

**TO: JUSTIN GAST, DAVID ALLAWAY – OREGON DEQ**

**FROM: BRYCE HESTERMAN, RESA DIMINO, KATY RICCHI, RRS  
VICTOR BELL, GABRIELA DOBROT, EPI-LORAX**

**DATE: 6.2.2020**

**RE: IMPACT OF EPR FOR PPP ON PRICE OF CONSUMER PACKAGED GOODS**

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RRS was asked to research several outstanding questions generated by the Recycling Steering Committee (RSC) during the framework and scenario review and evaluation process. This is the third in a series of memos responding to the RSC's questions. In this memo, RRS presents the results of original research to compare prices for consumer goods in jurisdictions with and without extended producer responsibility for packaging and printed paper (EPR for PPP) policy in place to determine if the presence of the policy correlates to higher prices paid by consumers. To address this question, the RRS team performed a virtual shopping study that compared the price of a range of products in Canadian provinces with and without EPR for PPP policies. The research identified that no significant correlation exists between product price and the presence of EPR for PPP policies.

### Methodology

RRS researched the extent to which EPR for PPP impacts product price by comparing prices of common consumer products purchased in EPR and non-EPR jurisdictions through an online virtual shopping exercise. The team identified 17 common consumer packaged goods, six communities (3 EPR and 3 Non-EPR) and multiple Canadian retailers with online grocery shopping platforms in the communities selected. The "virtual shopper" logged into the retailers' online shopping platform using a simulated address from each target community and "shopped" for the items on the list. The price of each item was recorded before taxes and the data was analyzed to determine whether there was correlation between EPR policy and price.

#### Selection of Consumer Packaged Goods

The items on the shopping list were selected to represent a range of material substrates, brands and EPR fee rates. Beverages, household cleaners, and other products that might be included in other EPR or deposit programs were avoided, as they would not be subject to the relevant EPR fees for PPP. Table 1 presents the items included in the study.

Table 1. Virtual Shopping List

Product	Brand	Substrate
Vlasic Pickles Zesty Dill 1L	ConAgra	Glass
Classico Napoli Tomato & Basil Sauce, 650 ml	Kraft Heinz	Glass
Hellman's Real Mayonnaise 445mL	Unilever	PET Jar
Colgate Total Mouthwash 1L	Colgate Palmolive	PET Bottle
Folgers Classic Roast 920g	JM Smuckers	HDPE Tub
Aveeno Body Wash 354 ml	Johnson & Johnson	HDPE Bottle
M&M's (stand up pouch) 330 g	M&M Mars	Multi-laminate
Lay's Classic Potato Chip 235g	PepsiCo	Multi-laminate
Campbell's Chicken Broth 900 ml	Campbells	Carton
Honey Bunches of Oats, Almonds 411g	Post	Boxboard / Bag
Cinnamon Toast Crunch 591g	General Mills	Boxboard / Bag
Philadelphia Cream Cheese (foil + box) 250g	Mondelez / Kraft Heinz	Multi-Material
Pringles Sour Cream and Onion 156g	Kellogg	Multi-Material
Haagen-Dazs vanilla 500mL	Nestle	Polycoat Paper Tub
Amy's Minestrone soup 398mL	Amy's	Steel Can
Fancy Feast (individual can) Beef 85g	Nestle	Aluminum Can
Earth Balance Butter 425g	GFA Brands	Polypropylene Tub

Selection of Comparison Communities and Retailers

RRS sought to compare prices of the selected items between EPR and non-EPR jurisdictions by identifying three community groups. Each group consists of one community within a province with EPR for PPP and one in a province that does not have EPR for PPP. The communities were grouped based on similar population size, geographic proximity, and grocery index scores<sup>1</sup>, to minimize the influence of other factors that may affect price, such as demographics. Table 2 presents the communities and retailers included in the study.

RRS set out to study prices at three retailers that serve each group of communities, as including multiple retailers ensures that data is not skewed based on one retailer's pricing strategy. Originally, the team sought to identify three national retailers to allow price comparisons across all communities. However, RRS was only able to identify one retailer (Walmart) with an online shopping platform that served all selected communities. RRS identified only retailers that served both communities within the comparison groups. For group three (Quebec City, Quebec and Halifax, Nova Scotia) the team was only able to identify two online retailers serving both communities.

<sup>1</sup> [https://www.numbeo.com/cost-of-living/region\\_rankings.jsp?title=2020&region=021&displayColumn=3](https://www.numbeo.com/cost-of-living/region_rankings.jsp?title=2020&region=021&displayColumn=3)

Table 2. Communities and Retailers Selected for Comparison

Community Comparisons			
	No EPR for PPP	EPR for PPP	Retailers
<b>Group 1</b>	Calgary	Vancouver	<ul style="list-style-type: none"> <li>Walmart</li> <li>Safeway<sup>2</sup></li> <li>Loblaw</li> </ul>
<b>Group 2</b>	Edmonton	Winnipeg	<ul style="list-style-type: none"> <li>Walmart</li> <li>Real Canadian Super Store</li> <li>Save-on-Foods<sup>3</sup></li> </ul>
<b>Group 3<sup>4</sup></b>	Halifax	Quebec City	<ul style="list-style-type: none"> <li>Walmart</li> <li>Wholesale Club<sup>5</sup></li> </ul>

While not every retailer carried every item sought (see table footnotes), this methodology generated eight comparative sets of products with 238 individual consumer product prices. Since not all stores in the groups carried both products, any non-matched products were removed from the list and 118 measured datapoints (price differences) were calculated. With non-matched products removed, a comparative set could also be evaluated based on the uniform basket of goods from the same retailer in each of the two communities of a group.

### Results: The Impact of EPR for PPP on Consumer Packaged Goods Prices

RRS did not find any evidence of correlation between the existence of an EPR for PPP program and product prices, when each comparative set of stores was analyzed, or when all data points were evaluated.

Figure 1 presents the price of the total basket of goods for each comparative set. Each set is represented by the two columns with matching colors. The non-EPR jurisdictions are displayed as a solid column and the EPR jurisdictions indicated by a striped pattern. Each set reflects a comparable basket of items<sup>6</sup>. For a local point of reference, RRS also compared two Oregon communities, Portland and La Grande<sup>7</sup>. This offers context demonstrating that the range of prices in Canadian provinces are similar to the range of prices within Oregon.

<sup>2</sup> Comparison was only available on 11 of the products from Safeway in Vancouver and Calgary. Loblaw and Walmart had all 17 products in both communities.

<sup>3</sup> Comparison was available on 16 of the products from Save-on-Foods in Edmonton and Winnipeg. Walmart and Real Canadian Super Store had all 17 products in both communities.

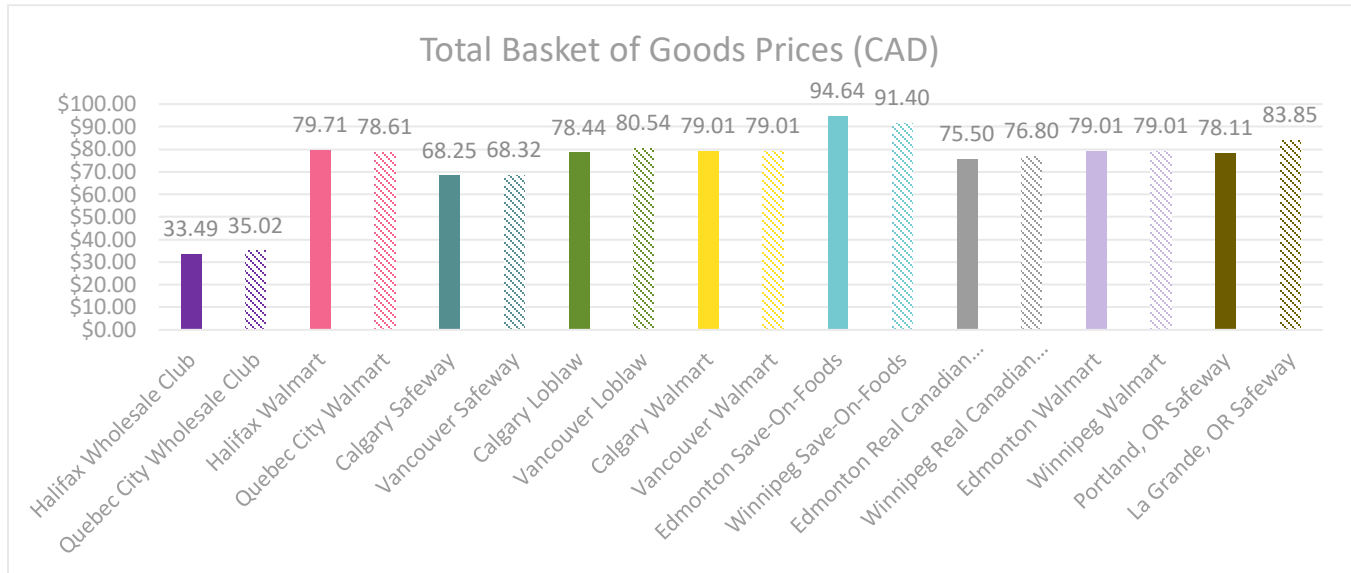
<sup>4</sup> The team was only able to identify two retailers with online shopping available in both communities in this group.

<sup>5</sup> Wholesale Club was the only retailer other than Walmart with online shopping capabilities in both communities. However, comparison was only available on seven of the products between Halifax and Quebec City from that store. Walmart had all 17 products in both communities.

<sup>6</sup> Not all products were available in every store. The total cart comparison between each community only includes the exact same items found in both stores in each community.

<sup>7</sup> Prices were converted to Canadian dollars

Figure 1. Total Cart Price for Each Comparison

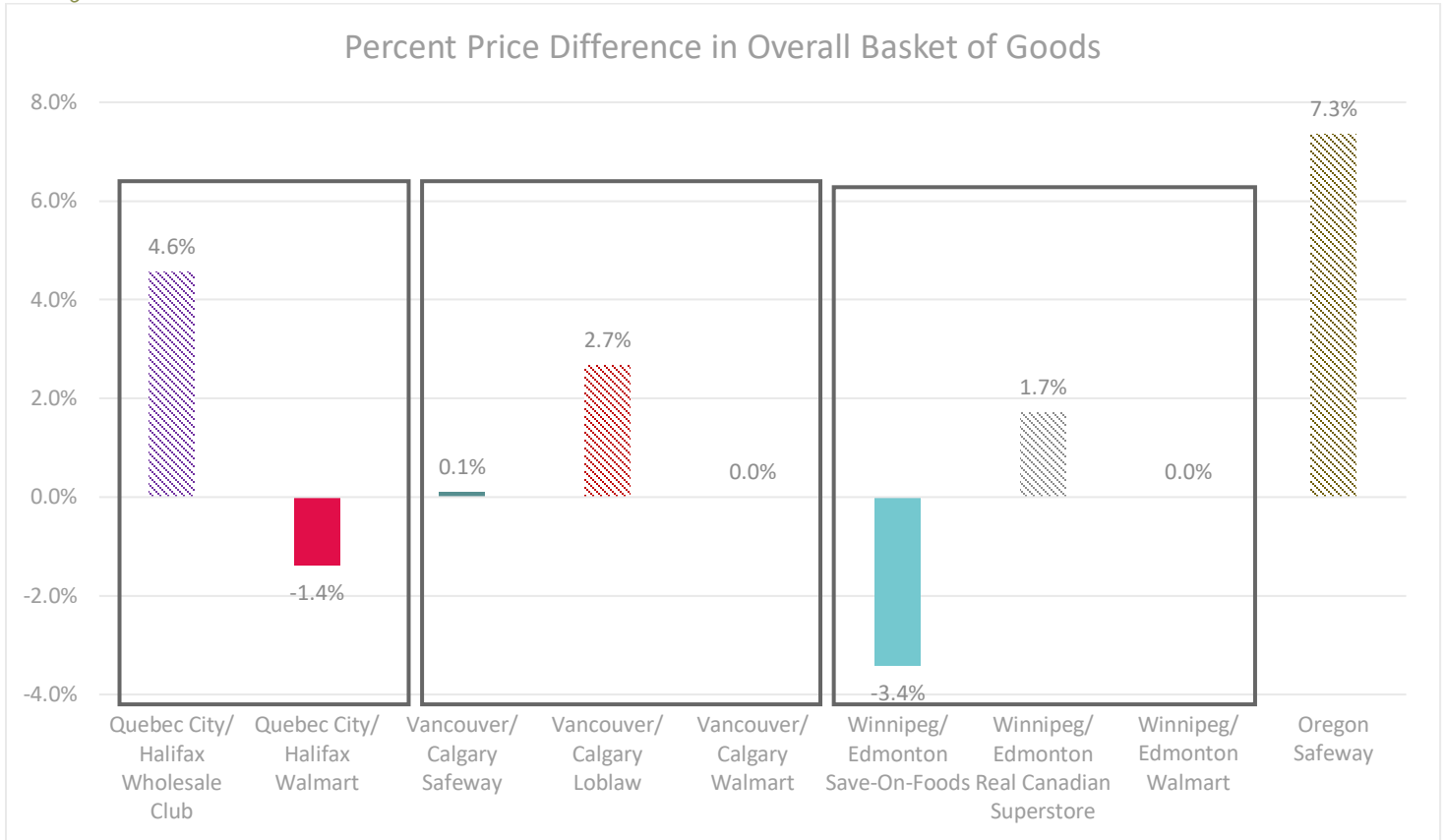


The data indicates that there is no consistent pattern of higher prices in jurisdictions with EPR policies, as compared to those without such policy. Of the eight comparative sets evaluated, four were higher in EPR jurisdictions (although one of those was only \$.07 higher, or 0.1% difference), two were lower in EPR jurisdictions, and two were exactly the same. Each group of stores also had a range of outcomes across the list of items, with no case where the EPR jurisdiction had consistently higher or lower prices than the non-EPR jurisdiction for the basket of goods evaluated. Figure 2 summarizes the difference in basket of goods price per retailer for EPR jurisdictions compared to the non-EPR jurisdiction. Notably, the most significant price difference in a comparative set was the difference between the two Oregon stores studied, where the basket of goods studied in La Grande cost \$5.74 more than the same products purchased in Portland.

Given the lack of clear correlation between higher prices and the existence of EPR policy, it is likely that pricing is driven by other economic factors, such as energy or labor costs, local taxes, distance from distribution hubs, competition, or other operating expense differences. Evaluating the potential impact of such differences was outside of the scope of this project.

Appendix A provides more detail on the price study, including the prices of all items identified at all locations studied, organized by grouping.

Figure 2. Percent Price Difference for Full Basket of Goods at Retailers in EPR versus Non-EPR Jurisdictions



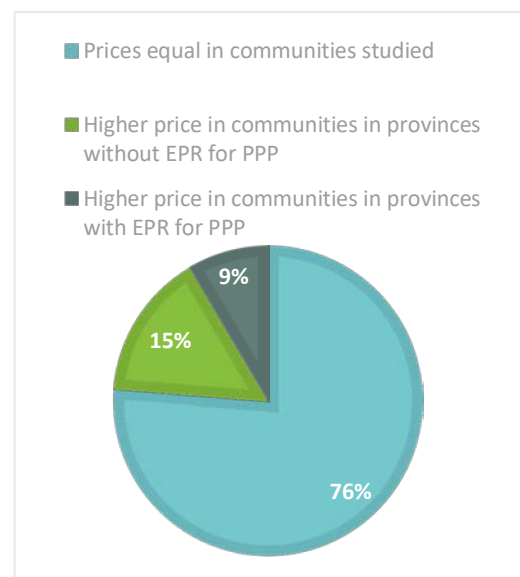
Note: Positive values (hatched bars) indicate higher price in the EPR jurisdiction store (except Oregon); negative values (solid bars) indicate higher price in the non-EPR jurisdiction store. The Oregon bar shows the difference in price in the La Grande Safeway compared to a Portland Safeway

Table 3 and Figure 3 present all price difference datapoints for matched products, that is, products within a group for the same retailer. The data show that more than three quarters of matched product prices were the same, regardless of the community they were purchased in. Product prices were more often higher in communities located in provinces without EPR for PPP policy, than in communities in provinces with EPR for PPP.

Table 3. Price differences in items studied

	Number of products	
Prices equal in communities studied	90	76%
Higher price in communities in provinces without EPR for PPP	18	15%
Higher price in communities in provinces with EPR for PPP	10	9%
<b>Total</b>	<b>118</b>	<b>100%</b>

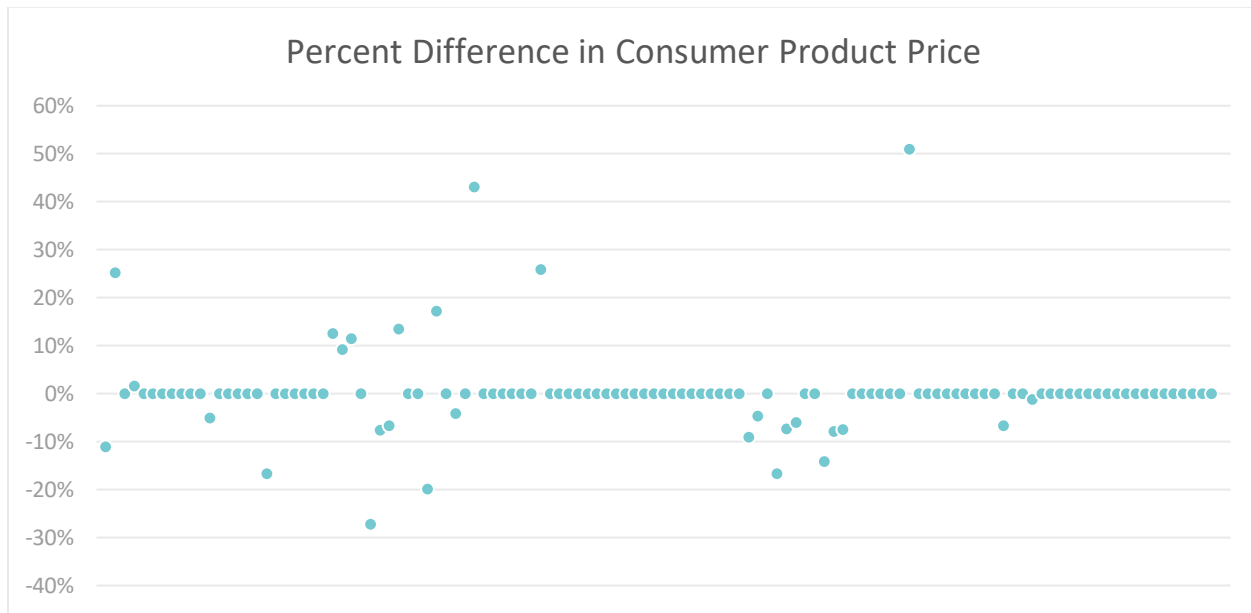
Figure 3. Price differences in items studied



However, while there were more instances where the price of an item was higher in the non-EPR jurisdiction when compared to the EPR jurisdiction, some of the price differences were greater in the EPR jurisdictions. On average, the sum of prices in EPR jurisdictions were very slightly higher, with an average price increase of \$0.0056 per item purchased. As noted above, it is not clear whether these increases are due to the presence of EPR or other economic or geographical factors.

Figure 4 combines all data points into one scatter plot. The points show the difference in price for each matched product – i.e. M&M’s at Walmart in Vancouver versus M&M’s at Walmart in Calgary, or Folgers Coffee in Real Canadian Superstore in Winnipeg versus Folgers Coffee in Real Canadian Superstore in Edmonton<sup>8</sup>. Items with prices that are the same in communities in provinces with and without EPR for PPP are plotted along the 0% line. A positive percentage change reflects an instance where a product had a higher price in the community that has EPR for PPP policy. A negative percentage change reflects an instance where a product had a lower price in the community with EPR for PPP. Figure 5 presents the same data in a histogram, which displays a tightly peaked normalized curve, also indicating no clear correlation between EPR and prices. If the data supported a correlation between the presence of EPR for PPP policy and product price, it would show as an observable trend displaying more data points above 0% and a positively skewed distribution in the histogram.

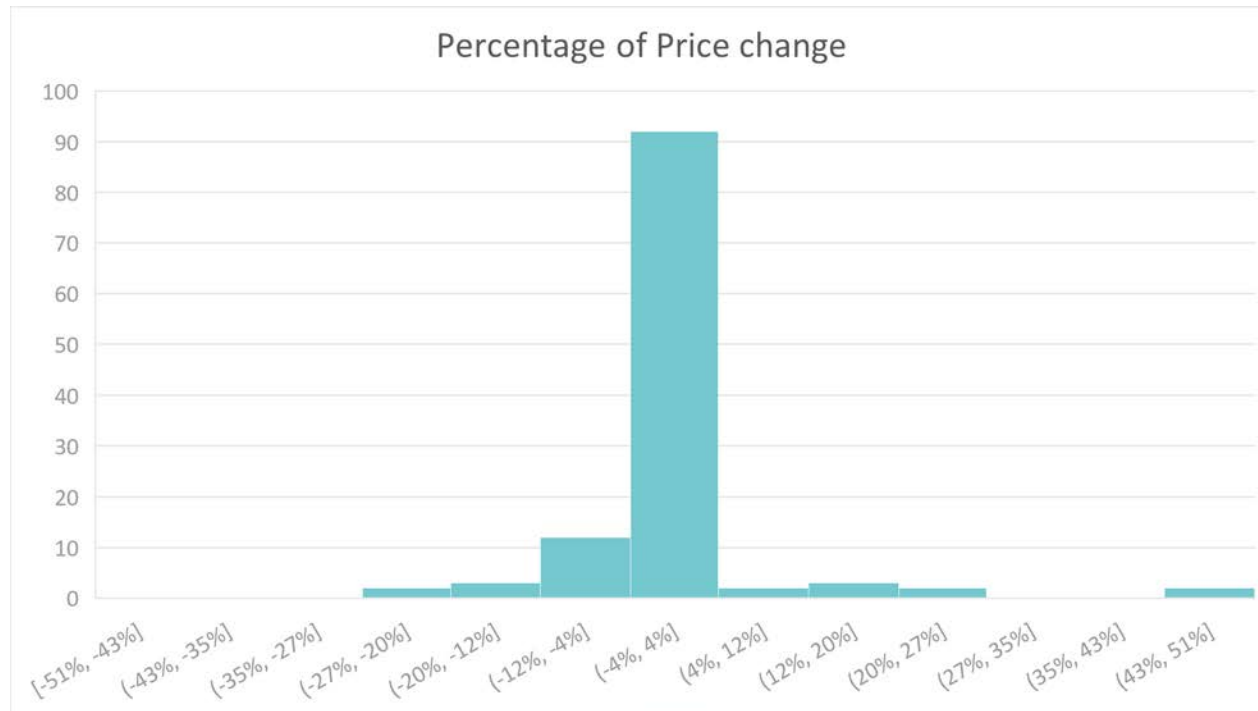
Figure 4. Price Differentials of Matched Products, Expressed as a Percentage Change in Product Price



Note: Positive values indicate a higher price in jurisdictions with EPR for PPP policy; negative values indicate a higher price in the jurisdiction without EPR for PPP policy

<sup>8</sup> Percent Change = 100\*(EPR Price/non-EPR Price)-1

Figure 5. Frequency of Pricing Differentials Between EPR and Non-EPR Comparison Communities (percentage of price change)



Note: Positive values indicate a higher price in jurisdictions with EPR for PPP policy; negative values indicate a higher price in the jurisdiction without EPR for PPP policy

### EPR Fees

As a part of this analysis, the research team calculated the EPR program fees paid on each of the items studied in the three jurisdictions evaluated (BC, MN, QC) to better understand the scale of the fees as compared to product price. The team acquired the items on the list, weighed each component of the packaging, and calculated the fees based on each program's fee schedule. Table 4 presents the fee, the average price at the stores studied within the province, and the percentage of the total price that the EPR fee represents. The items with the highest relative fees correspond with the heaviest packaging (glass, large HDPE tub) and multi-material substrate (spiral wound can).

Table 4. EPR Fees in Jurisdictions Studied

Product	BC			Quebec			Manitoba		
	Avg Price	Fee / Item	% of Product Price	Avg Price	Fee / Item	% of Product Price	Avg Price	Fee / Item	% of Product Price
Earth Balance Butter	\$ 7.27	\$ 0.02	0.28%	\$ 4.97	\$ 0.01	0.10%	\$ 6.15	\$ 0.01	0.15%
Hellman's Mayo	\$ 4.85	\$ 0.04	0.75%	\$ 4.22	\$ 0.01	0.28%	\$ 4.48	\$ 0.02	0.48%
Vlasic Zesty Dill Pickles	\$ 3.88	\$ 0.07	1.73%	\$ 2.97	\$ 0.07	2.28%	\$ 3.64	\$ 0.02	0.54%
Amy's Minestrone Soup	\$ 3.98	\$ 0.02	0.44%	\$ 3.97	\$ 0.01	0.25%	\$ 3.91	\$ 0.01	0.27%
Fancy Feast	\$ 0.82	\$ 0.01	0.65%	\$ 0.74	\$ 0.00	0.23%	\$ 0.73	\$ -0.007	-0.10%
Pringles	\$ 2.72	\$ 0.04	1.41%	\$ 2.01	\$ 0.01	0.65%	\$ 2.71	\$ 0.03	1.17%
Haagen-Dazs Vanilla Ice Cream	\$ 6.59	\$ 0.02	0.27%	\$ 6.47	\$ 0.01	0.09%	\$ 5.98	\$ 0.02	0.25%
Honey Bunches of Oats	\$ 5.02	\$ 0.03	0.63%	\$ 4.67	\$ 0.02	0.35%	\$ 4.75	\$ 0.02	0.51%
Classico Pasta Sauce	\$ 4.18	\$ 0.06	1.38%	\$ 3.27	\$ 0.06	1.79%	\$ 3.15	\$ 0.02	0.54%
Cinnamon Toast Crunch	\$ 7.00	\$ 0.05	0.70%	\$ 5.72	\$ 0.03	0.44%	\$ 6.05	\$ 0.04	0.62%
Colgate Total Mouthwash 1L	\$ 6.73	\$ 0.05	0.77%	\$ 5.97	\$ 0.02	0.30%	\$ 6.93	\$ 0.03	0.41%
Campbell's Chicken Broth	\$ 2.46	\$ 0.03	1.15%	\$ 1.94	\$ 0.01	0.41%	\$ 2.11	\$ 0.02	1.09%
Philadelphia Cream Cheese	\$ 4.61	\$ 0.01	0.27%	\$ 4.17	\$ 0.01	0.14%	\$ 4.48	\$ 0.01	0.15%
M&M's	\$ 7.23	\$ 0.01	0.11%	\$ 6.97	\$ 0.00	0.04%	\$ 7.91	\$ 0.00	0.04%
Folgers Classic Roast	\$ 11.02	\$ 0.12	1.05%	\$ 9.71	\$ 0.04	0.41%	\$ 8.80	\$ 0.07	0.81%
Aveeno Body Wash	\$ 7.97	\$ 0.05	0.64%	\$ 7.97	\$ 0.01	0.10%	\$ 8.75	\$ 0.03	0.38%
Lay's Classic Potato Chip	\$ 3.33	\$ 0.01	0.34%	\$ 3.17	\$ 0.00	0.12%	\$ 3.14	\$ 0.00	0.13%



Since the study found a slightly higher price in the total EPR basket of goods (\$0.0056 avg per item), RRS sought to determine if there is a relationship between price differences and the fees on the products that had price differences. If EPR fees resulted in higher prices, one would expect to see some correlation between the magnitude of the fee and the magnitude of the price increase.

RRS analyzed the price data points in each matched product to determine whether there is a correlation between higher fees and higher prices in the EPR jurisdictions. Figure 6 shows the relationship between the EPR fees for each product and the observed price difference within each group. A higher correlation between the EPR fee and price difference is reflected by an R<sup>2</sup> value approaching 1. An R<sup>2</sup> value approaching 0 indicates no correlation. The analysis yielded an R<sup>2</sup> value of 0.039, indicating no significant correlation.

Figure 6: EPR Fee for Each Product as Compared to Documented Price Difference

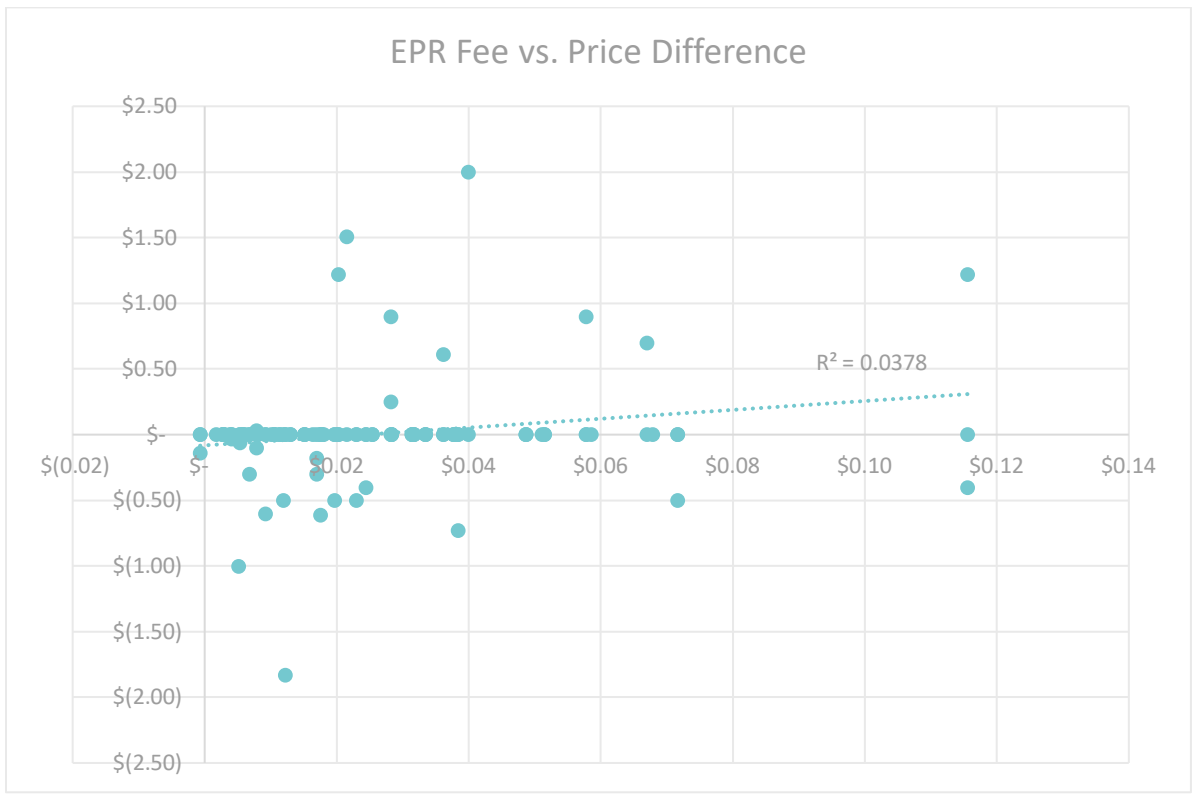


Table 5 presents data on the relationship between the magnitude of the EPR for PPP fee and price difference in Group 1 (Vancouver and Calgary). This group represents the highest EPR fees and the most instances of higher priced products in an EPR jurisdiction<sup>9</sup>. If there was a correlation between fees and price, one would expect the actual price differences to track the BC EPR fees for each item. The data shows that the actual price differences do not correspond to the EPR fees in any consistent pattern. It should be noted that averaging the prices across the stores may introduce an additional variable related to the pricing models of the different stores. The following table should be used for illustrative purposes only; it does not reflect any actual price modeling.

Table 5. Expected Versus Actual Differences in Vancouver and Calgary

	Vancouver (BC) Avg Price	Calgary (AB) Avg Price	BC EPR for PPP Fee	Actual Difference in BC vs AB	Actual Price Difference less EPR fee
Earth Balance Butter	\$ 7.27	\$ 6.87	\$ 0.02	\$ 0.41	\$ 0.39
Hellman's Mayo	\$ 4.85	\$ 4.64	\$ 0.04	\$ 0.20	\$ 0.17
Vlasic Zesty Dill Pickles	\$ 3.88	\$ 3.53	\$ 0.07	\$ 0.35	\$ 0.28
Amy's Minestrone Soup	\$ 3.98	\$ 3.98	\$ 0.02	\$ -	\$ (0.02)
Fancy Feast	\$ 0.82	\$ 0.84	\$ 0.01	\$ (0.02)	\$ (0.03)
Pringles	\$ 2.72	\$ 2.96	\$ 0.04	\$ (0.24)	\$ (0.28)
Haagen-Dazs Vanilla Ice Cream	\$ 6.59	\$ 6.79	\$ 0.02	\$ (0.20)	\$ (0.22)
Honey Bunches of Oats	\$ 5.02	\$ 5.02	\$ 0.03	\$ -	\$ (0.03)
Classico Pasta Sauce	\$ 4.18	\$ 3.88	\$ 0.06	\$ 0.30	\$ 0.24
Cinnamon Toast Crunch	\$ 7.00	\$ 7.00	\$ 0.05	\$ -	\$ (0.05)
Colgate Total Mouthwash 1L	\$ 6.73	\$ 6.73	\$ 0.05	\$ -	\$ (0.05)
Campbell's Chicken Broth	\$ 2.46	\$ 2.08	\$ 0.03	\$ 0.38	\$ 0.35
Philadelphia Cream Cheese	\$ 4.61	\$ 5.22	\$ 0.01	\$ (0.61)	\$ (0.62)
M&M's	\$ 7.23	\$ 7.23	\$ 0.01	\$ -	\$ (0.01)
Folgers Classic Roast	\$ 11.02	\$ 10.75	\$ 0.12	\$ 0.27	\$ 0.15
Aveeno Body Wash	\$ 7.97	\$ 8.48	\$ 0.05	\$ (0.51)	\$ (0.56)
Lay's Classic Potato Chip	\$ 3.33	\$ 3.33	\$ 0.01	\$ -	\$ (0.01)
<b>Sum</b>	<b>\$ 89.65</b>	<b>\$ 89.32</b>	<b>\$ 0.62</b>	<b>\$ 0.33</b>	<b>\$ (0.29)</b>

<sup>9</sup> Table 5 uses the average price for each item across all three the retailers in each jurisdiction

## Appendix A: Price Difference of Matched Products

Each of the figures below presents the price differences of matched products. A point with a positive value indicates that the price for that item at that store was higher in the jurisdiction with EPR for PPP policy. A point with a negative value indicates that the price for that item in that store was higher in the jurisdiction without EPR for PPP policy.

