

# PUBLIC POLICY SOURCES

PNumber 43

## Prescription Drug Prices in Canada and the United States—Part 2 Why the Difference?

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Editing and design: Kristin McCahon and Lindsey Thomas Martin

Printed and bound in Canada.

ISSN 1206-6257.

## Introduction

The American attitude to Canada is generally thought to be one of benign neglect. However, there is one area where many Americans pay close attention to the Canadian scene: the differences in prices of prescription drugs in the two countries. Because prescription drugs are thought to be cheaper in Canada than they are in the United States, many American politicians are proposing that a Canadian-style regulation of drug prices be adopted.

The media often claim that pharmaceutical prices in Canada are low because of the Patented Medicine Prices Review Board (Arnold 2000; Evenson 2000; Trickey 2000). The Patented Medicine Prices Review Board (PMPRB) is a quasi-judicial body that regulates introductory prices of new patented drugs and increases in the price of extant patented drugs in Canada. However, the PMPRB does not purchase drugs; rather, it determines the maximum prices that manufacturers can charge for patented drugs, thereby preventing market participants from negotiating a price among themselves.

The PMPRB was established in 1987 as part of the Bill C-22 amendments to the *Patent Act*, which were designed to allay American concerns about Canada's intellectual property policies on the eve of the approval of the Free Trade Agreement between Canada and the United States. In 1992, the PMPRB's mandate was expanded by Bill C-91, which brought Canada's intellectual-property laws up to the standard existing in developed countries at that time. The creation and expansion of the PMPRB was intended to mollify domestic fears that the legislative changes contained in C-22 might lead to higher drug prices.<sup>1</sup> The mission of the PMPRB is to "contribute to Cana-

dian health care by ensuring prices of patented medicines are not excessive" (PMPRB 2000: 6). The maximum price established by the PMPRB applies to all patented drugs sold in Canada.<sup>2</sup> Hospitals, provincial drug-benefits plans, private insurers, and individual cash buyers are all affected by the PMPRB's price controls.

However, the PMPRB controls only the manufacturer's "gate price" (the price at which the manufacturer sells to the wholesaler) not the wholesale price, retail margin, pharmacist's dispensing fee, or any other distribution cost. The manufacturer must submit detailed price and sales reports for the first 30 days' sales and for every six months thereafter until the patent expires or the drug is removed from the market.

The pricing guidelines used by the PMPRB are decided behind closed doors with so-called stakeholders: provincial and territorial Ministers of Health, pharmaceutical and biotech companies, health associations, and self-styled consumers' advocacy groups such as the government-funded Consumers Association. The PMPRB classifies patented drugs into three categories. Category 1 ("line extension") usually contains drugs that are a new strength of an existing drug. Category 2 ("breakthrough") includes drugs that produce a substantial improvement over predecessors. Category 3 ("me-too") contains drugs that provide moderate, little, or no improvement over existing medicines. The basic pricing guidelines are as follows.

(1) For previously introduced and approved medicines in all categories, price increases are limited to changes in the Consumer Price Index (CPI). The excessive price test is based on a three-

year cumulative change in the CPI. In addition, single year increases are limited to 1.5 times the forecast change in the annual index. In periods of high inflation (over 10 percent), the limit to price increases is five percentage points more than the forecast change in the CPI.

(2) For a new drug in Category 1, the introductory price will be judged to be excessive if it does not bear a “reasonable relationship” to the average price of the same medicine in the same or comparable dosage forms.

(3) For a new drug in Category 2, the introductory price will be presumed to be excessive if it exceeds the higher of the cost of therapy with medicines in the same therapeutic class and the median of prices of the same drug in the United States, United Kingdom, Switzerland, Sweden, France, Germany, and Italy.

(4) For a new drug in Category 3, the introductory price will be presumed to be excessive if the cost of therapy with the new drug is higher than the cost of therapy with existing comparable drug products in the same therapeutic class.

(5) In addition, the price of a patented drug cannot exceed the highest price of the same medicine sold in the United States, United Kingdom, Switzerland, Sweden, France, Germany, and Italy.

If the PMPRB considers that a price is excessive, it has the power to order a price reduction. Depending on the degree of harm that the PMPRB believes that the public has suffered, it can also order a rebate to customers, a payment to the Crown, a temporary *greater* reduction below the assessed fair price, or a temporary price reduction of *another* patented drug manufactured by the same company. In extreme cases, the company can be referred to the Attorney General for contempt of court.

During the five years from 1994 through 1998, 408 new patented human drugs were introduced, of which the Board classified 213 (52 percent) as Category 1 (“line extensions”), 171 (42 percent) as Category 3 (“me-toos”), and 24 (6 percent) as category 2 (“breakthroughs”). Given the pricing guidelines for different categories described above, 94 percent of new drugs were not able to enter the market at a higher price than their comparable predecessors.

On the face of it, these strict regulations appear to have served their purpose well. The Patented Medicine Prices Index (PMPI), which measures the manufacturer’s gate price for patented drugs, has increased by less than the CPI for all years but one of the PMPRB’s existence. Furthermore, the ratio of Canadian prices to international prices has decreased every year from 1991 to 1998, increasing marginally in 1999 (PMPRB 2000: 22). In 1999, the PMPRB’s price indices showed that American prices for patented drugs were 62 percent higher than prices in Canada whereas, in 1987, the year in which the PMPRB was founded, the difference was 36 percent (PMPRB 1999: 21; 2000: 23).

Inspired by the apparent success of the PMPRB in keeping prices low in Canada and lists of drugs with large Canadian discounts, some American legislators are proposing similar price control agencies for their jurisdictions.

Maine, for example, has passed legislation to establish the Fair Drug Pricing Board in 2001. This Board will be broadly similar to the PMPRB. The two major differences are that the Maine Fair Drug Pricing Board will regulate wholesaling and retailing margins as well as the prices of non-patented drugs. Despite these differences, the impact of the Maine Fair Drug Pricing Board should resemble that of PMPRB. Firstly, in the United States, manufacturer’s gate prices for cash buyers of pharmaceuticals (those who do not have insur-

ance) make up 77 percent of retail prices (US Department of Health and Social Services 2000: 98), so this is where regulatory pressure is likely to focus. Secondly, since branded non-patent drugs generally (but not always) face generic competitors and generic drugs are unambiguously cheaper than patented drugs, it is unlikely that they will face real scrutiny by the Board.

Similar legislation is under way in other American jurisdictions. It is understandable that American observers, concerned about the costs of prescription drugs, are ready to adopt blunt instruments

of price control fashioned after the PMPRB. After all, the circumstantial evidence seems to indicate that the PMPRB has kept Canadian drug prices low without serious negative consequences.

The history of legislated price controls, however, shows that they have results that are not immediately apparent and quite different from those intended by their creators (Walker 1976). This paper will examine the evidence for the differences between the prices that Canadians and Americans pay for prescription drugs, explore their actual causes, and assess all the effects of the PMPRB.

## The degree of price difference

It is hardly disputable that American prices for prescription drugs are higher than Canadian prices. Public discussion, however, focuses exclusively on patented drugs and not on non-patented branded drugs or generic drugs. To obscure the difference between patented and non-patented drugs is a significant failing, because generics make up 47.1 percent by volume of the American market for prescription drugs (Pharmaceutical Research and Manufacturers of America 2000: 69).

Hillary Clinton has presented a list that compares the Canadian and American prices of six drugs, all of which are patented (Clinton 2000). Besides this bias, Mrs. Clinton's list is confounded by the inclusion of Claritin® (Loratadine), the market-leading allergy medicine. Claritin® is a prescription drug in the United States but is sold "over the counter" (i.e., no prescription is required) in Canada. Therefore, Claritin® operates in a different competitive environment in Canada than it does in the United States. This difference necessitates very different marketing strategies and distribution channels in the two countries, result-

ing in different cost structures. Senator Slade Gorton has produced a similar list containing ten patented drugs (Gorton 2000).

A United States Congressional committee has published a study of the differences between prices for prescription drugs in Maine and those in Canada (US House of Representatives 1998). This study found a 72 percent price premium in the United States but exhibited certain weaknesses, which include analyzing only patented drugs (Danzon 1999: 27–32).

Canada's Patented Medicine Prices Review Board estimates that, in 1999, patented drugs sold in the United States cost 62 percent more than they did in Canada, a figure commonly quoted in the Canadian media as if it referred to all prescription drugs. However, patented drugs make up only 61 percent of sales of prescription drugs in Canada in 1999 (PMPRB 2000: 17). This suggests that it is important to investigate the prices of generic drugs and off-patent branded drugs as well in order to draw a more complete picture of prescription drug costs.

The PMPRB's comparison, which uses broad indices of patented drugs, may be the most accurate current estimate of the differences between Canadian and American prices for patented medicines. However, because regulatory approval is so slow in Canada, innovative and highly priced drugs may be included in the American price index before they are included in the Canadian index. In the United States, many of these drugs are priced at a premium compared to existing drugs but nevertheless earn significant market share. Recent examples include Viagra® (Sildenafil Citrate), Vioxx® (Rofecoxib), and Celebrex® (Celecoxib). The American price index for any given year may include certain new drugs that the Canadian index may not.

Comparing price indices is a challenging task. Using 1992 data, Professor Patricia Danzon measured prices using 12 different methods (1996). She explains how each of these methods is valid, even though they give rise to significantly different results. For example, by using American consumption levels and comparing drugs with the same molecular composition (rather than brand name) and by standard dosage unit (rather than gram of active ingredient), she found that the price index for Canadian drugs was 3 percent higher than in the United States. At the other extreme, using Canadian consumption levels while still comparing molecular composition and standard unit, she determined that the Canadian price index was only 45 percent of the American level. For those interested in the challenges to comparing interna-

tional price differences for pharmaceuticals, Danzon's work is highly recommended.

Using 1999 data, Graham and Robson (2000) compared American and Canadian wholesale and retail prices for the top 60 drugs, ranked by prescriptions written in the United States. They found that only 45 drugs were comparable but that price differences for those drugs ranged from a Canadian discount of 98 percent to a Canadian premium of 350 percent at the wholesale level and a 95 percent discount to a 238 percent premium at the retail level. Two drugs were more expensive in Canada at the wholesale level and seven at the retail level. All these drugs were generic. The average retail price for generic drugs was found to be higher in Canada than in the United States, whereas off-patent, branded drugs were significantly cheaper in Canada. Patented drugs were also cheaper in Canada, though much less so than the off-patent, branded drugs.

Even if we cannot say exactly how much more expensive American drugs are than Canadian drugs, many measures indicate that average Canadian drug prices are lower than those in the United States. This does not necessarily lead to the conclusion, however, that copying Canada's price-control regime will have the positive consequences anticipated by American advocates of price controls. Given the difference in the price relationship of generic drugs and branded drugs between the two countries, we must ask whether public policy has contrary effects in different market segments.

## Why are Canadian prices lower?

The PMPRB was set up in 1987, when its measurements showed that manufacturers' "gate prices" (prices at which manufacturers sell to

wholesalers) for patented drugs in the United States were 36 percent higher than Canadian prices. Canadian manufacturer's gate prices at

that time reflected the program of compulsory licensing through which Canadian generic drug producers could copy patented medicines and pay the inventor a licensing fee, set by the federal government, of 4 percent of sales. Since the creation of the PMPRB, the difference in prices between the two countries has widened: in 1998, it was 60 percent (PMPRB 1999:21). What has caused the 24 percent improvement in Canada's favour over the 11 years from 1987 to 1998?

### Comparing drug prices and GDP

The PMPRB has compared foreign prices to Canadian prices for patented drugs as of 1987 and 1998 for Italy, France, the United Kingdom, Sweden, Germany, Switzerland, and the United States (1999: 21). As well, the US Congress has studied Mexican drug prices in the same way it has studied Canadian prices (US House of Representatives 1998).<sup>3</sup> Danzon has pointed out that it is inappropriate to compare Mexican and American pharmaceutical prices because the standards of living are so different between the two countries (1999: 32).

However, this stipulation is also relevant for countries with smaller disparities in national income. Table 1 compares drug prices and income per capita in Canada and the eight countries. Each entry in the table represents the ratio of the foreign country's patented-drug price index or Gross Domestic Product (GDP) per capita to Canada's (multiplied by 100). Politicians and policy analysts who believe that patented drug prices should be uniform internationally use market exchange rates to compare prices. This is appropriate because these people often propose allowing countries with highly priced pharmaceuticals to import cheaper drugs from their neighbours. Therefore, the ratios in table 1 are based on market-exchange rates rather than purchasing power parity rates (discussed below). The scattergram (figure 1) plots

**Table 1: Ratio between foreign and Canadian prices of patented drugs**

	Prices of Patented Drugs (1998)	GDP per Capita (1997)
United States	160	146
Canada	100	100
Switzerland	118	179
Germany	109	127
Sweden	108	128
United Kingdom	107	109
France	92	118
Italy	85	99
Mexico (1997)	85	21

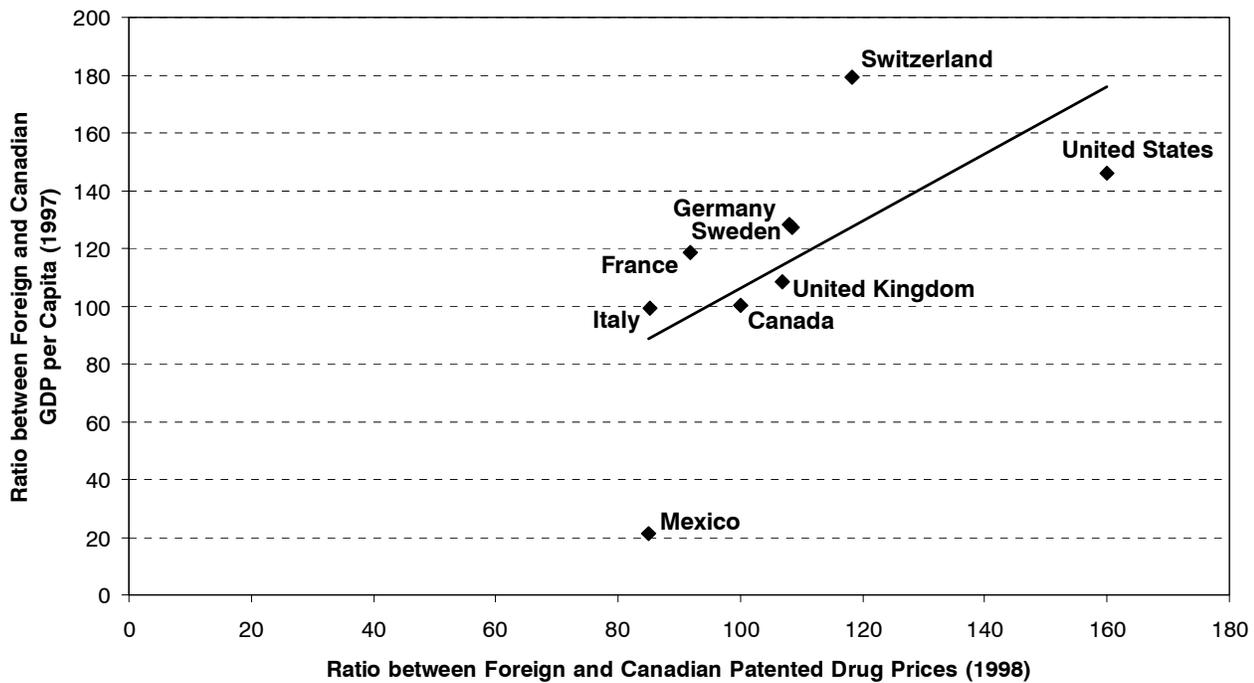
Source: PMPRB 1998; OECD 1997.

these two data sets, with Canada located at (100, 100). Although the sample is too small to give a statistically significant result, the trendline implies a positive correlation between the two ratios, especially for the developed countries. This indicates that higher income in one country compared to another partially explains that country's relatively higher patented drug prices.

### Change over time

It is also informative to look at the change in these relationships over time, especially since the founding of the PMPRB in 1987. The median Canadian price for patented drugs has declined relative to other developed countries during this period. As well, Canada's GDP per capita has also declined relative to these countries. For example, in 1987, GDP per capita in the United States was 20 percent greater than Canada, at nominal market-exchange rates. In 1998, it was 46 percent greater. Thus, the gap widened by 26 percentage points.<sup>4</sup>

Table 2 reports the changes in GDP per capita and drug prices for seven countries relative to Canada between 1987 to 1998.<sup>5</sup> Figure 2 plots the

**Figure 1: Countries with higher incomes have higher drug prices**

Sources: PMPRB 1999; US House of Representatives 1998; OECD.

data with Canada at (0, 0). Although the trend-line is not as clear as it is in figure 1, it demonstrates that the other six countries enjoyed superior growth relative to Canada over this period, a fact noted by other commentators (Emes 2000). They also experienced greater increases in patented pharmaceutical prices than Canada. Although we cannot make assessments of statistical

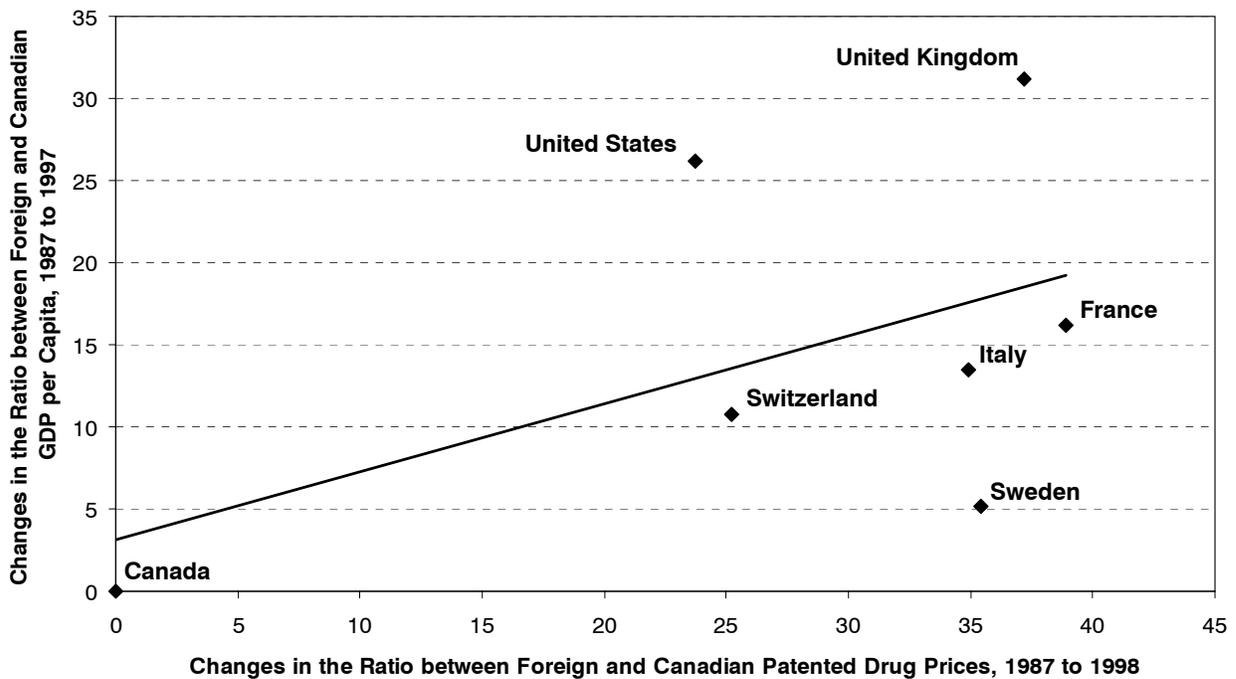
significance, this observation indicates that the relative decline in Canadians' incomes has been a factor leading to relative restraint in price increases of patented drugs compared to those in other countries.

The decline in Canada's standard of living compared to that of the United States corresponds

**Table 2: Changes in the ratio between foreign and Canadian drug prices from 1987 to 1998**

	Prices of Patented Drugs (1987)	Prices of Patented Drugs (1998)	Change (Difference)	GDP per Capita (1987)	GDP per Capita (1997)	Change (Difference)
<b>United States</b>	136	160	24	120	146	26
<b>Canada</b>	100	100	0	100	100	0
<b>Switzerland</b>	93	118	25	169	179	11
<b>Sweden</b>	73	108	35	123	128	5
<b>United Kingdom</b>	70	107	37	77	109	31
<b>France</b>	53	92	39	102	118	16
<b>Italy</b>	50	85	35	86	99	13

Source: PMPRB 1998; OECD 1997.

**Figure 2: Changes in foreign drug prices and incomes as a percent of Canada's from 1987 to 1998**

Sources: PMPRB 1999; OECD.

with the deviation from purchasing power parity of the exchange rate between Canadian and American currencies. That is, the Canadian dollar has depreciated significantly against the American dollar during the period studied but the prices of goods and services in Canada have not increased to the degree necessary to compensate for the decreasing value of the Canadian currency.<sup>6</sup>

The real price level of American GDP in 1998 was 25 percent higher than that in Canada. In 1987, the difference was only six percent (Kemp 2000). This widening of the gap between Canadian and American aggregate price levels by 19 percentage points explains all but 5 percentage points of the increased difference between pharmaceutical prices in the two countries. Simply put, Canadians get a 25 percent discount on total purchases, including drugs, compared to their southern neighbours. Indeed, this gap has been widening consistently since 1992.

### Comparing sectors of the economy

Comparing the aggregate level of prices is telling, but even more interesting is the analysis of various sectors of the economy. Of course, not every good and service sells for 25 percent more in the United States than in Canada. When we look at different sectors, we observe that the real price of medical services and health care overall is 87 percent higher in the United States than Canada (Kemp 2000: 125). This indicates that Canadians are getting even less of a bargain for prescription drugs than we are in other health services.

However, although the price of health services in Canada is low, it is difficult to know whether these figures are meaningful. The price system is legally forbidden as a mechanism for allocating most primary health-care resources in Canada, which are allocated, instead, by political

decisions. The Canadian system is marked by lengthy waiting lists for surgery and severe shortages of medical technology (Walker and Zelder 1999; Harriman, McArthur, and Zelder 1999). Therefore, it is not clear that the quality of health care produced in Canada can be compared to that in the United States. Some of the difference in price may be explained by the lower quality of health care in Canada, which is not accurately measured.

Notwithstanding that comparing the overall price of health services in Canada and the United States is not very helpful because the Canadian market is so distorted, it is still necessary to explore why the real price of goods and services is significantly higher in the United States.

Many goods and services are based on intellectual property. Much of the total cost of providing these goods and services are incurred before they are packaged and sold: they are incurred during research and development and have been spent long before the manufacturer receives any revenue (i.e. these are “sunk” costs). The costs of research and development are also “joint costs,” which cannot be attributed to specific units of output or to specific consumers. Manufacturers, however, must charge prices such that they can recover both the costs of manufacturing and distributing individual units and the sunk costs of research and development, although the latter cannot be rationally allocated to individual customers. Manufacturers will, therefore, charge different prices to different consumers and, when segmenting markets by country, they often use measures of national income to guide them in setting their prices: wealthier countries will pay more (Danzon 1997).

As we have seen, Canadians’ incomes are increasingly trailing those of Americans. This poor economic performance is driven by relatively poor productivity in Canada and has had signif-

icant consequences for Canadians’ standard of living (Law 2000). It has become difficult for businesses to compete when purchasing relatively expensive machinery and equipment from the more productive United States (Kemp 2000: 102). Since these goods have high marginal manufacturing costs, producers have less ability to differentiate prices in order to keep selling into the poorer country: they will lose money on each item they produce and sell here.

Manufacturers of goods with a large sunk investment in research and development were able to respond by increasing the differences between prices in Canada and prices in the United States. We expect to observe such price differences between Canada and the United States for goods and services besides patented, prescription pharmaceuticals. Indeed, products where marginal production costs are negligible tend to show the largest price differences. Table 3 provides a few examples.

The CD-ROM version of Intuit’s *Quicken Basic 2000*, a popular personal financial planning software package, can be ordered for US\$34.95 from the company’s web site. However, the Canadian version, purchased from the company’s Canadian web-site, costs the equivalent of US\$20 (before GST). AOL charges US\$21.95 for unlimited monthly Internet access in the United States but AOL Canada charges less than US\$16 for the same service. Intuit’s and AOL’s American customers pay premiums of 70 percent and 40 percent respectively.<sup>7</sup> These are products with very low manufacturing and distribution costs. The price differences cannot be caused by supply costs to the two markets because they are not substantially different.<sup>8</sup> Nor, do we have a Canadian “Patented Software Prices Review Board” to claim credit for the price differences.

Bayer Aspirin®, the original branded acetylsalicylic acid (ASA) and the generic, private-label

**Table 3: Comparison between Canadian and American prices (ex-tax)**

Product	Canadian Price (in \$US)	US Price	Difference
Quicken Basic Windows 2000 CD_ROM (website order)	\$20.52	\$34.95	70%
AOL unlimited monthly Internet access	\$15.72	\$21.95	40%
Private label ASA (London Drugs/Walgreen's)	\$3.08	\$4.99	62%
Bayer Aspirin® 500mg 50 caplets (Shoppers Drug Mart/Walgreen's)	\$3.99	\$4.99	25%

Sources: AOL (American Online, Inc.), Intuit, London Drugs, Shoppers Drug Mart, Walgreens.

substitute sold by London Drugs in Canada and Walgreen's in the United States provide an interesting comparison. They are pharmaceutical products but sold over the counter (OTC). The market structure for OTC drugs in Canada is virtually the same as it is in the United States. There are no significant differences in government involvement yet we still observe significant differences in the prices of these goods. Both the branded and the generic OTC drugs are more expensive in the United States than they are in Canada.

### Cost from litigation

Even if incomes and real aggregate prices were equal on both sides of the border, there are other differences between the two countries that would lead to price differentiation in favour of Canadian consumers. Pharmaceuticals can be dangerous in the wrong hands and manufacturers are justly concerned about the safety of their products. The United States is a more litigious society than Canada and we would expect that prices for pharmaceuticals in the United States would be higher, reflecting the increased costs of legal liability. Professor Richard L. Manning found evidence that one-third to one-half of any pharmaceutical price differentials in 1990 were due to the higher cost of protection from legal liability in the United States (Manning 1997). In Canadian courts, compensation for personal

injury is capped at CDN\$250,000 and judges rarely award large liability settlements.<sup>9</sup>

### Proxy for comparison

Given that Canada has not experienced free-market drug prices in decades, it is impossible to say what those drug prices would be. The closest proxy for the price level of patented drugs in Canada is the price level of non-patented, single-source prescription drugs. These are branded drugs that were never patented (or whose patents have expired) that have no competing generic substitutes in the market. Accutane® (Isotretinoin), used in treating severe acne and some cancers, is an example of such a drug. Although these drugs require regulatory approval of their therapeutic benefits, their prices are not regulated by the PMPRB. In 1996, American prices for these drugs were 96 percent higher than Canadian prices (Conference of Federal/Provincial/Territorial Deputy Ministers of Health 1999a: 6). In contrast, the American price premium for patented drugs in 1998 was 60 percent: the "Canadian discount" for branded drugs *not regulated* by the PMPRB was far greater than it was for those that *were regulated*. A recent Fraser Institute survey of price differences for prescription drugs in Canada and the United States confirms that the Canadian discount for branded, off-patent drugs is greater than that for patented drugs (Graham and Robson 2000).

## Generic drugs

The United States has far more generic competitors than Canada. In 1992, the United States had an average of 5.7 manufacturers of each therapeutic molecule whereas Canada had only 2.02, that is, one branded firm and one generic firm (Danzon 1996: 94). As well, the median price of generic drugs in Canada has increased relative to that of brand-name drugs from 1990 to 1997 (Conference of Federal/Provincial/Territorial Deputy Ministers of Health 1999b: 35). During the term of the PMPRB's existence to 1999, the Patented Medicine Prices Index rose at an average annual rate of 0.8 percent while for the Industrial Product Price Index (Pharmaceutical), which is published by Statistics Canada and includes both patented and non-patented drugs, rose 1.9 percent (PMPRB 2000: 20). Certain generic drugs in Canada are sold at multiples of their prices in the United States (Robson and Graham 2000). This is surprising: given the income and legal differences between the two countries, we would expect Canadian generic drugs to be significantly cheaper than those sold in the United States, as we have observed for branded drugs and other consumer goods, such as OTC drugs and software, with relatively low marginal costs of manufacturing and distribution.

Another interesting difference between the brand-name companies and the generics is the level of

market concentration. Of the top ten pharmaceutical companies in Canada, ranked by sales, only one is a generic manufacturer (IMS Health 1999). The second largest generic ranks thirteenth by sales. However, these two firms together had sales of \$568 million in 1998, fully 71 percent of the total generic market by revenue. In comparison, the top two brand-name firms captured only 15 percent of the market for that sector, and it took 16 companies to account for 71 percent market share.<sup>10</sup> Research-based companies do compete against each other within a therapeutic class, as described below through the example of Cozaar®. It appears that the brand-name companies have a large, highly competitive market, whereas generic companies appear to make up a near duopoly.

This observation is contrary to what one would expect in a free market. Patented drugs have limited monopolies, which give them market exclusivity, and give them incentives to continue to invest in research and development. When patent protection for a drug expires, one would expect generic competitors to operate within a market structure of almost perfect competition. How is it that, in Canada, generic competitors have enjoyed superior pricing power relative to their research-based competitors? The Patented Medicine Price Review Board gives us the answer.

## The unintended consequences of the PMPRB

Innovative pharmaceutical companies compete by introducing differentiated products, not only by offering low prices. Drugs are launched with either a strategy of "skimming"—high price and

low volume—or a strategy of "penetration"—low price and high volume. Nevertheless, the American experience is that subsequent entrants into a therapeutic class are launched at lower

prices than the first entrant (Schweitzer 1997: 18). This reflects some degree of price competition in the American patented pharmaceutical market. In Canada, the PMPRB's price controls restrict manufacturers' pricing flexibility. The following case study explores the consequences.

The PMPRB's deliberations are not generally open to public scrutiny and examples of introductory price setting are hard to come by. There are, however, publicly available case studies for Cozaar® (Losartan Potassium), Fosamax® (Alendronate) and Lipitor® (Atorvastin) (PMPRB 1998). Although the PMPRB does not regulate generic prices, it compares the prices of therapeutically equivalent generics to branded drugs. The PMPRB's discussion of the case states:

The patent status of comparator drugs, or the length of time they have been on the market, are not considerations in the selection process. In other words, the TCC (Therapeutic Class Comparison) will include brand name and generic products that meet the selection criteria: "old drugs" that are still being used are not excluded because of their age. (PMPRB 1998: 6)

Merck Frosst introduced Cozaar® into Canada in September 1995 in two dosages, 25mg and 50mg. However, Merck Frosst was also developing a 100mg tablet, which was introduced in March 1998, two and one-half years later. The company markets this dose as the "once-a-day" option.

Table 4 shows the drugs that the PMPRB compared to Cozaar® for the purpose of price regulation. Cozaar® was the first of a new class of anti-hypertensives, the angiotensin II receptor antagonists. The primary use of these drugs is to manage high blood-pressure. In the absence of other members of that class, the PMPRB had to compare Cozaar® to members of another class, namely, angiotensin converting enzyme inhibitors (ACE inhibitors). The ACE inhibitor with the greatest market share was, and is, Vasotec®, another Merck Frosst product, which was the first in class (i.e. the first ACE inhibitor to be put on the market) when it was launched in Canada in 1987.

Since Cozaar's® launch, five new angiotensin receptor antagonists have received approval from Health Canada.<sup>11</sup> Each is produced by a different company, so five new competitors

**Table 4: Category 3 comparison (1995)**

Drug	Brand	Daily Cost	Marketer in Canada	Last Patent Expires
<b>Captopril</b>	various	\$2.70 to \$4.90	various	expired
<b>Losartan</b>	Cozaar®	\$1.10	Merck Frosst	January 24, 2012
<b>Quinapril</b>	Accupril®	\$1.64	Parke-Davis	August 23, 2011
<b>Fosinopril</b>	Monopril®	\$1.90	Bristol Myers Squibb	June 19, 2010
<b>Enalapril</b>	Vasotec®	\$1.92	Merck Frosst	October 16, 2007
<b>Lisinopril</b>	Prinivil®, Zestril®	\$1.94	Merck Sharp Dohme, AstraZeneca	October 16, 2007
<b>Cilazapril</b>	Inhibace®	\$1.36	Hoffman-LaRoche	March 29, 2005
<b>Benazepril</b>	Lotensin®	\$1.56	Novartis	November 12, 2002
<b>Ramipril</b>	Altace®	\$1.50	Hoechst Marion Roussel	May 12, 2002

have entered the market. Although we do not know the marketing policy of Merck Frosst, we can see that the unintended effect of the PMPRB's guidelines is to prevent the company from ever reducing its drug prices. Firstly, in anticipation of the original launch of Cozaar®, the company will keep the price of Vasotec® high, despite the competitive environment, because Vasotec's® price will be used as a guideline for the introduction of the new drug. Secondly, anticipating the introduction of Cozaar's® 100mg dose two years later, Merck Frosst will be extremely reluctant to reduce the price of the original 25mg and 50mg doses, for fear of spoiling the entry-price of the once-daily dosage. Furthermore, despite the introduction and potential entry of new competitors, Merck Frosst will resist reducing the price of either Vasotec® or Cozaar®, because the firm must anticipate the

effects of the PMPRB on the introductory price of future hypotensive drugs in its own development pipeline. Thus, the PMPRB's direct price controls can be seen to inhibit any price competition between drugs within a therapeutic class.

Of course, this effect gives Canadian generic competitors latitude to charge higher prices than they could in a free market because patented drug manufacturers face severe deterrents to reducing prices. Some Canadian commentators lament the passing of compulsory licensing, under which generic companies could copy and sell patented drugs for a royalty of 4 percent (Rachlis and Kushner 1994: 125–51; Fuller 1998: 190–209). However, it is clear that PMPRB gives generics a great advantage. It allows generic drugs to sell for much higher average prices in Canada than would be expected in a free market.

## Conclusions

- The average price of goods and services in the United States is 25 percent higher than in Canada. This situation has arisen because of the significant decline in incomes in Canada relative to the United States.
- The types of products that drive this difference in prices are creations of intellectual property, which have low marginal production costs, so that manufacturers can earn marginal profits by charging low prices in those markets where consumers cannot pay prices high enough to cover the sunk costs of research and development.
- Canada's low drug prices are exemplary of this type of product. They are chiefly the result of Canada's low standard of living relative to the United States and pharmaceutical companies' marketing response to our declining incomes. This gap in incomes and prices has increased over the past decade.
- As well, higher legal liability costs in the United States account for about one-third to one-half of the difference in price of patented pharmaceuticals in Canada and the price in the United States.
- The Patented Medicine Prices Review Board does not keep prices low; rather, it keeps prices high, because its guidelines discourage patented drug manufacturers from using price reductions as a competitive strategy.
- This allows generic companies to charge prices significantly higher than they could in a free market and insulates them from any effects of price competition among brand-name competitors, which would lower the ceiling under which generic companies price their drugs.

- High American drug prices result primarily from America's position as the world's most productive and wealthiest country. As long as the United States maintains this position, it is likely that its drug prices, along with prices of other goods and services, will be higher than they are in other countries.
- American imitators of the PMPRB, such as the Maine Fair Drug Pricing Board, are unlikely to succeed in keeping prices low but will have unintended negative consequences, as has the Canadian PMPRB.

## Policy implications

If the United States wants to lower the prices of pharmaceuticals in America, meaningful tort reform is one place to begin: eliminating the "liability lottery" will lead to significant price reductions.

The author hopes that this discussion will shed some light on the issue of international price differences and pharmaceutical price controls, especially the Patented Medicine Prices Review Board, which conventional wisdom credits with keeping Canada's patented drug prices low. This analysis shows that the PMPRB is not a positive force for drug consumers, nor is it irrelevant: it is expensive and harmful. Canada should abolish this agency and let market forces determine the prices of patented pharmaceuticals. This will remove the incentive for patented drug manufacturers to keep prices of old patented drugs high.

This pricing flexibility will result in lower prices, as branded drugs within therapeutic classes compete on price against each other and the prices of generic drugs drop in response to this competition. As well, newly launched patented drugs may often have lower introductory Canadian prices than they do now, because manufacturers will know that they have the flexibility to increase prices in cases of unexpectedly high demand.

American states should not look to the Patented Medicine Prices Review Board as a prototype in their search for solutions to the costs of pharmaceutical drugs. Adoption of this model is fraught with unintended consequences, which consumers will suffer: high prices for generic and older patented drugs, and little impact on the prices of innovative, new drugs.

## Notes

- 1 For details on the changes in the protection of intellectual property in these Acts, see Lippert and McArthur 1997.
- 2 The PMPRB also regulates the prices of patented veterinary medicines. However, veterinary drugs are a small proportion of the total number.
- 3 The Mexican drug-price ratio is derived from the US House of Representatives report, which stated that patented drugs in Maine were 72 percent more expensive than in Canada and 102 percent more expensive than in Mexico in 1997. Although the report is flawed, these figures imply that the ratio of Mexican to Canadian patented drug prices is 85.
- 4 As we shall see below, the real depreciation in living standards has been significantly less than 46 percentage points. This is because the average price level of goods and services has dropped in Canada relative to the United States.
- 5 Mexican data were not available, nor were German data from 1987.
- 6 When the American dollar was worth \$1.35 in Canadian funds, classical economics expects that a product that sold for \$1.00 in the United States would have sold for \$1.35 in Canada. If the Canadian dollar depreciates to \$1.45 per American dollar, the price of the good should increase by 7.4 percent to \$1.45 in Canada. Alternatively, if the Canadian price remains at \$1.35, we would expect the American price to decrease to 93 cents. This relationship between international price levels has not held for Canada and the United States over the period. Readers who want to learn more about how market exchange rates come to deviate from purchasing power parity are referred to Grubel 1981: 274–94.
- 7 Inclusion of sales taxes does not alter the substantive result.
- 8 The costs to supply over-the-counter drugs include sales representatives and other personnel, which one expects to cost more in the United States than in Canada, thus making some contribution to higher American prices. However, the author was not able to quantify average wages for pharmaceutical sales representatives in the two countries. As well, this relatively minor supply-side cause of price differences should not distract us from the primary, demand-side cause.
- 9 Although it is beyond the scope of this paper, it would be interesting to revisit Manning's study using more recent data. Some observers believe that Canada is following the United States towards an expensive "legal lottery" civil-liability system (Robson and Lippert 1997). If this is happening, we might expect to see relative Canadian drug prices rise to compensate for this risk.
- 10 The originally reported 1998 data showed Astra and Zeneca as separate companies. Since they have since merged, the two are combined to show the present situation more accurately. Furthermore, at the time of writing, Pfizer and Warner Lambert have agreed to merge. As well, Glaxo Wellcome and SmithKline Beecham have announced a friendly merger. Since these deals are recent and may involve further changes in assets, they have not been combined.
- 11 They are Astra Zeneca's Atacand® (Candesartan), Smith Kline Beecham's Teveten® (Eprosartan), Sanofi's Avapro® (Irbesartan), Boehringer Ingelheim's Micardis® (Telmisartan), and Novartis' Diovan® (Valsartan).

## References

- Arnold, Tom (2000). Hillary Clinton Touts Canadian Drug Plans. *National Post* (February 10): A1.
- Clinton, Hillary (2000). *Hillary Clinton Receives Endorsement of Nurses—Announces New Proposal to Make Prescription Drugs Affordable*. Campaign speech (February 8). New York: Hillary Rodham Clinton for U.S. Senate Committee. Digital document: [www.hrc2k.com/issues/plans/healthcare.html](http://www.hrc2k.com/issues/plans/healthcare.html).
- Conference of Federal/Provincial/Territorial Deputy Ministers of Health (1999a). *Top Selling Non-Patented Single Source Drug Products, 1996: International Price Comparison Study 2* (April). Ottawa: Health Canada.
- Conference of Federal/Provincial/Territorial Deputy Ministers of Health (1999b). *Drug Prices and Cost Drivers* Ottawa: Health Canada.
- Danzon, Patricia (1996). The Uses and Abuses of International Price Comparisons. In R.B. Helms (ed.), *Competitive Strategies in the Pharmaceutical Industry*. Washington, DC: The AEI Press: 85–106.
- Danzon, Patricia (1997). Price Discrimination for Pharmaceuticals: Welfare Effects in the US and the EU. *International Journal of the Economics of Business* 4, 3: 301–21.
- Danzon, Patricia (1999). *Price Comparisons for Pharmaceuticals: A Review of U.S. and Cross-National Studies*. Washington, DC: AEI Press.
- Emes, Joel (2000). Questions & Answers. *Fraser Forum* (June): 19–20.
- Evenson, Brad (2000). Indulging in “Different Kind of Drug Trip.” *National Post* (April 17): A1.
- Fuller, Colleen (1998). *Caring for Profit: How Corporations are Taking Over Canada’s Health Care System*. Ottawa: Canadian Centre for Policy Alternatives.
- Gorton, Slade (2000). *Top Ten Most Commonly Prescribed Drugs in the US*. Washington, DC: Office of Senator Slade Gorton. Digital document: [gorton.senate.gov/drugs-1.htm](http://gorton.senate.gov/drugs-1.htm).
- Graham, John R., and Beverley A. Robson (2000). *Prescription Drug Prices in Canada and the United States 1: A Comparative Survey*. Public Policy Sources 42. Vancouver, BC: The Fraser Institute.
- Grubel, Herbert G. (1981). *International Economics* Homewood, IL: Richard D. Irwin.
- Harriman, David, William McArthur, and Martin Zelder (1999). Public Policy Source No. 28. *The Availability of Medical Technology in Canada: An International Comparative Study* (Vancouver: The Fraser Institute).
- IMS Health (1999). State of the Pharmaceutical Industry 1998. News release (April 3). Montreal: IMS Health.
- Kemp, Katherine (2000). Purchasing Power Parities and Real Expenditures, United States and Canada—An Update to 1998. *National Income and Expenditure Accounts* 47, 3 (February): 98–138. Cat. No. 13-001-XPB. Ottawa: Statistics Canada.

- Law, Marc T. (2000). *Productivity and Economic Performance: An Overview of the Issues*. Public Policy Sources 37. Vancouver, BC: The Fraser Institute.
- Lippert, Owen, and William McArthur (1997). Drugs and the Intellectual Property Debate. *Fraser Forum* (June): 22–24.
- Manning, Richard L. (1997). Products Liability and Prescription Drug Prices in Canada and the United States. *Journal of Law and Economics* 40 (April): 203–43.
- Patented Medicine Prices Review Board (1998). Category 3 Drug Prices: Preliminary Outline of Issues. Attachment to the *Road Map for the Next Decade*. Ottawa: Patented Medicine Prices Review Board.
- Patented Medicine Prices Review Board (1999). *Eleventh Annual Report: Year Ending December 31, 1998*. Ottawa: Patented Medicine Prices Review Board.
- Patented Medicine Prices Review Board (2000). *Annual Report 1999*. Ottawa: Patented Medicine Prices Review Board.
- Pharmaceutical Research and Manufacturers of America (2000). *Pharmaceutical Industry Profile 2000*. Washington, DC: Pharmaceutical Research and Manufacturers of America.
- Rachlis, Michael, and Carol Kushner (1994). *Strong Medicine: How to Save Canada's Health-Care System*. Toronto: HarperCollins.
- Robson, John, and Owen Lippert (Eds.) (1997). *Law and Markets: Is Canada Inheriting America's Litigious Legacy?* Vancouver, BC: The Fraser Institute.
- Schweitzer, Stuart O. (1997). *Pharmaceutical Economics and Policy*. New York: Oxford University Press.
- Trickey, Mike (2000). Drug Pricing Policy to Stay, Manley Vows. *National Post* (April 12): A9.
- United States Department of Health and Social Services (2000). *Prescription Drug Coverage, Spending, Utilization, and Prices*. Report to the President (April). Washington, DC: US Department of Health & Social Services. Digital document: [aspe.hhs.gov/health/reports/drugstudy/](http://aspe.hhs.gov/health/reports/drugstudy/).
- United States House of Representatives, Committee on Government Reform and Oversight (1998). *Prescription Drug Pricing in the 1<sup>st</sup> Congressional District in Maine: An International Price Comparison*. Minority Staff International Report (October 24). Washington, DC: US House of Representatives.
- Walker, Michael, Ed. (1976). *The Illusion of Wage and Price Control*. Vancouver, BC: The Fraser Institute.
- Walker, Michael, and Martin Zelder (1999). *Waiting Your Turn: Hospital Waiting Lists in Canada (9th Edition)*. Critical Issues Bulletin. Vancouver, BC: The Fraser Institute.

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## Acknowledgments

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Thanks to Michael Walker and Martin Zelder for review of the manuscript and to Joel Emes for help with the research.

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