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### Economic Insights

# New Evidence on Exchange-rate-adjusted Prices in Canada

*by Guy Gellatly and Beiling Yan*

Economic Analysis Division



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p	preliminary
r	revised
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*	significantly different from reference category ( $p < 0.05$ )

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# New Evidence on Exchange-rate-adjusted Prices in Canada

By Guy Gellatly and Beiling Yan

This *Economic Insights* article presents new data on the relative prices of Canadian and U.S. products, focusing on various classes of goods and services. It also evaluates the extent to which changes in these relative prices correlate with movements in the nominal exchange rate. The comparative price estimates are based on data from Statistics Canada's Purchasing Power Parity program.

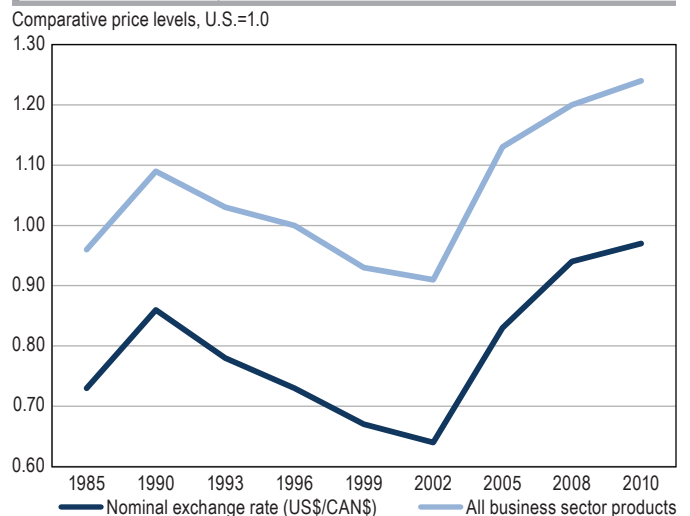
The recent appreciation of the Canadian dollar has renewed interest in the relative prices paid for consumer goods in Canada and the United States. One view north of the border is that Canadian consumers pay more than U.S. consumers for standardized products that are traded freely between the two countries, such as books, electronic equipment and automobiles, even after the Canada/U.S. exchange rate is taken into account. Given the degree of market integration between the two economies, Canadian consumers may expect that the exchange-rate-adjusted prices they pay for many products should equate with U.S. prices, thereby obeying the 'law of one price' in both countries.<sup>1</sup>

## Data on Canadian and U.S. prices

The estimates presented here complement recent work on Canada/U.S. price levels that examined a less detailed set of commodities for which information on cross-border prices are readily available.<sup>2</sup> The tabulations are derived from a Statistics Canada database that comes from a joint Canada/U.S. statistical program used to produce price comparisons between the two countries at an aggregate level.<sup>3</sup> The results in this report use detailed price information on more than 150 commodity groups,<sup>4</sup> representing a cross-section of goods and services sold by industries that are mainly in the private sector.<sup>5</sup>

The groups are divided into two basic classes—goods and services. Goods might be expected to be influenced more strongly by the economic forces that serve to adjust prices on both sides of the border. Within the goods class, commodities are divided into (1) alcohol and tobacco consumer products; (2) foods affected by marketing boards or supply management; (3) other consumer products; and (4) investment goods. Thus, the commodities are differentiated, first, by their principal user (consumer goods purchased by households versus investment

**Chart 1**  
Median comparative price levels (CPLs), all business sector products, selected years, 1985 to 2010



Source: Authors' calculations, Statistics Canada.

1. Changes in Canadian prices respond both to U.S. price changes and to domestic cost pressures (Baldwin and Yan, 2008).

2. Porter, D. 2009. *Loonie's Leap: Mind the (Price) Gap*. Special Report, BMO Capital Markets Economics.

3. These data are from Statistics Canada's Purchasing Power Parity program.

4. For the years 1985, 1990 and 1993, commodity groups total 187, 145 of which are goods. For 1996, 1999, 2002, 2005 and 2008, commodity groups total 154, 112 of which are goods. Expenditures by governments are omitted from this comparison.

5. Underlying each of the 150 categories are individual commodity comparisons. More than 900 individual comparisons are made in 2008.



goods purchased by firms), and second, by the degree to which final prices are determined by arbitrage (less arbitrage is anticipated for consumer products such as alcohol, cigarettes, poultry, milk, cheese, butter and eggs, for example).<sup>6</sup>

### Measuring the Canadian price relative to the U.S. price

The comparative price level (CPL) is used to trace the course of price differences between the two countries since the mid-1980s. The CPL is derived for each commodity group by taking the ratio of the final selling price in Canada to the final selling price in the United States, adjusted for differences in the Canada/U.S. exchange rate.<sup>7</sup> These are the final prices paid by consumers, and include all taxes and margins.<sup>8</sup>

The CPL indexes the U.S. selling price to 1.0, and shows the percentage difference in the Canadian price against this baseline. For example, if the CPL for a particular product is 1.2, the Canadian price is 20% above the U.S. price level after adjusting for the exchange rate; conversely, a CPL of 0.8 indicates that the exchange-rate-adjusted Canadian price is 20% below the U.S. price level.<sup>9</sup>

Median CPL prices are produced for each commodity group.<sup>10</sup> These are referred to synonymously as “median exchange-rate-adjusted prices” or “median relative prices” in Canada.

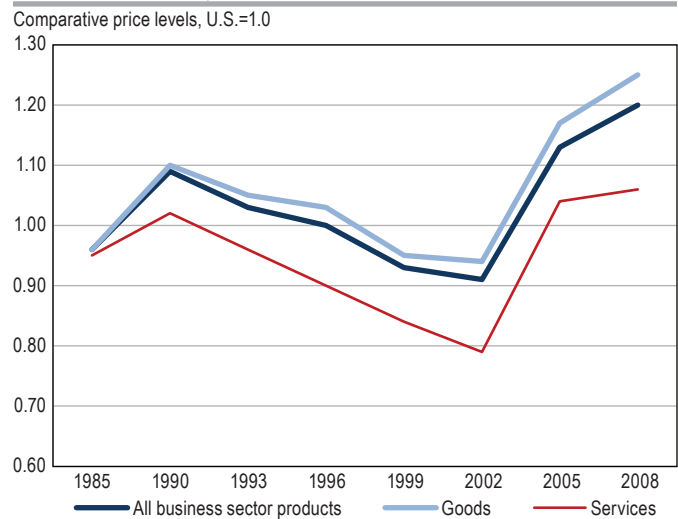
### Weaker Canadian dollar—lower relative Canadian goods prices

The median relative price for all commodity groups for the 1985-to-2010 period is plotted in Chart 1 along with changes in the US\$/CAN\$ nominal exchange rate. The depreciation of the Canadian dollar from 1990 to 2002 was accompanied by progressively lower relative prices in Canada.

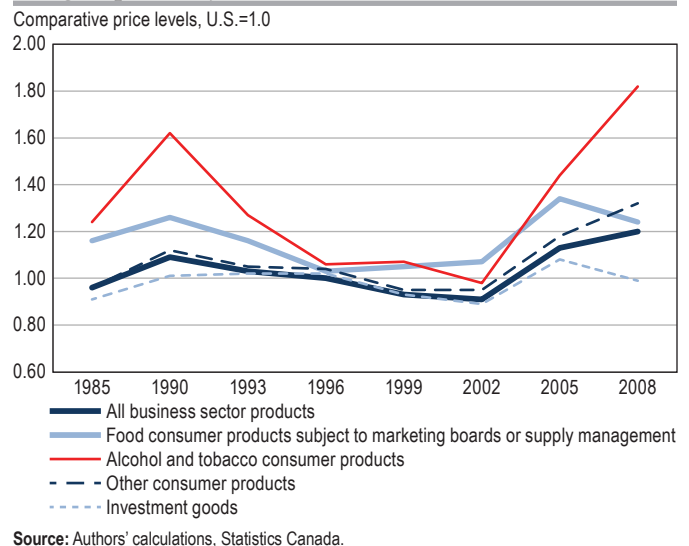
This suggests that the loss of Canadian purchasing power during these years because of the depreciation of the Canadian dollar was not fully passed on to Canadian consumers in the form of higher relative prices. The median exchange-rate-adjusted price for all commodities fell from 109% of the U.S. price level in 1990 to 91% in 2002. Thereafter, as the exchange rate appreciated, the median exchange-rate-adjusted price rose, reaching 124% of the U.S. price level in 2010.

The median exchange-rate-adjusted Canadian prices for both goods and services are plotted in Chart 2.<sup>11</sup> On balance, the course followed by the median CPL for each broad product class closely mirrors that of the aggregate. Median CPLs declined

**Chart 2**  
Median comparative price levels (CPLs), goods and services, selected years, 1985 to 2008



**Chart 3**  
Median comparative price levels (CPLs) for goods, by sub-group, select years, 1985 to 2008



6. For a list of products in each category, see the Appendix.

7. The CPL is conceptually equivalent to what is generally referred to as the “real exchange rate.”

8. For background, see Baldwin and Yan (2004).

9. The advantage of this measure is that it corresponds directly to the back-of-the-envelope calculation that many consumers make when presented with information on both Canadian and U.S. prices.

10. Weighted averages produce results that are qualitatively similar to the medians used here.

11. These two series are plotted only for selected years when benchmark estimates are created (1985, 1990, 1993, 1996, 1999, 2002, 2005 and 2008). By contrast, the 2010 estimates were obtained by extrapolating the PPP estimate for 2008 forward using the relative movement in the implicit prices of consumer expenditures taken from the National Accounts estimates of the two countries.

**Table 1**  
**Median comparative price level (CPL) estimates, by product group, selected years, 1985 to 2010**

	1985	1990	1993	1996	1999	2002	2005	2008	2010
<b>Nominal exchange rate (US\$/CAN\$)</b>	<b>0.73</b>	<b>0.86</b>	<b>0.78</b>	<b>0.73</b>	<b>0.67</b>	<b>0.64</b>	<b>0.83</b>	<b>0.94</b>	<b>0.97</b>
<b>Median CPL estimates for all products</b>	<b>0.96</b>	<b>1.09</b>	<b>1.03</b>	<b>1.00</b>	<b>0.93</b>	<b>0.91</b>	<b>1.13</b>	<b>1.20</b>	<b>1.24</b>
Median CPL estimates for goods	0.96	1.10	1.05	1.03	0.95	0.94	1.17	1.25	...
Median CPL estimates for all consumer products	0.97	1.14	1.07	1.04	0.96	0.96	1.21	1.33	...
Median CPL estimates for food consumer products subject to marketing boards or supply management	1.16	1.26	1.16	1.03	1.05	1.07	1.34	1.24	...
Median CPL estimates for alcohol and tobacco consumer products	1.24	1.62	1.27	1.06	1.07	0.98	1.44	1.82	...
Median CPL estimates for other consumer products	0.96	1.12	1.05	1.04	0.95	0.95	1.18	1.32	...
Median CPL estimates for investment products	0.91	1.01	1.02	1.02	0.93	0.89	1.08	0.99	...
Median CPL estimates for services	0.95	1.02	0.96	0.9	0.84	0.79	1.04	1.06	...

Source: Authors' calculations, Statistics Canada.

for both goods and services during the 1990s. The median exchange-rate-adjusted goods price in Canada was 10% above the U.S. price level in 1990, when the exchange rate stood at 86 cents. In 1999 and 2002, when the exchange rates were 67 cents and 64 cents, respectively, the median exchange-rate-adjusted goods price in Canada fell below the U.S. price level. The median exchange-rate-adjusted price of services followed a similar pattern during these years, as median relative prices in Canada fell to about 80% of the U.S. price level by 2002.

In Chart 3 and Table 1, the median relative price estimates for goods are divided into the subgroups identified earlier: alcohol and tobacco consumer products; consumer food products affected by supply management or marketing boards; other consumer products; and investment goods. During the 1990s, the decline in the median relative price estimates for investment goods and 'other' consumer products closely tracks the overall estimate for goods. The median relative prices of alcohol and tobacco products and products affected by marketing boards or supply management also declined with the depreciation of the Canadian dollar. In the early 1990s, price levels for these products were higher than for other consumer products. For example, in 1990, the median relative price of alcohol and tobacco products in Canada was 62% higher than the United States price level; by 2002, with a much weaker Canadian dollar, median exchange-rate-adjusted prices were equivalent on both sides of the border.

### Stronger dollar—higher Canadian goods prices

With the emergence of a stronger dollar in recent years, the median relative price of goods in Canada rose from 94% of the U.S. price level in 2002 (when the dollar was at 64 U.S. cents) to 125% in 2008 (when the dollar was at 94 U.S. cents). The median relative price of services also rose—from 79% of the U.S. price level in 2002 to 106% of the U.S. price level in 2008. During this period, economic forces were pushing up the general Canadian price level relative to the U.S. price level.

After 2000, more price variation is apparent in the different subgroups of goods. The relative price level of consumer products other than alcohol and tobacco products and food affected by marketing boards was 18% higher than the U.S. price level in 2005, and 32% higher in 2008. The median relative Canadian price of investment goods rose from 2002 to 2005, but by 2008, had declined to a level that roughly equated prices in both countries. By contrast, large relative price increases for alcohol and tobacco products in 2005 and 2008 brought the median exchange-rate-adjusted price of these products up from rough equality in 2002 to 82% above the U.S. price level in 2008. For food products affected by marketing boards or supply management (goods such as poultry, eggs and milk), the median relative Canadian price was 34% above the U.S. price level in 2005, but declined to 24% higher in 2008.

### Conclusion

Several conclusions can be drawn from these price data. First, prices in the two countries generally do not equate, nor do relative prices remain constant when there are movements in the exchange rate. Substantial variability in relative Canadian prices, closely associated with changes in the market exchange rate, is apparent in recent decades. When the Canadian dollar depreciated in the 1990s and early 2000s, the relative prices paid by Canadian consumers did not rise in proportion to the higher costs of imported products. By the late 1990s, the exchange-rate-adjusted prices paid for goods in Canada were near or below the median U.S. price levels. As the dollar then strengthened after 2002, relative price levels in Canada reversed course. Hence, in relation to prices in the United States, Canadians tend to pay less when the dollar devalues, and more when the dollar appreciates.

Second, the relative price of other consumer products (those not classified as alcohol and tobacco products or foods affected by marketing boards or supply management) has been higher in Canada in recent years. The median relative price for these other consumer products was 18% above the U.S. price level in 2005, and 32% higher in 2008. Large increases in relative prices are most apparent for alcohol and tobacco products.



## References

For additional information related to this *Economic Insights* article, see:

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Porter, D. 2009. *Loonie's Leap: Mind the (Price) Gap*. Special Report, BMO Capital Markets Economics.

## Appendix: Product classification

### Goods – Consumer products – Alcohol and Tobacco

Spirits; wine; beer; and tobacco.

### Goods – Consumer products – Food affected by marketing boards or supply management

Poultry; fresh milk; preserved milk and other milk products; cheese; eggs and egg-based products; and butter.

### Goods – Consumer products – Others

Rice; other cereals, flour and other cereal products; bread; other bakery products; pasta products; beef and veal; pork; lamb, mutton and goat; other meats and edible offal; delicatessen and other meat preparations; fresh, chilled or frozen fish and seafood; preserved or processed fish and seafood; margarine; other edible oils and fats; fresh or chilled fruit; frozen, preserved or processed fruit and fruit-based products; fresh or chilled vegetables other than potatoes; fresh or chilled potatoes; frozen, preserved or processed vegetables and vegetable-based products; sugar; jams, marmalades and honey; confectionery, chocolate and other cocoa preparations; edible ice, ice cream and sorbet; food products not elsewhere classified; coffee, tea and cocoa; mineral waters; soft drinks and concentrates; fruit and vegetable juices; clothing materials; men's clothing; women's clothing; children's and infant's clothing; other articles of clothing and clothing accessories; men's footwear; women's footwear; children's and infant's footwear; materials for the maintenance and repair of the dwelling; water supply; electricity; gas; liquid fuels; solid fuels; furniture and furnishings; carpets and other floor coverings; household textiles; major household appliances whether electric or not; small electric household appliances; glassware, tableware and household utensils; major tools and equipment; small tools and miscellaneous accessories; non-durable household goods; pharmaceutical products; other medical products; therapeutic appliances and equipment; motor cars; motor cycles; bicycles; spare parts and accessories for personal transport equipment; fuels and lubricants for personal transport equipment; telephone and telefax equipment; equipment for the reception, recording and reproduction of sound and pictures; photographic and cinematographic equipment and optical instruments; information processing equipment; pre-recorded recording media; unrecorded recording media; major durables for outdoor recreation; musical instruments and major durables for indoor recreation; games, toys and hobbies; equipment for sport, camping and open-air recreation; gardens, plants and flowers; pets and related products; books; newspapers and periodicals; miscellaneous printed matter, stationery and drawing materials; electric appliances for personal care; other appliances, articles and products for personal care; jewellery, clocks and watches; other personal effects.

### Goods – Investment products

Fabricated metal products, except machinery and equipment; engines and turbines, pumps and compressors; other general purpose machinery; agricultural and forestry machinery; machine tools; machinery for metallurgy, mining, quarrying and construction; machinery for food, beverages and tobacco processing; machinery for textile, apparel and leather production; other special purpose machinery; office machinery; computers and other information processing equipment; electrical machinery and apparatus; radio, television and communications equipment and apparatus; medical, precision and optical instruments, watches and clocks; other manufactured goods not elsewhere classified; software; motor vehicles, trailers and semi-trailers; other road transport; ships, boats, steamers, tugs, floating platforms, rigs; locomotives and rolling stock; aircraft, helicopters, hovercraft and other aeronautical equipment; residential buildings; non-residential buildings; civil engineering works.

### Services

Cleaning, repair and hire of clothing; repair and hire of footwear; actual rentals for housing; imputed rentals for housing; services for the maintenance and repair of the dwelling; miscellaneous services relating to the dwelling; repair of furniture, furnishings and floor coverings; repair of household appliances; domestic services; household services; medical services; dental services; paramedical services; hospital services; maintenance and repair of personal transport equipment; other services in respect of personal transport equipment; passenger transport by railway; passenger transport by road; passenger transport by air; passenger transport by sea and inland waterway; other purchased transport services; postal services; telephone and telefax services; repair of audio-visual, photographic and information processing equipment; maintenance and repair of other major durables for recreation and culture; veterinary and other services for pets; recreational and sporting services; photographic services; other cultural services; games of chance; education definable by level; education not definable by level; restaurant services whatever the type of establishment; pubs, bars, cafes, tea room and the like; canteens; accommodation services; hairdressing salons and personal grooming establishments; social protection; insurance; financial intermediation services indirectly measured; other financial services not elsewhere classified; other services.