_____

An Empirical Analysis of Beer Price Differentials between Ontario and Quebec

_____

Part II

Of a Two-Part Study Conducted for the Ontario Convenience Store Association

Anindya Sen[1]

Associate Professor

Department of Economics

University of Waterloo

---

[1] The author assumes responsibility for any errors. The opinions expressed in this study are exclusively those of the author's and do not reflect any official opinion of the Department of Economics at the University of Waterloo or the University of Waterloo.

Executive Summary

This study offers an analysis of data on beer prices for five major brands over a twenty-two week period in order to compare beer price differences between Ontario and Quebec. The motivation is to evaluate the magnitude of incremental profits enjoyed by The Beer Store because of its legislation-protected monopoly status.

- The Beer Store is a classic textbook example of a cartel, which in this case is paradoxically protected by provincial legislation. My results suggest that roughly $700 million in annual revenue earned by The Beer Store is *incremental* profit earned because of its monopoly status and ability to charge higher prices. These profits are captured by the foreign multinational companies that own The Beer Store.

- This is not an argument to cut beer prices, as there are arguments that higher prices may be useful from a social policy perspective. However, my findings highlight the concept that while Ontario earns the vast majority of its alcohol related revenue through the mark-up on liquor at the wholesale level of the LCBO (not the retail stores), it earns comparatively very little revenue from the sale of beer through The Beer Store.

- Further, this study is an understatement of other societal costs imposed by The Beer Store. First, the monopoly prices charged by it, implies the existence of deadweight loss – in other words, economic inefficiency in the marketplace. Second, there should be concerns on whether local brewers have sufficient access to shelf space and the opportunity to promote their brands, versus the brewers that own and control The Beer Store.

- My analysis focuses on beer prices for 24 bottle (341 ml) cases of beer. The data on beer prices were collected from two major grocery stores in Quebec and The Beer Store (in Ontario). I find that beer prices are virtually identical between different grocery stores in Quebec. However, there are significant differences between average Quebec and Ontario prices for each week, with the sample mean difference of roughly $9.50, or 27 percent. For example, the pre-tax average price for 24 bottle packs of brands including Molson Canadian, Molson Dry, Coors Light, Budweiser and Bud Light were $25.95 in Quebec and $35.56 at the Beer Store in Ontario.

- Empirical estimates from multivariate regression models demonstrate that a 1% increase in the price of a 24 bottle pack in Quebec is associated, on average, with a 1.7% rise in the corresponding price of the same product in Ontario. This finding is consistent with standard models of imperfect competition or market power. The policy implication is that a uniform cost shock in Ontario and Quebec - for example through the enactment of an additional Federal tax or levy or an increase in manufacturing or wholesale costs – would have a greater impact on retail prices in Ontario, relative to Quebec.

- These findings can be an important policy contribution to discuss the issue of alcohol retailing in Ontario given the relative dearth of studies that have compared actual beer prices for specific products across Canadian provinces over a relatively long time period.

I.   Government policy towards alcohol distribution

There are considerable differences in the precise mechanism of retail delivery, even among provinces, which have exclusive jurisdiction over the sale of alcohol. In Ontario, the Liquor Control Board of Ontario (LCBO) operates stores, which sell liquor and wine to the public and to commercial establishments.[2] While these stores do offer beer, they are primarily imported brands. The sale of domestic beer to retail customers and commercial establishments is conducted in large part through The Beer Store, which is a legal near-monopoly that is regulated by the Alcohol and Gaming Commission of Ontario (AGCO) but owned mostly by foreign brewers.[3] The Beer Store acts as a retail distribution network for all brewers and may even offer imported beer (purchased from the LCBO).[4] This is a unique arrangement that is not emulated by any other province. In contrast, retail alcohol (beer, wine, and liquor) in New Brunswick, Prince Edward Island, Nova Scotia, Saskatchewan, and Manitoba are sold by government-regulated stores. The Nova Scotia Liquor Company, NB Liquor Corporation, and P.E.I. Liquor Control Commission Manitoba Liquor Control Commission, and the Saskatchewan Liquor and Gaming Authority are the liquor control agencies in these provinces. However, Alberta, Manitoba, Saskatchewan, and British Columbia allow the sale of beer in some licensed hotels. Finally, Newfoundland, Quebec, Ontario, New Brunswick, Alberta, and British Columbia allow retail sales by wineries.

---

[2] Convenience and grocery stores are allowed to sell alcohol in some rural areas in Ontario. But they are licensed by the LCBO and must follow LCBO regulation. Similarly, groceries are allowed to sell Ontario wine through boutique stores. These boutiques must also follow LCBO regulation.

[3] Specifically, 49% of the company is owned by the Labatt arm of Anheuser-Busch InBev of Belgium; 49% is owned by Molson Coors Brewing Company; and the remaining 2% is owned by Sleeman Breweries, which in turn is owned by Sapporo of Japan.

[4] According to Mysicka and McKendry (2013), The Beer Store sells roughly less than 80% of all beer in the province. The remainder is sold by the LCBO and retail outlets at breweries.

II.   **Estimating the effects of more competition on beer prices**

Previous Findings

The obvious question is whether there exist certain patterns in the prices of alcoholic beverages that might be attributable to differences in the mechanism of retail delivery. In this respect there are very few studies that have actually compared the product-specific prices of alcoholic beverages across provinces and over time. A reason of course is the difference in product offerings across, provinces, especially with respect to wine.

In terms of earlier research, West (2003) compares alcohol prices in Alberta, based on a January 1996 retail price survey and the October 1993 Alberta Liquor Control Board (ALCBO) General Stock Catalogue. He finds that prices, on average, increased over this sample period. Teno et al. (2013) exploit the natural experiment offered by the partial privatization of liquor retail stores in British Columbia. Increased densities of private liquor stores were associated with lower mean prices of beer and all alcohol, aggregated across brands at the store level. In other words, controlling for all else, enhanced competition and access is associated with lower prices. However, results from Campanella and Flanagan (2012) suggest the contrary. They collect data on beer (three domestic and two international brands), wine (three red wines and one white wine from three different wineries), and spirits (two whiskeys and two vodkas) from private outlets in Alberta and British Columbia and public catalogues of government-owned stores in British Columbia and Saskatchewan. Their analysis suggests that privatization and increased access in Alberta and British Columbia resulted in higher prices in the private liquor stores of these specific provinces.

The results from Campanella and Flanagan (2012) should be viewed with extreme caution. As the authors themselves note, their analysis is based on a non-scientific data sample.

Further, their selection of private stores does not seem to be based on a sufficiently random sample, raising the possibility that their results might be contaminated by sample selection bias. Finally, the authors do not reveal how many observations were collected in order to construct a mean price for each alcoholic beverage.

In contrast, the identifying variation and empirical strategy used by Teno et al. (2013) is much more convincing. They employ data over a relatively long time period and also employ a multivariate regression model that allows them to control for the potentially confounding effects of other potential determinants of alcohol prices. Specifically, the authors exploit variation across Local Health Areas (LHAs) by conducting a survey of prices charged by private liquor stores. This is accomplished by randomly choosing two stores for each of the 89 LHAs between June and October of 2010. A multivariate regression model is employed in which the effects of an increase in the density of local liquor stores are estimated with respect to alcohol prices. The authors also use controls for local median income, percent of aboriginal income, population density, and the density of local bars. Average alcohol prices are computed for 33 popular brands of alcoholic beverages, including 9 beers, 10 spirits, 12 wines, and 2 coolers. Their results demonstrate a statistically significant correlation between an increase in the density of private liquor stores and lower mean prices of beer and all alcohol, aggregated across brands at the store level.

In summary, it is appropriate to put more emphasis on the results of Teno et al. (2003) as they actually attempt to correlate the increase in the number of liquor stores (through privatization) on alcohol prices, which other studies have not attempted. Further, neither West (2003), nor Campanella and Flanagan (2012) employ a multivariate regression analysis, which is better suited to evaluating the effects of a control variable on an outcome, while allowing the

researcher to simultaneously control for the potentially confounding effects of other factors. This is not possible through a comparison of sample means.

Beer Prices in Ontario and Quebec

Given the paucity of relevant research, I collected data over a twenty-two week period (from December 2012 to May 2013) on pre-tax beer prices of comparable beer products in Ontario and Quebec.[5] The objective of this exercise is to evaluate the possible effects of allowing the sale of beer through convenience stores and groceries given that this is the major institutional difference in the retail delivery of alcohol between the two provinces. The perfect experiment, of course, would be to evaluate differences in prices in a 'treatment' jurisdiction that permitted the sale of beer through convenience stores and compare the differences to prices in a 'control' jurisdiction. All other characteristics between control and treatment jurisdictions would be similar. As this is not possible, I am forced to compare prices between two jurisdictions - one that allows beer to be sold through groceries and convenience stores (Quebec) and another in which beer is basically sold by a monopoly (Ontario).

I focus on actual before tax price differences between categories. Investigating before tax differentials is important as it yields a perspective on price distortions due to market power. It is possible to look at prices per litre of alcohol. However, such an approach hides actual price differences for specific products. For example, assume a market with two different types of beer, where a firm charges a low price for a beer with low demand and a high price for another beer with higher demand. Taking a per litre average across brands may give the result that average prices are low, which is inaccurate. While this paper does take averages across different brands,

---

[5] Minimum retail prices for a pack of 24 bottles of beer at 341 ml are virtually identical in Quebec and Ontario, facilitating a comparison of pre-tax prices.

all the brands studied are high demand products. Therefore, the results should not be skewed or biased. Finally, I note that adding retail sales taxes does not significantly alter any of my findings.

The products I employ are 24 bottle (341 ml) packs of Molson Canadian, Molson Dry, Coors Light, Budweiser, and Bud Light. The use of these brands is dictated by the availability of weekly price data from the websites of two large grocery retailers in Quebec- IGA and Metro. However, the use of these brands is relevant as they are among the top 10 brands sold by the Beer Store.[6] Corresponding prices for Ontario were collected from the website of the Beer Store. The average price for each of these products is given in Table 1.

Table 1: A comparison of average prices for 24 bottle packs for selected brands

	Quebec – IGA	Quebec – Metro	The Beer Store	Percent % difference in sample average prices between Beer Store and IGA	Percent % difference in sample average prices between Beer Store and Metro
Pre-tax Sample Average ($)	$26.08	$25.95	$35.56	27%	27%

Notes: The data for this comparison were collected on Monday morning of each week from the Quebec websites of IGA and Metro and the Beer Store from December 4th to May 21st. The averages are computed for 24 bottle (341 ml) packs of Molson Canadian, Molson Dry, Coors Light, Budweiser, and Bud Light. The price differentials are computed relative to the average Beer Store price.

---

[6] http://www.thebeerstore.ca/beers/big-10-brands.

The analysis in Table 1 reveals very strong differences in average prices for these specific categories between the Beer Store and grocery stores in Quebec. The price differences are large are roughly $9.5, or 27 percent. Unsurprisingly, using standard t tests of statistical differences between sample means, I am able to reject the null hypothesis of the equality of sample means between average prices posted by the Beer Store and corresponding average prices posted by IGA and Metro at the 1% level.

Figure 1: Price Differences Between Quebec and Ontario
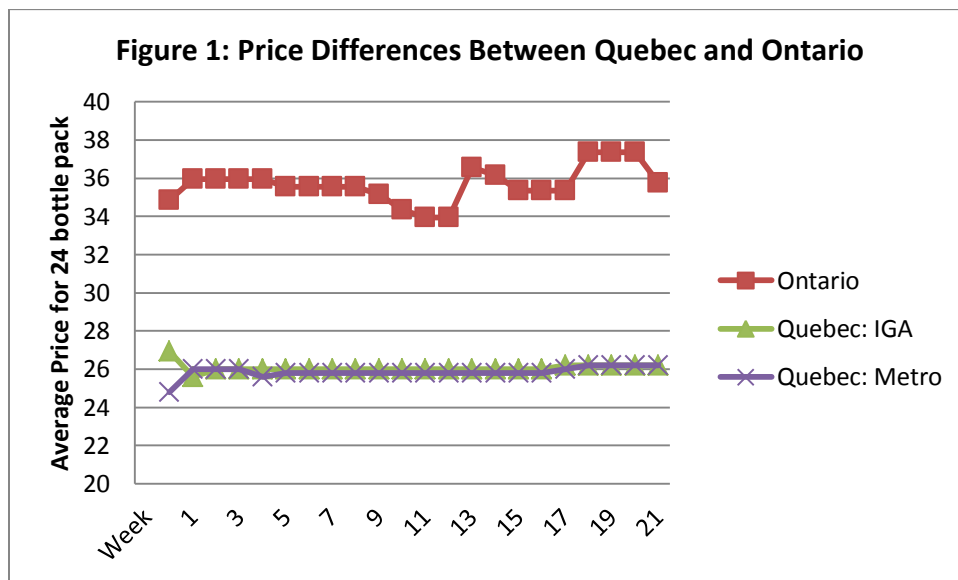
The above figure presents time-series trends in average beer prices with respect to the sample of five brands from The Beer Store and IGA and Metro, over the twenty-two week period. The fact that prices charged by IGA and Metro are virtually identical, is unsurprising. The data probably reflects the effects of competition and a close watch on prices by each firm. What is striking is the price gap between Quebec prices and those charged by The Beer Store, which ranges from a minimum of $5 to a maximum of $14.

There are obvious caveats to this analysis. We rely on a limited time-series sample as well as a relatively small number of categories. However, these are popular brands and the uniform difference between Quebec-Ontario prices is striking. Further, these differences are present for each week of our sample. Finally, to the best of our knowledge, we are unaware of the presence of any other factors, independent of market structure, such as economies of scale or scope or distribution or warehousing costs that might explain these large price differentials.

As a further sensitivity test, I employ a multivariate regression model in order to estimate average price differences between Quebec and Ontario beer prices (in our sample). The model takes the following form;

$$P_{\text{iot}} = \beta_0 + \beta_1 P_{\text{iqt}} + Z_{\text{h}} + B_{\text{i}} + T_{\text{t}} + \varepsilon_{\text{ijt}}$$

In the above model, P_{iot} is the price of a brand i in Ontario at time t. P_{iqt} denotes the corresponding price of same brand i (averaged across IGA and Metro stores) in Quebec at time t. B_{i} is a vector representing brand specific dummies while T_{t} is a vector of week specific dummy variables. The use of these dummy variables is meant to control for the potentially confounding effects of idiosyncratic brand or week specific shocks. ε_{ijt} is the error term which captures the effects of other unobservable factors that might impact beer prices in Ontario.

I run the model in levels as well as in natural logarithms. Converting the data into natural logarithms allows me to interpret the coefficients in terms of elasticities. Specifically, β_1 yields the percentage change in the beer price of a specific product associated with a corresponding 1% change in the price of the same product in Quebec. Otherwise, in a levels model β_1 yields the change in the beer price of a specific product associated with a corresponding $1 change in the

price of the same product in Quebec. It should be noted that coefficient estimates do not imply a causal relationship. Instead it gives an associated change in a particular direction as well an "on average" effect. In comparison to the analysis contained in Table 1, estimating the above model allows me to estimate conditional mean differences between Ontario and Quebec prices.

Table 2. OLS Estimates of the relationship between Ontario and Quebec Prices

	Levels	Natural Logs
	(1)	(2)
Average Quebec Price	2.308 (0.67)***	1.77 (0.517)***
Brand Dummies	Yes	Yes
Time Dummies	Yes	Yes
Adjusted R Square	0.575	0.5946
Obs	88	88

Notes: These regression estimates are based on a sample of 88 observations of four brands collected over a twenty two week period. Standard errors are in parentheses. *** denotes statistical significance at the 1% level.

The difference between columns is that column 1 contains estimates from a levels specification, while column 2 reports results from log-log regressions. The results from column 1 suggest that a $1 increase in pack prices in Quebec is significantly associated (at the 1% level) with a $2.3 increase in Ontario prices, on average, across different brands and over time. The estimates in column 3 reveal that a 1% increase in the price of a 24 bottle pack in Quebec is associated with a roughly 1.8% increase rise in the corresponding price of the similar product in Ontario. This relationship is statistically significant at the 1% level.

I offer a simple explanation of the importance of the above results. It is reasonable to assume that beer prices in Ontario and Quebec are impacted by similar factors – such as changes in the prices of inputs. An increase in the price of an input usually results in a higher retail price for the product. The above findings imply that the specific retail price effect for Ontario as a result of such a common shock – independent of federal and provincial taxes – is much more amplified relative to the change in the retail price in Quebec. While I cannot causally attribute this result to the differences in retail delivery between the two provinces, this finding is consistent with standard text book models, which clearly demonstrate that changes in retail prices in response to cost or input price shocks are greater in less competitive markets.

III.   Implications for Provincial Revenue

These results have significant implications for the amount of potential revenue – or social transfer - the province is losing from allowing beer to be sold by a retail monopoly. The difference in average beer prices between Quebec and Ontario, and specifically the consistently higher price in Ontario is most likely attributable to this specific monopoly system of distribution to consumers. With some further assumptions, these differences allow me to form estimates of the potential revenue lost by the province.
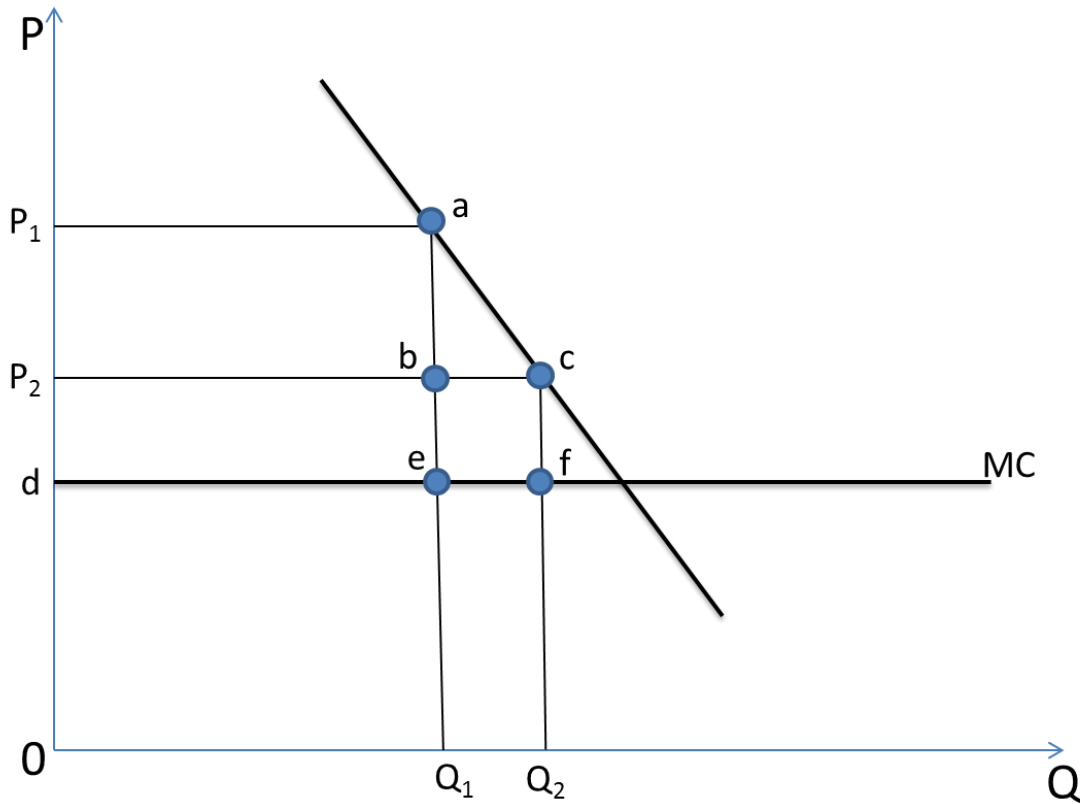
Figure 2

Figure 2 shows the demand curve for beer sold by The Beer Store. For simplicity I assume a constant marginal cost curve. Given the presence of retail market power, the average price per litre for beer is higher than marginal cost. Based on The Beer Store Operations Report of 2010, I take the average reported 2009 price (with tax) of $3.9 per litre paid by consumers as the benchmark.[7] The relevant counterfactual question is then, what would average per litre price be if the retail distribution was more competitive? My empirical analysis of Ontario-Quebec beer price differentials offers a plausible counterfactual price that is grounded in rigorous statistical analysis. Specifically, my analysis suggests a price difference of roughly twenty-seven percent

---

[7] Available at
http://www.thebeerstore.ca/sites/default/files/Operational%20Report/0432_TBS_OpsReport_May01.pdf.

between the two provinces. Assume a slightly lower figure of twenty-five percent. Therefore, the counterfactual average per litre beer price that would have occurred with more retail competition is \$2.925.[8] This price is still higher than marginal cost, as retailers still make profits from this lower price.

The actual per litre beer price in Ontario is given by P_1 in Figure 2, with corresponding aggregate demand denoted by Q_1. The counterfactual price and aggregate demand are given by P_2 and Q_2, respectively. Hence, the amount of incremental profit earned by The Beer Store because of its monopoly status is the rectangle P_1P_2ab. This rectangle allows me to form estimates of the amount of surplus that is *lost* by consumers because of the market power that The Beer Store is allowed to exercise. In 2009, The Beer Store sold more than 7,250,000 hectolitres (725,000,000 litres of beer). I assume that Q_1= 725,000,000 litres. Therefore, on an annual basis, \$706,875,000 ((\$3.9-\$2.925) * 725,000,000) of consumer surplus is transferred to The Beer Store, because of its protected monopoly status.

There are, of course, other inefficiencies arising from market power. Both producers and consumers experience deadweight loss from higher prices. For the sake of simplicity, I ignore the deadweight loss experienced by consumers (triangle abc) and producers (rectangle bcef). This is because the objective of this analysis is to evaluate the magnitude of virtual monopoly profits enjoyed by The Beer Store in the absence of *significant retail competition* at the expense of *consumers*. These profits are over and above reasonable margins that are to be expected, and should be earned by industry participants.

IV.   Conclusions and Policy Implications

There are obvious reasons as to why this lost surplus should be of concern. This amount is going directly from consumer pockets to a consortium with majority ownership by foreign

---

[8] This is because (3.9-2.925)/3.9 = 0.25.

based firms. The first finding of policy importance is the significant price difference between Ontario and Quebec. Higher prices are an opportunity cost to consumers, as savings from lower prices may always be used for other productive ends. Second, a relevant point is the degree that such profits are actually re-invested in the province, given the presence of majority ownership by foreign controlled firms. Third, it affects the *additional* amount of social transfer revenue that could be earned by the province.

To clarify, the province does earn revenue from excise and value added taxes on beer. However, unlike the case of the LCBO, the province obviously does not receive significant portions of the net revenue earned by The Beer Store. In their recent study, Mysicka and McKendry (2013) state, " the financial benefits of regulation should accrue to public and not private interests (as is the case with the LCBO, for example)." This is good policy and should be carefully considered by policymakers.

There are caveats that should be noted. An analysis of price differentials across more categories is certainly desirable, but difficult because of data access. More data would also enable a sophisticated estimation of the demand curve, and allow me to add further sensitivity tests. However, it is unlikely that the central conclusions of this research would change. A recent study conducted by Ipsos Reid on behalf of Canada's National Brewers, suggests that beer prices in Ontario and Quebec are comparable. However, another price comparison check contradicts the Ipsos Reid study and finds remarkably similar results to this study. QMI Agency compared prices in both Ottawa and Gatineau (Quebec) and found that for every brand compared, "a 24-pack of beer was at least $5 cheaper in Quebec, and Ontarians could often save as much as $15

by shopping in Gatineau. A case of Stella Artois sells for $46.95 at The Beer Store, but the same brand can be picked up at a Gatineau IGA grocery store for just $27.99."[9]

The Beer Store is a classic textbook example of a cartel, which is paradoxically protected by provincial legislation. It is also a very good illustration of the George Stigler (1971) theory of regulation, which predicts that industry may be able to appropriate surplus from consumers through government policy originally intended to *protect* consumers. Therefore, the results of this study are unsurprising. In such a regime, significantly higher prices should be the norm. What is perplexing is the willingness of consumers or government to accept them. Further, the results of this study are an understatement of other costs of the present system of retail beer distribution. As noted, higher prices result in deadweight loss, which I have not quantified. Smaller breweries conceivably have difficulties in accessing shelf space and ensuring that their products receive recognition, and have a reasonable probability of attracting consumer interest. This affects their bottom lines and negatively impacts the financial health of our own Canadian products.

---

[9] http://www.ottawasun.com/2013/06/29/despite-new-study-ottawa-beer-drinkers-still-say-they-shop-in-quebec

References

Camapanella, David and Greg Flanagan (2012). "Impaired Judgement: The Economic and Social Consequences of Liquor Privatization in Western Canada." Report by the Canadian Centre of Policy Alternatives, available at http://www.policyalternatives.ca/sites/default/files/uploads/publications/Saskatchewan%20Office/2012/10/Impaired_Judgement_Oct2012.pdf.

Mysicka, Robert and Marty McKendry (2013). "Beer, Butter, and Barristers:How Canadian Governments Put Cartels before Consumers. C.D. Howe Commentary Number 382, available at http://www.cdhowe.org/pdf/Commentary_382.pdf.

Stigler, G.(1971). "The Theory of Economic Regulation." *Bell Journal of Economics and Management Science*, 2, pp. 3 – 21.

Treno, Andrew, William R. Ponicki, Tim Stockwell, Scott Macdonald, Paul J. Gruenewald, Jinhui Zhao, Gina Martin, and Alissa Greer (2013). "Alcohol Outlet Densities and Alcohol Price: The British Columbia Experiment in the Partial Privatization of Alcohol Sales Off-Premise." Forthcoming, *Alcoholism: Clinical and Experimental Research*.

West, Doug (2003). "The Privatization of Liquor Retailing in Alberta" Study by the Fraser Institute, available at http://choiceforontario.com/uploads/ALCB_Privatization_Study.pdf.