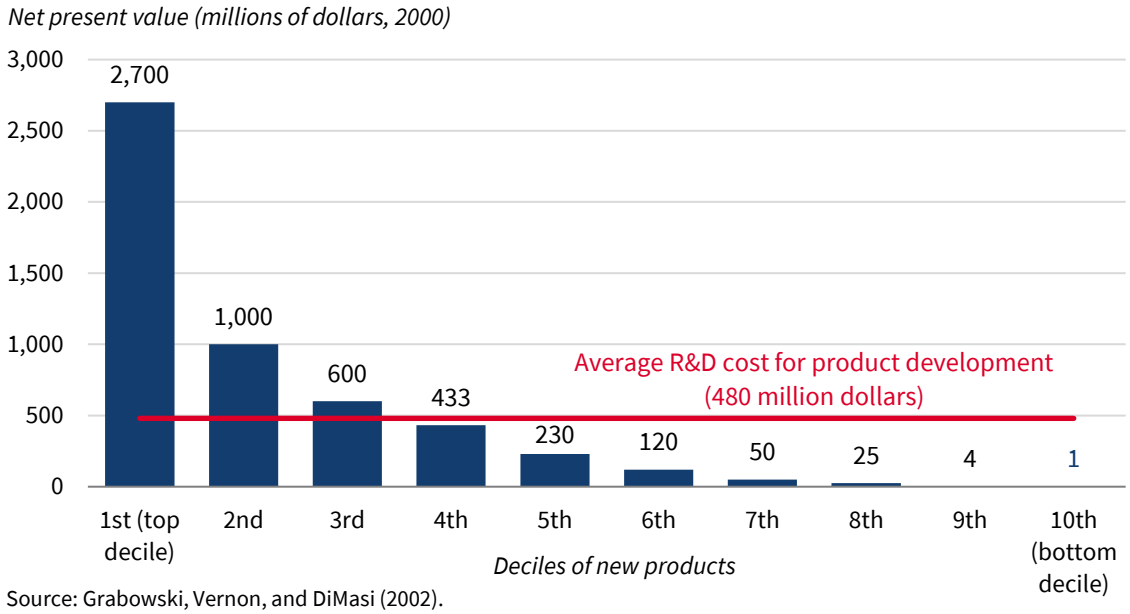


Source: DeMasi and Grabowski (2007).

Even in the few ultimately successful cases, the drugmaker sees no sales for many years. Figure 2 shows the long development and approval times for pharmaceutical (90.3 months) and biological drug products (97.3 months). These long periods impose a major opportunity cost for capital investments, meaning that for R&D to be undertaken profitably, the expected returns must be high for successful products. Moreover, even among drugs that do eventually reach the market, most do not produce enough revenue to recoup the R&D investment (Grabowski, Vernon, and DiMasi 2002). Figure 3 illustrates the general distribution of successful, approved drug products in terms of their relative revenues compared to R&D costs represented by the red horizontal line. As can be seen, most successful products do not make enough money to recoup R&D costs, meaning that the few relative blockbusters carry the burden of financing the R&D for all drugs that make it to market.

During the development phase, the innovator accumulates substantial costs associated with laboratory research, clinical development and trials, and the opportunity costs of investment capital. Only upon approval for marketing does the innovator firm begin to see revenues. As the drug enters the market, revenues typically rise rapidly at first. Then market competition from other products tends to slow revenue growth. Eventually, the product loses its sales exclusivity rights and competition from generics (or biosimilars) leads to a steep drop in revenues.

Figure 3. Distribution of Net Lifetime Sales for Innovator Products



Source: Grabowski, Vernon, and DiMasi (2002).

It is important to note that generic competition is not a perfect analog for new market entry of biologics. Biologics are a large and increasing share of newly approved drugs, and are often the target of concerns over pricing. Late in the life-cycle of biologics, there is only limited competition from biosimilars and no direct competition from generics. Biosimilar competition is limited, in that only about half of all FDA-approved biosimilars are even marketed by one year after approval, and prices of the biosimilars are typically not small fractions of the price of the reference listed product, as is the case with generics. In addition, the laws that regulate the approvals of biosimilars or interchangeable biologics are relatively recent and are more complicated, which further explains the reduced number of biosimilar approvals to push down biologic prices.

A vital part of the value of IP protection is the freedom to price products according to the value of the products for the limited time in which the innovator enjoys exclusive sales rights. An economically efficient global marketplace for patented prescription drugs would not involve a uniform, one-world price as seen in simple commodities markets. Rather, price disparities across various market segments, even large disparities, can represent efficient market outcomes for products such as prescription drugs, where sales exclusivity rights confer the right to price products differently across markets that value the products differently. For example, a country with a per-capita income lower than that in the United States might have a lower observed market price for a patented drug if that foreign market were allowed to function freely. Current prices in other developed countries, however, generally do not result

from market demand factors—in most cases they are caused by nonmarket-based government policies. Foreign government monopsonies push prices down, below the value of the treatment; these single-payer systems do not allow market forces to determine a drug's value to patients. In the United States, if a private insurance plan does not cover a drug, that insurance plan will be vulnerable to competitive pressure from other, more generous plans and could lose enrollees over time. Competing insurers thus make decisions in accordance with what their customers—whether they be enrollees in individual plans or large employers who need to attract and retain workers—want. On the contrary, if a government-run system decides not to cover a drug, there is no risk of losing a customer. And drug companies face competitive pressure to sell their products at administered prices rather than not selling their products at all. Therefore, many new, innovative products that are approved for sale in the United States are unavailable in foreign countries, either because they are not approved for sale (and not sought to be approved for sale by the manufacturer) or are simply not covered by public health insurance plans. That often means that healthcare expenditures are lower in those countries, with associated fiscal benefits for their governments, but an additional result is a slower global pace of drug innovation.

The gains from global sales of innovative products drive incentives for research and development, which means that the challenge of financing global biopharmaceutical R&D poses a public-goods problem. All countries benefit when a new, valuable drug is developed and marketed, but at the same time, every country faces an incentive to try to attain savings for itself on prescription drug expenditures, minimizing its own financial contribution to the R&D efforts that lead to innovation. However, in many developed countries, prescription drug sales are subject to price and utilization controls, which prevent market forces from driving transaction prices to reflect the drug's value.

In addition, in many developed countries, prescription drug benefits are financed entirely or almost entirely by public programs, often single-payer health insurance systems. Those systems amount to monopsonistic purchasing arrangements which have the ability to extract much of the economic profit that innovative drugmakers would otherwise be able to earn in more market-based systems. Viewed from the perspective of a small developed country outside the U.S., such policies might appear attractive in that they allow that country to enjoy the full benefit of lower prices and budget savings, while having little apparent effect on global innovation (in the case of a small nation with a small drug market). However, when many nations behave accordingly, the collective global result of these "Prisoner's Dilemma" choices is a reduced global return to costly, risky R&D investments, and a slower pace of innovation for patients in all countries, amounting to government failure from policies distorting market activity. In fact, lower prices obtained by single-payer systems have the effect of undermining

the original purpose of patent policy for prescription drugs: creating a strong financial incentive for innovative R&D.

Sales of prescription drugs in the U.S., in contrast, are much more subject to private market forces. Innovative drugs that confer major clinical benefits generally have U.S. market prices that tend to reflect those benefits—not primarily political or budget considerations. When a new innovator drug enters the market in the U.S., it faces a market test in which private insurers seek to negotiate favorable prices from drugmakers, subject to the constraint that they must attract and retain enrollees by providing quality drug benefits reflecting patient demand. Thus, innovators across the world rely heavily on Americans paying market prices to underwrite the returns on investments into products that improve health.

The Disproportionate Contribution of the United States in Funding Biopharmaceutical Innovation

Patients in every country benefit when biopharmaceutical research and development leads to new valuable therapies that confer clinical benefits previously unattainable with older treatments. Despite the universality of such benefits, most developed countries fail to contribute adequately to the costs of funding medical innovation, leaving the United States to bear a highly disproportionate part of that burden both in terms of funding medical R&D as well as providing reimbursements for products that provide the returns necessary for investments to occur in the first place.

In terms of medical R&D spending, one part of that disproportionate burden comes in the form of public expenditures on basic research in the medical sciences including biopharmaceutical research. In 2018, taxpayers in the United States devoted $37.3 billion in appropriated funds for biomedical science research at the National Institutes of Health, the primary funder of basic medical science research in the United States. Even when adjusted for purchasing power parity, the amount of publicly-financed medical research in the United States was approximately twice as much as the rest of the OECD combined in 2015, the last year for which we have complete data. Publicly-funded medical research in the United States produced two-thirds of the top-cited medical articles in 2009, illustrating the prominent role played by U.S. taxpayers in cultivating medical breakthroughs. In addition, private industry in the United States plays a major role as well in terms of funding development of discovered treatments. Various estimates suggest that the U.S. funds nearly half of all global medical research and invests 75 percent of global medical venture capital. The intellectual property rights for most new medicines are held by U.S.-based firms (BMI 2017; Moses et al. 2015; TEC 2017).

The U.S. market provides the economic returns needed to incentivize private medical R&D investments. The disproportionate role of the United States in providing these returns comes from the substantially higher prescription drug prices paid by private payers and public insurance programs in the United States compared to other developed nations. Those higher prices provide the incentives needed to entice investors to develop new therapies, and the associated costs are borne by domestic patients and taxpayers.

Estimates of International Price and Availability Disparities in Patented Drugs

Transaction prices for innovator prescription drugs are substantially higher in the United States than in other wealthy, developed countries in those cases where corresponding products are available in both the United States and elsewhere. By setting product prices below market value as a condition of market entry, those countries are diluting the value of IP and free-riding off the United States. This section provides estimates of the large differences in innovator prescription drug prices between the United States and other wealthy developed nations in order to illustrate the extent of the free-riding behavior. The major finding reported is that this free-riding has dramatically increased during the last 14 years.

Estimating differences in prices for patented drugs presents several methodological challenges. One difficulty is posed by the large number of patented drug products available in the global market. Also, many prescription drug products differ slightly by country of distribution—for example, in dosage, or in capsule versus tablet form—creating difficulties in generating appropriate comparisons. To create a simple and valid comparison, we have assembled data on expenditures, prices, and prescription quantities for the 200 top-selling, brand-name sole-source drugs in the United States and select developed country markets. Drugs that are distributed as generics in one or more of the countries examined are excluded from the analysis. Focusing on the 200 top-selling products can exclude other products that are first approved and marketed abroad, and hence potentially missing from the analysis. Despite the potential bias, we chose the 200 top-selling benchmark for an easy global comparison illustration that might be otherwise biased by small volumes per country. The sample of drugs examined includes both the retail and hospital sectors, with data reported separately for the combination of the two and retail alone. The data are from IQVIA-MIDAS and represent 2017.

IQVIA's MIDAS data has limitations of note. MIDAS provides ex-manufacturer prices that do not necessarily capture differences in retail prices (with or without taking into account payments by parties acting on behalf of patients or consumers). MIDAS presents only revenues and quantities sold.

Price comparisons are made between the United States and the following countries: Australia, Austria, Belgium, Canada, France, Germany, Greece, Italy, Japan, Netherlands, Spain, Sweden, Switzerland, Turkey, and the United Kingdom. Because many of these products are not marketed in all the countries examined here, the set of drugs compared in the estimates below varies greatly by country of comparison. For that reason, care must be taken in interpretation of the findings. For example, if the ratio of Country A's prices to U.S. prices is 0.5 and the ratio of Country B's prices to U.S. prices is 0.4, it does not necessarily follow that Country B's prices are lower than Country A's prices because the set of drugs being examined is likely to be different. Bilateral estimates are to be interpreted only with respect to the two countries shown in the estimates.

Another important consideration is how to weigh the price comparisons, specifically, whether the weights should be based on quantities consumed in the United States or quantities consumed in the foreign country of comparison. This analysis constructs Fisher price indexes, which represent a geometric mean of those two alternative weighting methods. Figure 4 presents estimated Fisher indexes which illustrate the foreign-U.S. price of branded drugs. The index is normalized to a value of one, so the foreign price represents a relative ratio; a value less than one indicates a lower price in the foreign country of comparison.

The first thing to note is that according to the IQVIA-MIDAS data, many of the 200 top-selling drugs examined here show no quantities sold in the countries of comparison, suggesting that those drugs are not available for sale in that country. For example, in Australia, only 97 of the 200 drugs show evidence of significant sales. Similarly, Canada has only 120 of the drugs, France 109, and Germany 133. The absence of significant sales volume for these drug products might be the result of delayed regulatory approval, a decision by a public insurance program not to cover a drug based on health technology assessment criteria, or other factors.

The blue bars in figure 4 show the foreign-U.S. relative patented drug prices. Australia has a price index value of 0.33, indicating that its prices for top-selling patented drugs are just one-third those in the United States. Canada has a value of 0.35, indicating that the set of drugs in the comparison are only 35 percent of the price observed in the U.S. market. France and Germany have indexes of 0.42 and 0.43 respectively. Drug prices in Greece and Turkey are particularly low—just 17 percent and 11 percent of those here in the United States.

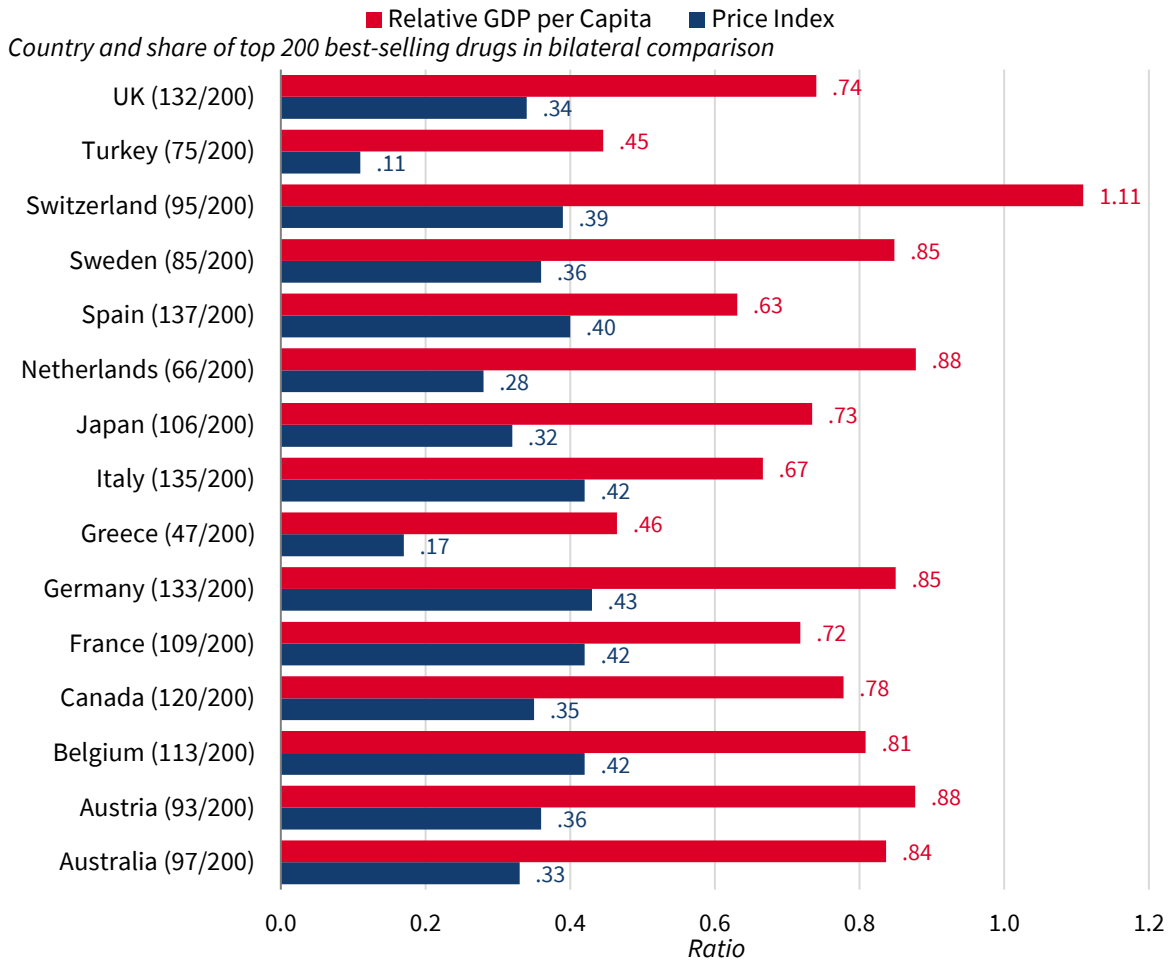
It is difficult to make definitive estimates of what observed market prices for prescription drugs would be in other countries if those countries had more market-based systems like the one seen in the United States. However, income is known to be an important determinant of

healthcare spending, including prescription drug spending, so a simple examination of differences in per-capita incomes between the United States and foreign countries can shed some light on whether the large international price disparities appear to be related to the demand-based factor of per-capita incomes. In other words, even in the absence of price distortions due to differing government pricing policies, we might expect to observe different market prices in different countries depending on a country's per-capita income.

As the data show, however, observed patented drug prices are much lower than what could be explained by differences in per-capita income. In addition to the price indexes, figure 4 shows ratios of per-capita incomes for each foreign country to U.S. per-capita incomes. Almost all countries examined here have lower incomes than the U.S., but far lower drug prices. Australia, Canada, France, Germany, Japan, and the U.K. have relative per-capita incomes falling in the range of 72 percent to 85 percent of the U.S. per-capita income, but their relative drug prices are much lower, ranging from 33 percent to 36 percent. Switzerland has a per-capita income that was 11 percent higher than that for the United States in 2017, but remarkably, its patented drug prices were only 40 percent of those in the United States.

Income is not the only determinant of a nation's healthcare spending level. Other important factors include consumers' preferences for new and valuable medical therapies. It is possible, for example, that patients in other countries have different tastes regarding medical care and that they would make different choices than American consumers, reflecting different views concerning tradeoffs between medical care consumption and other goods and services in an economy. No reliable measure of the differences in preferences is available. However, one broad gauge of a country's general willingness to pay for medical care is the level of overall healthcare spending per capita. National healthcare systems provide their patients with varying levels of access to medical technologies, and those differences are reflected in the differences in healthcare spending per patient. An examination of the differences between American and foreign levels of healthcare spending per capita can illustrate whether differences in innovator drug prices are in-line with general differences in health expenditures across countries.

Figure 4. Foreign–U.S. Price Index for 200 Top-Selling Prescriptions and Relative GDP per Capita for Selected Nations, 2017

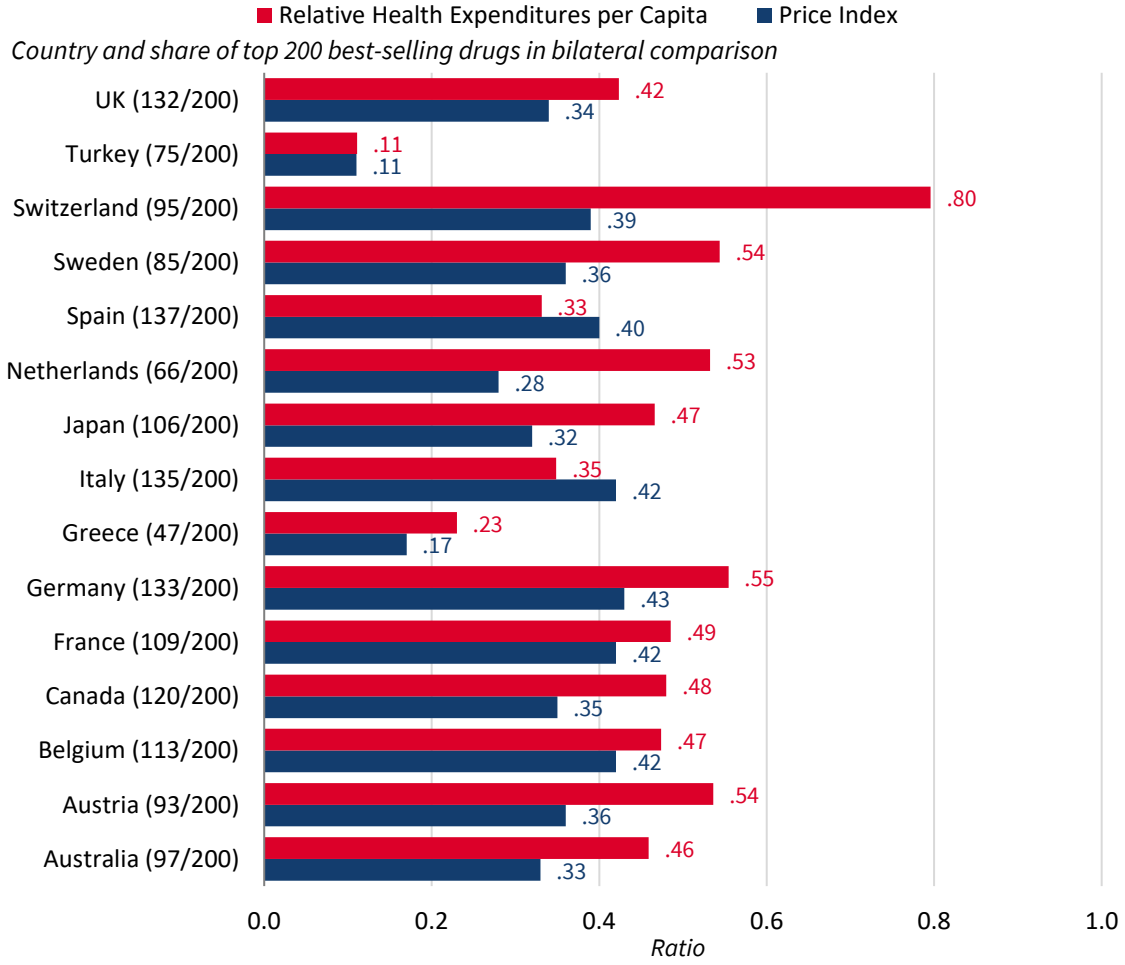


Sources: Food and Drug Administration; IQVIA; OECD.

Figure 5 shows the top-selling patented drug price indexes discussed above along with ratios reflecting per-capita healthcare expenditures in foreign countries relative to those in the United States in 2017. Other developed countries, such as Australia, Austria, Belgium, France, Germany, Japan, the Netherlands, and Sweden, have per-capita healthcare spending levels ranging from 0.46 to 0.55, indicating that those healthcare systems expend roughly half the amount of resources per person as the U.S. healthcare system. Furthermore, the observed price index values are even lower. For example, Germany's healthcare system expends $0.55 for every dollar spent per person in the U.S., but pays only 43 percent of the price paid in the United States for the set of top selling patented drugs that were examined. Similar results are seen with the other countries. Austria and Sweden have per-capita healthcare spending levels comparable to those of Germany, but have price indexes of 0.36, and another similar country,

the Netherlands, has a price index of 0.28. Australia, Canada, and the U.K. all have prices lower than that which would be expected by healthcare spending patterns. Switzerland is an outlier among European countries in its relative healthcare spending level, but its drug prices are far lower than its general healthcare spending levels would suggest. Italy is a notable exception among developed countries, with a drug price index higher than its relative healthcare spending per person. Only Turkey has a price index reflecting its relative healthcare spending.

Figure 5. Foreign–U.S. Price Index for 200 Top-Selling Prescriptions and Relative Health Care Expenditures per Capita for Selected Nations, 2017



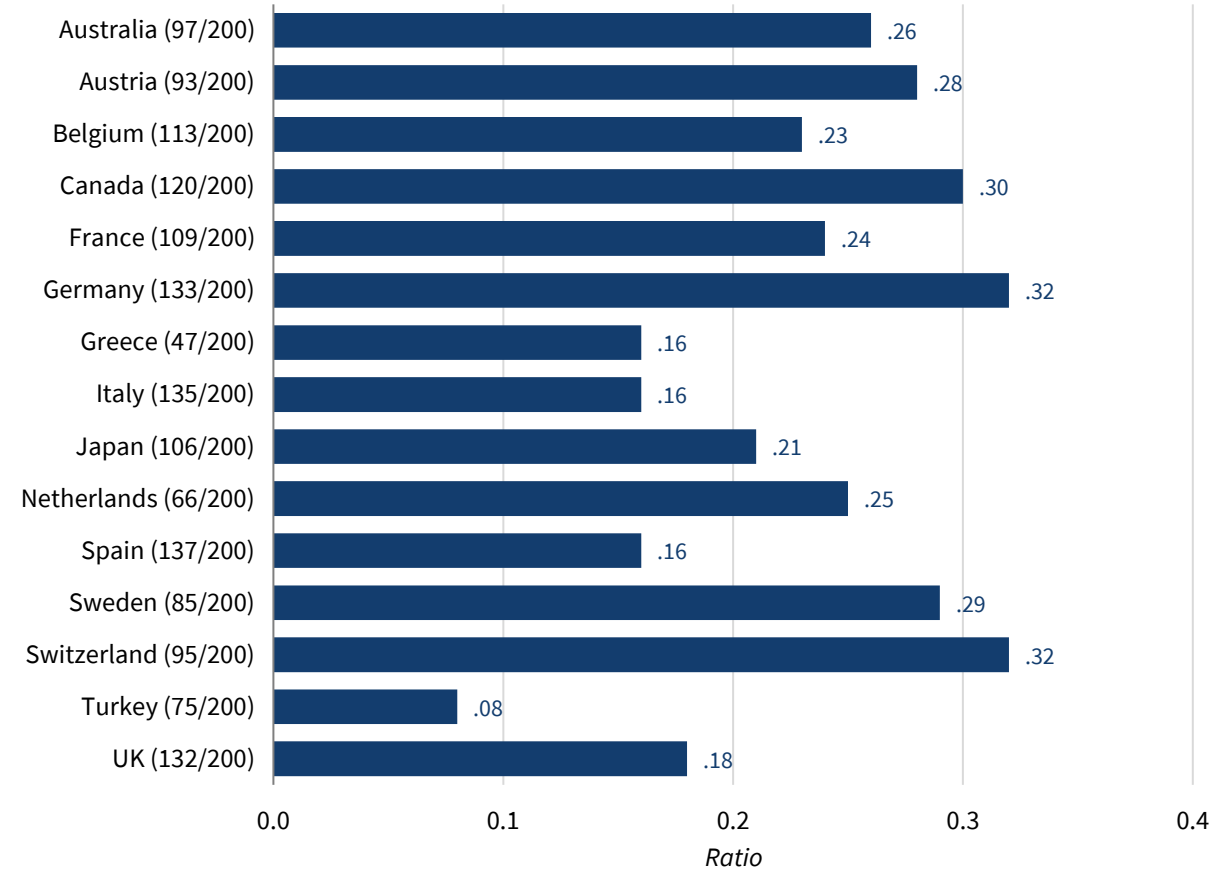
Sources: Food and Drug Administration; IQVIA; OECD.

As can be seen, differences in healthcare system-wide resource utilization are unable to fully account for the differences in observed drug prices. This might suggest that when single-payer systems seek to attain budget savings, their efforts at cost-containment fall disproportionately on pharmaceutical spending rather than spending for care provided by domestic healthcare providers.

Separate estimates of the price indexes were made using only the retail pharmacy channel of drug distribution, excluding hospital drugs (figure 6). When limited to the retail pharmacy sector, the estimated price indexes fall substantially in almost every country, indicating that the foreign-U.S. price disparities are greater for retail drugs than hospital drugs. France and Germany, for example, had indexes of 0.42 and 0.43 in the combined sample and only 0.24 and 0.32 in the retail sample, respectively.

Figure 6. Foreign to U.S. Price Ratio for Retail Drugs, 2017

Country and share of top 200 best-selling drugs in bilateral comparison



Sources: Food and Drug Administration; IQVIA.

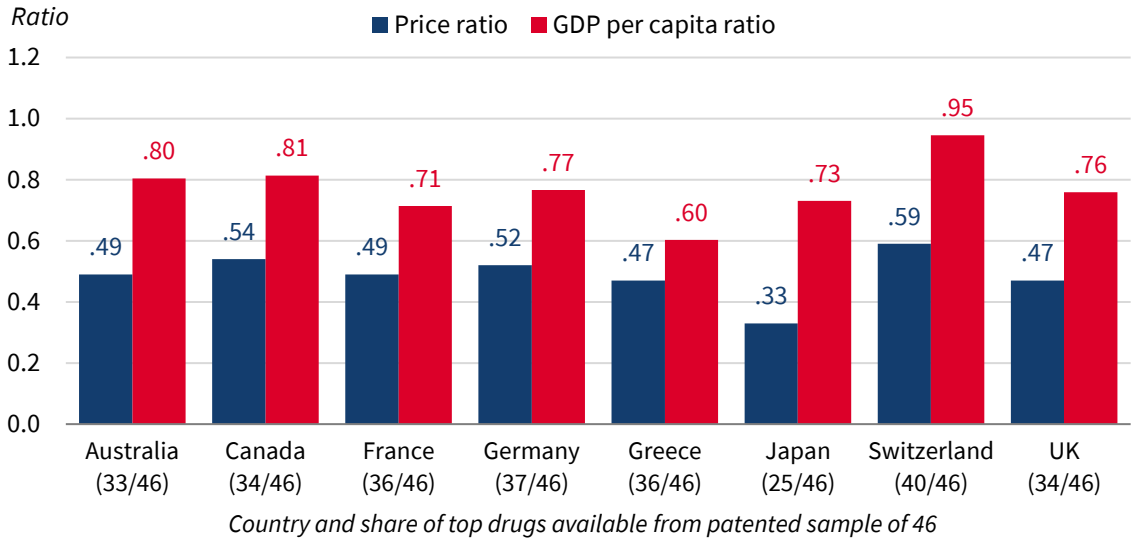
The evidence suggests that the disparity in drug transaction prices between the United States and other developed countries has expanded over time. A 2004 Commerce Department report provides estimates of Fisher price indexes constructed in a manner similar to those shown above. Those estimates, which represent 46 top-selling patented drugs in 2003, are shown in figure 7, along with relative per-capita income data representing 2003. Similar to the 2017 estimates, the foreign countries examined in the 2004 report often had no significant sales

quantities for many of the 46 drugs examined in the analysis. Among the drugs that did have sales, the relative prices tended to be roughly half of the U.S. price. For example, France, which had 36 of the 46 drugs available, had a price index of .49, while Germany, which had 37 of the drugs available, had an index of 0.52. These 2003 index estimates with values of roughly one-half of American prices contrast with the 2017 estimates of roughly one-third for some countries. As with the more recent data, differences in per-capita income do not appear to explain the discrepancy.

Although the estimated price disparity seems to have widened, caution is warranted in interpretation because the sets of drugs in 2003 and 2017 differ greatly. For instance, the 2017 estimates contain a more encompassing range of top-selling products than the earlier study. Part of the trend toward greater estimated price disparities could also result from less availability in foreign countries of recently-developed blockbuster products that are being sold in the United States but delayed in other countries. In general, single-year comparison of prices such as those shown here should be interpreted with the understanding that the set of top-selling drugs changes over time.

Developments in the U.S. pharmaceutical markets over the period 2003 to 2017 might also have played a role in widening the gap in estimated prices in the United States versus foreign countries. Below we discuss trends in international practices that constitute free riding and may reduce pharmaceutical prices in foreign countries. At the same time, some developments in the U.S. trends might have driven up U.S. pharmaceutical prices. Beginning in 2006, the Medicare Part D program began offering prescription drug coverage for Americans age 65 and older. By 2016 almost 46 million Medicare recipients were enrolled in a Part D plan (Hoadley, Cubanski, and Neuman 2016). The large increase in insurance coverage among a high-utilization population might be expected to increase market demand and increase U.S. pharmaceutical prices. Duggan and Scott Morton (2010) found evidence that Part D increased enrollees' utilization of prescription drugs often purchased by Medicare beneficiaries. However, they also found evidence that insurers' use of formularies and other mechanisms resulted in Part D enrollees paying substantially lower prices for drugs with significant therapeutic competition.

Figure 7. Foreign to U.S. Drug Price and GDP Per Capita Ratios, 2003

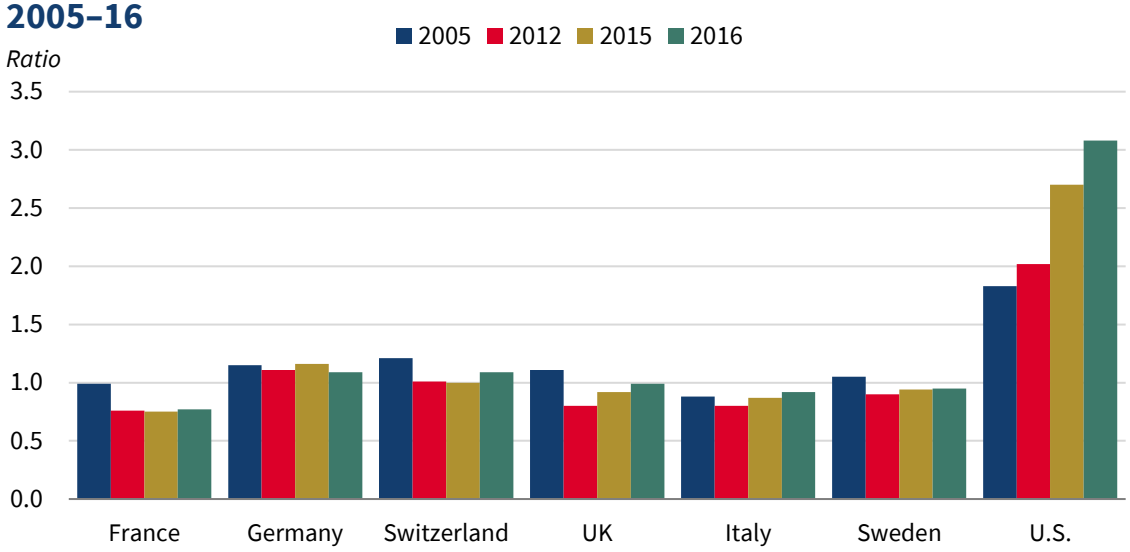


Sources: ITA (2004); OECD.
Note: Prices per standard unit are used.

Our findings are consistent with other data sources providing international price comparisons. Another independent source of data on patented drug price differences by country comes from the Canadian Patented Medicine Prices Review Board (PMPRB), a quasi-judicial body that collects and reports data on international patented drug product prices for use in Canada's price regulation policies. Estimates from a recent PMPRB report, shown in figure 8, illustrate the large differences in patented drug prices between the United States and Canada. In 2005, U.S. drug prices were an estimated 83 percent higher than those in Canada, and in 2012, they were 102 percent higher according to the PMPRB analysis. Since then, the estimated difference has increased dramatically, with U.S. prices estimated to be more than three times their counterparts in Canada (note that these estimates represent all patented drug products, not just the 200 top-selling patented drug products discussed above). The Canadian PMPRB's estimates tend to confirm the general trend suggested in CEA's analysis toward greater U.S.-foreign price disparities in recent years.

In general, these findings on price disparities appear consistent with CEA's earlier finding that consumers in the U.S. account for the overwhelming share of profits earned by innovator drug companies around the world because it makes clear that the United States is paying more for the same drug products than other countries. CEA's estimate that 70 percent of world pharmaceutical profits are earned in the United States was based on all innovator drugs, not just top-selling products.

Figure 8. Average Foreign to Canada Patented Drug Price Ratio, 2005–16



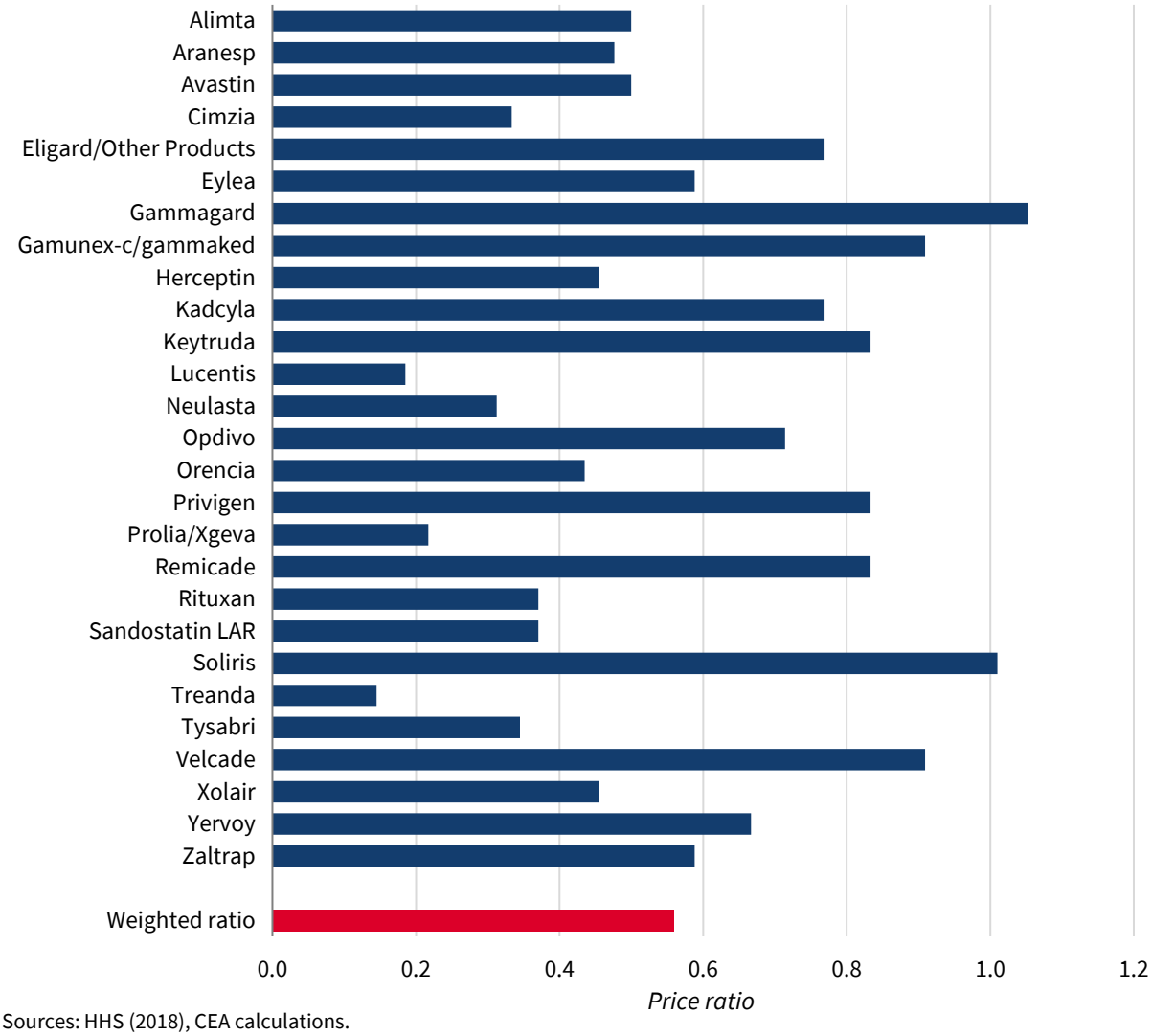
Sources: PMPRB (2012, 2017).
Note: All ratios are for market exchange rates.

International Price Comparisons for Physician Administrated Drugs Covered in Medicare Part B

Estimates of international drug price disparities are sensitive to the selection of drugs included in the sample. A recent report by the Department of Health and Human Services (2018) compared U.S. and foreign prices for the top 20 top single-source drugs in the Medicare Part B program based on total Medicare reimbursement. That report concluded that prices charged by manufacturers to U.S. wholesale buyers and distributors for those drugs were 1.8 times the corresponding prices in foreign countries. Inverting that overall estimate to correspond with the ratios shown above yields an estimated foreign-U.S. price ratio of 0.56. Bilateral comparisons of overall weighted U.S. drug prices and foreign countries' prices were not presented in that report. Instead, average international prices for a specific drug were compared to the U.S. price. Figure 9 shows the drug-specific comparisons of average foreign prices and U.S. prices for physician-administrated drugs that were examined. The comparative prices varied greatly, though in all but one case the foreign prices were far lower than the U.S. price.

The estimated overall ratio of 0.56 differs substantially from the range of bilateral foreign-U.S. estimates shown in figure 4 above, most of which fall between 0.32 and 0.43. That means that the estimated international price disparities for physician-administrated drugs, which are top sellers in Medicare Part B, are smaller than the disparities found in our analysis of a broader set of drugs, though still substantial.

Figure 9. Foreign to U.S. Price Ratio for Selected Drugs Covered by Medicare Part B, First Quarter 2018



Sources: HHS (2018), CEA calculations.
Note: Estimates from HHS are based on IQVIA MIDAS data released August 17, 2018.

Lowering U.S. Spending by Reducing Free-Riding by Foreign Developed Countries

If other developed nations paid their fair share for the value of medical treatments, the United States would be able to reduce the burden on its population without sacrificing the flow of new treatments. Economists are generally skeptical that pricing in one country affects pricing in another since manufacturers would seek the highest return in each, but they recognize that in the biopharmaceutical sector with reference pricing—where one country sets price ceilings (and sometimes the price) as a function of one or more foreign countries—pricing in one country will affect pricing in another.

As previously stated, estimating the prices for foreign countries if they adopted a more market-based pricing system like that in the United States is difficult. However, a country's relative GDP per capita (compared to the United States) and relative healthcare spending per capita provide rough benchmarks for what plausible comparative price levels might be in foreign countries if they did not employ price controls. Countries with lower per-capita incomes would likely have lower market prices for innovative drugs even if their healthcare systems relied on market forces as the United States does.

To illustrate the savings to the United States from reduced foreign free-riding, consider Canada in 2017, which paid 35 percent of U.S prices for top-selling drugs available in both countries, even though Canada's GDP per capita was 78 percent that of the United States. If Canada had paid prices that were 78 percent of the U.S. level, total revenues for innovative drugs in Canada would have been $27.2 billion instead of the actual $12.2 billion. Applying this type of simple calculation to all the developed foreign countries examined here, CEA estimates that if foreign relative drug prices reflected relative GDP per capita, total innovator revenues would have been $194 billion higher in 2017, raising global revenues by 42 percent.

Conclusion

Innovation in the development of new, life-saving, and life-enhancing medical treatments is driven by the prospect of recouping those investments with returns from the global marketplace. Because of this, there is a public goods problem in which some countries can benefit from the availability of new innovative products made possible by the high returns earned elsewhere—primarily the United States—without paying their fair share.

This CEA report documents that prices for top-selling patented prescription drug products in several wealthy foreign countries are far lower than those for corresponding products in the United States. Differences in income by country do not account for that disparity. The gap in prices between the United States and foreign countries, which appears to be widening over time, is due primarily to price controls and other nonmarket-based pricing practices in other countries that keep prices for products below the value they generate. The global result of the "free-riding" behavior of such countries is a slower pace of innovation, resulting in fewer potential new life-saving therapies for patients in all countries. If developed countries did not pay below the value of new products, there would be greater potential for better treatments, cures, and healthcare around the world.

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