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Prescription Drug Prices in Canada and the United States—Part 3 Retail Price Distribution

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Contents

<i>Executive summary</i>	3
<i>Introduction</i>	4
<i>Method</i>	7
<i>Results</i>	9
<i>Analysis</i>	11
<i>Prices to governments in the areas</i>	15
<i>Policy implications</i>	19
<i>References</i>	20
<i>Acknowledgements & About the contributors</i>	23

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Executive summary

This study looks at retail prices of three patented prescription drugs in three American and three Canadian areas along the border between Canada and the United States. Although finding that Canadian prices are significantly lower than American prices, it also finds significant differences in prices within each of these areas, as well as between areas in the same country. Given these domestic price differences, a shopper can save almost as much money by bargain hunting within his own area as by crossing the border.

The study finds that differences among services offered by individual pharmacies explain some of the price differences. It also indicates that income differentials among regions within one country may also explain price differences.

In an attempt to understand the consequences of subsidies to pharmaceutical consumption on prices for those who pay out of pocket, the paper looks at current government benefits to patients who use prescription drugs. It finds that Canadian patients do not necessarily have easier access to prescription drugs, and that the effect of these programs on market prices is unclear.

This research shows that there is no such thing as one Canadian or one American price for prescription drugs. Because of this, policy-makers who seek to equalize Canadian and American pharmaceutical prices face an impossible task.

Erratum—page 17

In the paragraph starting “Lipitor® and Paxil® . . .”, the sentence:

Generally, patients must have had unavoidable reactions to older, non-steroidal, anti-inflammatory drugs (NSAIDs) such as acetaminophen before the plans will reimburse the purchase of Celebrex®.

should read :

Generally, patients must have had unavoidable reactions to older, non-steroidal, anti-inflammatory drugs (NSAIDs) **or analgesics** such as acetaminophen before the plans will reimburse the purchase of Celebrex®.

Introduction

The difference between prices paid for prescription drugs in Canada and the United States continues to be an issue of public attention. A previous paper, *Prescription Drug Prices in Canada and the United States—Part 1: A Comparative Survey*, published by the Fraser Institute, supported the conventional wisdom that comparable brand-name drugs are more expensive in the United States than in Canada but found that the average retail price of the 19 most widely prescribed generic drugs in the United States is higher in Canada (Graham and Robson 2000: 13). A second paper challenged the view that low Canadian brand-name drug prices are the result of price controls imposed by Canada's Patented Medicine Prices Review Board (PMPRB). *Prescription Drug Prices in Canada and the United States—Part 2: Why the Difference?* argued that they are largely the result of Canada's low and decreasing standard of living relative to the United States. Lower average incomes result in Canadians' weaker purchasing power and, therefore, in lower prices (Graham 2000). This situation, which holds for almost all goods and services sold in Canada and the United States, makes the relatively high Canadian prices for generic drugs even more exceptional.

In any case, the PMPRB regulates only manufacturers' gate prices (also called ex-factory prices), the prices at which manufacturers sell to wholesalers or (in some cases) directly to pharmacies. Therefore, the effect of these price controls on retail prices is unclear. One might expect that *effec-*

tive price controls (in the unlikely event that they could exist) would reduce pharmacies' acquisition costs, and therefore lower retail prices.¹

Research on this is important because many American politicians have decried these price differences across the border, claiming that brand-name pharmaceutical manufacturers are gouging American consumers. Initiatives to lower drug prices are taking place in various states and former President Clinton signed the *Medicine Equity and Drug Safety Act* of 2000. This law authorizes the US Secretary of Health and Human Services to break up the pharmaceutical companies' distribution chains to allow wholesalers or other third parties to "re-import" prescription drugs into the United States from Canada and other countries (also known as "parallel importing"). Although Donna Shalala, who was Health Secretary at the time, declined to use this authority, her successor, Secretary Tommy Thompson, has not ruled out its use. Implementing this policy would motivate brand-name drug companies to stop selling their products in Canada and to shut down Canadian facilities for production and research and development (Graham 2001a).

Other proposals in state legislatures and Washington, DC fall into two types. Some propose increasing subsidies to make prescription drugs affordable. The primary example of this is a drug benefit under Medicare. Others, such as the state of Maine, propose explicit price controls, whereby the state intervenes to lower the price charged by

1 Danzon (1999: 46) argues that there is no guarantee that pharmacists will pass on savings from discounts on their drug acquisitions because it is doctors (who are unaware of drug prices), not patients, who drive the demand for prescribed drugs. However, even if consumers are insensitive to prices, competition between pharmacies would reduce prices if those pharmacies enjoyed lower prices for their supplies of drugs.

a pharmaceutical manufacturer, even in cases where the state does not subsidize prescriptions.

Much research on prices has focused on discovering *the* Canadian price or *the* American price by following a handful of patients across the border to record their savings from filling their prescriptions in Canada. As Professor Patricia M. Danzon has explained, comparing prices across borders is a difficult enterprise, because chemical composition, manufacturers, dosage forms, strength, and package size are not consistent from one country to another (1999: 8).

Nevertheless, drug price comparisons that are produced to affect public policy, such as those put out by some American candidates during the 2000 election, report *the* price at which an American buys prescription drugs versus *the* price available to her Canadian neighbour (see, e.g. Clinton 2000; Gorton 2000). However, they do not make clear how they discovered these prices. A minority staff report from the US House of Representatives examined prices for 10 drugs gathered from four pharmacies in three Canadian provinces, a sample far too small to be significant (1998). Danzon harshly—and justifiably—criticizes this report for its “severely flawed methodology” (1999: 27–32).

Journalists have reported on trips by American seniors to Canada to purchase drugs (Evenson 2000; Fong 2000; Koren 2000; Mehren 2000; O’Neill 2000; Peritz 2000; Sullivan 2001). These reports document significant savings for Americans who come to Canada to buy medicines. They also report only *one* American and *one* Canadian price for the drugs purchased.

Pharmacies, however, do not charge a uniform national price for a drug and observers in the

United States have reported large differences in retail prices. For example:

- An “informal survey” of three brand-name drugs at 201 pharmacies in Florida, Georgia, and Alabama found that customers could save up to 39% (US\$52) on a single prescription by shopping around (Center for Florida Consumers 2000).
- A reporter found a 30% lower price for Atenolol® and a 27% lower price for Xalatan® in some drug stores in Denver, Colorado (Booth 2000).
- Patients in Washington, DC can save US\$105 annually on Lipitor® and US\$120 on Accupril® by shopping around (Consumer Reports 2001).
- In New York City, prices for 20 drugs vary greatly among the 70 pharmacies sampled. For example, the highest price of the anti-inflammatory Daypro® was 45% greater than the lowest price (Green 2000a).
- Prices at Internet pharmacies vary widely: a recent report indicates that cyber-pharmacies offer discounts averaging 25% to 40% (Parker-Pope 2001). On the other hand, an article in the *Annals of Internal Medicine* found Internet prices to be 10% *higher* than prices in traditional pharmacies in Philadelphia (Bloom and Iannacone 1999).²
- Mail order pharmacies offer discounts up to 75% off standard retail prices (Royal and Brown 2000).

There is one study of retail price dispersion in the academic economic literature. Alan T. Sorensen looked at prices of 428 prescriptions at 19 pharmacies in two towns in New York (2000). The

2 According to Jupiter Communications, on-line drug sales in the United States were US\$23 million in 2000 (as cited in National Association of Boards of Pharmacy 2001: 44), barely a scratch on the total of US\$97.4 billion sold through retail pharmacies (IMS Health 2001).

pharmacies in each town were within a five-minute drive from each other. He found that the highest posted price for a given prescription was over 50% higher than the lowest available price, thereby supporting the evidence of price dispersion given by journalists and consumer advocates.³ Furthermore, Sorensen found that:

- The “heterogeneity” of pharmacies accounts for at most one third of the observed price dispersion (“heterogeneity” refers to the fact that pharmacies will differ in their services and other features). The finding supporting this conclusion was that a pharmacy that charged a high price for one drug often charged a low price for another drug.
- “Consumer search costs” explain a lot of the price differences. This means that it is not the best use of a consumer’s time to check prices at every pharmacy in his area. The evidence supporting this was that prices at different pharmacies for drugs that were used frequently were closer together than prices of drugs that were used less. This

indicates that people shopped around more aggressively for the drugs that they used most, which led pharmacies to compete more on price for those drugs than others.

With these observations and analyses as background, this paper brings together analytically the two phenomena of cross-border prescription shopping by Americans in Canada and large retail price differences within one country. Using retail prices for three patented drugs from over 30 pharmacies for each of three American and three Canadian border areas (a total of 223 pharmacies), this study reports the savings that an American can gain by comparison-shopping without crossing the Canadian border and the different savings he will gain by shopping at different Canadian pharmacies.

Furthermore, the paper discusses current government interventions in the surveyed states and provinces. Any further government intervention will have an effect on the market, so knowledge of the status quo is important in order to understand current prices.

³ Sorensen gathered data by recording prices that were written on posters in the pharmacies. New York state law mandates these posters. Green found that posters in pharmacies in New York City were very inaccurate and out of date (2000b, 2001). However, Sorensen ensured that the posters he checked in up-state New York had been updated within the month before his survey (2000: 837).

Method

At least one legitimate (that is, profit-seeking rather than politically motivated) enterprise provides bus service to Canada for Americans seeking savings on prescription drugs.⁴ For a fee of US\$99, RxPassport Inc. provides trips between the Northgate Mall in Seattle, Washington and the Doctor Solve Health Care Solutions Centre in White Rock, British Columbia: a distance of about 130 miles along Interstate 5 through the Peace Arch border crossing. The bus departs at 9:30 a.m. and returns at 4:30 p.m. As well as filling their prescriptions, passengers take advantage of low Canadian prices to buy other goods in shops near the pharmacy in White Rock (O'Neill 2000; RxPassport Inc. personal communication November 8, 2000).

The existence of this business implies that some people are willing to travel larger distances than assumed reasonable by Sorensen. Therefore, I chose three catchment areas in the United States where a major highway goes to Canada, allowing an American an easy trip North. Furthermore, the adjacent Canadian areas are urban, offering Americans opportunities to shop for goods other than prescription drugs. The areas selected were within Washington and British Columbia, North Dakota—Minnesota and Manitoba, and New York and Ontario.

This study examines prices of three patented drugs that many patients use for a long period: Celebrex® (*celecoxib*), Lipitor® (*atorvastatin*), and

Paxil® (*paroxetine*). Previous research indicates that Lipitor® has a smaller Canadian discount (27%), and Paxil® has a larger Canadian discount (42%), than the average volume-weighted Canadian discount of 35% for a sample of the 20 drugs having market exclusivity that are most often prescribed in the United States (Graham and Robson 2000: 13, 20–21). The previous paper did not report on Celebrex®.

Celebrex® is used for patients with osteoarthritis and rheumatoid arthritis. For osteoarthritis, the usual adult dosage of *celecoxib* is 200mg. For rheumatoid arthritis, the usual adult dosage is 100mg to 200mg twice daily. This study uses a daily dose of 200mg.

Lipitor® is used in various doses to lower blood cholesterol and fats to help prevent heart attacks and strokes. This study uses a dose of 40mg daily.

Paxil® is used to treat depression, panic disorder, obsessive-compulsive disorder, and social phobia. For depression, the recommended initial daily dose is 20mg, the dose used in this study. (Uses and dosages described above are from Medscape 2001).

Using a standard road atlas (Rand McNally 1999), and the criterion that a reasonable cross-border shopping trip for pharmaceutical drugs would be accomplished within daylight hours along a well maintained highway, three areas

4 The United Health Alliance, a consulting firm in Bennington, Vermont, runs a program called Medicine Assist, which advises American patients on filling prescriptions through Canadian pharmacies. However, Vermont Governor Howard Dean, a proponent of price controls, has consistently promoted the program since at least June 2000 (Martialay 2000; Blackwell 2001). Therefore, it is unclear whether this program is a straightforward business or political advocacy.

were defined where Americans might be expected to undertake such a trip.

- *Washington to British Columbia* refers to the area along the Interstate 5 and British Columbia's Highway 1 from Seattle, WA to West Vancouver, BC. It encompasses Washington's San Juan Islands, which are connected to the mainland by ferry and bridge, but not British Columbia's Gulf Islands. The distance north to south is about 145 miles. The number of pharmacies in the British Columbia area is estimated to be 306 and the number in the Washington area, 397.⁵
- *North Dakota—Minnesota to Manitoba* refers to the area from Fargo, ND and Moorhead, MN along the Interstate 29 and the parallel US Highway 75 through Grand Forks, ND, crossing the Canadian border at Emerson, MB, and continuing on Manitoba's Highway 75 to Winnipeg, MB. The distance north to south is about 220 miles. The estimated number of pharmacies in this area is 178 in Manitoba and 73 in North Dakota and Minnesota.
- *New York to Ontario* refers to the area from Rochester, NY through Buffalo, NY on Interstate 90 or New York's Highway 104, crossing the Canadian border at Niagara Falls, ON or Fort Erie, ON and along Ontario's Queen Elizabeth Way through St. Catherine's ON to Hamilton, ON. The distance east to west is about 150 miles. The estimated number of pharmacies in this area is 165 in Ontario and, in New York, 492.

A random number generator was used to select 50 pharmacies from each of the six areas. Between March 5 and March 16, 2001, each of the 300 pharmacies was canvassed by telephone for the price of a 30-day supply of each of the three drugs. The interviewer also asked for the dispensing fee and about the availability and price of delivery for a prescription.

Canadian prices were converted to American dollars at a rate of CDN\$1.48 per US\$1.00, the estimated rate at which an American individual would buy US\$300 worth of Canadian dollars at a retail foreign-exchange bureau at the time.⁶

5 Two Internet directories were used: www.yellowpages.ca for Canada and www.yellowpagesinc.com for the United States.

6 On March 21, Graham telephoned Custom House Currency Exchange in Seattle and was quoted a rate of CDN\$1.50 per US\$1.00 with no commission to buy US\$300 worth of Canadian dollars. This was a premium of about 4.62% over the Bank of Canada's noon fix for the exchange rate that day. Assuming this spread was constant, Graham calculated the simple average of the Bank's noon rates for March 5 through March 16, and applied the premium to this average to estimate the rate of CDN\$1.48 per US\$1.00.

Results

The number of pharmacies in each area that gave meaningful responses was: Washington: 37, British Columbia: 33, North Dakota and Minnesota: 38, Manitoba: 36, New York: 38, Ontario: 41, a total of 223. There were 660 observations (table 1). (During the interviews, 669 observations were collected but nine were such extreme

outliers that they were discarded because it was probable that they had been recorded in error.) The means and standard deviations of the samples are shown in table 2. Table 3 shows the lowest and highest price for each area, reported in US dollars. These prices include the dispensing fee but not any delivery charge.

Table 1: Number of observations for each drug and area

	Celebrex® 200mg	Lipitor® 40 mg	Paxil® 20 mg	Total
Washington	37	36	37	110
British Columbia	33	33	33	99
North Dakota & Minnesota	38	36	37	111
Manitoba	35	35	35	105
New York	38	38	38	114
Ontario	40	40	41	121
TOTAL	221	218	221	660

Table 2: Means and standard deviations of the samples (US dollars)

	Celebrex® 200 mg		Lipitor® 40 mg		Paxil® 20 mg	
	Mean	Standard deviation (coefficient of variation)	Mean	Standard deviation (coefficient of variation)	Mean	Standard deviation (coefficient of variation)
Washington	\$86.26	\$5.66 (6.56%)	\$110.01	\$8.97 (8.15%)	\$82.47	\$3.86 (4.67%)
British Columbia	\$33.17	\$2.37 (7.13%)	\$52.83	\$3.50 (6.62%)	\$40.75	\$2.54 (6.23%)
North Dakota & Minnesota	\$78.08	\$5.70 (7.30%)	\$107.75	\$7.03 (6.53%)	\$78.63	\$6.08 (7.74%)
Manitoba	\$32.36	\$1.60 (4.96%)	\$52.43	\$1.52 (2.90%)	\$39.80	\$2.00 (5.02%)
New York	\$88.57	\$7.59 (8.57%)	\$117.69	\$5.44 (4.62%)	\$85.06	\$4.39 (5.16%)
Ontario	\$34.82	\$1.96 (5.64%)	\$55.52	\$2.09 (3.76%)	\$42.62	\$2.03 (4.75%)

Table 3: Low and high prices (US dollars, 30 doses)

	Celebrex 200mg		Lipitor 40 mg		Paxil 20 mg	
	Low	High	Low	High	Low	High
Washington	\$75.00	\$92.59	\$97.99	\$121.58	\$75.00	\$91.71
British Columbia	\$29.82	\$38.38	\$44.68	\$59.76	\$37.19	\$46.64
North Dakota & Minnesota	\$67.95	\$93.05	\$92.95	\$124.95	\$68.95	\$96.50
Manitoba	\$29.65	\$37.18	\$48.67	\$55.60	\$36.11	\$45.97
New York	\$76.68	\$97.99	\$103.89	\$124.99	\$76.97	\$95.59
Ontario	\$30.76	\$37.84	\$51.03	\$59.99	\$38.77	\$46.22

Analysis

Savings

Table 4 shows the savings that could be obtained by a shopper who moves from the sampled pharmacy in his home area with the highest prices to that with the lowest prices. As well, it shows the maximum and minimum savings from cross-border shopping by an American patient who goes to the adjacent Canadian area. For example, a shopper from the pharmacy with the highest priced Celebrex® in the Washington area, US\$92.59, who travels to the British Columbian pharmacy with the lowest priced Celebrex®, US\$29.82, would save \$62.77. However, the Washington customer who already shops at the pharmacy with the cheapest Celebrex® there, US\$75, who travels to the most expensive British Columbian pharmacy, will save only US\$36.62. In all cases, there is a large difference in the savings earned by the American customer, depending on the pharmacies from which, and to which, he travels.

In some cases, a consumer can save about as much in absolute terms by bargain hunting at home as he can by crossing the border, depend-

ing on where he starts. The Midwestern shopper for Celebrex® saves US\$30.77 by going from the cheapest pharmacy in the North Dakota and Minnesota area to the most expensive pharmacy in the Manitoba area; he saves US\$25.10 by going from the most expensive pharmacy in the North Dakota and Minnesota area to the cheapest in the same area. The shopper for Paxil® in the same area saves at least US\$22.98 by crossing the border but saves up to US\$27.55 by bargain-hunting at home. (This does not disguise the fact that consumers at the sampled pharmacies can always increase their savings by crossing the Canadian border.)

Furthermore, the shopper who crosses the border incurs greater costs than the one who shops at home because he probably has to drive farther, wait at the border-crossing, exchange money, and get his prescription co-signed by a Canadian doctor. This means that the actual savings by crossing the border are less than indicated above. For example, the cost of using RxPassport's bus service is US\$99, which eliminates more than the savings from crossing from

Table 4: Savings from domestic and cross-border bargain hunting (US dollars, 30-day supply)

	Celebrex® 200mg			Lipitor® 40 mg			Paxil® 20 mg		
	Domestic	Max	Min	Domestic	Max	Min	Domestic	Max	Min
British Columbia	\$8.56			\$15.08			\$9.45		
Manitoba	\$7.52			\$6.93			\$9.86		
Ontario	\$7.08			\$8.96			\$7.45		
Washington	\$17.59	\$62.77	\$36.62	\$23.59	\$76.90	\$38.23	\$16.71	\$54.52	\$28.36
North Dakota/Minnesota	\$25.10	\$63.40	\$30.77	\$32.00	\$76.28	\$37.35	\$27.55	\$60.39	\$22.98
New York	\$21.31	\$67.23	\$38.84	\$21.10	\$73.96	\$43.90	\$18.62	\$56.82	\$30.75

Washington to British Columbia to get one month's supply of any one of these drugs. Patients making their own arrangements would probably face higher costs.

Statistically estimated prices

Although prices were not gathered from every pharmacy in each area, observations from the randomly selected pharmacies can be used to infer prices throughout each area. Table 5 shows certain estimated price parameters for each area. These estimates are made easier because the samples suggest that the prices for each drug in each area can be described by the normal (or bell-shaped) distribution.⁷

Table 5 supports the hypothesis that American prices on these drugs are, on average, higher than Canadian prices. However, it also demonstrates that the price of prescription drugs differs significantly from one area to another within one country. We can say with great confidence that:

- The average retail prices for Celebrex® and Paxil® are less in the North Dakota—Minnesota area than in the Washington and New York areas;
- The average retail price for Lipitor® is less in the North Dakota—Minnesota area than in the New York area;
- The average retail price of all three drugs in the Ontario area is higher than in the two other Canadian areas, although the difference is probably not financially significant for consumers.

Furthermore, using the rule of thumb for normal distributions, we can estimate the distribution of

prices across pharmacies within one area. Table 6 shows the estimated number of pharmacies in each area that have prices within given ranges.

Prices and the characteristics of pharmacies

Because the survey was done by telephone, the researchers had a limited ability to assess the characteristics of individual pharmacies that might give them the ability to charge higher prices. Free delivery was expected to be a service that would be priced into the prescriptions. Regression analysis indicates that this is the case. In three of the four areas where the regression was significant at the 5% level, free delivery explains about one-fifth of the higher price between pharmacies who offer the service and those who do not. Table 7 summarizes the equations.

Regression equations for the Washington area and the North Dakota—Minnesota area were not statistically significant. To interpret these equations, imagine a patient armed with a prescription for one month's worth of the three drugs in our sample. If she were in the British Columbia area, we would expect the total cost of the prescription to be about US\$7 higher if she filled it at a pharmacy that offered free delivery instead of one that did not. In the New York area, we would expect the difference to be about US\$15. Of course, there are large variances around these estimates.

On the other hand, this service factor probably explains more of the price variance than can be captured in an equation. In the real world, the option of prescription-delivery is not simply free versus not free. There are a variety of delivery services offered: free only during certain times of

⁷ Tested with the Jarque-Bera statistic at 5% significance. Prices cannot literally be normally distributed because the normal distribution contains continuous, not discrete, variables. Literal normalness would also imply that some prices were negative at the far left tail of the distribution.

Table 5: Estimated population means and standard deviations (US dollars, 95% confidence interval)

	Celebrex® 200 mg		Lipitor® 40 mg		Paxil® 20 mg	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Washington	\$84.44–\$88.08	\$4.23–\$8.30	\$107.08–\$112.94	\$6.68–\$13.26	\$81.22–\$83.71	\$2.88–\$5.66
British Columbia	\$32.36–\$33.98	\$1.74–\$3.57	\$51.64–\$54.03	\$2.57–\$5.28	\$39.89–\$41.62	\$1.87–\$3.83
North Dakota & Minnesota	\$76.27–\$79.89	\$4.27–\$8.31	\$105.46–\$110.05	\$5.24–\$10.39	\$76.67–\$80.59	\$4.55–\$8.93
Manitoba	\$31.83–\$32.89	\$1.19–\$2.39	\$51.93–\$52.93	\$1.13–\$2.26	\$39.14–\$40.46	\$1.48–\$2.97
New York	\$86.16–\$90.98	\$5.69–\$11.07	\$115.96–\$119.42	\$4.08–\$7.93	\$83.67–\$86.45	\$3.29–\$6.40
Ontario	\$34.21–\$35.43	\$1.48–\$2.83	\$54.87–\$56.17	\$1.58–\$3.01	\$42.00–\$43.24	\$1.53–\$2.91

Table 6: Estimated number of pharmacies in an area within a given range of prices (rounded to nearest US dollar)

Number of pharmacies	British Columbia (306 pharmacies)						Washington (397 pharmacies)					
	8	43	102	102	43	8	10	56	132	133	56	10
Celebrex®	Under \$28	\$28–\$31	\$31–\$33	\$33–\$36	\$36–\$38	Over \$38	Under \$75	\$75–\$81	\$81–\$86	\$86–\$92	\$92–\$98	Over \$98
Lipitor®	Under \$46	\$46–\$49	\$49–\$53	\$53–\$56	\$56–\$60	Over \$60	Under \$92	\$92–\$101	\$101–\$110	\$110–\$119	\$119–\$128	Over \$128
Paxil®	Under \$36	\$36–\$38	\$38–\$41	\$41–\$43	\$43–\$46	Over \$46	Under \$76	\$76–\$79	\$79–\$82	\$82–\$86	\$86–\$90	Over \$90
Number of pharmacies	Manitoba (178 pharmacies)						North Dakota & Minnesota (73 pharmacies)					
	4	25	60	60	25	4	2	10	24	25	10	2
Celebrex®	Under \$29	\$29–\$31	\$31–\$32	\$32–\$34	\$34–\$36	Over \$36	Under \$67	\$67–\$72	\$72–\$78	\$78–\$84	\$84–\$89	Over \$89
Lipitor®	Under \$49	\$49–\$51	\$51–\$52	\$52–\$54	\$54–\$55	Over \$55	Under \$94	\$94–\$101	\$101–\$108	\$108–\$115	\$115–\$122	Over \$122
Paxil®	Under \$36	\$36–\$38	\$38–\$40	\$40–\$42	\$42–\$44	Over \$44	Under \$66	\$66–\$73	\$73–\$79	\$79–\$85	\$85–\$91	Over \$91
Number of pharmacies	Ontario (165 pharmacies)						New York (492 pharmacies)					
	4	23	55	55	24	4	12	70	164	164	70	12
Celebrex®	Under \$31	\$31–\$33	\$33–\$35	\$35–\$37	\$37–\$39	Over \$39	Under \$73	\$73–\$81	\$81–\$89	\$89–\$96	\$96–\$104	Over \$104
Lipitor®	Under \$51	\$51–\$53	\$53–\$56	\$56–\$58	\$58–\$60	Over \$60	Under \$107	\$107–\$112	\$112–\$118	\$118–\$123	\$123–\$129	Over \$129
Paxil®	Under \$39	\$39–\$41	\$41–\$43	\$43–\$45	\$45–\$47	Over \$47	Under \$76	\$76–\$81	\$81–\$85	\$85–\$89	\$89–\$94	Over \$94

day, free only to regular customers, free on an ad-hoc basis depending on how busy the pharmacy is, and so on. Unfortunately, this sophistication cannot be captured in the equation.

Furthermore, ordinary least squares regression equations were estimated of the form: $A = k + cB$, where A was the price of one of the three drugs in an area and B was the price of one of the other two. Given three drugs and six areas, this resulted in 18 equations. Of the 18, only one was not significant at the 5% level. For the other 17, the coefficients ranged from US\$0.51 to US\$1.51 and the R^2 's from 0.13 to 0.97. For example, if a pharmacy in the Washington area charges US\$1 more for a 30-day supply of Paxil® than another does, we would expect that pharmacy also to charge US\$0.51 more for a 30-day supply of Celebrex®.

This may support the claim that service characteristics cause different prices in different pharmacies. We would expect to see consistently higher prices for drugs in pharmacies with superior service. However, it could also reflect higher prices in pharmacies in areas with higher incomes.

Limits of the analysis

Besides the inability to capture sophisticated differences in types and quality of services of individual pharmacies, the study has other limits:

- This study only looks at three drugs from among thousands of prescription products of different dosages sold in the United States and Canada.
- Some pharmacies did not give meaningful answers and were not included in the results. The usual answer given was that the pharmacy's staff was too busy to give prices on the telephone. However, some pharmacies indicated that it was against store policy. This may indicate that the pharmacies that opted out had higher prices than those that participated, resulting in selection bias. This question was not resolved.
- For some jurisdictions, it was against policy to report the dispensing fee separate from the total price. This prevented an analysis of the fee as a factor in prices.

Table 7: Ordinary least squares regressions of total prescription cost versus free delivery as dummy variable

	Constant (k)	Coefficient (c)	R ²	R ² adj.	Significance level
British Columbia	124.2133	6.99333	0.17	0.15	5%
Manitoba	119.886	5.340429	0.21	0.19	5%
Ontario	129.8044	4.286222	0.09	0.07	10%
New York	284.9841	15.04091	0.21	0.19	5%

Form: $T = k + cFD$ where T = total cost of a combined 30 day supply of Celebrex®, Lipitor®, and Paxil®; and $FD = 1$ if pharmacy offers free delivery, 0 if not.

Prices to governments in the areas

Overview

An understanding of government intervention helps to clarify the conditions under which drugs are priced. Each state and province intervenes differently in the market. All seven jurisdictions have programs that subsidize prescriptions for some of their residents. In themselves, pure subsidies for consumption do not reduce prices or costs: they increase them because the demand for free goods is almost unlimited.

In order to reduce prices and costs, subsidies must be accompanied by rationing or price controls. As well, significant government purchasing of drugs can increase prices in the rest of the market. When the government agency demands the best price (“most favoured customer”), it has been

observed that this causes drug manufacturers to raise prices to non-government buyers so that the best price is a high price (Scott Morton 1997).

In all the states and provinces, prescriptions are paid in three ways. There is a mix of government subsidy, private third-party payment (insurance), and out-of-pocket expenditure (cash). Table 8 shows the breakdown of pharmaceutical expenditures into these three categories. Because the customers who pay out of their own pockets are those upon whom politicians focus, the seven regions are ranked according to the proportion of expenditures that are paid out of pocket.

Although the public share of payment is greater in the Canadian provinces than the American states, ranging from 39% to 56% of all prescription costs,

Table 8: Total expenditures on prescription drugs for sampled provinces (2000) and states (1999) and expenditures by source of payment

	Out of pocket	Private third party	Public payer
North Dakota (US\$235 million)	39%	47%	14%
Ontario (C\$4.9 billion)	25%	36%	39%
Washington (US\$2.0 billion)	23%	68%	9%
Manitoba (C\$377 million)	22%	32%	45%
Minnesota (US\$1.9 billion)	18%	73%	9%
British Columbia (C\$1.2 billion)	18%	26%	56%
New York (US\$8.8 billion)	13%	62%	25%

Sources: Novartis 2000; Canadian Institute for Health Information 2001; author’s calculations and estimates.

Note: For the provinces, the public-payer column is exact. The private third-party and cash shares were not directly available. They are estimated by taking the ratios of private third-party and out-of-pocket payments to aggregate national private prescription drug expenditures in 1998 (Canadian Institute for Health Information 2001: 11) and multiplying those ratios by the total private share of expenditure on prescription drugs in each province in 2000 (Canadian Institute for Health Information 2001: 74, 78, 90). For the states, the out-of-pocket share is exact but the third-party data at source are divided into “Medicaid” and “Third-Party Share” (Novartis 2000: 14-15). Since states have programs other than Medicaid, which can be supplied through private third parties, the amount reported as “Medicaid” likely under-reports the public share of third-party expenditures.

it is not clear that this gives patients advantageous access to prescription drugs. There is no relationship between the country and the amount of expenditures paid out of pocket. The American states rank first, third, fifth, and seventh on the list, whereas the Canadian provinces rank second, fourth, and sixth. If the high level of public expenditure gives the provinces leverage when negotiating with the drug companies—monopsony power, as argued by Kolassa (2001: 11)—it does not appear that the potential short-term benefits of this leverage are extended to all the province's pharmaceutical consumers.

The American states

North Dakota is exceptional in the proportion of pharmaceutical expenditures paid out of pocket. The area surveyed from this state (and neighbouring Minnesota) had significantly lower drug prices than the other American areas. This is consistent with the theory that when people have to pay out of pocket rather than rely on an insurer or the state for their drugs, they are more sensitive to prices. As well, North Dakota is relatively poor. Average annual pay in North Dakota in 1999 was about US\$24,000, below the American national average, whereas the figures for Washington and New York were above the national average, at US\$36,000 and US\$42,000, respectively (US Bureau of Labor Statistics 2000).

New York has the highest prices of the American areas and the largest public share of prescription costs, at one quarter of all costs. This is consistent with the theory (and Scott Morton's evidence) that a large public buyer who demands to be treated as the most favoured customer will drive prices up for smaller buyers.

The United States' *Omnibus Budget Reconciliation Act* of 1990 demands that pharmaceutical manufacturers offer Medicaid a minimum 15.1% discount off the price they charge to private distributors. It is estimated that discounts are actually as high as 30%. This corresponds to discounts from retail prices of 29% to 42% (US Department of Health and Human Services 2000: 98). Actual prices are generally not disclosed, however, and, because of this uncertainty, it is not possible to estimate the exact prices paid by the state programs nor their relationship to cash prices.

One price that is disclosed is the Federal Supply Schedule (FSS) price, which is supposed to be no greater than the price charged to most-favoured non-federal customers (US Department of Veterans Affairs 2001). This is the price obtained by several American government agencies and associated purchasers. The FSS does not list a price for 30 capsules of Celebrex®, but lists US\$200.25 for 200 capsules, from which I estimate a price of US\$60.08 for 30. Similarly, the FSS lists 90 tablets of Lipitor® at US\$190.49, from which I estimate a price of US\$63.50 for 30.⁸ The price for 30 tablets of Paxil® is US\$38.40. Although these prices are much lower than those reported in table 2 for the American areas, dispensing fees and mark-ups from the manufacturer through the pharmacy would explain some of the difference.

The Canadian provinces

Provincial programs have closed formularies, which list drugs that are subsidized. As well, the programs charge some deductible or co-payment. This condition is unique in the Canadian health-care system: most services by physicians

8 This simple function is far from satisfactory. The price per unit is not a linear function of the number of units in a package. That is, for a drug that is distributed in packages of 100 tablets and 200 tablets, the larger package will not necessarily be twice as expensive as the smaller.

and hospitals in Canada are “free” when used and fully financed by taxes.⁹

There is one major difference in the reimbursement policies of the three provincial plans. The *Ontario Drug Benefit Act* imposes price controls by prohibiting pharmacies from charging clients of the Ontario Drug Benefit Program more than the reimbursement rate (unless the acquisition cost to the pharmacy is greater than that listed in the Ontario formulary). However, Manitoba and British Columbia laws do not limit the total cost of a prescription to a client of the provincial Pharmacare plan. Pharmacies are free to charge whatever price the market will bear, without losing the subsidy. However, this may not realistically be an option. Surely, if pharmacies marked up subsidized prices, the provincial governments would immediately amend their legislation to impose controls similar to those in Ontario.

Lipitor® and Paxil® are listed for general reimbursement in all three provinces. However, Celebrex® is reimbursed on a restricted basis. The Ontario formulary (2001) and Manitoba’s *Prescription Drugs Cost Assistance Act*¹⁰ describe the restrictions. Generally, patients must have had unfavourable reactions to older, non-steroidal, anti-inflammatory drugs (NSAIDs) such as acetaminophen before the plans will reimburse the purchase of Celebrex®. For British Columbia’s Pharmacare, the

drug is reimbursed under “extraordinary circumstances,” but these circumstances are not spelled out (British Columbia Ministry of Health and Ministry Responsible for Seniors 2000). Furthermore, the class of drugs to which NSAIDs and Celebrex® belong is subject to BC Pharmacare’s Reference Drug Program, which usually reimburses only the cheapest drugs in certain therapeutic classes. This strict cost-containment measure is unique in the Canadian provinces. Counter-intuitively, BC Pharmacare’s costs have exploded relative to the costs of public drug plans in the rest of Canada since reference-based pricing was introduced (Graham 2001b).

Both British Columbia and Ontario list the same prices per unit of these three drugs (Ontario Ministry of Health 2001, British Columbia Ministry of Health and Ministry Responsible for Seniors 2001). The estimated maximum reimbursement in the two provinces for 30 tablets or capsules of the three drugs is shown in table 9. Manitoba Pharmacare does not list prices but takes the prevailing price in the larger provinces (Ross Forsythe, personal communication April 9, 2001).

Referring to table 3 and table 9, we see that customers who pay out of their own pockets at the Canadian pharmacies might pay more or less than the estimated reimbursement from the provincial drug program.

9 Zelder has pointed out that only 1% of increased government health spending in Canada is on prescription drugs, although they are the only area (other than capital expenditures) where increased government spending reduces surgical waiting lists (2000). Zelder’s analysis indicates that this misallocation of public health dollars may increase overall health costs. The failure of governments to spend adequately on prescription drugs in Canada’s socialized health care system is an issue ripe for examination under public choice theory, by examining the strategies of various interest groups at the public trough. However, this study is not that examination.

10 *Prescription Drugs Costs Assistance Act* (C.C.S.M. c. P115), *Specified Drugs Regulation* 6/95, registered January 23, 1995, Schedule effective July 3, 2001, Part 2.

Table 9: Estimated maximum reimbursement for 30 day supply of selected drugs by BC Pharmacare and Ontario Drug Benefit Program

	Celebrex® 200 mg (C\$1.25 per unit)	Lipitor® 40 mg (C\$2.15 per unit)	Paxil® 20 mg (C\$1.59 per unit)
British Columbia	C\$47.73 (US\$32.26)	C\$76.62 (US\$51.79)	C\$58.64 (US\$39.64)
Ontario	C\$47.72 (US\$32.26)	C\$77.42 (US\$52.33)	C\$58.94 (US\$39.84)

Source: Ontario Ministry of Health (2001); British Columbia Ministry of Health and Ministry Responsible for Seniors (2001); author's calculations.

Note: BC Pharmacare reimburses the unit price plus a 7% mark-up, plus a maximum dispensing fee of C\$7.60, whereas Ontario reimburses with a 10% mark-up and a maximum dispensing fee of C\$6.47.

Policy implications

Lawmakers who seek price controls to make American prices equal to Canadian prices face an impossible task. There is no such thing as one single price difference and shoppers can save significantly by bargain hunting without crossing the border.

There are no proposals to re-import prescription drugs from North Dakota to New York, or indeed from Rochester to Buffalo. Lawmakers respect the freedom of buyers and sellers to determine market prices on their own terms, accepting that prices will be different in different areas. In this equilibrium, all Americans have access to prescription drugs, in the sense that they are available throughout the country. The fact that price differences also exist internationally is not surprising and not a call to action for the impossible task of international price equalization.

These intraregional and intranational price differences exist in the absence of regulation. Graham (2000) has previously argued that different incomes from area to area are a cause of pharmaceutical price differences, and this may explain why the North Dakota and Minnesota area and the Manitoba area have lower prices than the other areas in their respective countries.

Given these apparently demand-driven price differences, full re-importing from Canada to the United States would not result in Canadian prices in the United States, even if brand-name manufacturers did not prevent the re-importation by cutting off the Canadian market. Physical pharmacies, which serve customers who value personal contact with a pharmacist (as opposed to customers who order by mail or over the Inter-

net), will continue to enjoy segmented markets. Prices would still vary across the United States.

There are also supply-side causes for price differences. Pharmacies with superior service appear to charge higher prices. It is difficult to anticipate how a regime of price controls enforced by the federal or state governments could respect the value added by individual pharmacies in response to the unique needs of their local customers.

Furthermore, the number of cash-paying American patients who are so price-conscious that they are willing to drive to Canada appears to be small. If a large number of patients in border areas were taking advantage of cross-border shopping, American pharmacies in border areas would have to respond by lowering their prices to approximate Canadian prices. If their own costs prevented them from doing so, they would stop supplying customers who pay out of pocket. This has not occurred in our sample-areas, indicating that so-called high prices are not a widespread barrier to patients.

Finally, high government subsidies do not ensure favourable access to prescription drugs. Although all three Canadian provinces subsidize prescription drugs heavily, patients in the American states may have greater access through the non-taxable benefit of health insurance. The effect of current subsidies on prices is unclear. Cash prices in Canada vary around the provincial reimbursement rates, indicating that the subsidies do not prevent pharmacies from charging different prices to non-subsidized patients.

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